View this document in HTML
crestron.com/docs/9496

Product Manual

DM NVX® AV-over-IP

Distribution Platform

Crestron Electronics, Inc.

Have feedback on this document? Contact docfeedback@crestron.com.

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

Regulatory Model: M202234002, M202028003, M202013001, M201910003

Crestron product development software is licensed to Crestron dealers and Crestron Service Providers (CSPs) under a limited nonexclusive, nontransferable Software Development Tools License Agreement. Crestron product operating system software is licensed to Crestron dealers, CSPs, and end-users under a separate End-User License Agreement. Both of these Agreements can be found on the Crestron website at www.crestron.com/legal/software_license_agreement.

The product warranty can be found at www.crestron.com/warranty.

The specific patents that cover Crestron products are listed online at www.crestron.com/legal/patents.

Certain Crestron products contain open source software. For specific information, please visit www.crestron.com/opensource.

Crestron, the Crestron logo, .AV Framework, 3-Series, AirMedia, Crestron Home, Crestron Toolbox, DigitalMedia, DM, DM NAX, DM NVX, DM NVX Director, QuickSwitch HD, and XiO Cloud are either trademarks or registered trademarks of Crestron Electronics, Inc. in the United States and/or other countries. Safari is either a trademark or registered trademark of Apple, Inc. in the United States and/or other countries. Dante is either a trademark or registered trademark of Audinate Pty Ltd. in the United States and/or other countries. Dolby, Dolby Atmos, Dolby Digital, and Dolby Vision are either trademarks or registered trademarks of Dolby Laboratories Licensing Corporation in the United States and/or other countries. DTS, DTS HD, and DTS:X are either trademarks or registered trademarks of DTS, Inc. in the United States and/or other countries. Chrome is either a trademark or registered trademark of Google Inc. in the United States and/or other countries. HDBaseT and the HDBaseT Alliance logo are either trademarks or registered trademarks of the HDBaseT Alliance in the United States and/or other countries. HDMI and the HDMI logo are either trademarks or registered trademarks of HDMI Licensing LLC in the United States and/or other countries. Intertek is either a trademark or registered trademark of Intertek Group in the United States and/or other countries. Active Directory is either a trademark or registered trademark of Microsoft Corporation in the United States and/or other countries. Firefox is ether a trademark or a registered trademark of the Mozilla Foundation in the United States and/or other countries. USB-C and USB Type-C are either trademarks or registered trademarks of USB Implementers Forum, Inc. in the United States and/or other countries. DisplayPort is either a trademark or registered trademark of Video Electronics Standards Association in the United States and/or other countries. UL is either a trademark or registered trademark of Underwriters Laboratories, Inc. in the United States and/or other countries. Other trademarks, registered trademarks, and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Crestron disclaims any proprietary interest in the marks and names of others. Crestron is not responsible for errors in typography or photography.







©2025 Crestron Electronics, Inc.

Contents

What's New? 1

Getting Started 3

- Multiview 3
  - Multiview on an Encoder 5
  - Multiview on a Decoder 6
- Installation Content (Quick Start Guides) 8
- Specifications 9
- Web Interface Configuration 9
- Network Design and Configuration 9
- Point-to-Point DM NVX Streaming 9
- Change Encoder/Decoder Mode 10
- Starting a Network Stream 10

Overview 13

- Products 13
- Card-Based AV-over-IP Endpoints 14
  - Products 14
  - DM-NVX-350C 15
  - DM-NVX-351C 22
  - DM-NVX-352C 29
  - DM-NVX-360C 36
  - DM-NVX-363C 42
  - DM-NVX-384C 49
  - DM-NVX-385C 56
  - DM-NVX-D30C 64
  - DM-NVX-E30C 68
  - DM-NVX-E760C 72
- DM NVX Director® Switching Appliances 77
  - Products 77
  - DM-NVX-DIR-80 77
  - DM-NVX-DIR-160 78
  - DM-NVX-DIR-ENT 80
  - DM-NVX-DIR2 83
  - Physical Description 85
- Room Box AV-over-IP Endpoints 89
  - Products 89
  - DM-NVX-350 90
  - DM-NVX-351 97
  - DM-NVX-352 104
  - DM-NVX-360 111
  - DM-NVX-363 118

DM-NVX-384 ... 125
DM-NVX-385 ... 132
DM-NVX-D10 ... 140
DM-NVX-D20 ... 144
DM-NVX-D200 ... 148
DM-NVX-D30 ... 152
DM-NVX-E10 ... 156
DM-NVX-E20 ... 160
DM-NVX-E30 ... 164
DM-NVX-E760 ... 168
Wall Plate AV-over-IP Endpoints ... 173
Products ... 173
DM-NVX-E20-2G ... 174

Applications ... 178

Community College 4K AV Distribution Network ... 178
4K Residential AV Distribution Network ... 180
4K Residential AV Distribution Network ... 181
4K AV Distribution Over Fiber ... 182

Specifications ... 184

Card-Based AV-over-IP Endpoints ... 185
DM-NVX-350C Specifications ... 186
DM-NVX-351C Specifications ... 191
DM-NVX-352C Specifications ... 196
DM-NVX-360C Specifications ... 201
DM-NVX-363C Specifications ... 206
DM-NVX-384C Specifications ... 211
DM-NVX-385C Specifications ... 216
DM-NVX-D30C Specifications ... 221
DM-NVX-E30C Specifications ... 224
DM-NVX-E760C Specifications ... 228
DM NVX Director® Switching Appliances ... 232
DM-NVX-DIR-80 Specifications ... 233
DM-NVX-DIR-160 Specifications ... 235
DM-NVX-DIR-ENT Specifications ... 237
DM-NVX-DIR2 Specifications ... 240
Room Box Models ... 242
DM-NVX-350 Specifications ... 243
DM-NVX-351 Specifications ... 250
DM-NVX-352 Specifications ... 257
DM-NVX-360 Specifications ... 264
DM-NVX-363 Specifications ... 271
DM-NVX-384 Specifications ... 278
DM-NVX-385 Specifications ... 285
DM-NVX-D10 Specifications ... 292

DM-NVX-D20 Specifications 296
DM-NVX-D200 Specifications 300
DM-NVX-D30 Specifications 305
DM-NVX-E10 Specifications 310
DM-NVX-E20 Specifications 314
DM-NVX-E30 Specifications 319
DM-NVX-E760 Specifications 325
Wall Plate Models 330
DM-NVX-E20-2G Specifications 331

Installation 337

Card Installation 338
In the Box 338
Install the Device into a DMF-CI-8 338
Connect the Device 340
Observe the LED Indicators 353
Reset the Device 356
DM NVX Director Switching Appliance Installation 358
In the Box 358
Mount the Device 358
Connect the Device 364
Observe the LED Indicators 364
DM-NVX-350, DM-NVX-351, and DM-NVX-352 Installation 366
In the Box 366
Mount the Device 367
Connect the Device 369
Observe the LED Indicators 372
Reset the Device 373
DM-NVX-360 and DM-NVX-363 Installation 374
In the Box 374
Mount the Device 375
Connect the Device 377
Observe the LED Indicators 380
Reset the Device 380
DM-NVX-384 and DM-NVX-385 Installation 382
In the Box 382
Mount the Device 383
Connect the Device 385
Observe the LED Indicators 387
Reset the Device 388
DM-NVX-D10, DM-NVX-D20, DM-NVX-E10, and DM-NVX-E20 Installation 389
In the Box 389
Mount the Device 390
Connect the Device 391
Observe the LED Indicators 393
Reset the Device 393

DM-NVX-D200 Installation 395
In the Box 395
Mount the Device 396
Connect the Device 398
Observe the LED Indicators 399
Reset the Device 400
DM-NVX-D30 and DM-NVX-E30 Installation 401
In the Box 401
Mount the Device 402
Connect the Device 404
Observe the LED Indicators 406
Reset the Device 406
DM-NVX-E760 Installation 408
In the Box 408
Mount the Device 409
Connect the Device 412
Observe the LED Indicators 414
Reset the Device 414
Wall Plate Installation 416
In the Box 416
Install the Device into an Electrical Box 416
Connect the Device 416
Observe the LED Indicators 418
Reset the Device 418

Configuration 420

Configuration (DM-NVX-35X Models) 421
Web Interface Configuration 421
Action 424
Status 433
Settings 439
Security 485
802.1X Configuration 492
Configuration (DM-NVX-36X Models) 494
Web Interface Configuration 494
Action 497
Status 506
Settings 512
Security 558
802.1X Configuration 565
Configuration (DM-NVX-38X Models) 567
Web Interface Configuration 567
Action 570
Status 579
Settings 585
Security 659

802.1X Configuration ... 666
Configuration (DM-NVX-D30, E30, and E760 Models) ... 668
Web Interface Configuration ... 668
Action ... 671
Status ... 680
Settings ... 686
Security ... 725
802.1X Configuration ... 732
Configuration (DM-NVX-D10, D20, D200, E10, and E20 Models) ... 734
Web Interface Configuration ... 734
Action ... 737
Status ... 745
Settings ... 751
Security ... 780
802.1X Configuration ... 787
Configuration (DM NVX Director Switching Appliances) ... 789
Web Interface Configuration ... 789
Action ... 793
Status ... 803
Network ... 805
Manage Certificates ... 809
Device ... 814
Dashboard ... 818
Add Domain ... 829
Global Domain Routing ... 851
Modifying a Domain ... 857

AV-over-IP Network Design ... 871

Minimum Network Requirements ... 871
Network Design Overview ... 871
Network Topologies ... 872
Star ... 873
Tree ... 873
Daisy Chain ... 874
Other Topologies and Network Functionality ... 875
Multicast Network Traffic ... 875
Protocol Independent Multicast (PIM) ... 876
Network Security ... 877
Network Design Considerations ... 878
System Installation ... 879
Endpoint Installation ... 880
Network Installation ... 881
Crestron Service Provider Handoff ... 882

Resources ... 883

Crestron Support and Training ... 883

Programmer and Developer Resources 883
Product Certificates 883
Related Documentation 883

What's New?

Updates to the DM NVX® AV-over-IP platform and this document are described below from newest to oldest.

September 30, 2025

- **Documentation Updates**
  - Added Applications on page 178 section.
  - Added diagrams to the Overview sections for the following devices:
    - DM-NVX-384 on page 125
    - DM-NVX-384C on page 49
    - DM-NVX-385 on page 132
    - DM-NVX-385C on page 56

July 22, 2025

- **DM-NVX-385 and DM-NVX-385C Announced.**
  - Refer to the DM-NVX-385 and DM-NVX-385C product pages for more information about these new DM NVX AV-over-IP endpoints.
- **Documentation Updates**
  - Added DM-NVX-385 and DM-NVX-385C specifications and installation instructions.
  - Added information regarding the new Multiview feature from firmware version 7.3.5 to Settings on page 585. Refer to the Routing heading for more information.

June 1, 2025

- **DM-NVX-DIR2 Announced**
  - Refer to the DM-NVX-DIR2 product page for information about this new DM NVX Director® switching appliance.
- **Documentation Updates**
  - Added DM NVX Director switching appliance content to this product manual. The previous product manual is still available here, but will no longer be updated. Refer to Getting Started on page 3 if you are not sure how to find content from the previous manual in this larger document.

- Added What's New section.
- Added DM-NVX-DIR2 specifications and installation instructions.

Getting Started

Welcome to the DM NVX® AV-over-IP Product Manual. This one-stop-shop manual replaces documents for each DM NVX endpoint and DM NVX Director® switching appliance. If this is your first time setting up DM NVX, or you are looking for content from these replaced documents, please refer to the headings below to get your DM NVX system up and running smoothly.

- Multiview on page 3
    - Multiview on an Encoder on page 5
    - Multiview on a Decoder on page 6
- Installation Content (Quick Start Guides) on page 8
- Specifications on page 9
- Web Interface Configuration on page 9
- Network Design and Configuration on page 9
- Point-to-Point DM NVX Streaming on page 9
- Change Encoder/Decoder Mode on page 10
- Starting a Network Stream on page 10

Multiview

DM NVX endpoint firmware 7.3.5 introduces support for the Multiview feature on the following models:

- DM-NVX-384
- DM-NVX-384C
- DM-NVX-385
- DM-NVX-385C

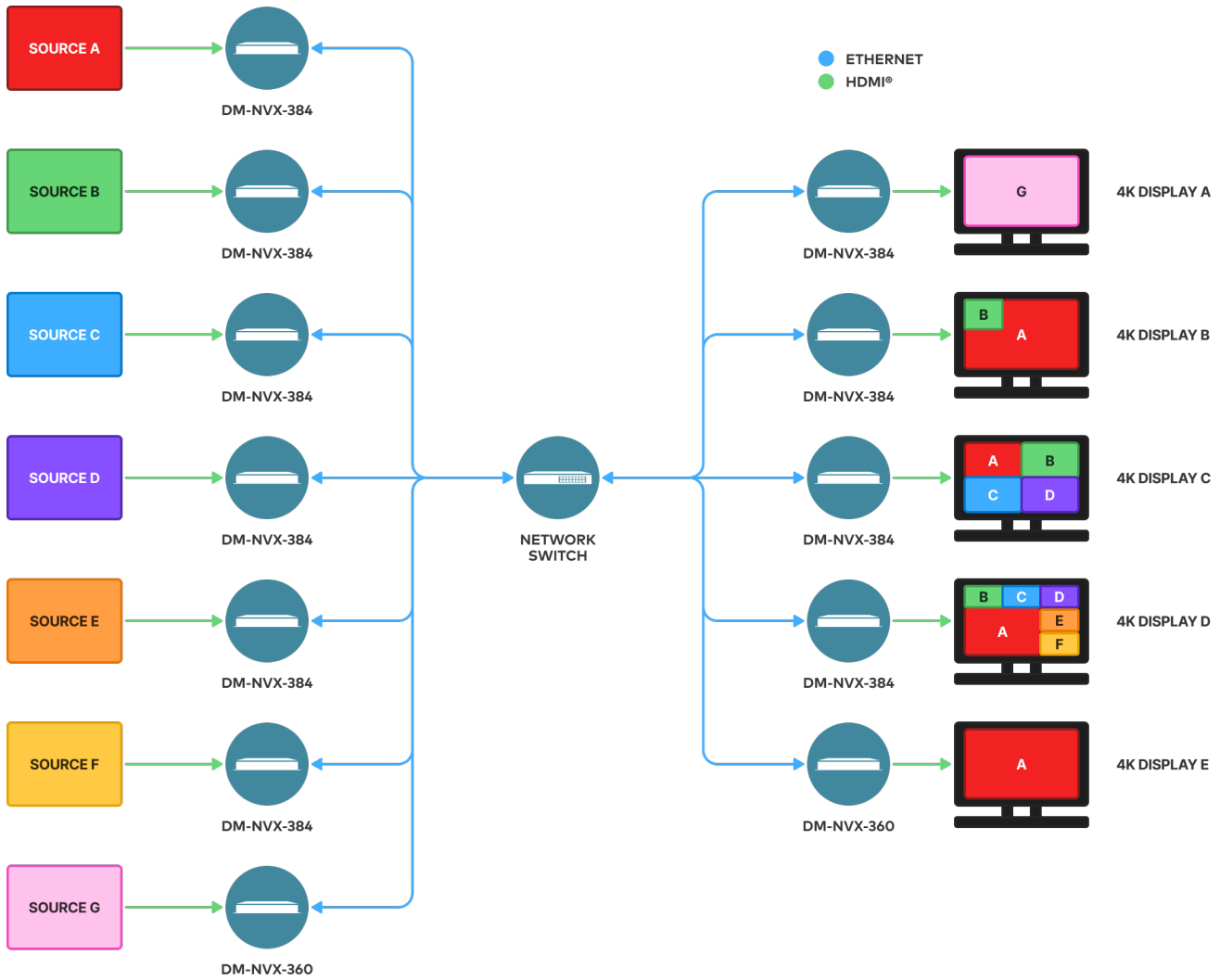
Multiview allows up to six DM NVX video streams to be combined into a single video output signal. The video signals are arranged in preconfigured layouts and feature the same Pixel Perfect image clarity of a standard DM NVX network stream.

> **NOTE:** Multiview is only supported on the models listed above.
>
> - Other DM NVX models cannot receive a Multiview stream.
> - The models listed above can still receive standard DM NVX streams from other models when Multiview is disabled or set to **Full Screen**.

The diagram below shows a mix of DM NVX models, highlighting which ones can receive specific streams and how those streams are combined into video outputs. To implement Multiview, the feature must be configured on both the encoders and decoders. The decoders shown are configured for specific layouts to receive different combinations of transmitter signals:

- **4K Display A:** The decoder is configured with the **Full Screen** layout to receive a standard DM NVX stream from Source G via a DM-NVX-360 encoder.
- **4K Display B:** The decoder is configured with the **PIP Small Top Left** layout to receive Multiview streams from Source A and Source B via two DM-NVX-384 encoders.
- **4K Display C:** The decoder is configured with the **2 Top 2 Bottom** layout to receive Multiview streams from Sources A-D via four DM-NVX-384 encoders.
- **4K Display D:** The decoder is configured with the **5 Around, 1 Large Bottom Left** layout to receive Multiview streams from Sources A-F via six DM-NVX-384 encoders.
- **4K Display E:** The decoder does not support Multiview, but is still receiving a standard DM NVX stream from Source A via a DM-NVX-384.

Multiview Signal Paths

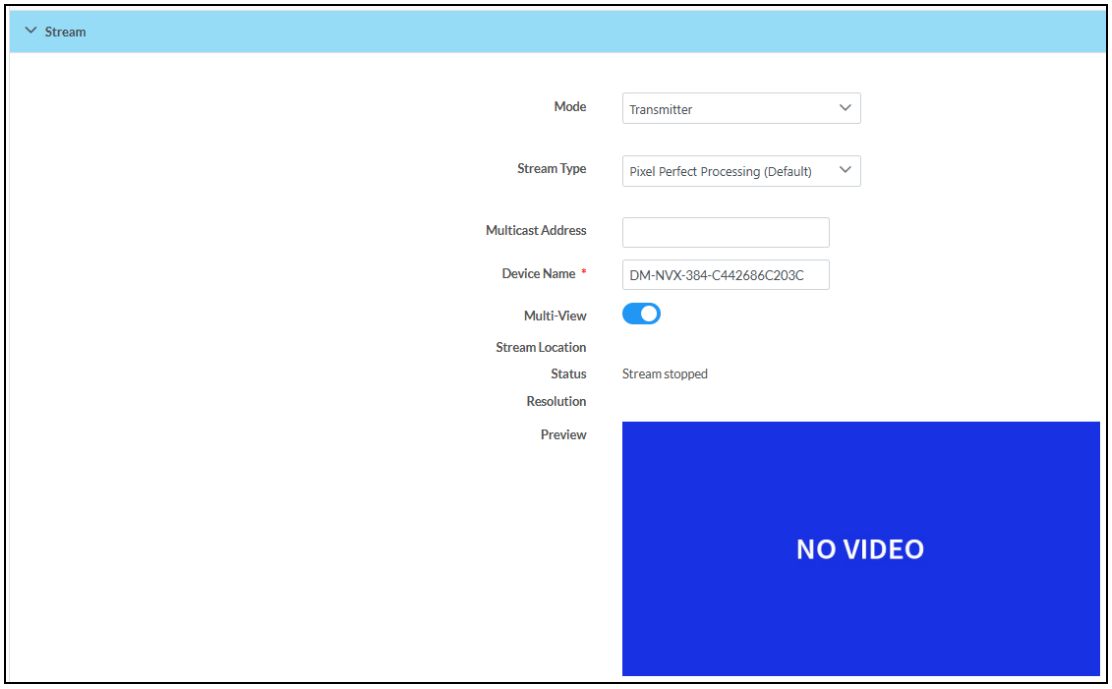


Multiview on an Encoder

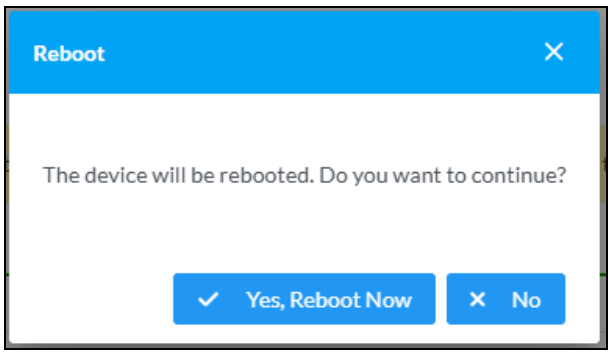
CAUTION: Enabling Multiview on an encoder device will generate an additional multicast stream and consume an additional multicast address. Ensure that three consecutive multicast addresses are available on the network to avoid multicast collisions. For example, if the main multicast address of the DM NVX encoder is set at 239.10.0.1, ensure that 239.10.0.2 and 239.10.0.3 are also available on the network. 239.10.0.2 will be used for the secondary audio stream and 239.10.0.3 will be used for the Multiview video stream.

To enable Multiview on an encoder:

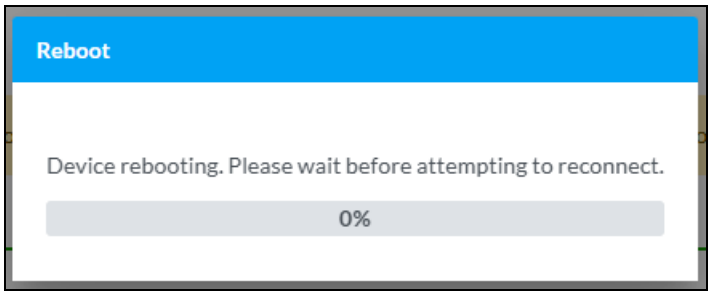
1. Access the web interface of the encoder device.
2. Navigate to the **Settings** tab.
3. Select the **Stream** accordion to expand the **Stream** settings.



4. Set the **Multi-View** toggle to the right. A **Reboot** confirmation dialog box will appear.



5. Select **Yes, Reboot Now** to reboot the device or select **No** to cancel the change. If **Yes, Reboot Now** was selected, a **Reboot** status box will appear.



6. Wait for the device to fully reboot before attempting to log in to the user interface. Once the reboot has completed, a Multiview video stream can begin transmitting from the device.

TIPS: Some additional considerations while streaming content with Multiview enabled are as follows:

- All supported resolutions of Multiview capable devices are supported up to 5120x2160p at 30 Hz 4:4:4. However, HDR, HDR10+, and Dolby Vision formats are not supported. These formats are excluded from the input EDID with Multiview enabled.
- Multiview supports HDCP content, but the display must support the highest HDCP level of all incoming Multiview signals to show it properly.
- Encoders with Multiview enabled can still transmit their standard DM NVX stream to other DM NVX endpoints not listed above. However, those endpoints cannot receive the Multiview stream. For example, if the standard multicast address of a DM-NVX-384 is set as 239.10.0.1 and its Multiview stream is set as 239.10.0.3, a DM-NVX-363 can receive the stream at 239.10.0.1 but not the stream at 239.10.0.3.

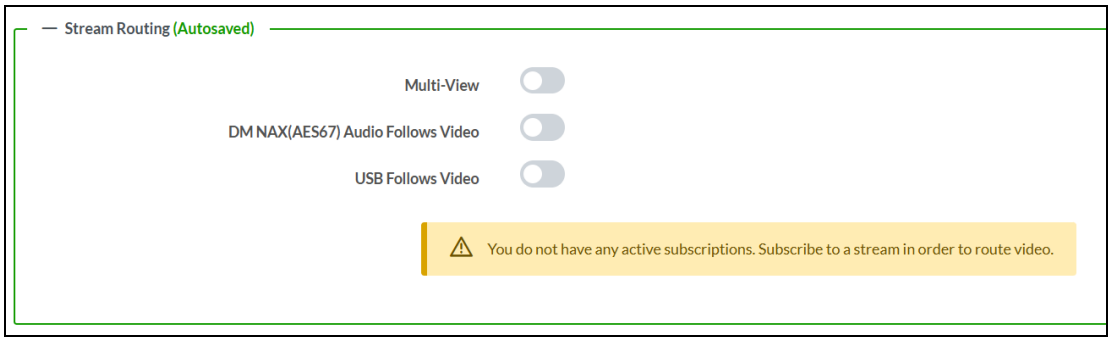
Refer to the **Stream** heading within Settings on page 585 for further information on configuring DM NVX transmit streams.

Multiview on a Decoder

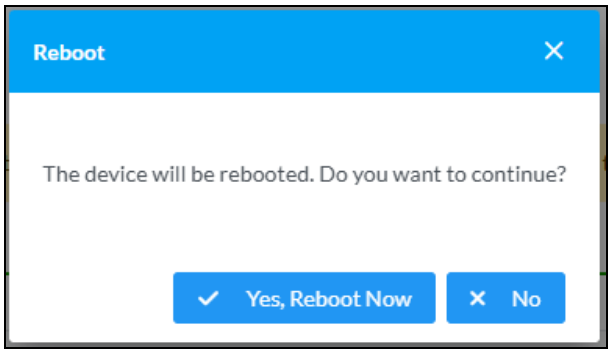
To enable Multiview on a decoder:

1. Access the web interface of the encoder device.
2. Navigate to the **Settings** tab.

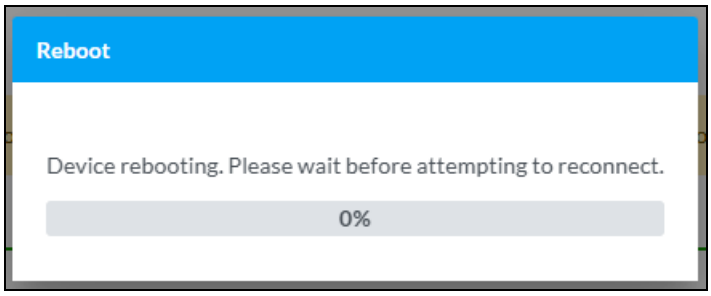
3. Select the **Routing** accordion to expand the **Stream Routing** settings.



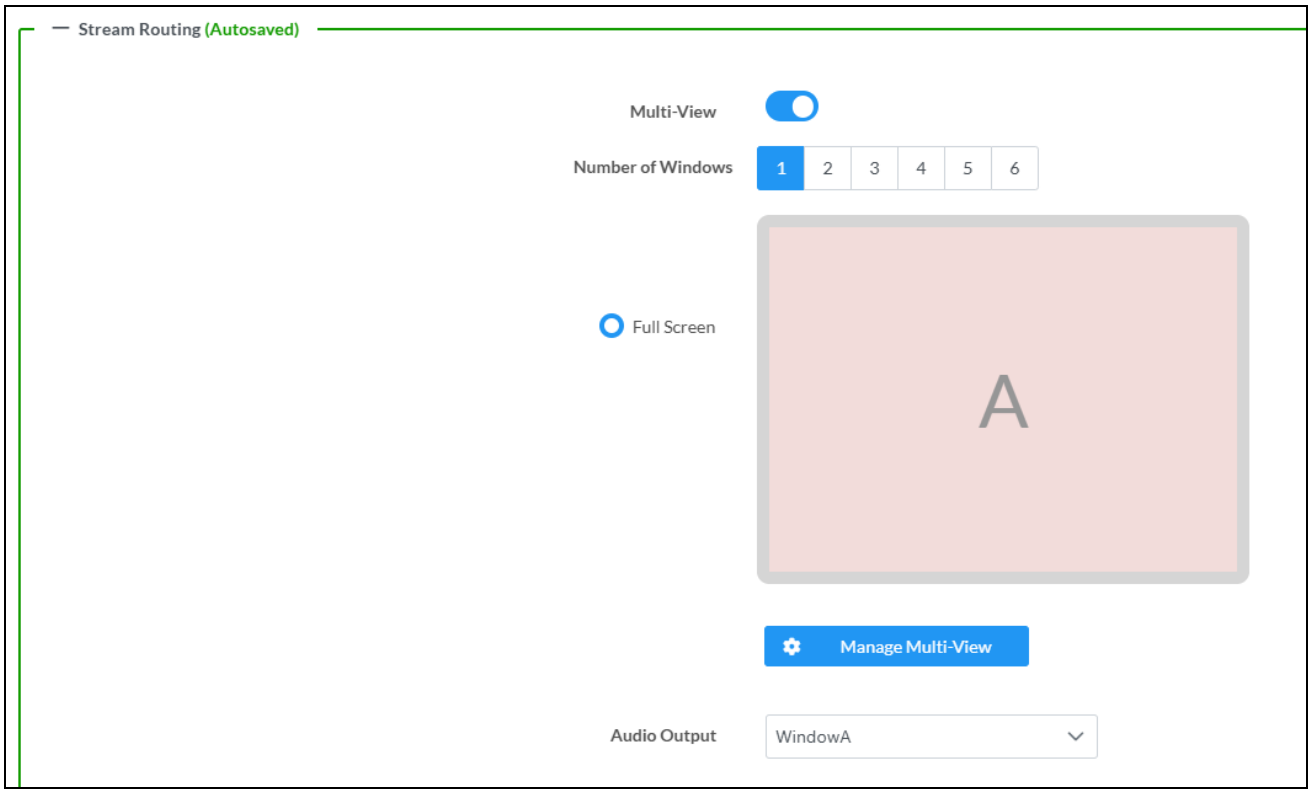
4. Set the **Multi-View** toggle to the right. A **Reboot** confirmation dialog box will appear.



5. Select **Yes, Reboot Now** to reboot the device or select **No** to cancel the change. If **Yes, Reboot Now** was selected, a **Reboot** status box will appear.



6. Wait for the device to fully reboot before attempting to log in to the user interface. Once the reboot has completed, further Multiview settings will be available in the **Stream Routing** section.



Configure additional Multiview settings that are available after rebooting:

- Select **Manage Multi-View** to open the **Manage Multi-View** window with the following settings:
  - **Transitions:** Select an effect such as a fade, stretch, zoom, or wipe to play on each window when switching sources. Each window can have a discrete transition applied.
  - **Text Overlay:** Apply a friendly name or description to each window (up to 18 characters), then select a location, font color, and background for the text.
  - **Window Border:** Apply a highlight to either a selected window or whichever window is actively playing audio. Select a color for the highlight and/or add a narrow black separation between all windows in the layout.
- Select a window from the **Audio Output** drop-down to route its associated audio signal to the audio output, or select **None** to mute all windows.

> **NOTE:** The connected display should be configured to receive a 4K 4:4:4 video signal. Displays configured to receive 4K 4:2:0 video may not properly display the Multiview video signal.

Refer to the **Routing** heading within Settings on page 585 for further information on configuring Multiview on a DM NVX decoder device.

Installation Content (Quick Start Guides)

Installation and connection instructions previously covered in individual Quick Start guides are now contained in a dedicated section for each DM NVX device and DM NVX Director appliance. Refer to

Installation on page 337 for a full list of the installation instructions covered in this manual, then select the desired model from the list.

Specifications

The specifications for each device are available on their respective product pages on the Crestron website, as are downloadable PDF files. For convenient reference, the specifications for all models covered in this manual are also available under Specifications on page 184.

Web Interface Configuration

All information regarding how to use each device's web interface is now contained in a dedicated configuration section. Refer to Configuration on page 420 for a full list of the configuration topics covered in this manual, then select the desired model from the list.

Network Design and Configuration

Refer to AV-over-IP Network Design on page 871 for the fundamentals of how to design and configure a network that can handle multicast, 1 Gbps AV-over-IP traffic.

Point-to-Point DM NVX Streaming

DM NVX AV-over-IP devices are typically used as encoders and decoders as part of a wider AV-over-IP network-based matrix. However, DM NVX devices also have a built-in point-to-point streaming function that allows two units to be used as an extender pair with only a single CAT5e (or higher) connection between them.

This point-to-point feature is set up to autodetect a stream out of the box, so there is no need to access the device's web interface to make any changes. This feature provides a quick proof-of-concept for a given signal chain to validate HDCP or resolution compatibility between a video source and sink. Point-to-point streaming can also be a permanent installation method to use DM NVX devices as signal extenders rather than matrix endpoints.

For point-to-point streaming to work, these basic conditions must be met:

- Both devices must have compatible resolution capabilities.
    - For example, a DM-NVX-E20 encoder cannot stream 4K60 4:2:0 video to a DM-NVX-D10 decoder.
    - Refer to Specifications on page 184 to confirm the capabilities of a given endpoint.
- One device must be an encoder and the other must be a decoder.
    - For devices that can operate in either mode, check the built-in LEDs to confirm which mode each device is in. To switch the operating mode of either device, refer to Changing Encoder/Decoder Mode below.

- The devices must be connected directly via 1000 BASE-T connections.
    - The SFP ports can be used for point-to-point streaming.
    - Some DM NVX devices feature a 100 BASE-TX port labeled **(10/100)** which will not provide sufficient link speeds to transmit or receive a DM NVX AV-over-IP signal.

Once these conditions are met and the DM NVX devices are powered on, point-to-point streaming from the encoder to the decoder should begin automatically.

The point-to-point feature can be disabled from the web interface of the DM NVX device. Refer to Configuration on page 420 and select the desired model for more information.

Change Encoder/Decoder Mode

Some DM NVX endpoints are capable of operating as either an encoder (transmitter) or decoder (receiver) - refer to Specifications on page 184 for the capabilities of each DM NVX device model.

The mode of these devices can be changed directly from the hardware of the device without ever needing to access the web interface. These devices are all in decoder mode by default.

Changing the encoder/decoder mode on a room box model DM NVX device (models that do not end in "C") is most easily done with the HDMI output of the device connected to a display, though this is not required. To change the mode:

1. Hold the **SETUP** button for 10 seconds. The **SETUP** LED will start to blink.
2. Press the **SETUP** button again. Following a device reboot, the device will have swapped to encoder mode from decoder mode or vice versa.
3. Check the **TX** and **RX** LEDs to ensure the device is in the desired mode.

To change the encoder/decoder mode on a card-based DM NVX device (models ending in "C"), use the front-panel menu of the DMF-CI-8:

1. Access the Main Menu by pressing the **HOME** button.
2. Select **Cards**. For each card slot (1–8), the corresponding name of the card is listed.
3. Select the desired card. The card status and configuration menu appears on the display for the selected card. The name of the card is displayed at the top of the screen.
4. On the card status and configuration menu, select **Device Mode**.
5. For the **Mode** parameter, select **Receiver** or **Transmitter**. The default setting is **Receiver**. A prompt appears on the display to either **Apply** or **Exit**.
6. Select **Apply**. The card reboots. When the reboot process is complete, the corresponding **TX** or **RX** LED on the front panel illuminates green to indicate that the card is in transmitter (**TX**) or receiver (**RX**) mode.

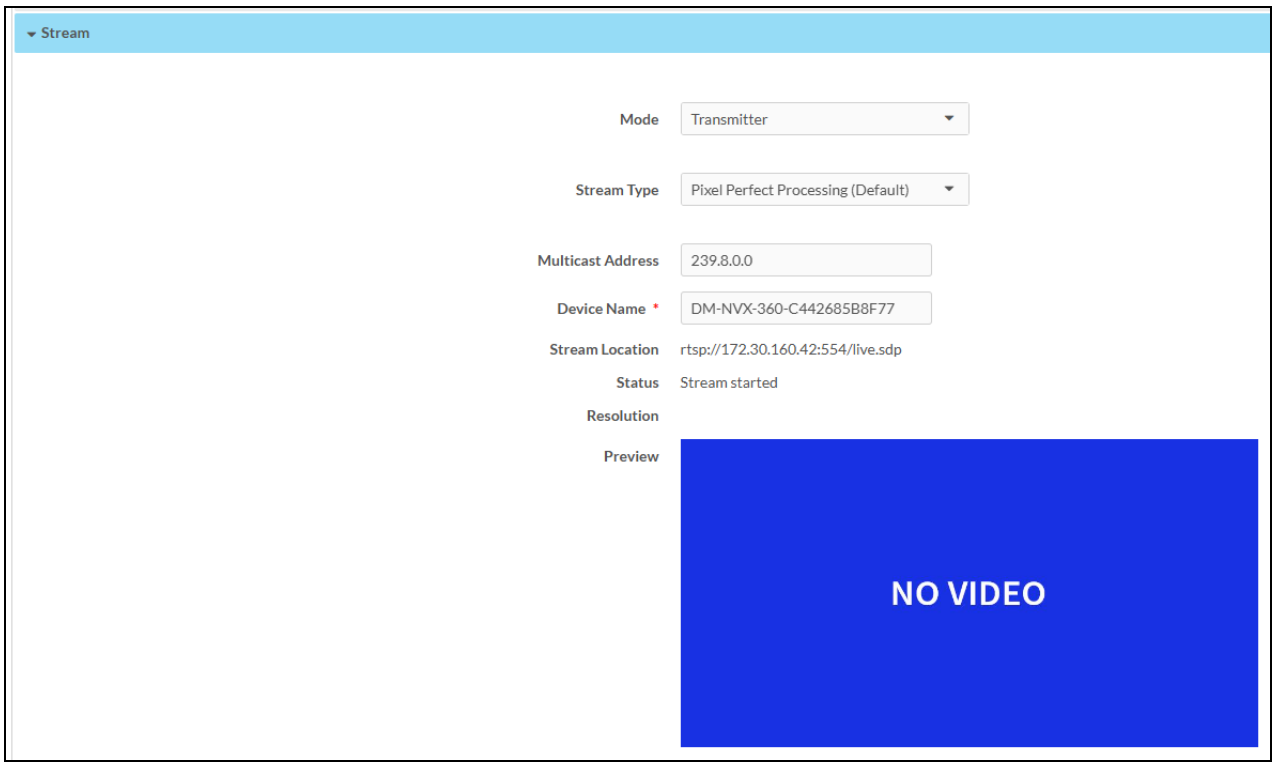
Starting a Network Stream

Once a DM NVX encoder is connected to a network and a video source is connected to it, its network stream can be initiated. This will allow the video from the encoder to be received by any number of decoders on the network.

CAUTION: This process assumes that the network is ready to receive multicast DM NVX AV-over-IP traffic. If the network is not properly configured to handle this traffic, starting a DM NVX stream can flood the network and take devices offline. Refer to AV-over-IP Network Design on page 871 for details on designing and configuring a network to handle multicast AV-over-IP traffic.

To start a DM NVX stream:

1. Access the web interface of the encoder device.
2. Navigate to the **Settings** tab.
3. Select the **Stream** accordion to expand the **Stream** settings.



4. Enter a multicast address in the **Multicast Address** field.

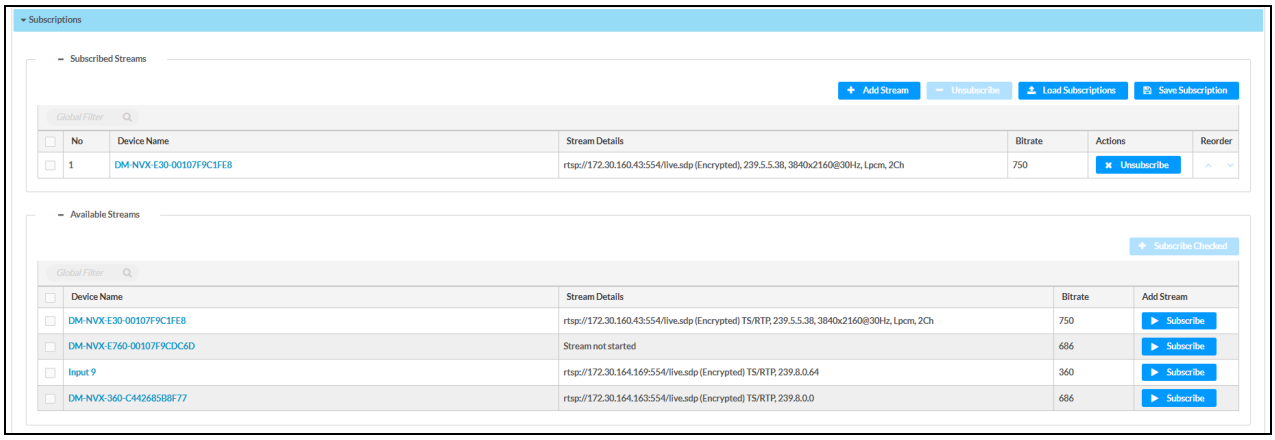
   NOTE: DM NVX devices can have a multicast transmit address anywhere in the range from 239.0.0.0 to 239.127.255.255. Starting at 239.1.0.0 is recommended to avoid common multicast MAC address conflicts. If multiple DM NVX encoders are present on the network, be sure the entered **Multicast Address** value is not already being used by another encoder.

   The DM NVX encoder will begin transmitting its video input signal as an AV-over-IP stream on the network at the specified multicast address.

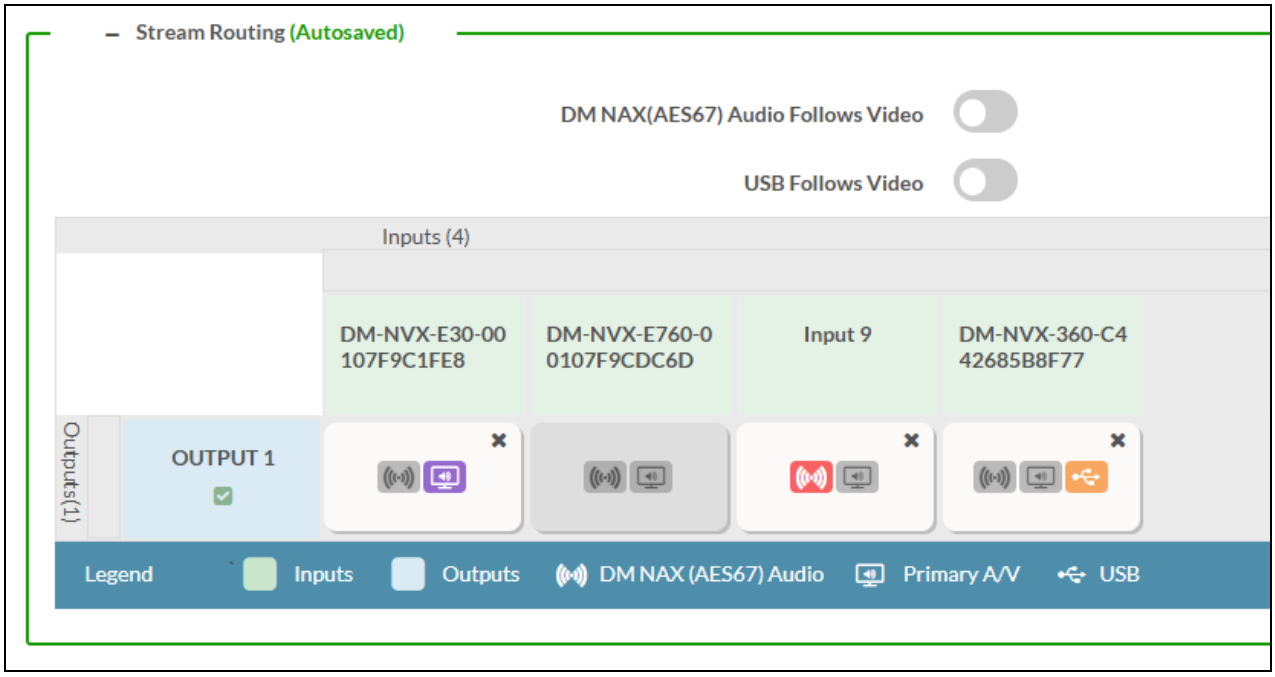
To receive this DM NVX stream at a decoder:

1. Access the web interface of the decoder device.
2. Navigate to the **Settings** tab.

3. Select the **Subscriptions** accordion to expand the **Subscriptions** table



4. Select the **Subscribe** icon for the stream in the **Available Streams** table. If the stream is not discovered automatically, the address can also be manually entered by selecting **+ Add Stream** from above the **Subscribed Streams** table.
5. Select the **Routing** accordion and open the **Stream Routing** matrix.



6. For the desired **OUTPUT** row of the DM NVX device, select the Primary A/V icon for the desired stream. Video will begin to pass.

Overview

DM NVX® AV-over-IP network encoders and decoders transport video, audio, and USB signals over standard Gigabit Ethernet. A range of devices across the lineup provides the flexibility to support up to ultra high-definition 4K video with 60 Hz frame rates and 4:4:4 color sampling. With devices supporting Pixel Perfect Processing technology, a video signal is encoded, transported across the network, and decoded to achieve imperceptible end-to-end latency of less than 1 frame.

DM NVX technology also supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. This allows a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. The platform also leverages AES67 and natively supports DM NAX® Audio-over-IP networking to discretely extract and route audio signals to a broad range of AES67 compatible devices.

Products

The following product categories are described in this product manual:

- Card-Based AV-over-IP Endpoints on page 14
- DM NVX Director® Switching Appliances on page 77
- Room Box AV-over-IP Endpoints on page 89
- Wall Plate AV-over-IP Endpoints on page 173

Card-Based AV-over-IP Endpoints

The card-based models in the DM NVX AV-over-IP family of hardware encoder and decoder endpoints are designed for installation into a DMF-CI-8 card chassis (sold separately), providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Products

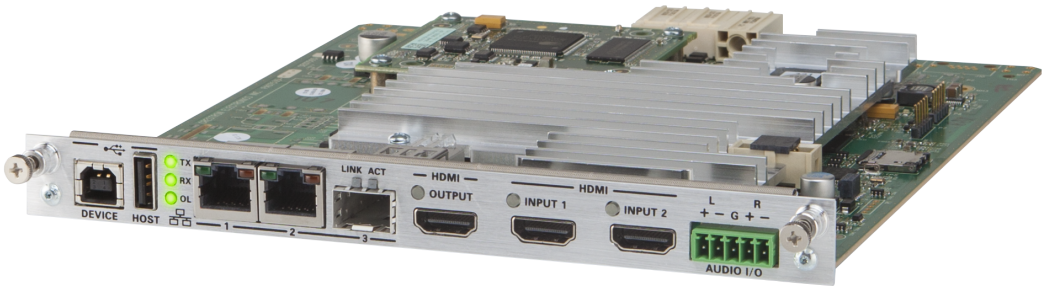
The following products are card-based DM NVX AV-over-IP endpoints:

- DM-NVX-350C on page 15
- DM-NVX-351C on page 22
- DM-NVX-352C on page 29
- DM-NVX-360C on page 36
- DM-NVX-363C on page 42
- DM-NVX-384C on page 49
- DM-NVX-D30C on page 64
- DM-NVX-E30C on page 68
- DM-NVX-E760C on page 72

DM-NVX-350C

The DM-NVX-350C is an AV-over-IP encoder/decoder card that occupies one slot of a DMF-CI-8 card chassis. The card is designed to function as either a transmitter or receiver in a high-density rack-mount installation. Capable of handling a network AV installation of any size, the DM-NVX-350C includes features such as secure web-based control and management, auto-switching HDMI® inputs, a scaling HDMI output, video wall processing, an analog audio input or output, native AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional onboard scaling, High Dynamic Range support (HDR10), and HDCP 2.2 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.2 compliant
- Configurable as an encoder or decoder
- Two auto-switching HDMI® inputs
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate

- Analog audio embedding or de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-350C can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1-Gigabit network at any resolution up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-350C is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-350C allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-350C receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-350C provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or via the DMF-CI-8 front panel.

Autoswitching HDMI® Inputs

The DM-NVX-350C includes two HDMI inputs. Switching between the two inputs can be performed automatically using auto-switching mode, programmatically via a control system, manually via the DMF-CI-8 front panel, or through a computer using a web browser.

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-350C is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-350C is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-350C enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-350C is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-350C is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

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. In decoder mode, the DM-NVX-350C can receive both multichannel and 2-channel downmix signals from an encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-350C includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-350C device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-351C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[8]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[9]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-350C provides a gateway for controlling devices via CEC over the HDMI connections. Under the management of a control system, the DM-NVX-350C can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-350C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

XiO Cloud® Service Support

The DM-NVX-350C is compatible with the XiO Cloud service, which is a platform for remotely provisioning, monitoring, and managing Crestron devices across an enterprise or an entire client base. The service enables installers and IT managers to deploy and manage thousands of devices in the amount of time it previously took to manage a single device. Refer to the XiO Cloud service feature page for more information.

High-Density, Card-Based Solution

The DM-NVX-350C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-350C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

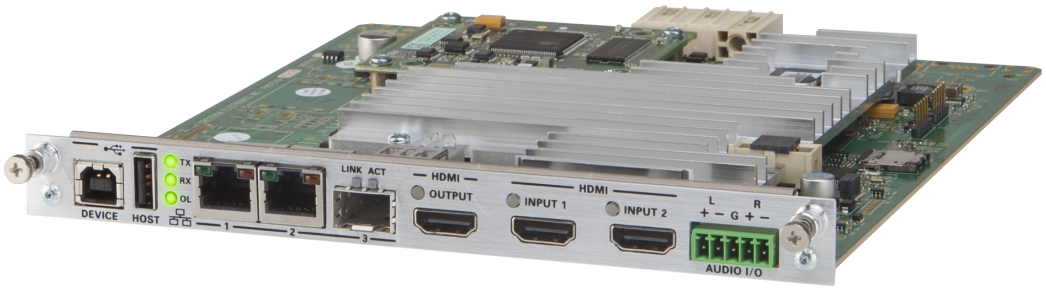
   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-350C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-350C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.

6. The analog audio port can function as an input or output, not both. Analog audio output is only functional when the DM-NVX-350C is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-351, DM-NVX-351C, DM-NVX-363, or DM-NVX-363C.
7. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The DM-NVX-350C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
9. The DM-NVX-350C is not compatible with the USB HID signal extender technology found in other Crestron DM products.

DM-NVX-351C

The DM-NVX-351C is an AV-over-IP encoder/decoder card that occupies one slot of a DMF-CI-8 card chassis. The card is designed to function as either a transmitter or receiver in a high-density rack-mount installation. Capable of handling a network AV installation of any size, the DM-NVX-351C includes features such as secure web-based control and management, auto-switching HDMI® inputs, a scaling HDMI output, video wall processing, an analog audio input or output, surround sound to stereo downmixing, native AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional on-board scaling, HDR (High Dynamic Range) support, and HDCP 2.2 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.2 compliant
- Configurable as an encoder or decoder
- Two auto-switching HDMI® inputs
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator

- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio support with downmixing
- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-351C can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-351C is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-351C allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-351C receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-351C provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or via the DMF-CI-8 front panel.

Autoswitching HDMI® Inputs

The DM-NVX-351C includes two HDMI inputs. Switching between the two inputs can be performed automatically using the built-in autoswitching mode, programmatically via a control system, manually via the DMF-CI-8 front panel, or through a computer using a web browser.

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-351C is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-351C is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-351C enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-351C is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-351C is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

7.1 Surround Sound Audio with Downmixing

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[7]. The DM-NVX-351C can decode the incoming multichannel surround sound signal, whether from the network or an HDMI input, and downmix that signal to stereo. The stereo downmix signal is automatically routed to the built-in analog output[6], while the HDMI output can be configured to output either stereo or multichannel signals. As an encoder, the DM-NVX-351C distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders.[8]

Copper and Fiber Ethernet Connectivity

The DM-NVX-351C includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-351C device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-351C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[9]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[10]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-351C provides a gateway for controlling devices via CEC over the HDMI connections. Under the management of a control system, the DM-NVX-351C can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-351C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

XiO Cloud® Service Support

The DM-NVX-351C is compatible with the XiO Cloud service, which is a platform for remotely provisioning, monitoring, and managing Crestron devices across an enterprise or an entire client base. The service enables installers and IT managers to deploy and manage thousands of devices in the amount of time it previously took to manage a single device. Refer to the XiO Cloud service feature page for more information.

High-Density, Card-Based Solution

The DM-NVX-351C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-351C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

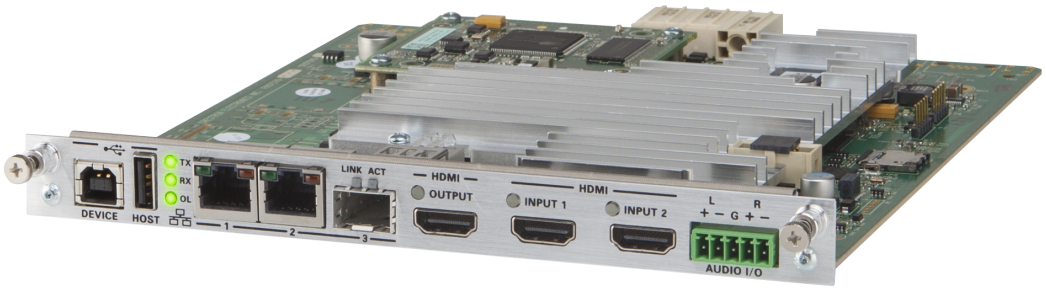
   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-351C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-351C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both

7. The DM-NVX-351C does not downmix Dolby Atmos MAT 2.0 audio.
8. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
9. The DM-NVX-351C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. The DM-NVX-351C is not compatible with the USB HID signal extender technology found in other Crestron DM products.

DM-NVX-352C

The DM-NVX-352C is an AV over IP encoder/decoder card that occupies one slot of a DMF-CI-8 card chassis. The card is designed to function as either a transmitter or receiver in a high-density rack-mount installation. Capable of handling a network AV installation of any size, the DM-NVX-352C includes features such as secure web-based control and management, auto-switching HDMI® inputs, a scaling HDMI output, video wall processing, an analog audio input or output, native Dante® or AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional onboard scaling, High Dynamic Range support (HDR10), and HDCP 2.2 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.2 compliant
- Configurable as an encoder or decoder
- Two auto-switching HDMI® inputs
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator

- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio support
- Dante or AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-352C can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1-Gigabit network at any resolution up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-352C is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-352C allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-352C receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-352C provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or via the DMF-CI-8 front panel.

Autoswitching HDMI® Inputs

The DM-NVX-352C includes two HDMI inputs. Switching between the two inputs can be performed automatically using auto-switching mode, programmatically via a control system, manually via the DMF-CI-8 front panel, or through a computer using a web browser.

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-352C is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-352C is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-352C enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-352C is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-352C is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

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. In decoder mode, the DM-NVX-352C can receive both multichannel and 2-channel downmix signals from an encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.

Dante® and DM NAX® Audio Embedding or De-embedding

Dante and AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel Dante or AES67 source while another 2-channel Dante or AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received Dante or AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received Dante or AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-352C includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-352C device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-351C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[8]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[9]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-352C provides a gateway for controlling devices via CEC over the HDMI connections. Under the management of a control system, the DM-NVX-352C can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-352C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

XiO Cloud® Service Support

The DM-NVX-352C is compatible with the XiO Cloud service, which is a platform for remotely provisioning, monitoring, and managing Crestron devices across an enterprise or an entire client base. The service enables installers and IT managers to deploy and manage thousands of devices in the amount of time it previously took to manage a single device. Refer to the XiO Cloud service feature page for more information.

High-Density, Card-Based Solution

The DM-NVX-352C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-352C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

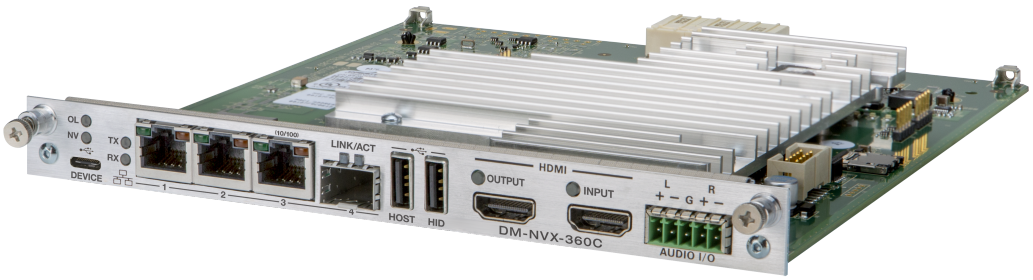
   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-352C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-352C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.

6. The analog audio port can function as an input or output, not both. Analog audio output is only functional when the DM-NVX-352C is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-351, DM-NVX-351C, DM-NVX-363, or DM-NVX-363C.
7. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The DM-NVX-352C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
9. The DM-NVX-352C is not compatible with the USB HID signal extender technology found in other Crestron DM products.

DM-NVX-360C

The DM-NVX-360C is an AV-over-IP encoder/decoder card that occupies one card slot in a DMF-CI-8 card chassis. The card is designed to function as either a transmitter or receiver in a high-density rack-mount installation. Capable of handling a network AV installation of any size, the DM-NVX-360C includes features such as secure web-based control and management, a scaling HDMI® output, video wall processing, an analog audio input or output, native AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional onboard scaling, HDR (High Dynamic Range) support, and HDCP 2.3 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI® input
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate

- Analog audio embedding or de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

DM NVX technology ensures real-time, full-motion 4K60 and 5K video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and using a mouse are fluid and natural. Line-synchronized outputs ensure synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-360C can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-360C is configurable to operate as either a network AV encoder or decoder. As an encoder, the connected media source can be transmitted over the network to one or many decoders. As a decoder, the device feeds the received signal to a connected display device, and can quickly switch between multiple encoder feeds. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or via the DMF-CI-8 front panel.

HDMI® Input

The DM-NVX-360C includes one HDMI input, which provides a convenient way to connect a source device to a DM NVX integrated system.

HDMI Output with 4K60 4:4:4 Scaler

Whether configured as an encoder or decoder, the built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device.[1, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-360C enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-360C is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-360C is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.

- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

7.1 Surround Sound Audio with Downmixing

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. In decoder mode, the DM-NVX-360C can receive both multichannel and 2-channel downmix signals from a DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.[6]

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders. Combining signals from two separate encoders is limited to 2-channel stereo audio.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-360C includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2), one RJ-45 100BASE-TX port (Ethernet port 3), and one SFP port (Ethernet port 4). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 4 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local

device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

An RJ-45 100BASE-TX port is included for connection to a dedicated audio network or for use as a convenience port.

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-360C device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-360C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[8]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[9]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs. DM NUX, USB-NX2, and USB-EXT DM devices do not support Layer 3.

Device Control

The DM-NVX-360C provides a gateway for controlling devices via CEC over the HDMI connections. Under the management of a control system, the DM-NVX-360C can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-360C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, DM-NVX-DIR-ENT, or DM-NVX-DIR2) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

High-Density, Card-Based Solution

The DM-NVX-360C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

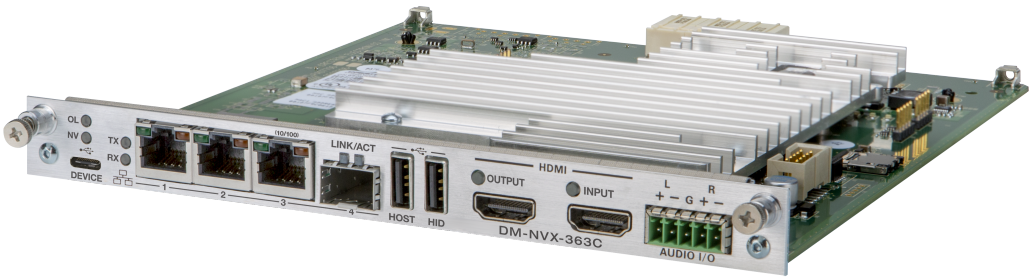
1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-360C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-360C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-360C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both. Analog audio output is functional only when the DM-NVX-360C is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C.
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The DM-NVX-360C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

DM-NVX-363C

The DM-NVX-363C is an AV-over-IP encoder/decoder card that occupies one card slot in a DMF-CI-8 card chassis. The card is designed to function as either a transmitter or receiver in a high-density rack-mount installation. Capable of handling a network AV installation of any size, the DM-NVX-363C includes features such as secure web-based control and management, a scaling HDMI® output, video wall processing, an analog audio input or output, native AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional onboard scaling, HDR (High Dynamic Range) support, and HDCP 2.3 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI® input
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate

- Analog audio embedding or de-embedding
- 7.1 surround sound audio with downmixing
- Dante® or AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-363C can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-363C is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-363C allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-363C receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-363C provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or via the DMF-CI-8 front panel.

HDMI® Input

The DM-NVX-363C includes one HDMI input, which provides a convenient way to connect a source device to a DM NVX integrated system.

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-363C is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-363C is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-363C enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-363C is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-363C is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

7.1 Surround Sound Audio with Downmixing

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 PCM6. The DM-NVX-363C can decode the incoming multichannel surround sound signal from the network or an HDMI input and then downmix that signal to stereo. The stereo downmix signal is automatically routed to the onboard analog output7, while the HDMI output can be configured to output either stereo or multichannel signals. As an encoder, the DM-NVX-363C distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.

> **NOTE:** The DSP of the DM-NVX-363C is compatible with Dolby Atmos audio using True HD or Dolby Digital Plus audio formats.

Dante® and DM NAX® Audio Embedding or De-embedding

Dante and AES67 support enables the selected audio source to be transmitted as a 2-channel Dante or AES67 audio stream while another 2-channel Dante or AES67 audio stream is received from a Crestron DSP or other third-party device and combined with the video signal.

In DM NVX encoder mode, the received Dante or AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received Dante or AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

> **NOTE:** A Dante or AES67 stream that is received by a DM NVX endpoint cannot be transmitted from that endpoint.

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders. Combining signals from two separate encoders is limited to 2-channel stereo audio.[8]

Copper and Fiber Ethernet Connectivity

The DM-NVX-363C includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2), one RJ-45 100BASE-TX port (Ethernet port 3), and one SFP port (Ethernet port 4). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 4 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

An RJ-45 100BASE-TX port is included for connection to a dedicated audio network or for use as a convenience port.

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-363C device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-363C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[9]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[10]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs. DM NUX, USB-NX2, and USB-EXT DM devices do not support Layer 3.

Device Control

The DM-NVX-363C provides a gateway for controlling devices via CEC over the HDMI connections. Under the management of a control system, the DM-NVX-363C can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-363C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

High-Density, Card-Based Solution

The DM-NVX-363C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-363C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

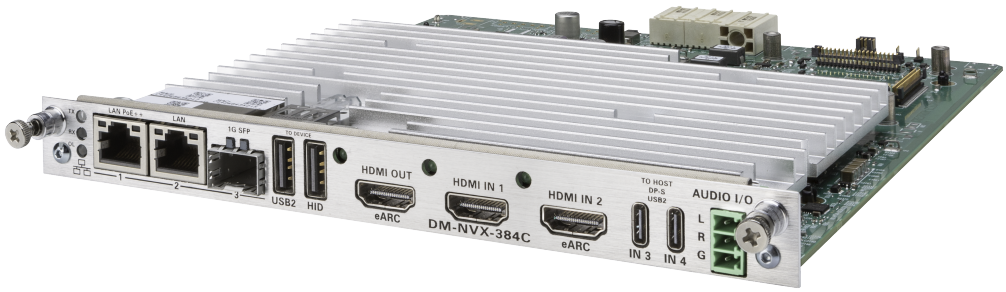
   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-363C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-363C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.

6. The DM-NVX-363C does not down-mix Dolby Atmos MAT 2.0 audio.
7. The analog audio port can function as an input or output, not both.
8. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
9. The DM-NVX-363C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. In encoder mode, the stream type of the DM-NVX-363C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-363C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

    In decoder mode, the proper stream type of the DM-NVX-363C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type of the DM-NVX-363C decoder. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type of the DM-NVX-363C decoder.

DM-NVX-384C

The DM-NVX-384C is a compact DM NVX® AV-over-IP encoder/decoder card that occupies one card slot in a DMF-CI-8 card chassis. The card is designed to function as either a transmitter or receiver in a high-density rack-mount installation. Capable of handling a network AV installation of any size, the DM-NVX-384C includes features such as secure web-based control and management, a scaling HDMI output, video wall processing, an analog audio input or output, native AES67 transmit and receive capability, surround sound audio, support for copper and fiber-optic Ethernet connectivity, and USB 2.0 and KVM integration.[1, 2]



- Two HDMI® and two USB-C® inputs
- 4K60 4:4:4 video over standard Gigabit Ethernet
- Support for 5K Wide (16:9), Ultra-Wide (21:9), and Super-Wide (32:9) resolutions
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Breakaway audio

- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- Designed for installation into a DMF-CI-8 card chassis

Multiview

The DM-NVX-384C supports Multiview, allowing up to 6 discrete video signals to be combined into a single video output. While operating as an encoder, the DM NVX device can send both a traditional DM NVX AV-over-IP stream and a Multiview AV-over-IP stream. The traditional stream is compatible with DM NVX decoders that do not support Multiview, allowing the same content to pass to any decoder simultaneously, regardless of Multiview support. Multiview streams are supported on a nonblocking 1 Gbps, meaning they do not require any additional network bandwidth compared to traditional DM NVX AV-over-IP streams.

HDMI® and USB-C® 4x1 Input Switching

The DM-NVX-384C includes two HDMI inputs and two USB-C inputs that comprise a 4x1 input switcher. Switching between the four inputs can be performed automatically using auto-switching mode, programmatically via a control system, or through the web interface. When mounted behind a conference room display device, the HDMI input provides a convenient way to connect a Crestron AirMedia® presentation gateway, video-conferencing codec, or small form factor computer. The USB-C inputs allow for a DisplayPort™ Alt Mode video connection to laptops that do not feature an HDMI connection. The USB-C connectors also pass USB 2.0 data back and forth from the host PC and other DM NVX or DM NUX endpoints.

Real-Time 4K60 Video Distribution

DM NVX technology ensures real-time, full-motion 4K60 and 5K video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and using a mouse are fluid and natural. Line-synchronized outputs ensure synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers.

Support for 5K Resolutions

The DM-NVX-384C includes support for 5K Ultra-Wide 5120 × 2160 and 5K Super-Wide 5120 × 1440 video resolutions, expanding the DM NVX product family's compatibility with the latest generation of computers, monitors, and displays.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-384C can encode or

decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-384C is configurable to operate as either a network AV encoder or decoder. As an encoder, the connected media source can be transmitted over the network to one or many decoders. As a decoder, the device feeds the received signal to a connected display device, and can quickly switch between multiple encoder feeds. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or via the DMF-CI-8 front panel.

HDMI Output with 5K Scaler

Whether configured as an encoder or decoder, the built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device.[4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Analog Audio Embedding or De-embedding

An unbalanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

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. In decoder mode, the DM-NVX-384C can receive both multichannel and 2-channel downmix signals from a DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.[6]

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

NOTE: An AES67 audio stream that is received by a DM NVX endpoint cannot be transmitted from that endpoint.

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders. Combining signals from two separate encoders is limited to 2-channel stereo audio.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-384C includes two RJ-45 1000BASE-T ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). Any Ethernet port can be used to transport video over a Gigabit Ethernet network. The ports can also be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 ports are provided on the DM-NVX-384C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint.[9]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, DM-NVX-DIR-ENT, or DM-NVX-DIR2) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

High-Density, Card-Based Solution

The DM-NVX-384C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-384C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.

2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-384C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-384C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The DM-NVX-384C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

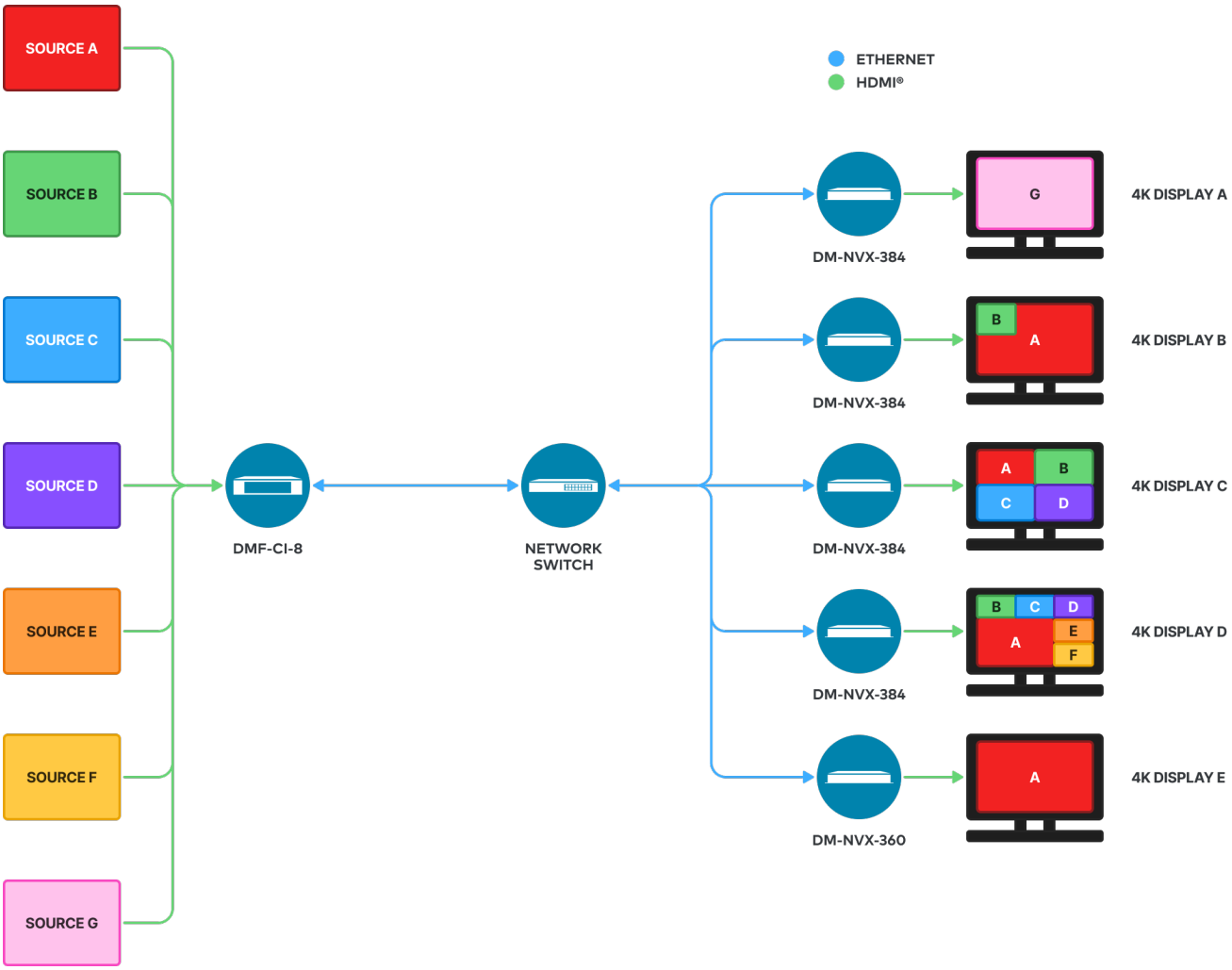
Application Diagrams

This section highlights applications for the differentiating features of the DM-NVX-384C.

DM-NVX-384C Multiview

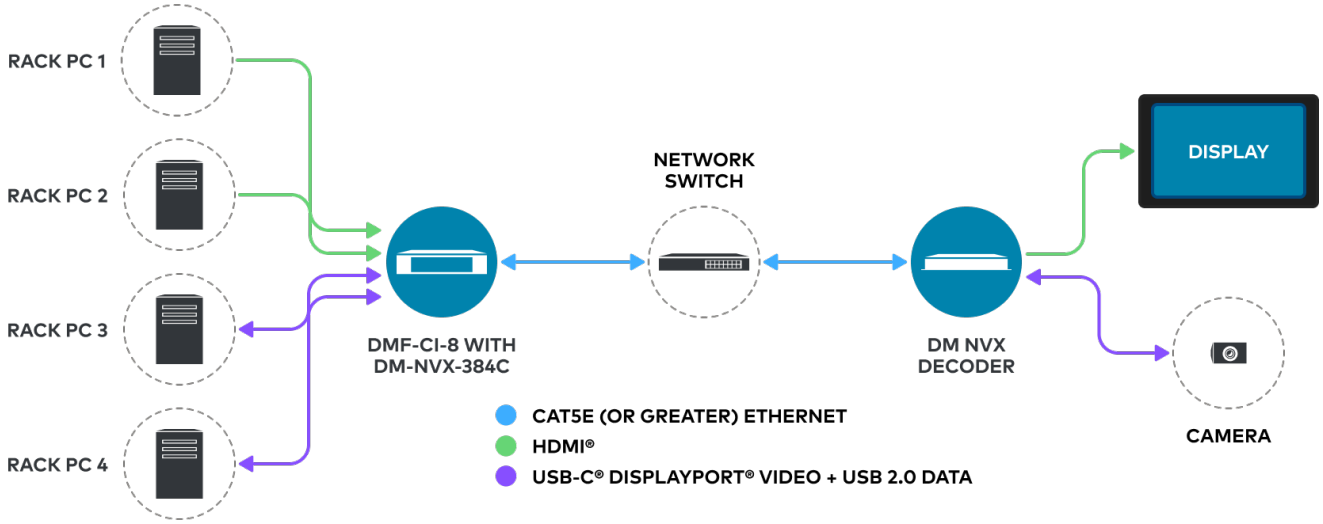
This application shows a mix of DM NVX models, highlighting which ones can receive specific streams and how those streams are combined into video outputs. Sources A through F are connected to DM-NVX-384C encoder cards while Source G is connected to a DM-NVX-360C encoder card. To implement Multiview, the feature must be configured on all compatible encoders and decoders. The decoders shown are configured for specific layouts to receive different combinations of transmitter signals:

- **4K Display A:** The decoder is configured with the **Full Screen** layout to receive a standard DM NVX stream from Source G via a DM-NVX-360C encoder.
- **4K Display B:** The decoder is configured with the **PIP Small Top Left** layout to receive Multiview streams from Source A and Source B via two DM-NVX-384C encoders.
- **4K Display C:** The decoder is configured with the **2 Top 2 Bottom** layout to receive Multiview streams from Sources A-D via four DM-NVX-384C encoders.
- **4K Display D:** The decoder is configured with the **5 Around, 1 Large Bottom Left** layout to receive Multiview streams from Sources A-F via six DM-NVX-384C encoders.
- **4K Display E:** The decoder does not support Multiview, but is still receiving a standard DM NVX stream from Source A via a DM-NVX-384C.


SOURCE A
SOURCE B
SOURCE C
SOURCE D
SOURCE E
SOURCE F
SOURCE G
DMF-CI-8
NETWORK SWITCH
ETHERNET
HDMI®
DM-NVX-384
DM-NVX-384
DM-NVX-384
DM-NVX-384
DM-NVX-360
G
B
A
A
B
C
D
B
C
D
A
E
F
A
4K DISPLAY A
4K DISPLAY B
4K DISPLAY C
4K DISPLAY D
4K DISPLAY E

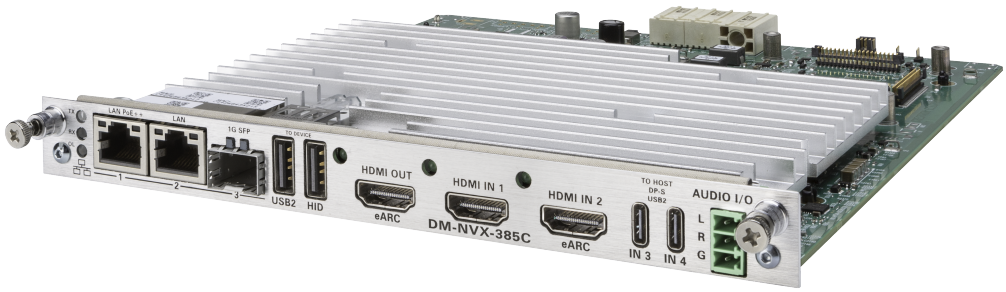
DM-NVX-384C Input Switching

This application shows a DM-NVX-384C fully populated with four video input connections (all video input connections to the DMF-CI-8 are made to the same encoder card). The internal 4x1 video switcher allows for dynamic routing of these four sources based either on signal detection or custom programming. The USB-C DisplayPort sources connected on inputs 3 and 4 can also receive USB 2.0 device data from a connected peripheral at the downstream DM NVX decoder.



DM-NVX-385C

The DM-NVX-385C is a DM NVX® AV-over-IP encoder/decoder card that occupies one card slot in a DMF-CI-8 card chassis. The card is designed to function as either a transmitter or receiver in a high-density rack-mount installation. Capable of handling a network AV installation of any size, the DM-NVX-385C includes features such as secure web-based control and management, a scaling HDMI output, video wall processing, an analog audio input or output[5], native AES67 transmit and receive capability, surround sound audio with downmixing, support for copper and fiber-optic Ethernet connectivity, and USB 2.0 and KVM integration.[1, 2]



- Two HDMI® and two USB-C® inputs
- 4K60 4:4:4 video over standard Gigabit Ethernet
- Support for 5K Wide (16:9), Ultra-Wide (21:9), and Super-Wide (32:9) resolutions
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio with downmixing
- AES67 audio embedding and de-embedding
- Breakaway audio

- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- Designed for installation into a DMF-CI-8 card chassis

Multiview

The DM-NVX-38C supports Multiview, allowing up to 6 discrete video signals to be combined into a single video output. While operating as an encoder, the DM NVX device can send both a traditional DM NVX AV-over-IP stream and a Multiview AV-over-IP stream. The traditional stream is compatible with DM NVX decoders that do not support Multiview, allowing the same content to pass to any decoder simultaneously, regardless of Multiview support. Multiview streams are supported on a nonblocking 1 Gbps, meaning they do not require any additional network bandwidth compared to traditional DM NVX AV-over-IP streams.

HDMI® and USB-C® 4x1 Input Switching

The DM-NVX-38C includes two HDMI inputs and two USB-C inputs that comprise a 4x1 input switcher. Switching between the four inputs can be performed automatically using auto-switching mode, programmatically via a control system, or through the web interface. When mounted behind a conference room display device, the HDMI input provides a convenient way to connect a Crestron AirMedia® presentation gateway, video-conferencing codec, or small form factor computer. The USB-C inputs allow for a DisplayPort™ Alt Mode video connection to laptops that do not feature an HDMI connection. The USB-C connectors also pass USB 2.0 data back and forth from the host PC and other DM NVX or DM NUX endpoints.

Real-Time 4K60 Video Distribution

DM NVX technology ensures real-time, full-motion 4K60 and 5K video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and using a mouse are fluid and natural. Line-synchronized outputs ensure synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers.

Support for 5K Resolutions

The DM-NVX-38C includes support for 5K Ultra-Wide 5120 × 2160 and 5K Super-Wide 5120 × 1440 video resolutions, expanding the DM NVX product family's compatibility with the latest generation of computers, monitors, and displays.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the C can encode or decode a video

signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The C is configurable to operate as either a network AV encoder or decoder. As an encoder, the connected media source can be transmitted over the network to one or many decoders. As a decoder, the device feeds the received signal to a connected display device, and can quickly switch between multiple encoder feeds. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or via the DMF-CI-8 front panel.

HDMI Output with 5K Scaler

Whether configured as an encoder or decoder, the built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device.[4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

7.1 Surround Sound Audio with Downmixing

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. The DM-NVX-385C can decode the incoming multichannel surround sound signal from the network or an HDMI input and then downmix that signal to stereo. The stereo downmix signal is automatically routed to the analog output[5], while the HDMI output can be configured to output either stereo or multichannel signals. As an encoder, the DM-NVX-385C distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.

Audio Embedding or De-embedding

AES67 support via native integration of Crestron DM NAX® Audio-over-IP technology allows the selected audio source to be transmitted as a 2-channel AES67 source. Another AES67 2-channel audio stream can be received from a Crestron DM NAX device or other AES67 capable device simultaneously and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, secondary audio stream, and analog audio output. In DM NVX decoder mode, the AES67 received audio stream can be combined with the video and then output via the HDMI output and analog audio output.

An unbalanced stereo analog audio port is also included, which can be configured as either an input or output.[5]

Copper and Fiber Ethernet Connectivity

The DM-NVX-38C includes two RJ-45 1000BASE-T ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). Any Ethernet port can be used to transport video over a Gigabit Ethernet network.

The ports can also be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 ports are provided on the DM-NVX-38C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint.[9]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, DM-NVX-DIR-ENT, or DM-NVX-DIR2) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

High-Density, Card-Based Solution

The C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

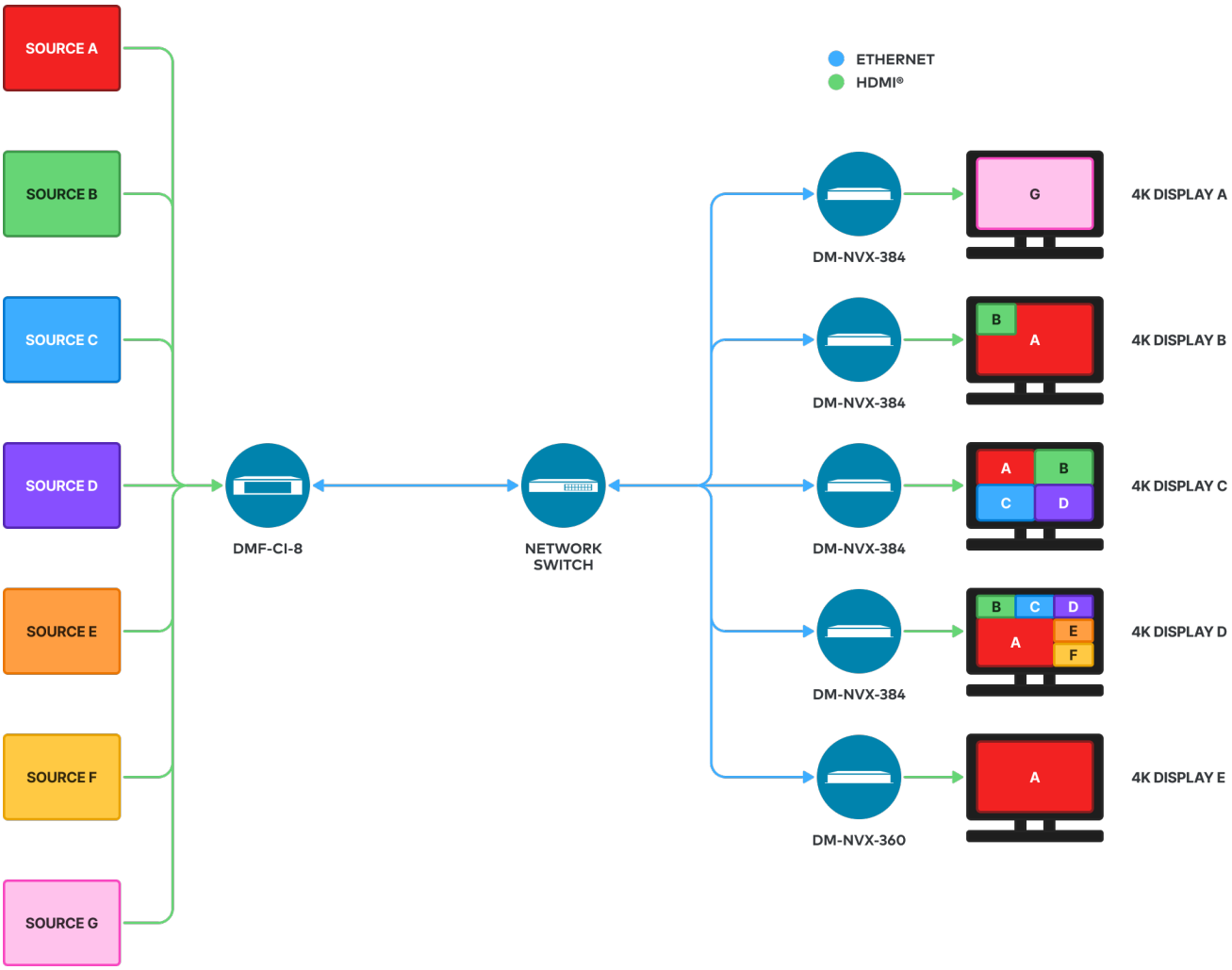
Application Diagrams

This section highlights applications for the differentiating features of the DM-NVX-385C.

DM-NVX-385C Multiview

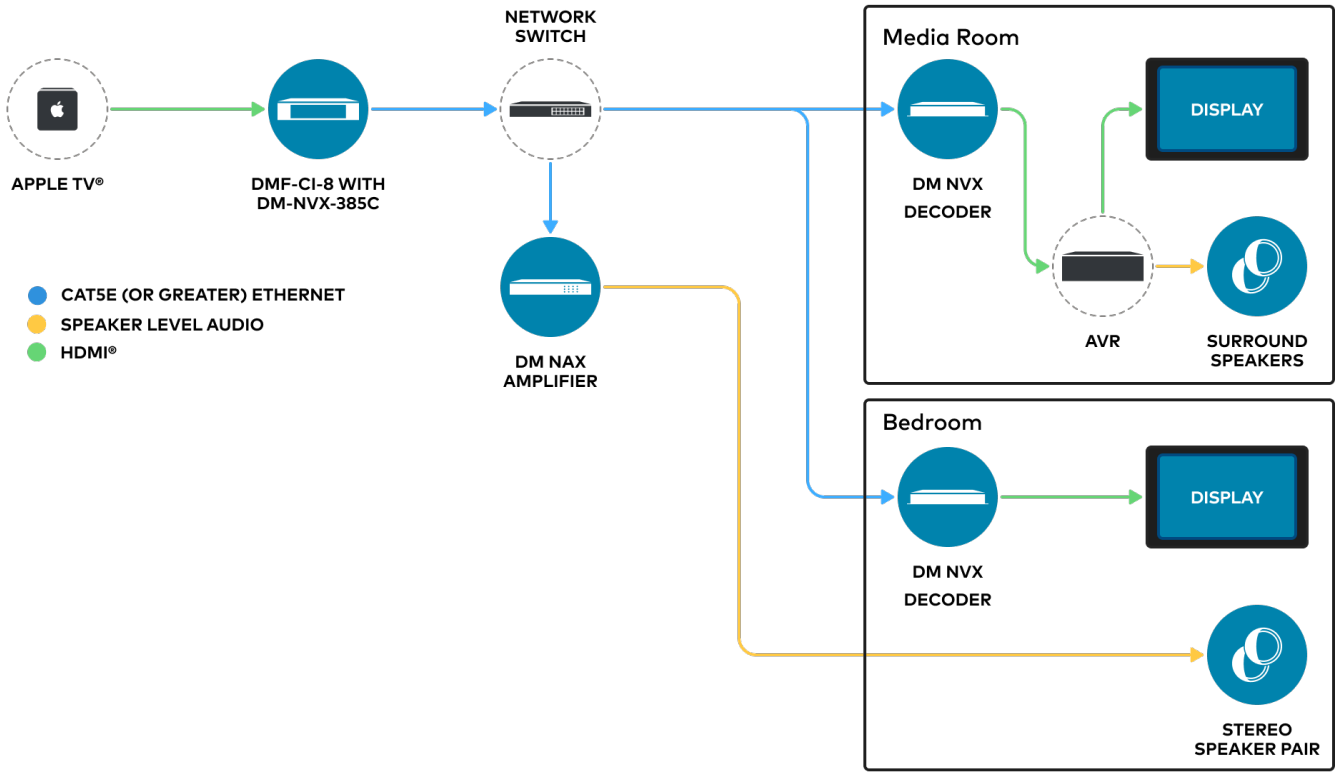
This application shows a mix of DM NVX models, highlighting which ones can receive specific streams and how those streams are combined into video outputs. Sources A through F are connected to DM-NVX-385C encoder cards while Source G is connected to a DM-NVX-360C encoder card. To implement Multiview, the feature must be configured on all compatible encoders and decoders. The decoders shown are configured for specific layouts to receive different combinations of transmitter signals:

- **4K Display A:** The decoder is configured with the **Full Screen** layout to receive a standard DM NVX stream from Source G via a DM-NVX-360C encoder.
- **4K Display B:** The decoder is configured with the **PIP Small Top Left** layout to receive Multiview streams from Source A and Source B via two DM-NVX-385C encoders.
- **4K Display C:** The decoder is configured with the **2 Top 2 Bottom** layout to receive Multiview streams from Sources A-D via four DM-NVX-385C encoders.
- **4K Display D:** The decoder is configured with the **5 Around, 1 Large Bottom Left** layout to receive Multiview streams from Sources A-F via six DM-NVX-385C encoders.
- **4K Display E:** The decoder does not support Multiview, but is still receiving a standard DM NVX stream from Source A via a DM-NVX-385C.


SOURCE A
SOURCE B
SOURCE C
SOURCE D
SOURCE E
SOURCE F
SOURCE G
DMF-CI-8
NETWORK SWITCH
ETHERNET
HDMI®
DM-NVX-384
DM-NVX-384
DM-NVX-384
DM-NVX-384
DM-NVX-360
G
B
A
A
B
C
D
B
C
D
A
E
F
A
4K DISPLAY A
4K DISPLAY B
4K DISPLAY C
4K DISPLAY D
4K DISPLAY E

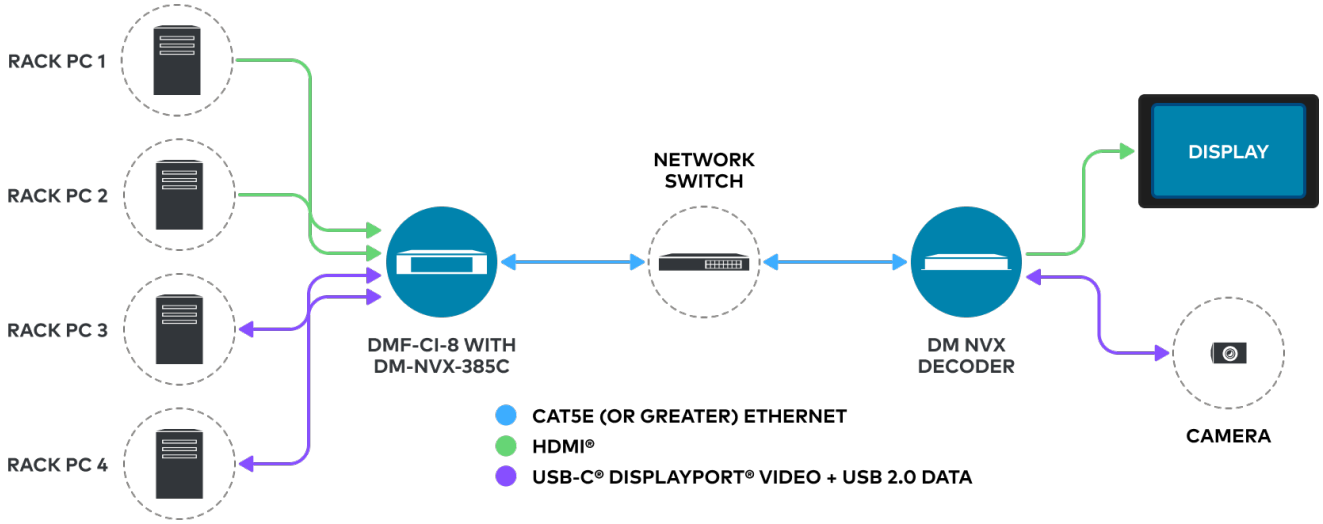
DM-NVX-385C Downmixing Surround Audio

This application shows an Apple TV® streaming player feeding an HDMI signal to a DM-NVX-385C encoder card in a DMF-CI-8 card chassis. This signal includes surround sound audio, but one of the output zones is only capable of stereo audio playback. The DM-NVX-385C creates a downmix of the surround sound audio signal to feed a 2-channel DM NAX audio-over-IP stream to a DM NAX amplifier on the network while still preserving the original surround sound signal for the multichannel AVR in the media room.



DM-NVX-385C Input Switching

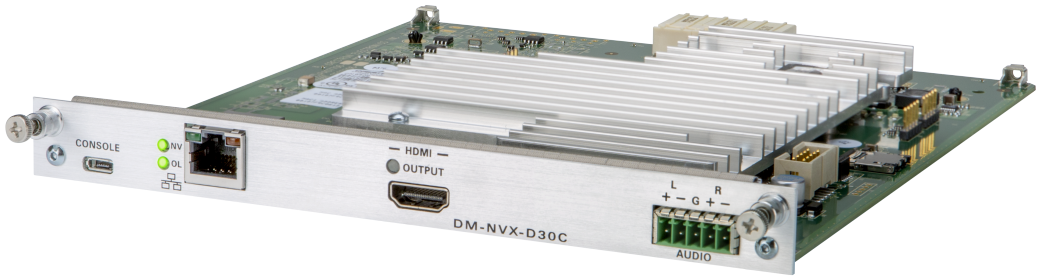
This application shows a DM-NVX-385C fully populated with four video input connections (all video input connections to the DMF-CI-8 are made to the same encoder card). The internal 4x1 video switcher allows for dynamic routing of these four sources based either on signal detection or custom programming. The USB-C DisplayPort sources connected on inputs 3 and 4 can also receive USB 2.0 device data from a connected peripheral at the downstream DM NVX decoder.



DM-NVX-D30C

The DM-NVX-D30C is an AV over IP decoder that occupies one slot of a DMF-CI-8 card chassis. The card is designed to function as a receiver in a high-density rack-mount installation. Featuring secure web-based control and management, an HDMI® output, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity, the DM-NVX-D30C offers a decoder solution for a DM NVX network AV installation of any size.[1]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution for any enterprise or campus-wide 4K content distribution application. Support for HDR (High Dynamic Range) and HDCP 2.3 compliance ensures the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 2]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision®video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Decoder functionality for use with DM NVX® products that can function as encoders
- One HDMI® output
- Image preview
- Background image for on-screen display
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity
- Automatic point-to-point connectivity
- Device control via CEC
- Easy setup via built-in web pages

- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. The DM-NVX-D30C can decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at any resolution up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Decoder Functionality

The DM-NVX-D30C is a basic decoder card that receives a signal from a DM NVX encoder and feeds it to a local display device via the HDMI output. The DM-NVX-D30C can quickly and easily switch among multiple encoders on the network. Compatible with DM nVX products that can function as encoders, the DM-NVX-D30C can be used in any DM NVX network AV design.

> **NOTE:** The HDMI output of the DM-NVX-D30C does not support video scaling.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

An image can be uploaded to the DM-NVX-D30C for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume is adjustable via a control system or web browser.[3]

7.1 Surround Sound Audio with Downmixing

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-D30C includes one RJ-45 1000BASE-T Ethernet port.[1] For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-D30C to be connected directly to a DM NVX 4K60 4:4:4 encoder to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the decoder is connected directly to a 1000BASE-T port of an encoder.

By default, point-to-point mode automatically detects whether the DM-NVX-D30C is connected directly to a DM NVX 4K60 4:4:4 encoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-E30C and an encoder is detected, the devices operate in point-to-point mode without the need for additional configuration; however, a control system is required for CEC (Consumer Electronics Control).

CEC Device Control

Under the management of a control system, the DM-NVX-D30C can control a display device via CEC (Consumer Electronics Control) over the HDMI connection, potentially eliminating the need for dedicated serial cables or IR emitters.

CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-D30C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

High-Density, Card-Based Solution

The DM-NVX-D30C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

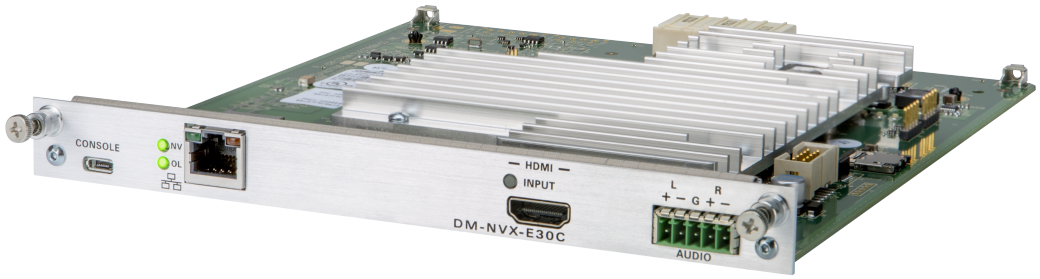
1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-E30C is for connection to an Ethernet network or device. The Ethernet port cannot be connected to the DM® port of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
3. The analog audio output is functional only when the DM-NVX-E30C is receiving a 2-channel stereo input signal.

DM-NVX-E30C

The DM-NVX-E30C is an AV over IP encoder that occupies one slot of a DMF-CI-8 card chassis. The card is designed to function as a transmitter in a high-density rack-mount installation. Featuring secure web-based control and management, an HDMI® input, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity, the DM-NVX-E30C offers an encoder solution for a DM NVX network AV installation of any size.[1]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution for any enterprise or campus-wide 4K content distribution application. Support for HDR (High Dynamic Range) and HDCP 2.3 compliance ensures the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 2]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision®video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Encoder functionality for use with DM NVX® products that can function as decoders
- One HDMI® input
- Image preview
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity
- Automatic point-to-point connectivity
- Device control via CEC

- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. The DM-NVX-E30C can encode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at any resolution up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder Functionality

The DM-NVX-E30C is a basic encoder card with one HDMI input that allows a laptop computer, camera, or other media source to be connected via an HDMI cable and then transmitted over the network to one or many decoders.[2] Compatible with DM NVX products that can function as decoders, the DM-NVX-E30C can be used in any DM NVX network AV design.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Test Pattern Generator

The built-in test pattern generator can be used during setup to ensure that video streaming is functional and can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and

video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

The bit rate of a transmitting DM NVX 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.[3]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume is adjustable via a control system or web browser.[4]

7.1 Surround Sound Audio with Downmixing

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-E30C includes one RJ-45 1000BASE-T Ethernet port.[1] For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-E30C 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, the 1000BASE-T Ethernet port of the encoder is connected directly to a 1000BASE-T port of a decoder.

By default, point-to-point mode automatically detects whether the DM-NVX-E30C is connected directly to a DM NVX 4K60 4:4:4 decoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-E30C and a decoder is detected, the devices operate in point-to-point mode without the need for additional configuration; however, a control system is required for CEC (Consumer Electronics Control).

CEC Device Control

Under the management of a control system, the DM-NVX-E30C can control a source device via CEC (Consumer Electronics Control) over the HDMI connection, potentially eliminating the need for dedicated serial cables or IR emitters.

Web-Based Setup

Setup of the DM-NVX-E30C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

High-Density, Card-Based Solution

The DM-NVX-E30C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

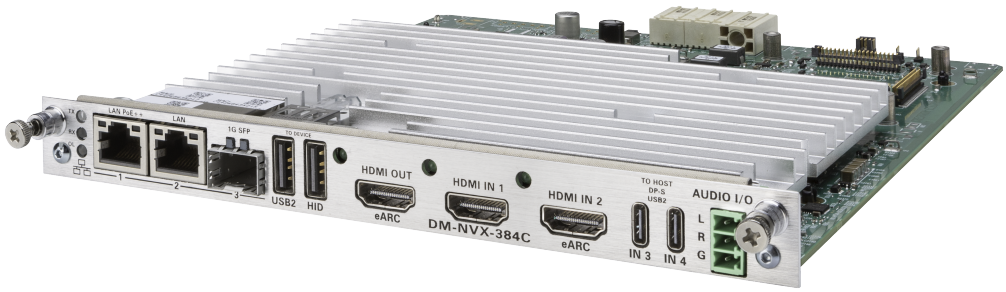
Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-E30C is for connection to an Ethernet network or device. The Ethernet port cannot be connected to the DM® port of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. The analog audio output is functional only when the DM-NVX-E30C is receiving a 2-channel stereo input signal.

DM-NVX-E760C

The DM-NVX-E760C is a compact DM NVX® AV-over-IP encoder card that occupies one card slot in a DMF-CI-8 card chassis. The DM-NVX-E760C includes a DM® input that provides interoperability with DM 8G+® output devices and DM Essentials transmitters. Certified using HDBaseT® technology, the DM input is also compatible with third-party HDBaseT products.[1, 2]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Encoder functionality for use with DM NVX® products that can function as decoders
- DM® input for interoperability with DM 8G+® output devices and DM Essentials transmitters, including DM 8G+ and DM Essentials wall plate transmitters
- HDBaseT® certification
- Image preview
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio de-embedding
- 7.1 surround sound audio
- AES67 audio embedding and de-embedding
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances

- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- Designed for installation into a DMF-CI-8 card chassis

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. The DM-NVX-E760C can encode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at any resolution up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder Functionality

The DM-NVX-E760C is an encoder that is compatible with DM NVX products that can function as decoders. The DM-NVX-E760C enables AV signals from the DM input to be transmitted over the network to one or many decoders. Encoder functionality of the DM-NVX-E760C can be used in any DM NVX network AV design.

Interoperability with DM 8G+ Output Devices and DM Essentials Transmitters

The DM input of the DM-NVX-E760C can be connected to the DM 8G+ output of a DM switcher, transmitter, or other DM device. Supported DM 8G+ output devices are the DMC-4KZ-CO-HD and DMB-4K-O-C 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 can also be connected to the DM Essentials port of a DM Essentials transmitter.

HDBaseT Certification

Crestron DM 8G+ technology of the DM input is designed using HDBaseT Alliance specifications, ensuring interoperability with other HDBaseT certified products. The DM input of the DM-NVX-E760C can be connected directly to an HDBaseT compliant source. The DM-NVX-E760C provides the capability to bridge an HDBaseT system with AV-over-IP, resulting in a hybrid system design and a smooth migration path for existing DM or HDBaseT solutions. Investment protection is achieved for applications that require integration of AV-over-IP with existing HDBaseT systems or expansion of an existing room system for broader distribution.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by the DM input of the DM-NVX-E760C. Still images are shown at 1 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 other supported interface.

Test Pattern Generator

The built-in test pattern generator can be used during setup to ensure that video streaming is functional and can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM-NVX-E760C can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[3]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio De-embedding

The analog audio output provides a balanced or unbalanced stereo line level signal to feed a local sound system or sound bar. The output volume is adjustable using the web interface or a control system.[4]

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. In decoder mode, the DM-NVX-384C can receive both multichannel and 2-channel downmix signals from a DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.[6]

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

NOTE: An AES67 audio stream that is received by a DM NVX endpoint cannot be transmitted from that endpoint.

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders. Combining signals from two separate encoders is limited to 2-channel stereo audio.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-384C includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **TO HOST** and **TO DEVICE** ports are provided on the DM-NVX-384C, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[8]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **TO DEVICE** port of up to seven remote DM NVX endpoints to the **TO HOST** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB-over-Ethernet devices (DM-NUX-L2 or DM-NUX-R2, sold separately), which can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX and DM NUX devices under the management of a control system.

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-384C provides a gateway for controlling devices via CEC over the HDMI connections. Under the management of a control system, the DM-NVX-384C can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-384C is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, DM-NVX-DIR-ENT, or DM-NVX-DIR2) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

High-Density, Card-Based Solution

The DM-NVX-384C is designed for installation into a DMF-CI-8 card chassis, providing a scalable high-density solution for applications requiring multiple encoders and decoders in one equipment rack.

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-384C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-384C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-384C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The DM-NVX-384C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

DM NVX Director® Switching Appliances

The DM NVX Director switching appliances are enterprise-grade network appliances that facilitate configuration, control, and management of a large-scale AV network using DM NVX® encoder and decoder endpoints.

Products

The following products are DM NVX Director switching appliances:

- DM-NVX-DIR-80 on page 77
- DM-NVX-DIR-160 on page 78
- DM-NVX-DIR-ENT on page 80

Refer to Physical Description on page 85 for details of the front and rear panel connectors and indicators of the DM NVX Director models.

DM-NVX-DIR-80

The Crestron DM-NVX-DIR-80 is an enterprise-grade network appliance that facilitates configuration, control, and management of a large-scale AV network using DM NVX® encoder and decoder endpoints, The DM-NVX-DIR-80 virtually emulates the functionality of a traditional hardware-based DM® matrix switcher, routing high-quality 4K streaming AV signals throughout a room, building, or campus.

The DM-NVX-DIR-80 supports a maximum of 80 DM NVX endpoints. Multiple DM NVX Director® network appliances can be deployed to handle corporate enterprise, university, governmental, military, medical, transportation, sports, entertainment, hospitality, gaming, and retail applications.



- Network AV system configuration, management, and signal routing
- Compatible with DM NVX® encoders and decoders
- Support of 80 endpoints in a single domain
- Fully scalable for a network of any size
- Intuitive web-based graphical user interface
- Full programmable control of virtual matrices and physical endpoints
- Automatic endpoint device discovery

- Multicast address control
- Credential management of DM NVX endpoints
- Custom naming and search tools
- Easy diagnostics and signal status display
- XML device map file import and export
- Built-in logging
- Four 1000BASE-T RJ-45 ports
- 1 RU 19 in. rack-mountable
- Universal 100-240VAC internal power supply

Simple and Flexible Configuration

The DM-NVX-DIR-80 automatically discovers up to 80 DM NVX endpoints on the network, and enables each endpoint to be assigned as a logical input or output within a single domain. The DM-NVX-DIR-80 routes inputs of DM NVX endpoints to outputs of DM NVX endpoints within the domain. Each DM-NVX-DIR-80 network appliance in a system functions as a separate domain.

Easy Web-Based Setup and Control

The DM-NVX-DIR-80 provides an intuitive web-based user interface to facilitate system configuration, signal routing, and diagnostics of the complete AV network. Each domain and endpoint, as well as the inputs and outputs of each endpoint, can be designated with a user-friendly name. Navigating the entire system is easy using the search box to quickly find domains, endpoints, inputs, and outputs by name or address. A system overview screen is also provided, showing the video and audio signal status for every input and output in a graphical layout that's easy to view and navigate.

Multicast Address Control

A custom multicast range can optionally be assigned for DM NVX encoder and decoder endpoints within a domain. The custom multicast range is determined by the assignment of a starting multicast address, the number of multicast addresses assigned to each DM NVX endpoint, and the number of DM NVX endpoints assigned to a domain. Multicast address control is accomplished by using the web interface.

Credential Management of DM NVX Endpoints

Username and password credentials can be changed simultaneously for all DM NVX encoder and decoder endpoints within a domain. Alternatively, the username and password can be changed for only particular DM NVX endpoints within a domain. Username and password credential management is accomplished by using the web interface.

DM-NVX-DIR-160

The Crestron DM-NVX-DIR-160 is an enterprise-grade network appliance that facilitates configuration, control, and management of a large-scale AV network using DM NVX® encoder and decoder endpoints. The DM-NVX-DIR-160 virtually emulates the functionality of a traditional hardware-based DM® matrix switcher, routing high-quality 4K streaming AV signals throughout a room, building, or campus.

The DM-NVX-DIR-160 supports a maximum of 160 DM NVX endpoints. Multiple DM NVX Director® network appliances can be deployed to handle corporate enterprise, university, government, military, medical, transportation, sports, entertainment, hospitality, gaming, and retail applications.



- Network AV system configuration, management, and signal routing
- Compatible with DM NVX® encoders and decoders
- Support of 160 endpoints and 20 domains
- Fully scalable for a network of any size
- Intuitive web-based graphical user interface
- Full programmable control of virtual matrices and physical endpoints
- Automatic endpoint device discovery
- Interdomain routing
- Multicast address control
- Credential management of DM NVX endpoints
- Custom naming and search tools
- Easy diagnostics and signal status display
- XML device map file import and export
- Built-in logging
- Multiple control system support
- Four 1000BASE-T RJ-45 ports
- 1 RU 19 in. rack-mountable
- Universal 100-240VAC internal power supply

Simple and Flexible Configuration

The DM-NVX-DIR-160 automatically discovers up to 160 DM NVX endpoints on the network and enables each endpoint to be assigned as a logical input or output within a domain. Up to 20 domains are supported. For larger systems, multiple DM-NVX-DIR-160 network appliances can be used.

Easy Web-Based Setup and Control

The DM-NVX-DIR-160 provides an intuitive web-based user interface to facilitate system configuration, signal routing, and diagnostics of the complete AV network. Each domain and endpoint, as well as the inputs and outputs of each endpoint, can be designated with a user-friendly name. Navigating the entire system is easy using the search box to quickly find domains, endpoints, inputs, and outputs by name or address. A system overview screen is also provided, showing the video and audio signal status for every input and output in a graphical layout that is easy to view and navigate.

Interdomain Routing

Video inputs can be routed to video outputs within a single domain. In addition, support of interdomain routing enables video inputs within a domain to be routed to video outputs of one or more other domains. Routing control of AV signals is accomplished by using the web interface or control system programming.

Multicast Address Control

A custom multicast range can optionally be assigned for DM NVX encoder and decoder endpoints within a domain. The custom multicast range is determined by the assignment of a starting multicast address, the number of multicast addresses assigned to each DM NVX endpoint, and the number of DM NVX endpoints assigned to a domain. Multicast address control is accomplished by using the web interface.

Credential Management of DM NVX Endpoints

Username and password credentials can be changed simultaneously for all DM NVX encoder and decoder endpoints within a domain. Alternatively, the username and password can be changed for only particular DM NVX endpoints within a domain. Username and password credential management is accomplished by using the web interface.

Multiple Control System Support

The DM-NVX-DIR-160 supports Crestron 3-Series® or later control systems. A single control system, referred to as the Global Domain control system, can be assigned to all domains simultaneously. In addition, support of multiple control systems enables the Global Domain control system or another control system, referred to as a Domain control system, to be assigned to each domain on an individual basis. The Domain control system that is assigned on an individual basis must be different for each domain. Assignment of multiple control systems is accomplished by using the web interface or control system programming.

DM-NVX-DIR-ENT

The Crestron DM-NVX-DIR-ENT is an enterprise-grade network appliance that facilitates configuration, control, and management of a large-scale AV network using DM NVX® encoder and decoder endpoints. The DM-NVX-DIR-ENT virtually emulates the functionality of a traditional hardware-based DM® matrix switcher, routing high-quality 4K streaming AV signals throughout a room, building, or campus.

The DM-NVX-DIR-ENT supports a maximum of 1000 DM NVX endpoints. Multiple DM NVX Director® network appliances can be deployed to handle corporate enterprise, university, government, military, medical, transportation, sports, entertainment, hospitality, gaming, and retail applications.



- Network AV system configuration, management, and signal routing
- Compatible with DM NVX® encoders and decoders
- Support of 1000 endpoints and 240 domains
- Fully scalable for a network of any size
- Intuitive web-based graphical user interface
- Full programmable control of virtual matrices and physical endpoints
- Automatic endpoint device discovery
- Interdomain routing
- Multicast address control
- Credential management of DM NVX endpoints
- Custom naming and search tools
- Easy diagnostics and signal status display
- XML device map file import and export
- Built-in logging
- Multiple control system support
- Six 1000BASE-T RJ-45 ports
- Six 10GBASE-X SFP+ ports (four are 1000BASE-T compatible)
- Fiber-optic connectivity via SFP or SFP+ transceivers (sold separately)
- 1 RU 19 in. rack-mountable
- Onboard 100-240VAC hot-swappable redundant power supplies

Simple and Flexible Configuration

The DM-NVX-DIR-ENT automatically discovers up to 1000 DM NVX endpoints on the network and enables each endpoint to be assigned as a logical input or output within a domain. Up to 240 domains are supported. For larger systems, multiple DM-NVX-DIR-ENT network appliances can be used.

Easy Web-Based Setup and Control

The DM-NVX-DIR-ENT provides an intuitive web-based user interface to facilitate system configuration, signal routing, and diagnostics of the complete AV network. Each domain and endpoint, as well as the inputs and outputs of each endpoint, can be designated with a user-friendly name. Navigating the entire system is easy using the search box to quickly find domains, endpoints, inputs, and outputs by name or address. A system overview screen is also provided, showing the video and audio signal status for every input and output in a graphical layout that is easy to view and navigate.

Interdomain Routing

Video inputs can be routed to video outputs within a single domain. In addition, support of interdomain routing enables video inputs within a domain to be routed to video outputs of one or more other domains. Routing control of AV signals is accomplished by using the web interface or control system programming.

Multicast Address Control

A custom multicast range can optionally be assigned for DM NVX encoder and decoder endpoints within a domain. The custom multicast range is determined by the assignment of a starting multicast address,

the number of multicast addresses assigned to each DM NVX endpoint, and the number of DM NVX endpoints assigned to a domain. Multicast address control is accomplished by using the web interface.

Credential Management of DM NVX Endpoints

Username and password credentials can be changed simultaneously for all DM NVX encoder and decoder endpoints within a domain. Alternatively, the username and password can be changed for only particular DM NVX endpoints within a domain. Username and password credential management is accomplished by using the web interface.

Copper or Fiber Ethernet Connectivity

The DM-NVX-DIR-ENT includes six 1000BASE-T RJ-45 ports and six 10GBASE-X SFP+ ports. Four of the 10GBASE-X SFP+ ports are 1000BASE-T compatible. Connection to a 1000BASE-T or 10GBASE-X fiber-optic network is facilitated by inserting an appropriate SFP or SFP+ transceiver module (Crestron SFP-1G or SFP-10G series, sold separately) into an SFP+ port. A selection of modules is offered to accommodate various multimode and single-mode fiber types.

> **NOTE:** Ports 7 and 8 support 10GBASE-X only and are compatible with SFP-10G SFP+ transceivers only.

Redundant Power Supplies

Onboard dual redundant power supplies provide enhanced reliability for demanding applications. In the unlikely event of an individual power supply fault, the DM-NVX-DIR-ENT will continue to operate unhindered on only one functioning power supply. A modular, hot-swappable design allows either power supply to be replaced in seconds from the rear panel without powering down or rebooting the system. The DM-NVX-DIR-ENT ships complete with both power supply modules installed.

Multiple Control System Support

The DM-NVX-DIR-ENT supports Crestron 3-Series® or later control systems. A single control system, referred to as the Global Domain control system, can be assigned to all domains simultaneously. In addition, support of multiple control systems enables the Global Domain control system or another control system, referred to as a Domain control system, to be assigned to each domain on an individual basis. The Domain control system that is assigned on an individual basis must be different for each domain. Assignment of multiple control systems is accomplished by using the web interface or control system programming.

DM-NVX-DIR2

The Crestron DM-NVX-DIR2 is an enterprise-grade network appliance that facilitates configuration, control, and management of a large-scale AV network using DM NVX® encoder and decoder endpoints. The DM-NVX-DIR2 virtually emulates the functionality of a traditional hardware-based DM® matrix switcher, routing high-quality 4K streaming AV signals throughout a room, building, or campus.

The DM-NVX-DIR2 supports a maximum of 100 DM NVX endpoints. A single Ethernet port is built-in, and up to three ADPT-USB3.0-GBENET (sold separately) can be connected via USB for additional Ethernet ports. DM NVX Director® network appliances can be deployed to handle corporate enterprise, university, government, military, medical, transportation, sports, entertainment, hospitality, gaming, and retail applications.



- Network AV system configuration, management, and signal routing
- Compatible with DM NVX® encoders and decoders
- Support of 100 endpoints and 20 domains
- Interdomain routing
- Intuitive web-based graphical user interface
- Full programmable control of virtual matrices and physical endpoints
- Automatic endpoint device discovery

- Multicast address control
- Credential management of DM NVX endpoints
- Custom naming and search tools
- Easy diagnostics and signal status display
- XML device map file import and export
- Built-in logging
- Multiple control system support
- Includes external power supply

Simple and Flexible Configuration

The DM-NVX-DIR2 automatically discovers up to 100 DM NVX endpoints on the network and enables each endpoint to be assigned as a logical input or output within a domain. Up to 20 domains are supported. For larger systems, multiple DM-NVX-DIR2 network appliances can be used. Alternatively, the DM-NVX-DIR-ENT, which supports 240 domains and includes additional enterprise features, can also be used.

Easy Web-Based Setup and Control

The DM-NVX-DIR2 provides an intuitive web-based user interface to facilitate system configuration, signal routing, and diagnostics of a complete AV network. Each domain and endpoint, as well as the inputs and outputs of each endpoint, can be designated with a user-friendly name. Navigating the entire system is easy using the search box to quickly find domains, endpoints, inputs, and outputs by name or address. The system overview screen visually displays the video and audio signal status for all inputs and outputs, offering an intuitive and easy-to-navigate graphical layout.

Interdomain Routing

Video inputs can be routed to video outputs within a single domain. In addition, support of interdomain routing enables video inputs within a domain to be routed to video outputs of one or more other domains. Routing control of AV signals is accomplished by using the web interface or control system programming.

Multicast Address Control

A custom multicast range can be assigned for DM NVX encoder and decoder endpoints. This range is defined by three factors: the starting multicast address, the number of multicast addresses allocated per DM NVX endpoint, and the total number of DM NVX endpoints within the domain. Multicast address control is accomplished by using the web interface.

Credential Management of DM NVX Endpoints

Username and password credentials can be changed simultaneously for all DM NVX encoder and decoder endpoints. Alternatively, the username and password can be changed for only particular DM NVX endpoints. Username and password credential management is accomplished by using the web interface.

Multiple Control System Support

The DM-NVX-DIR2 is compatible with Crestron 3-Series® and later control systems. It allows for the assignment of a single control system, known as the Global Domain control system, to all domains at once. Additionally, multiple control systems can be assigned, enabling either the Global Domain control system or a separate Domain control system to be allocated to each domain individually. Control system assignment can be managed through the web interface or control system programming.

Physical Description

The DM NVX Director switching appliance provides the following connectors, controls, and indicators.

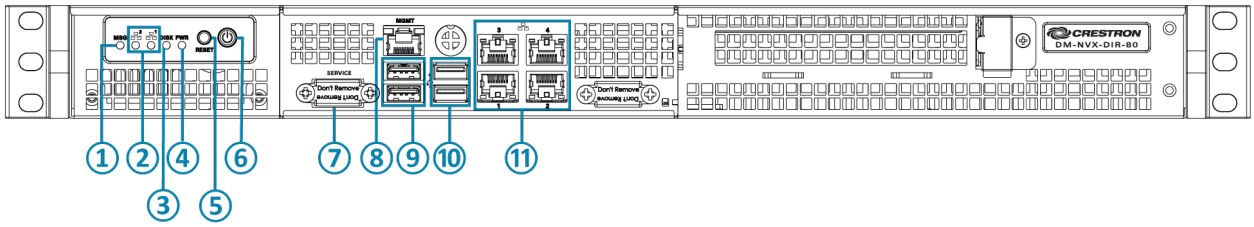
DM-NVX-DIR-80 and DM-NVX-DIR-160

The following illustration shows the front and rear panels of the DM-NVX-DIR-80 and DM-NVX-DIR-160.

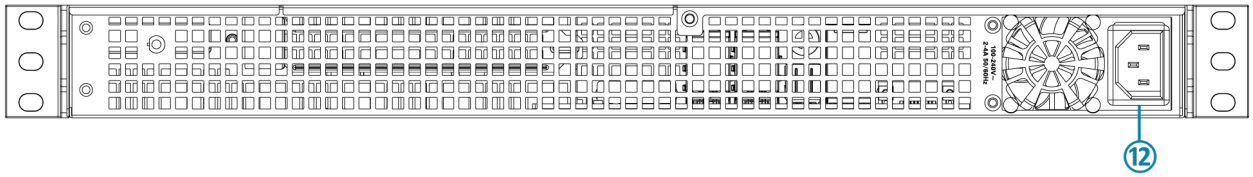
> **NOTE:** With the exception of the model name, the front panels of the DM-NVX-DIR-80 and DM-NVX-DIR-160 are identical to one another. The rear panel of the DM-NVX-DIR-80 is identical to the rear panel of the DM-NVX-DIR-160.

DM-NVX-DIR-80 and DM-NVX-DIR-160 Front and Rear Panels (DM-NVX-DIR-80 Model Name Shown)

Front Panel



Rear Panel



① **MSG:** Blue LED, identifies the device when the unit identification process is initiated.

> **NOTE:** To be able to locate the device in a rack, use the web interface to initiate the unit identification process (refer to Device on page 814for information).

② **Ethernet 1-2:** Green LEDs, indicate Ethernet activity on the corresponding Ethernet port.

③ **DISK:** Yellow LED, indicates SSD (solid-state drive) activity.

④ **PWR:** Green LED, indicates that the unit is powered on.

⑤ **RESET:** Recessed push button, initiates a hardware reset.

⑥ **Power Button:** Push button, initiates boot up or shutdown.

> **NOTE:** If the device is powered on, pressing and holding the power button for less than five seconds performs a normal shutdown. Holding the power button for five seconds performs a forced shutdown.

⑦ **SERVICE:** For factory use only.

⑧ **MGMT:** 8-pin RJ-45 connector, shielded, female;
100BASE-TX/1000BASE-T Ethernet port for hardware management;
Bicolor green/orange LED, green indicates 100 Mbps link status and orange indicates 1 Gbps link status;
Amber LED, indicates Ethernet activity.

> **NOTE:** The **MGMT** port connects to the management network and is used for management and monitoring of the DM NVX Director hardware. The **MGMT** port does not provide access to the DM NVX Director software and is independent of Ethernet ports 1-4.

⑨ **USB 2.0:** For factory use only.

⑩ **USB 3.0:** For factory use only.

⑪ **Ethernet 1-4:** 8-pin RJ-45 connectors, shielded, female;
100BASE-TX/1000BASE-T Ethernet ports for web browser, endpoint, and control traffic;
Bicolor green/orange LED, green indicates 100 Mbps link status and orange indicates 1 Gbps link status;
Amber LED, indicates Ethernet activity.

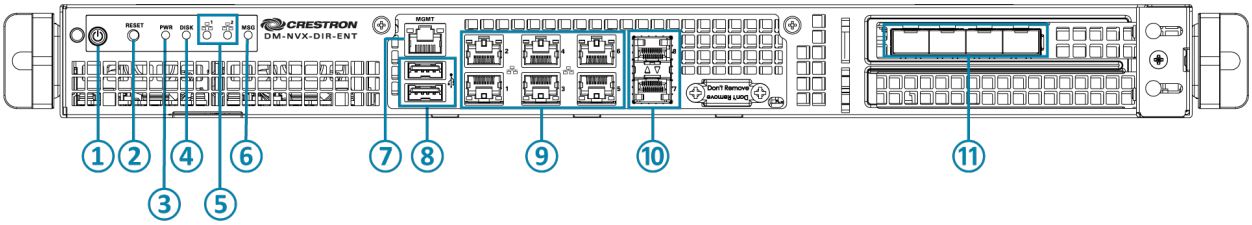
> **NOTES:**
>
> - Ethernet ports 1-4 connect to video or control networks. The ports provide access to the DM NVX Director configuration software. All Ethernet ports on the device are independent from each other.
> - By default, DHCP is enabled for ports 1-3, allowing each port to be assigned a different IP address automatically. The IP address of port 4 defaults to a link-local address in the 169.254.xxx.xxx range (refer to RFC 3927 for information about link-local addressing). To find the IP address of any of the connected Ethernet ports (1-4), use the Device Discovery Tool in Crestron Toolbox™ software.
> - The port that is used to configure the DM NVX Director software must be accessible from the network of the device running the web browser, the network of the associated DM NVX devices, and the network of the control system (if present).

⑫ **100-240V~2-4A 50/60Hz:** IEC 60320 C14 mains power inlet;
Mates with removable power cord (included).

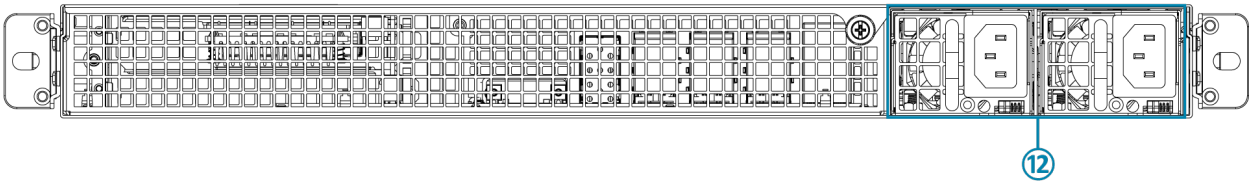
DM-NVX-DIR-ENT

The following illustration shows the rear of the DM NVX® AV-over-IP.

Front Panel



Rear Panel



① **Power Button:** Push button, initiates boot up or shutdown.

> **NOTE:** If the device is powered on, pressing and holding the power button for less than five seconds performs a normal shutdown. Holding the power button for five seconds performs a forced shutdown.

② **RESET:** Recessed push button, initiates a hardware reset.

③ **PWR:** Green LED, indicates that the unit is powered on.

④ **DISK:** Yellow LED, indicates SSD activity.

⑤ **Ethernet 1-2:** Green LEDs, indicate Ethernet activity on the corresponding Ethernet port.

⑥ **MSG:** Bicolor blue/red LED, blue identifies the device when the unit identification process is initiated, red indicates a power supply fault.

> **NOTE:** To be able to locate the device in a rack, use the web interface to initiate the unit identification process (refer to Device on page 814for information).

⑦ **MGMT:** 8-pin RJ-45 connector, shielded, female;
100BASE-TX/1000BASE-T Ethernet port for hardware management;
Bicolor green/orange LED, green indicates 100 Mbps link status and orange indicates 1 Gbps link status;
Amber LED, indicates Ethernet activity.

> **NOTE:** The **MGMT** port connects to the management network and is used for management and monitoring of the DM NVX Director hardware. The **MGMT** port does not provide access to the DM NVX Director software and is independent of Ethernet ports 1-12.

⑧ **USB 3.0:** For factory use only.

⑨ **Ethernet 1-6:** 8-pin RJ-45 connectors, shielded, female;
100BASE-TX/1000BASE-T Ethernet ports for web browser, endpoint, and control traffic;
Bicolor green/orange LED, green indicates 100 Mbps link status and orange indicates 1 Gbps link status;
Amber LED, indicates Ethernet activity.

> **NOTES:**
>
> - Ethernet ports 1-6 connect to video or control networks. The ports provide access to the DM NVX Director configuration software. All Ethernet ports on the device are independent from each other.
> - By default, DHCP is enabled for ports 1-5 and 7-12, allowing each port to be assigned a different IP address automatically. The IP address of port 6 defaults to a link-local address in the 169.254.xxx.xxx range (refer to RFC 3927 for information about link-local addressing). To find the IP address of any of the connected Ethernet ports (1-4), use the Device Discovery Tool in Crestron Toolbox™ software.
> - The port that is used to configure the DM NVX Director software must be accessible from the network of the device running the web browser, the network of the associated DM NVX devices, and the network of the control system (if present).

⑩ **Ethernet 7-8:** SFP+ ports;
10GBASE-X Ethernet ports for web browser, endpoint, and control traffic;
Accept Crestron SFP-10G Series SFP+ transceiver modules.

> **NOTE:** Ethernet ports 7-8 connect to video or control networks. The ports provide access to the DM NVX Director configuration software. All Ethernet ports on the device are independent from each other.

⑪ **Ethernet 9-12:** SFP+ ports;
1000BASE-X/10GBASE-X Ethernet ports for web browser, endpoint, and control traffic;
Accept Crestron SFP-1G or SFP-10G series SFP/SFP+ transceiver modules.

> **NOTE:** Ethernet ports 9-12 connect to video or control networks. The ports provide access to the DM NVX Director configuration software. All Ethernet ports on the device are independent from each other.

⑫ **100-240~3-6A 50/60Hz:** (2) IEC 60320 C14 mains power inlets;
Each mates with removable power cord (included).

Room Box AV-over-IP Endpoints

The room box models in the DM NVX AV-over-IP family of hardware encoder and decoder endpoints are housed in a metal chassis that can be rack-mounted or surface-mounted. The profile of a room box endpoint is shallow enough that it can be installed behind a flat panel display, above a ceiling-mounted projector, or inside a lectern, AV cart, or equipment cabinet.

Products

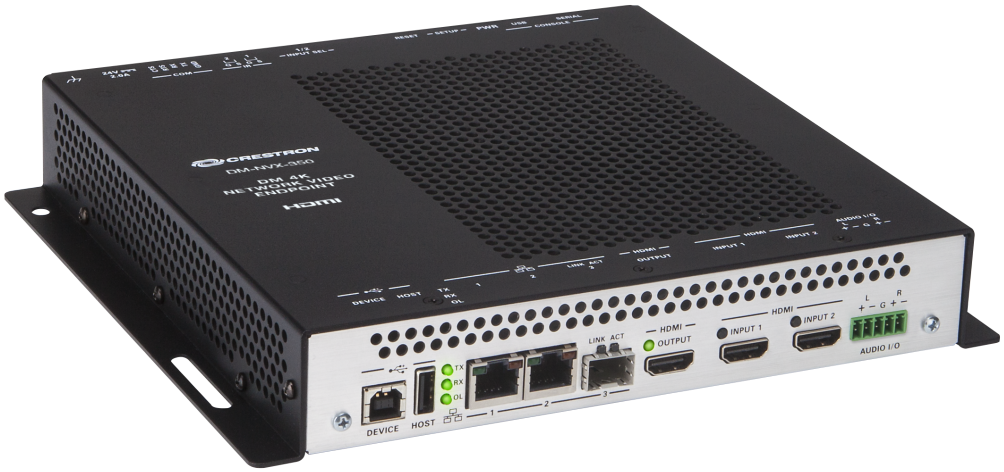
The following products are room box DM NVX AV-over-IP endpoints:

- DM-NVX-350 on page 90
- DM-NVX-351 on page 97
- DM-NVX-352 on page 104
- DM-NVX-360C on page 36
- DM-NVX-363 on page 118
- DM-NVX-384 on page 125
- DM-NVX-D10 on page 140
- DM-NVX-D20 on page 144
- DM-NVX-D200 on page 148
- DM-NVX-D30 on page 152
- DM-NVX-E10 on page 156
- DM-NVX-E20 on page 160
- DM-NVX-E30 on page 164
- DM-NVX-E760 on page 168

DM-NVX-350

The DM-NVX-350 is a compact AV over IP encoder/decoder designed to function as either a transmitter or receiver. Capable of handling a network AV installation of any size, the DM-NVX-350 includes features such as secure web-based control and management, auto-switching HDMI® inputs, a scaling HDMI output, video wall processing, an analog audio input or output, native AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional on-board scaling, HDR (High Dynamic Range) support, and HDCP 2.2 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.2 compliant
- Configurable as an encoder or decoder
- Two auto-switching HDMI® inputs
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay

- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE++, UPOE, or the included power pack

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-350 can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM

NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-350 is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-350 allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-350 receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-350 provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or can be changed by using the built-in **SETUP** button.

Autoswitching HDMI® Inputs

The DM-NVX-350 includes two HDMI inputs. Switching between the two inputs can be performed automatically using the built-in autoswitching mode, programmatically via a control system, manually using the built-in **INPUT SEL** button, or through a computer using a web browser. When used as a decoder mounted behind a typical conference room display device, the HDMI inputs provide a convenient way to connect a Crestron AirMedia® presentation gateway, video conferencing codec, or small form factor computer.[3]

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-350 is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-350 is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-350 enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-350 is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-350 is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

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. In decoder mode, the DM-NVX-350 can receive both multichannel and 2-channel downmix signals from a DM-NVX-351, DM-NVX-351C, DM-NVX-363, or DM-NVX-363C encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-350 includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image. Port 1 is also capable of receiving power from a PoE++ or UPOE compliant Ethernet switch or third-party IEEE 802.3bt compliant PSE.[1, 8]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-351 device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-350, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote

endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[10]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[11]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-350 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display, camera, or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-350 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-350 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-350 mounts conveniently to a flat surface or rack rail, and fits easily behind a flat panel display, above a ceiling-mounted projector, beneath a tabletop, or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided using PoE++, UPOE, or the included 100-240 V universal power pack.[9]

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-350 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

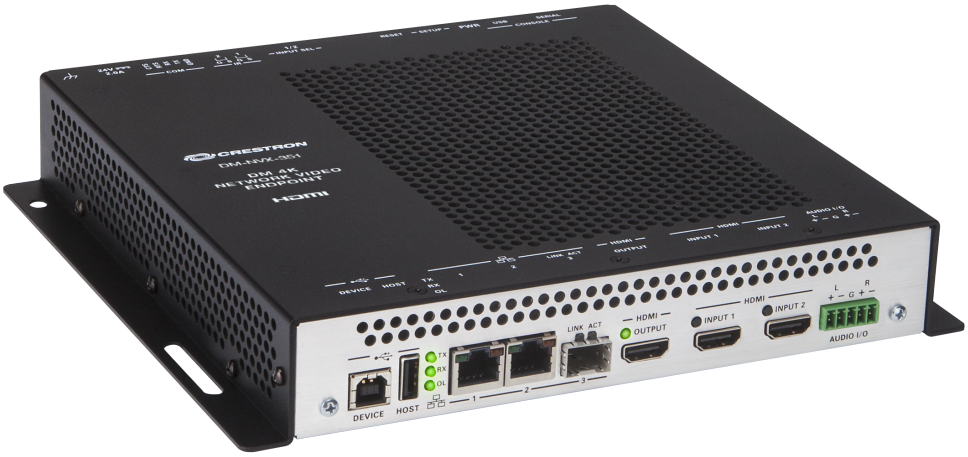
   A nonblocking network is required for DM NVX devices.

2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-350 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-350 is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. Refer to the "Power" specifications section for approved powering options.
9. The DM-NVX-350 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. The DM-NVX-350 is not compatible with the USB HID signal extender technology found in other Crestron DM products.

DM-NVX-351

The DM-NVX-351 is a compact AV-over-IP encoder/decoder designed to function as either a transmitter or receiver. Capable of handling network installations both large and small, the DM-NVX-351 includes features such as secure web-based control and management, auto-switching HDMI® inputs, a scaling HDMI output, video wall processing, an analog audio input or output, surround sound to stereo downmixing, native AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional on-board scaling, HDR (High Dynamic Range) support, and HDCP 2.2 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.2 compliant
- Configurable as an encoder or decoder
- Two auto-switching HDMI® inputs
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing

- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio with downmixing
- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE++, UPOE, or the included power pack

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-351 can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-351 is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-351 allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-351 receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-351 provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or can be changed by using the built-in **SETUP** button.

Autoswitching HDMI® Inputs

The DM-NVX-351 includes two HDMI inputs. Switching between the two inputs can be performed automatically using the built-in autoswitching mode, programmatically via a control system, manually using the built-in **INPUT SEL** button, or through a computer using a web browser. When used as a decoder mounted behind a typical conference room display device, the HDMI inputs provide a convenient way to connect a Crestron AirMedia® presentation gateway, video conferencing codec, or small form factor computer.[3]

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-351 is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-351 is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-351 enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-351 is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-351 is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

7.1 Surround Sound Audio with Downmixing

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[7]. The DM-NVX-351 can decode the incoming multichannel surround sound signal, whether from the network or an HDMI input, and downmix that signal to stereo. The stereo downmix signal is automatically routed to the built-in analog output[6], while the HDMI output can be configured to output either stereo or multichannel signals. As an encoder, the DM-NVX-351 distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio

stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders.[8]

Copper and Fiber Ethernet Connectivity

The DM-NVX-351 includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image. Port 1 is also capable of receiving power from a PoE++ or UPOE compliant Ethernet switch or third-party IEEE 802.3bt compliant PSE.[1, 9]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-351 device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-351, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[10]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[11]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-351 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display, camera, or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-351 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-351 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-351 mounts conveniently to a flat surface or rack rail, and fits easily behind a flat panel display, above a ceiling-mounted projector, beneath a tabletop, or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided using PoE++, UPOE, or the included 100-240 V universal power pack.[9]

Notes:

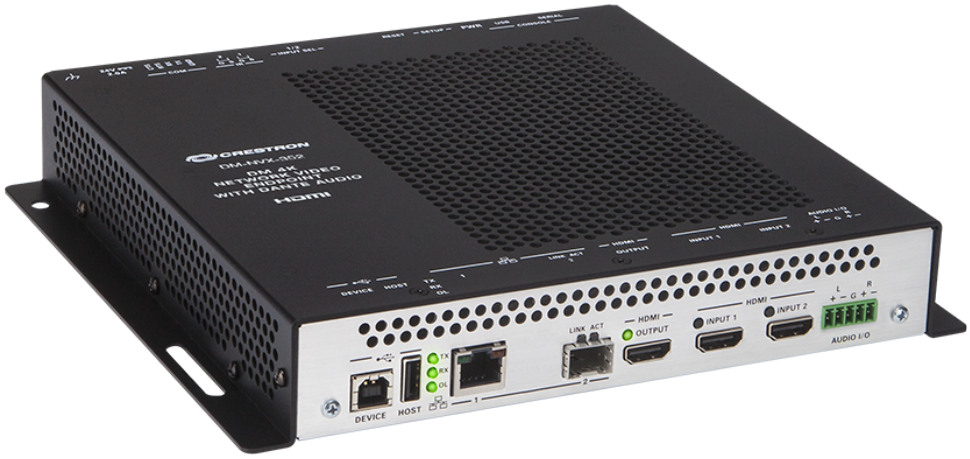
1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-351 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-351 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-351 is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. The DM-NVX-351 does not downmix Dolby Atmos MAT 2.0 audio.
8. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
9. Refer to the "Power" specifications section for approved powering options.
10. The DM-NVX-351 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
11. The DM-NVX-351 is not compatible with the USB HID signal extender technology found in other Crestron DM products.

DM-NVX-352

The DM-NVX-352 is a compact AV over IP encoder/decoder designed to function as either a transmitter or receiver. Capable of handling a network AV installation of any size, the DM-NVX-352 includes features such as secure web-based control and management, auto-switching HDMI® inputs, a scaling HDMI output, video wall processing, an analog audio input or output, native Dante® or AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional on-board scaling, HDR (High Dynamic Range) support, and HDCP 2.2 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.2 compliant
- Configurable as an encoder or decoder
- Two auto-switching HDMI® inputs

- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio support
- Dante® or AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE++, UPOE, or the included power pack

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-352 can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-352 is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-352 allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-352 receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-352 provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or can be changed by using the built-in **SETUP** button.

Autoswitching HDMI® Inputs

The DM-NVX-352 includes two HDMI inputs. Switching between the two inputs can be performed automatically using the built-in autoswitching mode, programmatically via a control system, manually using the built-in **INPUT SEL** button, or through a computer using a web browser. When used as a decoder mounted behind a typical conference room display device, the HDMI inputs provide a convenient way to connect a Crestron AirMedia® presentation gateway, video conferencing codec, or small form factor computer.[3]

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-352 is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-352 is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-352 enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-352 is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-352 is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

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. In decoder mode, the DM-NVX-350 can receive both multichannel and 2-channel downmix signals from a DM-NVX-351, DM-NVX-351C, DM-NVX-363, or DM-NVX-363C encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.

> **NOTE:** The DSP of the DM-NVX-352 is compatible with Dolby Atmos audio using True HD or Dolby Digital Plus audio formats.

Dante® or AES67 Audio Embedding or De-embedding

Dante and AES67 support allows the selected audio source to be transmitted as a 2-channel Dante or AES67 audio stream while another 2-channel Dante or AES67 audio stream is received from a Crestron DSP or other third-party device and combined with the video signal.

In DM NVX encoder mode, the Dante or AES67 received audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received Dante or AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

> **NOTE:** A Dante or AES67 audio stream that is received by a DM NVX endpoint cannot be transmitted from that endpoint.

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-352 includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image. Port 1 is also capable of receiving power from a PoE++ or UPOE compliant Ethernet switch or third-party IEEE 802.3bt compliant PSE.[1, 8]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-352 device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a

decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-352, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[10]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[11]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-350 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display, camera, or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-350 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-352 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-352 mounts conveniently to a flat surface or rack rail, and fits easily behind a flat panel display, above a ceiling-mounted projector, beneath a tabletop, or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided using PoE++, UPOE, or the included 100-240 V universal power pack.[9]

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-352 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-352 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-352 is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. Refer to the "Power" specifications section for approved powering options.
9. The DM-NVX-352 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. The DM-NVX-352 is not compatible with the USB HID signal extender technology found in other Crestron DM products.

DM-NVX-360

The DM-NVX-360 is a compact AV-over-IP encoder/decoder designed to function as either a transmitter or receiver. Capable of handling a network AV installation of any size, the DM-NVX-360 includes features such as secure web-based control and management, a scaling HDMI® output, video wall processing, an analog audio input or output, native AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional onboard scaling, HDR (High Dynamic Range) support, and HDCP 2.3 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI® input
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay

- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE+ or optional power pack (sold separately)

Real-Time 4K60 Video Distribution

DM NVX technology ensures real-time, full-motion 4K60 and 5K video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and using a mouse are fluid and natural. Line-synchronized outputs ensure synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-360 can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-360 is configurable to operate as either a network AV encoder or decoder. As an encoder, the connected media source can be transmitted over the network to one or many decoders. As a decoder, the device feeds the received signal to a connected display device, and can quickly switch between multiple encoder feeds. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or can be changed by using the built-in **SETUP** button.

HDMI® Input

The DM-NVX-360 includes one HDMI input. When the DM-NVX-360 is used as a decoder mounted behind a typical conference room display device, the HDMI input provides a convenient way to connect to a Crestron AirMedia® presentation gateway, videoconferencing codec, or small form factor computer.[1]

HDMI Output with 4K60 4:4:4 Scaler

Whether configured as an encoder or decoder, the built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device.[1, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-360 enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-360 is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-360 is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

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. In decoder mode, the DM-NVX-360 can receive both multichannel and 2-channel downmix signals from a DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.[6]

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders. Combining signals from two separate encoders is limited to 2-channel stereo audio.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-360 includes two RJ-45 1000BASE-T LAN ports (Ethernet ports 1 and 2), one RJ-45 100BASE-TX port (Ethernet port 3), and one SFP port (Ethernet port 4). The SFP port enables

connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[2]

Ethernet port 1, 2, or 4 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image. Port 1 is also capable of receiving power from a PoE+ compliant Ethernet switch or third-party IEEE 802.3bt compliant PSE.[1, 8]

An RJ-45 100BASE-TX port is included for connection to a dedicated audio network or for use as a convenience port.

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-360 device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-360, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[9]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be

used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[10]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs. DM NUX, USB-NX2, and USB-EXT DM devices do not support Layer 3.

In addition to USB 2.0 HOST and DEVICE ports, the DM-NVX-360 includes a USB 2.0 HID port that can provide hot key functionality when enabled via the web interface or a control system. When the DM NVX device is operating as a receiver, the HID port can detect a series of hot key sequences on a keyboard and route USB traffic to the control system and then to selected source devices (for example, PCs).

Device Control

The DM-NVX-360 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display, camera, or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-360 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-360 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, DM-NVX-DIR-ENT, or DM-NVX-DIR2) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-360 mounts conveniently to a flat surface or rack rail, and fits easily behind a flat panel display, above a ceiling-mounted projector, beneath a tabletop, or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided using PoE+ or the optional PW-2412WU power pack (sold separately).[8]

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-360 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.

2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-360 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-360 is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both. Analog audio output is functional only when the DM-NVX-360 is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C.
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. Refer to the "Power" specifications section for approved powering options.
9. The DM-NVX-360 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

DM-NVX-363

The DM-NVX-363 is a compact AV-over-IP encoder/decoder designed to function as either a transmitter or receiver. Capable of handling a network AV installation of any size, the DM-NVX-363 includes features such as secure web-based control and management, a scaling HDMI® output, video wall processing, an analog audio input or output, surround sound audio with downmixing, native Dante® and AES67 transmit and receive capability, USB 2.0 and KVM integration, and support for copper and fiber Ethernet connectivity.[1, 2]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional onboard scaling, HDR (High Dynamic Range) support, and HDCP 2.3 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 3]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI® input
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing

- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio with downmixing
- Dante® or AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE+ or optional power pack (sold separately)

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-363 can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-363 is configurable to operate as either a network AV encoder or decoder:

- As an encoder, the DM-NVX-363 allows the HDMI signal of a laptop computer, camera, or other media source to be transmitted over the network to one or many decoders.[3]
- As a decoder, the DM-NVX-363 receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. The decoder can quickly and easily switch between multiple encoders on the network alongside locally connected HDMI sources.[3]

The DM-NVX-363 provides a versatile, cost-effective solution for applications that require encoder and decoder operating modes in a single device. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or can be changed by using the built-in **SETUP** button.

HDMI® Input

The DM-NVX-363 includes one HDMI input. When the DM-NVX-363 is used as a decoder mounted behind a typical conference room display device, the HDMI input provides a convenient way to connect to a Crestron AirMedia® presentation gateway, videoconferencing codec, or small form factor computer.[3]

HDMI Output with 4K60 4:4:4 Scaler

When the DM-NVX-363 is configured as a decoder, the HDMI output feeds the decoded signal to the HDMI input of a local display device, switcher, or other equipment. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device. When the DM-NVX-363 is configured as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.[3, 4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Dynamic Text Overlay

The DM-NVX-363 enables the display of dynamic text, providing a means to label the video source or to display special instructions, schedules, announcements, alerts, and other messaging.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

When the DM-NVX-363 is configured as a decoder, an image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Test Pattern Generator

When the DM-NVX-363 is configured as an encoder, the built-in test pattern generator can be used during setup to ensure that video streaming is functional. The test pattern generator can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[5]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.

7.1 Surround Sound Audio with Downmixing

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[6]. The DM-NVX-363 can decode the incoming multichannel surround sound signal, whether from the network or an HDMI input, and downmix that signal to stereo. The stereo downmix signal is automatically routed to the built-in analog output[7], while the HDMI output can be configured to output either stereo or multichannel signals. As an encoder, the distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.

> **NOTE:** The DSP of the DM-NVX-363 is compatible with Dolby Atmos audio using True HD or Dolby Digital Plus audio formats.

Dante® and DM NAX® Audio Embedding or De-embedding

Dante and AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel Dante or AES67 source while another 2-channel Dante or AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received Dante or AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received Dante or AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

> **NOTE:** A Dante or AES67 audio stream that is received by a DM NVX endpoint cannot be transmitted from that endpoint.

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders. Combining signals from two separate encoders is limited to 2-channel stereo audio.[8]

Copper and Fiber Ethernet Connectivity

The DM-NVX-363 includes two RJ-45 1000BASE-T ports (Ethernet ports 1 and 2), one RJ-45 100BASE-TX port (Ethernet port 3), and one SFP port (Ethernet port 4). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.[3]

Ethernet port 1, 2, or 4 can be used to transport video over a Gigabit Ethernet network. Ports 1 and 2 can also be used to provide network connections for an AirMedia gateway, display device, or other local device. In addition, the ports can be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image. Port 1 is also capable of receiving power from a POE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE (power sourcing equipment).[2, 9]

An RJ-45 100BASE-TX port is included for connection to a dedicated audio network or for use as a convenience port.

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables a DM NVX 4K60 4:4:4 encoder to be connected directly to a DM NVX 4K60 4:4:4 decoder to stream video, audio, and USB signals. Rather than being connected to a Gigabit Ethernet network, a 1000BASE-T Ethernet port of an encoder is connected directly to a 1000BASE-T port of a decoder. By default, point-to-point mode is enabled and can be disabled if desired.

When point-to-point mode is enabled and a direct connection between an encoder and decoder is automatically detected, no additional configuration is required for the encoder or decoder to operate in point-to-point mode; however, the operating mode of a DM-NVX-363 device must be configured correctly. If the device is to function as an encoder, the operating mode of the device must be configured as an encoder. If the device is to function as a decoder, the operating mode must be configured as a decoder. In addition, a control system is required for CEC (Consumer Electronics Control), IR, and RS-232 control.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 **HOST** and **DEVICE** ports are provided on the DM-NVX-363, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint. In addition to KVM switch functionality, various types of USB peripherals are supported, including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.[10]

USB 2.0 data transport can be configured for Layer 2 or Layer 3. Layer 2 supports USB signal extension in point-to-point and multipoint applications. USB signals can be routed from the **HOST** port of up to seven remote DM NVX endpoints to the **DEVICE** port of a single local DM NVX endpoint. Layer 2 also supports Crestron USB over Ethernet Network extenders, which consist of the DM-NUX-L2, DM-NUX-R2, DM-NUX-L2-1G, DM-NUX-R2-1G, and legacy models (USB-NX2-LOCAL-1G, USB-NX2-REMOTE-1G, USB-EXT-DM-LOCAL, and USB-EXT-DM-REMOTE). The USB extenders can be used in locations that do not include DM NVX endpoints. USB signals can be routed between DM NVX endpoints and USB extenders under the management of a control system.[11]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs. DM NUX, USB-NX2, and USB-EXT DM devices do not support Layer 3.

In addition to USB 2.0 HOST and DEVICE ports, the DM-NVX-363 includes a USB 2.0 HID port that can provide hot key functionality when enabled via the web interface or a control system. When the DM NVX device is operating as a receiver, the HID port can detect a series of hot key sequences on a keyboard and route USB traffic to the control system and then to selected source devices (for example, PCs).

Device Control

The DM-NVX-363 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display, camera, or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-363 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-363 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80,

DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-363 mounts conveniently to a flat surface or rack rail, and fits easily behind a flat panel display, above a ceiling-mounted projector, beneath a tabletop, or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided using PoE+ or the optional PW-2412WU power pack (sold separately).[9]

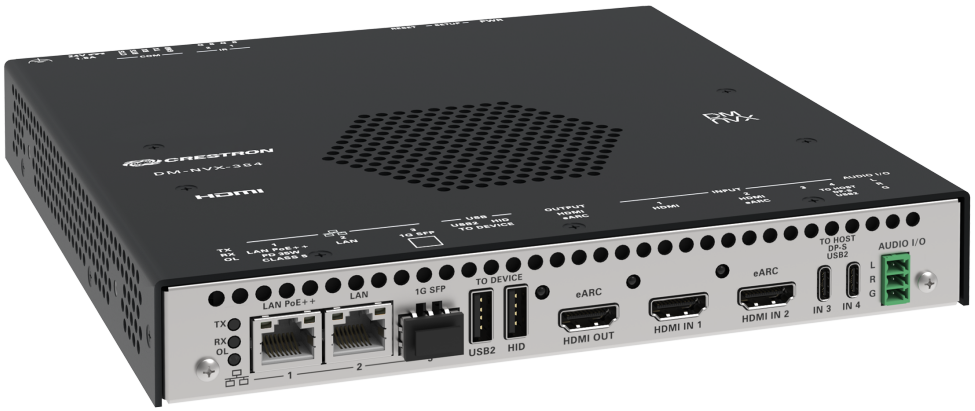
Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-363 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-363 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-363 is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The DM-NVX-363 does not down-mix Dolby Atmos MAT 2.0 audio.
7. The analog audio port can function as an input or output, not both.
8. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
9. Refer to the "Power" specifications section for approved powering options.
10. The DM-NVX-363 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
11. USB 2.0 extension and switching over LAN may not work when directly connecting a host PC's USB-C port to a DM-NVX-36X series endpoint's USB-C port. This is a known hardware limitation. Connect the host PC's USB-A port (if available) to the DM NVX endpoint using a USB-A to USB-C cable. A USB OTG USB-C to USB-A adapter may also be used at the host PC's USB-C port, which would be connected to the DM NVX endpoint using a USB-A to USB-C cable.

DM-NVX-384

The DM-NVX-384 is a compact DM NVX® AV-over-IP encoder/decoder designed to function as either a transmitter or receiver. Capable of handling a network AV installation of any size, the DM-NVX-384 includes features such as secure web-based control and management, a scaling HDMI output, video wall processing, an analog audio input or output, native AES67 transmit and receive capability, surround sound audio, support for copper and fiber-optic Ethernet connectivity, and USB 2.0 and KVM integration.[1, 2]



- Two HDMI® and two USB-C® inputs
- 4K60 4:4:4 video over standard Gigabit Ethernet
- Support for 5K Wide (16:9), Ultra-Wide (21:9), and Super-Wide (32:9) resolutions
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio support

- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- Compact, surface-mountable design
- Powered via PoE++ or optional power pack (sold separately)

Multiview

The DM-NVX-384 supports Multiview, allowing up to 6 discrete video signals to be combined into a single video output. While operating as an encoder, the DM NVX device can send both a traditional DM NVX AV-over-IP stream and a Multiview AV-over-IP stream. The traditional stream is compatible with DM NVX decoders that do not support Multiview, allowing the same content to pass to any decoder simultaneously, regardless of Multiview support. Multiview streams are supported on a nonblocking 1 Gbps, meaning they do not require any additional network bandwidth compared to traditional DM NVX AV-over-IP streams.

HDMI® and USB-C® 4x1 Input Switching

The DM-NVX-384 includes two HDMI inputs and two USB-C inputs that comprise a 4x1 input switcher. Switching between the four inputs can be performed automatically using auto-switching mode, programmatically via a control system, or through the web interface. When mounted behind a conference room display device, the HDMI input provides a convenient way to connect a Crestron AirMedia® presentation gateway, video-conferencing codec, or small form factor computer. The USB-C inputs allow for a DisplayPort™ Alt Mode video connection to laptops that do not feature an HDMI connection. The USB-C connectors also pass USB 2.0 data back and forth from the host PC and other DM NVX or DM NUX endpoints.

Real-Time 4K60 Video Distribution

DM NVX technology ensures real-time, full-motion 4K60 and 5K video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and using a mouse are fluid and natural. Line-synchronized outputs ensure synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers.

Support for 5K Resolutions

The DM-NVX-384 includes support for 5K Ultra-Wide 5120 × 2160 and 5K Super-Wide 5120 × 1440 video resolutions, expanding the DM NVX product family's compatibility with the latest generation of

computers, monitors, and displays.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-384 can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The DM-NVX-384 is configurable to operate as either a network AV encoder or decoder. As an encoder, the connected media source can be transmitted over the network to one or many decoders. As a decoder, the device feeds the received signal to a connected display device, and can quickly switch between multiple encoder feeds. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or can be changed by using the built-in **SETUP** button.

HDMI Output with 5K Scaler

Whether configured as an encoder or decoder, the built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device.[4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

Analog Audio Embedding or De-embedding

An unbalanced stereo analog audio port is included, which can be configured as either an input or output. As an input, the port allows a stereo audio source to be connected and combined with the video signal from either HDMI input or the incoming network video stream. As an output, the port can provide a stereo line-level signal to feed a local sound system or soundbar. The output volume is adjustable via a control system or web browser.[6]

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. In decoder mode, the DM-NVX-384 can receive both multichannel and 2-channel downmix signals from a DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C encoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.[6]

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, and analog audio output. In DM NVX decoder mode, the received AES67 audio stream can be combined with the video and then output via the HDMI output and analog audio output.

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

Breakaway Audio

A DM NVX decoder can select and combine separate video and audio signals from two different inputs or even two different encoders. Combining signals from two separate encoders is limited to 2-channel stereo audio.[7]

Copper and Fiber Ethernet Connectivity

The DM-NVX-384 includes two RJ-45 1000BASE-T ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). Any Ethernet port can be used to transport video over a Gigabit Ethernet network. The ports can also be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 ports are provided on the DM-NVX-384, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint.[9]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Device Control

The DM-NVX-384 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display, camera, or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-384 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-384 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using a DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, DM-NVX-DIR-ENT, or DM-NVX-DIR2) enhances and streamlines the entire

configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-384 mounts conveniently to a flat surface or rack rail, and fits easily behind a flat panel display, above a ceiling-mounted projector, beneath a tabletop, or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided using PoE++ or the optional PW-2420RU power pack (sold separately).[8]

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-384 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-384 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the DM-NVX-384 is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. Refer to the "Power" specifications section for approved powering options.
9. The DM-NVX-384 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

Application Diagrams

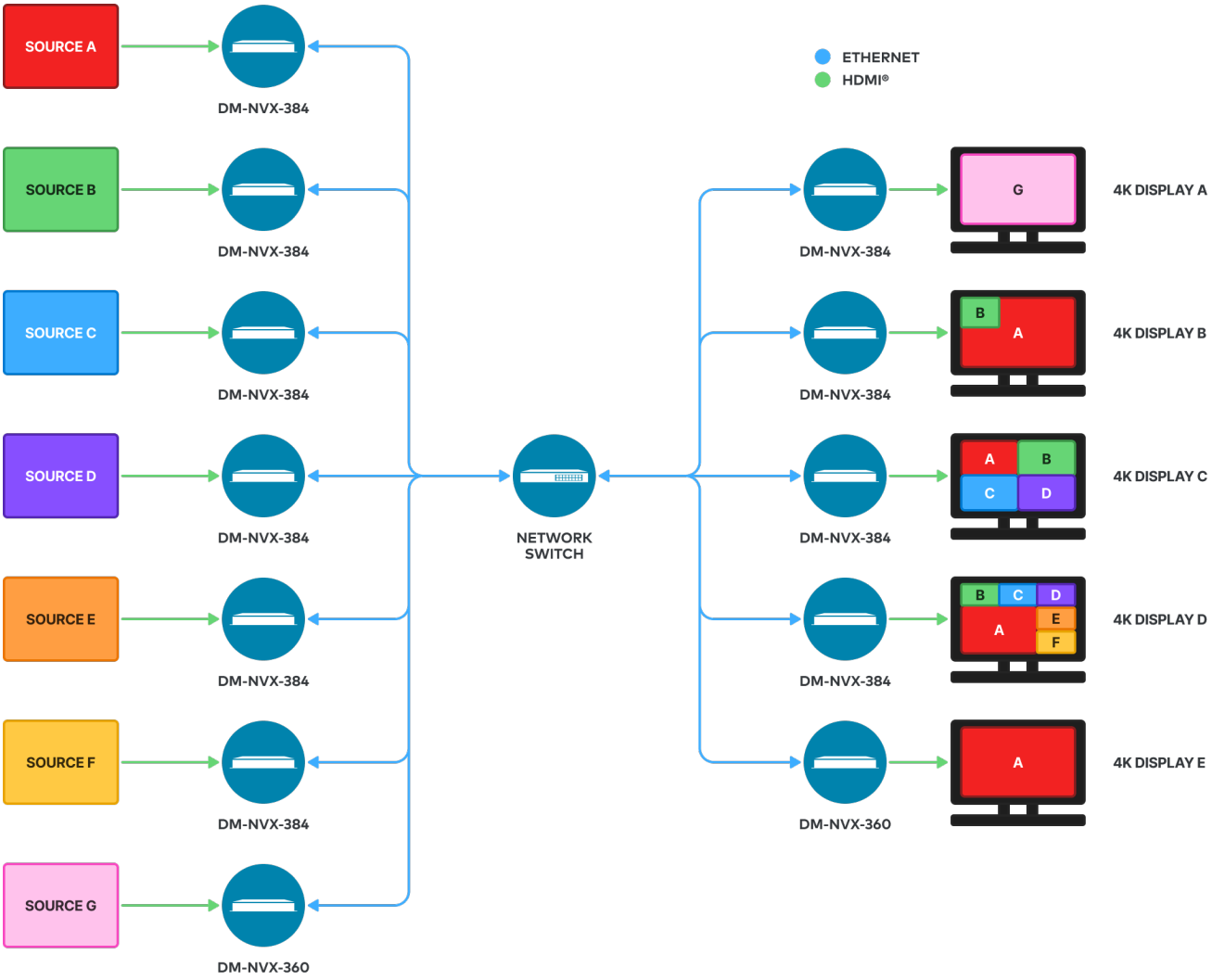
This section highlights applications for the differentiating features of the DM-NVX-384.

DM-NVX-384 Multiview

This application shows a mix of DM NVX models, highlighting which ones can receive specific streams and how those streams are combined into video outputs. To implement Multiview, the feature must be configured on both the encoders and decoders. The decoders shown are configured for specific layouts to receive different combinations of transmitter signals:

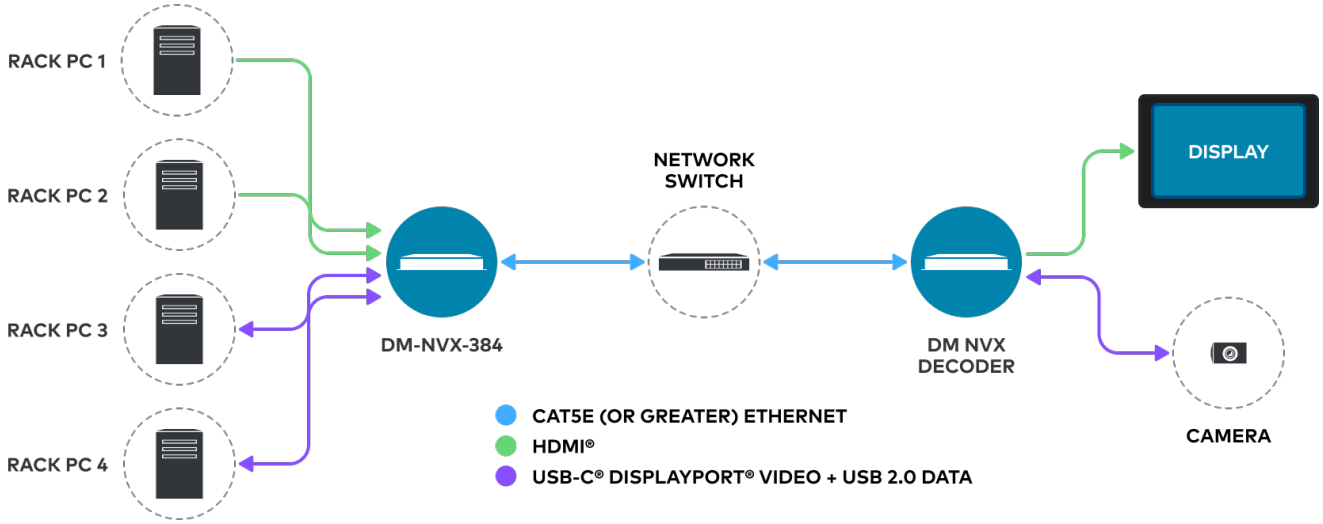
- **4K Display A:** The decoder is configured with the **Full Screen** layout to receive a standard DM NVX stream from Source G via a DM-NVX-360 encoder.
- **4K Display B:** The decoder is configured with the **PIP Small Top Left** layout to receive Multiview streams from Source A and Source B via two DM-NVX-384 encoders.

- **4K Display C:** The decoder is configured with the **2 Top 2 Bottom** layout to receive Multiview streams from Sources A-D via four DM-NVX-384 encoders.
- **4K Display D:** The decoder is configured with the **5 Around, 1 Large Bottom Left** layout to receive Multiview streams from Sources A-F via six DM-NVX-384 encoders.
- **4K Display E:** The decoder does not support Multiview, but is still receiving a standard DM NVX stream from Source A via a DM-NVX-384.



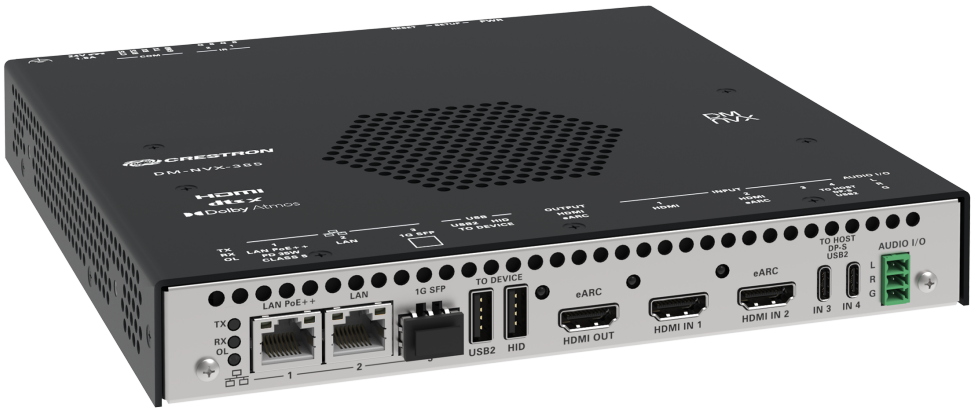
DM-NVX-384 Input Switching

This application shows a DM-NVX-384 fully populated with four video input connections. The internal 4x1 video switcher allows for dynamic routing of these four sources based either on signal detection or custom programming. The USB-C DisplayPort sources connected on inputs 3 and 4 can also receive USB 2.0 device data from a connected peripheral at the downstream DM NVX decoder.



DM-NVX-385

The DM-NVX-385 is a compact DM NVX® AV-over-IP encoder/decoder designed to function as either a transmitter or receiver. Capable of handling a network AV installation of any size, the DM-NVX-385 includes features such as secure web-based control and management, a scaling HDMI output, video wall processing, an analog audio input or output[5], native AES67 transmit and receive capability, surround sound audio with downmixing, support for copper and fiber-optic Ethernet connectivity, and USB 2.0 and KVM integration.[1, 2]



- Two HDMI® and two USB-C® inputs
- 4K60 4:4:4 video over standard Gigabit Ethernet
- Support for 5K Wide (16:9), Ultra-Wide (21:9), and Super-Wide (32:9) resolutions
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Configurable as an encoder or decoder
- One HDMI output with 4K60 4:4:4 scaler
- Video wall processing
- Dynamic text overlay
- Image preview
- Background image for on-screen display
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio embedding or de-embedding
- 7.1 surround sound audio with downmixing

- AES67 audio embedding and de-embedding
- Breakaway audio
- USB 2.0 and KVM signal extension and routing
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- Compact, surface-mountable design
- Powered via PoE++ or optional power pack (sold separately)

Multiview

The DM-NVX-38 supports Multiview, allowing up to 6 discrete video signals to be combined into a single video output. While operating as an encoder, the DM NVX device can send both a traditional DM NVX AV-over-IP stream and a Multiview AV-over-IP stream. The traditional stream is compatible with DM NVX decoders that do not support Multiview, allowing the same content to pass to any decoder simultaneously, regardless of Multiview support. Multiview streams are supported on a nonblocking 1 Gbps, meaning they do not require any additional network bandwidth compared to traditional DM NVX AV-over-IP streams.

HDMI® and USB-C® 4x1 Input Switching

The DM-NVX-38 includes two HDMI inputs and two USB-C inputs that comprise a 4x1 input switcher. Switching between the four inputs can be performed automatically using auto-switching mode, programmatically via a control system, or through the web interface. When mounted behind a conference room display device, the HDMI input provides a convenient way to connect a Crestron AirMedia® presentation gateway, video-conferencing codec, or small form factor computer. The USB-C inputs allow for a DisplayPort™ Alt Mode video connection to laptops that do not feature an HDMI connection. The USB-C connectors also pass USB 2.0 data back and forth from the host PC and other DM NVX or DM NUX endpoints.

Real-Time 4K60 Video Distribution

DM NVX technology ensures real-time, full-motion 4K60 and 5K video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and using a mouse are fluid and natural. Line-synchronized outputs ensure synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast TTL (Time To Live) enables traversing multiple network routers.

Support for 5K Resolutions

The DM-NVX-38 includes support for 5K Ultra-Wide 5120 × 2160 and 5K Super-Wide 5120 × 1440 video resolutions, expanding the DM NVX product family's compatibility with the latest generation of

computers, monitors, and displays.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the can encode or decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder or Decoder Functionality

The is configurable to operate as either a network AV encoder or decoder. As an encoder, the connected media source can be transmitted over the network to one or many decoders. As a decoder, the device feeds the received signal to a connected display device, and can quickly switch between multiple encoder feeds. The operating mode can be reconfigured dynamically in less than 1 minute via a control system or web browser or .

HDMI Output with 5K Scaler

Whether configured as an encoder or decoder, the built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device.[4]

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to eight wide by eight high.

7.1 Surround Sound Audio with Downmixing

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. The DM-NVX-385 can decode the incoming multichannel surround sound signal from the network or an HDMI input and then downmix that signal to stereo. The stereo downmix signal is automatically routed to the analog output[5], while the HDMI output can be configured to output either stereo or multichannel signals. As an encoder, the DM-NVX-385 distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.

Audio Embedding and De-embedding

AES67 support via native integration of Crestron DM NAX® audio-over-IP technology allows the selected audio source to be transmitted as a 2-channel AES67 source. Another AES67 2-channel audio stream can be received from a Crestron DM NAX device or other AES67 capable device simultaneously and combined with the video signal.

In DM NVX encoder mode, the received AES67 audio stream can be output via the local HDMI output, primary AV stream, secondary audio stream, and analog audio output. In DM NVX decoder mode, the AES67 received audio stream can be combined with the video and then output via the HDMI output and analog audio output.

An unbalanced stereo analog audio port is also included, which can be configured as either an input or output.[5]

Copper and Fiber Ethernet Connectivity

The DM-NVX-38 includes two RJ-45 1000BASE-T ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). Any Ethernet port can be used to transport video over a Gigabit Ethernet network. The ports can also be used to daisy chain multiple endpoints feeding a single-source video wall or individual displays that show the same video image.[1]

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

USB 2.0 and KVM Integration

DM NVX technology supports the extension of USB signals, which can be switched and routed alongside the AV signal or separately via a control system. USB 2.0 ports are provided on the DM-NVX-38, allowing a USB mouse, keyboard, or other peripheral device to be connected to a remote endpoint and routed to a computer or other host at the local endpoint.[9]

USB 2.0 Layer 3 data transport supports USB signal extension in DM NVX point-to-point applications across VLANs.

Streamlined Management Using a DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, DM-NVX-DIR-ENT, or DM-NVX-DIR2) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Crestron XiO Cloud® Service Support

The is compatible with the XiO Cloud service, which is a platform for remotely provisioning, monitoring, and managing Crestron devices across an enterprise or an entire client base. The service enables installers and IT managers to deploy and manage thousands of devices in the amount of time it previously took to manage a single device. Refer to the XiO Cloud service feature page for more information.

Low-Profile Installation

The mounts conveniently to a flat surface or rack rail, and fits easily behind a flat panel display, above a ceiling-mounted projector, beneath a tabletop, or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided using PoE++ or the optional PW-2420RU power pack (sold separately).[8]

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.

2. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. When the is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
6. The analog audio port can function as an input or output, not both
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. Refer to the "Power" specifications section for approved powering options.
9. The can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

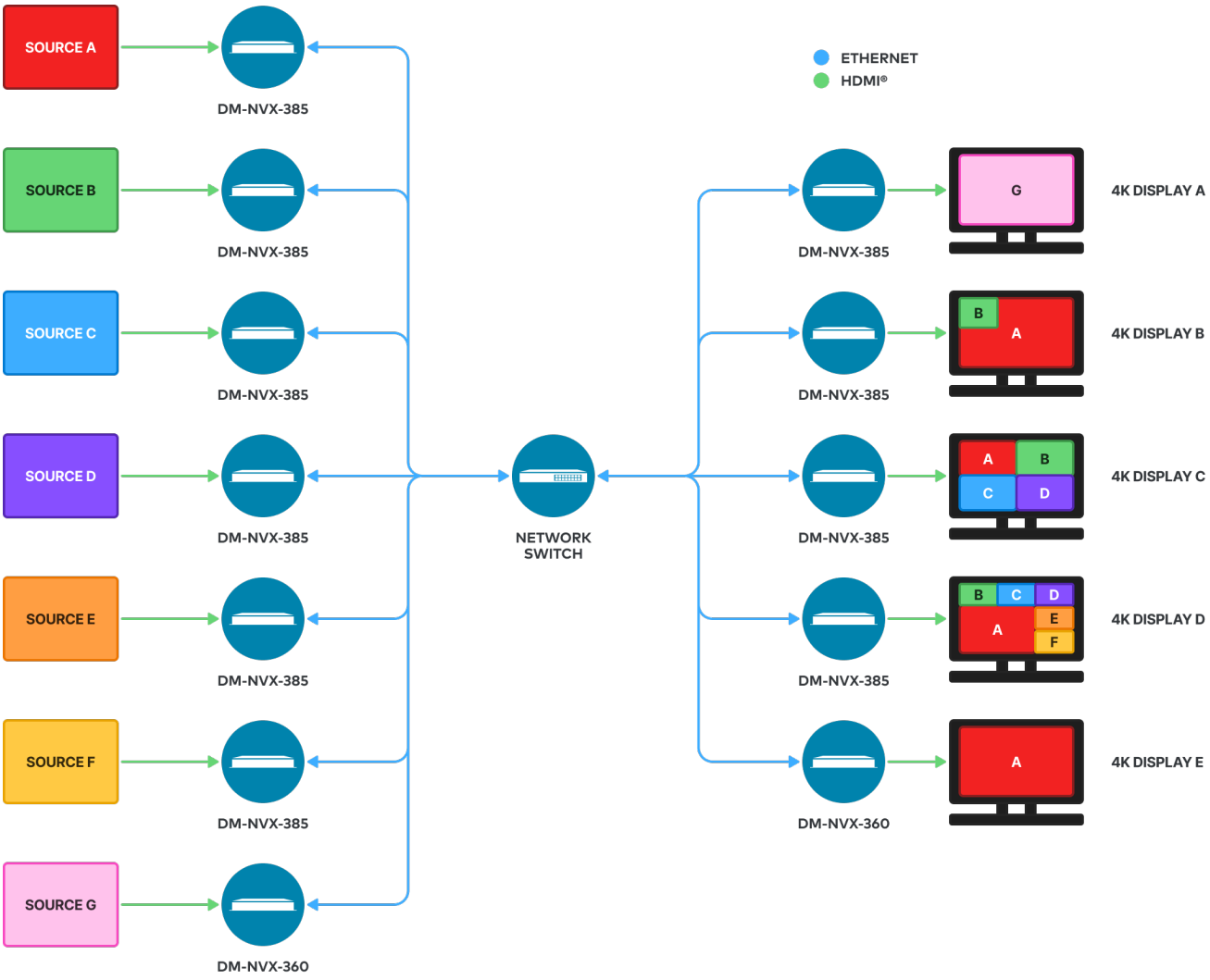
Application Diagrams

This section highlights applications for the differentiating features of the DM-NVX-385.

DM-NVX-385 Multiview

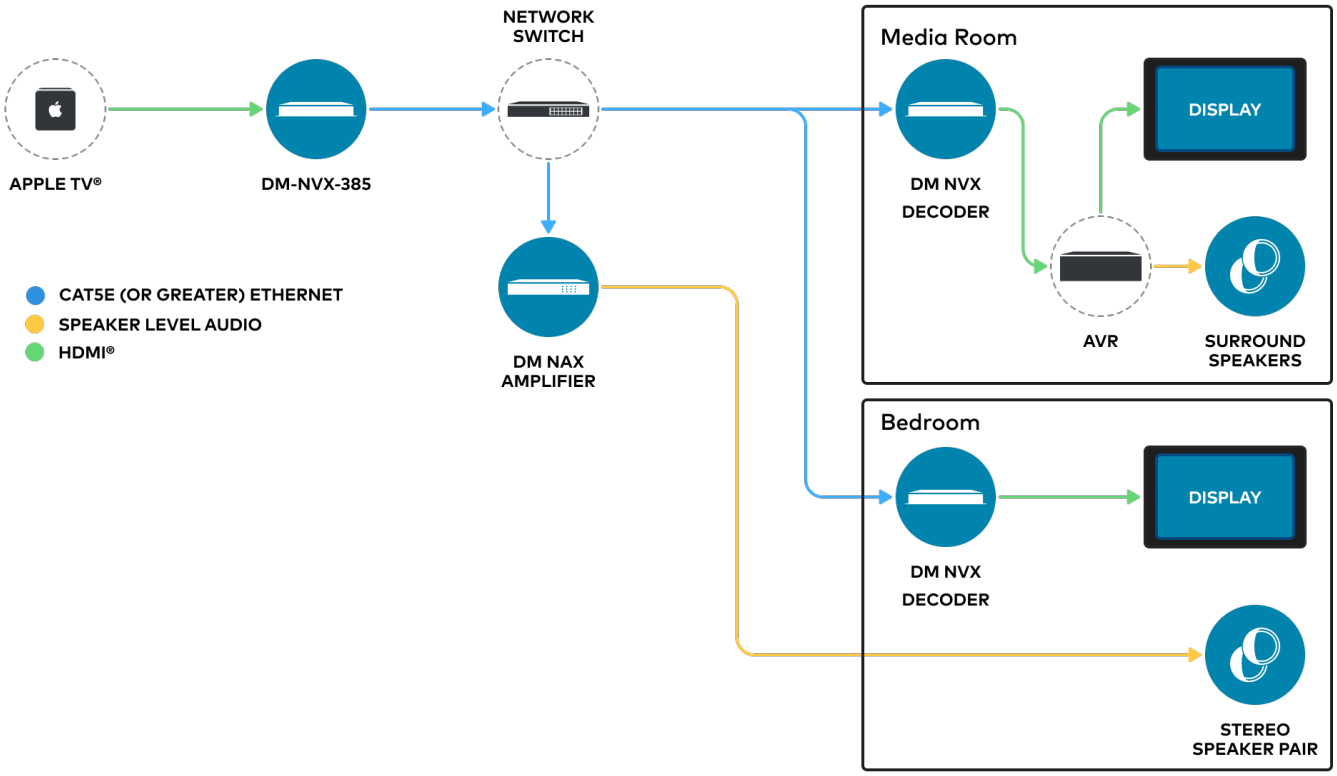
This application shows a mix of DM NVX models, highlighting which ones can receive specific streams and how those streams are combined into video outputs. To implement Multiview, the feature must be configured on both the encoders and decoders. The decoders shown are configured for specific layouts to receive different combinations of transmitter signals:

- **4K Display A:** The decoder is configured with the **Full Screen** layout to receive a standard DM NVX stream from Source G via a DM-NVX-360 encoder.
- **4K Display B:** The decoder is configured with the **PIP Small Top Left** layout to receive Multiview streams from Source A and Source B via two DM-NVX-385 encoders.
- **4K Display C:** The decoder is configured with the **2 Top 2 Bottom** layout to receive Multiview streams from Sources A-D via four DM-NVX-385 encoders.
- **4K Display D:** The decoder is configured with the **5 Around, 1 Large Bottom Left** layout to receive Multiview streams from Sources A-F via six DM-NVX-385 encoders.
- **4K Display E:** The decoder does not support Multiview, but is still receiving a standard DM NVX stream from Source A via a DM-NVX-385.


ETHERNET
HDMI®
SOURCE A
SOURCE B
SOURCE C
SOURCE D
SOURCE E
SOURCE F
SOURCE G
DM-NVX-385
DM-NVX-385
DM-NVX-385
DM-NVX-385
DM-NVX-385
DM-NVX-385
DM-NVX-360
NETWORK SWITCH
DM-NVX-385
DM-NVX-385
DM-NVX-385
DM-NVX-385
DM-NVX-360
G
4K DISPLAY A
B
A
4K DISPLAY B
A
B
C
D
4K DISPLAY C
B
C
D
A
E
F
4K DISPLAY D
A
4K DISPLAY E

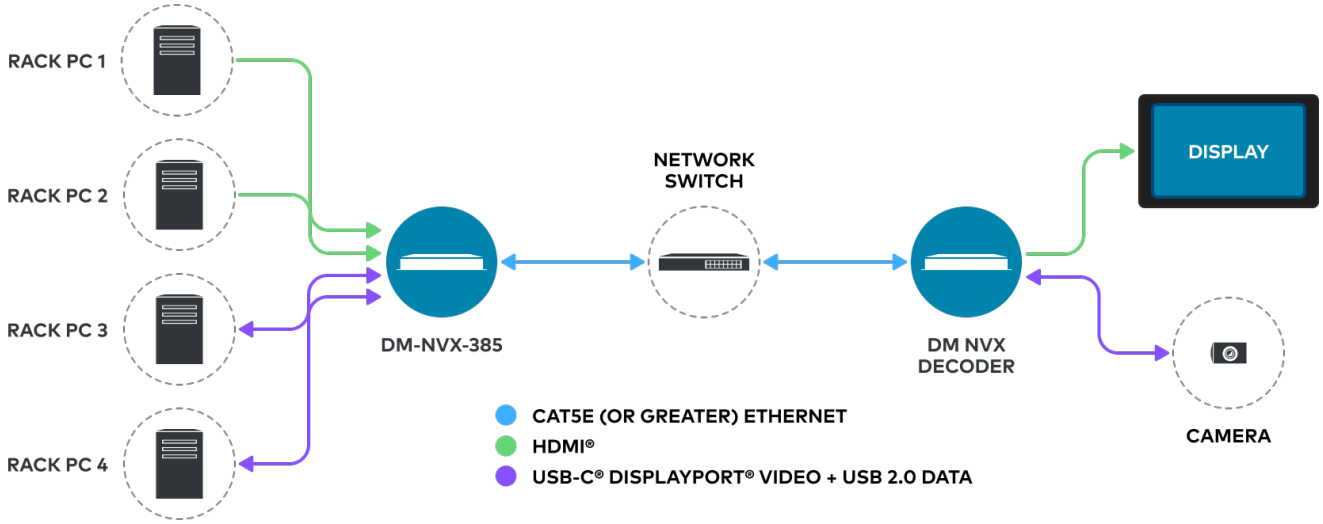
DM-NVX-385 Downmixing Surround Audio

This application shows an Apple TV® streaming player feeding an HDMI signal to a DM-NVX-385 encoder. This signal includes surround sound audio, but one of the output zones is only capable of stereo audio playback. The DM-NVX-385 creates a downmix of the surround sound audio signal to feed a 2-channel DM NAX audio-over-IP stream to a DM NAX amplifier on the network while still preserving the original surround sound signal for the multichannel AVR in the media room.



DM-NVX-385 Input Switching

This application shows a DM-NVX-385 fully populated with four video input connections. The internal 4x1 video switcher allows for dynamic routing of these four sources based either on signal detection or custom programming. The USB-C DisplayPort sources connected on inputs 3 and 4 can also receive USB 2.0 device data from a connected peripheral at the downstream DM NVX decoder.



DM-NVX-D10

The DM-NVX-D10 is a compact AV over IP decoder designed to receive video with resolutions up to 1080p 4:4:4 over standard Gigabit Ethernet. Featuring secure web-based control and management, an HDMI® output, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE support, the DM-NVX-D10 provides a decoder solution that offers price and performance optimization in a DM NVX® network AV installation of any size.[1]



- Support of video resolutions up to 1080p 4:4:4 over standard Gigabit Ethernet
- Real-time video performance over the network
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 1.4 compliant
- Decoder functionality designed for use with the DM-NVX-E10 encoder, with support for other DM NVX® products that can function as encoders
- One HDMI® output
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE support
- Automatic point-to-point connectivity with the DM-NVX-E10
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support

- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE or optional power pack (sold separately)

Real-Time 1080p60 Video Performance

Engineered for demanding conference room and classroom applications, the DM-NVX-D10 ensures real-time, full-motion 1080p60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Decoder Functionality

The DM-NVX-D10 provides decoder functionality designed for use with the DM-NVX-E10 encoder. Both the DM-NVX-D10 and DM-NVX-E10 support resolutions up to 1080p60. The DM-NVX-D10 receives a signal from the DM-NVX-E10 and feeds it to a local display device via the HDMI output.

> **NOTE:** In addition to the DM-NVX-E10, the DM-NVX-D10 is also interoperable with other DM NVX products that can function as encoders. The resolution of the encoder must be configured so that it does not exceed the maximum resolution of the DM-NVX-D10. If the DM-NVX-D10 is used with a DM NVX encoder other than the DM-NVX-E10 or DM-NVX-E20 Series, the stream type of the encoder must also be configured to interoperate with the DM-NVX-D10. Configuration of the encoder is accomplished by using the web interface or a control system.
>
> It is recommended that the DM-NVX-D10 not be used with 4K60 4:4:4 encoders (for example, the DM-NVX-38x[C] Series) or the 4K60 4:2:0 encoders (DM-NVX-E20 Series) in order to maintain the higher resolutions supported by the 4K60 4:4:4 and 4:2:0 encoders.
>
> The HDMI output of the DM-NVX-D10 does not support video scaling.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume can be adjusted by using the web interface or a control system.[2]

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio

stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-D10 includes one RJ-45 1000BASE-T Ethernet port.[1] The port is PoE compliant, enabling the device to be powered via a PoE Ethernet switch.[3] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-D10 to be connected directly to a DM-NVX-E10 to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the DM-NVX-D10 is connected directly to the 1000BASE-T port of the DM-NVX-E10. By default, point-to-point mode automatically detects whether a DM-NVX-D10 is connected directly to the DM-NVX-E10 or to a 1000BASE-T switch. When a direct connection between the DM-NVX-D10 and DM-NVX-E10 is detected, the devices operate in point-to-mode without the need for additional configuration. The web interface or a control system can be used to disable point-to-point mode or to enable automatic detection of point-to-point connectivity.

Device Control

The DM-NVX-D10 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-D10 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-D10 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-D10 mounts conveniently to a flat surface or rack rail and fits easily behind a flat panel display, above a ceiling-mounted projector, or inside an AV cart or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE or an optional power pack (sold separately).[3]

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-D10 is for connection to an Ethernet network or device. The Ethernet port cannot be connected to the DM® port of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. The analog audio output is functional only when the DM-NVX-D10 is receiving a 2-channel stereo input signal.
3. In order for the Ethernet port to receive PoE, the port must be connected to a PoE compliant Ethernet switch or other equipment that has a PoE power sourcing equipment (PSE) port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

DM-NVX-D20

The DM-NVX-D20 is a compact AV-over-IP decoder designed to receive video with resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet. Featuring secure web-based control and management, an HDMI® output, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE support, the DM-NVX-D20 provides a decoder solution that offers price and performance optimization in a DM NVX network AV installation of any size.[1, 2]



- Support of video resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet, 4K30 4:4:4 included
- Real-time video performance over the network
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Decoder functionality designed for use with the DM-NVX-E20 or DM-NVX-E10, with support for other DM NVX® products that can function as encoders
- One HDMI® output
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE support
- Automatic point-to-point connectivity with the DM-NVX-E20 or DM-NVX-E10
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support

- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE or optional power pack (sold separately)

Real-Time 4K60 Video Performance

Engineered for demanding conference room and classroom applications, the DM-NVX-D20 ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Decoder Functionality

The DM-NVX-D20 provides decoder functionality designed for use with the DM-NVX-E20 or DM-NVX-E10 encoder. The DM-NVX-D20 supports resolutions up to 4K60 4:2:0 including 4K30 4:4:4. The DM-NVX-D20 receives a signal from the DM-NVX-E20 or DM-NVX-E10 and feeds it to a local display device via the HDMI output.

> **NOTE:** In addition to the DM-NVX-E20 or DM-NVX-E10, the DM-NVX-D20 is also interoperable with other DM NVX products that can function as encoders. If the DM-NVX-D20 is used with a DM NVX encoder other than the DM-NVX-E20 or DM-NVX-E10, the stream type of the encoder must be configured to interoperate with the DM-NVX-D20. The resolution of the encoder must also be configured so that it does not exceed the maximum resolution of the DM-NVX-D20. Configuration of the encoder is accomplished by using the web interface or a control system.
>
> It is recommended that the DM-NVX-D20 not be used with 4K60 4:4:4 encoders (for example, the DM-NVX-38x[C] Series) in order to maintain the higher resolutions supported by the 4K60 4:4:4 encoders.
>
> The HDMI output of the DM-NVX-D20 does not support video scaling.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume can be adjusted by using the web interface or a control system.[3]

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-D20 includes one RJ-45 1000BASE-T Ethernet port.[2] The port is PoE compliant, enabling the device to be powered via a PoE Ethernet switch.[4] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-D20 to be connected directly to a DM-NVX-E20 or DM-NVX-E10 to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the DM-NVX-D20 is connected directly to the 1000BASE-T port of the encoder. By default, point-to-point mode automatically detects whether a DM-NVX-D20 is connected directly to the encoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-D20 and the encoder is detected, the devices operate in point-to-point mode without the need for additional configuration. The web interface or a control system can be used to disable point-to-point mode or to enable automatic detection of point-to-point connectivity.

Device Control

The DM-NVX-D20 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-D20 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-D20 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-D20 mounts conveniently to a flat surface or rack rail and fits easily behind a flat panel display, above a ceiling-mounted projector, or inside an AV cart or equipment cabinet. All connectors and

LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE or an optional power pack (sold separately).[4]

Notes:

1. For 4K60 4:2:0 or 4K30 4:4:4 performance, HDMI cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-D20 is for connection to an Ethernet network or device. The Ethernet port cannot be connected to the DM® port of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
3. The analog audio output is functional only when the DM-NVX-D20 is receiving a 2-channel stereo input signal.
4. In order for the Ethernet port to receive PoE, the port must be connected to a PoE compliant Ethernet switch or other equipment that has a PoE power sourcing equipment (PSE) port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

DM-NVX-D200

The DM-NVX-D200 is a compact AV-over-IP decoder designed to receive video with resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet. Featuring secure web-based control and management, an HDMI® output with 4K60 video scaler, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE+ support, the DM-NVX-D200 provides a decoder solution that offers price and performance optimization in a DM NVX® network AV installation of any size.[1, 2]



- Support of video resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet, 4K30 4:4:4 included
- Real-time video performance over the network
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Decoder functionality designed for use with the DM-NVX-E20 or DM-NVX-E10, with support for other DM NVX® products that can function as encoders
- One HDMI® output with 4K60 4:2:0 video scaler
- Video wall processing
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE+ support
- Automatic point-to-point connectivity with the DM-NVX-E20 or DM-NVX-E10
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support

- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE+ or optional power pack (sold separately)

Real-Time 4K60 Video Performance

Engineered for demanding conference room and classroom applications, the DM-NVX-D200 ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Decoder Functionality with 4K60 4:2:0 Scaler

The DM-NVX-D200 provides decoder functionality designed for use with the DM-NVX-E20 or DM-NVX-E10 encoder. The DM-NVX-D200 supports resolutions up to 4K60 4:2:0 including 4K30 4:4:4. The DM-NVX-D200 receives a signal from the DM-NVX-E20 or DM-NVX-E10 and feeds it to a local display device via the HDMI output. The built-in scaler ensures an optimal image, scaling the encoded source resolution up or down to match the native resolution of the display device.

> **NOTE:** In addition to the DM-NVX-E20 or DM-NVX-E10, the DM-NVX-D200 is also interoperable with other DM NVX products that can function as encoders. If the DM-NVX-D200 is used with a DM NVX encoder other than the DM-NVX-E20 or DM-NVX-E10, the stream type of the encoder must be configured to interoperate with the DM-NVX-D200. The resolution of the encoder must also be configured so that it does not exceed the maximum resolution of the DM-NVX-D200. Configuration of the encoder is accomplished by using the web interface or a control system.
>
> It is recommended that the DM-NVX-D200 not be used with 4K60 4:4:4 encoders (for example, the DM-NVX-38x[C] Series) in order to maintain the higher resolutions supported by the 4K60 4:4:4 encoders.

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM NVX endpoints. Each endpoint provides fully adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM NVX endpoint is required per display, supporting configurations of up to 8 wide by 8 high.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume can be adjusted by using the web interface or a control system.[3]

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-D200 includes one RJ-45 1000BASE-T Ethernet port.[2] The port is PoE+ compliant, enabling the device to be powered via a PoE+ Ethernet switch.[4] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-D200 to be connected directly to a DM-NVX-E20 or DM-NVX-E10 to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the DM-NVX-D200 is connected directly to the 1000BASE-T port of the encoder. By default, point-to-point mode automatically detects whether a DM-NVX-D200 is connected directly to the encoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-D200 and the encoder is detected, the devices operate in point-to-point mode without the need for additional configuration. The web interface or a control system can be used to disable point-to-point mode or to enable automatic detection of point-to-point connectivity.

Device Control

The DM-NVX-D200 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-D200 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-D200 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-D200 mounts conveniently to a flat surface or rack rail and fits easily behind a flat panel display, above a ceiling-mounted projector, or inside an AV cart or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE+ or an optional power pack (sold separately).[4]

Notes:

1. For 4K60 4:2:0 or 4K30 4:4:4 performance, HDMI cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-D200 is for connection to an Ethernet network or device. The Ethernet port cannot be connected to the DM® port of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
3. The analog audio output is functional only when the DM-NVX-D200 is receiving a 2-channel stereo input signal.
4. In order for the Ethernet port to receive PoE+, the port must be connected to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ power sourcing equipment (PSE) port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

DM-NVX-D30

The DM-NVX-D30 is a compact AV over IP decoder designed to function as a receiver. Featuring secure web-based control and management, an HDMI® output, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE+ support, the DM-NVX-D30 offers a decoder solution for a DM NVX network AV installation of any size.[1]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional on-board scaling, HDR (High Dynamic Range) support, and HDCP 2.3 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 2]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Decoder functionality for use with DM NVX® products that can function as encoders
- One HDMI® output
- Image preview
- Background image for on-screen display
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE+ support

- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE+ or optional power pack (sold separately)

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. The DM-NVX-D30 can decode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at any resolution up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Decoder Functionality

The DM-NVX-D30 is a basic decoder that receives a signal from a DM NVX encoder and feeds it to a local display device via the HDMI output. The DM-NVX-D30 can quickly and easily switch among multiple encoders on the network. Compatible with DM NVX products that can function as encoders, the DM-NVX-D30 can be used in any DM NVX network AV design.

> **NOTE:** The HDMI output of the DM-NVX-D30 does not support video scaling.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Background Image for On-Screen Display

An image can be uploaded to the device for use as a background image on a display whenever active video content is not being displayed. Supported image file types are .jpeg, .jpg, and .png. The supported maximum resolution of an image is 3840x2160 pixels. Up to 20 image files can be uploaded for a total storage capacity of up to 100 MB.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume can be adjusted by using the web interface or a control system.[3]

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-D30 includes one RJ-45 1000BASE-T Ethernet port.[2] The port is PoE+ compliant, enabling the device to be powered via a PoE Ethernet switch.[4] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-D30 to be connected directly to a DM NVX 4K60 4:4:4 encoder to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the decoder is connected directly to a 1000BASE-T port of an encoder.

By default, point-to-point mode automatically detects whether the DM-NVX-D30 is connected directly to a DM NVX 4K60 4:4:4 encoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-D30 and an encoder is detected, the devices operate in point-to-point mode without the need for additional configuration; however, a control system is required for CEC (Consumer Electronics Control), RS-232, and IR control.

Device Control

The DM-NVX-D30 includes built-in **COM** (RS-232) and **IR** ports for control of the connected display or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-D30 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

The **COM** port, **IR** port, and CEC over the HDMI output can also enable the display device to be turned on or off automatically without the use of a control system.

Web-Based Setup

Setup of the DM-NVX-D30 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-D30 mounts conveniently to a flat surface or rack rail and fits easily behind a flat panel display, above a ceiling-mounted projector, or inside an AV cart or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE+ or an optional power pack (sold separately).[4]

Notes:

1. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-D30 is for connection to an Ethernet network or device. The Ethernet port cannot be connected to the DM® port of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
3. The analog audio output is functional only when the DM-NVX-D30 is receiving a 2-channel stereo input signal.
4. In order for the Ethernet port to receive PoE+, the port must be connected to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ power sourcing equipment (PSE) port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

DM-NVX-E10

The DM-NVX-E10 is a compact AV-over-IP encoder designed to transmit video with resolutions up to 1080p 4:4:4 over standard Gigabit Ethernet. Featuring secure web-based control and management, an HDMI® input, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE support, the DM-NVX-E10 provides an encoder solution that offers price and performance optimization in a DM NVX network AV installation of any size.[1]



- Support of video resolutions up to 1080p 4:4:4 over standard Gigabit Ethernet
- Real-time video performance over the network
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 1.4 compliant
- Encoder functionality for use with the DM-NVX-D10 or other DM NVX® products that can function as decoders
- One HDMI® input
- Fixed or adaptive bit rate
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE support
- Automatic point-to-point connectivity with the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support

- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE or optional power pack (sold separately)

Real-Time 1080p60 Video Performance

Engineered for demanding conference room and classroom applications, the DM-NVX-E10 ensures real-time, full-motion 1080p60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder Functionality

The DM-NVX-E10 encoder provides one HDMI input that enables a laptop computer, camera, or other media source to be connected via an HDMI cable and then transmitted over the network to one or many decoders.[1] Compatible with the DM-NVX-D10 and other DM NVX products that can function as decoders, the DM-NVX-E10 can be used in any DM NVX network AV-over-IP design.

Fixed or Adaptive Bit Rate

The bit rate of a stream can be set to a fixed or adaptive bit rate. 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-specified fixed bit rate.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive bit rate functionality.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume can be adjusted by using the web interface or a control system.[2]

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-E10 includes one RJ-45 1000BASE-T Ethernet port.[1] The port is PoE compliant, enabling the device to be powered via a PoE Ethernet switch.[3] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-E10 to be connected directly to the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 in order to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the DM-NVX-E10 is connected directly to the 1000BASE-T port of the decoder. By default, point-to-point mode automatically detects whether the DM-NVX-E10 is connected directly to a decoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-E10 and the decoder is detected, the devices operate in point-to-point mode without the need for additional configuration. The web interface or a control system can be used to disable point-to-point mode or to enable automatic detection of point-to-point connectivity.

Device Control

The DM-NVX-E10 includes built-in **COM** (RS-232) and **IR** ports for control of the connected video source or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-E10 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

Web-Based Setup

Setup of the DM-NVX-E10 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-E10 mounts conveniently to a flat surface or rack rail and fits easily beneath a tabletop or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE or an optional power pack (sold separately).[3]

Notes:

1. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-E10 is for connection to an Ethernet network or device. The Ethernet port cannot be connected to the DM® port of other Crestron DigitalMedia™ devices.

   A nonblocking network is required for DM NVX devices.
2. The analog audio output is functional only when the DM-NVX-E10 is receiving a 2-channel stereo input signal.
3. In order for the Ethernet port to receive PoE, the port must be connected to a PoE compliant Ethernet switch or other equipment that has a PoE power sourcing equipment (PSE) port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

DM-NVX-E20

The DM-NVX-E20 is a compact AV-over-IP encoder designed to transmit video with resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet. Featuring secure web-based control and management, an HDMI® input, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE support, the DM-NVX-E20 provides an encoder solution that offers price and performance optimization in a DM NVX network AV installation of any size.[1, 2]



- Support of video resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet, 4K30 4:4:4 included
- Real-time video performance over the network
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Encoder functionality for use with the DM-NVX-D20, DM-NVX-D200, or other DM NVX® products that can function as decoders
- One HDMI® input
- Fixed or adaptive bit rate
- Analog audio de-embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE support
- Automatic point-to-point connectivity with the DM-NVX-D20, or DM-NVX-D200
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support

- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE or optional power pack (sold separately)

Real-Time 4K60 Video Performance

Engineered for demanding conference room and classroom applications, the DM-NVX-E20 ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder Functionality

The DM-NVX-E20 encoder provides one HDMI input that enables a laptop computer, camera, or other media source to be connected via an HDMI cable and then transmitted over the network to one or many decoders.[1] Compatible with the DM-NVX-D20, DM-NVX-D200, and other DM NVX products that can function as decoders, the DM-NVX-E20 can be used in any DM NVX network AV-over-IP design.

> **NOTE:** If the DM-NVX-E20 is used with the DM-NVX-D10, the resolution of the DM-NVX-E20 must be configured so that it does not exceed the maximum resolution supported by the DM-NVX-D10. It is recommended that the DM-NVX-E20 not be used with the DM-NVX-D10 in order to maintain the higher resolutions supported by the DM-NVX-E20.

Fixed or Adaptive Bit Rate

The bit rate of a stream can be set to a fixed or adaptive bit rate. 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.[3]

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-specified fixed bit rate.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive bit rate functionality.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume can be adjusted by using the web interface or a control system.[4]

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-E20 includes one RJ-45 1000BASE-T Ethernet port.[2] The port is PoE compliant, enabling the device to be powered via a PoE Ethernet switch.[5] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-E20 to be connected directly to a DM-NVX-D20 or DM-NVX-D200 in order to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the DM-NVX-E20 is connected directly to the 1000BASE-T port of the decoder.

By default, point-to-point mode automatically detects whether the DM-NVX-E20 is connected directly to a decoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-E20 and the decoder is detected, the devices operate in point-to-point mode without the need for additional configuration. The web interface or a control system can be used to disable point-to-point mode or to enable automatic detection of point-to-point connectivity.

Device Control

The DM-NVX-E20 includes built-in **COM** (RS-232) and **IR** ports for control of the connected video source or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-E20 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

Web-Based Setup

Setup of the DM-NVX-E20 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-E20 mounts conveniently to a flat surface or rack rail and fits easily beneath a tabletop or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE or an optional power pack (sold separately).[5]

Notes:

1. For 4K60 4:2:0 or 4K30 4:4:4 performance, HDMI cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. The minimum cable required for DM NVX AV over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-E20 is provided for connection to an Ethernet network or device—the port cannot be connected to the DM® port of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. The analog audio output is functional only when the DM-NVX-E20 is receiving a 2-channel stereo input signal.
5. In order for the Ethernet port to receive PoE, the port must be connected to a PoE compliant Ethernet switch or other equipment that has a PoE power sourcing equipment (PSE) port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

DM-NVX-E30

The DM-NVX-E30 is a compact AV over IP encoder designed to function as a transmitter. Featuring secure web-based control and management, an HDMI® input, an analog audio output, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE+ support, the DM-NVX-E30 offers an encoder solution for a DM NVX network AV installation of any size.[1]

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional on-board scaling, HDR (High Dynamic Range) support, and HDCP 2.3 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 2]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10, HDR10+, and Dolby Vision® video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Encoder functionality for use with DM NVX® products that can function as decoders
- One HDMI® input
- Image preview
- Test pattern generator
- Fixed, adaptive, or variable bit rate
- Analog audio de-embedding
- 7.1 surround sound audio support

- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE+ support
- Automatic point-to-point connectivity
- Device control via RS-232, IR, and CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE+ or optional power pack (sold separately)

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. The DM-NVX-E30 can encode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1-Gigabit network at any resolution up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder Functionality

The DM-NVX-E30 is a basic encoder with one HDMI input that allows a laptop computer, camera, or other media source to be connected via an HDMI cable and then transmitted over the network to one or many decoders.[2] Compatible with DM NVX products that can function as decoders, the DM-NVX-E30 can be used in any DM NVX network AV design.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder or displayed by an output of a DM NVX decoder. Still images are shown at 1 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 other supported interface.

Test Pattern Generator

The built-in test pattern generator can be used during setup to ensure that video streaming is functional and can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM NVX encoder can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

The bit rate of a transmitting DM NVX 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.[3]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate, or to enable adaptive or variable bit rate functionality.

Analog Audio De-embedding

The analog audio output provides a stereo line-level signal to feed a local sound system or sound bar. The output volume can be adjusted by using the web interface or a control system.[4]

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

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

Copper Ethernet Connectivity

The DM-NVX-E30 includes one RJ-45 1000BASE-T Ethernet port.[1] The port is PoE+ compliant, enabling the device to be powered via a PoE+ Ethernet switch.[5] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-E30 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, the 1000BASE-T Ethernet port of the encoder is connected directly to a 1000BASE-T port of a decoder.

By default, point-to-point mode automatically detects whether the DM-NVX-E30 is connected directly to a DM NVX 4K60 4:4:4 decoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-E30 and a decoder is detected, the devices operate in point-to-point mode without the need for additional configuration; however, a control system is required for CEC (Consumer Electronics Control), RS-232, and IR control.

Device Control

The DM-NVX-E30 includes built-in **COM** (RS-232) and **IR** ports for control of the connected video source or other devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connections. Under the management of a control system, the DM-NVX-E30 can control the display and source devices, potentially eliminating the need for dedicated serial cables or IR emitters.

Web-Based Setup

Setup of the DM-NVX-E30 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-E30 mounts conveniently to a flat surface or rack rail and fits easily beneath a tabletop or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE+ or an optional power pack (sold separately).[5]

Notes:

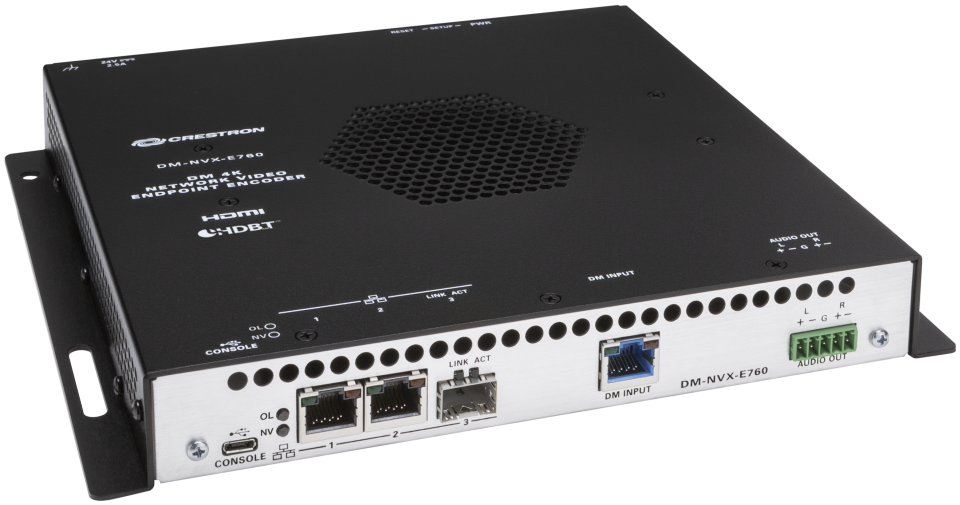
1. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. The minimum cable required for DM NVX AV over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-E30 is provided for connection to an Ethernet network or device—the port cannot be connected to the DM® port of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. The analog audio output is functional only when the DM-NVX-E30 is receiving a 2-channel stereo input signal.
5. In order for the Ethernet port to receive PoE+, the port must be connected to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ power sourcing equipment (PSE) port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

DM-NVX-E760

The DM-NVX-E760 is a compact AV-over-IP encoder designed to function as a transmitter. The DM-NVX-E760 includes a DM® input that provides 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.

DM NVX technology transports ultra high-definition 4K60 4:4:4 video over standard Gigabit Ethernet with no perceptible latency or loss of quality. Using standard network switches and CAT5e UTP wiring, a DM NVX system delivers a high-performance virtual matrix routing solution that is economically advantageous and infinitely scalable for any enterprise or campus-wide 4K content distribution application. Professional onboard scaling, HDR (High Dynamic Range) support, and HDCP 2.3 compliance ensure the ultimate in picture quality and compatibility for all of today's varied media sources.[1, 2]



- 4K60 4:4:4 video over standard Gigabit Ethernet
- HDR10 video support
- Real-time video performance over the network
- Pixel Perfect Processing technology
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant
- Encoder functionality for use with DM NVX® products that can function as decoders
- DM® input for interoperability with DM 8G+® output devices and DM Essentials transmitters, including DM 8G+ and DM Essentials wall plate transmitters
- HDBaseT® certification
- Image preview
- Test pattern generator

- Fixed, adaptive, or variable bit rate
- Analog audio de-embedding
- 7.1 surround sound audio
- AES67 audio embedding and de-embedding
- Copper and fiber Ethernet connectivity
- Network port selection
- Automatic point-to-point connectivity
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Compact, surface-mountable design
- Powered via PoE++, UPOE, or the included power pack

Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX technology ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and usage of a mouse are fluid and natural.

A DM NVX system also provides stability and reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage and video walls. Variable Multicast Time-to-live (TTL) enables traversing multiple network routers for optimal flexibility.

Pixel Perfect Processing Technology

A DM NVX system incorporates Pixel Perfect Processing technology, which provides flawless video transport in all applications. Depending on the operating mode, the DM-NVX-E760 can encode a video signal to achieve imperceptible end-to-end latency of less than 1 frame. The image quality of the source is maintained across a 1 Gbps network at resolutions up to 4K60 4:4:4.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder Functionality

The DM-NVX-E760 is an encoder that is compatible with DM NVX products that can function as decoders. The DM-NVX-E760 enables AV signals from the DM input to be transmitted over the network to one or many decoders. Encoder functionality of the DM-NVX-E760 can be used in any DM NVX network AV design.

Interoperability with DM 8G+ Output Devices and DM Essentials Transmitters

The DM input of the DM-NVX-E760 can be connected to the DM 8G+ output of a DM switcher, transmitter, or other DM device. Supported DM 8G+ output devices are the DMC-4KZ-CO-HD and DMB-4K-O-C 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 can also be connected to the DM Essentials port of a DM Essentials transmitter.

HDBaseT Certification

Crestron DM 8G+ technology of the DM input is designed using HDBaseT Alliance specifications, ensuring interoperability with other HDBaseT certified products. The DM input of the DM-NVX-E760 can be connected directly to an HDBaseT compliant source. The DM-NVX-E760 provides the capability to bridge an HDBaseT system with AV-over-IP, resulting in a hybrid system design and a smooth migration path for existing DM or HDBaseT solutions. Investment protection is achieved for applications that require integration of AV-over-IP with existing HDBaseT systems or expansion of an existing room system for broader distribution.

Image Preview

An image preview feature provides still images (thumbnails) that show the current video being received by the DM input of the DM-NVX-E760. Still images are shown at 1 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 other supported interface.

Test Pattern Generator

The built-in test pattern generator can be used during setup to ensure that video streaming is functional and can also be used as a tool for the adjustment, calibration, and alignment of displays, projectors, and video walls. The DM-NVX-E760 can send the test pattern to any routed DM NVX decoder.

Fixed, Adaptive, or Variable Bit Rate

In DM NVX encoder mode, 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.[3]
- 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@60 Hz (1080p60) would automatically be set to 400 Mbps. Adaptive bit rate makes better use of the available bandwidth than a user-specified fixed bit rate.
- 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 a maximum of 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.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive or variable bit rate functionality.

Analog Audio De-embedding

The analog audio output provides a balanced or unbalanced stereo line level signal to feed a local sound system or sound bar. The output volume is adjustable using the web interface or a control system.[4]

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.

DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the audio of the HDBaseT source to be transmitted as a 2-channel AES67 stream while another 2-channel AES67 audio stream is received from a Crestron DM NAX device. The received AES67 audio stream can be output via the analog audio output.

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

Copper and Fiber Ethernet Connectivity

The DM-NVX-E760 includes two RJ-45 1000BASE T Ethernet ports (Ethernet ports 1 and 2) and one SFP port (Ethernet port 3). The SFP port enables connection to a fiber-optic network with the use of the appropriate Crestron SFP-1G Series transceiver module (sold separately). A selection of modules is offered to accommodate various multimode and single-mode fiber types.

Ethernet port 1, 2, or 3 can be used to transport video over a Gigabit Ethernet network. The remaining Ethernet ports can be used to provide connections to local network devices or to daisy chain multiple endpoints.

Ethernet port 1 is PoE++ and UPOE compliant and can be powered from PoE++ power sourcing equipment such as a PoE++ or UPOE compliant Ethernet switch.

A DM NVX system can be deployed on an existing corporate or campus network or on a dedicated network. For information about network requirements and guidelines, refer to AV-over-IP Network Design on page 871.

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.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-E760 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 is connected directly to a 1000BASE-T port of a decoder.

By default, point-to-point mode automatically detects whether the DM-NVX-E760 is connected directly to a DM NVX 4K60 4:4:4 decoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-E760 and a decoder is detected, the devices operate in point-to-point mode without the need for additional configuration. The web interface or a control system can be used to disable point-to-point mode or to enable automatic detection of point-to-point connectivity.

Web-Based Setup

Setup of the DM-NVX-E760 is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using a DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Low-Profile Installation

The DM-NVX-E760 mounts conveniently to a flat surface or rack rail and fits easily beneath a tabletop or inside a lectern, AV cart, or equipment cabinet. All connectors and LED indicators are positioned on the front and rear of the device, offering optimal access and visibility for a clean, serviceable installation. Power is provided via PoE++, UPOE, or the included PW-2420RU power pack.

Notes:

1. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. Ethernet ports 1 and 2 are used for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. The analog audio output is functional only when the DM-NVX-E760 is receiving a 2-channel stereo input signal.

Wall Plate AV-over-IP Endpoints

The wall plate models in the DM NVX AV-over-IP family of hardware encoder and decoder endpoints are designed to mount into a 2-gang U.S. electrical box or plaster ring (not included).

Products

The following product is a wall plate DM NVX AV-over-IP endpoint:

- DM-NVX-E20-2G on page 174

DM-NVX-E20-2G

The DM-NVX-E20-2G is an AV-over-IP wall plate encoder designed to transmit video with resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet. Featuring secure web-based control and management, an HDMI® input, an analog audio input, AES67 transmit and receive capability, and copper Ethernet connectivity with PoE support, the DM-NVX-E20-2G provides an encoder solution that offers price and performance optimization in a DM NVX® network AV installation of any size.[1, 2]

The DM-NVX-E20-2G is available in two models: DM-NVX-E20-2G-B-T (black textured, pictured) and DM-NVX-E20-2G-W-T (white textured).



- Support of video resolutions up to 4K60 4:2:0 over standard Gigabit Ethernet, 4K30 4:4:4 included
- Real-time video performance over the network
- Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128
- HDCP 2.3 compliant

- Encoder functionality for use with the DM-NVX-D20, DM-NVX-D200, or other DM NVX® products that can function as decoders
- One HDMI® input
- Fixed or adaptive bit rate
- Analog audio embedding
- 7.1 surround sound audio support
- AES67 audio embedding and de-embedding
- Copper Ethernet connectivity with PoE support
- Automatic point-to-point connectivity with the DM-NVX-D20, or DM-NVX-D200
- Device control via CEC
- Easy setup via built-in web pages
- Compatibility with a Crestron® 3-Series® or later control system
- Streamlined management using DM NVX Director® virtual switching appliances
- .AV Framework™ technology support
- XiO Cloud® service support
- Crestron Home® OS support
- API for full control
- Two-gang wall plate design, black finish
- FP-G2-DM Series decorator style faceplate required (sold separately)
- Powered via PoE or optional power pack (sold separately)

Real-Time 4K60 Video Performance

Engineered for demanding conference room and classroom applications, the DM-NVX-E20-2G ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. Interactive functions such as gameplay and the use of a mouse are fluid and natural.

A DM NVX system is engineered for stability and ultimate reliability. Line-synchronized outputs ensure perfect synchronization of content across multiple displays for applications such as digital signage. Variable Multicast TTL (Time To Live) enables traversing multiple network routers for optimal flexibility.

Enterprise-Grade Security

Using advanced security features and protocols such as 802.1X authentication, Active Directory® credential management, AES-128 content encryption, PKI authentication, TLS, SSH, and HTTPS, a DM NVX system delivers a true enterprise-grade network AV solution engineered to fulfill demanding IT policies.

Encoder Functionality

The DM-NVX-E20-2G encoder provides one HDMI input that enables a laptop computer, camera, or other media source to be connected via an HDMI cable and then transmitted over the network to one or many decoders.[1] Compatible with the DM-NVX-D20, DM-NVX-D200, and other DM NVX products that can function as decoders, the DM-NVX-E20 can be used in any DM NVX network AV-over-IP design.

NOTE: If the DM-NVX-E20-2G is used with the DM-NVX-D10, the resolution of the DM-NVX-E20-2G must be configured so that it does not exceed the maximum resolution supported by the DM-NVX-D10. It is recommended that the DM-NVX-E20-2G not be used with the DM-NVX-D10 in order to maintain the higher resolutions supported by the DM-NVX-E20-2G.

Fixed or Adaptive Bit Rate

The bit rate of a stream can be set to a fixed or adaptive bit rate. 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.[3]

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-specified fixed bit rate.

The web interface or a control system can be used to set a fixed bit rate or to enable adaptive bit rate functionality.

Analog Audio Embedding

The unbalanced stereo line-level audio input enables a stereo audio source to be connected and combined with the HDMI input.

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.

AES67 and DM NAX® Audio Embedding or De-embedding

AES67 support (via native support for Crestron DM NAX® Audio-over-IP technology) allows the selected audio source to be transmitted as a 2-channel AES67 source while another 2-channel AES67 audio stream is received from a Crestron DM NAX device or other AES67 capable device and combined with the video signal.

NOTE: An AES67 audio stream that is received by a DM NVX endpoint cannot be transmitted from that endpoint.

Copper Ethernet Connectivity

The DM-NVX-E20-2G includes one RJ-45 1000BASE-T Ethernet port.[2] The port is PoE compliant, enabling the device to be powered via a PoE Ethernet switch.[4] For information about network requirements and guidelines, refer to the AV-over-IP Network Design on page 871.

Automatic Point-to-Point Connectivity

Point-to-point connectivity enables the DM-NVX-E20-2G to be connected directly to a DM-NVX-D20 or DM-NVX-D200 in order to stream video and audio. Rather than being connected to an Ethernet switch, the 1000BASE-T Ethernet port of the DM-NVX-E20-2G is connected directly to the 1000BASE-T port of the decoder.

By default, point-to-point mode automatically detects whether the DM-NVX-E20-2G is connected directly to a decoder or to a 1000BASE-T switch. When a direct connection between the DM-NVX-E20-2G and the decoder is detected, the devices operate in point-to-point mode without the

need for additional configuration. The web interface or a control system can be used to disable point-to-point mode or to enable automatic detection of point-to-point connectivity.

Device Control via CEC

Under the management of a control system, the DM-NVX-E20-2G can control a source device via CEC (Consumer Electronics Control) over the HDMI input, potentially eliminating the need for dedicated control cables.

Web-Based Setup

Setup of the DM-NVX-E20-2G is accomplished by using a web browser. Full control and monitoring of the device is enabled through integration with a control system or with a DM NVX Director® virtual switching appliance.

Streamlined Management Using DM NVX Director Virtual Switching Appliance

For applications that are small to moderate in size, a network of DM NVX endpoints can be configured and controlled with the use of a control system. For larger enterprise and campus-wide signal routing applications, adding a DM NVX Director virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) enhances and streamlines the entire configuration and control process. A DM NVX Director appliance provides a central point of management and enables the creation of multiple virtual matrix switchers through one easy-to-use web-based portal.

Two-Gang Wall Plate Design

The DM-NVX-E20-2G is designed to mount into a 2-gang U.S. electrical box or plaster ring (not included). Power is provided via PoE or the optional PW-2407WUL power pack (sold separately).[4]

Notes:

1. For 4K60 4:2:0 or 4K30 4:4:4 performance, HDMI cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. The minimum cable required for DM NVX AV over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port on the DM-NVX-E20-2G is provided for connection to an Ethernet network or device—the port cannot be connected to the DM® port of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. In order for the Ethernet port to receive PoE, the port must be connected to a PoE compliant Ethernet switch or other equipment that has a PoE power sourcing equipment (PSE) port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

Applications

The application diagrams below highlight various features of the DM NVX AV-over-IP platform, such as its scalability, video wall support, the DM NVX Director appliance, and support for both Ethernet and fiber-optic networking.

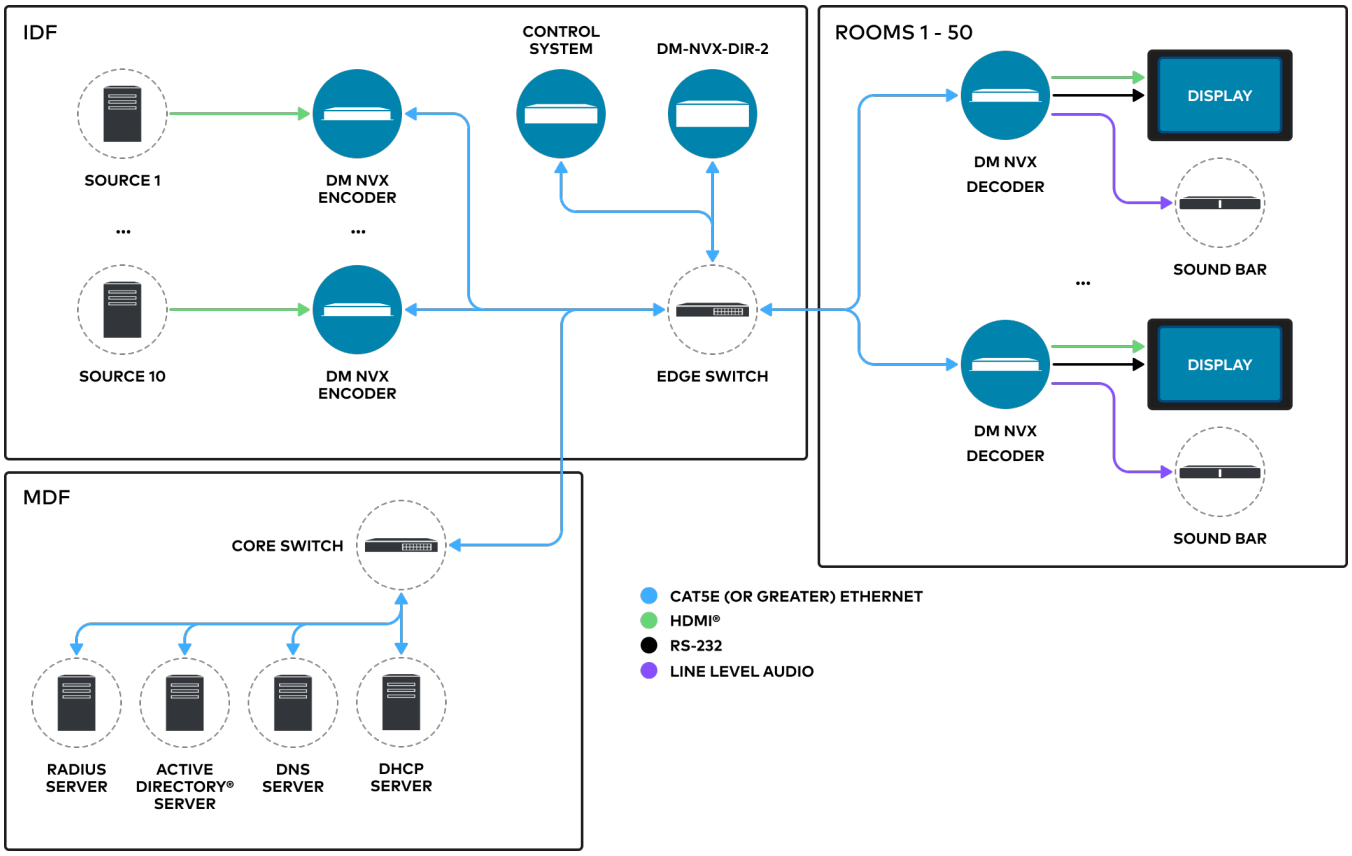
Refer to AV-over-IP Network Design on page 871 for more information on network topologies and best practices that enable a successful DM NVX AV-over-IP system deployment.

Community College 4K AV Distribution Network

This application highlights distribution of ten 4K HDMI video sources located in an IDF (intermediate distribution frame) closet to 50 classrooms in a community college. External sound bars are used for audio output at the displays. The existing network cabling infrastructure was reused and only nonblocking, managed network hardware was added, allowing more classrooms and video sources to be added in the future.

- The application is based on the use of DM NVX encoders and decoders and a DM-NVX-DIR-2:
  - Ten encoders with video source connections are located in the IDF closet.
  - Each of the 50 classrooms has a decoder that connects to a display. The decoders feed video to the displays and provide serial control of the displays.
  - A DM-NVX-DIR-2 is used to set up, control, and monitor the DM NVX system. The DM NVX Director appliance also provides the capability to add classrooms and additional video sources in the future.
- Using a star network topology, any source can be routed to any destination.
- A Crestron control system is installed in the MDF (main domain frame) closet to provide centralized control for the entire system.
- A nonblocking network switch is used. The network switch has sufficient ports to connect 10 encoders and 50 decoders.

Community College 4K AV Distribution Network

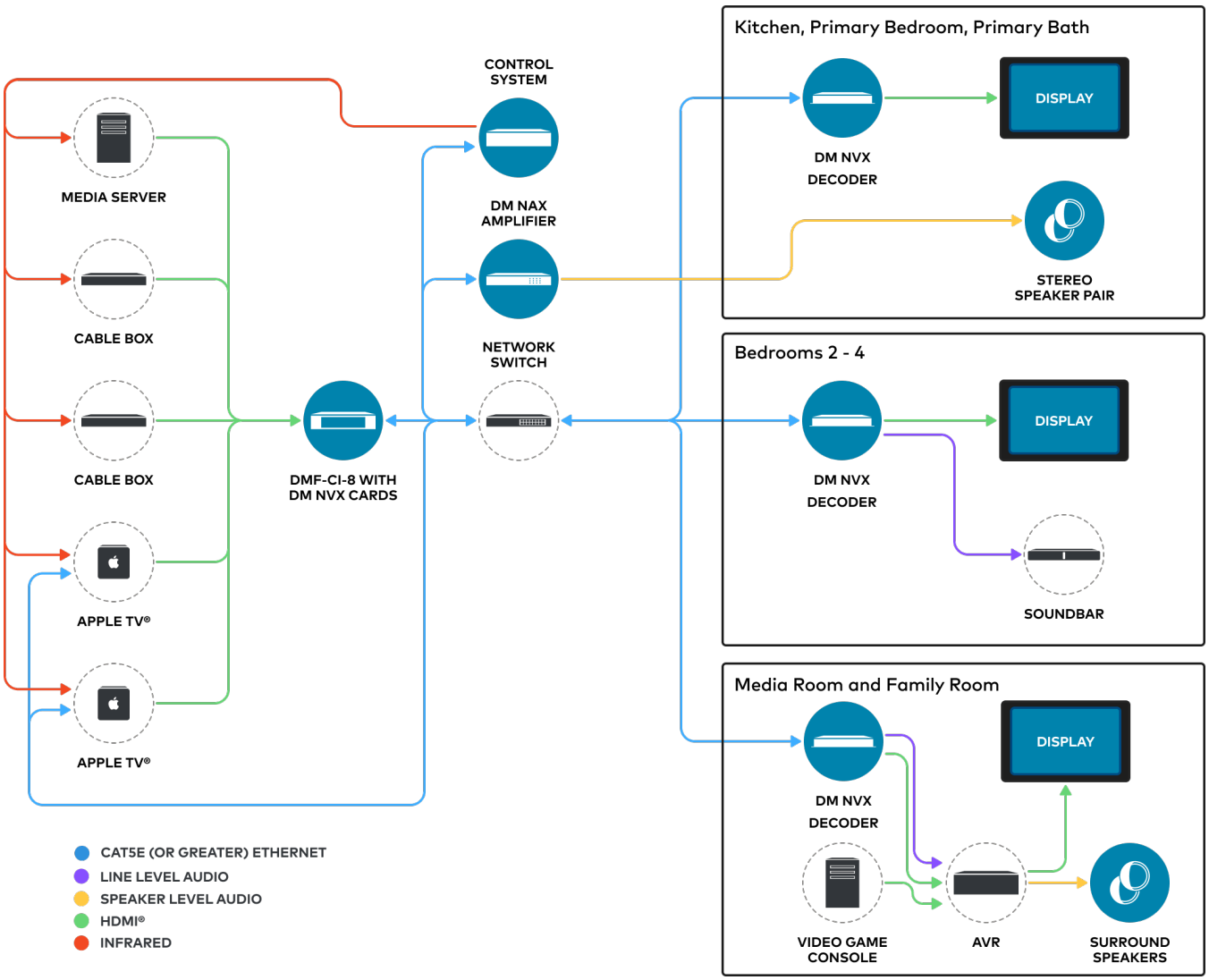


4K Residential AV Distribution Network

This application highlights retrofitting a DM NVX system into an existing home for 4K video distribution. The existing network infrastructure is reused. Sources are located in a basement rack room and are distributed to TV and surround sound receiver locations throughout the house. The system requires two cable set-top boxes, two Apple TV® streaming players, and one media server. The media room and family living room require surround sound systems, each with a local video game console and 4K HDR display. All other rooms require stereo audio output. The kitchen, primary bedroom, and primary bathroom require in-ceiling speakers.

- The application is based on the use of DM NVX cards as encoders and DM NVX surface-mountable endpoints as decoders:
    - Five DM NVX encoder cards are installed in a DMF-CI-8 chassis in the basement rack. Each of the five video sources in the basement rack room connects to an encoder card. A card with audio downmixing support (such as the DM-NVX-385C) can be used for any sources with multichannel audio to allow DM NAX zones to receive a two-channel downmixed audio stream from those sources.
    - The kitchen, primary bedroom, and primary bathroom each have a decoder that connects to a display, and a pair of in-ceiling speakers connected to a DM NAX amplifier for stereo audio playback.
    - The remaining bedrooms each have a decoder that connects to a display. The stereo line-level audio output of the decoder in each room connects to a sound bar.
    - The media room and family room each include a DM NVX decoder that connects to a surround sound AVR. The HDMI output of each AVR connects to a display. Each AVR powers in-room speakers.
- A custom control system program controls the system by issuing infrared signals or IP-based commands.
- Using a star network topology, any source can be routed to any destination.
- The network switch has at least thirteen available ports for five encoder endpoints and eight decoder endpoints. Up to 5 Gbps of DM NVX AV-over-IP traffic can be generated by the encoders, so this is the minimum bandwidth that the switch must support in order to be nonblocking. The switch in this application is capable of 40 Gbps, leaving sufficient headroom for future expansion of the system.

4K Residential AV Distribution Network

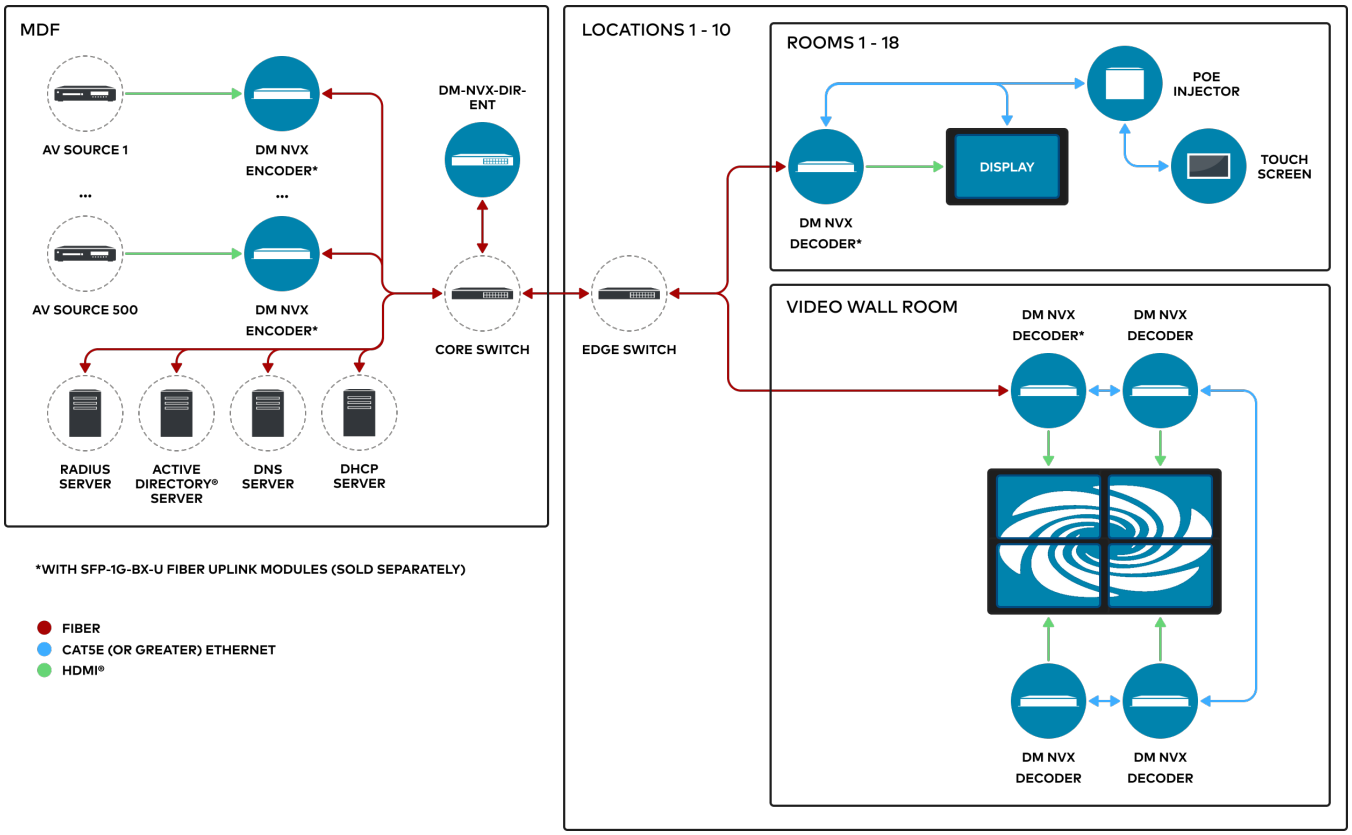


4K AV Distribution Over Fiber

This application highlights 4K AV distribution of 500 AV sources at an MDF to 10 different satellite locations across a campus, each up to 0.5 mi (0.8 km) from the MDF. Each satellite location contains 18 separate displays across multiple rooms and a larger space with a 2 x 2 video wall. All device logins must be tied to the campus Active Directory®, DHCP, and 802.1X services for policy reasons. Users must be able to switch between sources at any display independently.

- The application is based on the use of DM NVX endpoints as encoders and decoders, a fiber-optic network across a large MDF, and the DM-NVX-DIR-ENT:
    - The DM NVX endpoints consist of 500 encoders at the MDF, 180 decoders for the single-display rooms in all 10 locations, and 40 decoders for the video wall rooms (4 decoders for each wall).
    - Single-mode 1310 nm/1490 nm fiber is used. The network switches are configured using SFP-1G-BX-D downlink modules, and the DM NVX encoders and decoders use SFP-1G-BX-U uplink modules for fiber connections.
    - A DM-NVX-DIR-ENT allows fiber to be used for the DM NVX system and is used to set up, control, and monitor the system.
- A touch screen is used in each of the 18 rooms across 10 locations, totaling 180 touch screens. Each touch screen is connected to one of the additional LAN ports of the room's DM NVX endpoint and is powered by a PoE injector. A control system to manage each satellite location would be connected to the location's edge switch.
- A tree architecture requires a minimum core switch bandwidth of 190 Gbps for 500 encoders and 190 decoders (180 for the individual rooms + 10 at the start of each video wall daisy chain). The core switch in this application is capable of 1 Tbps.
- Each of the 10 locations requires a nonblocking edge switch with at least 19 free ports for 19 DM NVX decoders.
- The network switches are configured to route the campus RADIUS server for 802.1X, the campus Active Directory server for login authentication at each endpoint, the campus DNS server for name assignment, and the campus DHCP server for IP assignment and MAC filtering. The DM NVX endpoints are also configured to utilize these services.
- Four of the 22 DM NVX decoders in each of the 10 locations are daisy chained to connect the decoders in the video wall rooms. These decoders all receive the same 1 Gbps stream, and are connected in series via their RJ-45 LAN connections.
- In the other rooms, the 3-port switch of the DM NVX endpoints consists of the following connections:
    - SFP-1G-BX-U connection to the edge switch.
    - RJ-45 connection to extend the LAN to the room display as required.
    - RJ-45 connection to the PoE injector for the touch screen for room control.

4K AV Distribution Over Fiber



Specifications

Refer to the following sections for the specifications of these DM NVX AV-over-IP device categories:

- Card-Based AV-over-IP Endpoints on page 185
- DM NVX Director® Switching Appliances on page 232
- Room Box Models on page 242
- Wall Plate Models on page 330

Card-Based AV-over-IP Endpoints

Refer to the following sections for the specifications of the card-based DM NVX AV-over-IP endpoints:

- DM-NVX-350C Specifications on page 186
- DM-NVX-351C Specifications on page 191
- DM-NVX-352C Specifications on page 196
- DM-NVX-360C Specifications on page 201
- DM-NVX-363C Specifications on page 206
- DM-NVX-384C Specifications on page 211
- DM-NVX-D30C Specifications on page 221
- DM-NVX-E30C Specifications on page 224
- DM-NVX-E760C Specifications on page 228

DM-NVX-350C Specifications

Product specifications for the DM-NVX-350C are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Output Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[5])
Switcher	3x1 in decoder mode (HDMI 1, HDMI 2, Stream) 2x1 in encoder mode, manual or auto-switching, breakaway audio[6], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10 support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x up to 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.2
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 240 Hz is not supported.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), analog stereo[6]
Output Signal Types	HDMI, analog stereo[6]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[7]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3; USB 2.0 computer console (for setup)
HDMI	HDCP 2.2, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type B connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[8]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[8] Available Power: 500 mA at 5VDC
Ethernet 1-2	(2) 8-pin RJ-45 connectors, female; 100BASE-TX/1000BASE-T Ethernet port[9]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[10]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])
HDMI INPUT 1-2	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])
AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[6] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced

Controls and Indicators

TX	(1) Green LED, indicates unit is in encoder (transmitter) mode

RX	(1) Green LED, indicates unit is in decoder (receiver) mode
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 3 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 3 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

15.1 oz (427 g)

Compliance

FCC Part 15 Class B, IC Class B, CE, UL® Listed for US and Canada

Notes:

1. In encoder mode, the stream type of the DM-NVX-350C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-350C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-350C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The analog audio port can function as an input or output, not both. Analog audio output is only functional when the DM-NVX-350C is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-351 or DM-NVX-351C.
7. The DM-NVX-350C does not down-mix Dolby Atmos MAT 2.0 audio.
8. The DM-NVX-350C can be configured to accept the connection of a USB device or a USB host—not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

9. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-350C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.

10. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-350C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

DM-NVX-351C Specifications

Product specifications for the DM-NVX-351C are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Output Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[5])
Switcher	3x1 in decoder mode (HDMI 1, HDMI 2, Stream) 2x1 in encoder mode, manual or auto-switching, breakaway audio[6], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10 support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x up to 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.2
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 240 Hz is not supported.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), analog stereo[6]
Output Signal Types	HDMI (multichannel pass-through or 2-channel downmix), analog stereo (2-channel downmix)[6]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[7]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB
Audio Delay	0 to 1200 ms

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3; USB 2.0 computer console (for setup)
HDMI	HDCP 2.2, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type B connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[8]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[8] Available Power: 500 mA at 5VDC
Ethernet 1-2	(2) 8-pin RJ-45 connectors, female; 100BASE-TX/1000BASE-T Ethernet port[9]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[10]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])
HDMI INPUT 1-2	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])
AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[6] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced

Controls and Indicators

TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 3 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 3 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

15.1 oz (427 g)

Compliance

FCC Part 15 Class B, IC Class B, CE, UL® Listed for US and Canada

Notes:

1. In encoder mode, the stream type of the DM-NVX-351C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-351C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-351C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The analog audio port can function as an input or output, not both.
7. The DM-NVX-351C does not down-mix Dolby Atmos MAT 2.0 audio.
8. The DM-NVX-351C can be configured to accept the connection of a USB device or a USB host—not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

9. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-351C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.

10. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-351C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

DM-NVX-352C Specifications

Product specifications for the DM-NVX-352C are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Output Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[5])
Switcher	3x1 in decoder mode (HDMI 1, HDMI 2, Stream) 2x1 in encoder mode, manual or auto-switching, breakaway audio[6], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10 support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x up to 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.2
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 240 Hz is not supported.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), analog stereo[6]
Output Signal Types	HDMI, analog stereo[6]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[7]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3; USB 2.0 computer console (for setup)
HDMI	HDCP 2.2, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type B connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[8]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[8] Available Power: 500 mA at 5VDC
Ethernet 1	(1) 8-pin RJ-45 connectors, female; 100BASE-TX/1000BASE-T Ethernet port[9]
Ethernet 2	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[10]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])
HDMI INPUT 1-2	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])
AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[6] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced

Controls and Indicators

TX	(1) Green LED, indicates unit is in encoder (transmitter) mode

RX	(1) Green LED, indicates unit is in decoder (receiver) mode
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet 1	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 2 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 2 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

15.1 oz (427 g)

Compliance

FCC Part 15 Class B, IC Class B, CE, UL® Listed for US and Canada

Notes:

1. In encoder mode, the stream type of the DM-NVX-352C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-352C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-352C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The analog audio port can function as an input or output, not both. Analog audio output is only functional when the DM-NVX-352C is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-351 or DM-NVX-351C.
7. The DM-NVX-352C does not down-mix Dolby Atmos MAT 2.0 audio.
8. The DM-NVX-352C can be configured to accept the connection of a USB device or a USB host—not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.

9. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-352C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.

10. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-352C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

DM-NVX-360C Specifications

Product specifications for the DM-NVX-360C are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), 2-channel LPCM[2]
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[3] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4, 5] (Dual-Mode DisplayPort™ interface and DVI compatible[6])
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4] (DVI compatible[6])
Switcher	2x1 in decoder mode (HDMI, Stream), manual or auto-switching, breakaway audio[7], Crestron QuickSwitch HD™ technology
Scaler (Decoder Mode Only)	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect-ratio, or 1:1), video wall processing up to 8 wide x 8 high
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[6]), analog stereo[8]
Output Signal Types	HDMI, analog stereo[8]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type-C® connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[9, 10]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[9] Available Power: 500 mA at 5VDC
Ethernet 1-2	(2) 8-pin RJ-45 connectors, female; 100BASE-TX/1000BASE-T Ethernet port[11]
Ethernet 3 (10/100)	(1) 8-pin RJ-45 connector, female; 100BASE-TX Ethernet port
Ethernet 4	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[12]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[4] (DVI compatible[6])
HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6])
AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[8] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet

NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet link status; Amber indicates Ethernet activity
Ethernet 3	(2) LEDS; Green LED indicates Ethernet activity; Amber indicates Ethernet link status
Ethernet 4 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 4 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

15.1 oz (427 g)

Compliance

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

Notes:

1. In encoder mode, the stream type of the DM-NVX-360C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-360C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-360C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. As an encoder, the DM-NVX-360C transmits audio via the 2-channel AES67 stream when it receives a 2-channel stereo input signal via the HDMI or analog input. The DM-NVX-360C does not transmit audio via the 2-channel AES67 stream when it receives multichannel audio.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
5. 3D formats are not supported.
6. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
7. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.

8. The analog audio port can function as an input or output, not both. Analog audio output is functional only when the DM-NVX-360C is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C.
9. The DM-NVX-360C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. USB 2.0 extension and switching over LAN may not work when directly connecting a host PC's USB-C port to a DM-NVX-36X series endpoint's USB-C port. This is a known hardware limitation. Connect the host PC's USB-A port (if available) to the DM NVX endpoint using a USB-A to USB-C cable. A USB OTG USB-C to USB-A adapter may also be used at the host PC's USB-C port, which would be connected to the DM NVX endpoint using a USB-A to USB-C cable.
11. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-360C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

    A nonblocking network is required for DM NVX devices.
12. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-360C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

DM-NVX-363C Specifications

Product specifications for the DM-NVX-363C are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), 2-channel LPCM[2]
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[3] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4, 5] (Dual-Mode DisplayPort™ interface and DVI compatible[6])
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4] (DVI compatible[6])
Switcher	2x1 in decoder mode (HDMI, Stream), manual or auto-switching, breakaway audio[7], Crestron QuickSwitch HD™ technology
Scaler (Decoder Mode Only)	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect-ratio, or 1:1), video wall processing up to 8 wide x 8 high
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[6]), analog stereo[8]
Output Signal Types	HDMI, analog stereo[8]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[9]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type-C® connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[10, 11]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[10] Available Power: 500 mA at 5VDC
USB HID	(1) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device; Available Power: 500 mA at 5VDC
Ethernet 1-2	(2) 8-pin RJ-45 connectors, female; 100BASE-TX/1000BASE-T Ethernet port[12]
Ethernet 3 (10/100)	(1) 8-pin RJ-45 connector, female; 100BASE-TX Ethernet port
Ethernet 4	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[13]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[4] (DVI compatible[6])
HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6])

AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[8] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet
NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet link status; Amber indicates Ethernet activity
Ethernet 3	(2) LEDS; Green LED indicates Ethernet activity; Amber indicates Ethernet link status
Ethernet 4 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 4 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

15.1 oz (427 g)

Compliance

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

Notes:

1. In encoder mode, the stream type of the DM-NVX-363C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-363C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-363C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. As an encoder, the DM-NVX-363C transmits audio via the 2-channel AES67 stream when it receives a 2-channel stereo input signal via the HDMI or analog input. The DM-NVX-363C does not transmit audio via the 2-channel AES67 stream when it receives multichannel audio.

3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
5. 3D formats are not supported.
6. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
7. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The analog audio port can function as an input or output, not both.
9. The DM-NVX- does not down-mix Dolby Atmos MAT 2.0 audio.
10. The DM-NVX-363C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
11. USB 2.0 extension and switching over LAN may not work when directly connecting a host PC's USB-C port to a DM-NVX-36X series endpoint's USB-C port. This is a known hardware limitation. Connect the host PC's USB-A port (if available) to the DM NVX endpoint using a USB-A to USB-C cable. A USB OTG USB-C to USB-A adapter may also be used at the host PC's USB-C port, which would be connected to the DM NVX endpoint using a USB-A to USB-C cable.
12. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-363C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

    A nonblocking network is required for DM NVX devices.
13. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-363C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

DM-NVX-384C Specifications

Product specifications for the DM-NVX-384C are provided below.

Product Specifications

Encoding/Decoding

Video Codec	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 5120x2880 @30 Hz (5K Wide) or 5120x1440 @60 Hz (5K Super-Wide); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM[2]
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[3] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4, 5] (Dual-Mode DisplayPort™ interface and DVI compatible[6]); DisplayPort over USB-C (DisplayPort Alt Mode) with HDR10, HDR10+, and 4K60 4:4:4 support
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4] (DVI compatible[6])
Switcher	4x1 in encoder mode (Two HDMI, Two USB-C), manual or auto-switching, breakaway audio,[7] Crestron QuickSwitch HD™ technology; 5x1 in decoder mode (HDMI, Stream), manual or auto-switching, breakaway audio,[7] Crestron QuickSwitch HD™ technology
Scaler (Decoder Mode Only)	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	5120×2880 5K Wide	30 Hz	4:4:4	8 bit
	5120×2160 5K Ultra-Wide	30 Hz	4:4:4	8 bit
	5120×2160 5K Ultra-Wide*	60 Hz	4:2:0	8 bit
	5120×1440 5K Super-Wide	60 Hz	4:4:4	8 bit
	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	12 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	60 Hz	4:4:4	12 bit

*5K Ultra-Wide @60 Hz 4:2:0 is supported as an unscaled pass-through resolution only.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[6]), DisplayPort over USB-C (DisplayPort Alt Mode[7]), analog stereo[8]
Output Signal Types	HDMI (multichannel pass-through), analog stereo (2-channel)
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit, 48 kHz
Digital-to-Analog Conversion	24-bit, 48 kHz
AES67	24-bit, 48 kHz

Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, autodiscovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
HDMI	HDCP 2.3, EDID, CEC
USB-C (DisplayPort Alt Mode)	HDCP 2.3, EDID, CEC, USB 2.0
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB2 TO DEVICE	(1) USB Type-A connector, female; USB 2.0 device port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[9] Available Power: 500mA at 5 VDC
HID TO DEVICE	(1) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a USB HID compliant mouse, keyboard, or other USB HID compliant device;[9] Available Power: 500 mA at 5VDC
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[10]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[10]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[11]
HDMI OUT (eARC)	(1) HDMI Type A connector, female; HDMI digital video/audio output[4] (DVI compatible[6])

> **NOTE:** eARC connectivity will be enabled in a future firmware update.

HDMI IN 1	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6])
HDMI IN 2 (eARC)	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6]);

> **NOTE:** eARC connectivity will be enabled in a future firmware update.

TO HOST DP-S USB2 (IN 3-4)	(2) USB Type-C® connectors, female; USB 2.0 host ports; USB signal extender ports for connection to a computer or other USB 2.0 host; DisplayPort single stream video inputs[7]
AUDIO I/O	(1) 3-pin 3.5 mm detachable terminal block; Unbalanced stereo line-level audio input or output;[8] Input Impedance: 24 kΩ; Maximum Input Level: 2Vrms; Output Impedance: 100 Ω; Maximum Output Level: 2Vrms

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-3	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI IN 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

1.2 lb (0.54 kg)

Compliance

Regulatory Model: M202234002

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

Notes:

1. In encoder mode, the stream type of the DM-NVX-384C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-384C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-384C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. As an encoder, the DM-NVX-384C transmits audio via the 2-channel AES67 stream when it receives a 2-channel stereo input signal via the HDMI or analog input. The DM-NVX-384 does not transmit audio via the secondary 2-channel stream when it receives multichannel audio.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
5. 3D formats are not supported.
6. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
7. USB-C connections require USB-C cables that support DisplayPort Alt Mode video in order to pass video signal. Not all USB-C cables can support DisplayPort Alt Mode video.
8. The analog audio port can function as an input or output—not both. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
9. The DM-NVX-384C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-384C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

    A nonblocking network is required for DM NVX devices.
11. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-384C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

DM-NVX-385C Specifications

Product specifications for the DM-NVX-385C are provided below.

Product Specifications

Encoding/Decoding

Video Codec	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 5120x2880 @30 Hz (5K Wide) or 5120x1440 @60 Hz (5K Super-Wide); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5]); DisplayPort over USB-C (DisplayPort Alt Mode) with HDR10, HDR10+, and 4K60 4:4:4 support
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[5])
Switcher	4x1 in encoder mode (Two HDMI, Two USB-C), manual or auto-switching, breakaway audio,[6] Crestron QuickSwitch HD™ technology; 5x1 in decoder mode (HDMI, Stream), manual or auto-switching, breakaway audio,[6] Crestron QuickSwitch HD™ technology
Scaler (Decoder Mode Only)	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	5120×2880 5K Wide	30 Hz	4:4:4	8 bit
	5120×2160 5K Ultra-Wide	30 Hz	4:4:4	8 bit
	5120×2160 5K Ultra-Wide*	60 Hz	4:2:0	8 bit
	5120×1440 5K Super-Wide	60 Hz	4:4:4	8 bit
	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	12 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	60 Hz	4:4:4	12 bit

*5K Ultra-Wide @60 Hz 4:2:0 is supported as an unscaled pass-through resolution only.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), DisplayPort over USB-C (DisplayPort Alt Mode[6]), analog stereo[7]
Output Signal Types	HDMI (multichannel pass-through), analog stereo (2-channel)
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit, 48 kHz
Digital-to-Analog Conversion	24-bit, 48 kHz
AES67	24-bit, 48 kHz

Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, autodiscovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
HDMI	HDCP 2.3, EDID, CEC
USB-C (DisplayPort Alt Mode)	HDCP 2.3, EDID, CEC, USB 2.0
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB2 TO DEVICE	(1) USB Type-A connector, female; USB 2.0 device port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[8] Available Power: 500mA at 5 VDC
HID TO DEVICE	(1) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a USB HID compliant mouse, keyboard, or other USB HID compliant device;[8] Available Power: 500 mA at 5VDC
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[9]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[9]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[10]
HDMI OUT (eARC)	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])

> **NOTE:** eARC connectivity will be enabled in a future firmware update.

HDMI IN 1	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])
HDMI IN 2 (eARC)	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[3] (DVI and Dual-Mode DisplayPort interface compatible[5]);

> **NOTE:** eARC connectivity will be enabled in a future firmware update.

TO HOST DP-S USB2 (IN 3-4)	(2) USB Type-C® connectors, female; USB 2.0 host ports; USB signal extender ports for connection to a computer or other USB 2.0 host; DisplayPort single stream video inputs[6]
AUDIO I/O	(1) 3-pin 3.5 mm detachable terminal block; Unbalanced stereo line-level audio input or output;[7] Input Impedance: 24 kΩ; Maximum Input Level: 2Vrms; Output Impedance: 100 Ω; Maximum Output Level: 2Vrms

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-3	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI IN 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

1.2 lb (0.54 kg)

Compliance

Regulatory Model: M202234002

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

Notes:

1. In encoder mode, the stream type of the DM-NVX-385C must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-385C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-385C is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. USB-C connections require USB-C cables that support DisplayPort Alt Mode video in order to pass video signal. Not all USB-C cables can support DisplayPort Alt Mode video.
7. The analog audio port can function as an input or output—not both. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The DM-NVX-385C can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
9. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-385C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
10. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-385C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

DM-NVX-D30C Specifications

Product specifications for the DM-NVX-D30C are provided below.

Product Specifications

Decoding

Stream Type	Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Based on the stream received from the encoder[2]
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[4])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Output Signal Types	HDMI, analog stereo[5]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 computer console (for setup)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

Ethernet	(2) 8-pin RJ-45 connectors, female; 100BASE-TX/1000BASE-T Ethernet port[6]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output (DVI compatible[4])
AUDIO	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input;[5] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, USB	(1) Micro USB connector, female; USB 2.0 computer console port (for setup)

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet
NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
Ethernet	(2) LEDs; Green indicates Ethernet link status; Amber indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

14.4 oz (409 g)

Compliance

UL® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

Notes:

1. For a DM NVX 4K60 4:4:4 decoder, the proper stream type is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
5. The analog audio output is functional only when the DM-NVX-D30C is receiving a 2-channel stereo input signal.
6. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.

DM-NVX-E30C Specifications

Product specifications for the DM-NVX-E30C are provided below.

Product Specifications

Encoding

Stream Type	Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream)
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5])
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 computer console (for setup)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

Ethernet	(2) 8-pin RJ-45 connectors, female; 100BASE-TX/1000BASE-T Ethernet port[6]
HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])
AUDIO	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input;[7] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, USB	(1) Micro USB connector, female; USB 2.0 computer console port (for setup)

Controls and Indicators

NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet	(2) LEDs; Green indicates Ethernet link status; Amber indicates Ethernet activity
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

14.4 oz (409 g)

Compliance

UL® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

Notes:

1. The stream type of a DM NVX 4K60 4:4:4 encoder must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM NVX 4K60 4:4:4 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
7. The analog audio output is functional only when the DM-NVX-E30C is receiving a 2-channel stereo input signal.

DM-NVX-E760C Specifications

Product specifications for the DM-NVX-E760C are provided below.

Product Specifications

Encoding

Stream Type	Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, and Deep Color support
Audio Formats	Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Fixed: 200 to 950 Mbps - user specified,[2] Adaptive: dependent on input resolution of the stream), or Variable: less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3[3], AES-128, PKI

Video

Input Signal Types	DM 8G+ and HDBaseT with HDR10, Deep Color, and 4K60 4:4:4 support; DM Essentials with 4K60 4:2:0 support[4]
Copy Protection	HDCP 2.3[3]
Resolutions	Common resolutions are listed in the following table.[5]

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 120 Hz and 240 Hz are not supported due to HDBaseT limitations.

Audio

Input Signal Types	DM 8G+, HDBaseT, DM Essentials
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
DigitalMedia™	DM 8G+, DM Essentials, HDCP 2.3[3], EDID, PoDM+
HDBaseT	HDCP 2.3, EDID, PoE+
USB	USB 2.0 computer console (for setup)
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[6]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[6]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[7]
DM INPUT	(1) 8-pin RJ-45 connector, female, shielded; DM 8G+ (HDBaseT standard compliant) or DM Essentials input; PoDM+ (HDBaseT PoE+ compatible) PSE (power sourcing equipment) port or DM Essentials power port;[8] Connects to the DM 8G+ output of a DM switcher, transmitter or other DM device, to the DM Essentials port of a DM Essentials transmitter, or to an HDBaseT device via CAT5e, Crestron DM-CBL-8G, or Crestron DM-CBL-ULTRA cable[9]
AUDIO OUT	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[10] Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, USB	(1) Micro USB connector, female; USB 2.0 computer console port (for setup)

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet
NV	(1) Green LED, indicates unit is encoding (transmitting) network video
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 3 LNK	(1) Green LED, indicates Ethernet link status

Ethernet 3 ACT	(1) Green LED, indicates Ethernet activity
DM INPUT	(2) LEDs; Green indicates DM link status; Amber indicates video and HDCP signal presence

Construction

Plug-in card, occupies (1) card slot in a DMF-CI-8 card chassis, includes metal faceplate

Weight

15.1 oz(427 g)

Compliance

Intertek® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

Notes:

1. The stream type of a DM NVX 4K60 4:4:4 encoder must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-E760C encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. The DM-NVX-E760C supports HDCP 2.3. Refer to the product page of the DM 8G+ output device or DM Essentials transmitter for the HDCP version supported by those devices.
4. 3D formats are not supported.
5. Refer to the product page of the DM 8G+ output device or DM Essentials transmitter for information about the maximum resolution supported by those devices.
6. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-E760C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
7. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-E760C are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
8. The DM INPUT port can be used to power DM 8G+ and DM Essentials transmitters only when those devices are not connected to a 24VDC power pack.

   Wiring that connects to a PoDM+ or HDBaseT PoE+ PSE port or to a DM Essentials port is designed for intrabuilding use only.
9. Refer to the product page of the DM 8G+ output device or DM Essentials transmitter for cable length information.
10. The analog audio output is functional only when the DM-NVX-E760C is receiving a 2-channel stereo input signal.

DM NVX Director® Switching Appliances

Refer to the following section for the specifications of the DM NVX Director switching appliances:

- DM-NVX-DIR-80 Specifications on page 233
- DM-NVX-DIR-160 Specifications on page 235
- DM-NVX-DIR-ENT Specifications on page 237
- DM-NVX-DIR2 Specifications on page 240

DM-NVX-DIR-80 Specifications

Product specifications for the DM-NVX-DIR-80 are provided below.

Product Specifications

Device Support

Endpoints	Supports 80 DM NVX devices, each configured as an encoder or decoder
Domains	Supports a single domain (all endpoints are grouped together as a single system)

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, IPv4, HTTPS web browser setup and control, Crestron 3-Series® or later control system integration
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES audio/video content encryption, RTP, RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors - Front

MGMT	(1) 8-pin RJ-45 connector, shielded, female; 100BASE-TX/1000BASE-T Ethernet port for hardware management
USB 2.0	(2) USB Type A connectors, female, black; USB 2.0 host ports for factory use only
USB 3.0	(2) USB Type A connectors, female, blue; USB 3.0 host ports for factory use only
Ethernet 1-4	(4) 8-pin RJ-45 connectors, shielded, female; 100BASE-TX/1000BASE-T Ethernet ports for web browser, endpoint, and control traffic

Connectors - Rear

100-240V~ 2-4A 50/60 Hz	(1) IEC 60320 C14 mains power inlet; Mates with removable power cord (included)

Controls and Indicators

MSG	(1) Blue LED, identifies the device when the unit identification process is initiated
Ethernet 1-2	(2) Green LEDs, each indicates Ethernet activity on the corresponding Ethernet port
DISK	(1) Yellow LED, indicates SSD (solid-state drive) activity
PWR	(1) Green LED, indicates the unit is powered on
RESET	(1) Recessed pushbutton, initiates a hard reset
Power Button	(1) Push button, initiates boot up or shutdown

MGMT	(1) Amber LED and (1) bi-color green/orange LED; Indicates Ethernet activity, speed, and link status for the management Ethernet port
Ethernet 1-4	(1) Amber LED and (1) bicolor green/orange LED per each of (4) ports; Each pair indicates Ethernet activity, speed, and link status for the corresponding Ethernet port

Power

Mains Power	4.0-2.0A @ 100-240VAC, 50/60 Hz
Power Consumption	35 W at 100% CPU usage and fan speed

Environmental

Operating Temperature	50° to 95° F (10° to 35° C)
Operating Humidity	8% to 90% RH (non-condensing)
Nonoperating Temperature	-40° to 158° F (-40° to 70° C)
Nonoperating Humidity	5% to 95% RH (non-condensing)
Heat Dissipation	119.4 BTU/hr

Construction

Chassis	Metal, black finish; vented front, rear, and sides; Variable speed fan cooled
Mounting	Freestanding or 1 RU 19 in. rack mountable (rack ears included)

Dimensions

Height	1.72 in. (44 mm)
Width	17.21 in. (437 mm) without rack ears; 19.00 in (483 mm) with rack ears
Depth	10.49 in. (267 mm) without rack ears

Weight

10 lb (4.54 kg)

Compliance

UL® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

DM-NVX-DIR-160 Specifications

Product specifications for the DM-NVX-DIR-160 are provided below.

Product Specifications

Device Support

Endpoints	Supports 160 DM NVX devices, each configured as an encoder or decoder
Domains	Supports 20 domains (allows grouping of endpoints in up to 20 individual subsystems)

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, IPv4, HTTPS web browser setup and control, Crestron 3-Series® or later control system integration
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES audio/video content encryption, RTP, RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors - Front

MGMT	(1) 8-pin RJ-45 connector, shielded, female; 100BASE-TX/1000BASE-T Ethernet port for hardware management
USB 2.0	(2) USB Type A connectors, female, black; USB 2.0 host ports for factory use only
USB 3.0	(2) USB Type A connectors, female, blue; USB 3.0 host ports for factory use only
Ethernet 1-4	(4) 8-pin RJ-45 connectors, shielded, female; 100BASE-TX/1000BASE-T Ethernet ports for web browser, endpoint, and control traffic

Connectors - Rear

100-240V~ 2-4A 50/60 Hz	(1) IEC 60320 C14 mains power inlet; Mates with removable power cord (included)

Controls and Indicators

MSG	(1) Blue LED, identifies the device when the unit identification process is initiated
Ethernet 1-2	(2) Green LEDs, each indicates Ethernet activity on the corresponding Ethernet port
DISK	(1) Yellow LED, indicates SSD (solid-state drive) activity
PWR	(1) Green LED, indicates the unit is powered on
RESET	(1) Recessed pushbutton, initiates a hard reset
Power Button	(1) Push button, initiates boot up or shutdown

MGMT	(1) Amber LED and (1) bi-color green/orange LED; Indicates Ethernet activity, speed, and link status for the management Ethernet port
Ethernet 1-4	(1) Amber LED and (1) bicolor green/orange LED per each of (4) ports; Each pair indicates Ethernet activity, speed, and link status for the corresponding Ethernet port

Power

Mains Power	4.0-2.0A @ 100-240VAC, 50/60 Hz
Power Consumption	35 W at 100% CPU usage and fan speed

Environmental

Operating Temperature	50° to 95° F (10° to 35° C)
Operating Humidity	8% to 90% RH (non-condensing)
Nonoperating Temperature	-40° to 158° F (-40° to 70° C)
Nonoperating Humidity	5% to 95% RH (non-condensing)
Heat Dissipation	119.4 BTU/hr

Construction

Chassis	Metal, black finish; vented front, rear, and sides; Variable speed fan cooled
Mounting	Freestanding or 1 RU 19 in. rack mountable (rack ears included)

Dimensions

Height	1.72 in. (44 mm)
Width	17.21 in. (437 mm) without rack ears; 19.00 in (483 mm) with rack ears
Depth	10.49 in. (267 mm) without rack ears

Weight

10 lb (4.54 kg)

Compliance

UL® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

DM-NVX-DIR-ENT Specifications

Product specifications for the DM-NVX-DIR-ENT are provided below.

Product Specifications

Device Support

Endpoints	Supports 1000 DM NVX devices, each configured as an encoder or decoder
Domains	Supports 240 domains (allows grouping of endpoints in up to 240 individual subsystems)

Communications

Ethernet	100/1000 Mbps, 10 Gbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, IPv4, HTTPS web browser setup and control, Crestron 3-Series® control system integration
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES audio/video content encryption, RTP, RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors - Front

MGMT	(1) 8-pin RJ-45 connector, shielded, female; 100BASE-TX/1000BASE-T Ethernet port for hardware management
USB 3.0	(2) USB Type A connectors, female, blue; USB 3.0 host ports for factory use only
Ethernet 1-6	(6) 8-pin RJ-45 connectors, shielded, female; 100BASE-TX/1000BASE-T Ethernet ports for web browser, endpoint, and control traffic
Ethernet 7-8	(2) SFP+ ports; 10GBASE-X Ethernet ports for web browser, endpoint, and control traffic; Each port accepts one Crestron SFP-10G SFP+ transceiver module (sold separately)
Ethernet 9-12	(4) SFP+ ports; 1000BASE-X/10GBASE-X Ethernet ports for web browser, endpoint, and control traffic; Each port accepts one Crestron SFP-1G or SFP-10G series SFP/SFP+ transceiver module (sold separately)

Connectors - Rear

100-240V~ 3-6A 50/60 Hz	(2) IEC 60320 C14 mains power inlets; Each mates with a removable power cord (included)

Controls and Indicators

Power button	(1) Push button, initiates boot up or shutdown
RESET	(1) Recessed push button, initiates a hardware reset
PWR	(1) Green LED, indicates the unit is powered on

DISK	(1) Yellow LED, indicates SSD (solid-state drive) activity
Ethernet 1-2	(2) Green LEDs, indicate Ethernet activity on the corresponding Ethernet port
MSG	(1) Bicolor blue/red LED, blue identifies the device when the unit identification process is initiated, red indicates a power supply fault
MGMT	(1) Amber LED and (1) bicolor green/orange LED; Indicates Ethernet activity, speed, and link status for the management Ethernet port
Ethernet 1-6	(1) Amber LED and (1) bicolor green/orange LED per each of (6) ports; Each pair indicates Ethernet activity, speed, and link status for the corresponding Ethernet port
Ethernet 7-12	(2) Green LEDs per each of (6) ports; Each pair indicates Ethernet activity and link status for the corresponding SFP+ port

Power

Mains Power (x2)	6.0-3.0A @ 100-240VAC, 50/60 Hz
Redundancy	(2) Hot-swappable power supply modules, unit continues to operate at full capacity on one functioning power supply module
Power Consumption	140 W at 100% CPU usage and fan speed

Environmental

Operating Temperature	32° to 104°F (0° to 40°C)
Operating Humidity	8% to 90% RH (noncondensing)
Nonoperating Temperature	-40° to 158° F (-40° to 70° C)
Nonoperating Humidity	5% to 95% RH (non-condensing)
Heat Dissipation	477.7 BTU/hr

Construction

Chassis	Metal, black finish, vented front and rear, variable speed fan cooled
Mounting	Freestanding or 1 RU 19 in. rack-mountable; Includes rack mounting brackets for attachment to front and rear rack rails with 10-32 threaded screw holes or 3/8 in. (10 mm) square holes, adjustable for varying rack depths

Dimensions

Height	1.71 in. (44 mm)
Width	17.50 in. (445 mm) without rack mounting brackets; 19.00 in. (483 mm) with rack mounting brackets
Depth	18.78 in. (477 mm) without rack mounting brackets

Weight

18 lb (8.16 kg)

Compliance

UL® Listed for US and Canada, CE, IC, FCC Part 15 Class A digital device

DM-NVX-DIR2 Specifications

Product specifications for the DM-NVX-DIR2 are provided below.

Product Specifications

Computer

Model	Dell® OptiPlex® 7080 Micro Desktop computer
Processor	Intel Core® i5-10500T cPU @ 2.30 GHz
RAM	8 GB DDR4 2666 MT/s
Storage	256 GB SSD
Graphics	Intel® UHD Graphics 630
Network	Intel I219-LM 100/1000 Mbps Ethernet
Operating System	AlmaLinux OS® 9.5 software

Device Support

Endpoints	Supports 100 DM NVX devices, each configured as an encoder or decoder
Domains	Supports 20 domains (allows grouping of endpoints in up to 20 individual subsystems)

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, IPv4, HTTPS web browser setup and control, Crestron 3-Series® or later control system integration

Controls and Indicators

Power	(1) Push button with LED backlight; For power on/off and reset
LAN	(2) LEDs on LAN port; Indicate Ethernet link status and activity

Connectors

Audio (Front)	(1) 3.5 mm bidirectional line level audio connector (not used)
Line Out (Front)	(1) 3.5 mm stereo line level output audio connector (not used)
USB-C (Front)	(1) USB Type-C® 3.2 (Gen 2) connector, female (not used)
SSUSB (Front)	(1) USB Type-A 3.2 (Gen 2) connector, with PowerShare, female; Connects to a keyboard for optional command line configuration
Antenna	(2) Wireless antenna slots (not used)
HDMI	(1) HDMI® connector, female; Connects to a monitor for optional command line configuration
LAN	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port

SSUSB 3.2 Gen 1	(2) USB Type-A 3.2 (Gen 1) connectors, female; Provides one port with Smart Power; Connects to a keyboard or mouse for optional command line configuration; ADPT-USB3.0-GBENET (sold separately) can be connected for additional Ethernet ports
SSUSB 3.2 Gen 2	(2) USB Type-A 3.2 (Gen 2) connectors, female; Connects to a keyboard or mouse for optional command line configuration; ADPT-USB3.0-GBENET (sold separately) can be connected for additional Ethernet ports
Kensington Lock	(1) Slot for optional Kensington® lock (not included)
DisplayPort	(2) DisplayPort™ 1.4 connectors, female; Connects to a monitor for optional command line configuration
19.5VDC	(1) DC power connector; 19.5VDC power input; For included power adapter

Power

Power Adapter (included)	Input: 100-240VAC, 50/60 Hz; Output: 130 W @ 19.5VDC

Environmental

Operating Temperature	50 to 95°F (10 to 35°C)
Storage Temperature	-40 to 149°F (-40 to 65°C)
Heat Dissipation	42.9 BTU/hr (short idle)

Construction

Enclosure	Metal, plastic
Mounting	Freestanding, optional VESA® mount and Kensington® lock capabilities

Dimensions

Height	1.40 in. (36 mm)
Width	7.20 in. (183 mm)
Depth	7.00 in. (178 mm)

Weight

2.87 lb (1.30 kg)

Room Box Models

Refer to the following sections for the specifications of the room box DM NVX AV-over-IP devices:

- DM-NVX-350 Specifications on page 243
- DM-NVX-351 Specifications on page 250
- DM-NVX-352 Specifications on page 257
- DM-NVX-360 Specifications on page 264
- DM-NVX-363 Specifications on page 271
- DM-NVX-384 Specifications on page 278
- DM-NVX-D10 Specifications on page 292
- DM-NVX-D20 Specifications on page 296
- DM-NVX-D200 Specifications on page 300
- DM-NVX-D30 Specifications on page 305
- DM-NVX-E10 Specifications on page 310
- DM-NVX-E20 Specifications on page 314
- DM-NVX-E30 Specifications on page 319
- DM-NVX-E760 Specifications on page 325

DM-NVX-350 Specifications

Product specifications for the DM-NVX-350 are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Output Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[5])
Switcher	3x1 in decoder mode (HDMI 1, HDMI 2, Stream) 2x1 in encoder mode, manual or auto-switching, breakaway audio[6], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10 support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x up to 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.2
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 240 Hz is not supported.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), analog stereo[6]
Output Signal Types	HDMI, analog stereo[6]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[7]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3; USB 2.0 computer console (for setup)
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking (via control system); computer console (for setup)
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.2, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type B connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[8]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[8] Available Power: 500 mA at 5VDC
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[9] PoE++ or UPOE PD (powered device) port; IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant[10]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[9]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[11]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])
HDMI INPUT 1-2	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])

AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[6] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, SERIAL	(1) 8-pin RJ-45 connector, female; RS-232 computer console port (for setup)
CONSOLE, USB	(1) USB Type B connector, female; USB 2.0 computer console port (for setup)
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 2.0A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2420RU power pack included
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 3 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 3 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input
PWR	(1) Bicolor green/amber LED; Indicates operating power supplied via PoE++, UPOE, or the included power pack; Amber indicates device is booting; Green indicates device is operational

SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device
INPUT SEL	(1) Push button, enables manual input selection; (2) Bicolor green/amber LEDs, indicate the current active input and signal presence at each corresponding input

Power

Power Pack (Included)	Input: 1.3 A maximum @ 100-240VAC, 50/60 Hz; Output: 2 A @ 24VDC; Model: PW-2420RU
PoE++ or UPOE	IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant; Compatible with IEEE 802.3bt compliant Ethernet switch or third-party compliant PSE
Power Consumption	35 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	85 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.61 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.50 in. (39 mm)

Weight

2.0 lb (0.91 kg)

Compliance

FCC Part 15 Class B, IC Class B, CE, UL® Listed for US and Canada

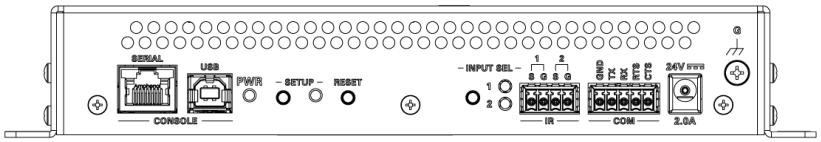
Notes:

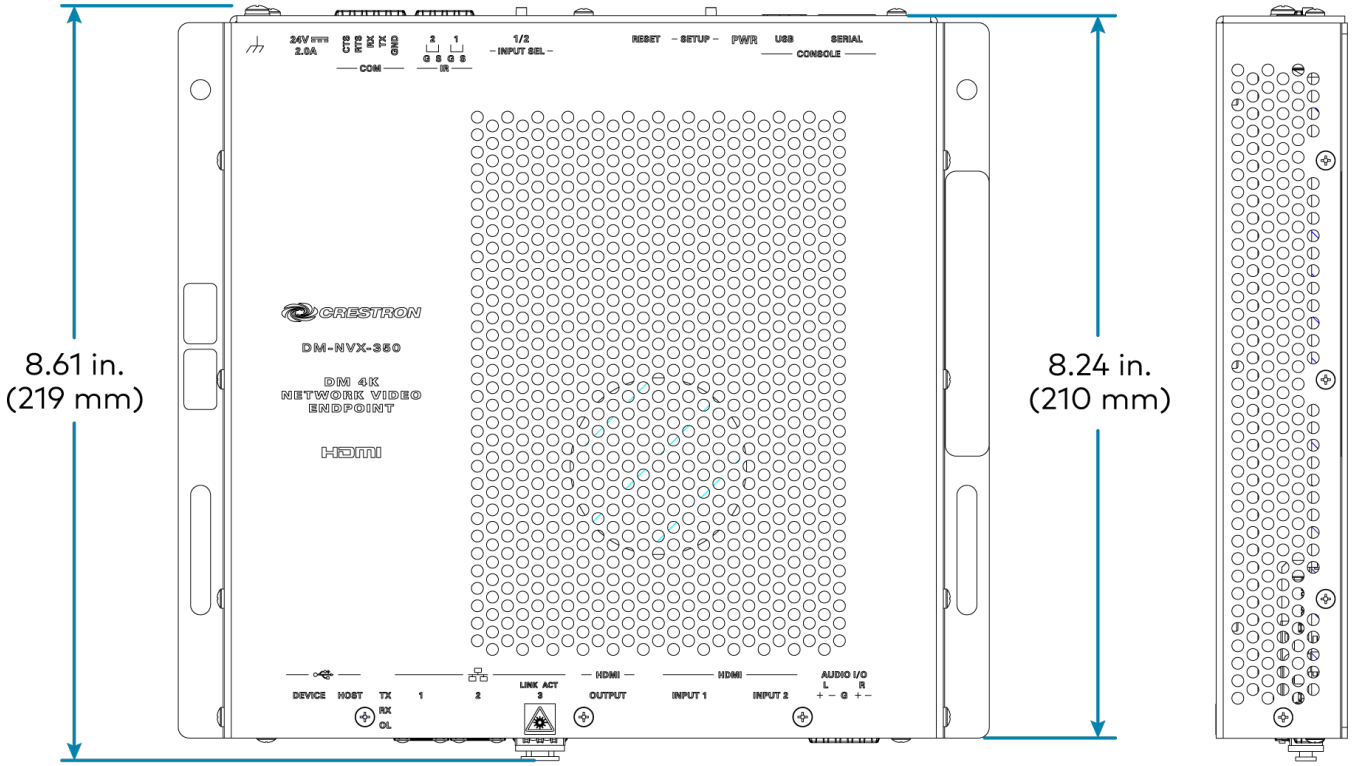
1. In encoder mode, the stream type of the DM-NVX-350 must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-350 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

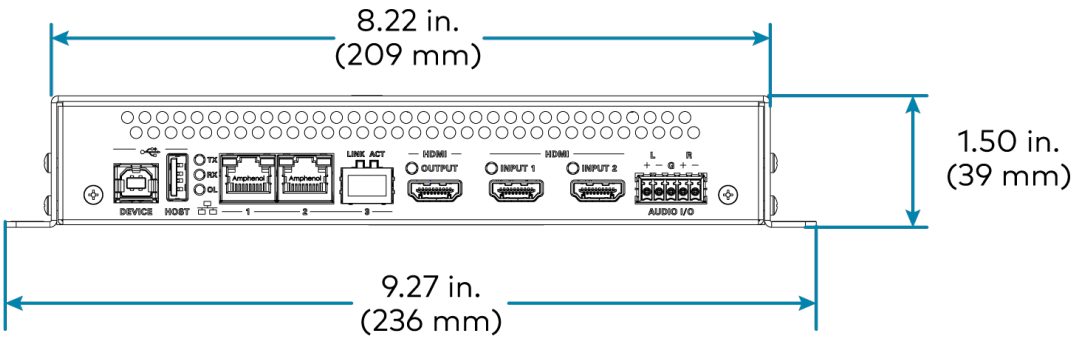
   In decoder mode, the proper stream type of the DM-NVX-350 is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The analog audio port can function as an input or output, not both. Analog audio output is only functional when the DM-NVX-350 is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-351 or DM-NVX-351C.
7. The DM-NVX-350 does not down-mix Dolby Atmos MAT 2.0 audio.
8. The DM-NVX-350 can be configured to accept the connection of a USB device or a USB host—not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
9. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-350 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
10. Refer to the "Power" specifications section for approved powering options.
11. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-350 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

Dimension Drawings







DM-NVX-351 Specifications

Product specifications for the DM-NVX-351 are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Output Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[5])
Switcher	3x1 in decoder mode (HDMI 1, HDMI 2, Stream) 2x1 in encoder mode, manual or auto-switching, breakaway audio[6], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10 support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x up to 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.2
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 240 Hz is not supported.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), analog stereo[6]
Output Signal Types	HDMI (multichannel pass-through or 2-channel downmix), analog stereo (2-channel downmix)[6]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[7]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB
Audio Delay	0 to 1200 ms

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3; USB 2.0 computer console (for setup)
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking (via control system); computer console (for setup)
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.2, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type B connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[8]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[8] Available Power: 500 mA at 5VDC
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[9] PoE++ or UPOE PD (powered device) port; IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant[10]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[9]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[11]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])
HDMI INPUT 1-2	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])

AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[6] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, SERIAL	(1) 8-pin RJ-45 connector, female; RS-232 computer console port (for setup)
CONSOLE, USB	(1) USB Type B connector, female; USB 2.0 computer console port (for setup)
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 2.0A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2420RU power pack included
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 3 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 3 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input
PWR	(1) Bicolor green/amber LED; Indicates operating power supplied via PoE++, UPOE, or the included power pack; Amber indicates device is booting; Green indicates device is operational

SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device
INPUT SEL	(1) Push button, enables manual input selection; (2) Bicolor green/amber LEDs, indicate the current active input and signal presence at each corresponding input

Power

Power Pack (Included)	Input: 1.3 A maximum @ 100-240VAC, 50/60 Hz; Output: 2 A @ 24VDC; Model: PW-2420RU
PoE++ or UPOE	IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant; Compatible with IEEE 802.3bt compliant Ethernet switch or third-party compliant PSE
Power Consumption	35 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	85 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.61 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.50 in. (39 mm)

Weight

2.0 lb (0.91 kg)

Compliance

FCC Part 15 Class B, IC Class B, CE, UL® Listed for US and Canada

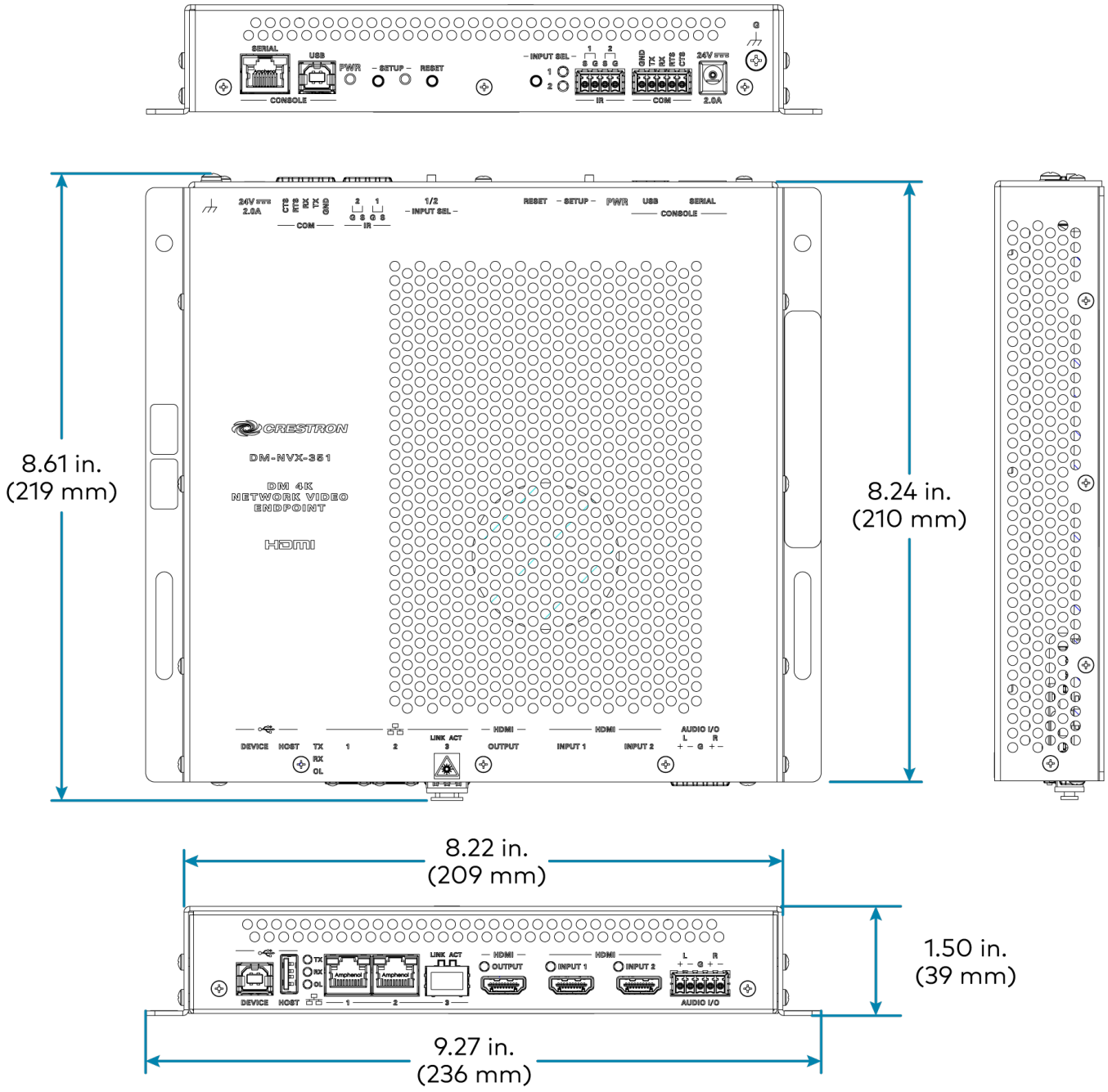
Notes:

1. In encoder mode, the stream type of the DM-NVX-351 must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-351 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-351 is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The analog audio port can function as an input or output, not both.
7. The DM-NVX-351 does not down-mix Dolby Atmos MAT 2.0 audio.
8. The DM-NVX-351 can be configured to accept the connection of a USB device or a USB host—not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
9. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-351 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
10. Refer to the "Power" specifications section for approved powering options.
11. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-351 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

Dimension Drawings



DM-NVX-352 Specifications

Product specifications for the DM-NVX-352 are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.2, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Output Signal Types	HDMI with HDR10, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[5])
Switcher	3x1 in decoder mode (HDMI 1, HDMI 2, Stream) 2x1 in encoder mode, manual or auto-switching, breakaway audio[6], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10 support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x up to 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.2
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 240 Hz is not supported.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), analog stereo[6]
Output Signal Types	HDMI, analog stereo[6]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[7]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3; USB 2.0 computer console (for setup)
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking (via control system); computer console (for setup)
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL/RS-232 (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.2, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.2, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type B connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[8]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[8] Available Power: 500 mA at 5VDC
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[9] PoE++ or UPOE PD (powered device) port; IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant[10]
Ethernet 2	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[11]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])
HDMI INPUT 1-2	(2) HDMI Type A connectors, female; HDMI digital video/audio inputs;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])

AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[6] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, SERIAL	(1) 8-pin RJ-45 connector, female; RS-232 computer console port (for setup)
CONSOLE, USB	(1) USB Type B connector, female; USB 2.0 computer console port (for setup)
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 2.0A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2420RU power pack included
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet 1	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 2 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 2 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input
PWR	(1) Bicolor green/amber LED; Indicates operating power supplied via PoE++, UPOE, or the included power pack; Amber indicates device is booting; Green indicates device is operational

SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device
INPUT SEL	(1) Push button, enables manual input selection; (2) Bicolor green/amber LEDs, indicate the current active input and signal presence at each corresponding input

Power

Power Pack (Included)	Input: 1.3 A maximum @ 100-240VAC, 50/60 Hz; Output: 2 A @ 24VDC; Model: PW-2420RU
PoE++ or UPOE	IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant; Compatible with IEEE 802.3bt compliant Ethernet switch or third-party compliant PSE
Power Consumption	35 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	85 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.61 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.50 in. (39 mm)

Weight

2.0 lb (0.91 kg)

Compliance

FCC Part 15 Class B, IC Class B, CE, UL® Listed for US and Canada

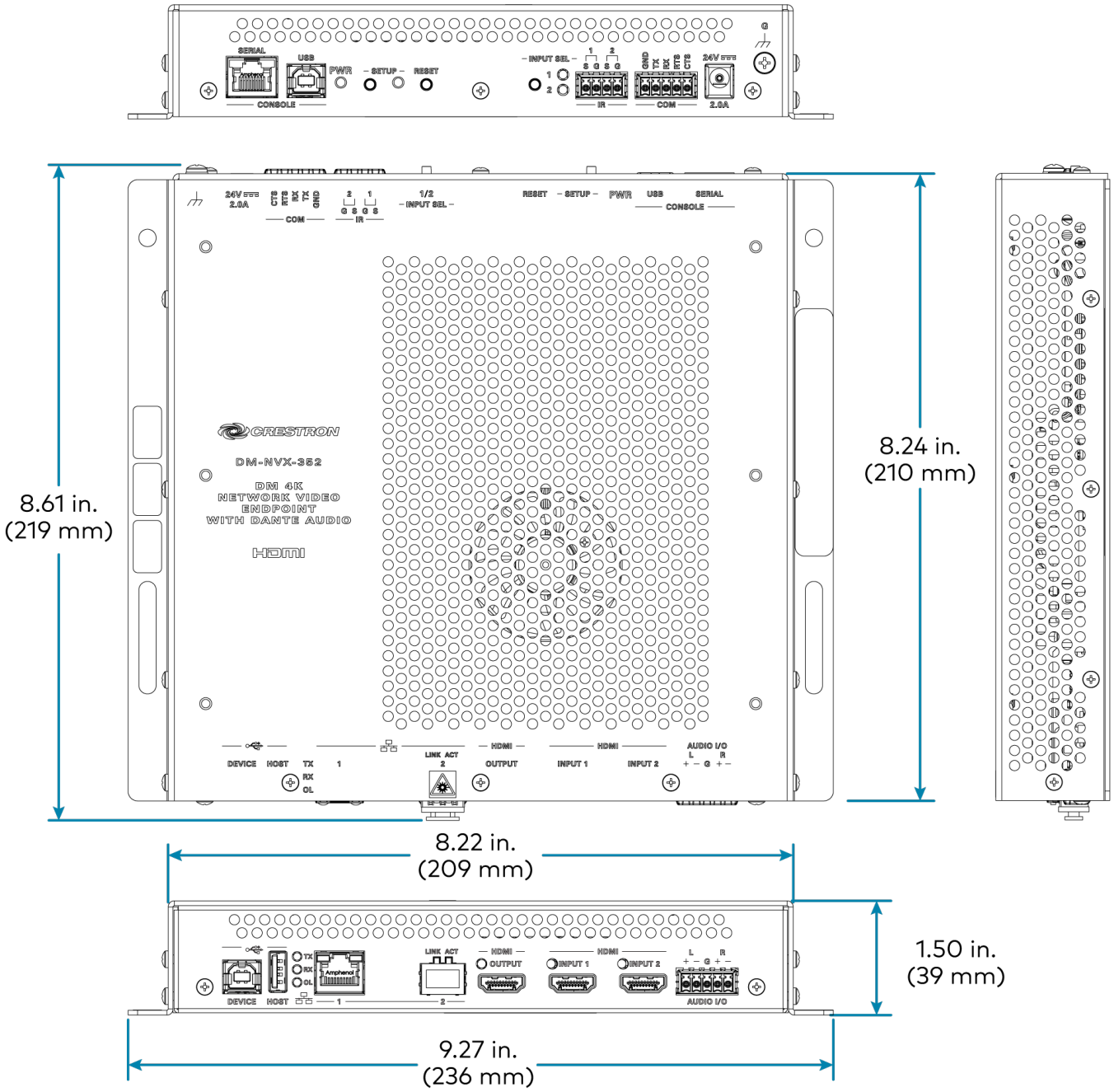
Notes:

1. In encoder mode, the stream type of the DM-NVX-352 must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-352 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-352 is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The analog audio port can function as an input or output, not both. Analog audio output is only functional when the DM-NVX-352 is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-351 or DM-NVX-351C.
7. The DM-NVX-352 does not down-mix Dolby Atmos MAT 2.0 audio.
8. The DM-NVX-352 can be configured to accept the connection of a USB device or a USB host—not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
9. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-352 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
10. Refer to the "Power" specifications section for approved powering options.
11. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-352 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

Dimension Drawings



DM-NVX-360 Specifications

Product specifications for the DM-NVX-360 are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), 2-channel LPCM[2]
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[3] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4, 5] (Dual-Mode DisplayPort™ interface and DVI compatible[6])
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4] (DVI compatible[6])
Switcher	2x1 in decoder mode (HDMI 1, Stream), manual or auto-switching, limited audio breakaway[7], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect-ratio, or 1:1), video wall processing up to 8 wide x 8 high
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[6]), analog stereo[8]
Output Signal Types	HDMI, analog stereo[8]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking via control system
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type-C® connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[9, 10]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[9] Available Power: 500 mA at 5VDC
USB HID	(1) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device; Available Power: 500 mA at 5VDC[11]
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[12] PoE+ PD (powered device) port; IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant[13, 14]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[12]
Ethernet 3 (10/100)	(1) 8-pin RJ-45 connector, female; 100BASE-TX Ethernet port
Ethernet 4	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[15]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[4] (DVI compatible[6])

HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6])
AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[8] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 1.25A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2412WU power pack (sold separately)
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device
INPUT SEL	(1) Push button, enables manual input selection; (2) Bicolor green/amber LEDs, indicate the current active input and signal presence at each corresponding input (HDMI and NV)
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity

Ethernet 3	(2) LEDs; Green indicates Ethernet activity; Amber indicates Ethernet link status
Ethernet 4 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 4 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input

Power

PoE+	IEEE 802.3at Type 2 Class 4 (25.5 W) compliant; Compatible with PoE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE[15]
Power Pack (Optional)	Input: 1.5A maximum @ 100-240VAC, 50/60 Hz; Output: 1.25A @ 24VDC; Model: PW-2412WU
Power Consumption	20 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	74 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.61 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.25 in. (32 mm)

Weight

2.0 lb (0.91 kg)

Compliance

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

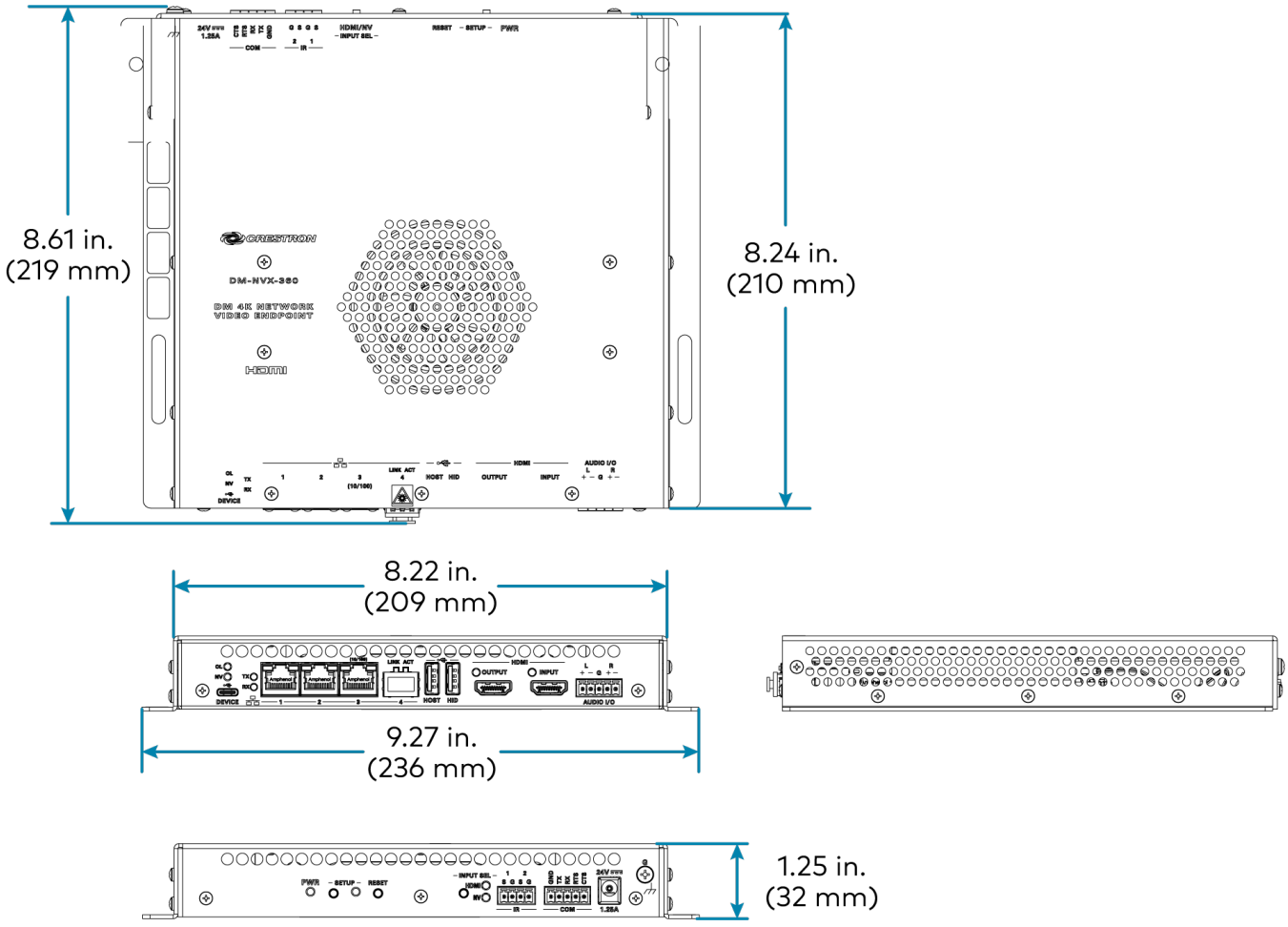
Notes:

1. In encoder mode, the stream type of the DM-NVX-360 must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-360 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-360 is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. As an encoder, the DM-NVX-360 transmits audio via the 2-channel AES67 stream when it receives a 2-channel stereo input signal via the HDMI or analog input. The DM-NVX-360 does not transmit audio via the 2-channel AES67 stream when it receives multichannel audio.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
5. 3D formats are not supported.
6. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
7. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The analog audio port can function as an input or output, not both. Analog audio output is functional only when the DM-NVX-360 is receiving a 2-channel stereo input signal. A 2-channel downmix signal from a multichannel surround sound source requires the use of a Crestron DM-NVX-363, DM-NVX-363C, DM-NVX-351, or DM-NVX-351C.
9. The DM-NVX-360 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. USB 2.0 extension and switching over LAN may not work when directly connecting a host PC's USB-C port to a DM-NVX-36X series endpoint's USB-C port. This is a known hardware limitation. Connect the host PC's USB-A port (if available) to the DM NVX endpoint using a USB-A to USB-C cable. A USB OTG USB-C to USB-A adapter may also be used at the host PC's USB-C port, which would be connected to the DM NVX endpoint using a USB-A to USB-C cable.
11. When PoE+ is used to power the DM-NVX-360, a maximum of 500mA is available to power both the USB HOST and USB HID ports. To prevent possible instability issues, it is recommended that the PW-2412WU power pack (sold separately) be used.
12. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-360 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

    A nonblocking network is required for DM NVX devices.
13. Refer to the "Power" specifications section for approved powering options.
14. In order for Ethernet port 1 to receive PoE+, the port requires connection to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ PSE port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.
15. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-360 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

Dimension Drawings



DM-NVX-363 Specifications

Product specifications for the DM-NVX-363 are provided below.

Product Specifications

Encoding/Decoding

Stream Type	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), 2-channel LPCM[2]
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[3] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4, 5] (Dual-Mode DisplayPort™ interface and DVI compatible[6])
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4] (DVI compatible[6])
Switcher	2x1 in decoder mode (HDMI 1, Stream), manual or auto-switching, limited audio breakaway[7], Crestron QuickSwitch HD™ technology
Scaler	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect-ratio, or 1:1), video wall processing up to 8 wide x 8 high
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[6]), analog stereo[8]
Output Signal Types	HDMI (multichannel pass-through), analog stereo (2-channel downmix)[8]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels[9]
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking via control system
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB DEVICE	(1) USB Type-C® connector, female; USB 2.0 device port; USB signal extender port for connection to a computer or other USB 2.0 host[10, 11]
USB HOST	(1) USB Type A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[10] Available Power: 500 mA at 5VDC
USB HID	(1) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device; Available Power: 500 mA at 5VDC[12]
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[14] PoE+ PD (powered device) port; IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant[14, 15]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[13]
Ethernet 3 (10/100)	(1) 8-pin RJ-45 connector, female; 100BASE-TX Ethernet port
Ethernet 4	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[16]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[4] (DVI compatible[6])

HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6])
AUDIO I/O	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output;[8] Input Impedance: 24 kΩ balanced/unbalanced; Maximum Input Level: 4Vrms balanced, 2Vrms unbalanced; Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 1.25A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2412WU power pack (sold separately)
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device
INPUT SEL	(1) Push button, enables manual input selection; (2) Bicolor green/amber LEDs, indicate the current active input and signal presence at each corresponding input (HDMI and NV)
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity

Ethernet 3	(2) LEDs; Green indicates Ethernet activity; Amber indicates Ethernet link status
Ethernet 4 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 4 ACT	(1) Green LED, indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input

Power

PoE+	IEEE 802.3at Type 2 Class 4 (25.5 W) compliant; Compatible with PoE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE[16]
Power Pack (Optional)	Input: 1.5A maximum @ 100-240VAC, 50/60 Hz; Output: 1.25A @ 24VDC; Model: PW-2412WU
Power Consumption	20 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	74 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.61 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.25 in. (32 mm)

Weight

2.0 lb (0.91 kg)

Compliance

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

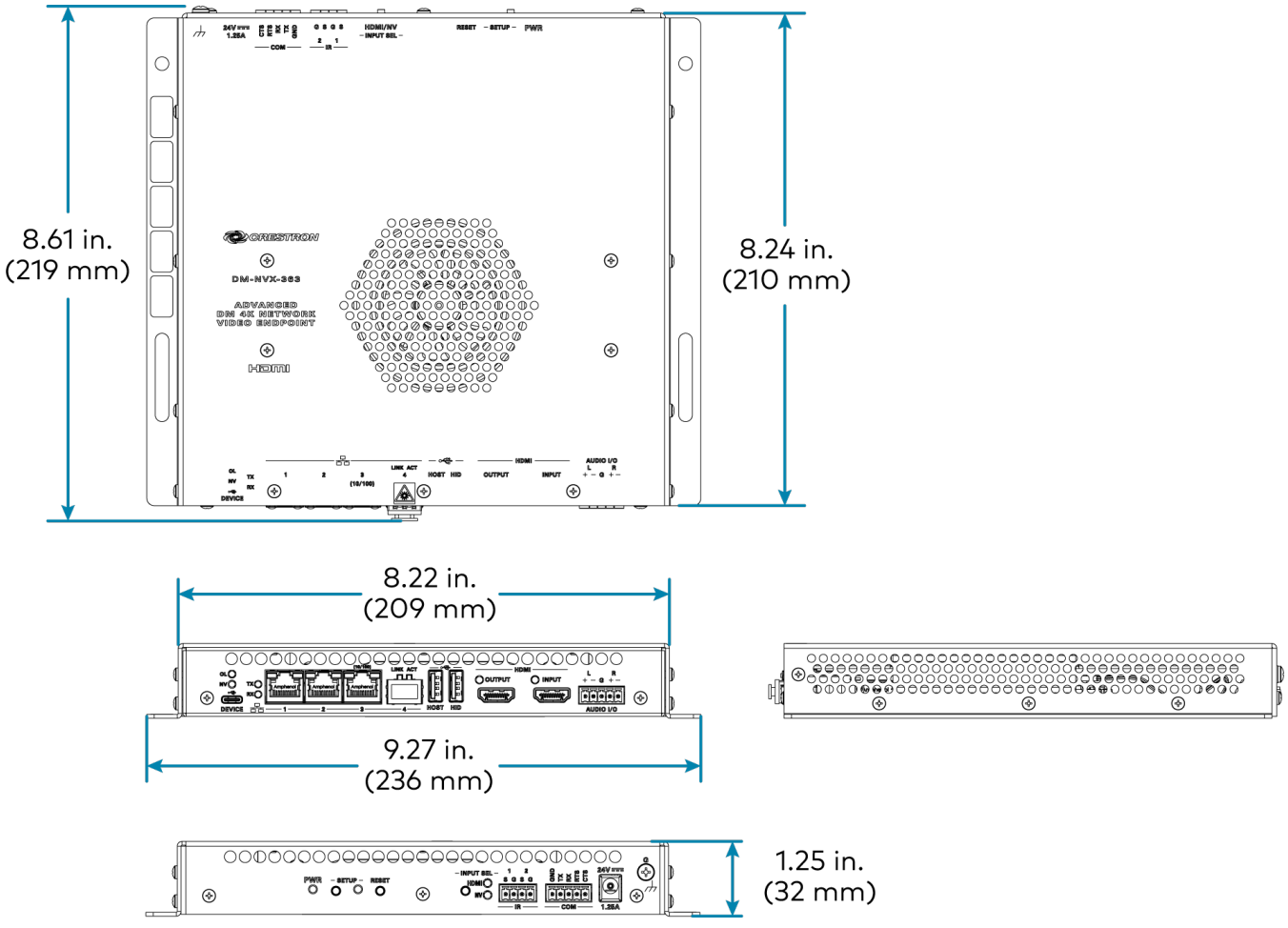
Notes:

1. In encoder mode, the stream type of the DM-NVX-363 must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-363 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-363 is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. As an encoder, the DM-NVX-363 transmits audio via the 2-channel AES67 stream when it receives a 2-channel stereo input signal via the HDMI or analog input. The DM-NVX-363 does not transmit audio via the 2-channel AES67 stream when it receives multichannel audio.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
5. 3D formats are not supported.
6. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
7. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The analog audio port can function as an input or output, not both.
9. The DM-NVX- does not down-mix Dolby Atmos MAT 2.0 audio.
10. The DM-NVX-363 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
11. USB 2.0 extension and switching over LAN may not work when directly connecting a host PC's USB-C port to a DM-NVX-36X series endpoint's USB-C port. This is a known hardware limitation. Connect the host PC's USB-A port (if available) to the DM NVX endpoint using a USB-A to USB-C cable. A USB OTG USB-C to USB-A adapter may also be used at the host PC's USB-C port, which would be connected to the DM NVX endpoint using a USB-A to USB-C cable.
12. When PoE+ is used to power the DM-NVX-363, a maximum of 500mA is available to power both the USB HOST and USB HID ports. To prevent possible instability issues, it is recommended that the PW-2412WU power pack (sold separately) be used.
13. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-363 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

    A nonblocking network is required for DM NVX devices.
14. Refer to the "Power" specifications section for approved powering options.
15. In order for Ethernet port 1 to receive PoE+, the port requires connection to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ PSE port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.
16. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-363 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.

Dimension Drawings



DM-NVX-384 Specifications

Product specifications for the DM-NVX-384 are provided below.

Product Specifications

Encoding/Decoding

Video Codec	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 5120x2880 @30 Hz (5K Wide) or 5120x1440 @60 Hz (5K Super-Wide); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM[2]
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[3] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[4, 5] (Dual-Mode DisplayPort™ interface and DVI compatible[6]); DisplayPort over USB-C (DisplayPort Alt Mode) with HDR10, HDR10+, and 4K60 4:4:4 support
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[6])
Switcher	4x1 in encoder mode (Two HDMI, Two USB-C), manual or auto-switching, breakaway audio,[7] Crestron QuickSwitch HD™ technology; 5x1 in decoder mode (HDMI, Stream), manual or auto-switching, breakaway audio,[7] Crestron QuickSwitch HD™ technology
Scaler (Decoder Mode Only)	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	5120×2160 5K Ultra-Wide	30 Hz	4:4:4	8 bit
	5120×2160 5K Ultra-Wide*	60 Hz	4:2:0	8 bit
	5120×1440 5K Super-Wide	60 Hz	4:4:4	8 bit
	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	12 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	60 Hz	4:4:4	12 bit

*5K Ultra-Wide @60 Hz 4:2:0 is supported as an unscaled pass-through resolution only.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[6]), DisplayPort over USB-C (DisplayPort Alt Mode[7]), analog stereo[8]
Output Signal Types	HDMI (multichannel pass-through), analog stereo (2-channel)
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit, 48 kHz
Digital-to-Analog Conversion	24-bit, 48 kHz
AES67	24-bit, 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, autodiscovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking (via control system)
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
USB-C (DisplayPort Alt Mode)	HDCP 2.3, EDID, CEC, USB 2.0
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB2 TO DEVICE	(1) USB Type-A connector, female; USB 2.0 device port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[9] Available Power: 500mA at 5 VDC[10, 11]
HID TO DEVICE	(1) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a USB HID compliant mouse, keyboard, or other USB HID compliant device;[9] Available Power: 500 mA at 5VDC[11]
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[12] PoE++ PD (powered device) port, IEEE 802.3bt Type 3 Class 5 (60 W) compliant[11]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[12]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[13]

HDMI OUT (eARC)	(1) HDMI Type A connector, female; HDMI digital video/audio output[4] (DVI compatible[6])
	NOTE: eARC connectivity will be enabled in a future firmware update.
HDMI IN 1	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6])
HDMI IN 2 (eARC)	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[4] (DVI and Dual-Mode DisplayPort interface compatible[6]);
	NOTE: eARC connectivity will be enabled in a future firmware update.
TO HOST DP-S USB2 (IN 3-4)	(2) USB Type-C® connectors, female; USB 2.0 host ports; USB signal extender ports for connection to a computer or other USB 2.0 host; DisplayPort single stream video inputs[7]
AUDIO I/O	(1) 3-pin 3.5 mm detachable terminal block; Unbalanced stereo line-level audio input or output;[8] Input Impedance: 24 kΩ; Maximum Input Level: 2Vrms; Output Impedance: 100 Ω; Maximum Output Level: 2Vrms
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 1.5A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2420RU power pack included
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

PWR	(1) Bicolor green/amber LED; Indicates operating power supplied via PoE++, UPOE, or the included power pack; Amber indicates device is booting; Green indicates device is operational

SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-3	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI IN 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input

Power

PoE++	EEE 802.3bt Type 3 Class 5 (60 W) compliant; Compatible with PoE++ compliant Ethernet switch or third-party IEEE 802.3bt compliant PSE[14]
Power Pack (Optional)	Input: 1.5 A maximum @ 100-240VAC, 50/60 Hz; Output: 2.5 A @ 24VDC; Model: PW-2420RU

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.61 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.22 in. (31 mm)

Weight

2.0 lb (0.91 kg)

Compliance

Regulatory Model: M202234002

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

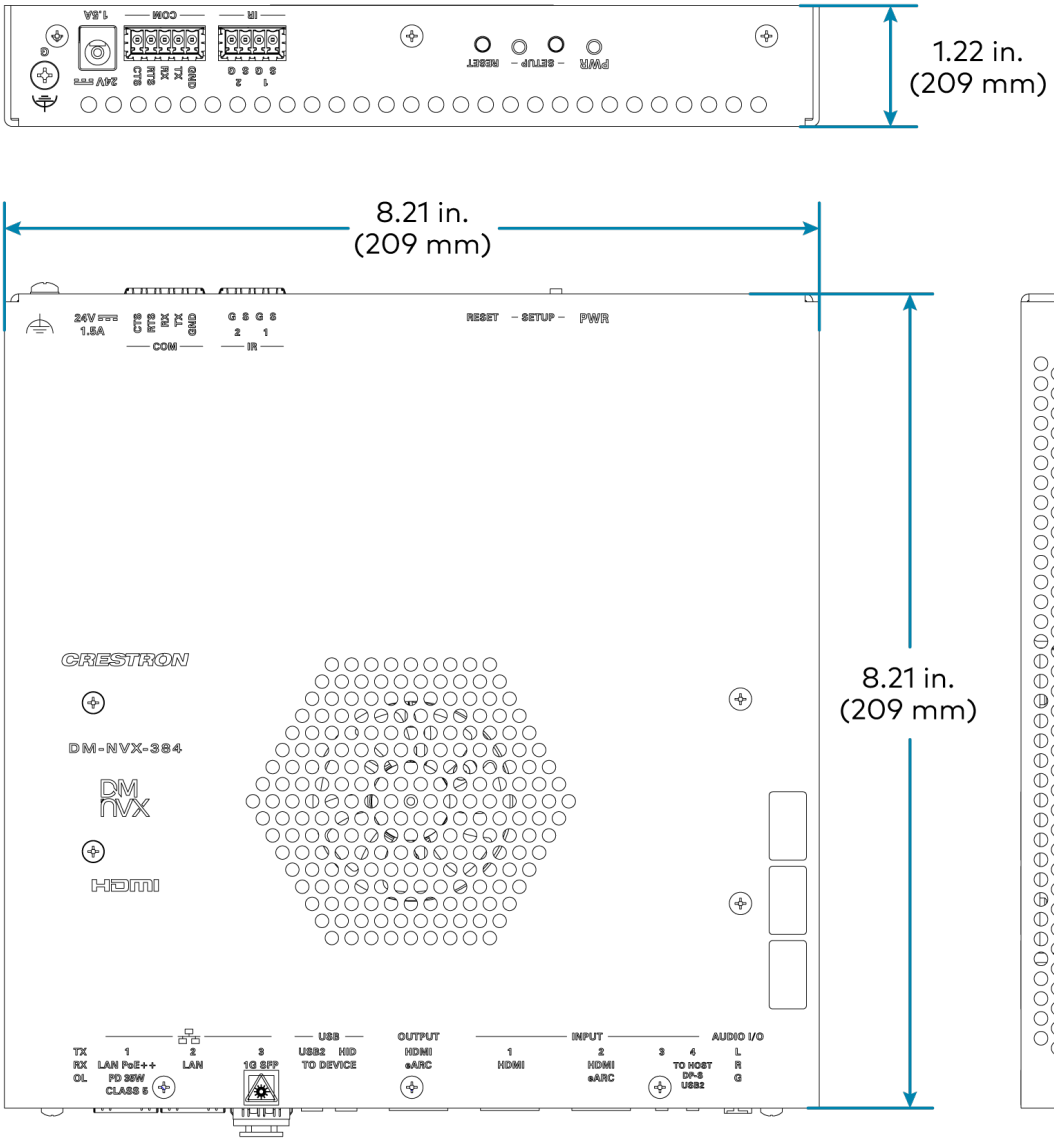
Notes:

1. In encoder mode, the stream type of the DM-NVX-384 must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-384 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-384 is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. As an encoder, the DM-NVX-384 transmits audio via the 2-channel AES67 stream when it receives a 2-channel stereo input signal via the HDMI or analog input. The DM-NVX-384 does not transmit audio via the secondary 2-channel stream when it receives multichannel audio.
3. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
4. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
5. 3D formats are not supported.
6. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
7. USB-C connections require USB-C cables that support DisplayPort Alt Mode video in order to pass video signal. Not all USB-C cables can support DisplayPort Alt Mode video.
8. The analog audio port can function as an input or output—not both. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
9. The DM-NVX-384 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
10. Refer to the "Power" specifications section for approved powering options.
11. When PoE+ is used to power the DM-NVX-384, a maximum of 500mA is available to power both the USB HOST and USB HID ports. To prevent possible instability issues, it is recommended that the PW-2420RU power pack (sold separately) be used.
12. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-384 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

    A nonblocking network is required for DM NVX devices.
13. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-384 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
14. In order for Ethernet port 1 to receive PoE+, the port requires connection to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ PSE port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

Dimension Drawings



DM-NVX-385 Specifications

Product specifications for the DM-NVX-385 are provided below.

Product Specifications

Encoding/Decoding

Video Codec	Encoder: Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]; Decoder: Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 5120x2880 @30 Hz (5K Wide) or 5120x1440 @60 Hz (5K Super-Wide); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
Bit Rates	Encoder: Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream); Decoder: Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5]); DisplayPort over USB-C (DisplayPort Alt Mode) with HDR10, HDR10+, and 4K60 4:4:4 support
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[2] (DVI compatible[5])
Switcher	4x1 in encoder mode (Two HDMI, Two USB-C), manual or auto-switching, breakaway audio,[6] Crestron QuickSwitch HD™ technology; 5x1 in decoder mode (HDMI, Stream), manual or auto-switching, breakaway audio,[6] Crestron QuickSwitch HD™ technology
Scaler (Decoder Mode Only)	4K60 4:4:4 video scaler with motion-adaptive deinterlacing, intelligent frame rate conversion, Deep Color support, HDR10, HDR10+, and Dolby Vision support, widescreen format selection (zoom, stretch, maintain aspect ratio, or 1:1), video wall processing up to 8 wide x 8 high, static or dynamic text overlay
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	5120×2160 5K Ultra-Wide	30 Hz	4:4:4	8 bit
	5120×2160 5K Ultra-Wide*	60 Hz	4:2:0	8 bit
	5120×1440 5K Super-Wide	60 Hz	4:4:4	8 bit
	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	12 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced (Input Only)	1920x1080 HD 1080i	60 Hz	4:4:4	12 bit

*5K Ultra-Wide @60 Hz 4:2:0 is supported as an unscaled pass-through resolution only.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5]), DisplayPort over USB-C (DisplayPort Alt Mode[6]), analog stereo[7]
Output Signal Types	HDMI (multichannel pass-through), analog stereo (2-channel)
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit, 48 kHz
Digital-to-Analog Conversion	24-bit, 48 kHz
AES67	24-bit, 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB

Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	Auto-switching, auto-negotiating, autodiscovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 host or device signal extension and routing, Layer 2 or Layer 3
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking (via control system)
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
USB-C (DisplayPort Alt Mode)	HDCP 2.3, EDID, CEC, USB 2.0
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

USB2 TO DEVICE	(1) USB Type-A connector, female; USB 2.0 device port; USB signal extender port for connection to a mouse, keyboard, or other USB 2.0 device;[10] Available Power: 500mA at 5 VDC[9, 10]
HID TO DEVICE	(1) USB Type-A connector, female; USB 2.0 host port; USB signal extender port for connection to a USB HID compliant mouse, keyboard, or other USB HID compliant device;[8] Available Power: 500 mA at 5VDC[10]
Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[11] PoE++ PD (powered device) port, IEEE 802.3bt Type 3 Class 5 (60 W) compliant[10]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[11]
Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[12]

HDMI OUT (eARC)	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[5])
	NOTE: eARC connectivity will be enabled in a future firmware update.
HDMI IN 1	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[3] (DVI and Dual-Mode DisplayPort interface compatible[5])
HDMI IN 2 (eARC)	(1) HDMI Type-A connector, female; HDMI digital video/audio input;[3] (DVI and Dual-Mode DisplayPort interface compatible[5]);
	NOTE: eARC connectivity will be enabled in a future firmware update.
TO HOST DP-S USB2 (IN 3-4)	(2) USB Type-C® connectors, female; USB 2.0 host ports; USB signal extender ports for connection to a computer or other USB 2.0 host; DisplayPort single stream video inputs[6]
AUDIO I/O	(1) 3-pin 3.5 mm detachable terminal block; Unbalanced stereo line-level audio input or output;[7] Input Impedance: 24 kΩ; Maximum Input Level: 2Vrms; Output Impedance: 100 Ω; Maximum Output Level: 2Vrms
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 1.5A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2420RU power pack included
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

PWR	(1) Bicolor green/amber LED; Indicates operating power supplied via PoE++, UPOE, or the included power pack; Amber indicates device is booting; Green indicates device is operational

SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
TX	(1) Green LED, indicates unit is in encoder (transmitter) mode
RX	(1) Green LED, indicates unit is in decoder (receiver) mode
Ethernet 1-3	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI IN 1-2	(2) Green LEDs, each indicates sync detection at the corresponding HDMI input

Power

PoE++	EEE 802.3bt Type 3 Class 5 (60 W) compliant; Compatible with PoE++ compliant Ethernet switch or third-party IEEE 802.3bt compliant PSE[13]
Power Pack (Optional)	Input: 1.5 A maximum @ 100-240VAC, 50/60 Hz; Output: 2.5 A @ 24VDC; Model: PW-2420RU

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.61 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.22 in. (31 mm)

Weight

2.0 lb (0.91 kg)

Compliance

Regulatory Model: M202234002

FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

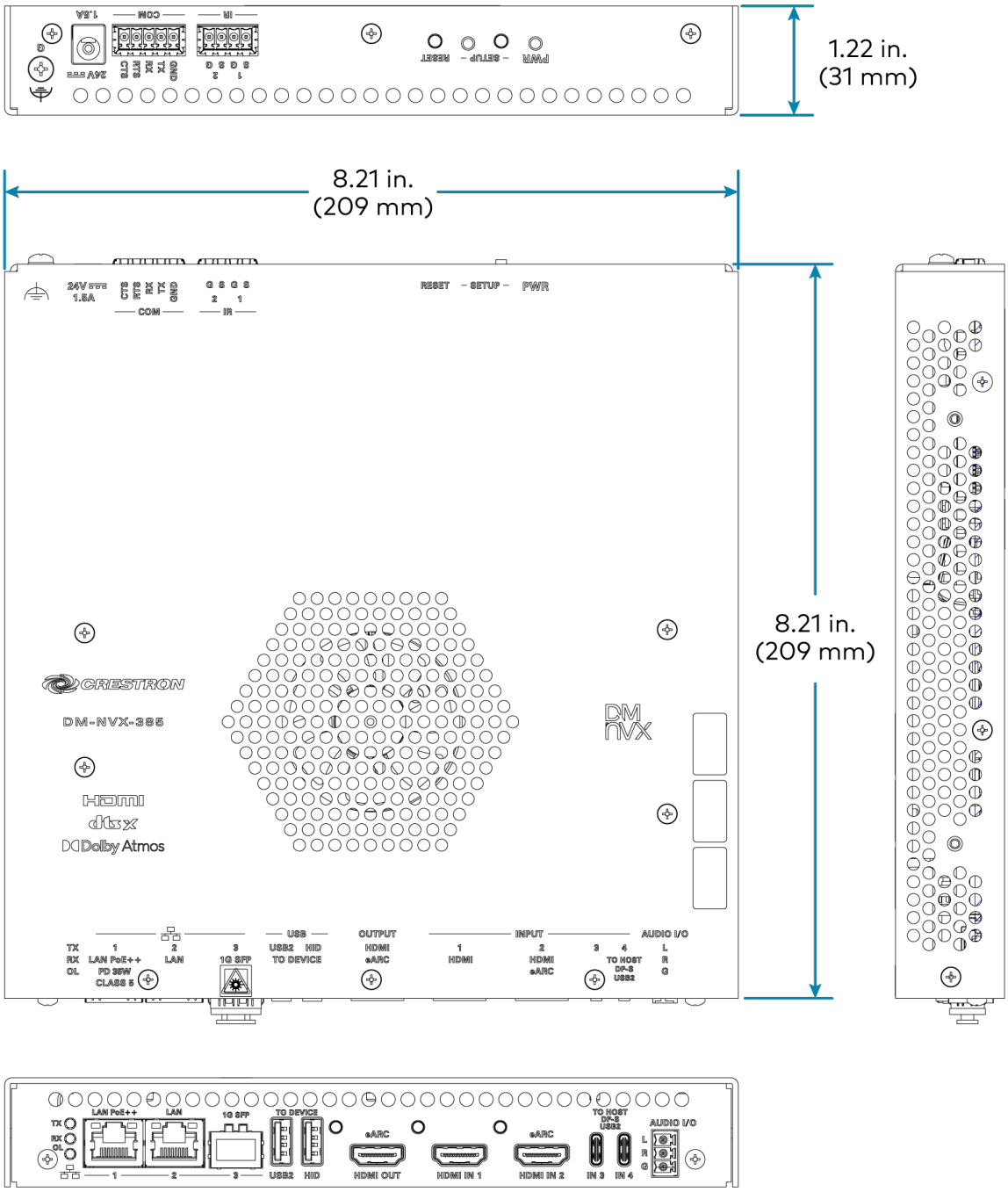
Notes:

1. In encoder mode, the stream type of the DM-NVX-385 must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-385 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.

   In decoder mode, the proper stream type of the DM-NVX-385 is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. USB-C connections require USB-C cables that support DisplayPort Alt Mode video in order to pass video signal. Not all USB-C cables can support DisplayPort Alt Mode video.
7. The analog audio port can function as an input or output—not both. Audio from one onboard HDMI input cannot be combined with video from the other onboard HDMI input. Combining audio from one encoder with video from another encoder is possible using the 2-channel AES67 audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
8. The DM-NVX-385 can be configured to accept the connection of a USB device or a USB host, not both. Crestron DM NVX products are engineered to deliver maximum compatibility with the widest possible range of USB products. Crestron does not guarantee that all USB products are compatible with DM NVX products. Refer to AV-over-IP Network Design on page 871 for USB bandwidth considerations.
9. Refer to the "Power" specifications section for approved powering options.
10. When PoE+ is used to power the DM-NVX-385, a maximum of 500mA is available to power both the USB HOST and USB HID ports. To prevent possible instability issues, it is recommended that the PW-2420RU power pack (sold separately) be used.
11. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-385 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

    A nonblocking network is required for DM NVX devices.
12. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-385 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
13. In order for Ethernet port 1 to receive PoE+, the port requires connection to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ PSE port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

Dimension Drawings



DM-NVX-D10 Specifications

Product specifications for the DM-NVX-D10 are provided below.

Product Specifications

Decoding

Stream Type	Default support for DM-NVX-E20/E10 Series; Support available for 4K60 4:4:4 encoders when using DM-NVX-D20 supported resolutions
Video Resolutions	Up to 1920x1080@60Hz (1080p), 4:4:4 color sampling, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 1.4, AES-128, PKI

Video

Output Signal Types	HDMI with Deep Color and 4K60 4:2:0 support (DVI compatible[1])
Copy Protection	HDCP 1.4
Resolutions	640x480@60Hz, 720x480@60Hz (480p), 720x576@50Hz (576p), 800x600@60Hz, 848x480@60Hz, 852x480@60Hz, 854x480@60Hz, 1024x768@60Hz, 1024x852@60Hz, 1024x1024@60Hz, 1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x768@60Hz, 1280x800@60Hz, 1280x960@60Hz, 1280x1024@60Hz, 1360x768@60Hz, 1365x1024@60Hz, 1366x768@60Hz, 1400x1050@60Hz, 1440x900@60Hz, 1600x900@60Hz, 1600x1200@60Hz, 1680x1050@60Hz, 1920x1080@24Hz (1080p24), 1920x1080@25Hz (1080p25), 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60), 1920x1200@60Hz, 2048x1080@24Hz, 2048x1152@60Hz, plus any other resolution allowed by HDMI up to 165MHz pixel clock

Audio

Output Signal Types	HDMI, analog stereo[2]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz

Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, secure CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
RS-232	2-way device control and monitoring up to 115.2k baud
IR/Serial	1-way device control via infrared up to 60 kHz or serial TTL/RS-232 (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 1.4, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 1.4, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022

Connectors

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[3] PoE PD (powered device) port; IEEE 802.3af Type 1 PoE Class 3 (12.95 W) compliant[4, 5]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output (DVI compatible[1])
AUDIO OUT	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[2] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
IR	(1) 2-pin 3.5 mm detachable terminal block; IR/Serial port; IR output up to 60 kHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 3-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud
24VDC 0.75A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2407WU power pack (sold separately)
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

PoE	IEEE 802.3af Type 1 Class 3 (12.95 W) compliant; Compatible with IEEE 802.3af compliant Ethernet switch or third-party PoE compliant PSE[5]
Power Pack (Optional)	Input: 100-240VAC, 50/60 Hz; Output: 0.75A @ 24VDC; Model: PW-2407WU
Power Consumption	8.6 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 95% RH (noncondensing)
Heat Dissipation	29 BTU/hr
Acoustic Noise	None (fanless)

Construction

Chassis	Metal, black finish, vented top, front, rear, and sides
Mounting	Freestanding, surface mountable, or attachment to a single rack rail (mounting flanges included)

Dimensions

Height	5.04 in. (128 mm)
Width	9.05 in. (230 mm)
Depth	1.00 in. (26 mm)

Weight

1.32 lb (0.60 kg)

Compliance

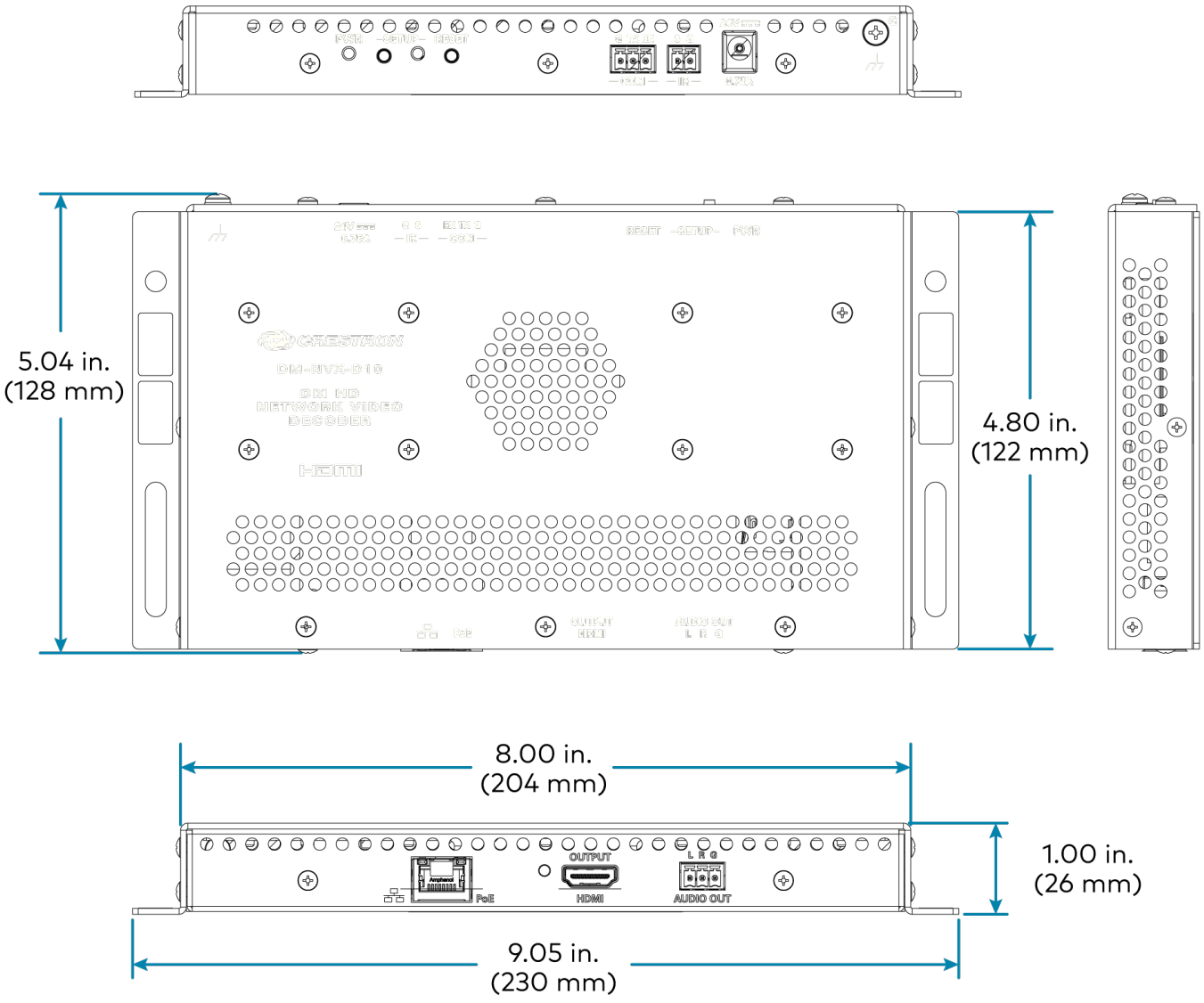
Bureau Veritas Listed for US and Canada, IC, CE, FCC Part 15 Class B digital device

Notes:

1. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
2. The analog audio output is functional only when the DM-NVX-D20 is receiving a 2-channel stereo input signal.
3. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
4. Refer to the "Power" specifications section for approved powering options.
5. In order for the Ethernet port to receive PoE, the port requires connection to a PoE compliant Ethernet switch or other equipment that has a PoE PSE port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

Dimension Drawings



DM-NVX-D20 Specifications

Product specifications for the DM-NVX-D20 are provided below.

Product Specifications

Decoding

Stream Type	Default support for DM-NVX-E20/E10 Series; Support available for 4K60 4:4:4 encoders when using DM-NVX-D20 supported resolutions
Video Resolutions	HDMI with Deep Color and 4K60 4:2:0 support[1]
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Based on the stream received from the encoder
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Output Signal Types	HDMI with Deep Color and 4K60 4:2:0 support (DVI compatible[2])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	8 bit
		30 Hz	4:2:2	12 bit
		60 Hz	4:2:0	8 bit
	2560x1600 WQXGA	60 Hz	4:4:4	8 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:2:0 color sampling. Custom resolutions are supported at pixel clock rates up to 300 MHz.

Audio

Output Signal Types	HDMI, analog stereo[3]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz

AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
RS-232	2-way device control and monitoring up to 115.2k baud
IR/Serial	1-way device control via infrared up to 60 kHz or serial TTL/RS-232 (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022

Connectors

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[4] PoE PD (powered device) port; IEEE 802.3af Type 1 PoE Class 3 (12.95 W) compliant[5, 6]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[1] (DVI compatible[2])
AUDIO OUT	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[3] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
IR	(1) 2-pin 3.5 mm detachable terminal block; IR/Serial port; IR output up to 60 kHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 3-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud
24VDC 0.75A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2407WU power pack (sold separately)

G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

PoE	IEEE 802.3af Type 1 Class 3 (12.95 W) compliant; Compatible with IEEE 802.3af compliant Ethernet switch or third-party PoE compliant PSE[6]
Power Pack (Optional)	Input: 100-240VAC, 50/60 Hz; Output: 0.75A @ 24VDC; Model: PW-2407WU
Power Consumption	8.6 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	29 BTU/hr
Acoustic Noise	None (fanless)

Construction

Chassis	Metal, black finish, vented top, front, rear, and sides
Mounting	Freestanding, surface mountable, or attachment to a single rack rail (mounting flanges included)

Dimensions

Height	5.04 in. (128 mm)
Width	9.05 in. (230 mm)
Depth	1.00 in. (26 mm)

Weight

1.32 lb (0.60 kg)

Compliance

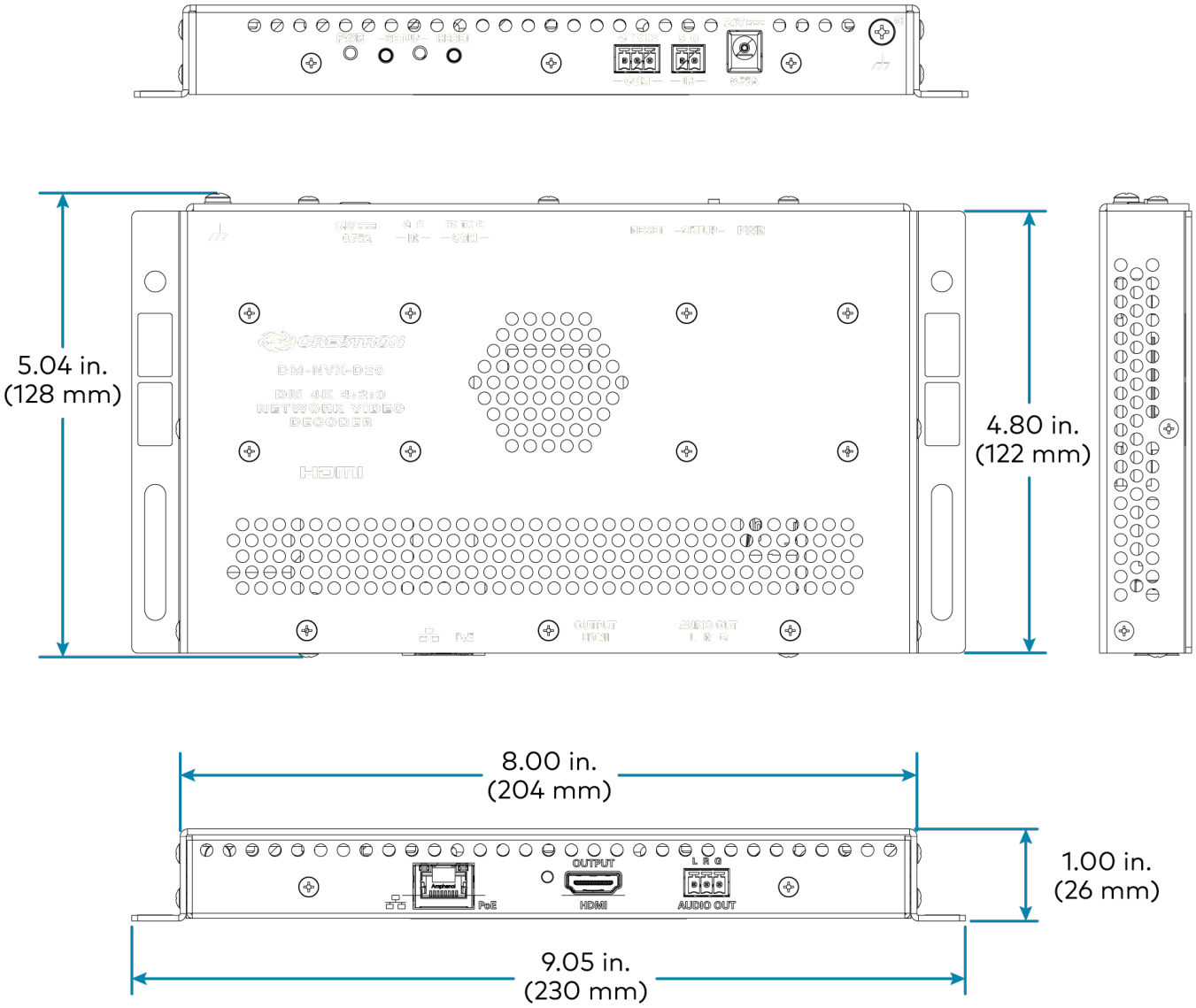
Bureau Veritas Listed for US and Canada, IC, CE, FCC Part 15 Class B digital device

Notes:

1. For 4K60 4:2:0 or 4K30 4:4:4 performance, cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
3. The analog audio output is functional only when the DM-NVX-D20 is receiving a 2-channel stereo input signal.
4. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
5. Refer to the "Power" specifications section for approved powering options.
6. In order for the Ethernet port to receive PoE, the port requires connection to a PoE compliant Ethernet switch or other equipment that has a PoE PSE port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

Dimension Drawings



DM-NVX-D200 Specifications

Product specifications for the DM-NVX-D200 are provided below.

Product Specifications

Decoding

Stream Type	Default support for DM-NVX-E20/E10 Series; Support available for 4K60 4:4:4 encoders when using DM-NVX-D200 supported resolutions
Video Resolutions	HDMI with Deep Color and 4K60 4:2:0 support[1]
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Based on the stream received from the encoder

Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Output Signal Types	HDMI with Deep Color and 4K60 4:2:0 support (DVI compatible[2])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	8 bit
		30 Hz	4:2:2	12 bit
		60 Hz	4:2:0	8 bit
	2560x1600 WQXGA	60 Hz	4:4:4	8 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:2:0 color sampling. Custom resolutions are supported at pixel clock rates up to 300 MHz.

Audio

Output Signal Types	HDMI, analog stereo[3]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, autonegotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, secure CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration

RS-232	2-way device control and monitoring up to 115.2k baud
IR/Serial	1-way device control via infrared up to 60 kHz or serial TTL/RS-232 (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022

Connectors

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[4] PoE+ PD (powered device) port; IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant[5, 6]
HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[1] (DVI compatible[2])
AUDIO	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[3] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
IR	(1) 2-pin 3.5 mm detachable terminal block; IR/Serial port; IR output up to 60 kHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 3-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud
24VDC 1.25A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2407WU power pack (sold separately)
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

PoE	IEEE 802.3af Type 1 Class 3 (12.95 W) compliant; Compatible with IEEE 802.3af compliant Ethernet switch or third-party PoE compliant PSE[6]
Power Pack (Optional)	Input: 100-240VAC, 50/60 Hz; Output: 1.25A @ 24VDC; Model: PW-2412WU
Power Consumption	11.9 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	40.6 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, vented top, front, rear, and sides
Mounting	Freestanding, surface mountable, or attachment to a single rack rail (mounting flanges included)

Dimensions

Height	5.41 in. (138 mm)
Width	8.38 in. (213 mm) without mounting flanges attached
Depth	1.20 in. (31 mm)

Weight

1.6 lb (0.73 kg)

Compliance

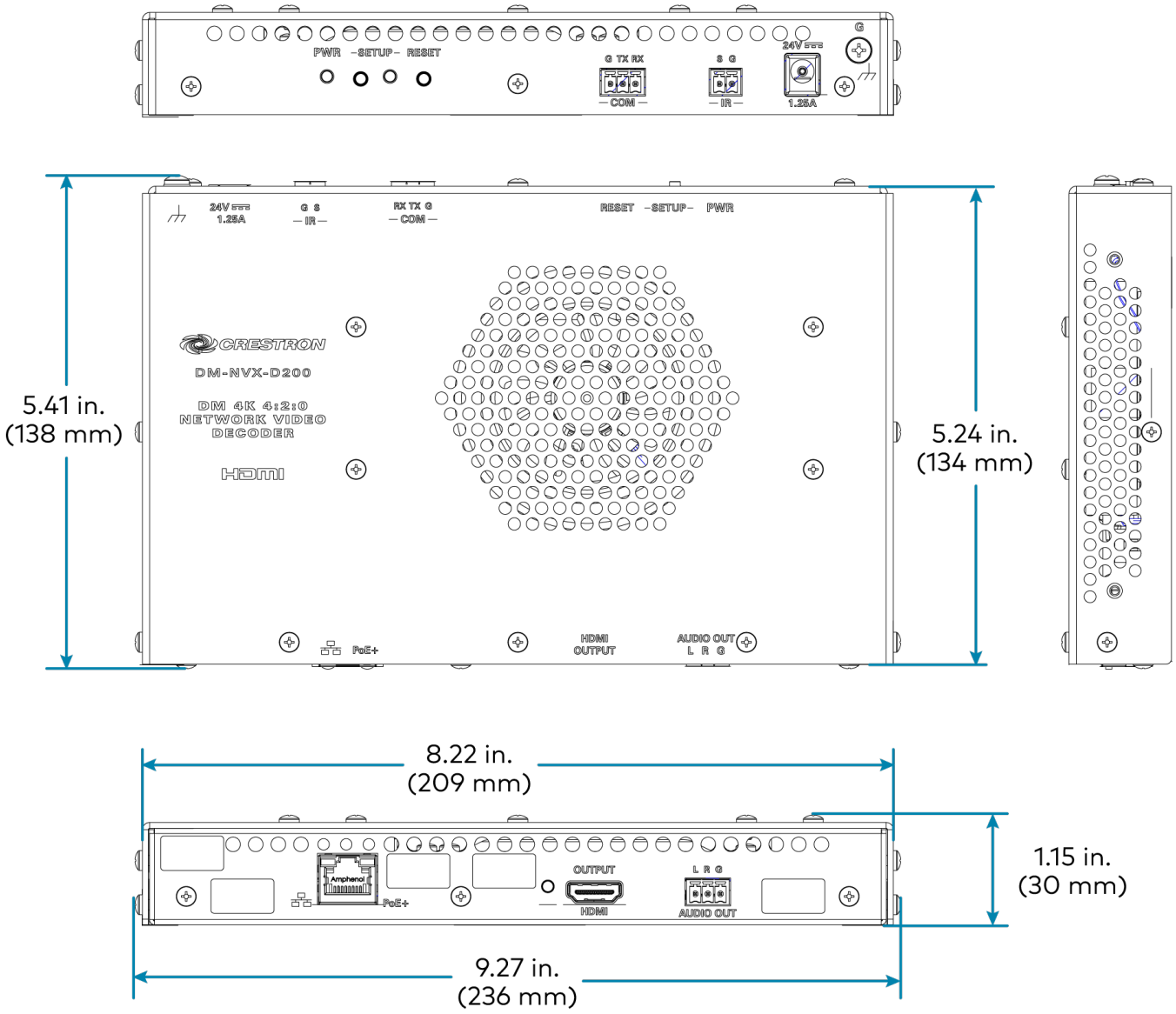
Bureau Veritas Listed for US and Canada, IC, CE, FCC Part 15 Class B digital device

Notes:

1. For 4K60 4:2:0 or 4K30 4:4:4 performance, cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
2. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
3. The analog audio output is functional only when the DM-NVX-D200 is receiving a 2-channel stereo input signal.
4. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
5. Refer to the "Power" specifications section for approved powering options.
6. In order for the Ethernet port to receive PoE, the port requires connection to a PoE compliant Ethernet switch or other equipment that has a PoE PSE port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

Dimension Drawings



DM-NVX-D30 Specifications

Product specifications for the DM-NVX-D30 are provided below.

Product Specifications

Decoding

Stream Type	Pixel Perfect Processing or DM-NVX-E10/E20 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Based on the stream received from the encoder[2]
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3] (DVI compatible[4])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Output Signal Types	HDMI, analog stereo[5]
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 computer console (for setup)
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking (via control system); Computer console (for setup)
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[6] PoE+ PD (powered device) port; IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant[7, 8]

HDMI OUTPUT	(1) HDMI Type A connector, female; HDMI digital video/audio output[3] (DVI compatible[4])
AUDIO	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[5] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, USB	(1) Micro USB connector, female; USB 2.0 computer console port (for setup)
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 1.25A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2412WU power pack (sold separately)
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
OL	(1) Green LED, indicates an online connection to a control system via Ethernet
Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI OUTPUT	(1) Green LED, indicates video signal transmission at the HDMI output
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address and also used to change operating mode (TX or RX)
RESET	(1) Recessed push button, reboots the device

Power

PoE+	IEEE 802.3at Type 2 Class 4 (25.5 W) compliant; Compatible with PoE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE[8]

Power Pack (Optional)	Input: 0.8A maximum @ 100-240VAC, 50/60 Hz; Output: 1.25A @ 24VDC; Model: PW-2412WU
Power Consumption	16 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	48 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	5.41 in. (138 mm)
Width	9.27 in. (236 mm)
Depth	1.15 in. (30 mm)

Weight

1.7 lb (0.77 kg)

Compliance

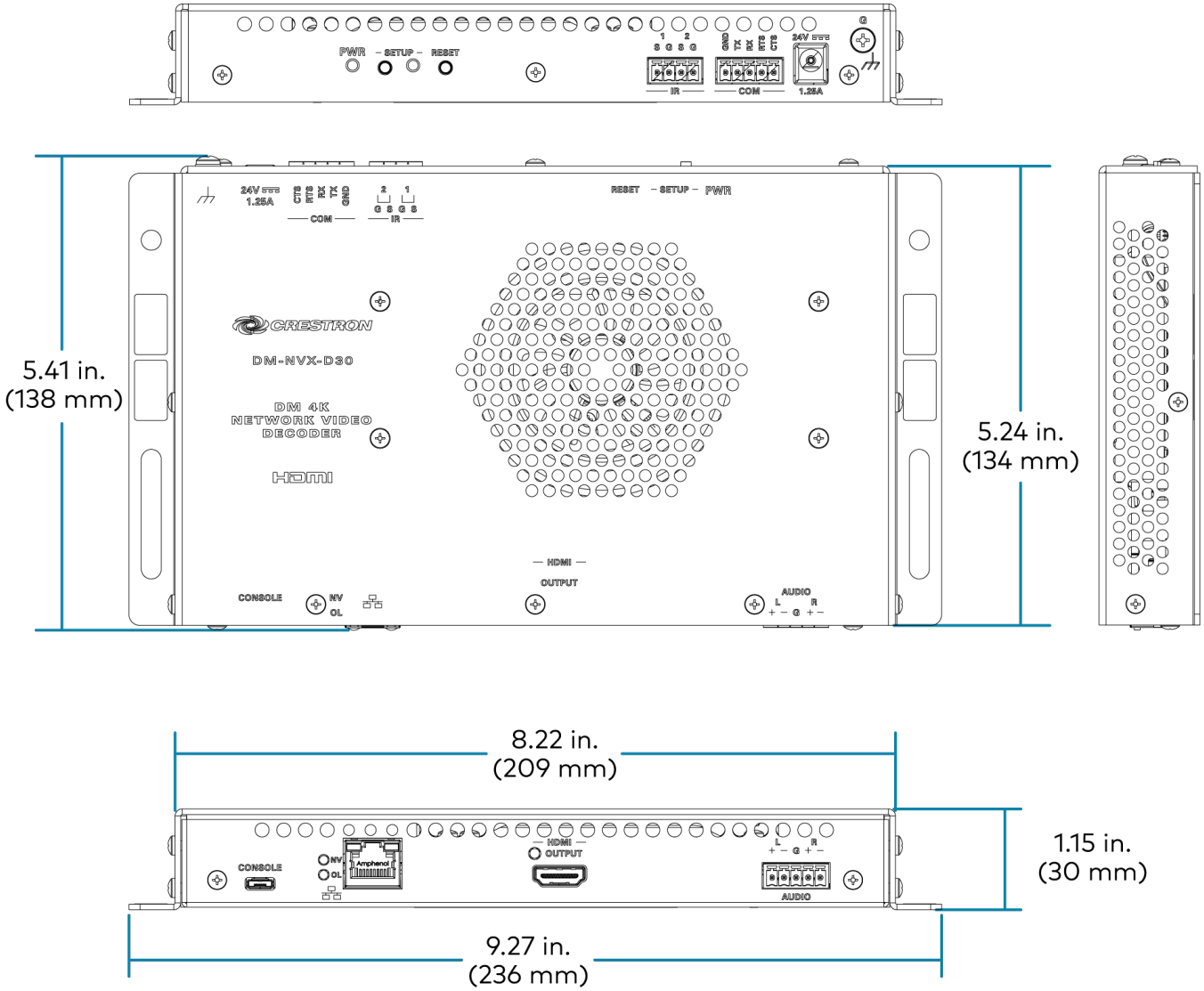
Bureau Veritas Listed for US & Canada, IC, CE, FCC Part 15 Class B digital device

Notes:

1. For a DM NVX 4K60 4:4:4 decoder, the proper stream type is automatically used. For interoperability with DM NVX 4K60 4:4:4 encoders, Pixel Perfect Processing is automatically used as the stream type. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-E10/E20 Series is automatically used as the stream type.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
5. The analog audio output is functional only when the DM-NVX-D30 is receiving a 2-channel stereo input signal.
6. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
7. Refer to the "Power" specifications section for approved powering options.
8. In order for the Ethernet port to receive PoE+, the port requires connection to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ PSE port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

Dimension Drawings



DM-NVX-E10 Specifications

Product specifications for the DM-NVX-E10 are provided below.

Product Specifications

Encoding

Video Resolutions	Up to 1920x1080@60Hz (1080p), 4:4:4 color sampling, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Fixed: 200 to 950 Mbps, user-specified Adaptive: Dependent on input resolution of the stream
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 1.4, AES-128, PKI

Video

Input Signal Types	HDMI with Deep Color and 1080p60 support[1] (Dual-Mode DisplayPort™ interface and DVI compatible[2])
Copy Protection	HDCP 1.4
Resolutions, Progressive	640x480@60Hz, 720x480@60Hz (480p), 720x576@50Hz (576p), 800x600@60Hz, 848x480@60Hz, 852x480@60Hz, 854x480@60Hz, 1024x768@60Hz, 1024x852@60Hz, 1024x1024@60Hz, 1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x768@60Hz, 1280x800@60Hz, 1280x960@60Hz, 1280x1024@60Hz, 1360x768@60Hz, 1365x1024@60Hz, 1366x768@60Hz, 1400x1050@60Hz, 1440x900@60Hz, 1600x900@60Hz, 1600x1200@60Hz, 1680x1050@60Hz, 1920x1080@24Hz (1080p24), 1920x1080@25Hz (1080p25), 1920x1080@50Hz (1080p50), 1920x1080@60Hz (1080p60), 1920x1200@60Hz, 2048x1080@24Hz, 2048x1152@60Hz, plus any other resolution allowed by HDMI up to 165 MHz pixel clock

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[2])
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz

Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.0005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, autonegotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, secure CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
RS-232	2-way device control and monitoring up to 115.2k baud
IR/Serial	1-way device control via infrared up to 60 kHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 1.4, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 1.4, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022

Connectors

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[3] PoE PD (powered device) port; IEEE 802.3af Type 1 PoE Class 3 (12.95 W) compliant[4, 5]
HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input; (DVI and Dual-Mode DisplayPort interface compatible[2])
AUDIO OUT	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[6] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
IR	(1) 2-pin 3.5 mm detachable terminal block; IR/Serial port; IR output up to 60 kHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 3-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud
24VDC 0.75A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2407WU power pack (sold separately)

G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

PoE	IEEE 802.3af Type 1 Class 3 (12.95 W) compliant; Compatible with PoE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE[4]
Power Pack (Optional)	Input: 100-240VAC, 50/60 Hz; Output: 0.75A @ 24VDC; Model: PW-2407WU
Power Consumption	8.6 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 95% RH (noncondensing)
Heat Dissipation	29 BTU/hr
Acoustic Noise	None (fanless)

Construction

Chassis	Metal, black finish, vented top, front, rear, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	5.04 in. (128 mm)
Width	9.05 in. (230 mm)
Depth	1.00 in. (26 mm)

Weight

1.32 lb (0.60 kg)

Compliance

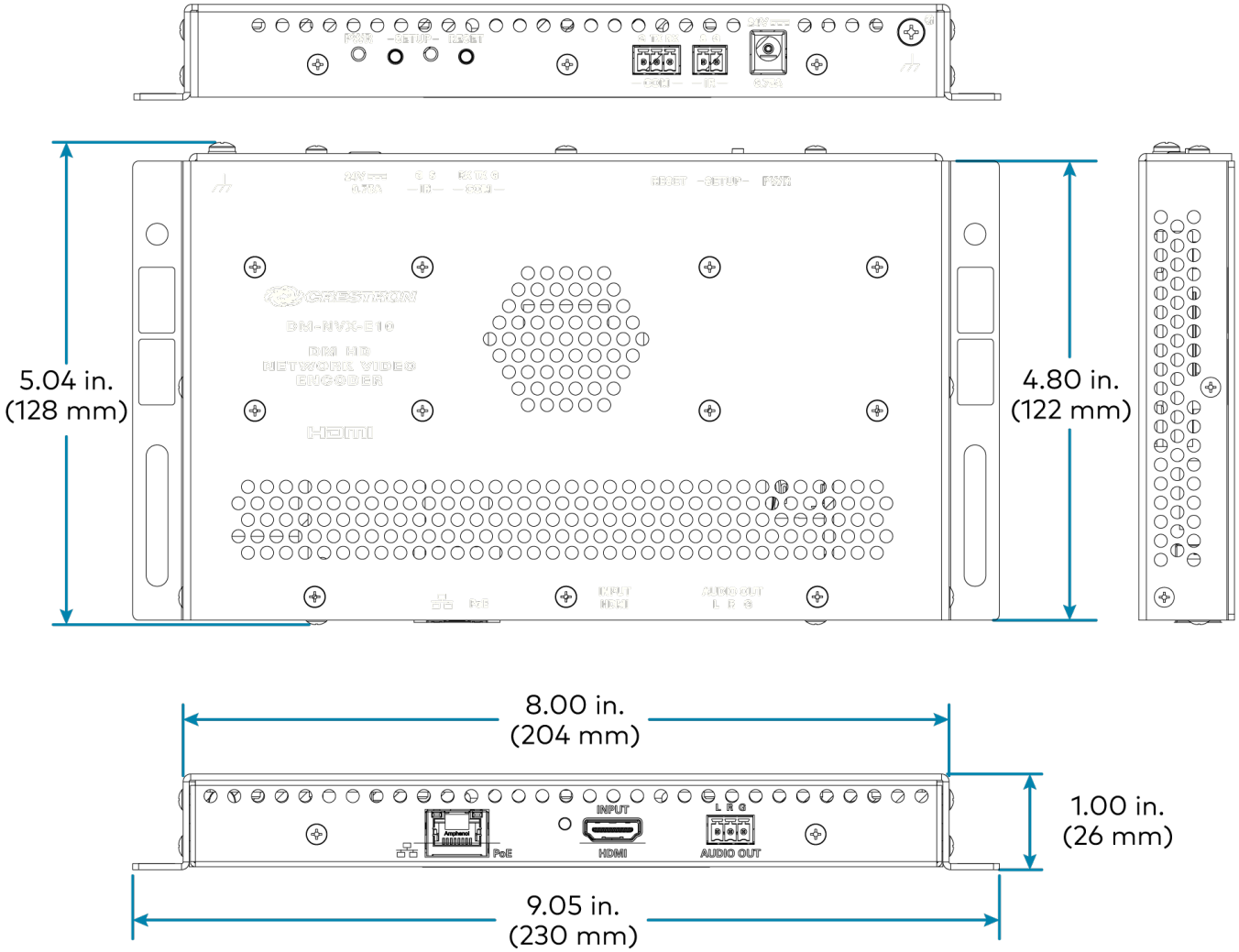
Bureau Veritas Listed for US and Canada, IC, CE, FCC Part 15 Class B digital device

Notes:

1. 3D formats are not supported.
2. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
3. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
4. In order for the Ethernet port to receive PoE, the port requires connection to a PoE compliant Ethernet switch or other equipment that has a PoE PSE port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.
5. Refer to the "Power" specifications section for approved powering options.
6. The analog audio output is functional only when the DM-NVX-E10 is receiving a 2-channel stereo input signal.

Dimension Drawings



DM-NVX-E20 Specifications

Product specifications for the DM-NVX-E20 are provided below.

Product Specifications

Encoding

Video Resolutions	HDMI with Deep Color and 4K60 4:2:0 support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Fixed: 200 to 950 Mbps, user-specified[1] Adaptive: Dependent on input resolution of the stream
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with Deep Color and 4K60 4:2:0 support[2, 3] (Dual-Mode DisplayPort™ interface and DVI compatible[4])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	8 bit
		30 Hz	4:2:2	12 bit
		60 Hz	4:2:0	8 bit
	2560x1600 WQXGA	60 Hz	4:4:4	8 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:2:0 color sampling. Custom resolutions are supported at pixel clock rates up to 300 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[4])
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz

Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.0005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, autonegotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, secure CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
RS-232	2-way device control and monitoring up to 115.2k baud
IR/Serial	1-way device control via infrared up to 60 kHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022

Connectors

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[5] PoE PD (powered device) port; IEEE 802.3af Type 1 PoE Class 3 (12.95 W) compliant[6, 7]
HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input; (DVI and Dual-Mode DisplayPort interface compatible[4])
AUDIO OUT	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[8] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
IR	(1) 2-pin 3.5 mm detachable terminal block; IR/Serial port; IR output up to 60 kHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 3-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud
24VDC 0.75A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2407WU power pack (sold separately)

G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

PoE	IEEE 802.3af Type 1 Class 3 (12.95 W) compliant; Compatible with PoE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE[6]
Power Pack (Optional)	Input: 100-240VAC, 50/60 Hz; Output: 0.75A @ 24VDC; Model: PW-2407WU
Power Consumption	8.6 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 95% RH (noncondensing)
Heat Dissipation	29 BTU/hr
Acoustic Noise	None (fanless)

Construction

Chassis	Metal, black finish, vented top, front, rear, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	5.04 in. (128 mm)
Width	9.05 in. (230 mm)
Depth	1.00 in. (26 mm)

Weight

1.32 lb (0.60 kg)

Compliance

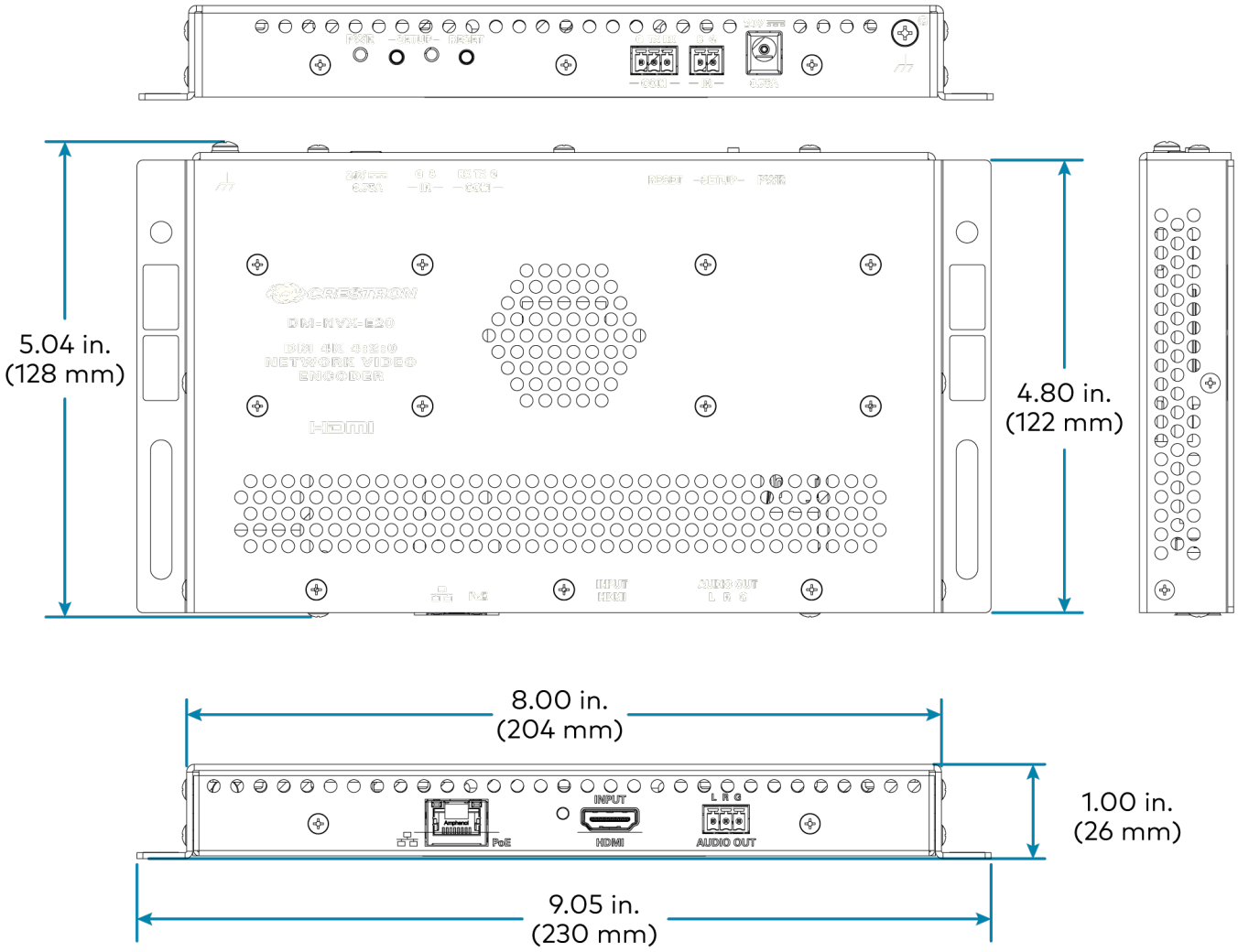
Bureau Veritas Listed for US and Canada, IC, CE, FCC Part 15 Class B digital device

Notes:

1. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
2. For 4K60 4:2:0 or 4K30 4:4:4 performance, HDMI cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
3. 3D formats are not supported.
4. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
5. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
6. In order for the Ethernet port to receive PoE, the port requires connection to a PoE compliant Ethernet switch or other equipment that has a PoE PSE port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.
7. Refer to the "Power" specifications section for approved powering options.
8. The analog audio output is functional only when the DM-NVX-E20 is receiving a 2-channel stereo input signal.

Dimension Drawings



DM-NVX-E30 Specifications

Product specifications for the DM-NVX-E30 are provided below.

Product Specifications

Encoding

Stream Type	Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1];
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, HDR10+, Dolby Vision, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound),
Bit Rates	Fixed (200 to 950 Mbps - user specified),[2] Adaptive (dependent on input resolution of the stream), or Variable (less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream)
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support[3, 4] (Dual-Mode DisplayPort™ interface and DVI compatible[5])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
		240 Hz	4:4:4	8 bit
Interlaced	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[5])
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
USB	USB 2.0 computer console (for setup)
RS-232	2-way device control and monitoring up to 115.2k baud with hardware and software handshaking via control system
IR/Serial	1-way device control via infrared up to 1.1 MHz or serial TTL (0-5V) up to 19.2k baud (via control system)
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[7] PoE+ PD (powered device) port; IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant[8, 9]
HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input; (DVI and Dual-Mode DisplayPort interface compatible[5])
AUDIO	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[6] Output Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, USB	(1) Micro USB connector, female; USB 2.0 computer console port (for setup)
IR 1-2	(1) 4-pin 3.5 mm detachable terminal block; Comprises (2) IR/Serial ports; IR output up to 1.1 MHz; 1-way serial TTL/RS-232 (0-5V) up to 19200 baud; IRP2 emitter sold separately
COM	(1) 5-pin 3.5 mm detachable terminal block; Bidirectional RS-232 port; Up to 115.2k baud, hardware and software handshaking support
24VDC 1.25A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2412WU power pack (sold separately)
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet
NV	(1) Green LED, indicates unit is encoding (transmitting) or decoding (receiving) network video
Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

PoE+	IEEE 802.3at Type 2 Class 4 (25.5 W) compliant; Compatible with PoE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE[9]
Power Pack (Optional)	Input: 0.8A maximum @ 100-240VAC, 50/60 Hz; Output: 1.25A @ 24VDC; Model: PW-2412WU
Power Consumption	15 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	48 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, bottom, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	5.41 in. (138 mm)
Width	9.27 in. (236 mm)
Depth	1.15 in. (30 mm)

Weight

2.0 lb (0.91 kg)

Compliance

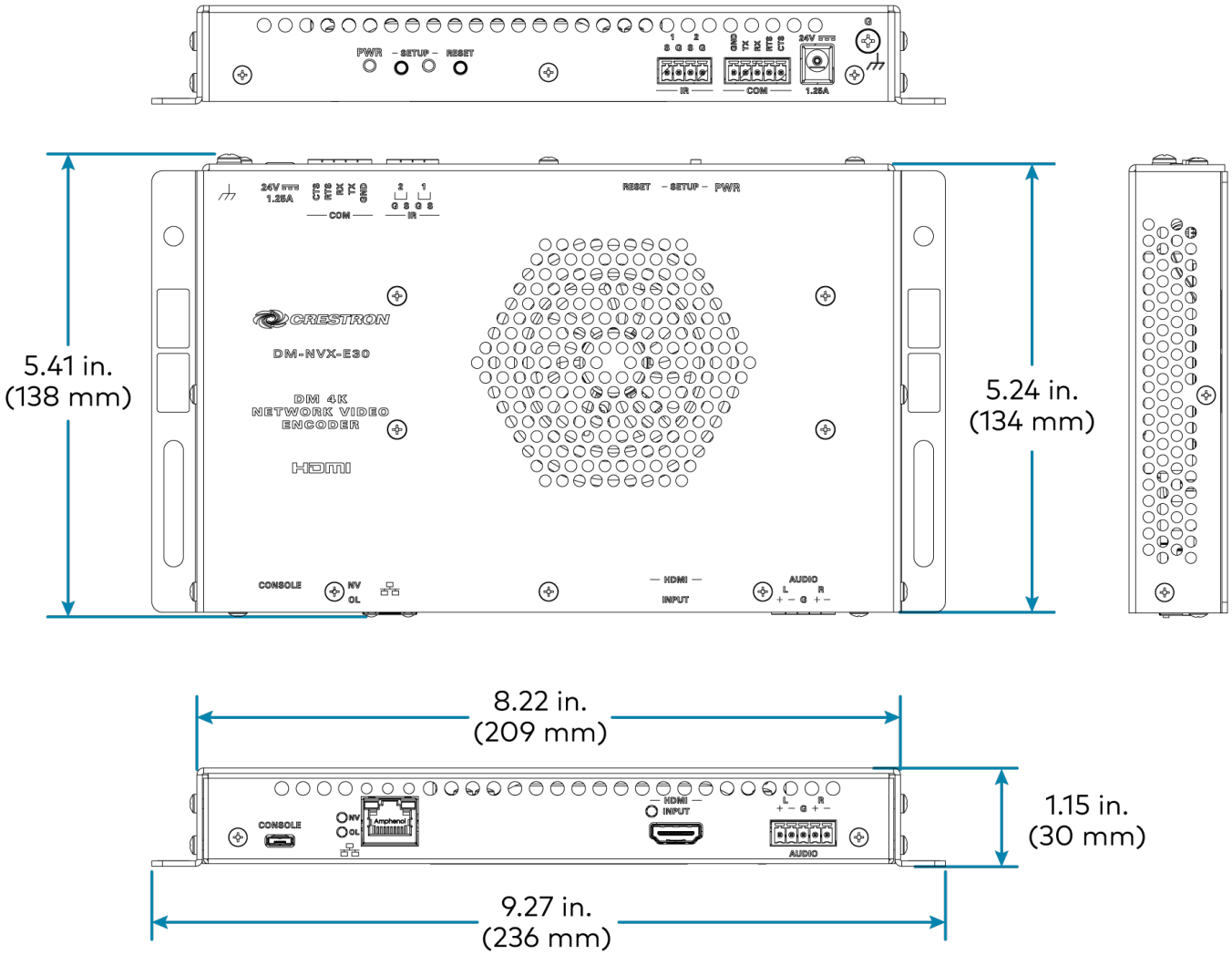
Bureau Veritas Listed for US and Canada, IC, CE, FCC Part 15 Class B digital device

Notes:

1. The stream type of a DM NVX 4K60 4:4:4 encoder must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM NVX 4K60 4:4:4 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. 4K60 4:4:4 performance and HDR support require the use of HDMI cables and couplers with a minimum TMDS bandwidth of 18 Gbps. If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables and couplers with a minimum bandwidth of 10.2 Gbps may be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
4. 3D formats are not supported.
5. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
6. The analog audio output is functional only when the DM-NVX-E30 is receiving a 2-channel stereo input signal.
7. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
8. Refer to the "Power" specifications section for approved powering options.
9. In order for the Ethernet port to receive PoE+, the port requires connection to a PoE+ compliant Ethernet switch or other equipment that has a PoE+ PSE port. Cabling that connects to a PoE+ PSE port is designed for intrabuilding use only.

Dimension Drawings



DM-NVX-E760 Specifications

Product specifications for the DM-NVX-E760 are provided below.

Product Specifications

Encoding

Stream Type	Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200 Series[1]
Video Resolutions	Up to 4096x2160@60Hz (DCI 4K60); 4:4:4 color sampling; HDR10, and Deep Color support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Fixed: 200 to 950 Mbps - user specified,[2] Adaptive: dependent on input resolution of the stream), or Variable: less than 150 Mbps to maximum of 750 Mbps, dependent on content and input resolution of the stream
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3[3], AES-128, PKI

Video

Input Signal Types	DM 8G+ and HDBaseT with HDR10, Deep Color, and 4K60 4:4:4 support; DM Essentials with 4K60 4:2:0 support[4]
Copy Protection	HDCP 2.3[3]
Resolutions	Common resolutions are listed in the following table.[5]

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	12 bit
		60 Hz	4:2:0	12 bit
		60 Hz	4:2:2	12 bit
		60 Hz	4:4:4	8 bit
	2560x1600 WQXGA Reduced Blanking	60 Hz	4:4:4	8 bit
	2560x1440 WQHD Reduced Blanking	60 Hz	4:4:4	8 bit
		120 Hz	4:4:4	8 bit
	2560x1080 UWFHD	60 Hz	4:4:4	8 bit
	2048x1152 QWXGA	60 Hz	4:4:4	12 bit
	2048x1080 DCI 2K	60 Hz	4:4:4	12 bit
	1600x1200 UXGA	60 Hz	4:4:4	12 bit
	1920x1200 WUXGA	60 Hz	4:4:4	12 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit
		120 Hz	4:4:4	8 bit
Interlaced	1920x1080 HD 1080i	30 Hz	4:4:4	12 bit

NOTES:

- The maximum supported resolution is 4096x2160 at 60 Hz with 4:4:4 color sampling. Custom resolutions are supported at pixel clock rates up to 600 MHz.
- 1920x1080 FHD 1080p at 120 Hz and 240 Hz are not supported due to HDBaseT limitations.

Audio

Input Signal Types	DM 8G+, HDBaseT, DM Essentials
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Digital-to-Analog Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz
Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.005% @ 1 kHz; Stereo Separation: >90 dB
Analog Output Volume Adjustment	–80 to +20 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, auto-negotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
DigitalMedia™	DM 8G+, DM Essentials, HDCP 2.3[3], EDID, PoDM+
HDBaseT	HDCP 2.3, EDID, PoE+
USB	USB 2.0 computer console (for setup)
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022, FEC (Forward Error Correction)

Connectors

Ethernet 1	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[6] PoE++ or UPOE PD (powered device) port; IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant[7]
Ethernet 2	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port[6]

Ethernet 3	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[8]
DM INPUT	(1) 8-pin RJ-45 connector, female, shielded; DM 8G+ (HDBaseT standard compliant) or DM Essentials input; PoDM+ (HDBaseT PoE+ compatible) PSE (power sourcing equipment) port or DM Essentials power port;[9] Connects to the DM 8G+ output of a DM switcher, transmitter or other DM device, to the DM Essentials port of a DM Essentials transmitter, or to an HDBaseT device via CAT5e, Crestron DM-CBL-8G, or Crestron DM-CBL-ULTRA cable[10]
AUDIO OUT	(1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;[11] Impedance: 200 Ω balanced, 100 Ω unbalanced; Maximum Output Level: 4Vrms balanced, 2Vrms unbalanced
CONSOLE, USB	(1) Micro USB connector, female; USB 2.0 computer console port (for setup)
24VDC 2.5A	(1) 2.1 x 5.5 mm DC power connector; 24VDC power input; PW-2420RU power pack included
G	(1) 6-32 screw; Chassis ground lug

Controls and Indicators

OL	(1) Green LED, indicates an online connection to a control system via Ethernet
NV	(1) Green LED, indicates unit is encoding (transmitting) network video
Ethernet 1-2	(2) LEDs per port; Green indicates Ethernet links status; Amber indicates Ethernet activity
Ethernet 3 LNK	(1) Green LED, indicates Ethernet link status
Ethernet 3 ACT	(1) Green LED, indicates Ethernet activity
DM INPUT	(2) LEDs; Green indicates DM link status; Amber indicates video and HDCP signal presence
PWR	(1) Bicolor green/amber LED; Indicates operating power supplied via PoE++, UPOE, or the included power pack; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

Power Pack (Included)	Input: 1.3 A maximum @ 100-240VAC, 50/60 Hz; Output: 2.5 A @ 24VDC; Model: PW-2420RU
PoE++ or UPOE	IEEE 802.3bt Type 3 Class 5 (60 W/4 pair) compliant; Compatible with IEEE 802.3bt compliant Ethernet switch or third-party compliant PSE
Power Consumption	20 W typical without device connection to DM INPUT port[12]

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 90% RH (noncondensing)
Heat Dissipation	68 BTU/hr
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal, black finish, integral mounting flanges, fan cooled; Vented top, front, rear, and sides
Mounting	Freestanding, surface mount, or attach to a single rack rail

Dimensions

Height	8.60 in. (219 mm)
Width	9.27 in. (236 mm)
Depth	1.25 in. (32 mm)

Weight

2.0 lb (0.91 kg)

Compliance

Intertek® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

Notes:

1. The stream type of a DM NVX 4K60 4:4:4 encoder must be set by using the web interface or a control system. The default setting is Pixel Perfect Processing for interoperability with DM NVX 4K60 4:4:4 decoders. For interoperability with a DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder, the stream type of the DM-NVX-E760 encoder must be set to DM-NVX-D10/D20/D200 Series. In addition, the resolution of the encoder must be set so that it does not exceed the maximum resolution of the DM-NVX-D10, DM-NVX-D20, or DM-NVX-D200 decoder.
2. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
3. The DM-NVX-E760 supports HDCP 2.3. Refer to the product page of the DM 8G+ output device or DM Essentials transmitter for the HDCP version supported by those devices.
4. 3D formats are not supported.
5. Refer to the product page of the DM 8G+ output device or DM Essentials transmitter for information about the maximum resolution supported by those devices.

6. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. All Ethernet ports on the DM-NVX-E760 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM® ports of other Crestron devices.

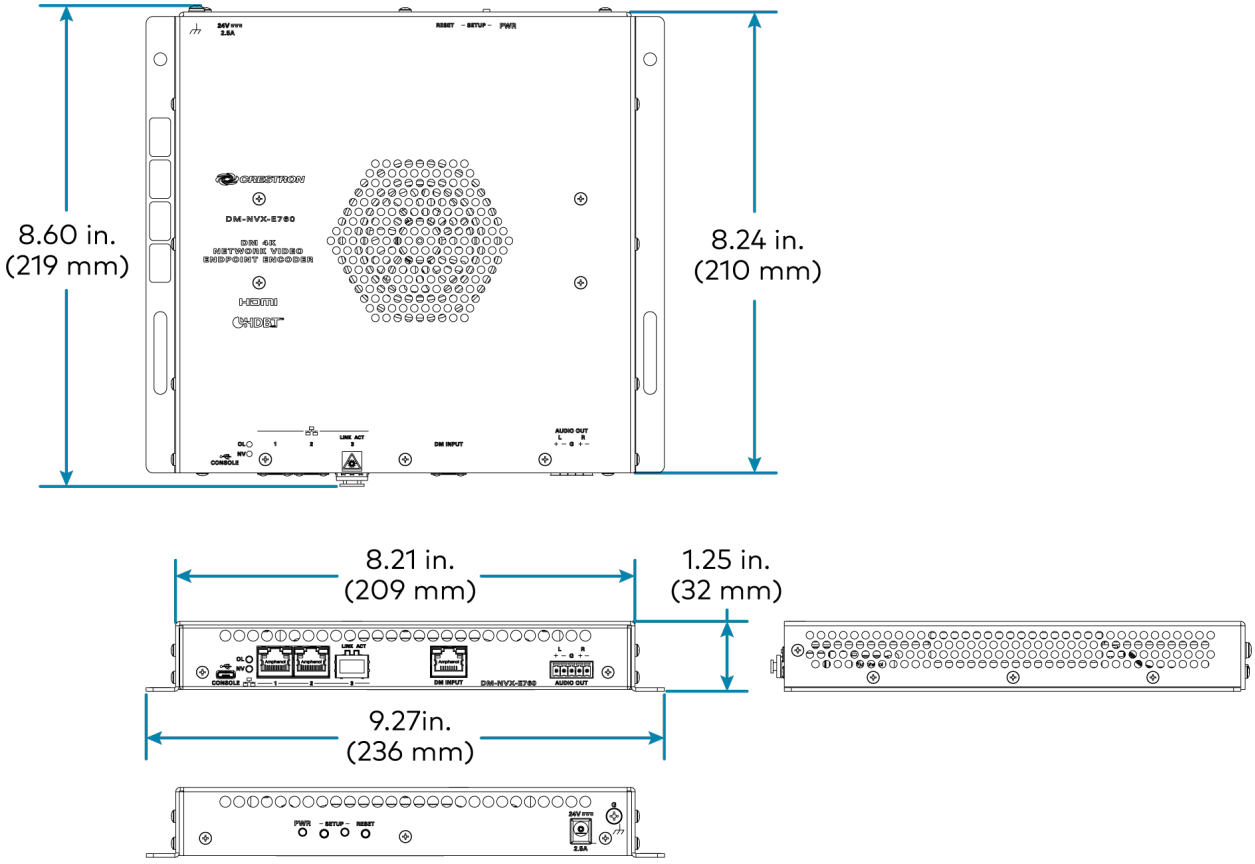
   A nonblocking network is required for DM NVX devices.

7. Refer to the "Power" specifications section for approved powering options.
8. Use of the SFP port requires the purchase of a Crestron SFP-1G Series transceiver module (sold separately). All Ethernet ports on the DM-NVX-E760 are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the DM ports of other Crestron DigitalMedia devices.
9. The DM INPUT port can be used to power DM 8G+ and DM Essentials transmitters only when those devices are not connected to a 24VDC power pack.

   Wiring that connects to a PoDM+ or HDBaseT PoE+ PSE port or to a DM Essentials port is designed for intrabuilding use only.

10. Refer to the product page of the DM 8G+ output device or DM Essentials transmitter for cable length information.
11. The analog audio output is functional only when the DM-NVX-E760 is receiving a 2-channel stereo input signal.
12. When the DM INPUT port is connected to a DM 8G+ or DM Essentials device, the power consumption of the DM-NVX-E760 varies depending on the connected device.

Dimension Drawings



Wall Plate Models

Refer to the following section for the specifications of the wall plate DM NVX AV-over-IP device:

- DM-NVX-E20-2G Specifications on page 331

DM-NVX-E20-2G Specifications

Product specifications for the DM-NVX-E20-2G are provided below.

Product Specifications

Encoding

Video Resolutions	HDMI with Deep Color and 4K60 4:2:0 support
Audio Formats	Multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound)
Bit Rates	Fixed: 200 to 950 Mbps, user-specified[1] Adaptive: Dependent on input resolution of the stream
Streaming Protocols	RTP, SDP
Container	MPEG-2 transport stream (.ts)
Session Initiation	Multicast via secure RTSP
Copy Protection	HDCP 2.3, AES-128, PKI

Video

Input Signal Types	HDMI with Deep Color and 4K60 4:2:0 support[2, 3] (Dual-Mode DisplayPort™ interface and DVI compatible[4])
Copy Protection	HDCP 2.3
Resolutions	Common resolutions are listed in the following table.

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K and 3840x2160 4K UHD	30 Hz	4:4:4	8 bit
		30 Hz	4:2:2	12 bit
		60 Hz	4:2:0	8 bit
	2560x1600 WQXGA	60 Hz	4:4:4	8 bit
	1920x1080 FHD 1080p	60 Hz	4:4:4	12 bit

NOTE: The maximum supported resolution is 4096x2160 at 60 Hz with 4:2:0 color sampling. Custom resolutions are supported at pixel clock rates up to 300 MHz.

Audio

Input Signal Types	HDMI (Dual-Mode DisplayPort interface compatible[4]), analog stereo
Digital Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS®, DTS ES, DTS 96/24, DTS HD High Res, DTS HD Master Audio, DTS:X, LPCM up to 8 channels
Analog Formats	Stereo 2-channel
Analog-to-Digital Conversion	24-bit 48 kHz
AES67	24-bit 48 kHz

Analog Performance	Frequency Response: 20 Hz to 20 kHz ±0.5 dB; S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted; THD+N: <0.0005% @ 1 kHz; Stereo Separation: >90 dB

Communications

Ethernet	100/1000 Mbps, auto-switching, autonegotiating, auto-discovery, full/half duplex, TCP/IP, UDP/IP, secure CIP, DHCP, SSL, TLS, SSH, SFTP (SSH File Transfer Protocol), IEEE 802.1X, IPv4 only or both IPv4 and IPv6, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, Crestron 3-Series or later control system integration
HDMI	HDCP 2.3, EDID, CEC
DM NVX AV-over-IP (via Ethernet)	HDCP 2.3, AES-128 AV content encryption with PKI authentication, RTP, secure RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022

Connectors

Ethernet	(1) 8-pin RJ-45 connector, female; 100BASE-TX/1000BASE-T Ethernet port;[5] PoE PD (powered device) port; IEEE 802.3af Type 1 PoE Class 3 (12.95 W) compliant[6, 7]
HDMI INPUT	(1) HDMI Type A connector, female; HDMI digital video/audio input; (DVI and Dual-Mode DisplayPort interface compatible[4])
AUDIO IN	(1) 1/8 in. (3.5 mm) connector, female TRS; Unbalanced stereo line level audio input; Maximum Input Level: 2Vrms; Input Impedance: 44 kΩ
24VDC 0.75A	(1) 2-pin captive screw terminal block; 24VDC power input; PW-2407WUL power pack (sold separately)
G	(1) M3 screw; Chassis ground lug

Controls and Indicators

Ethernet	(2) LEDs; Green indicates Ethernet links status; Amber indicates Ethernet activity
HDMI INPUT	(1) Green LED, indicates sync detection at the HDMI input
PWR	(1) Bicolor green/amber LED; Indicates operating power is being supplied; Amber indicates device is booting; Green indicates device is operational
SETUP	(1) Red LED and (1) push button, displays onscreen IP address
RESET	(1) Recessed push button, reboots the device

Power

PoE	IEEE 802.3af Type 1 Class 3 (12.95 W) compliant; Compatible with PoE+ compliant Ethernet switch or third-party IEEE 802.3at compliant PSE[6]
Power Pack (Optional)	Input: 100-240VAC, 50/60 Hz; Output: 0.75A @ 24VDC; Model: PW-2407WUL
Power Consumption	9.2 W typical

Environmental

Temperature	32° to 104°F (0° to 40°C)
Humidity	10% to 95% RH (noncondensing)
Heat Dissipation	31.48 BTU/hr typical
Acoustic Noise	33 dBA typical

Construction

Chassis	Metal housing and bracket with polycarbonate label overlay
Mounting	Mounts into a 2-gang, 2 in. (51 mm) deep U.S. electrical box or plaster ring; Requires an FP-G2-DM Series decorator style faceplate (sold separately)

Dimensions

Height	4.12 in. (105 mm)
Width	3.57 in. (91 mm)
Depth	2.13 in. (55 mm)

Weight

0.62 lb (0.29 kg)

Compliance

Intertek® Listed for US and Canada, IC, CE, FCC Part 15 Class B digital device

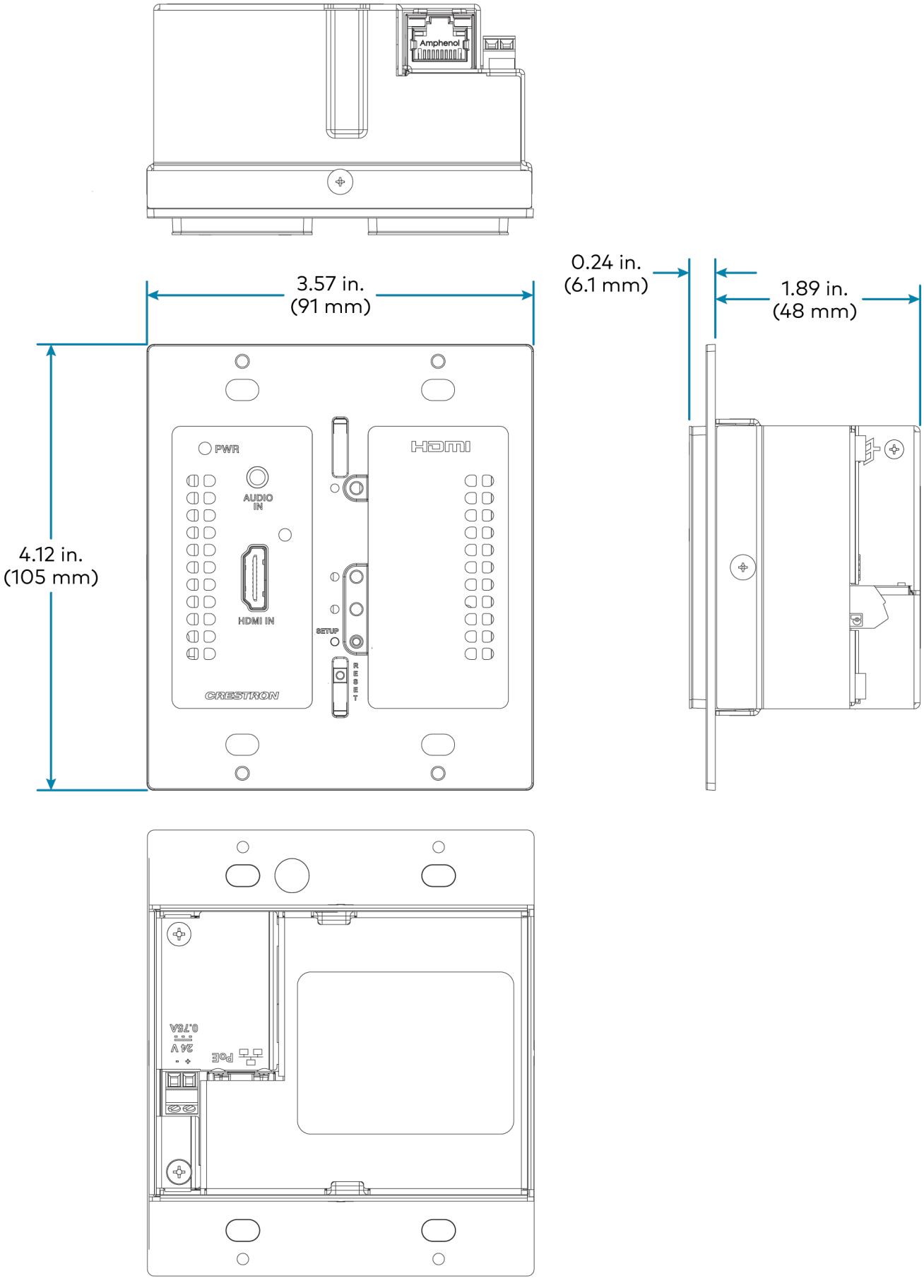
Notes:

1. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
2. For 4K60 4:2:0 or 4K30 4:4:4 performance, HDMI cables and couplers with a minimum bandwidth of 10.2 Gbps can be used. Bandwidth loss is cumulative; therefore, performance may be reduced when inserting multiple cables and couplers inline.
3. 3D formats are not supported.
4. HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal. CBL-HD-DVI interface cables are available separately.
5. The minimum cable required for DM NVX over 1000BASE-T Ethernet (copper) is unshielded CAT5e. The Ethernet port cannot be connected to the DM® ports of other Crestron devices.

   A nonblocking network is required for DM NVX devices.
6. In order for the Ethernet port to receive PoE, the port requires connection to a PoE compliant Ethernet switch or other

equipment that has a PoE PSE port. Cabling that connects to a PoE PSE port is designed for intrabuilding use only.

7. Refer to the "Power" specifications section for approved powering options.


Amphenol
3.57 in.
(91 mm)
0.24 in.
(6.1 mm)
1.89 in.
(48 mm)
4.12 in.
(105 mm)
PWR
AUDIO IN
HDMI IN
HDMI
SETUP
RESET
CRESTRON
24 V
0.75A
PoE

Installation

Refer to the following sections for installation instructions for these DM NVX device categories:

- Card Installation on page 338
- DM NVX Director Switching Appliance Installation on page 358
- Room Box Installation
  - DM-NVX-350, DM-NVX-351, and DM-NVX-352 Installation on page 366
  - DM-NVX-360 and DM-NVX-363 Installation on page 374
  - DM-NVX-384 and DM-NVX-385 Installation on page 382
  - DM-NVX-D200 Installation on page 395
  - DM-NVX-E760 Installation on page 408
  - DM-NVX-D10, DM-NVX-D20, DM-NVX-E10, and DM-NVX-E20 Installation on page 389
  - DM-NVX-D30 and DM-NVX-E30 Installation on page 401
- Wall Plate Installation on page 416

Card Installation

Refer to the following sections to install a DM NVX card (C models).

NOTE: This applies to the following models:

- DM-NVX-350C
- DM-NVX-351C
- DM-NVX-352C
- DM-NVX-360C
- DM-NVX-363C
- DM-NVX-384C
- DM-NVX-385C
- DM-NVX-D30C
- DM-NVX-E30C
- DM-NVX-E760C

- In the Box on page 338
- Install the Device into a DMF-CI-8 on page 338
- Connect the Device on page 340
- Observe the LED Indicators on page 353
- Reset the Device on page 356

In the Box

Qty.	Description
1	Network AV Card
	DM-NVX-384C and DM-NVX-385C Only
1	Connector, 3-pin (2058278)
	All Other Models
1	Connector, 5-pin (2003577)

Install the Device into a DMF-CI-8

The DM NVX card is designed to occupy a card slot of a DMF-CI-8 card chassis.

CAUTION: To prevent bodily injury when mounting or servicing the unit in a rack, observe the following guidelines:

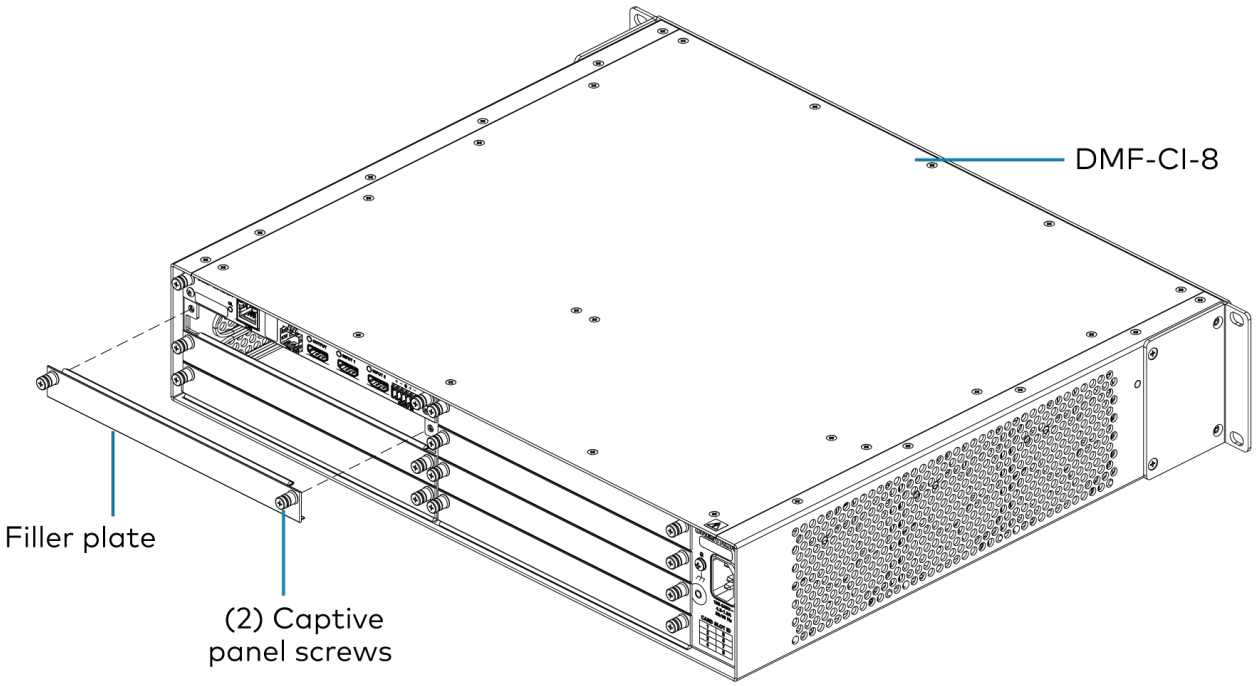
- DM NVX cards are susceptible to damage from electrostatic discharge (ESD). Observe standard ESD precautions when handling the cards. Wear an ESD wrist strap that is connected to ground, and place the cards on grounded surfaces only.
- To prevent damage to a card that is connected to cables, disconnect all cables from the card before installing the card into a card slot or removing the card.

NOTES:

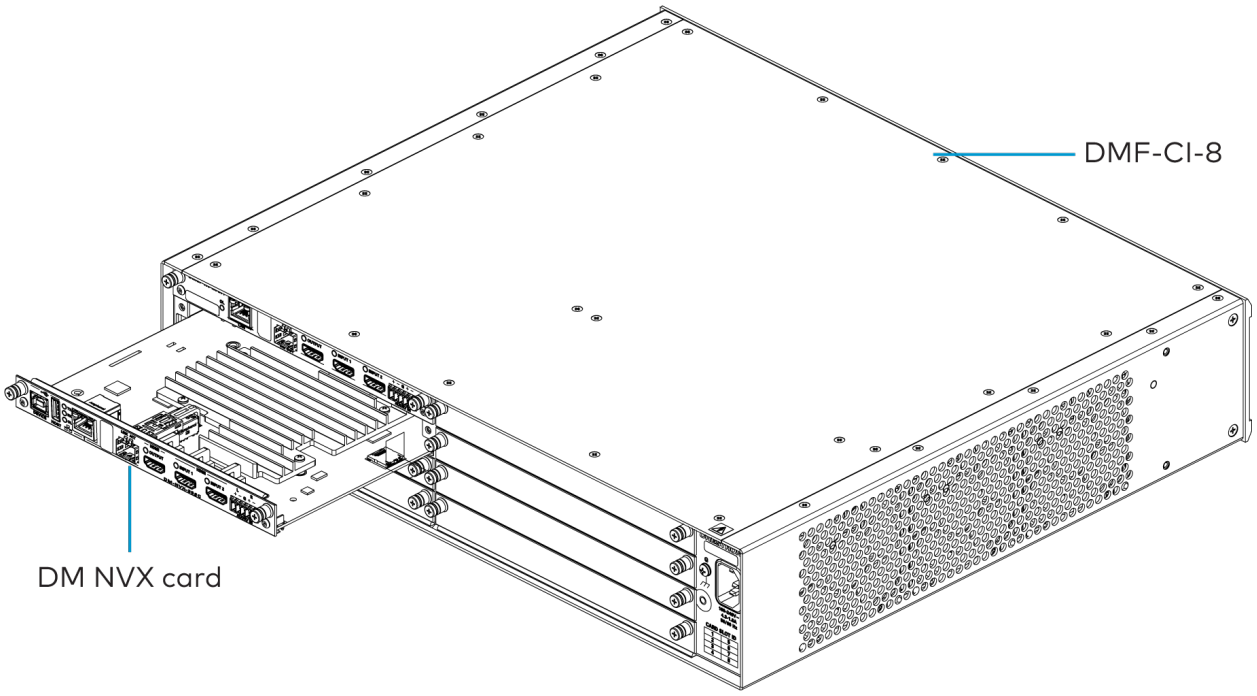
- In a new installation of the DMF-CI-8, it is recommended that the cards be installed before power is applied to the chassis. In an existing installation of the DMF-CI-8, cards can be added or replaced without the need to shut down the chassis.
- When installing the cards into a partially populated DMF-CI-8, install the cards into slots 5 through 8 before using slots 1 through 4. This ensures better cooling and lower power consumption.
- Always cover empty slots using the filler plates included with the DMF-CI-8.

To install the card into a slot:

1. Use a #2 Phillips screwdriver (not included) or your fingers to loosen the two captive screws on the filler plate of an unused chassis slot, then remove the filler plate.



2. Carefully insert the card into the card guides of the slot, then push the card inward until it situates in the chassis backplane.



3. Finger-tighten the two captive screws on the front panel of the card to secure it to the chassis. Do not overtighten the screws.

Connect the Device

Available connections for the devices depend on the physical connectors present on each model. Refer to the following sections:

- Connect the DM-NVX-350C and DM-NVX-351C on page 340
- Connect the DM-NVX-352C on page 343
- Connect the DM-NVX-360C and DM-NVX-363C on page 345
- Connect the DM-NVX-384C and DM-NVX-385C on page 348
- Connect the DM-NVX-D30C on page 348
- Connect the DM-NVX-E30C on page 350
- Connect the DM-NVX-E760C on page 351

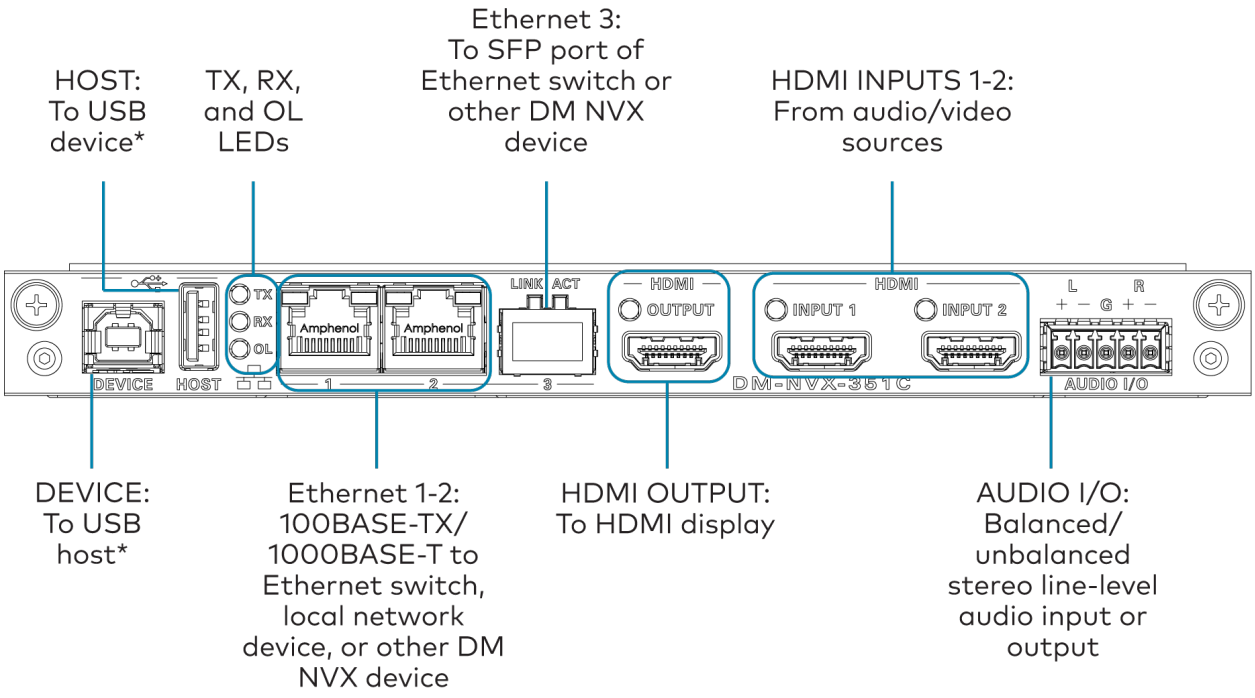
Connect the DM-NVX-350C and DM-NVX-351C

Connect the device as shown in the following illustrations.

NOTES:

- The DM-NVX-350C and DM-NVX-351C each provide three Ethernet ports.
  - Ethernet ports 1 and 2 are 100BASE-TX/1000BASE-T ports.
  - Ethernet port 3 is an SFP port, which connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - All Ethernet ports can be used to a connect to a 1000BASE-T Ethernet switch to stream network video.
  - Ethernet ports 1 and 2 can also be used to connect to a local network device as a courtesy port or to another DM NVX device for daisy chain applications.

Front Panel (DM-NVX-350C and DM-NVX-351C)

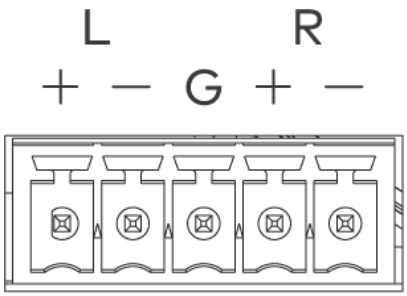


*The device can be configured to use either the **DEVICE** port or the **HOST** port. Both ports cannot be used simultaneously.

Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio input or output.

AUDIO Connector

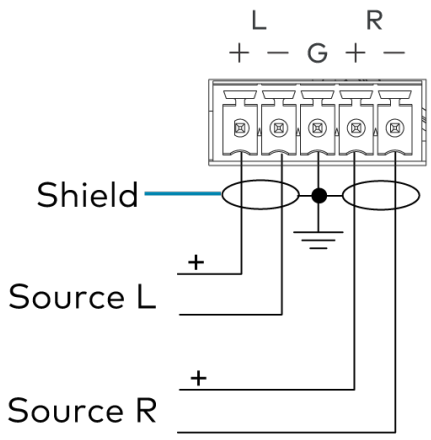


Balanced/Unbalanced Audio Input

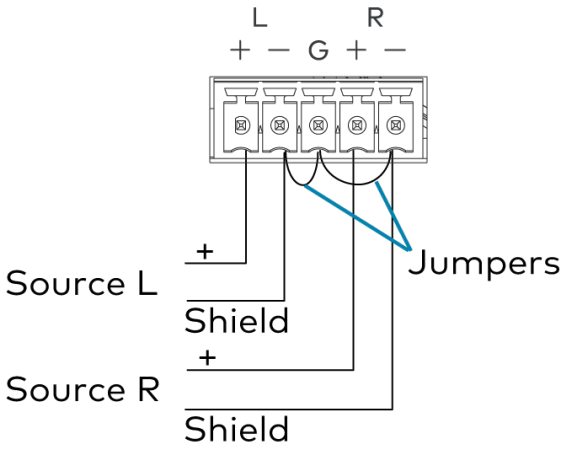
Refer to the following table and diagrams for balanced and unbalanced input pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ In
-	L-	L- Signal return, jumper to G
G	Shield/ground	Ground
+	R+	R+ In
-	R-	R- Signal return, jumper to G

Balanced Input



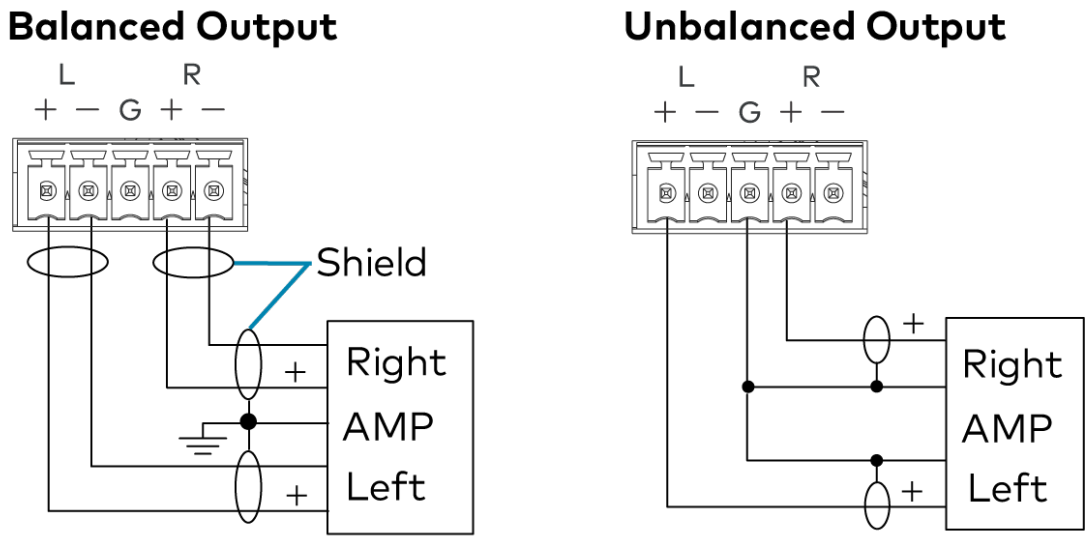
Unbalanced Input



Balanced/Unbalanced Audio Output

Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

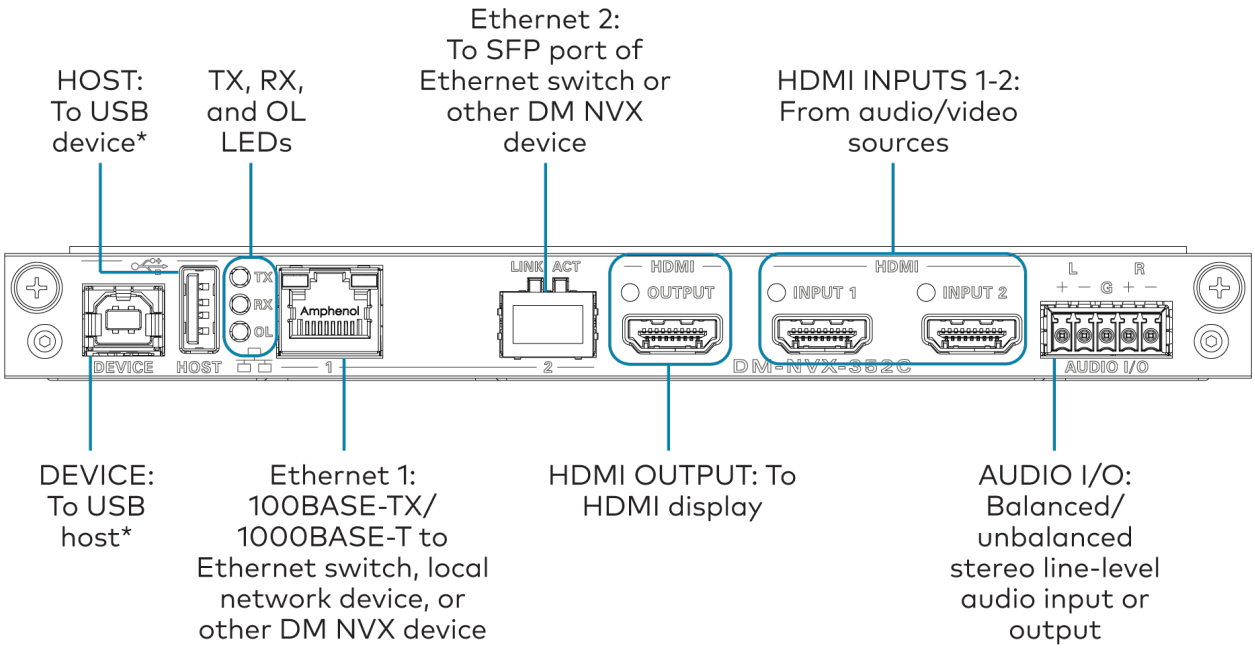
Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open



Connect the DM-NVX-352C

Connect the device as shown in the following illustrations.

Front Panel (DM-NVX-352C)

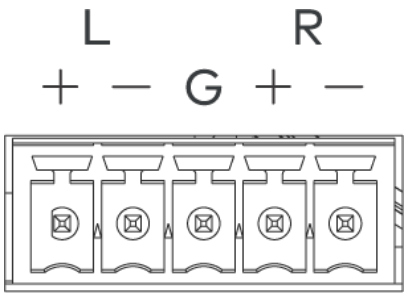


*The device can be configured to use either the **DEVICE** port or the **HOST** port. Both ports cannot be used simultaneously.

Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio input or output.

AUDIO Connector

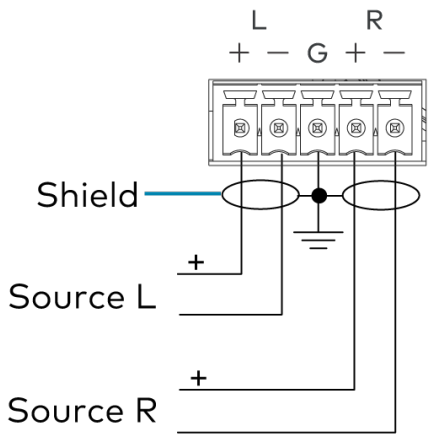


Balanced/Unbalanced Audio Input

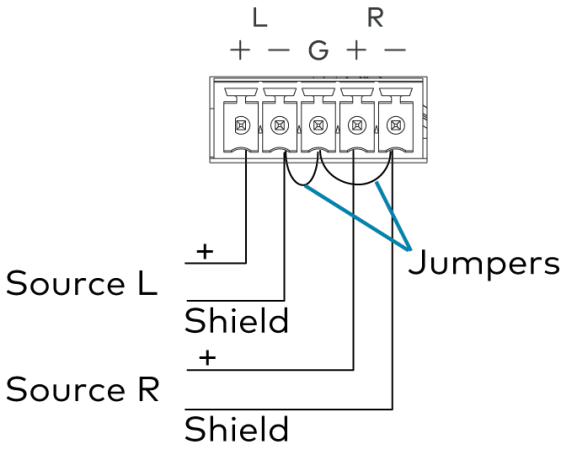
Refer to the following table and diagrams for balanced and unbalanced input pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ In
-	L-	L- Signal return, jumper to G
G	Shield/ground	Ground
+	R+	R+ In
-	R-	R- Signal return, jumper to G

Balanced Input



Unbalanced Input

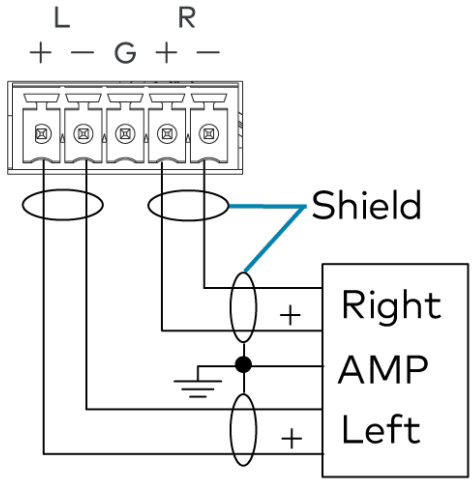


Balanced/Unbalanced Audio Output

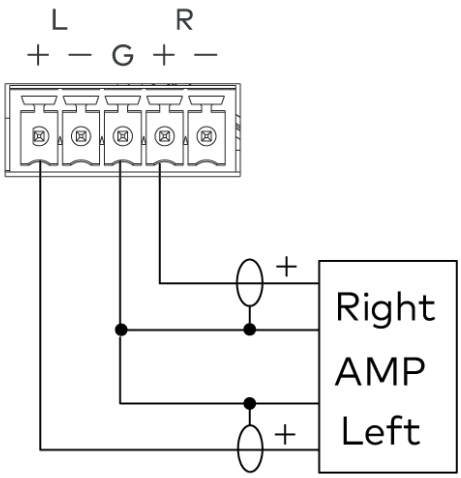
Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

Balanced Output



Unbalanced Output



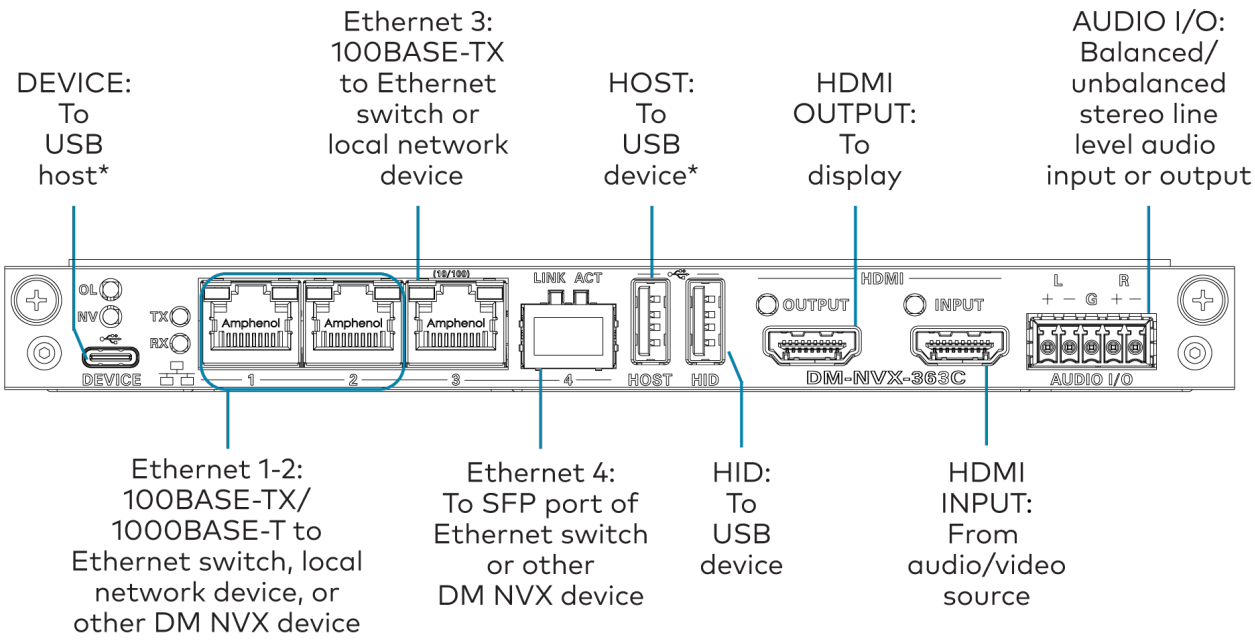
Connect the DM-NVX-360C and DM-NVX-363C

Connect the device as shown in the following illustrations.

NOTES:

- The DM-NVX-360C and DM-NVX-363C each provide four Ethernet ports.
  - Ethernet port 1 and 2 are 100BASE-TX/1000BASE-T ports.
  - Ethernet port 3 is a 100BASE-TX port that can be used to connect to a dedicated audio network or to a local network device.
  - Ethernet port 4 is an SFP port, which connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - Ethernet ports 1, 2, and 4 can be used to a connect to a 1000BASE-T Ethernet switch to stream network video.
  - Ethernet ports 1 and 2 can also be used to connect to a local network device as a courtesy port or to another DM NVX device for daisy chain applications.

Front Panel (DM-NVX-360C and DM-NVX-363C)

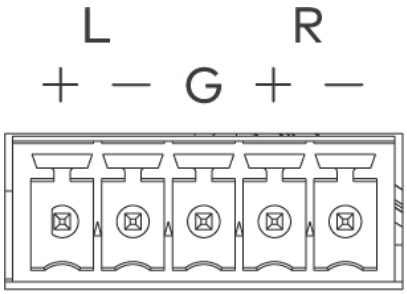


*The device can be configured to use either the **DEVICE** port or the **HOST** port. Both ports cannot be used simultaneously.

Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio input or output.

AUDIO Connector

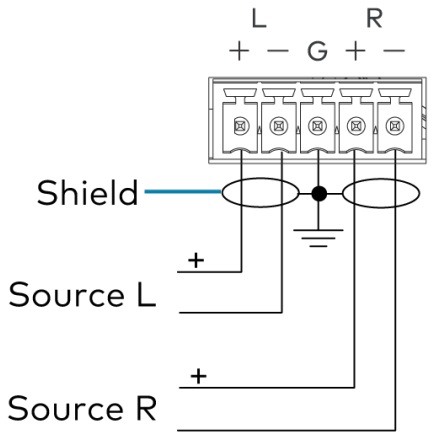


Balanced/Unbalanced Audio Input

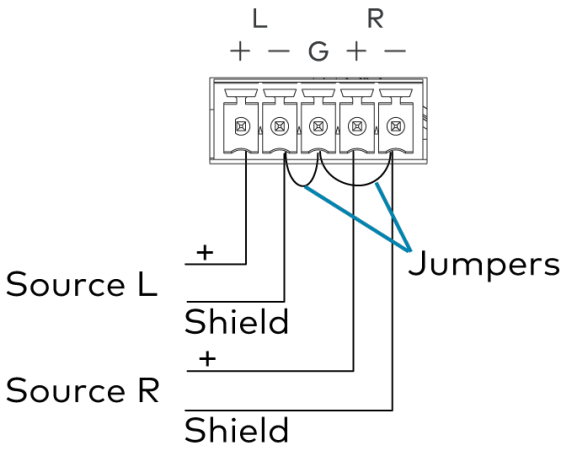
Refer to the following table and diagrams for balanced and unbalanced input pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ In
-	L-	L- Signal return, jumper to G
G	Shield/ground	Ground
+	R+	R+ In
-	R-	R- Signal return, jumper to G

Balanced Input



Unbalanced Input

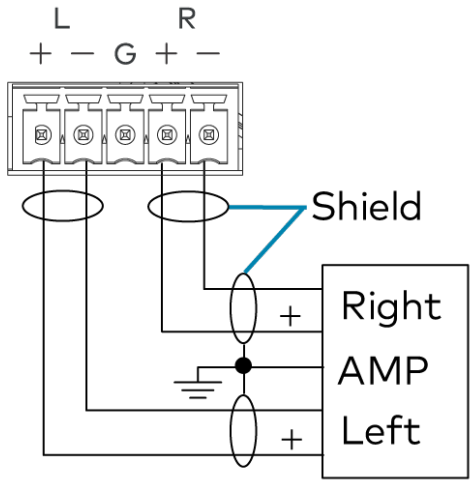


Balanced/Unbalanced Audio Output

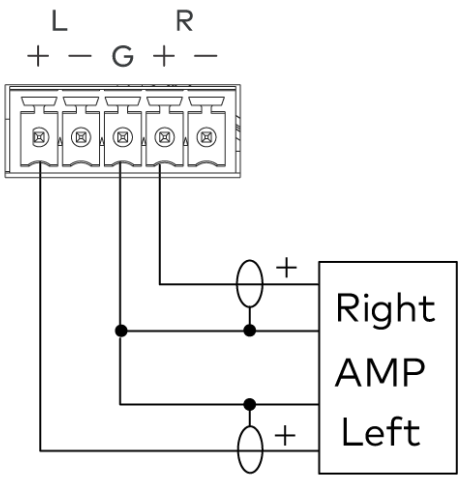
Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

Balanced Output



Unbalanced Output



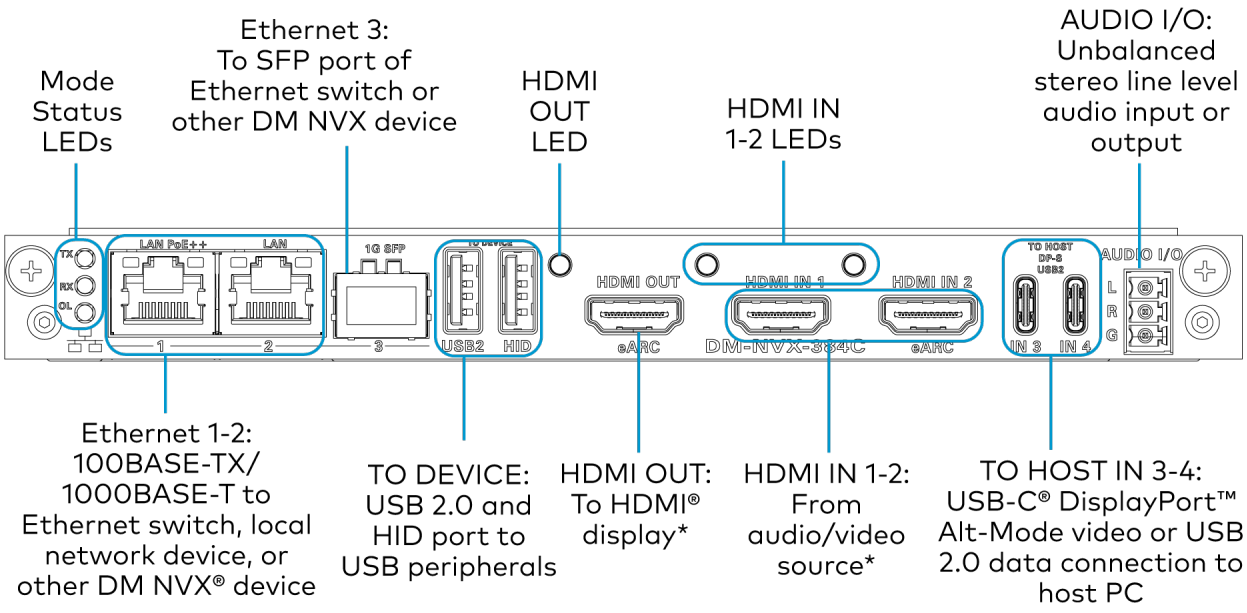
Connect the DM-NVX-384C and DM-NVX-385C

Connect the device as shown in the following illustrations.

NOTES:

- The DM-NVX-384C and DM-NVX-385C each provide three Ethernet ports.
  - Ethernet ports 1 and 2 are 100BASE-TX/1000BASE-T ports.
  - Ethernet port 3 is an SFP port, which connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - All Ethernet ports can be used to a connect to a 1000BASE-T Ethernet switch to stream network video.
  - Ethernet ports 1 and 2 can also be used to connect to a local network device as a courtesy port or to another DM NVX device for daisy chain applications.

Front Panel (DM-NVX-384C and DM-NVX-385C)



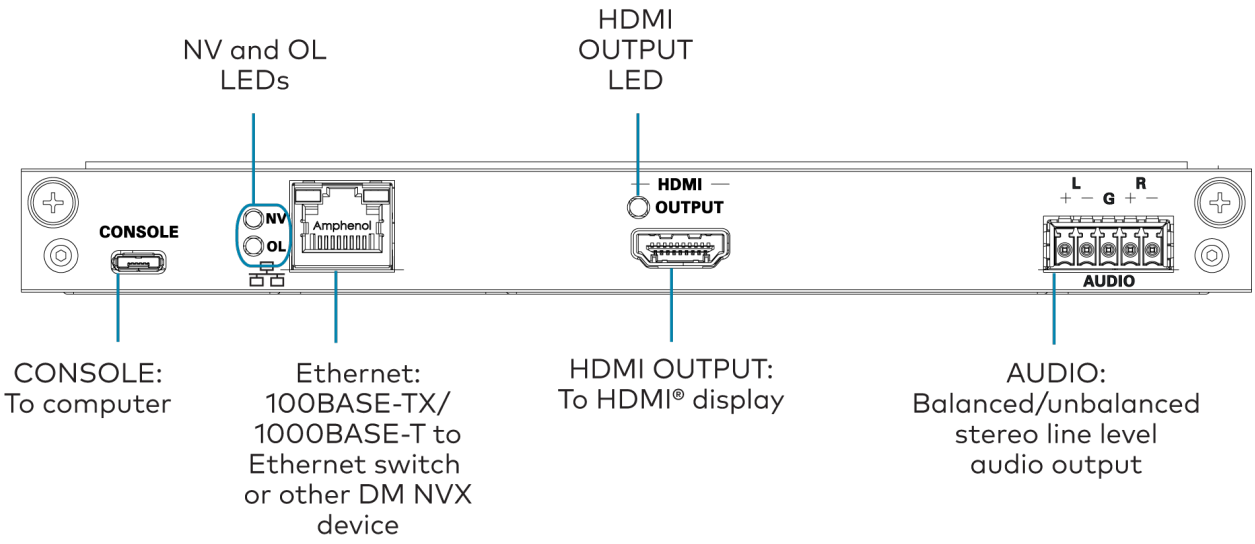
*eARC functionality is reserved for future use.

Connect the DM-NVX-D30C

Connect the device as shown in the following illustrations.

NOTE: The Ethernet port must be connected to a 1000BASE-T switch in order to stream network video.

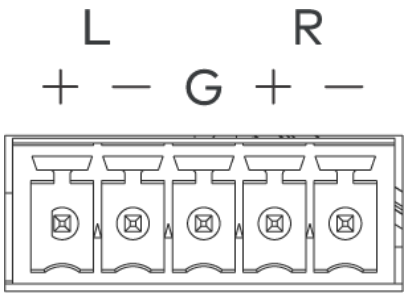
Front Panel (DM-NVX-D30C)



Audio Connector Pin Assignments

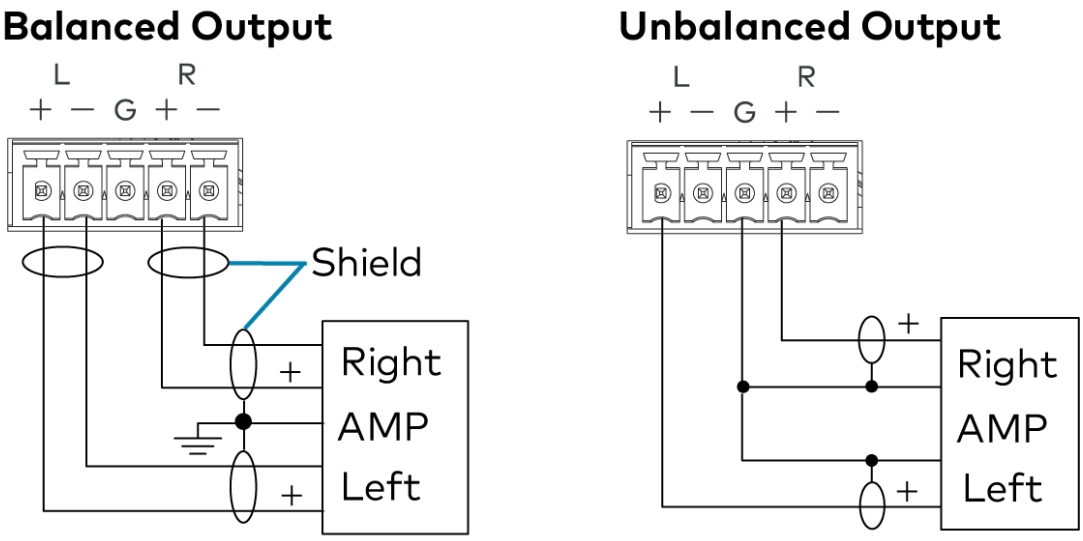
The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio output.

AUDIO Connector



Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

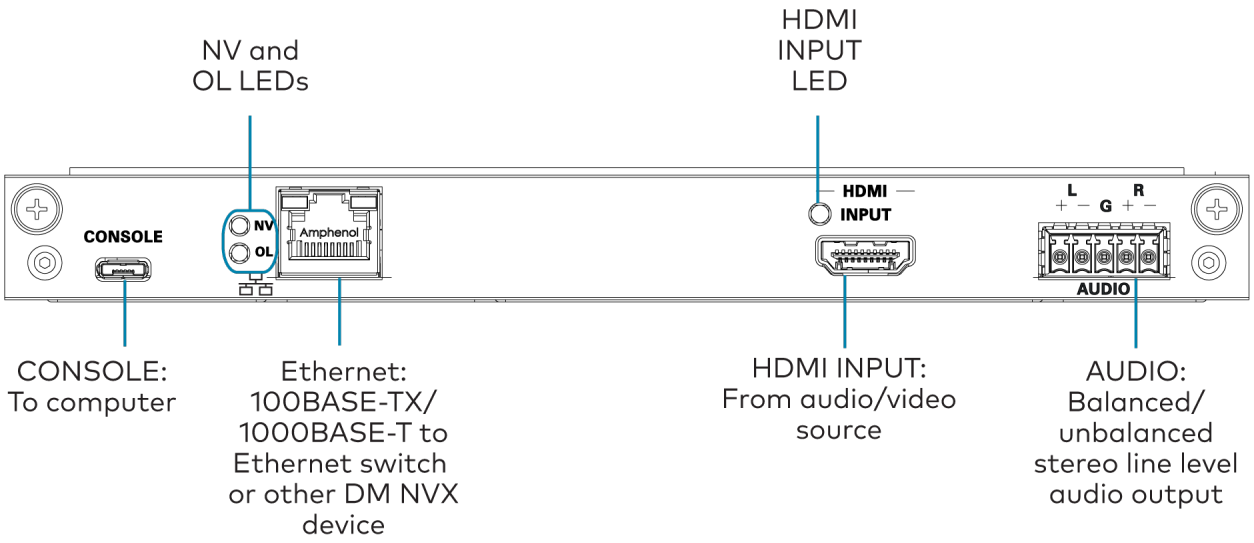


Connect the DM-NVX-E30C

Connect the device as shown in the following illustrations.

> **NOTE:** The Ethernet port must be connected to a 1000BASE-T switch in order to stream network video.

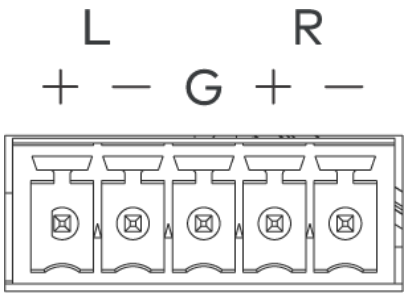
Front Panel (DM-NVX-E30C)



Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio output.

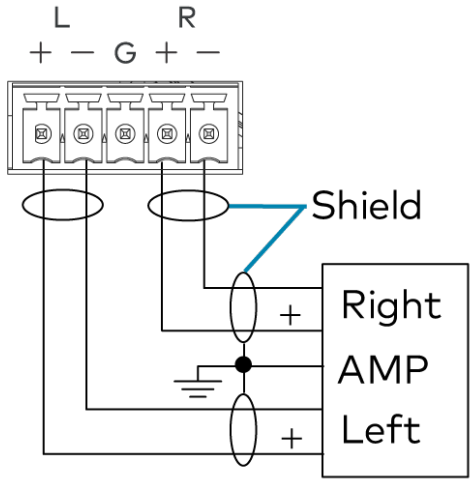
AUDIO Connector



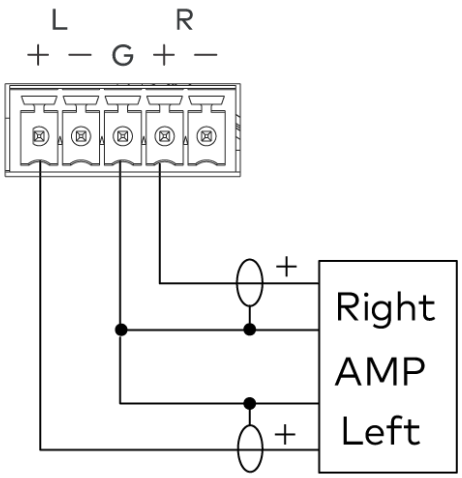
Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

Balanced Output



Unbalanced Output



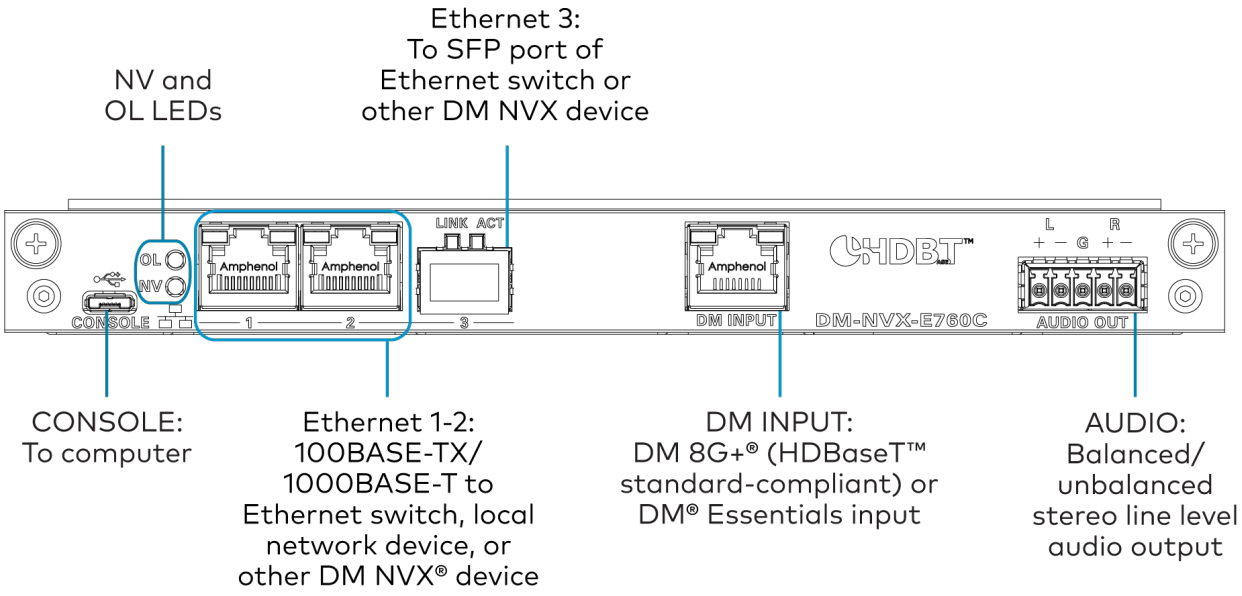
Connect the DM-NVX-E760C

Connect the device as shown in the following illustrations.

NOTES:

- The DM-NVX-E760C provides three Ethernet ports.
  - Ethernet port 1 and 2 are 100BASE-TX/1000BASE-T ports.
  - Ethernet port 3 is an SFP port, which connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - All Ethernet ports can be used to a connect to a 1000BASE-T Ethernet switch to stream network video.
  - Ethernet ports 1 and 2 can also be used to connect to a local network device as a courtesy port or to another DM NVX device for daisy chain applications.

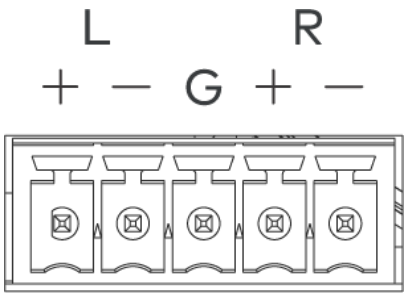
Front Panel (DM-NVX-E760C)



Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio output.

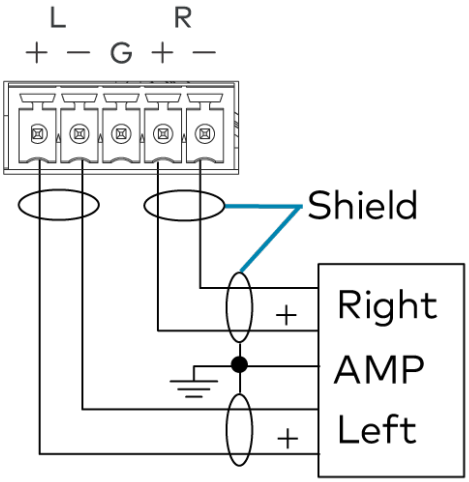
AUDIO Connector



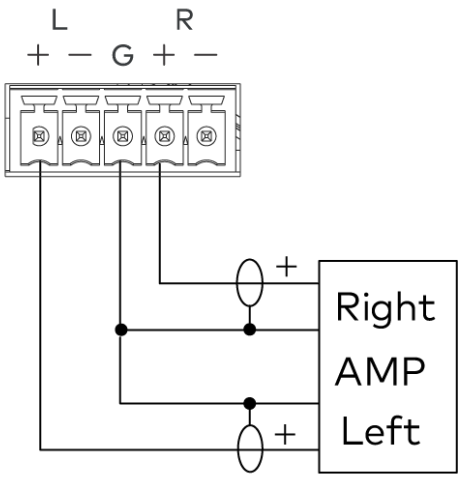
Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

Balanced Output



Unbalanced Output



Observe the LED Indicators

Available indicators depend on the hardware of each model. Refer to the following sections:

- DM-NXV-350C and DM-NVX-351C Indicators on page 353
- DM-NVX-352C Indicators on page 354
- DM-NVX-360C and DM-NVX-363C Indicators on page 354
- DM-NVX-384C and DM-NVX-385C Indicators on page 355
- DM-NVX-D30C Indicators on page 355
- DM-NVX-E30C Indicators on page 356
- DM-NVX-E760C Indicators on page 356

DM-NXV-350C and DM-NVX-351C Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
TX	Green	The device is in transmitter (encoder) mode.
RX	Green	The device is in receiver (decoder) mode.
OL	Green	The device is online with a control system.

LED Indicator	Color	Meaning
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 3 LINK	Green	An Ethernet link is established.
Ethernet 3 ACT	Flashing green	Data activity is occurring on the Ethernet link.
HDMI OUT	Green	A video signal is being transmitted to the HDMI output.
HDMI INPUT 1-2	Green	A video signal is detected at the corresponding HDMI input.

DM-NVX-352C Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
TX	Green	The device is in transmitter (encoder) mode.
RX	Green	The device is in receiver (decoder) mode.
OL	Green	The device is online with a control system.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2 LINK	Green	An Ethernet link is established.
Ethernet 2 ACT	Flashing green	Data activity is occurring on the Ethernet link.
HDMI OUT	Green	A video signal is being transmitted to the HDMI output.
HDMI INPUT 1-2	Green	A video signal is detected at the corresponding HDMI input.

DM-NVX-360C and DM-NVX-363C Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
OL	Green	The device is online with a control system.
TX	Green	The device is in transmitter (encoder) mode.
RX	Green	The device is in receiver (decoder) mode.
NV	Green	(Transmitter mode only) The device is encoding (transmitting) network video. (Receiver mode only) The device is decoding (receiving) network video.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.

LED Indicator	Color	Meaning
Ethernet 2	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 3	Green	An Ethernet link is established.
	Flashing green	Data activity is occurring on the Ethernet link.
	Flashing amber	A 100BASE-TX link is established.
Ethernet 4 LINK	Green	An Ethernet link is established.
Ethernet 4 ACT	Flashing green	Data activity is occurring on the Ethernet link.
HDMI OUTPUT	Green	A video signal is being transmitted to the HDMI output.
HDMI INPUT	Green	A video signal is detected at the corresponding HDMI input.

DM-NVX-384C and DM-NVX-385C Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
OL	Green	The device is online with a control system.
TX	Green	The device is in transmitter (encoder) mode.
RX	Green	The device is in receiver (decoder) mode.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 3 LINK	Green	An Ethernet link is established.
Ethernet 3 ACT	Flashing green	Data activity is occurring on the Ethernet link.
HDMI OUT	Green	A video signal is being transmitted to the HDMI output.
HDMI IN 1	Green	A video signal is detected at the HDMI input.
HDMI IN 2	Green	A video signal is detected at the HDMI input.

DM-NVX-D30C Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
NV	Green	The device is decoding (receiving) network video.
OL	Green	The device is online with a control system.

LED Indicator	Color	Meaning
Ethernet	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
HDMI OUTPUT	Green	A video signal is being transmitted to the HDMI output.

DM-NVX-E30C Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
NV	Green	The device is encoding (transmitting) network video.
OL	Green	The device is online with a control system.
Ethernet	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
HDMI INPUT	Green	A video signal is detected at the HDMI input.

DM-NVX-E760C Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
NV	Green	The device is transmitting (encoding) network video.
OL	Green	The device is online with a control system.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 3 LINK	Green	An Ethernet link is established.
Ethernet 3 ACT	Flashing green	Data activity is occurring on the Ethernet link.
DM INPUT	Green	A DM®, HDBaseT™, or DM Essentials link is established.
	Amber	HDCP video is detected at the input.
	Flashing amber	Non-HDCP video is detected at the input.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue

Support via phone, email or chat as described at www.crestron.com/support.

The restore procedure for a DM NVX encoder/decoder card is performed from the front panel of the DMF-CI-8 chassis. Refer to Restore a Card to the Factory Default Settings in the DMF-CI-8 Product Manual for more information.

DM NVX Director Switching Appliance Installation

Refer to the following sections to install the DM NVX Director switching appliance models:

- In the Box on page 358
- Mount the Device on page 358
- Connect the Device on page 364
- Observe the LED Indicators on page 364
- DM NVX Director Switching Appliance Installation on page 358

In the Box

DM-NVX-DIR-80 and DM-NVX-DIR-160

Qty.	Description
1	DM-NVX-DIR-80 or DM-NVX-DIR-160
	Additional Items
1	Power cord (2050011)

DM-NVX-DIR-ENT

Qty.	Description
1	DM-NVX-DIR-ENT
	Additional Items
2	Power cord (2050011)
2	Rack rail, outer (2050009)

DM-NVX-DIR2

Qty.	Description
1	DM-NVX-DIR2
	Additional Items
1	Power adapter

Mount the Device

The DM-NVX-DIR-80, DM-NVX-DIR-160, and DM-NVX-DIR-ENT appliances can be left freestanding on a flat surface or mounted onto a rack rail. The rack rail mounting procedure for the DM-NVX-DIR-ENT

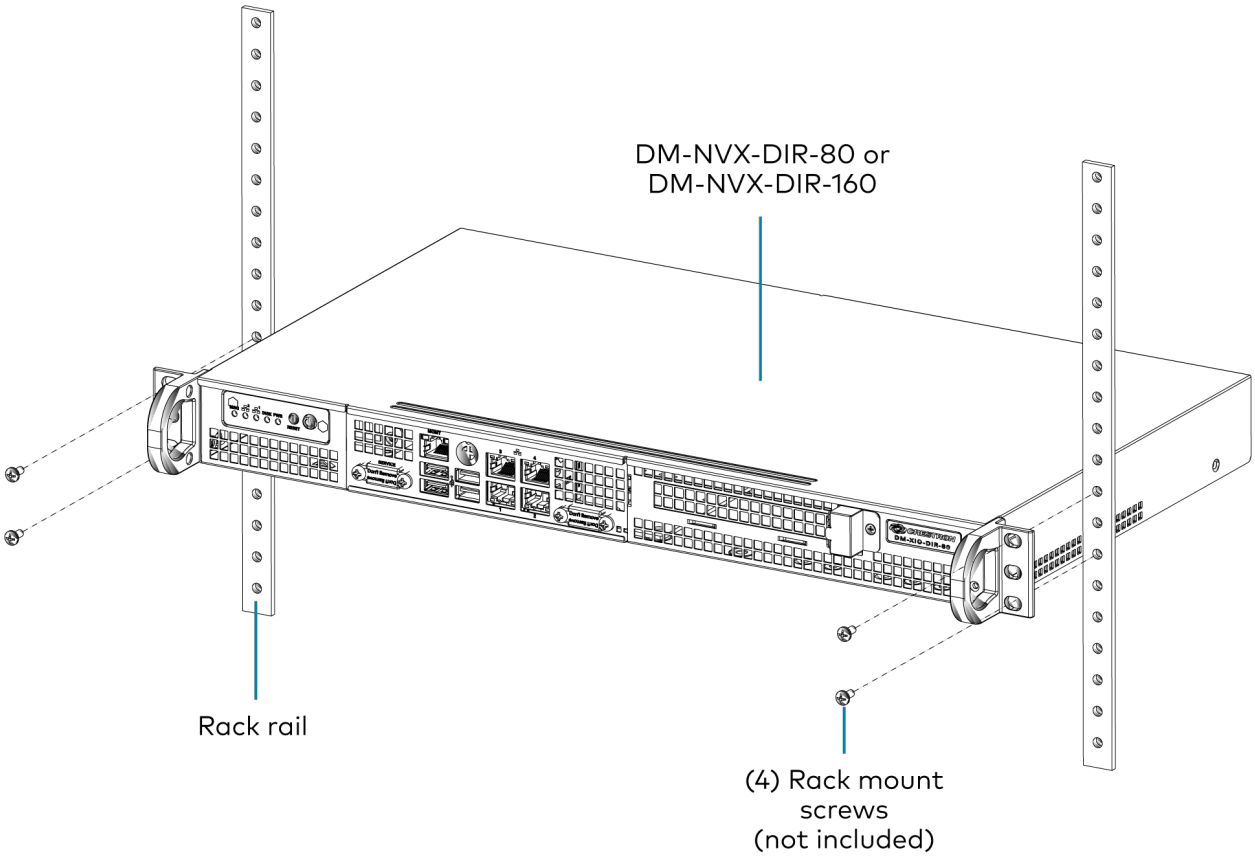
differs from the DM-NVX-DIR-80 and DM-NVX-DIR-160. The DM-NVX-DIR2 can either be placed on a flat, level surface or VESA® mounted using third-party VESA mounting solutions (not included). Refer to the procedures below:

- Mount to a Rack Rail - DM-NVX-DIR-80 and DM-NVX-DIR-160 on page 359
- Mount to a Rack Rail - DM-NVX-DIR-ENT on page 359
- Install the DM-NVX-DIR2 on page 363

Mount to a Rack Rail - DM-NVX-DIR-80 and DM-NVX-DIR-160

To mount the DM-NVX-DIR-80 or DM-NVX-DIR-160 in a rack, secure the device to two rack rails using four mounting screws (not included).

CAUTION: Do not lift the device using the front handles. The handles are designed for pulling the unit out from between other devices in a rack.

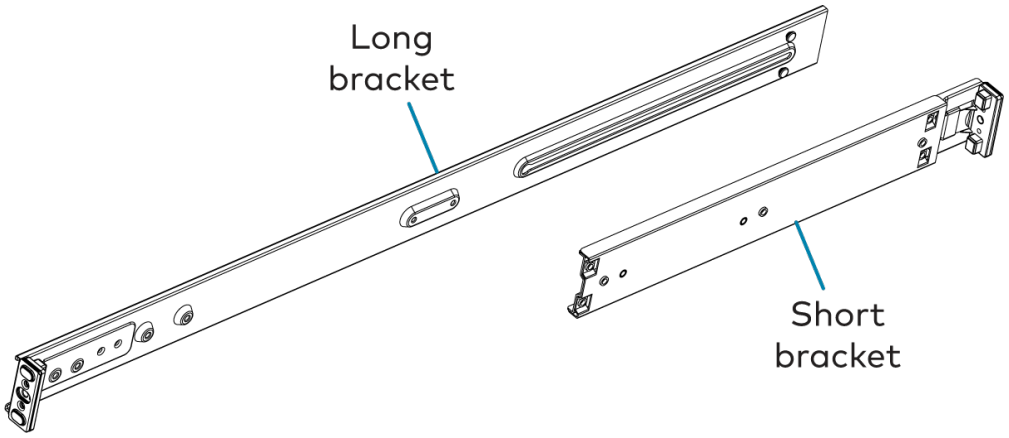


Mount to a Rack Rail - DM-NVX-DIR-ENT

CAUTION: Do not lift the device using the front handles. The handles are designed for pulling the unit out from between other devices in a rack.

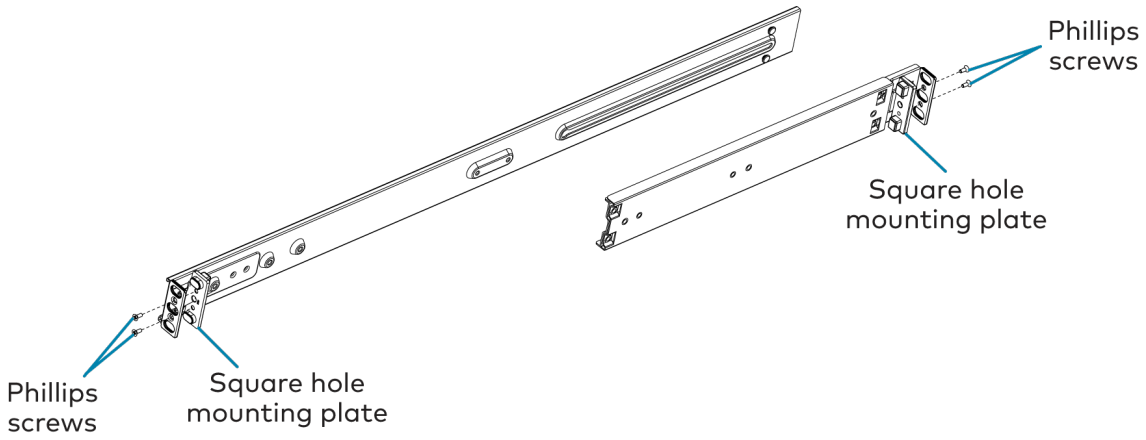
To mount the DM-NVX-DIR-ENT into a rack:

1. Install the two outer rack rails (included). Each outer rack rail consists of one short bracket and one long bracket.

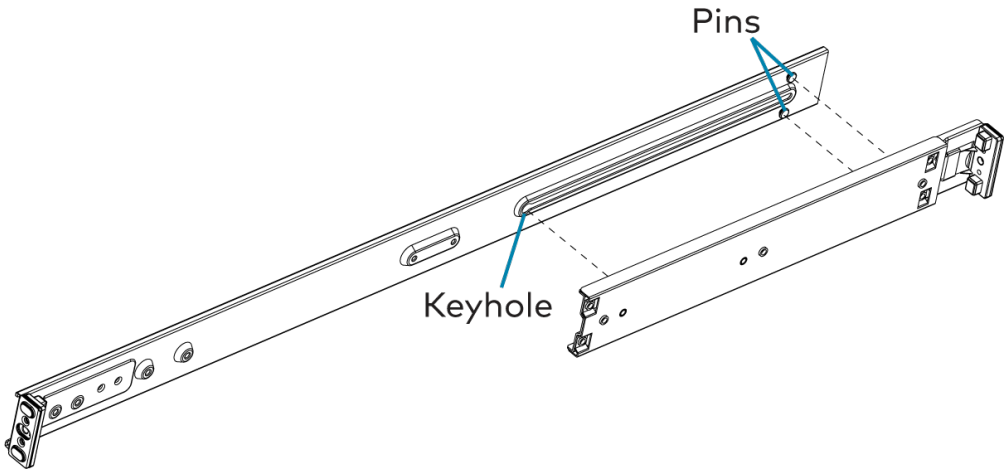


To install the outer rack rails:

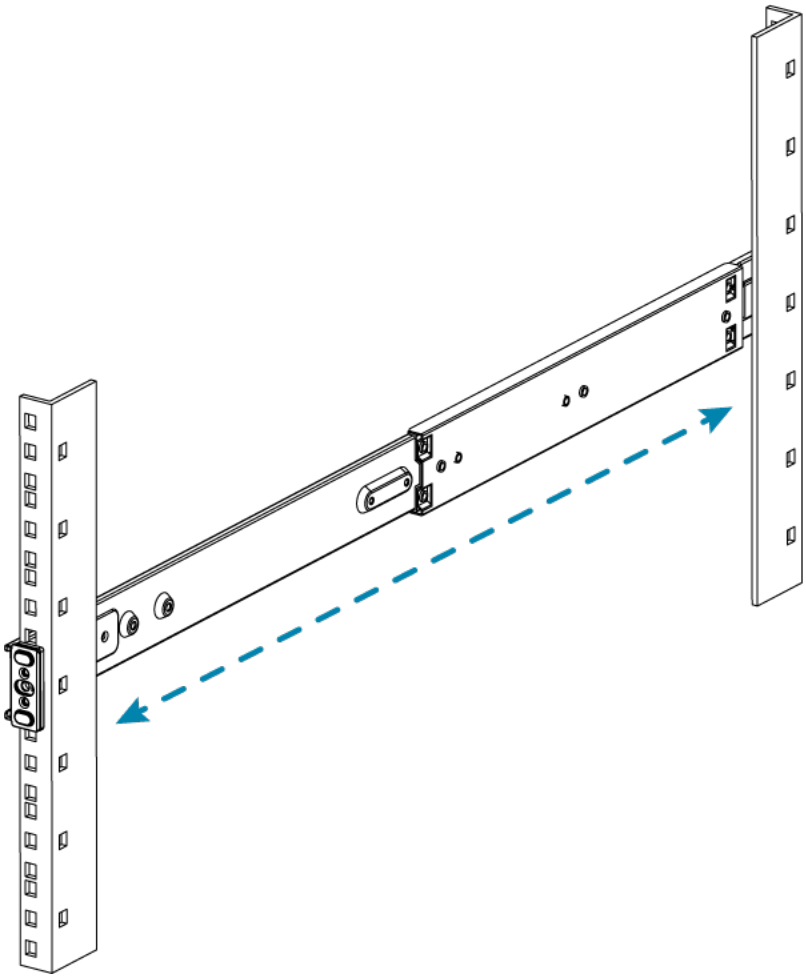
a. If the device will be mounted to a rack with round holes, detach the square hole mounting plates from the brackets by removing the two Phillips screws from the end of each bracket.



b. Attach the short bracket to the outside of the long bracket by inserting the pin on the short bracket into the keyhole on the long bracket. Position the two pins on the long bracket to slot into the two keyholes on the short bracket.

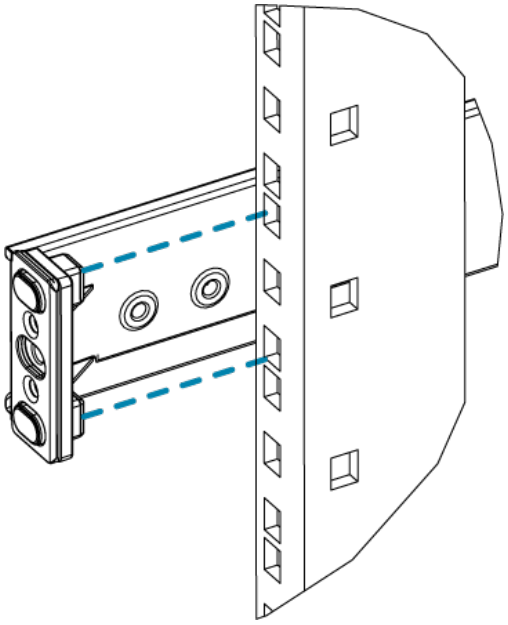


c. Position the long bracket toward the front of the rack and the short bracket toward the rear of the rack, and then adjust the rail by sliding the brackets to fit the depth of the rack.

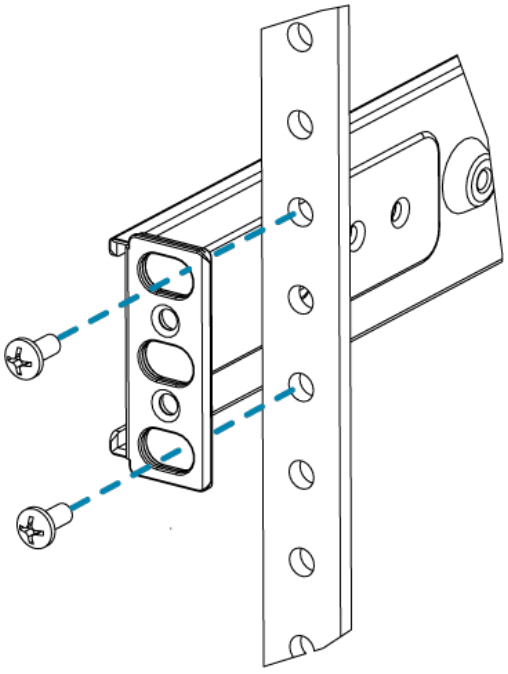


d. Do either of the following:

- If the rack has square holes, align the square hole mounting plates with the holes in the rack, then push the plates inward until they snap into place.

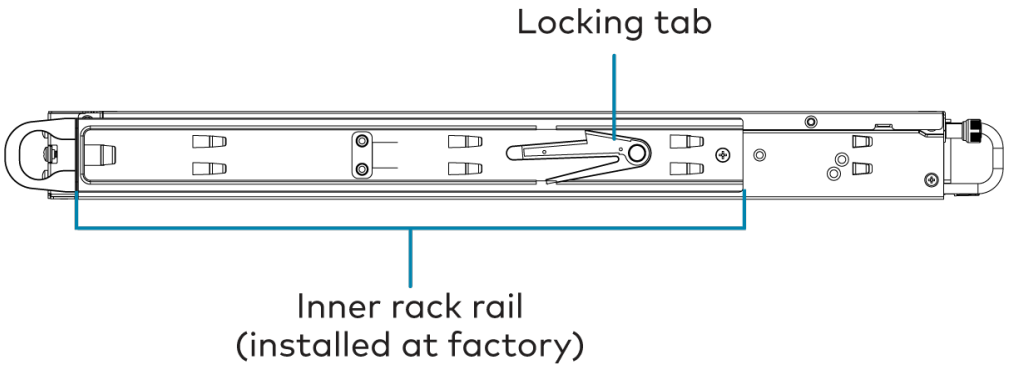


- If the rack has round holes, align the rack mounting holes in the rail with the holes in the rack and then attach the rail with four rack mounting screws (two at each end, not included)

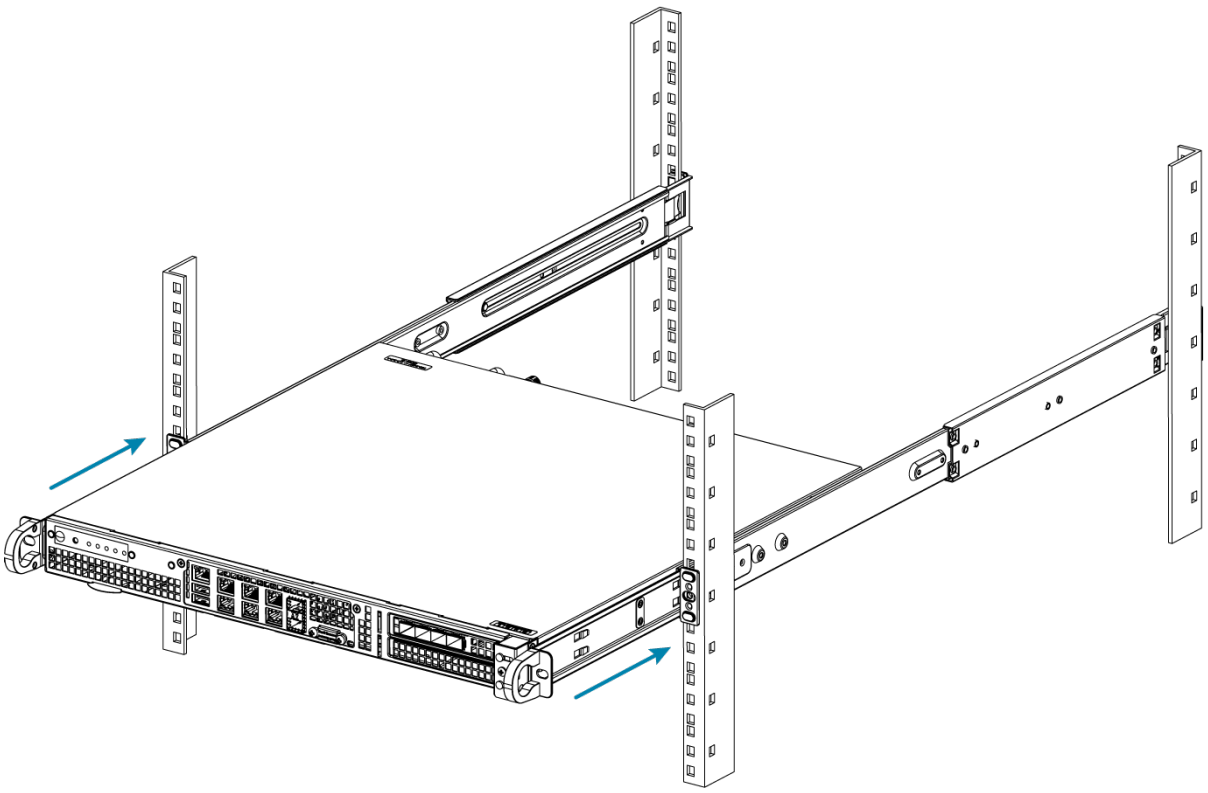


e. Repeat steps a-d for the remaining outer rack rail on the other side of the rack.

2. Observe the inner rack rails on the left and right sides of the device



3. Align the inner rack rails with the front of the outer rack rails.
4. Slide the device into the outer rack rails. If necessary, press down on the locking tabs of the inner rack rails to insert the device. When the device is fully inserted into the rack, the locking tabs lock the device in place in the rack. The locking tabs also prevent the device from coming completely out of the rack if the device is pulled from the rack



Install the DM-NVX-DIR2

Note the following enclosure and ventilation requirements when installing the DM-NVX-DIR2:

- If installing within an enclosure with doors, the doors must be of a type that allows at least 30% airflow through the enclosure (front and back).
- Leave a 4 in. (10 mm) minimum clearance on all vented sides of the DM-NVX-DIR2 to permit the airflow required for proper ventilation.

- Do not install the DM-NVX-DIR2 in an enclosure that does not provide sufficient airflow, that is dusty, or that reaches a temperature exceeding 95°F (35°C).
- Do not block the DM-NVX-DIR2 air vents with any objects, as this can restrict airflow and computer performance, possible causing the DM-NVX-DIR2 to overheat.
- If the DM-NVX-DIR2 is installed in a corner, on a table, or under a table, leave a 2 in. (5 mm) clearance from the back of the DM-NVX-DIR2 to the wall to permit the airflow required for proper ventilation.

NOTE: The air intake is located on the front of the device, and air is exhausted out of the rear. Ensure the device is installed in a location that permits sufficient airflow through the device.

Connect the Device

Refer to Physical Description on page 85 for details on the available connectors. Connect power last.

Observe the LED Indicators

Refer to the following tables for information about the LED indicators on the devices.

DM-NVX-DIR-80 and DM-NVX-DIR-160

LED Indicator	Color	Meaning
PWR	Green	The device is powered on.
Ethernet 1-2	Green	Data activity is occurring on the corresponding Ethernet link.
DISK	Yellow	SSD (solid-state drive) activity is occurring.
MSG	Blue	The identification process has been initiated on the device.
MGMT	Green	A 100 Mbps Ethernet link is established on the MGMT port.
	Orange	A 1 Gbps Ethernet link is established on the MGMT port.
	Flashing amber	Data activity is occurring on the MGMT link.
Ethernet 1-4	Green	A 100 Mbps Ethernet link is established on the corresponding Ethernet port.
	Orange	A 1 Gbps Ethernet link is established on the corresponding Ethernet port.
	Flashing amber	Data activity is occurring on the corresponding Ethernet link.

DM-NVX-DIR-ENT

LED Indicator	Color	Meaning
PWR	Green	The device is powered on.
Ethernet 1-2	Green	Data activity is occurring on the corresponding Ethernet link.
DISK	Yellow	SSD (solid-state drive) activity is occurring.
MSG	Blue	The identification process has been initiated on the device.
	Red	A power supply fault has occurred.

LED Indicator	Color	Meaning
MGMT	Green	A 100 Mbps Ethernet link is established on the MGMT port.
	Orange	A 1 Gbps Ethernet link is established on the MGMT port.
	Flashing amber	Data activity is occurring on the MGMT link.
Ethernet 1-6	Green	A 100 Mbps Ethernet link is established on the corresponding Ethernet port.
	Orange	A 1 Gbps Ethernet link is established on the corresponding Ethernet port.
	Flashing amber	Data activity is occurring on the corresponding Ethernet link.
Ethernet 7-12	Green	An Ethernet link is established on the corresponding Ethernet port.
	Flashing green	Data activity is occurring on the corresponding Ethernet link.

DM-NVX-DIR2

LED Indicator	Color	Meaning
PWR	White	The device is powered on.
LAN	Green	An Ethernet link is established on the Ethernet port.
	Flashing amber	Data activity is occurring on the Ethernet link.

DM-NVX-350, DM-NVX-351, and DM-NVX-352 Installation

Refer to the following sections to install the DM-NVX-350, DM-NVX-351, and DM-NVX-352.

> **NOTE:** This topic covers the installation of the room box models only. Refer to Card Installation on page 338 for instructions on installing the DM-NVX-350C, DM-NVX-351C, and DM-NVX-352C.

- In the Box on page 366
- Mount the Device on page 367
- Connect the Device on page 369
- Observe the LED Indicators on page 372
- Reset the Device on page 373

In the Box

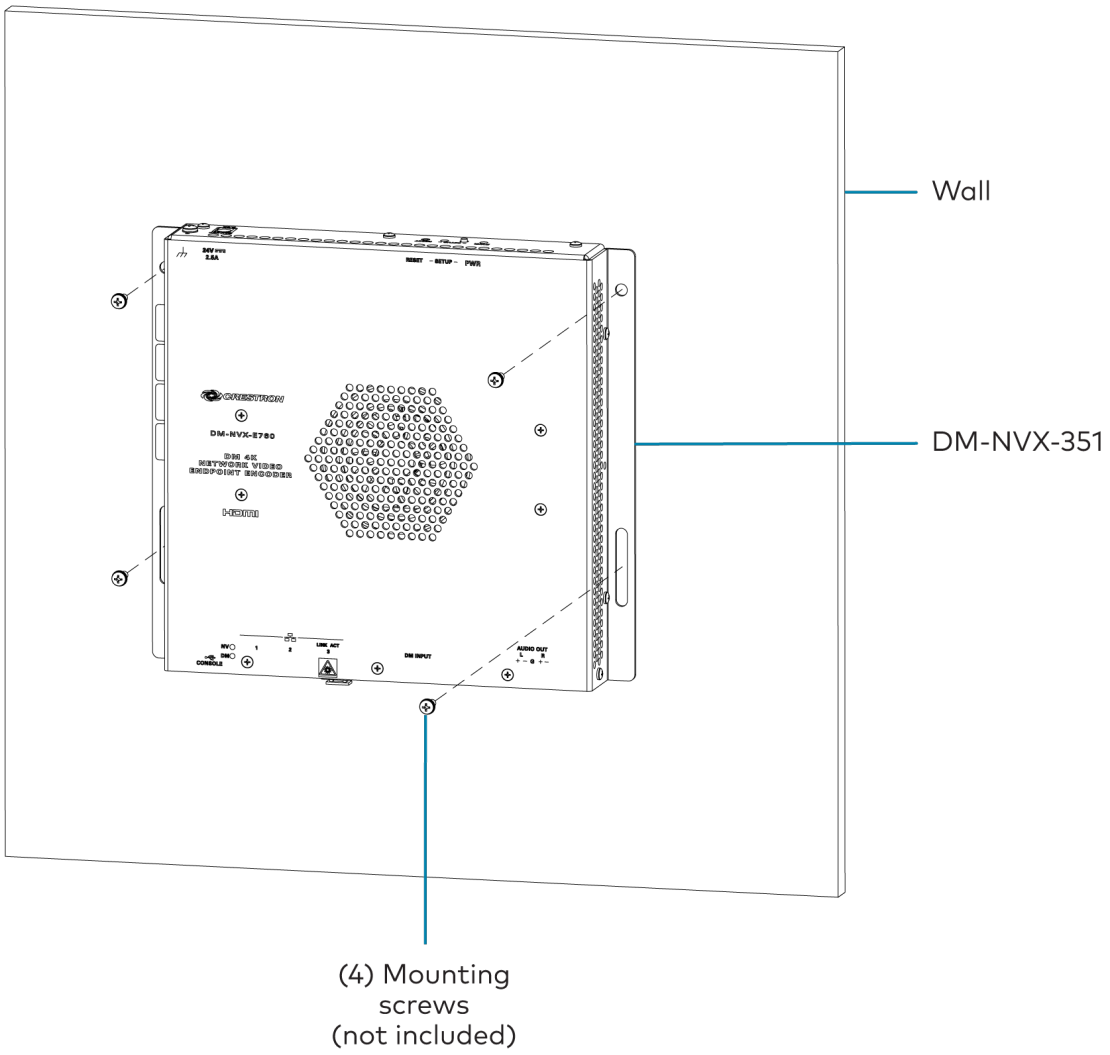
Qty.	Description
1	DM-NVX-350, DM-NVX-351, or DM-NVX-352 Network AV Encoder/Decoder
	Additional Items
1	Power pack, 24VDC, 2.5A, 100-240VAC (2045873)
2	Power cord, 5 ft 10 in. (1.78 m) (2042043)
1	Connector, 4-pin (2003576)
2	Connector, 5-pin (2003577)

Mount the Device

The DM NVX device can be mounted onto a flat surface or rack rail.

Mount to a Surface

Using four surface-appropriate mounting screws (not included), mount the device onto a flat surface such as a wall or the underside of a table.

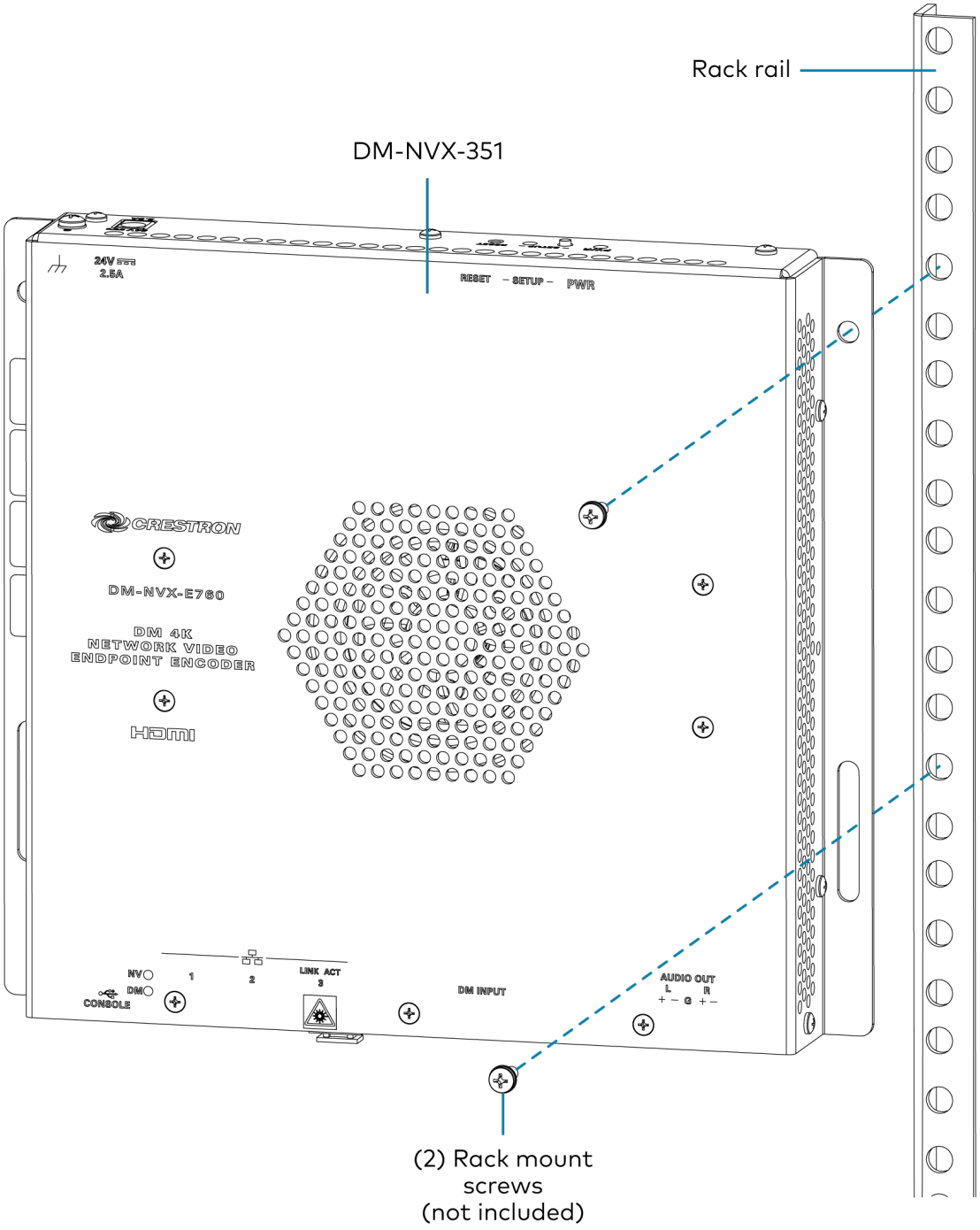


NOTE: Fan ventilation holes are provided on five sides of the device. If the installation necessitates that another object be positioned flush against the ventilation holes on one side of the device, leave a minimum clearance of 2 in. (51 mm) of space on all other sides containing ventilation holes.

Mount to a Rack Rail

The device can be mounted onto a front or rear rack rail. To mount the device:

1. Position either the left or right mounting flange so that the holes align with the holes in the rack rail.
2. Secure the device to the rack rail using two rack screws (not included).



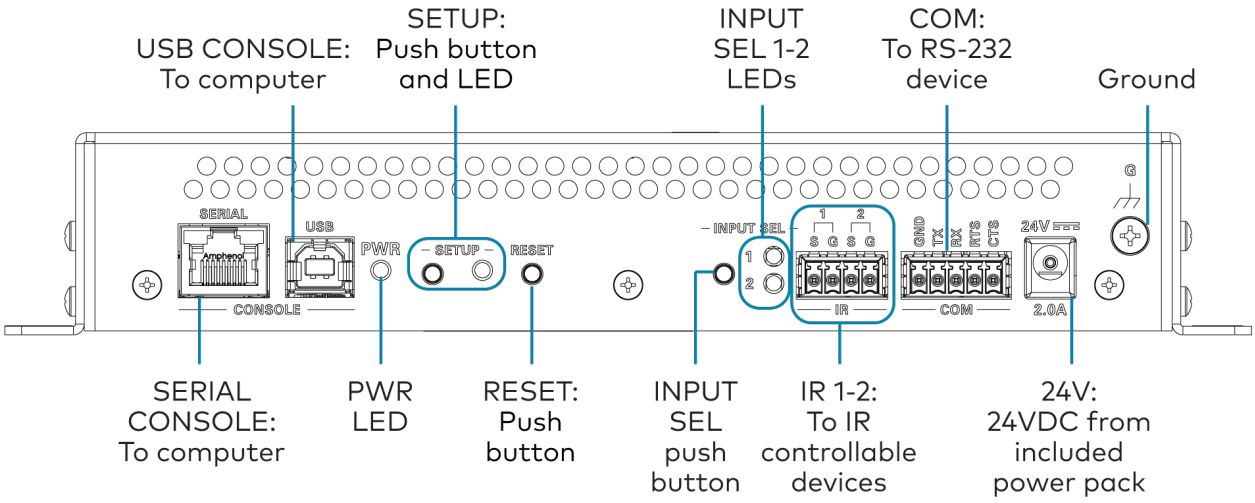
Connect the Device

Connect the device as shown in the following illustrations.

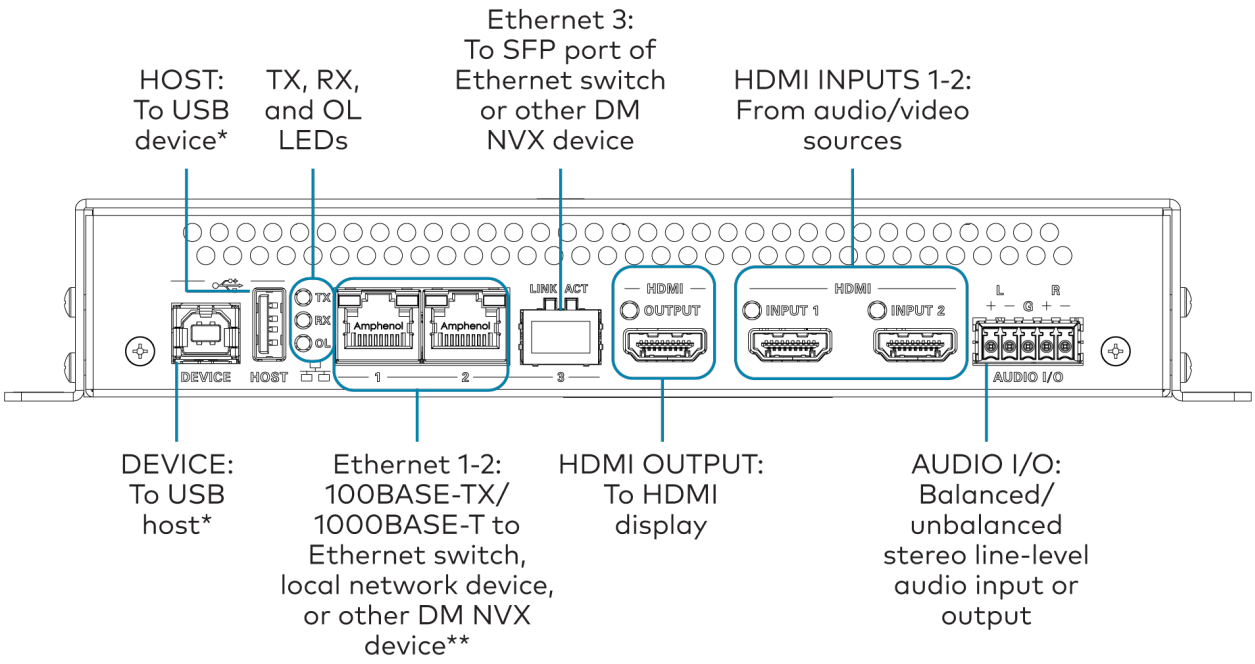
NOTES:

- The device provides multiple Ethernet ports.
  - The DM-NVX-350 and DM-NVX-351 each provide three LAN ports. LAN ports 1 and 2 are 100BASE-TX/1000BASE-T ports. LAN port 3 is an SFP port.
  - The DM-NVX-352 provides two LAN ports. LAN port 1 is a 100BASE-TX/1000BASE-T port LAN port 2 is an SFP port.
  - An SFP port connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - Only one LAN port at a time can be used as the primary LAN connection to a 1000BASE-T switch in order to stream network video. Any other LAN port can then be used for connection to a local network device or to another DM NVX device.
  - The DM NVX device can be powered by the included PW-2420RU power pack or over the LAN via LAN port 1, which is a powered device(PD) port. In order to receive power over the LAN, LAN port 1 must connect to PoE++ power sourcing equipment (PSE) such as a PoE++ compliant Ethernet switch or IEEE 802.3bt compliant injector. Do not connect both types of power simultaneously.

Top Panel



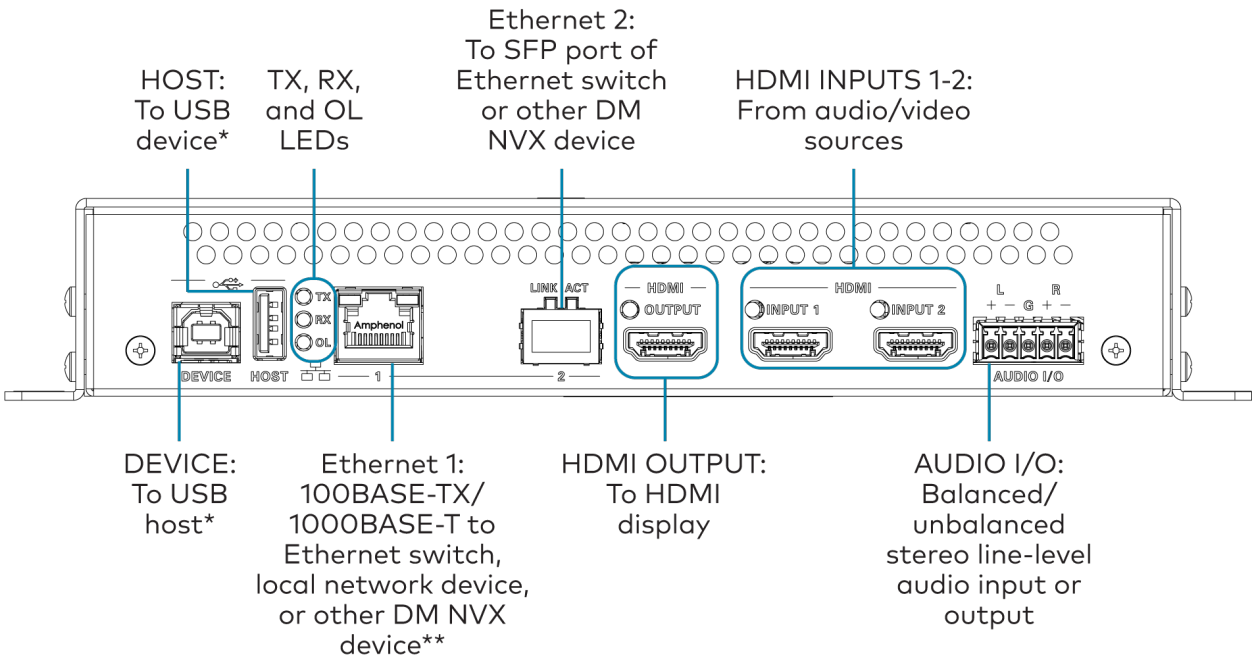
Bottom Panel - DM-NVX-350 and DM-NVX-351



*The device can be configured to use either the **DEVICE** port or the **HOST** port. Both ports cannot be used simultaneously.

**Ethernet port 1 is a PoE++ powered device port.

Bottom Panel - DM-NVX-352



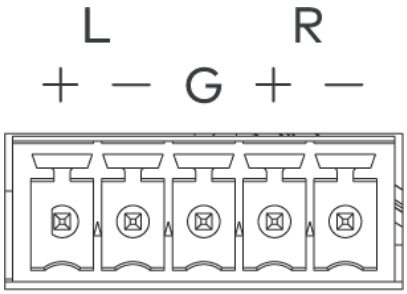
*The device can be configured to use either the **DEVICE** port or the **HOST** port. Both ports cannot be used simultaneously.

**Ethernet port 1 is a PoE++ powered device port.

Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio input or output.

AUDIO Connector

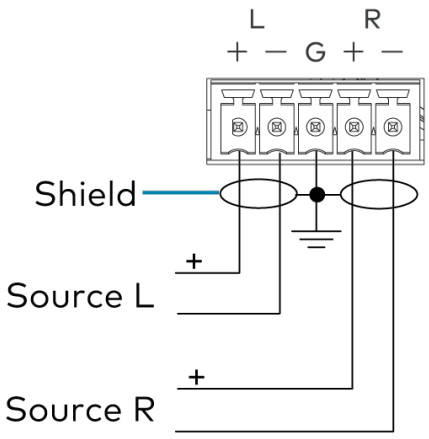


Balanced/Unbalanced Audio Input

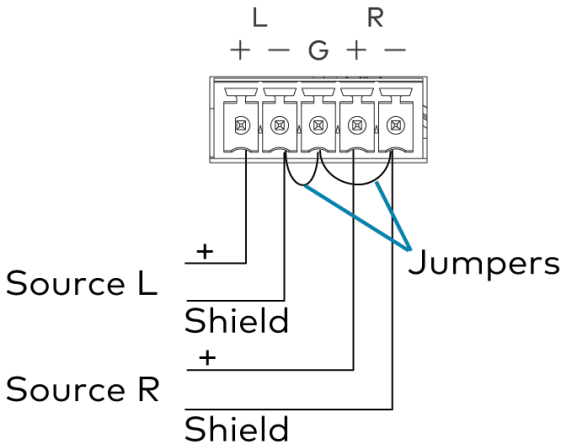
Refer to the following table and diagrams for balanced and unbalanced input pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ In
-	L-	L- Signal return, jumper to G
G	Shield/ground	Ground
+	R+	R+ In
-	R-	R- Signal return, jumper to G

Balanced Input



Unbalanced Input



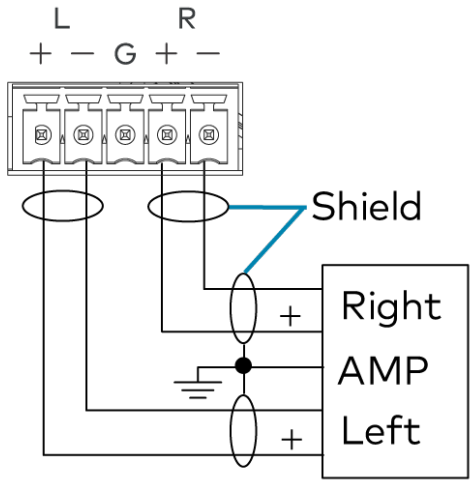
Balanced/Unbalanced Audio Output

Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

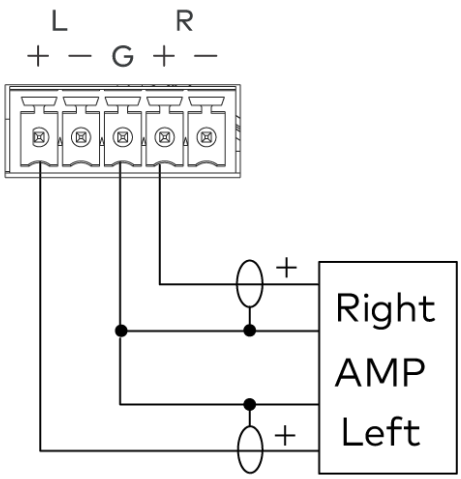
Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out

Pin Label	Balanced Wiring	Unbalanced Wiring
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

Balanced Output



Unbalanced Output



Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.
SETUP	Red	The SETUP button is pressed.
INPUT SEL 1-2	Green	The corresponding input is selected.
	Amber	The corresponding input is detected, but is not selected.
TX	Green	The device is in transmitter (encoder) mode.
RX	Green	The device is in receiver (decoder) mode.
OL	Green	The device is online with a control system.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.

LED Indicator	Color	Meaning
Ethernet 2 (350 and 351 only)	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2 LINK (352 only)	Green	An Ethernet link is established.
Ethernet 2 ACT (352 only)	Flashing green	Data activity is occurring on the Ethernet link.
Ethernet 3 LINK (350 and 351 only)	Green	An Ethernet link is established.
Ethernet 3 ACT (350 and 351 only)	Flashing green	Data activity is occurring on the Ethernet link.
HDMI OUT	Green	A video signal is being transmitted to the HDMI output.
HDMI INPUT 1-2	Green	A video signal is detected at the corresponding HDMI input.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

DM-NVX-360 and DM-NVX-363 Installation

Refer to the following sections to install the DM-NVX-360 and DM-NVX-363.

> **NOTE:** This topic covers the installation of the room box models only. Refer to Card Installation on page 338 for instructions on installing the DM-NVX-360C and DM-NVX-363C.

- In the Box on page 374
- Mount the Device on page 375
- Connect the Device on page 377
- Observe the LED Indicators on page 380
- Reset the Device on page 380

In the Box

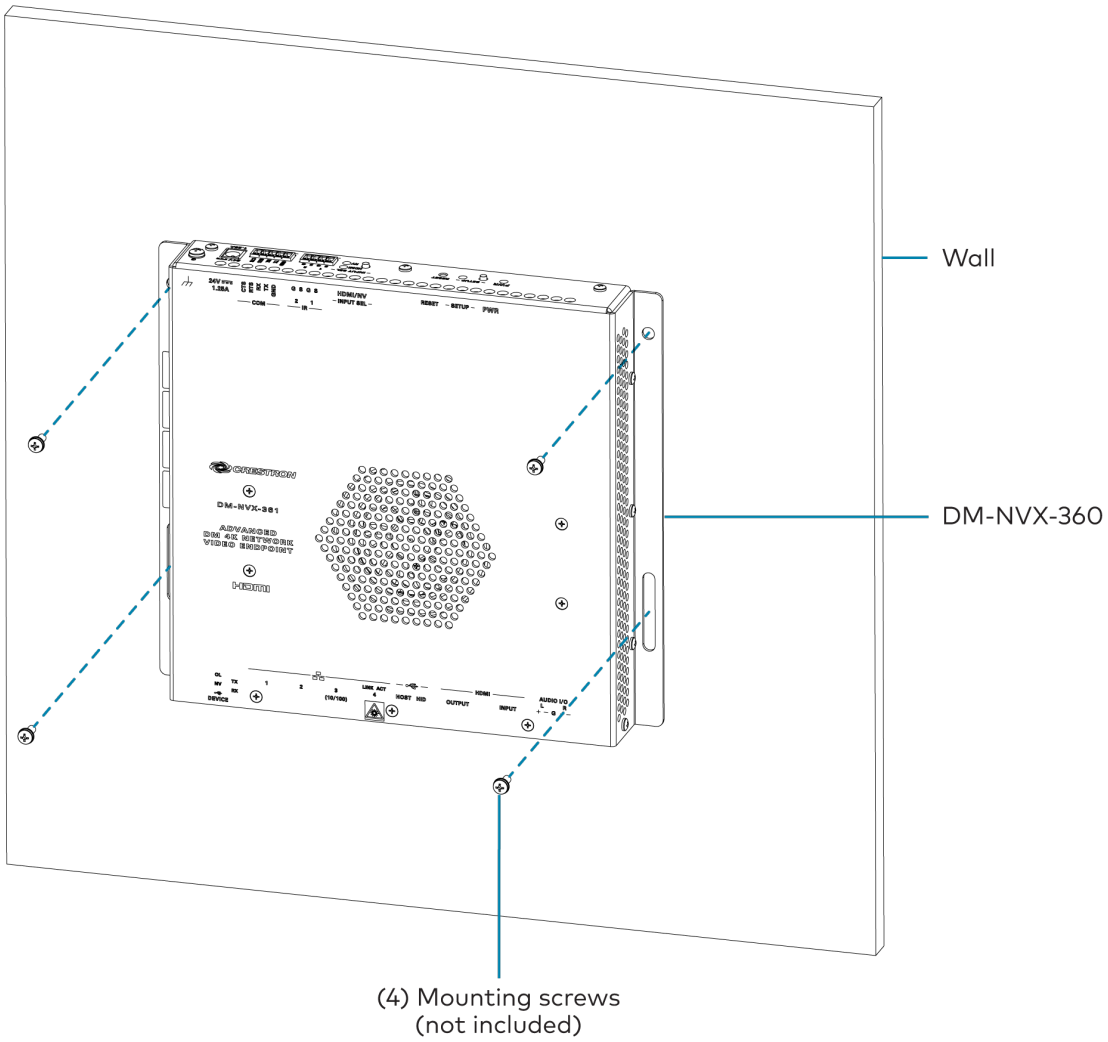
Qty.	Description
1	DM-NVX-360 or DM-NVX-363 Network AV Encoder/Decoder
	Additional Items
1	Connector, 4-pin (2003576)
2	Connector, 5-pin (2003577)

Mount the Device

The DM NVX device can be mounted onto a flat surface or rack rail.

Mount to a Surface

Using four surface-appropriate mounting screws (not included), mount the device onto a flat surface such as a wall or the underside of a table.

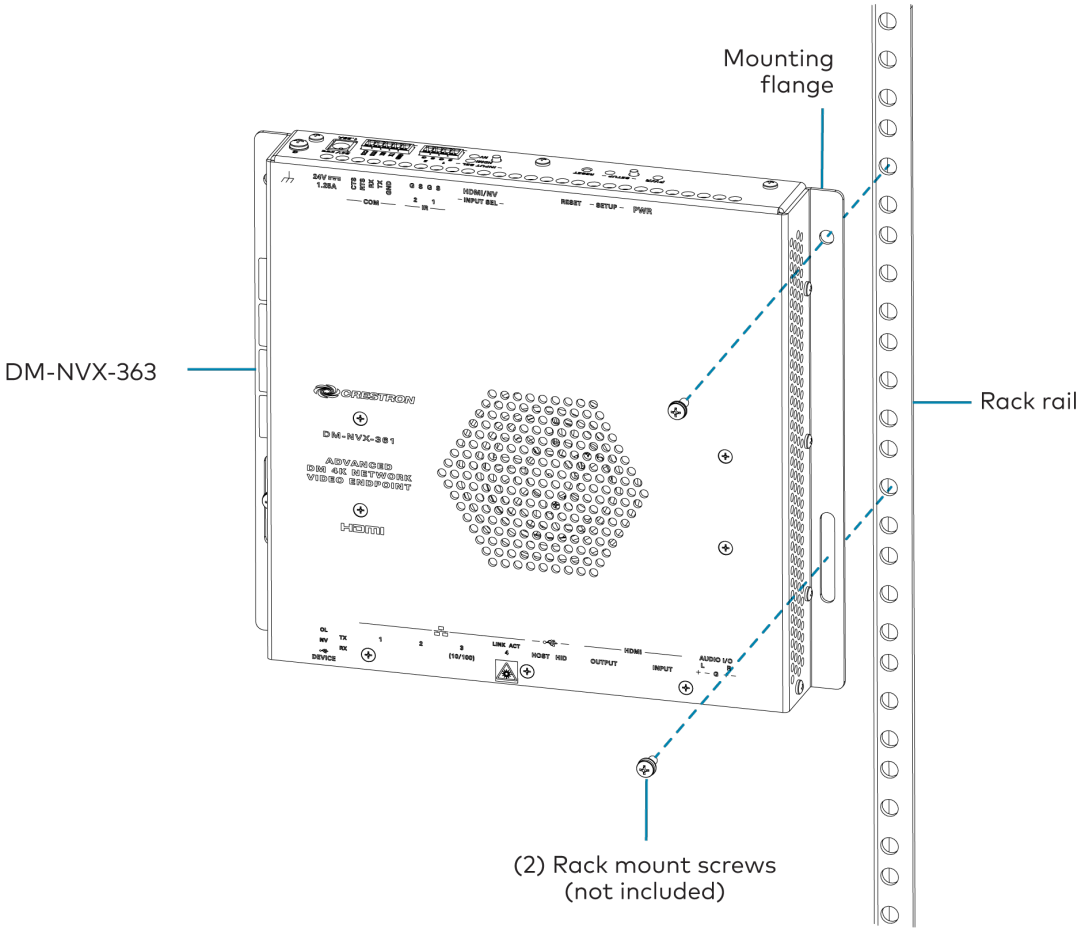


NOTE: Fan ventilation holes are provided on five sides of the device. If the installation necessitates that another object be positioned flush against the ventilation holes on one side of the device, leave a minimum clearance of 2 in. (51 mm) of space on all other sides containing ventilation holes.

Mount to a Rack Rail

The device can be mounted onto a front or rear rack rail. To mount the device:

1. Position either the left or right mounting flange so that the holes align with the holes in the rack rail.
2. Secure the device to the rack rail using two rack screws (not included).



Connect the Device

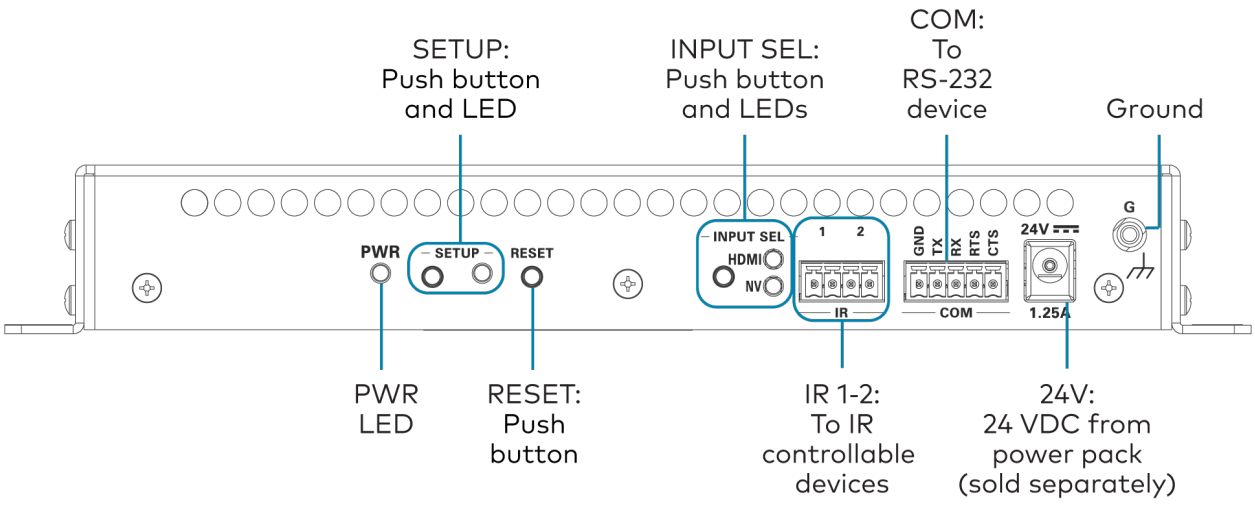
Connect the device as shown in the following illustrations.

NOTES:

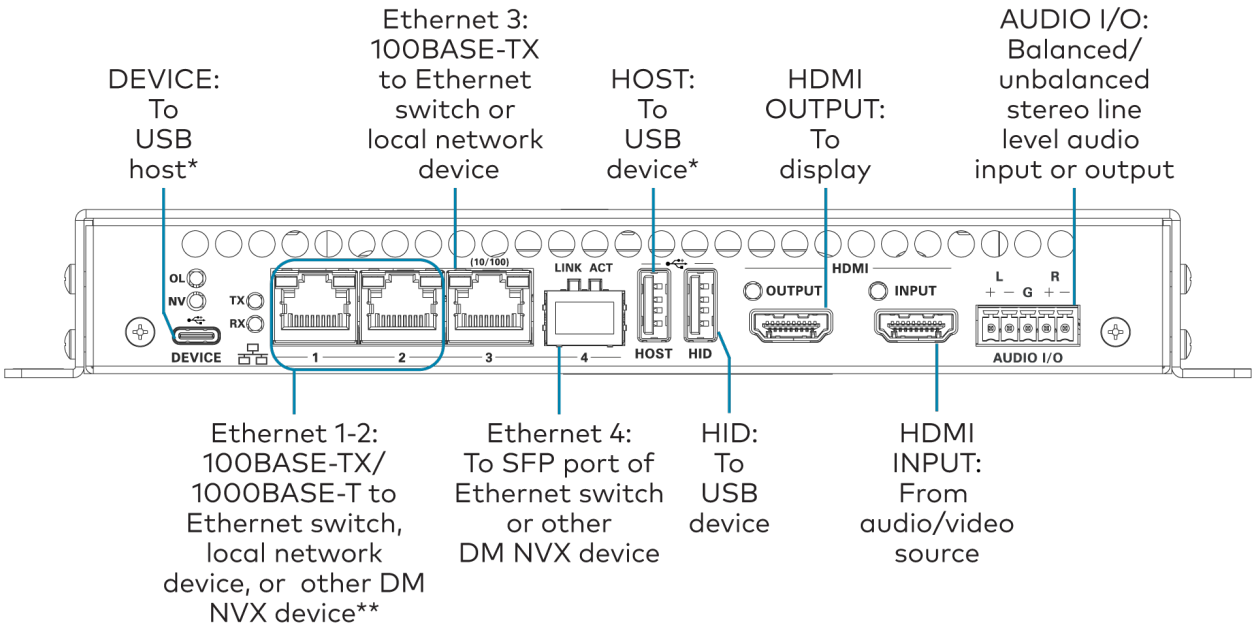
- The DM-NVX-360 and DM-NVX-363 each provide four Ethernet ports.
  - Ethernet port 1 is a 100BASE-TX/1000BASE-T port and a PoE+ powered device (PD) port. In order for the port to receive PoE+, it must be connected to PoE+ power sourcing equipment (PSE) such as a PoE++ compliant Ethernet switch or IEEE 802.3bt compliant injector.

    PoE++ or the optional PW-2412WU power pack can be used to power the device. Do not connect both types of power simultaneously.
  - Ethernet port 2 is a 100BASE-TX/1000BASE-T port.
  - Ethernet port 3 is a 100BASE-TX port that can be used to connect to a dedicated audio network or to a local network device.
  - Ethernet port 4 is an SFP port, which connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - Ethernet ports 1, 2, and 4 can be used to a connect to a 1000BASE-T Ethernet switch to stream network video.
  - Ethernet ports 1 and 2 can also be used to connect to a local network device as a courtesy port or to another DM NVX device for daisy chain applications.

Top Panel



Bottom Panel



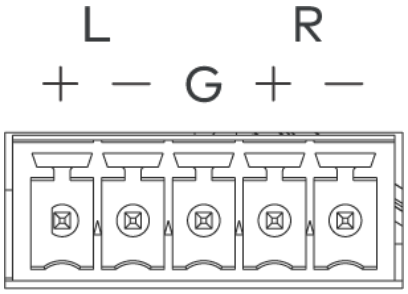
*The device can be configured to use either the **DEVICE** port or the **HOST** port. Both ports cannot be used simultaneously.

**Ethernet port 1 is a PoE+ powered device port.

Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio input or output.

AUDIO Connector

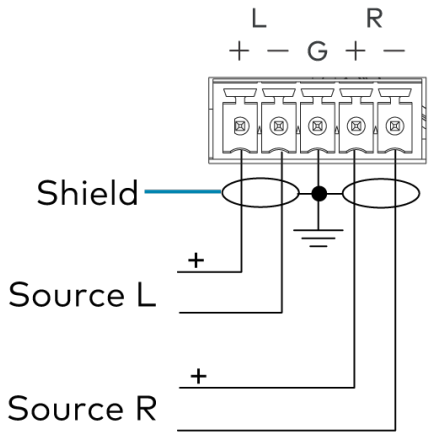


Balanced/Unbalanced Audio Input

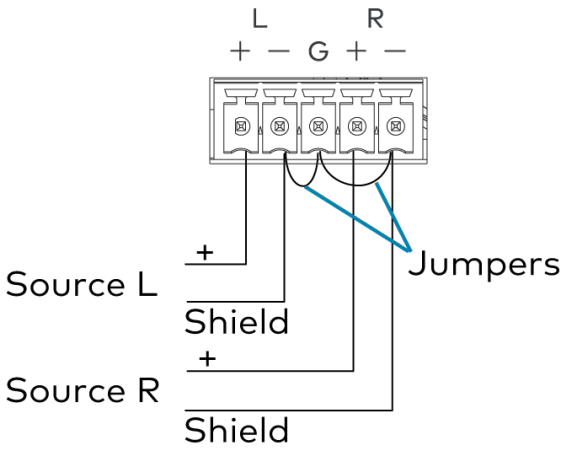
Refer to the following table and diagrams for balanced and unbalanced input pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ In
-	L-	L- Signal return, jumper to G
G	Shield/ground	Ground
+	R+	R+ In
-	R-	R- Signal return, jumper to G

Balanced Input



Unbalanced Input

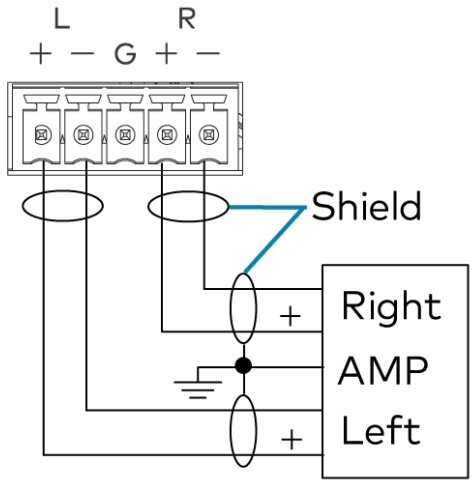


Balanced/Unbalanced Audio Output

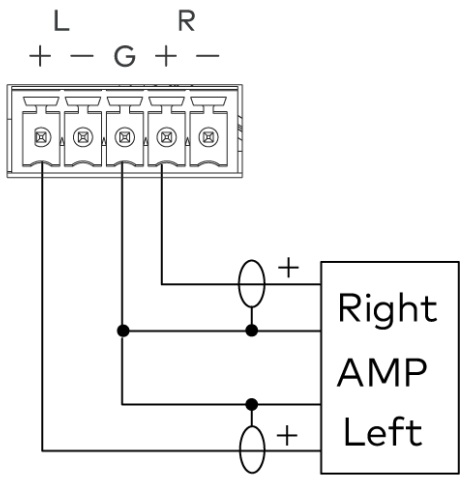
Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

Balanced Output



Unbalanced Output



Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.
SETUP	Red	The SETUP button is pressed.
INPUT SEL, HDMI	Green	The HDMI input is selected.
	Amber	An HDMI input is detected, but the HDMI input is not selected.
INPUT SEL, NV	Green	The NV (network video) input is selected.
	Amber	Network video is detected, but the NV input is not selected.
OL	Green	The device is online with a control system.
TX	Green	The device is in transmitter (encoder) mode.
RX	Green	The device is in receiver (decoder) mode.
NV	Green	(Transmitter mode only) The device is encoding (transmitting) network video. (Receiver mode only) The device is decoding (receiving) network video.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 3	Green	An Ethernet link is established.
	Flashing green	Data activity is occurring on the Ethernet link.
	Flashing amber	A 100BASE-TX link is established.
Ethernet 4 LINK	Green	An Ethernet link is established.
Ethernet 4 ACT	Flashing green	Data activity is occurring on the Ethernet link.
HDMI OUTPUT	Green	A video signal is being transmitted to the HDMI output.
HDMI INPUT	Green	A video signal is detected at the corresponding HDMI input.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

DM-NVX-384 and DM-NVX-385 Installation

Refer to the following sections to install the DM-NVX-384 and DM-NVX-385.

> **NOTE:** This topic covers the installation of the room box models only. Refer to Card Installation on page 338 for instructions on installing the DM-NVX-384C and DM-NVX-385C.

- In the Box on page 382
- Mount the Device on page 383
- Connect the Device on page 385
- Observe the LED Indicators on page 387
- Reset the Device on page 388

In the Box

Qty.	Description
1	DM-NVX-384 or DM-NVX-385 Network AV Encoder/Decoder
	Additional Items
4	Screw, 04-40 1/4 in. steel, black, pan-head Phillips (2007158)
2	Metal mounting bracket (2057347)
1	Connector, 3-pin (2058278)
1	Connector, 4-pin (2003576)
1	Connector, 5-pin (2003577)

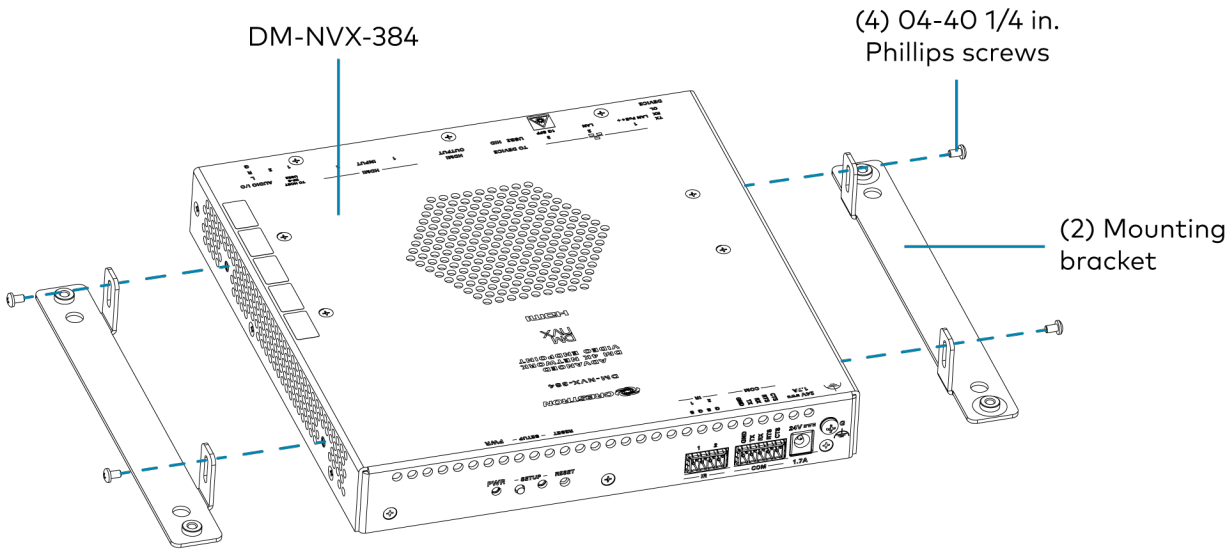
Mount the Device

The DM NVX device can be mounted onto a flat surface or rack rail.

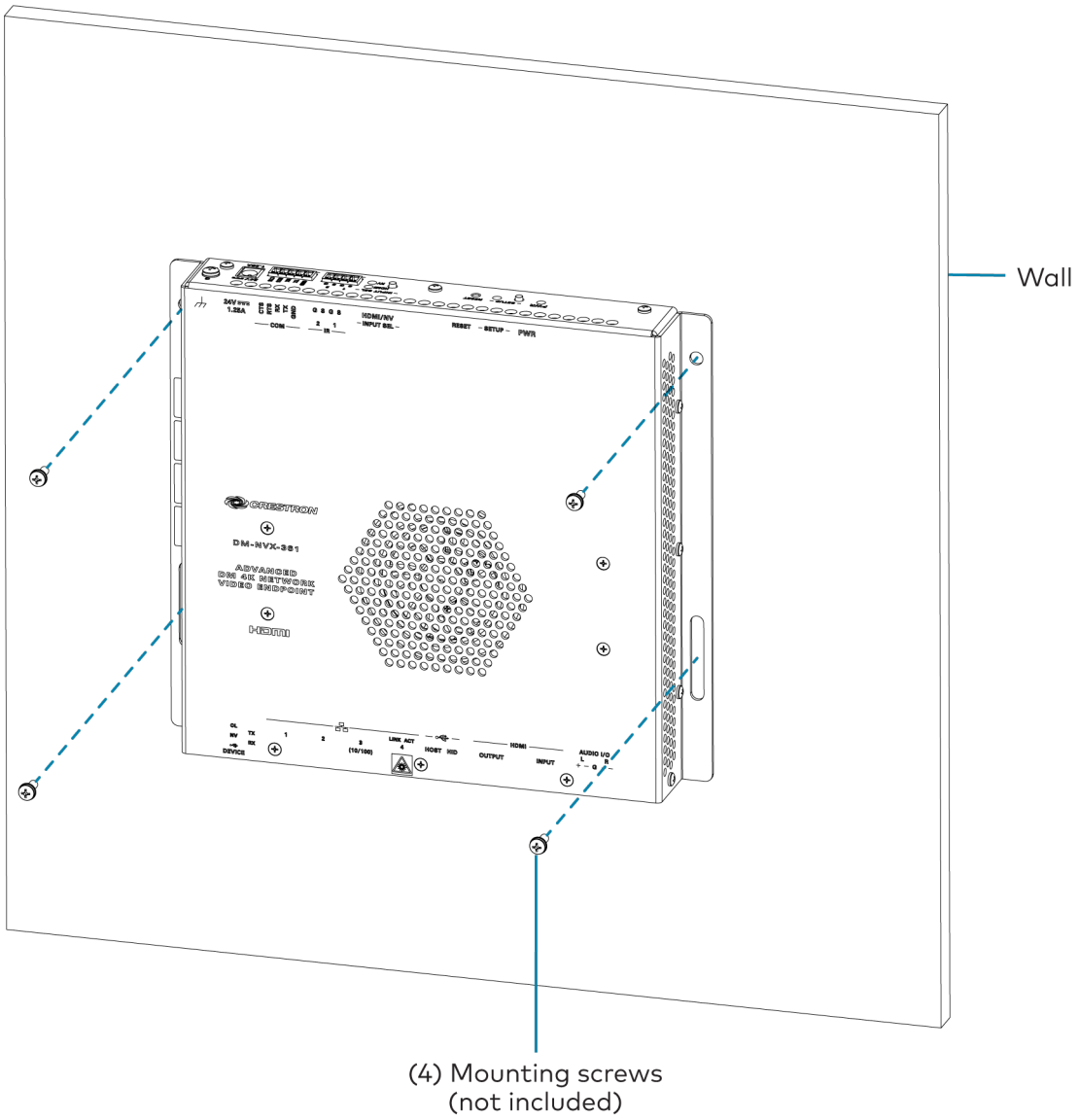
Mount to a Surface

To mount the device to a surface:

1. Use the four included 04-40 1/4 in. Phillips head screws to attach the two included mounting brackets to the sides of the device. Position the bracket so the flange of the bracket aligns with the rear panel of the device.



2. Using four appropriate mounting screws (not included), mount the device onto a flat surface such as a wall or the underside of a table.



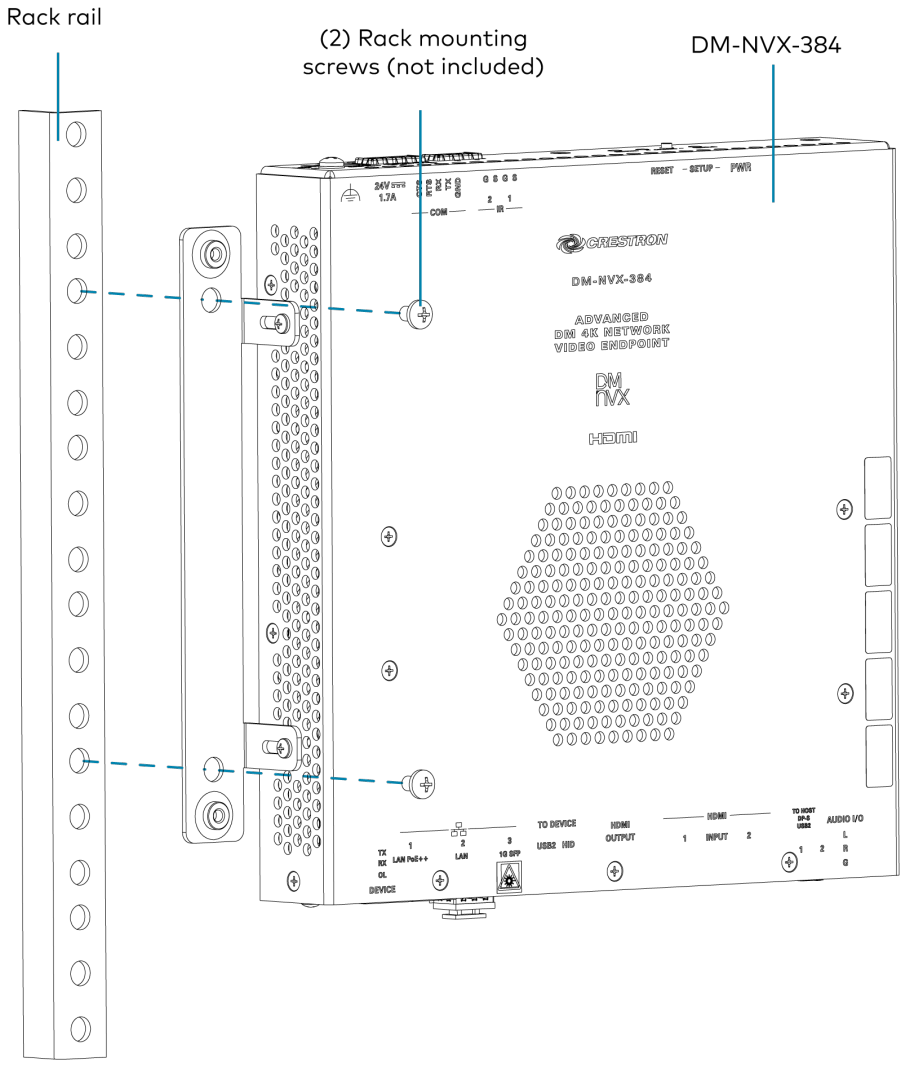
> **NOTE:** Fan ventilation holes are provided on five sides of the device. If the installation necessitates that another object be positioned flush against the ventilation holes on one side of the device, leave a minimum clearance of 2 in. (51 mm) of space on all other sides containing ventilation holes.

Mount to a Rack Rail

The device can be mounted onto a front or rear rack rail. To mount the device:

1. Use two of the included 04-40 1/4 in. Phillips head screws to attach one of the included mounting brackets to a side panel of the device.
2. Position the mounting bracket so that the holes align with the holes in the rack rail.

3. Secure the device to the rack rail using two rack screws (not included).



Connect the Device

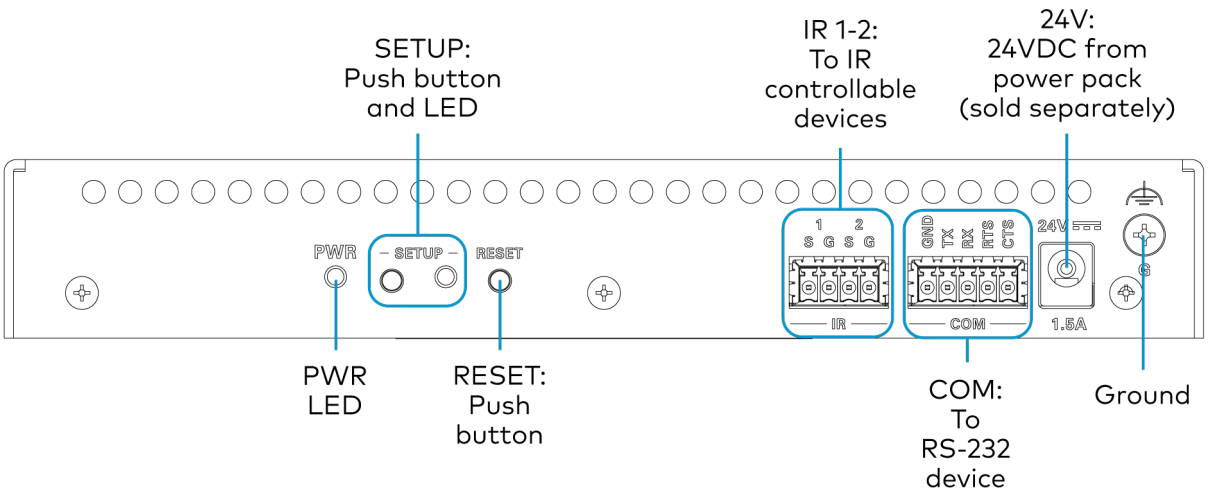
Connect the device as shown in the following illustrations.

> **NOTES:**

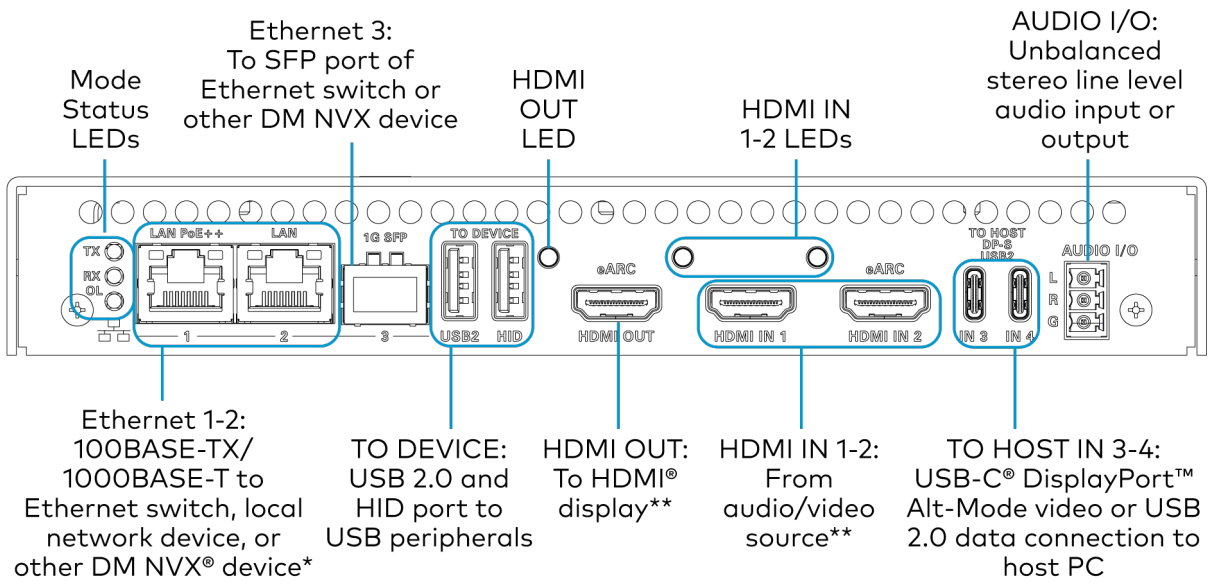
- The DM-NVX-384 and DM-NVX-385 each provide three Ethernet ports.
  - Ethernet port 1 is a 100BASE-TX/1000BASE-T port and a PoE++ powered device (PD) port. In order for the port to receive PoE++, it must be connected to PoE++ power sourcing equipment (PSE) such as a PoE++ compliant Ethernet switch or IEEE 802.3bt compliant injector.

    PoE++ or a PW-2420RU power pack (sold separately) can be used to power the device. Do not connect both types of power simultaneously.
  - Ethernet port 2 is a 100BASE-TX/1000BASE-T port.
  - Ethernet port 3 is an SFP port, which connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - All Ethernet ports can be used to a connect to a 1000BASE-T Ethernet switch to stream network video.
  - Ethernet ports 1 and 2 can also be used to connect to a local network device as a courtesy port or to another DM NVX device for daisy chain applications.

Top Panel



Bottom Panel



*Ethernet port 1 is a PoE++ powered device port.

**eARC functionality is reserved for future use.

Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.
SETUP	Red	The SETUP button is pressed.
OL	Green	The device is online with a control system.
TX	Green	The device is in transmitter (encoder) mode.
RX	Green	The device is in receiver (decoder) mode.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 3 LINK	Green	An Ethernet link is established.
Ethernet 3 ACT	Flashing green	Data activity is occurring on the Ethernet link.
HDMI OUT	Green	A video signal is being transmitted to the HDMI output.
HDMI IN 1	Green	A video signal is detected at the HDMI input.
HDMI IN 2	Green	A video signal is detected at the HDMI input.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

> **CAUTION:** These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

DM-NVX-D10, DM-NVX-D20, DM-NVX-E10, and DM-NVX-E20 Installation

Refer to the following sections to install the DM-NVX-D10, DM-NVX-D20, DM-NVX-E10, or DM-NVX-E20.

- In the Box on page 389
- Mount the Device on page 390
- Connect the Device on page 391
- Observe the LED Indicators on page 393
- Reset the Device on page 393

In the Box

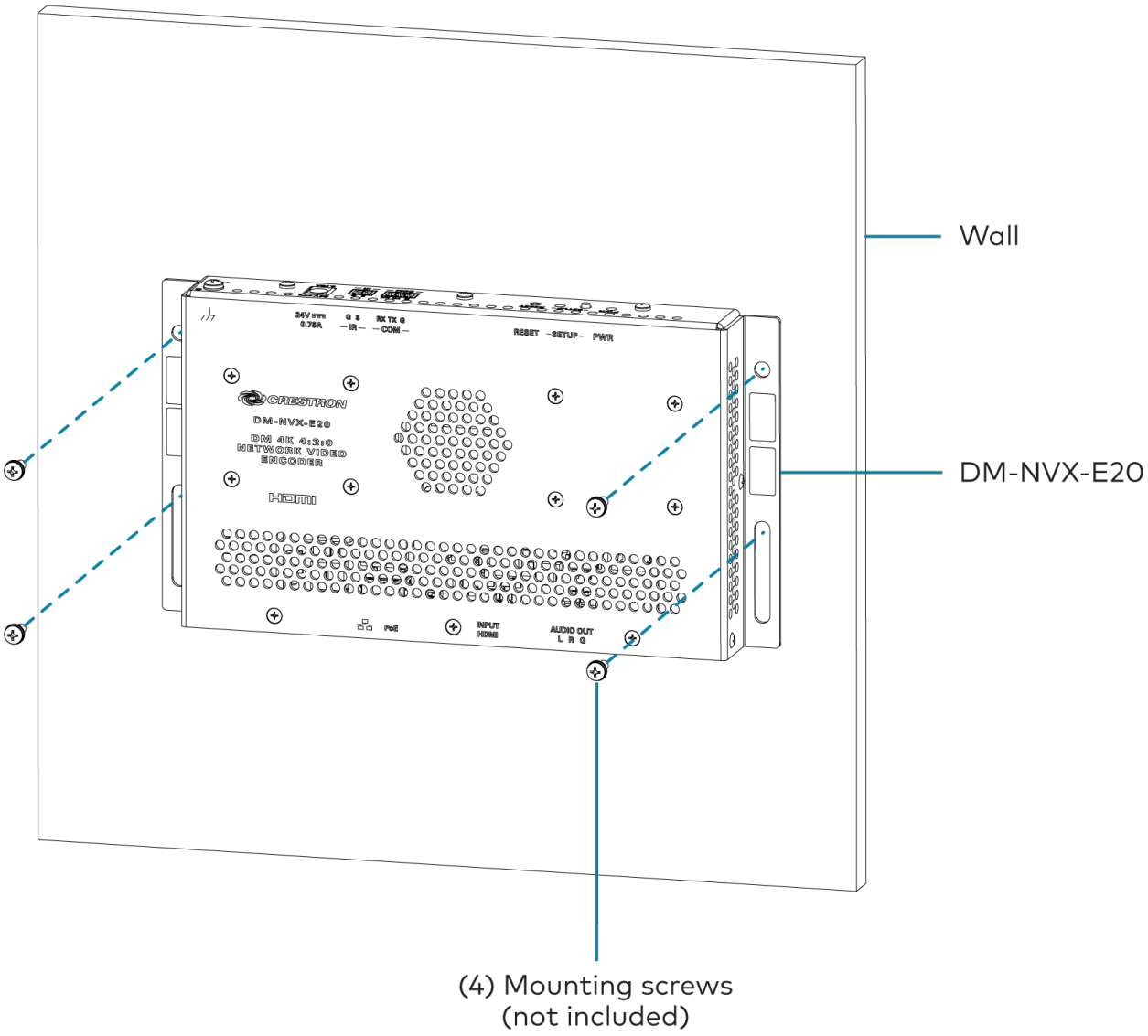
Qty.	Description
1	DM-NVX-D10 or DM-NVX-D20 Network AV Decoder, or DM-NVX-E10 or DM-NVX-E20 Network AV Encoder
	Additional Items
1	2-pin connector (2003574)
2	3-pin connector (2003575)

Mount the Device

The DM NVX device can be mounted onto a flat surface or rack rail.

Mount to a Surface

Using four surface-appropriate mounting screws (not included), mount the device onto a flat surface such as a wall or the underside of a table. The screw diameter should be no more than 0.25 in. (6 mm). The DM-NVX-E20 is shown in the illustration below.

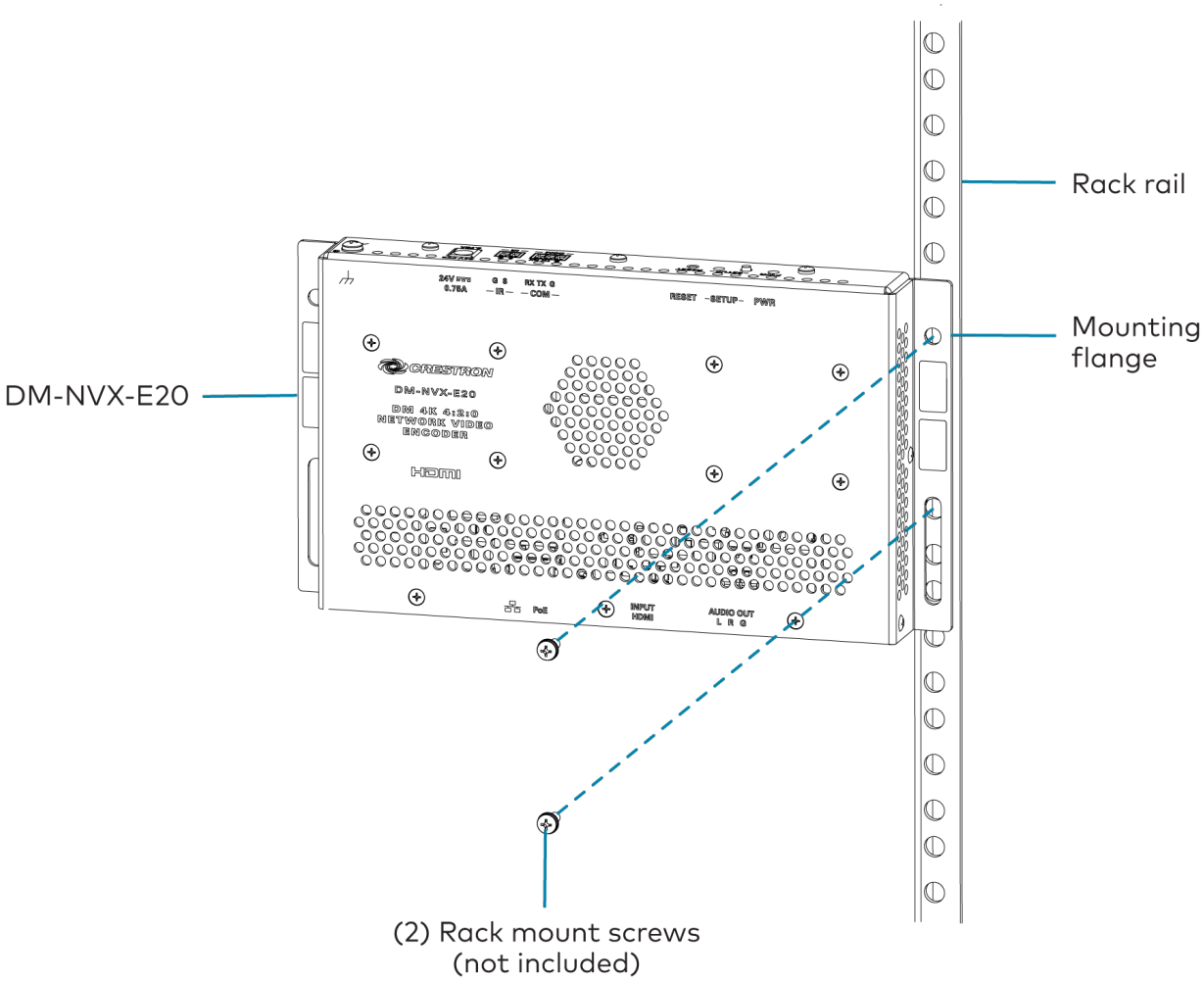


NOTE: Fan ventilation holes are provided on five sides of the device. If the installation necessitates that another object be positioned flush against the ventilation holes on one side of the device, leave a minimum clearance of 2 in. (51 mm) of space on all other sides containing ventilation holes.

Mount to a Rack Rail

The device can be mounted onto a front or rear rack rail. To mount the device:

1. Position either the left or right mounting flange so that the holes align with the holes in the rack rail.
2. Using two rack mounting screws (not included), mount the left or right mounting flange of the device to the front or rear rail of a rack. The DM-NVX-E20 is shown in the illustration below.



Connect the Device

Connect the device as shown in the following illustrations.

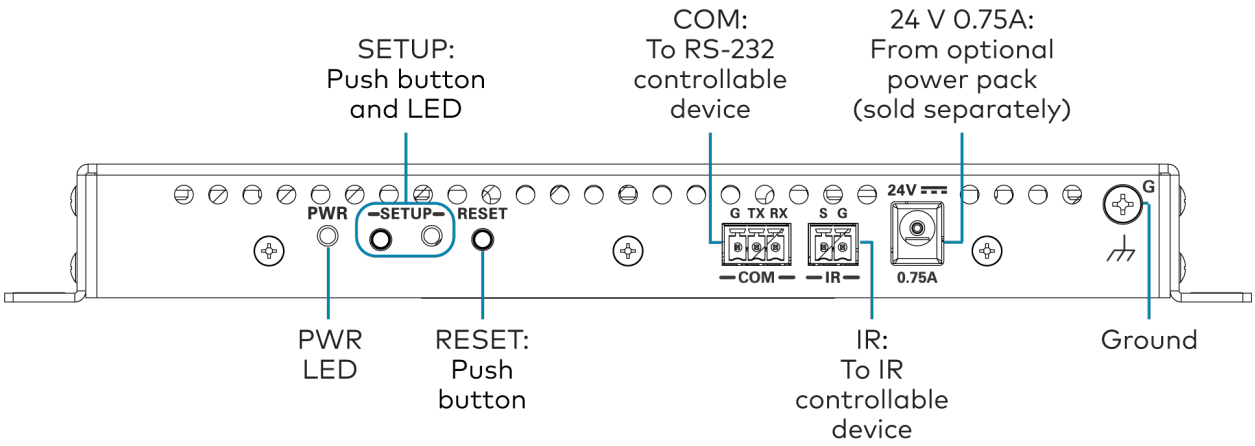
NOTES:

- The Ethernet port must be connected to a 1000BASE-T switch in order to stream network video.

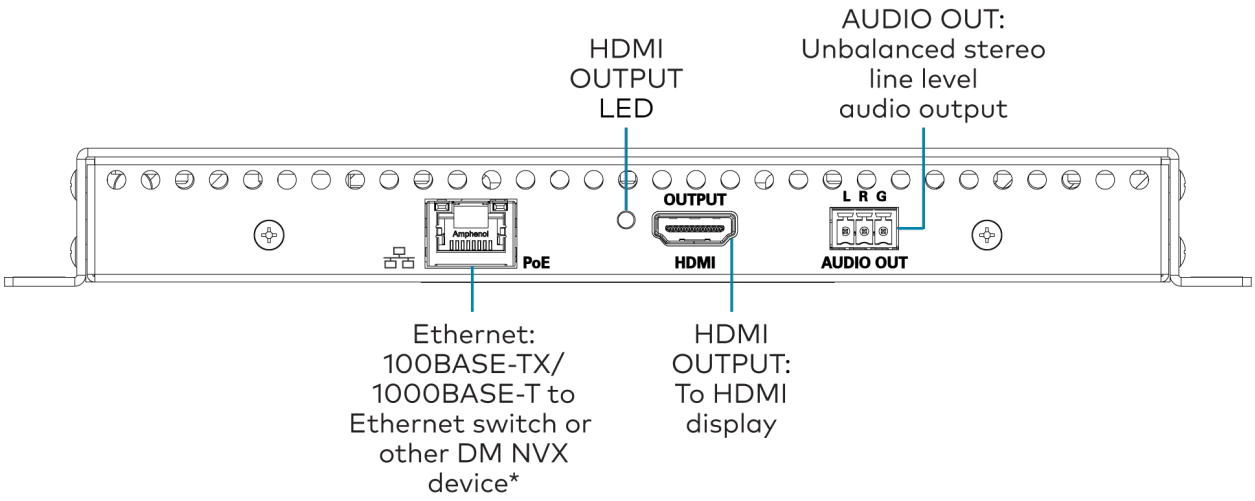
- The DM-NVX-D10, DM-NVX-D20, DM-NVX-E10, and DM-NVX-E20 can be powered via the Ethernet port, which is a PoE powered device (PD) port. In order for the device to receive PoE, the Ethernet port must be connected to a PoE power sourcing equipment (PSE) port of an Ethernet switch.

  Alternatively, the devices can be powered by a 24VDC power pack (sold separately).

Top Panel

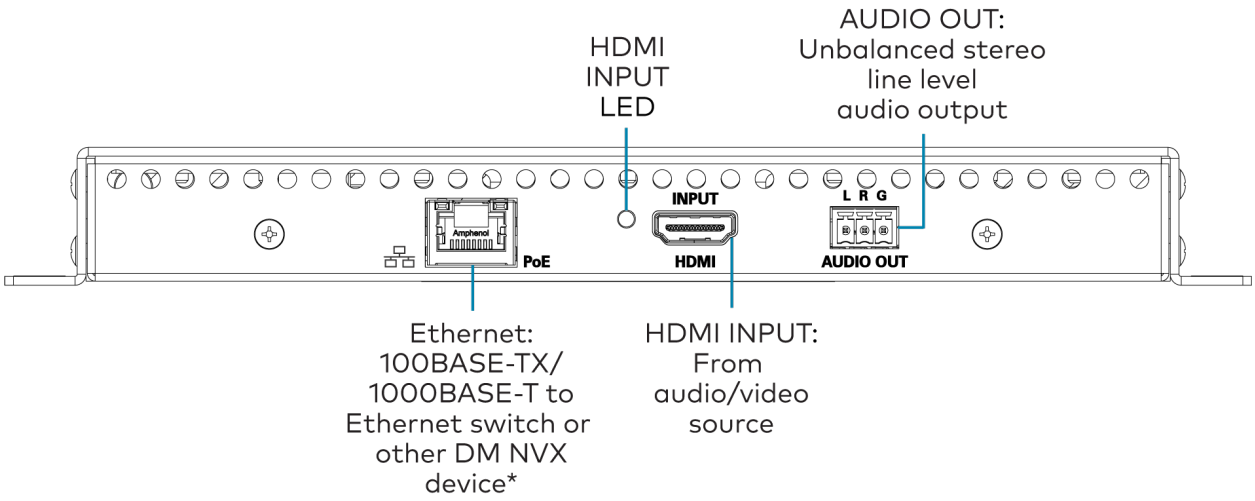


DM-NVX-D10 and DM-NVX-D20 Bottom Panel



*The Ethernet port is a PoE powered device port.

DM-NVX-E10 and DM-NVX-E20 Bottom Panel



*The Ethernet port is a PoE powered device port.

Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.
SETUP	Red	The SETUP button is pressed.
Ethernet	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
HDMI INPUT (DM-NVX-E10 and DM-NVX-E20 only)	Green	A video signal is detected at the HDMI input.
HDMI OUTPUT (DM-NVX-D10 and DM-NVX-D20 only)	Green	A video signal is being transmitted to the HDMI output.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

DM-NVX-D200 Installation

Refer to the following sections to install the DM-NVX-D200.

- In the Box on page 395
- Mount the Device on page 396
- Connect the Device on page 398
- Observe the LED Indicators on page 399
- Reset the Device on page 400

In the Box

Qty.	Description
1	DM-NVX-D200 Network AV Decoder

	Additional Items
1	2-pin connector (2003574)
2	3-pin connector (2003575)

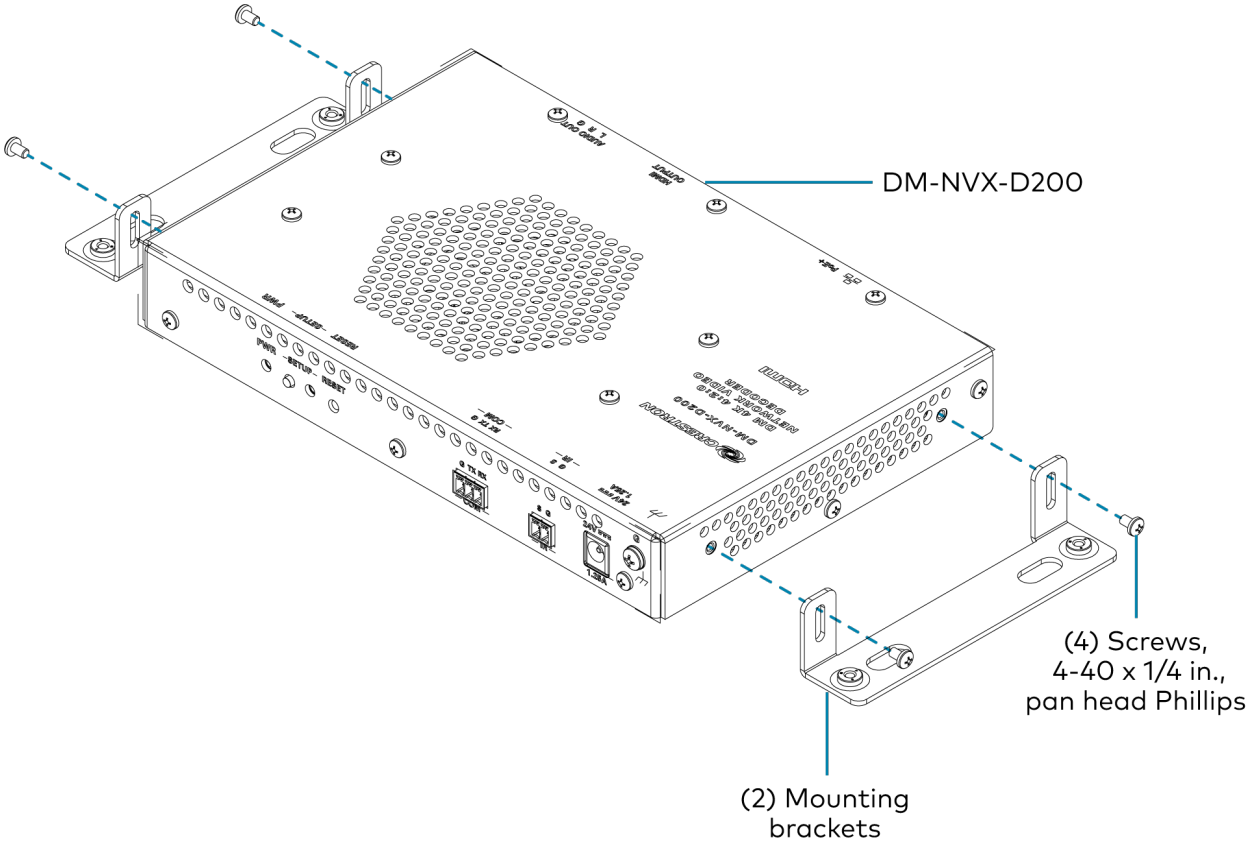
Mount the Device

The DM-NVX-D200 device can be mounted onto a flat surface or rack rail.

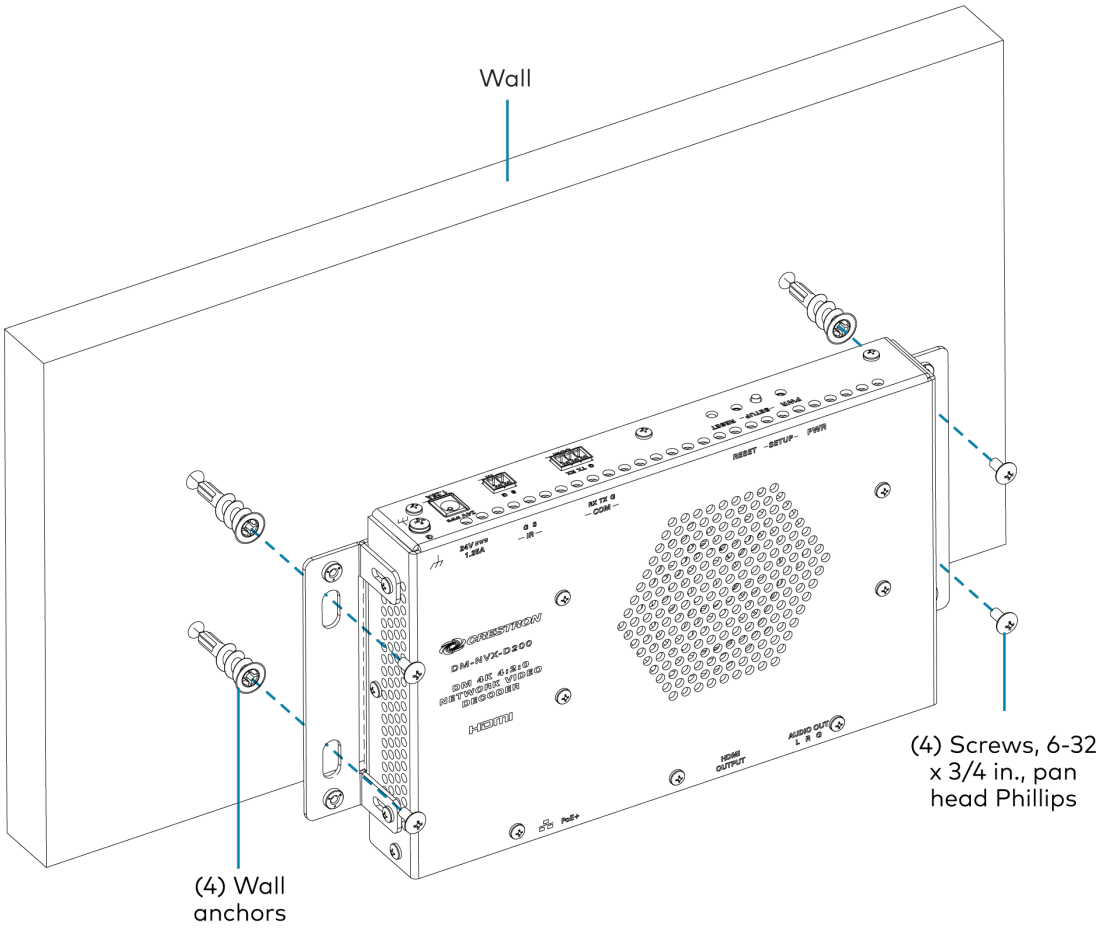
Mount to a Surface

To mount the DM-NVX-D200 to a surface:

1. Use the four included 04-40 1/4 in. Phillips head screws to attach the two included mounting brackets to the sides of the device. Position the bracket so the flange of the bracket aligns with the rear panel of the device.



2. Using the four included wall anchors (if necessary) and four surface-mounting 06-32 screws, mount the device onto a flat surface such as a wall or the underside of a table.



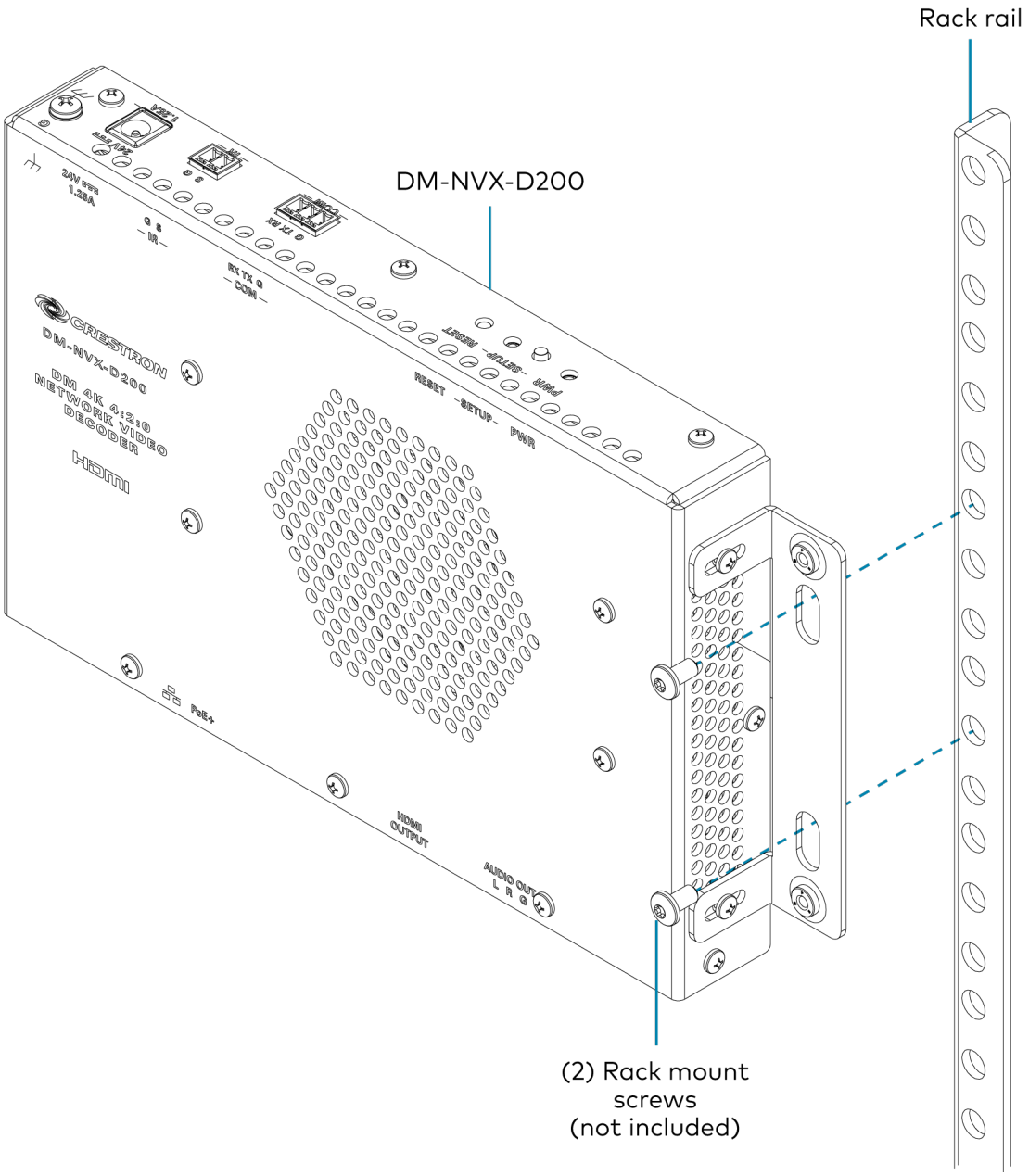
> **NOTE:** Fan ventilation holes are provided on five sides of the device. If the installation necessitates that another object be positioned flush against the ventilation holes on one side of the device, leave a minimum clearance of 2 in. (51 mm) of space on all other sides containing ventilation holes.

Mount to a Rack Rail

To mount the DM-NVX-D200 to a rack rail:

1. Use two of the included 04-40 1/4 in. Phillips head screws to attach one of the included mounting brackets to a side panel of the device.
2. Position the mounting bracket so that the holes align with the holes in the rack rail.

3. Secure the device to the rack rail using two rack screws (not included).



Connect the Device

Connect the device as shown in the following illustrations.

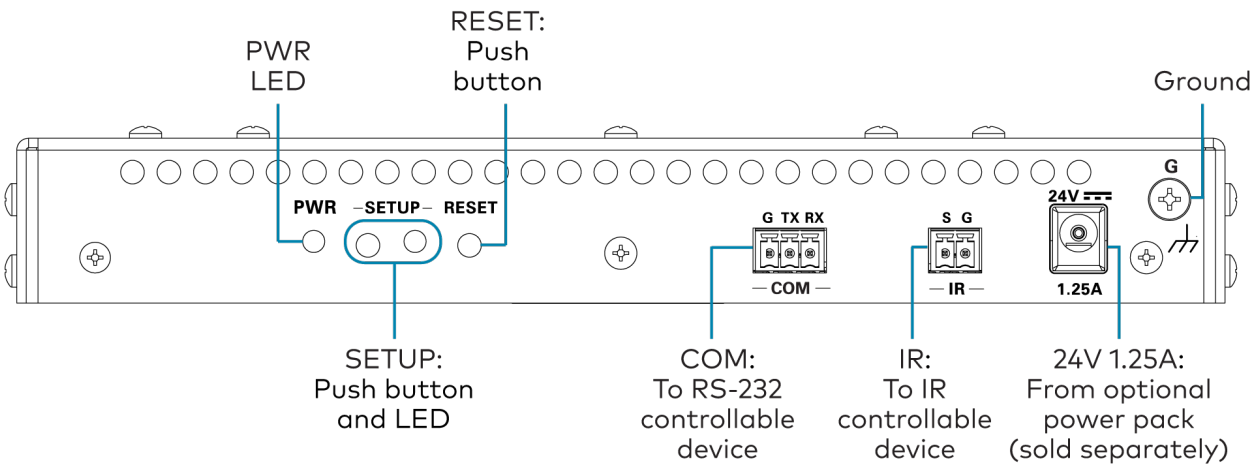
NOTES:

- The Ethernet port must be connected to a 1000BASE-T switch in order to stream network video.

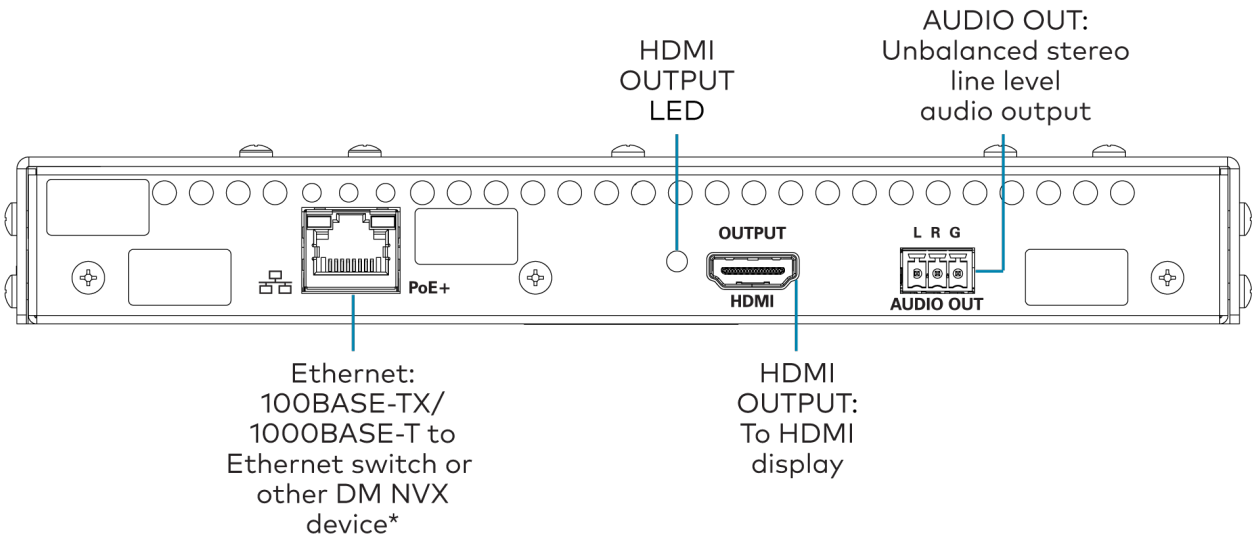
- The DM-NVX-D200 can be powered via the Ethernet port, which is a PoE+ powered device (PD) port. In order for the device to receive PoE+, the Ethernet port must be connected to a PoE+ power sourcing equipment (PSE) port of an Ethernet switch.

  Alternatively, the devices can be powered by a 24VDC power pack (sold separately).

Top Panel



Bottom Panel



*The Ethernet port is a PoE+ powered device port.

Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.

LED Indicator	Color	Meaning
SETUP	Red	The SETUP button is pressed.
Ethernet	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
HDMI OUTPUT	Green	A video signal is being transmitted to the HDMI output.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

DM-NVX-D30 and DM-NVX-E30 Installation

Refer to the following sections to install the DM-NVX-D30 or DM-NVX-E30.

> **NOTE:** This topic covers the installation of the room box models only. Refer to Card Installation on page 338 for instructions on installing the DM-NVX-D30C and DM-NVX-E30C.

- In the Box on page 401
- Mount the Device on page 402
- Connect the Device on page 404
- Observe the LED Indicators on page 406
- Reset the Device on page 406

In the Box

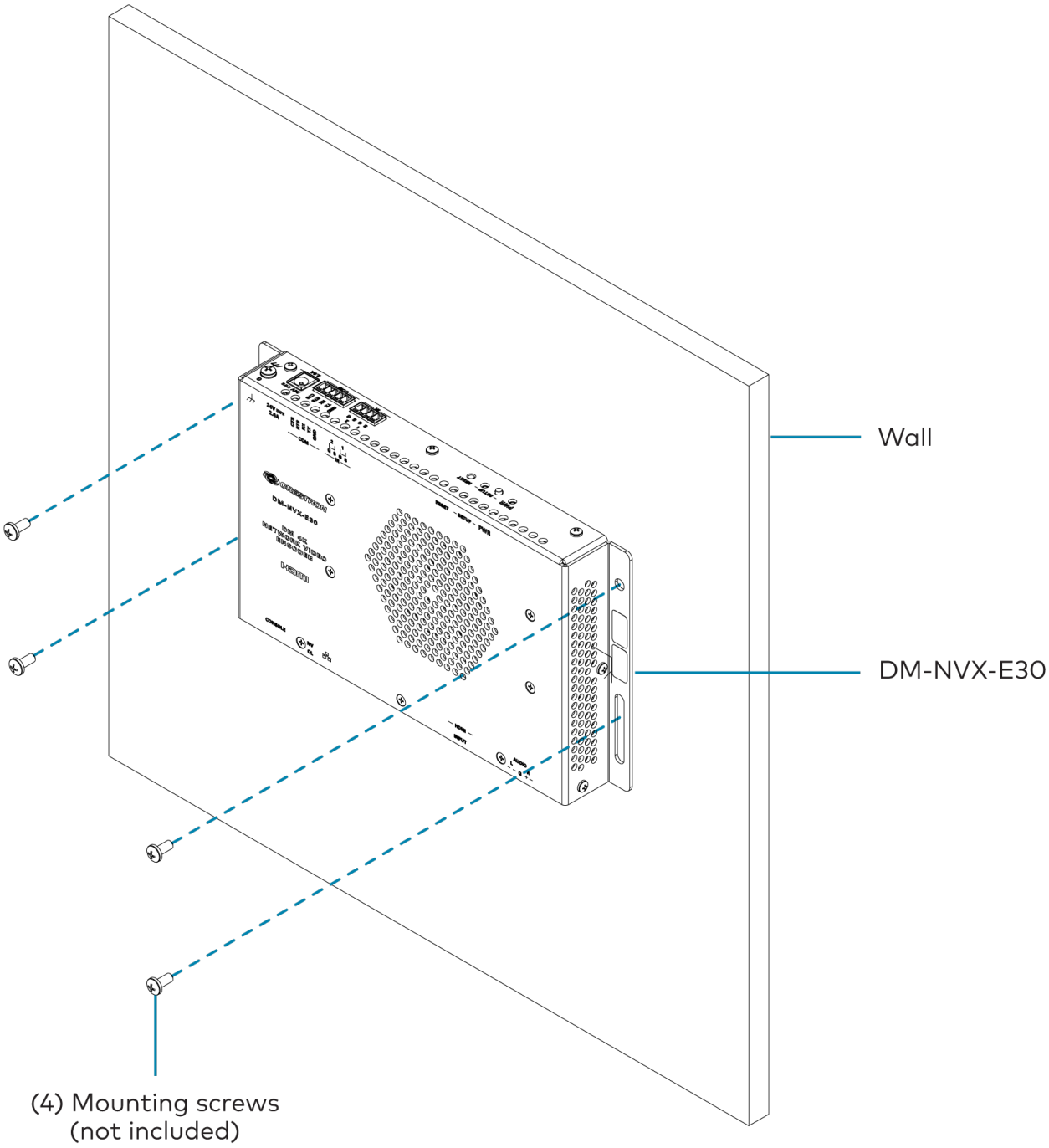
Qty.	Description
1	DM-NVX-D30 Network AV Decoder or DM-NVX-E30 Network AV Encoder
	Additional Items
1	4-pin connector (2003576)
2	5-pin connector (2003577)

Mount the Device

The DM NVX device can be mounted onto a flat surface or rack rail.

Mount to a Surface

Using four surface-appropriate mounting screws (not included), mount the device onto a flat surface such as a wall or the underside of a table. The screw diameter should be no more than 0.25 in. (6 mm). The DM-NVX-E30 is shown in the illustration below.

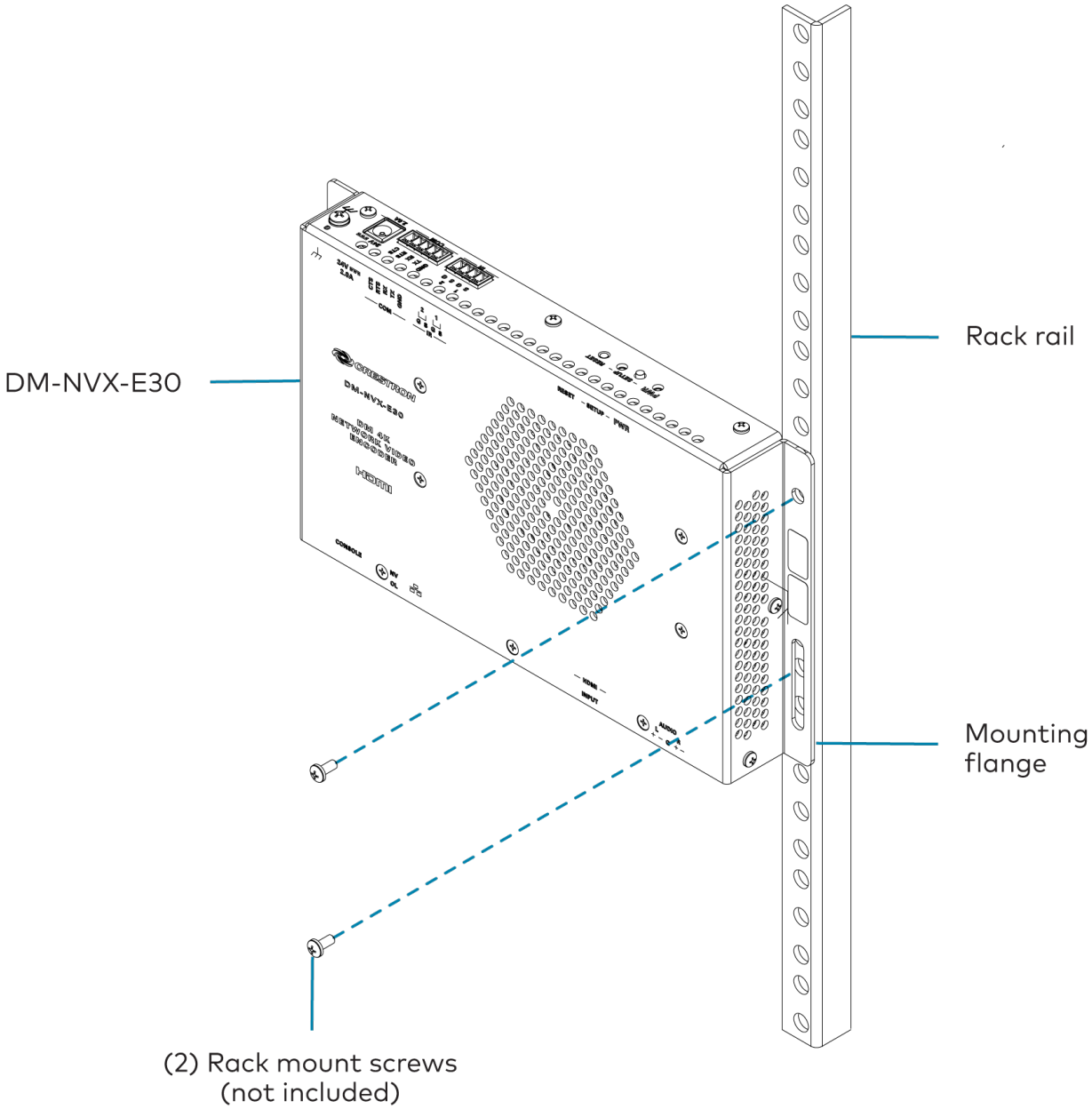


NOTE: Fan ventilation holes are provided on five sides of the device. If the installation necessitates that another object be positioned flush against the ventilation holes on one side of the device, leave a minimum clearance of 2 in. (51 mm) of space on all other sides containing ventilation holes.

Mount to a Rack Rail

The device can be mounted onto a front or rear rack rail. To mount the device:

1. Position either the left or right mounting flange so that the holes align with the holes in the rack rail.
2. Using two rack mounting screws (not included), mount the left or right mounting flange of the device to the front or rear rail of a rack. The DM-NVX-E30 is shown in the illustration below.



Connect the Device

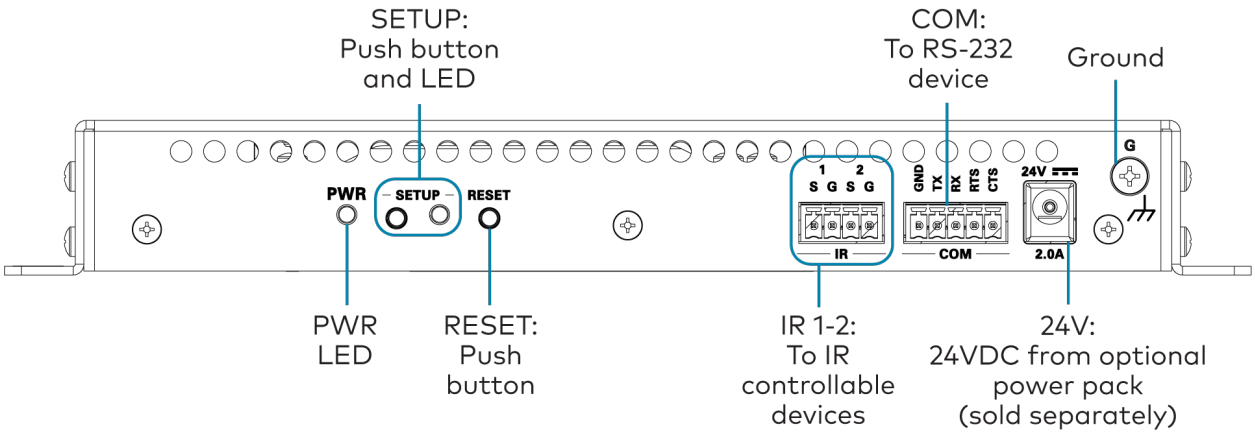
Connect the device as shown in the following illustrations.

NOTES:

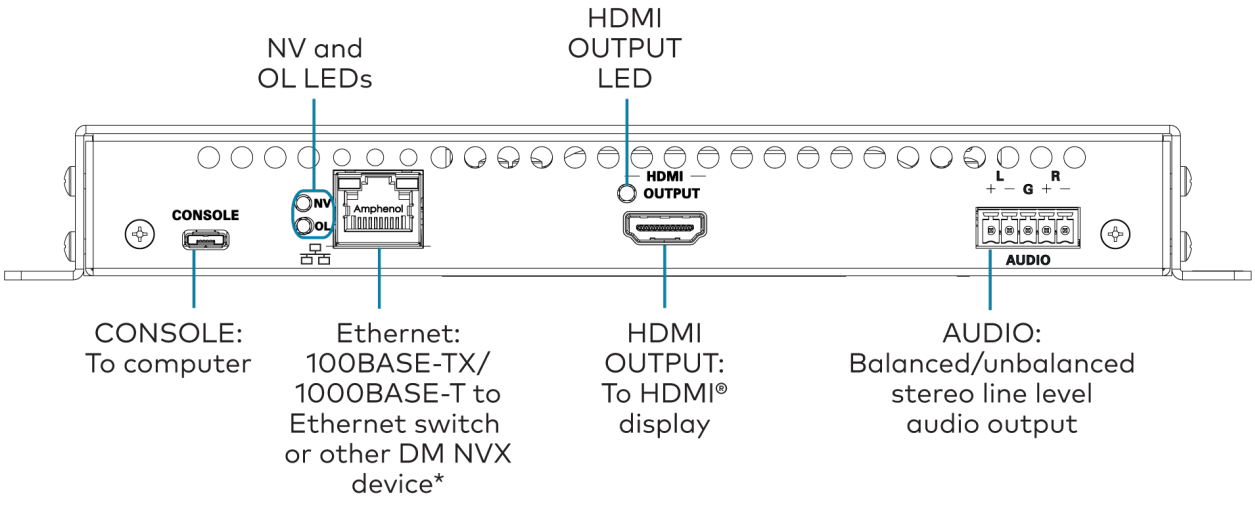
- The Ethernet port must be connected to a 1000BASE-T switch in order to stream network video.
- The DM-NVX-D30 and DM-NVX-E30 can be powered via the Ethernet port, which is a PoE+ powered device (PD) port. In order for the device to receive PoE+, the Ethernet port must be connected to a PoE+ port of an Ethernet switch.

  Alternatively, the devices can be powered by a 24VDC power pack (sold separately).

DM-NVX-D30 and DM-NVX-E30 Top Panel

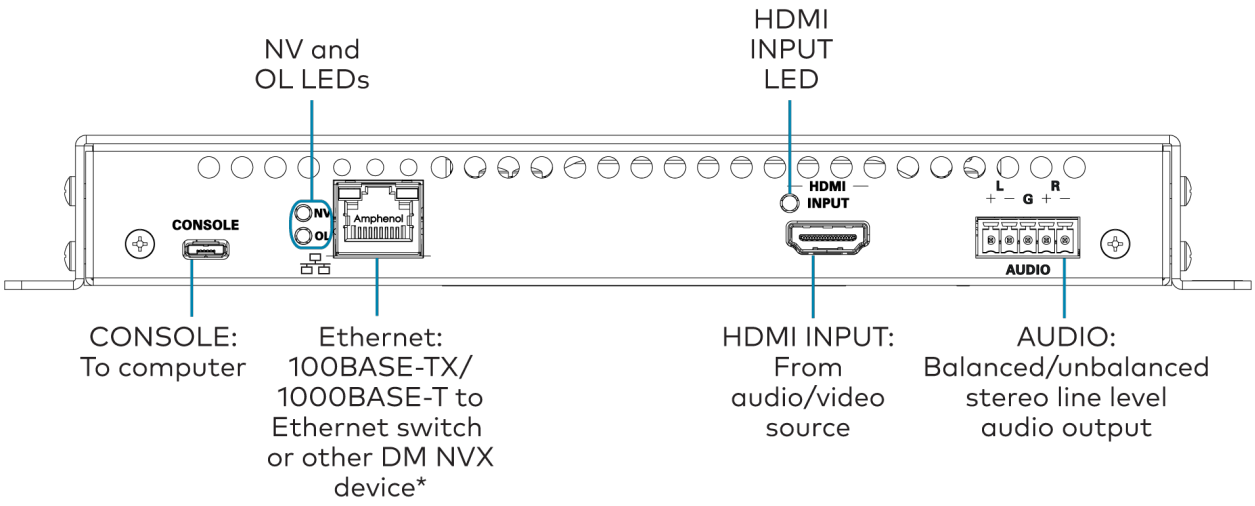


DM-NVX-D30 Bottom Panel



*The Ethernet port is a PoE+ powered device port.

DM-NVX-E30 Bottom Panel

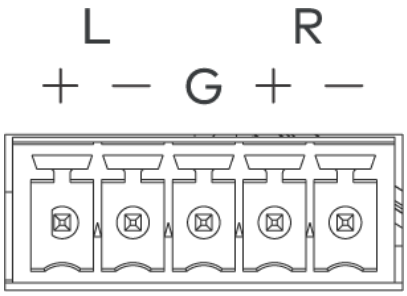


*The Ethernet port is a PoE+ powered device port.

Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio output.

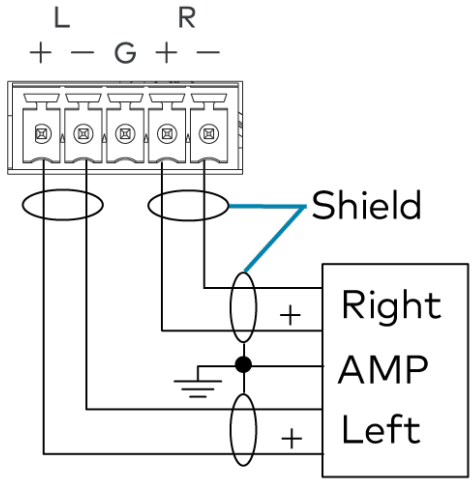
AUDIO Connector



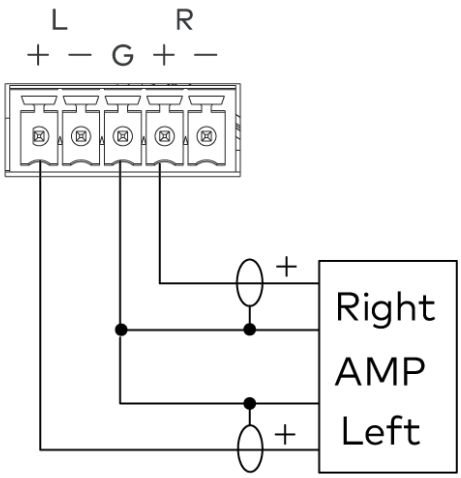
Refer to the following table and diagrams for balanced and unbalanced pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+
-	R-	Open

Balanced Output



Unbalanced Output



Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.
SETUP	Red	The SETUP button is pressed.
NV	Green	(DM-NVX-E30 only) The device is encoding (transmitting) network video. (DM-NVX-D30only) The device is decoding (receiving) network video.
OL	Green	The device is online with a control system.
Ethernet	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
HDMI INPUT (DM-NVX-E30 only)	Green	A video signal is detected at the HDMI input.
HDMI OUTPUT (DM-NVX-D30 only)	Green	A video signal is being transmitted to the HDMI output.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

DM-NVX-E760 Installation

Refer to the following sections to install the DM-NVX-E760.

> **NOTE:** This topic covers the installation of the room box model only. Refer to Card Installation on page 338 for instructions on installing the DM-NVX-E760C.

- In the Box on page 408
- Mount the Device on page 409
- Connect the Device on page 412
- Observe the LED Indicators on page 414
- Reset the Device on page 414

In the Box

Qty.	Description
1	DM-NVX-E760 Network AV Encoder/Decoder

	Additional Items
1	Power pack, 24VDC, 2.5A, 100-240VAC (2045873)
2	Power cord, 5 ft 10 in. (1.78 m) (2042043)
1	Connector, 5-pin (2003577)

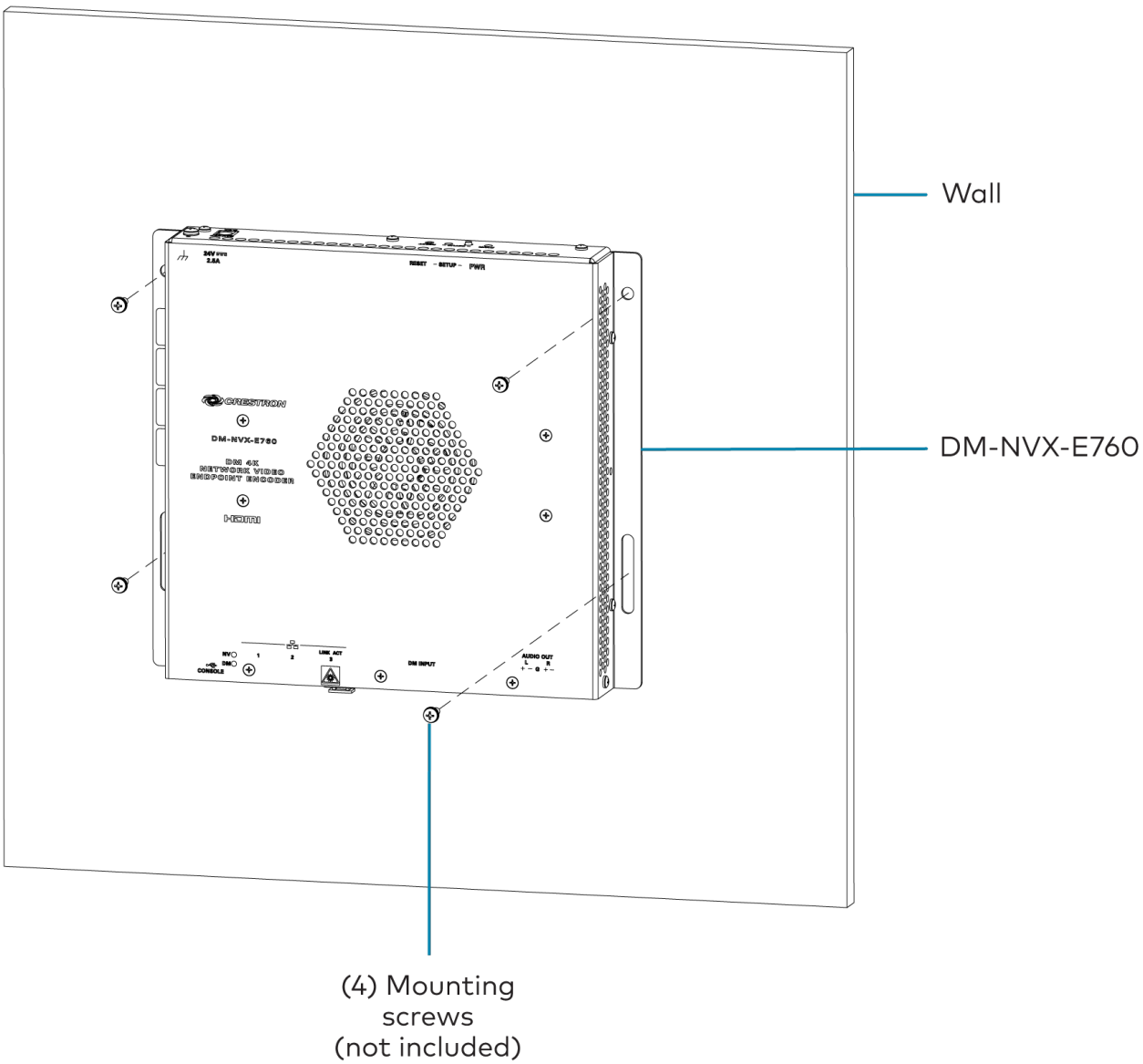
Mount the Device

The DM-NVX-E760 can be mounted onto a flat surface or rack rail.

Mount to a Surface

To mount the DM-NVX-E760 to a surface:

Using four surface-appropriate mounting screws (not included), mount the device onto a flat surface such as a wall or the underside of a table.



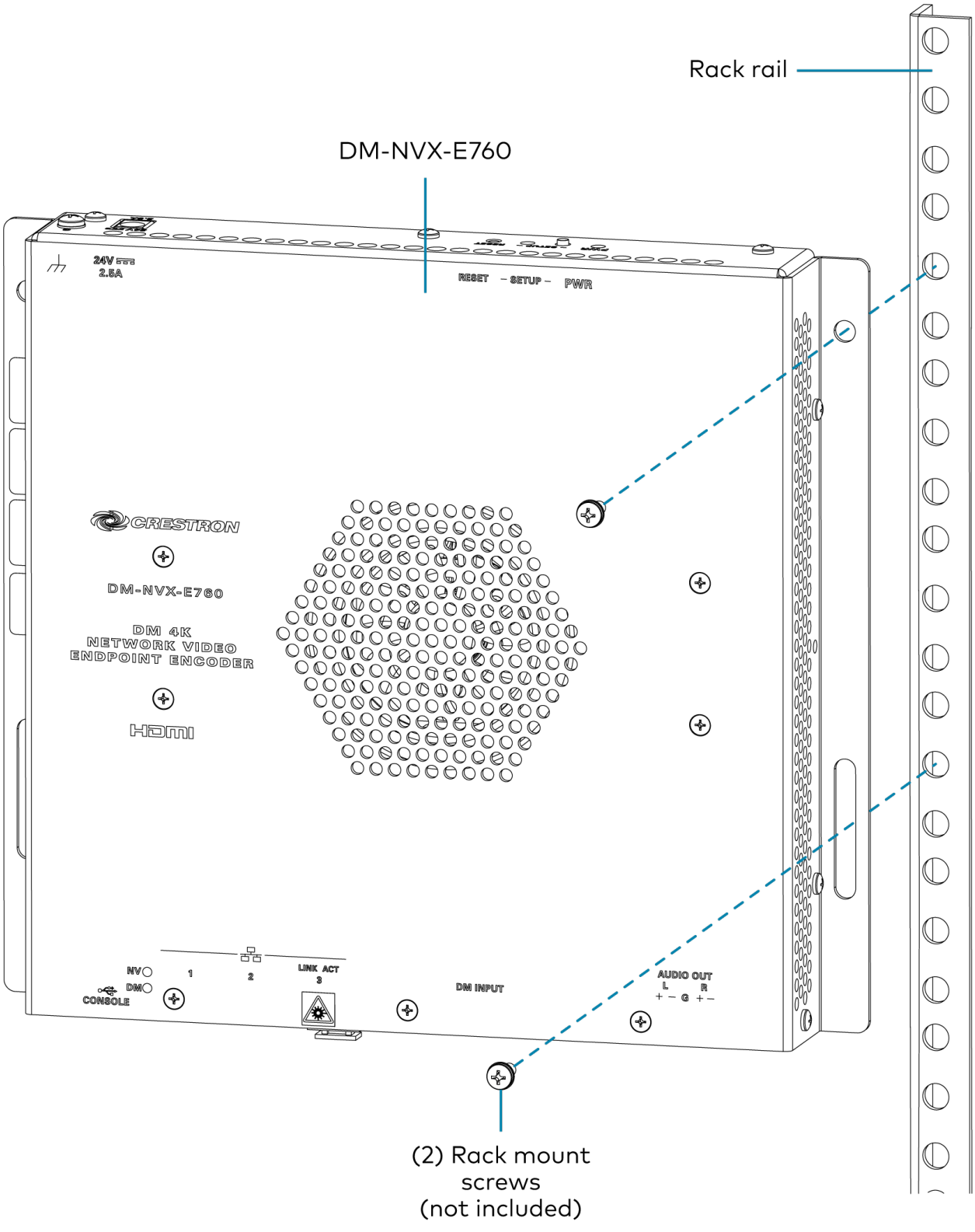
NOTE: Fan ventilation holes are provided on five sides of the device. If the installation necessitates that another object be positioned flush against the ventilation holes on one side of the device, leave a minimum clearance of 2 in. (51 mm) of space on all other sides containing ventilation holes.

Mount to a Rack Rail

The device can be mounted onto a front or rear rack rail. To mount the device:

1. Position either the left or right mounting flange so that the holes align with the holes in the rack rail.

2. Secure the device to the rack rail using two rack screws (not included).



Connect the Device

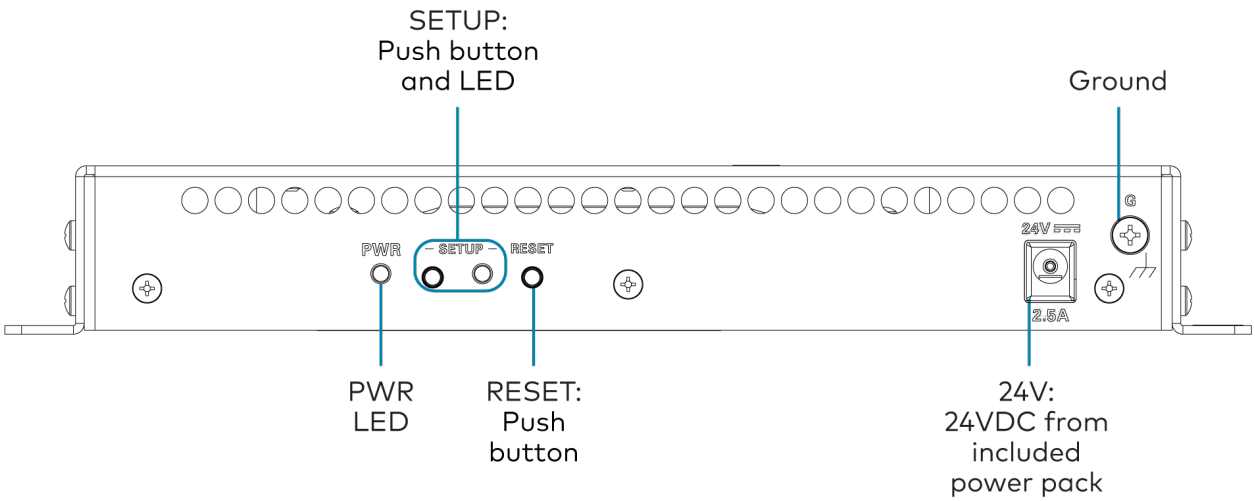
Connect the device as shown in the following illustrations.

NOTES:

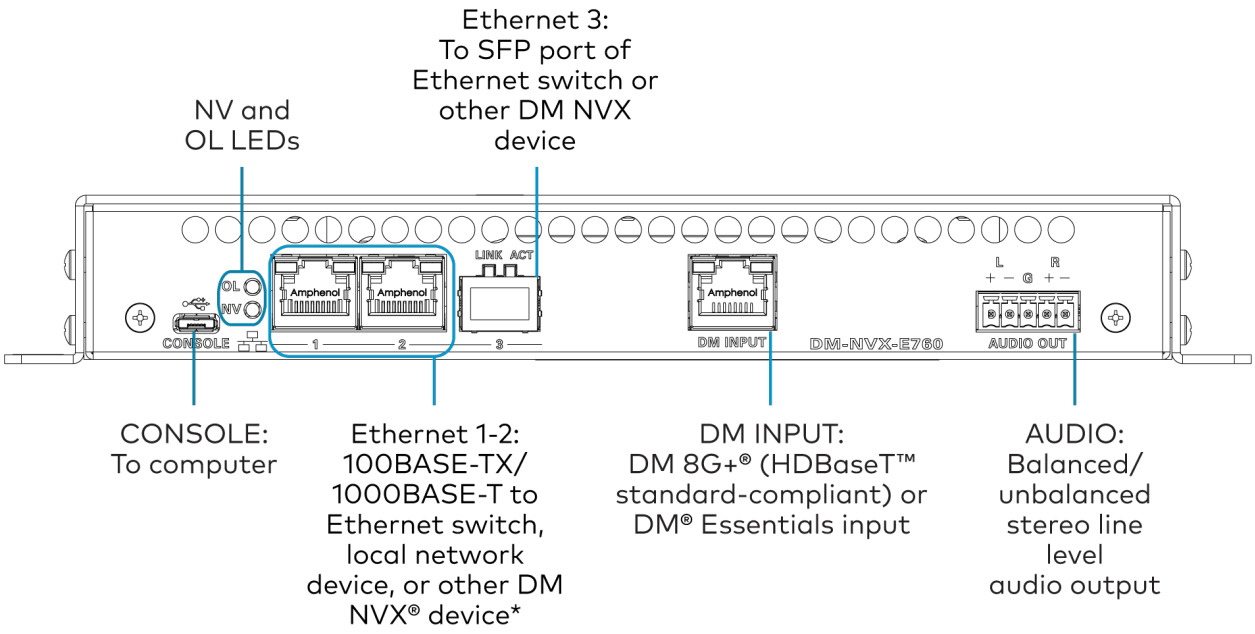
- The DM-NVX-E760 provides three Ethernet ports.
  - Ethernet port 1 is a 100BASE-TX/1000BASE-T port and a PoE++ powered device (PD) port. In order for the port to receive PoE++, it must be connected to PoE++ power sourcing equipment (PSE) such as a PoE++ compliant Ethernet switch or IEEE 802.3bt compliant injector.

    PoE++ or the included PW-2420RU power pack can be used to power the device. Do not connect both types of power simultaneously.
  - Ethernet port 2 is a 100BASE-TX/1000BASE-T port.
  - Ethernet port 3 is an SFP port, which connects to a fiber-optic network using the appropriate Crestron SFP-1G series transceiver module (sold separately). Refer to the SFP-1G Series Installation Guide for information on installing a SFP-1G transceiver module.
  - All Ethernet ports can be used to a connect to a 1000BASE-T Ethernet switch to stream network video.
  - Ethernet ports 1 and 2 can also be used to connect to a local network device as a courtesy port or to another DM NVX device for daisy chain applications.

Top Panel



Bottom Panel

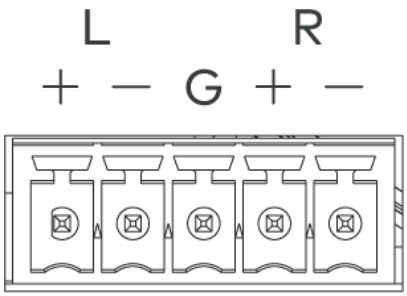


*Ethernet port 1 is a PoE++ powered device port.

Audio Connector Pin Assignments

The **AUDIO** connector consists of five pins, and can be wired for either balanced or unbalanced analog audio output.

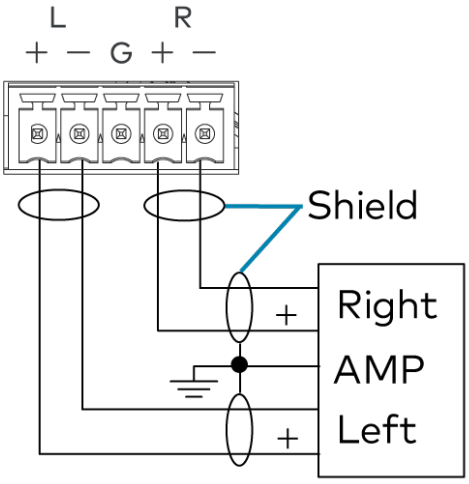
AUDIO Connector



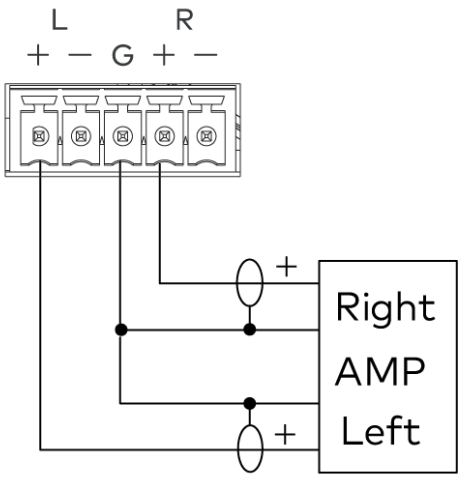
Refer to the following table and diagrams for balanced and unbalanced output pin assignments and wiring.

Pin Label	Balanced Wiring	Unbalanced Wiring
+	L+	L+ Out
-	L-	Open
G	Shield/ground	Common ground
+	R+	R+ Out
-	R-	Open

Balanced Output



Unbalanced Output



Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.
SETUP	Red	The SETUP button is pressed.
NV	Green	The device is transmitting (encoding) network video.
OL	Green	The device is online with a control system.
Ethernet 1	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 2	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
Ethernet 3 LINK	Green	An Ethernet link is established.
Ethernet 3 ACT	Flashing green	Data activity is occurring on the Ethernet link.
DM INPUT	Green	A DM®, HDBaseT™, or DM Essentials link is established.
	Amber	HDCP video is detected at the input.
	Flashing amber	Non-HDCP video is detected at the input.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

Wall Plate Installation

Refer to the following sections to install the DM-NVX-E20-2G-B-T and DM-NVX-E20-2G-W-T.

- In the Box on page 416
- Install the Device into an Electrical Box on page 416
- Connect the Device on page 416
- Observe the LED Indicators on page 418
- Reset the Device on page 418

In the Box

Qty.	Description
1	DM-NVX-E20-2G-B-T or DM-NVX-E20-2G-W-T Network AV Encoder

	Additional Items
4	Screw, 06-32, 1 in. steel, truss-head combo (2054883)

Install the Device into an Electrical Box

The DM-NVX-E20-2G is designed for installation into a 2-gang electrical box (not included) in a wall, floor, or ceiling. A minimum mounting depth of 2 in. (51 mm) is required.

To install the device into an electrical box:

1. Use a Phillips screwdriver (not included) to attach the DM-NVX-E20-2G to the electrical box using the four included #6-32 x 1 in. combo truss head screws.
2. Attach an FP-G2-DM Series decorator-style faceplate (black FP-G2-DM-B-T or white FP-G2-DM-W-T, sold separately) to the front of the DM-NVX-E20-2G.

   > **NOTE:** An FP-G2-DM Series faceplate is required. Faceplates other than the FP-G2-DM Series are incompatible with the DM-NVX-E20-2G.

Connect the Device

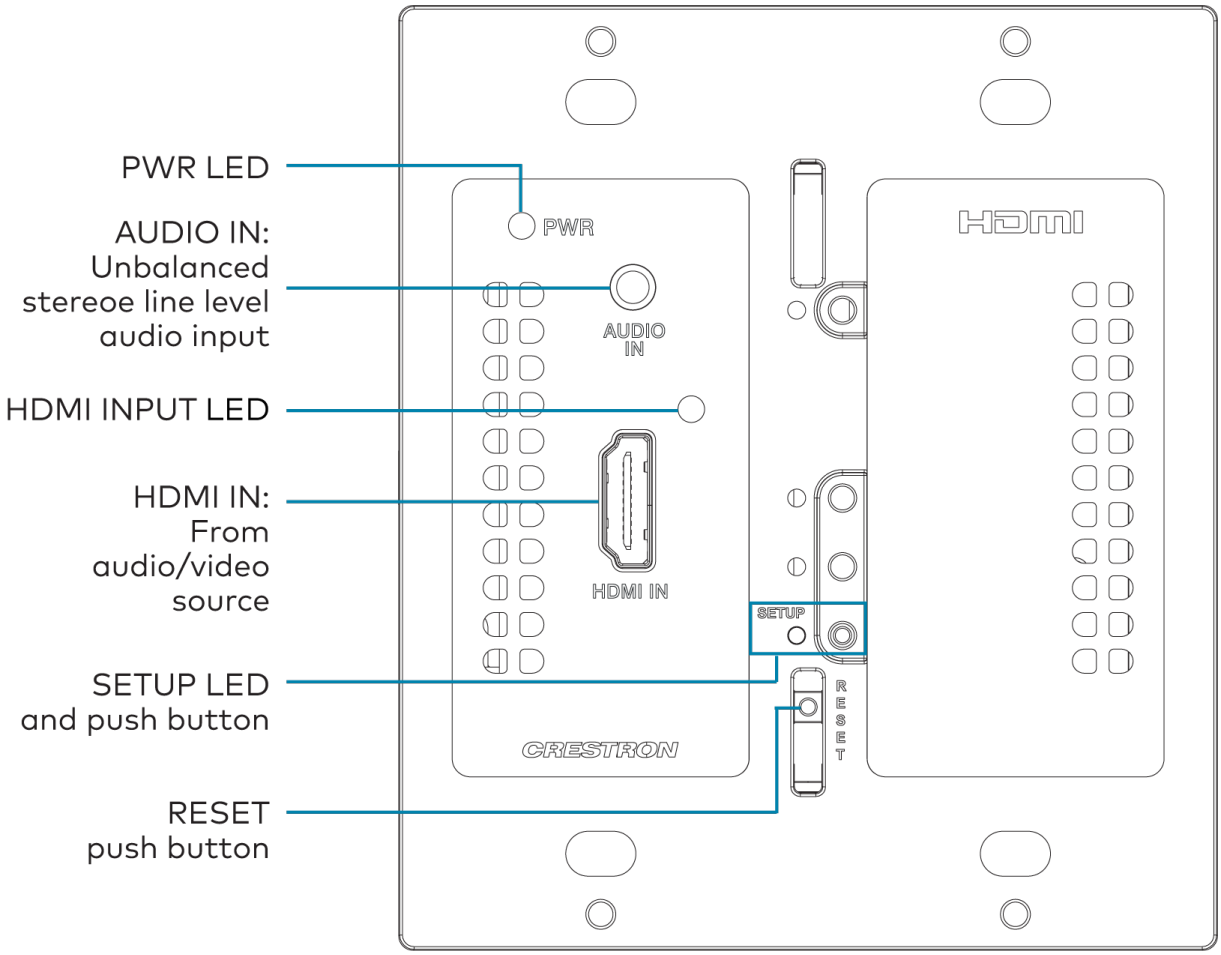
Connect the device as shown in the following illustrations.

> **NOTES:**
>
> - The Ethernet port must be connected to a 1000BASE-T switch in order to stream network video.

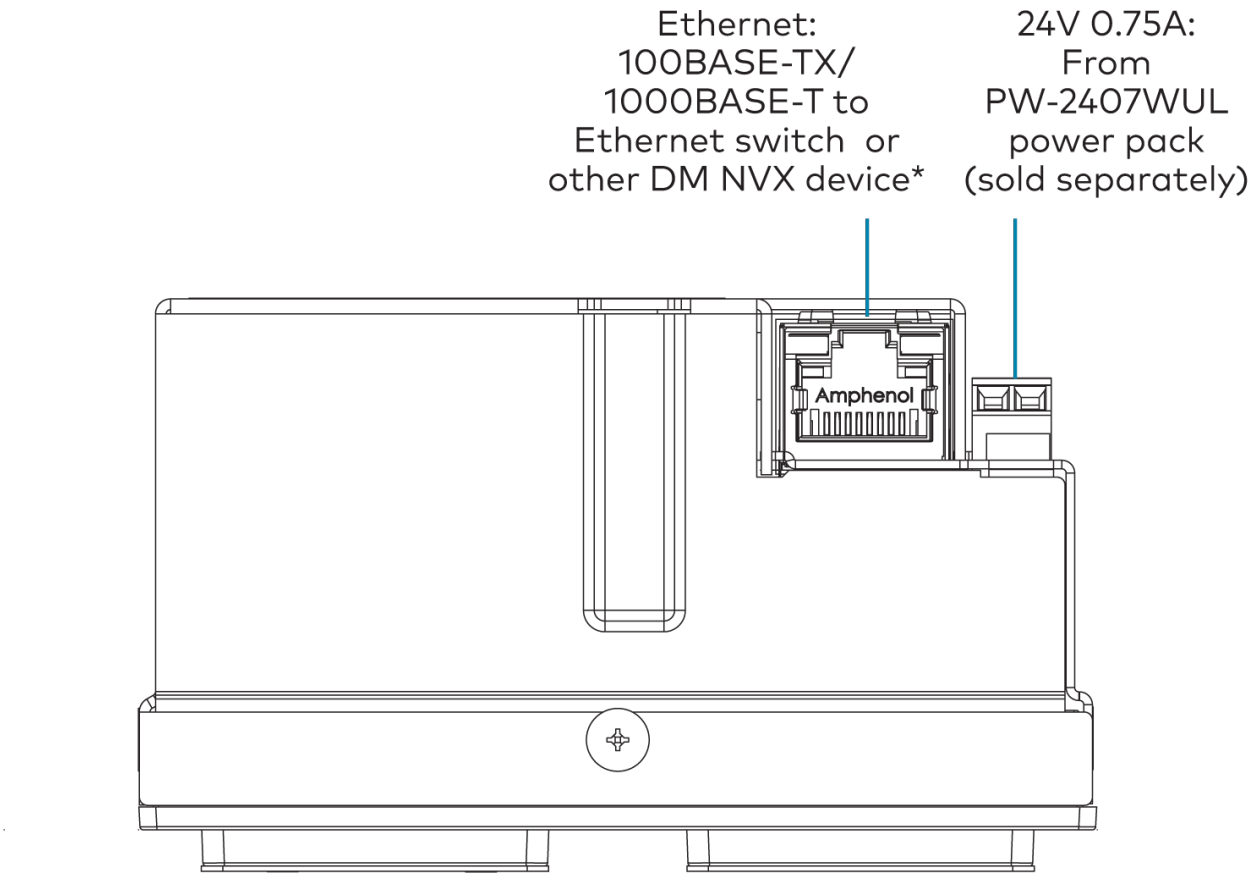
- The DM-NVX-E20-2G can be powered via the Ethernet port, which is a PoE powered device (PD) port. In order for the device to receive PoE, the Ethernet port must be connected to a PoE power sourcing equipment (PSE) port of an Ethernet switch.

  Alternatively, the device can be powered by a 24VDC power pack (PW2407-WUL, sold separately).

Front Panel



Top Panel



*The Ethernet port is a PoE powered device port.

Observe the LED Indicators

Refer to the following table for information about the LED indicators on the device.

LED Indicator	Color	Meaning
PWR	Amber	Power is applied to the device and the device is booting.
	Green	Power is applied to the device and the device is operational.
SETUP	Red	The SETUP button is pressed.
Ethernet	Green	An Ethernet link is established.
	Flashing amber	Data activity is occurring on the Ethernet link.
HDMI IN	Green	A video signal is detected at the HDMI input.

Reset the Device

A factory restore may be performed when troubleshooting to restore all factory default settings on the device.

CAUTION: These procedures should only be performed to recover an unresponsive device. The factory restore procedure will clear certain device settings that cannot be recovered once the procedure is complete. Before performing this procedure, please contact Crestron True Blue Support via phone, email or chat as described at www.crestron.com/support.

To restore a DM NVX device to factory default settings:

1. Press the **RESET** button 11 times, allowing 3-5 seconds between each press.
2. After the 11th press, wait until the **PWR** LED illuminates green.
3. Hold the **SETUP** button for 5 seconds.

The device will complete its current boot-up process, then reboot itself one more time. After this final boot-up, it will be restored to factory default settings.

Configuration

This section provides information on configuring the following products:

- Configuration (DM-NVX-35X Models)
- Configuration (DM-NVX-36X Models)
- Configuration (DM-NVX-38X Models)
- Configuration (DM-NVX-D30, E30, and E760 Models)
- Configuration (DM-NVX-D10, D20, D200, E10, and E20 Models)
- Configuration (DM NVX Director Switching Appliances)

Configuration (DM-NVX-35X Models)

NOTE: This section applies to the following models:

- DM-NVX-350
- DM-NVX-350C
- DM-NVX-351
- DM-NVX-351C
- DM-NVX-352
- DM-NVX-352C

Web Interface Configuration

The web interface of a DM NVX AV-over-IP device allows for the viewing of status information as well as the configuration of local device settings.

Access the Web Interface

To access the web interface, refer to either of the following:

- Access the Web Interface with a Web Browser on page 421
- Access the Web Interface with the Crestron Toolbox™ Application on page 423

The web interface runs in a web browser. The following web browser versions are supported:

Operating System and Supported Web Browsers

OPERATING SYSTEM	SUPPORTED WEB BROWSERS
Windows® operating system	Chrome™ web browser, version 31 and later
	Firefox® web browser, version 31 and later
	Internet Explorer web browser, version 11 and later
	Microsoft Edge web browser
macOS® operating system	Safari® web browser, version 6 and later
	Chrome web browser, version 31 and later
	Firefox web browser, version 31 and later

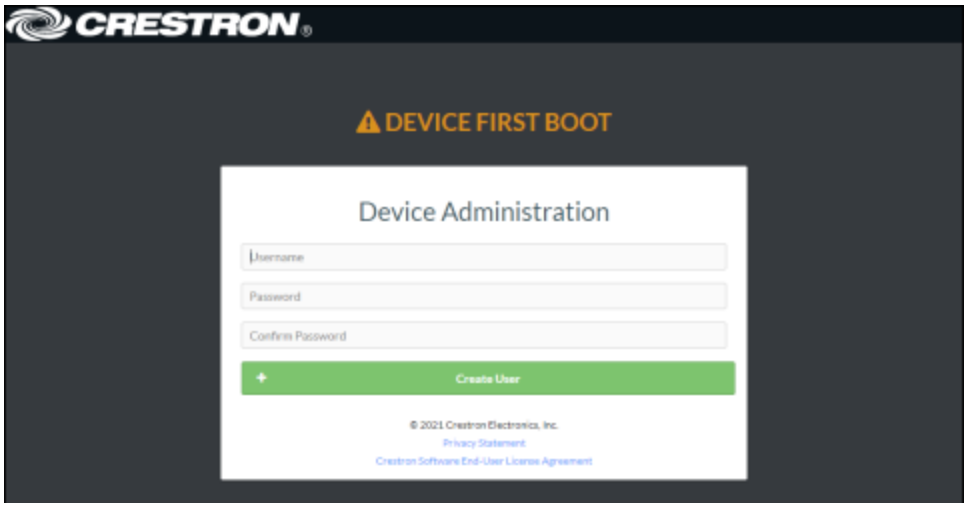
Access the Web Interface with a Web Browser

To access the web interface:

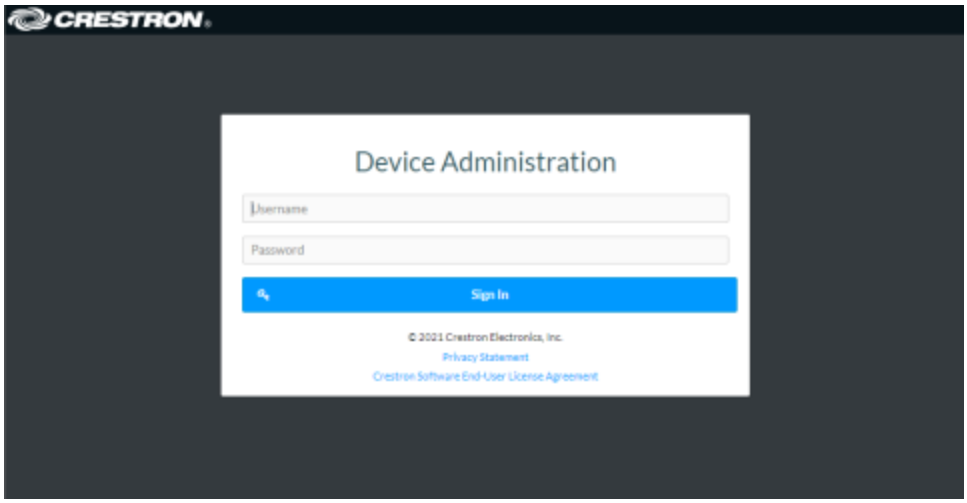
1. Enter the IP address of the DM NVX device into a web browser.

   NOTE: To obtain the IP address, use the Device Discovery Tool utility in Crestron Toolbox™ software or an IP scanner application.

2. If accessing the device for the first time, a prompt to create an administrator account will be displayed along with a **DEVICE FIRST BOOT** message. To create the first admin account:
    a. Enter a username in the **Username** field.
    b. Enter a password in the **Password** field.
    c. Re-enter the same password in the **Confirm Password** field.



    d. Select **Create User**. A new **Device Administration** page appears with an option to **Sign In** instead of **Create User**.



3. Enter the username in the **Username** field.
4. Enter the password in the **Password** field.
5. Select **Sign In**.

Access the Web Interface with the Crestron Toolbox™ Application

To access the web interface by opening a web browser from the Crestron Toolbox™ application:

1. Open the Crestron Toolbox application.
2. Select **Device Discovery Tool** from the **Tools** menu or select the Device Discovery Tool icon in the toolbar. Once the utility loads, the DM NVX device will be discovered on the network and listed in the device list on the left side of the screen. The device's host name, IP address, and firmware version are displayed.

   > **NOTE:** If there is security software running on the computer, a security alert might be displayed when the Crestron Toolbox application attempts to connect to the network. Make sure to allow the connection, so that the Device Discovery Tool can be used.

3. Select the device from the discovered devices list.
4. Enter the device credentials in the **Authentication Required** dialog that opens, then select **Log In**.
5. Select **Web Configuration**.

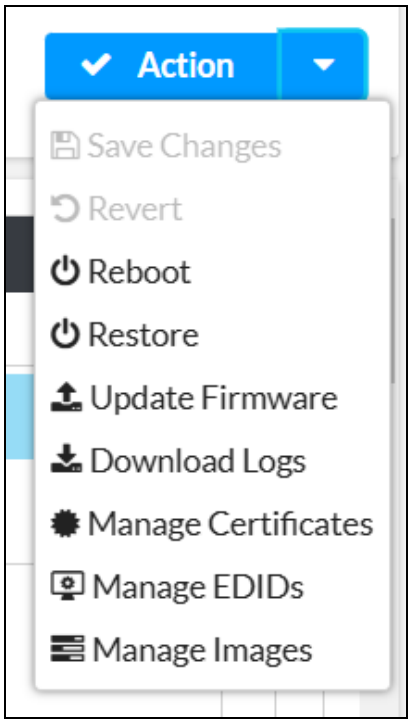
Action

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-350
- DM-NVX-350C
- DM-NVX-351
- DM-NVX-351C
- DM-NVX-352
- DM-NVX-352C

The **Action** drop-down menu is displayed at the top right side of the web interface and provides quick access to these common device functions:

- Save Changes on page 425
- Revert on page 425
- Reboot on page 425
- Restore on page 425
- Update Firmware on page 426
- Download Logs on page 426
- Manage Certificates on page 426
- Manage EDIDs on page 429
- Manage Images (Receiver Mode Only) on page 432



Save Changes

Select **Save Changes** to save any changes made to the configuration settings.

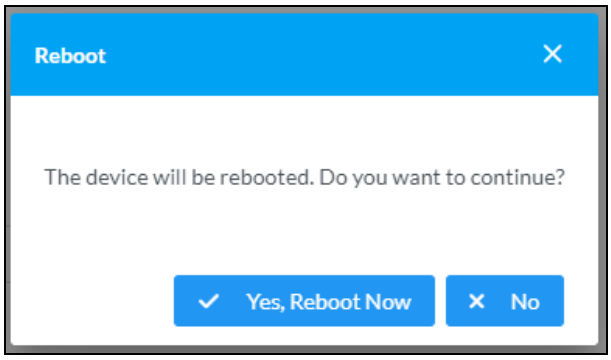
Revert

Select **Revert** to revert the device back to the last saved configuration.

Reboot

Certain changes to the settings may require a reboot to take effect. To reboot the device:

1. Select **Reboot** in the **Action** menu. The **Reboot** confirmation message box appears.



2. Select **Yes, Reboot Now** to reboot the device. The **Reboot** status message box appears. Wait for the device reboot to complete before attempting to reconnect to the web interface. Alternatively, select **No** to cancel the reboot operation.

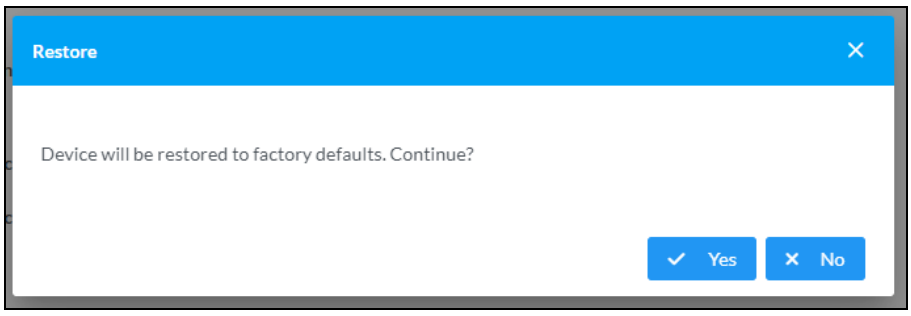
Restore

The DM NVX device can be restored to factory default settings from the **Action** menu.

> **NOTE:** The **Restore** procedure will wipe all settings from the device, including network settings. If a static IP address is set, restoring the device to factory default settings will clear this address and DHCP will be enabled instead.

To restore the device to factory defaults:

1. Select **Restore** in the **Action** menu. The **Restore** confirmation message box appears.



2. Select **Yes** to restore the device to factory default settings. Select **No** to cancel the restore operation. When **Yes** is selected, the **Restore** status message box appears. Wait for the device restore to complete before attempting to reconnect to the web interface.

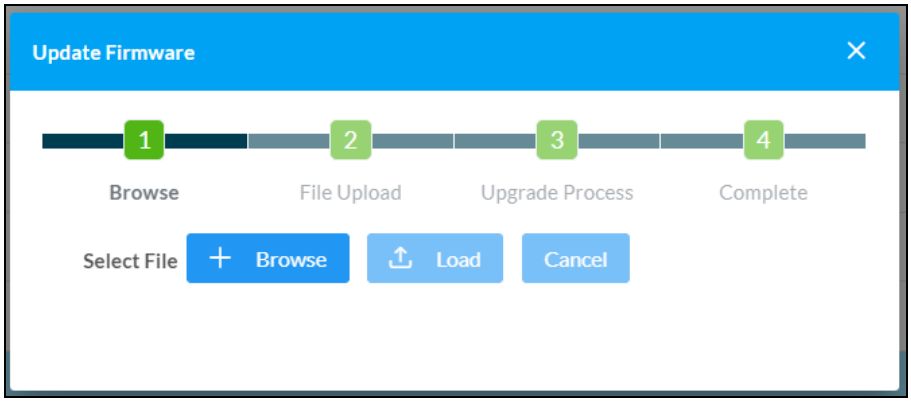
   > **NOTE:** Once the device is restored, it may have a new IP address. If reconnecting to the original address does not work, use the Device Discovery Tool in Crestron Toolbox software or an IP scanner application to find the device's new IP address.

If the web interface is not accessible, the device can also be restored to factory default settings via a hardware-based procedure (refer to DM-NVX-350, DM-NVX-351, and DM-NVX-352 Installation on page 366). Card-based DM NVX devices can also be restored from the front panel menu of the DMF-CI-8.

Update Firmware

To update the firmware of the device:

1. Select **Update Firmware** in the **Action** menu.
2. In the **Update Firmware** window that appears, select **+ Browse**.



3. Locate and select the desired firmware file, then select **Open**. The selected firmware file name is displayed in the **Update Firmware** window.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The firmware update is now complete, and the web interface will return to the main log-in page.

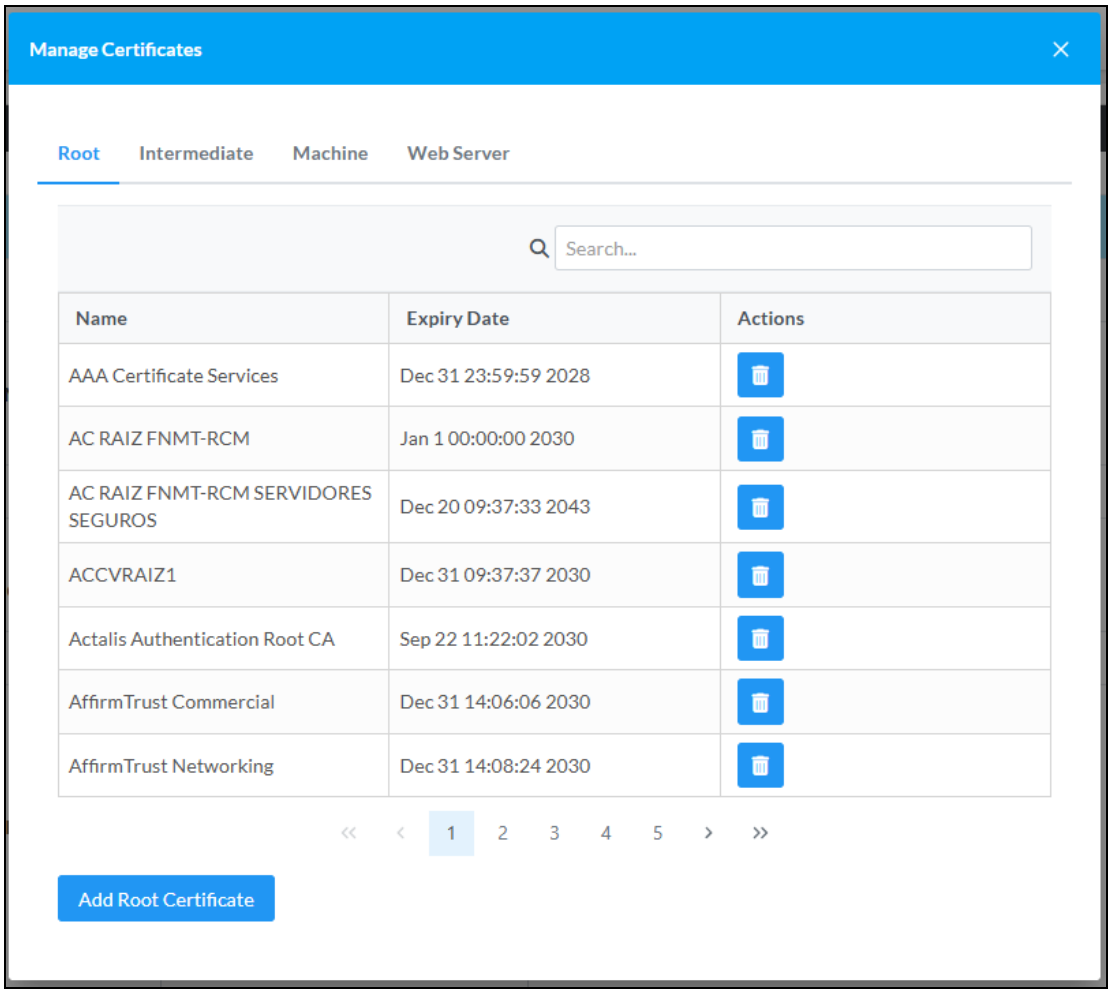
Download Logs

Select **Download Logs** in the **Action** menu to download the device message logs for diagnostic purposes.

The log file is downloaded to the Downloads folder of the PC.

Manage Certificates

Select **Manage Certificates** in the **Action** menu to open the **Manage Certificates** window. Use this window to add or remove certificates used in 802.1x authentication and other protected network functions.



The following certificate tabs are available in the **Manage Certificates** window:

- **Root:** The Root certificate is used by the DM NVX device to validate the network's authentication server. The device has a variety of Root certificates, self-signed by trusted CAs (Certificate Authorities) preloaded into the device. Root certificates must be self-signed.
- **Intermediate:** The Intermediate store holds non self-signed certificates that are used to validate the authentication server. These certificates will be provided by the network administrator if the network does not use self-signed Root certificates.
- **Machine:** The Machine certificate is an encrypted PFX file that is used by the authentication server to validate the identity of the DM NVX device. The machine certificate will be provided by the network administrator, along with the certificate password. For 802.1x, only one machine certificate can reside on the device.
- **Web Server:** The Web Server certificate is a digital file that contains information about the identity of the web server.

Add Certificates

To add a certificate:

1. Select the corresponding certificate tab.
2. Select **Add [Type] Certificate**.

3. Select **+ Browse**.
4. Locate and select the file, then select **Open**.

   > **NOTE:** If the selected certificate is a machine certificate, enter the password provided by the network administrator.

5. Select **OK**. This will add the certificate to the list in the **Manage Certificates** window, displaying the file name and expiration date. The certificate is now available for selection and can be loaded to the device.

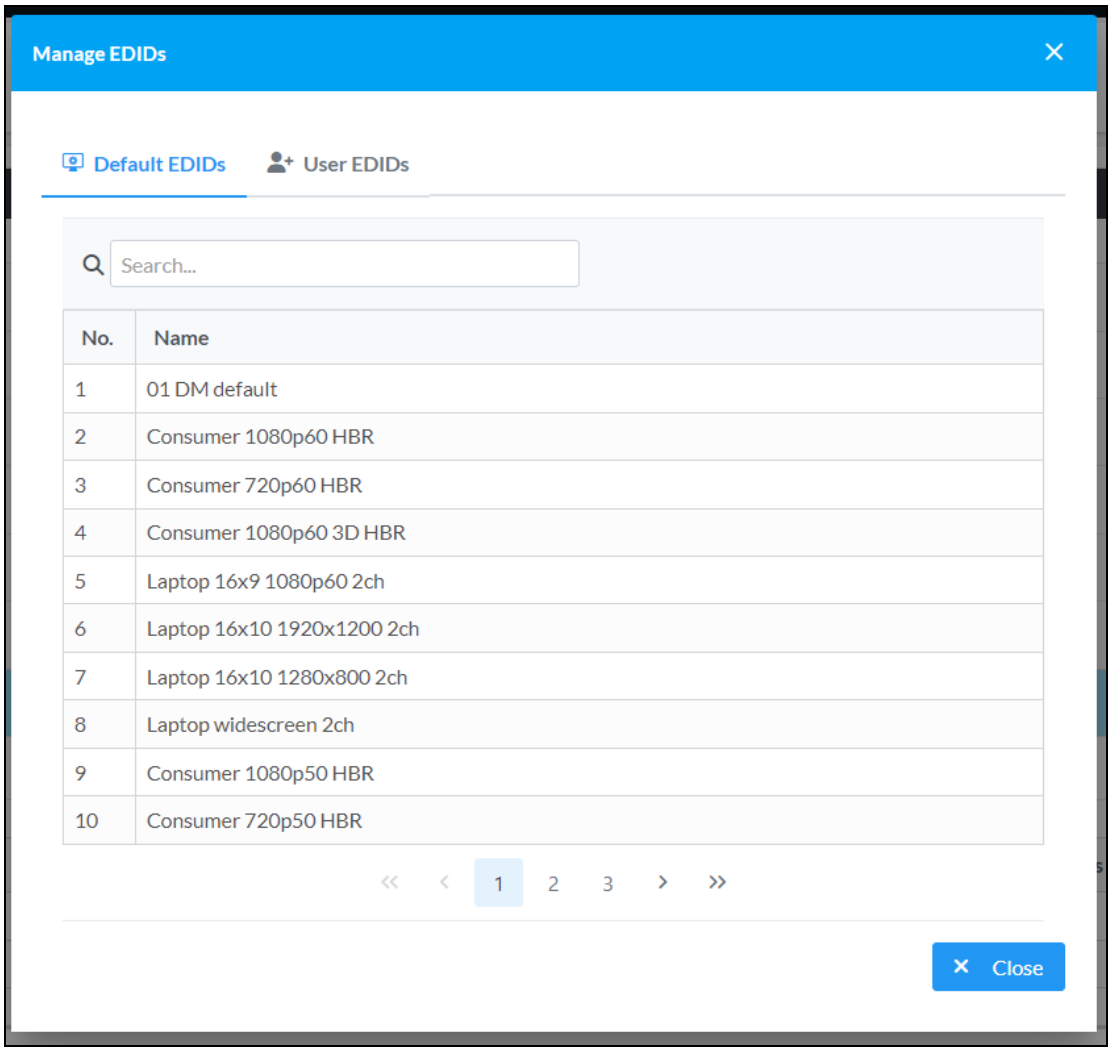
Delete Certificates

To delete a certificate:

1. Select the corresponding certificate tab.
2. Select the trashcan icon in the **Actions** column and the row of the certificate to be deleted.
3. Select **Yes** when prompted to delete the certificate or **No** to cancel the deletion.

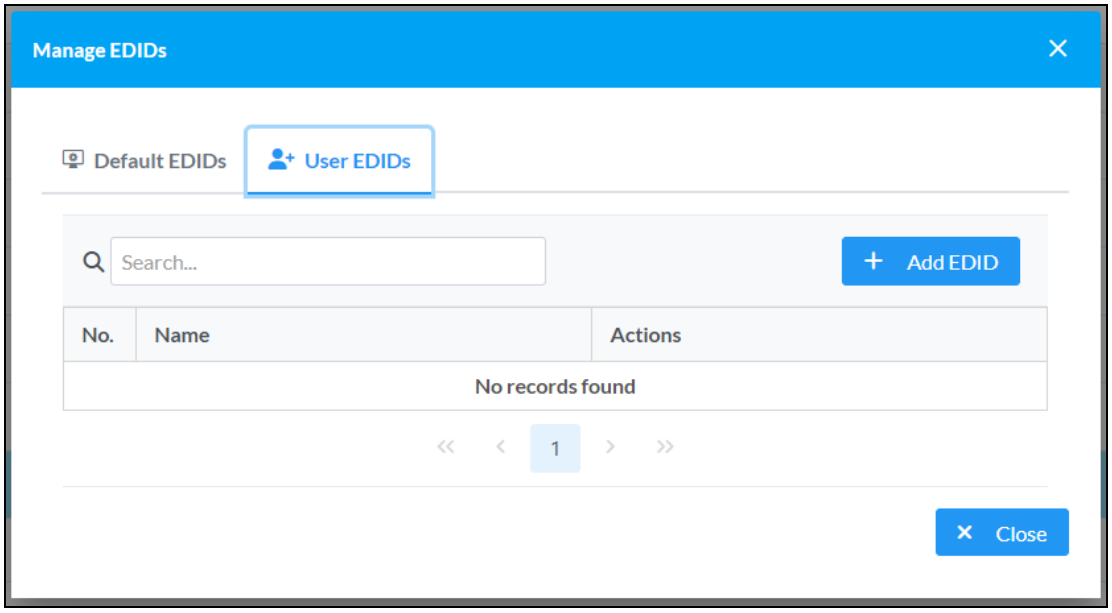
Manage EDIDs

Select **Manage EDIDs** in the **Action** menu to open the **Manage EDIDs** window. Use this window to add, remove, or browse which EDIDs are available for the AV inputs and outputs of the DM NVX device.



The default tab that will open in this window is the **Default EDIDs** tab. This tab is read only, and provides a list of all default EDIDs available on the DM NVX device as part of the firmware. Use the **Search...** text entry field to filter the list of EDIDs by name. Default EDIDs cannot be removed from the device.

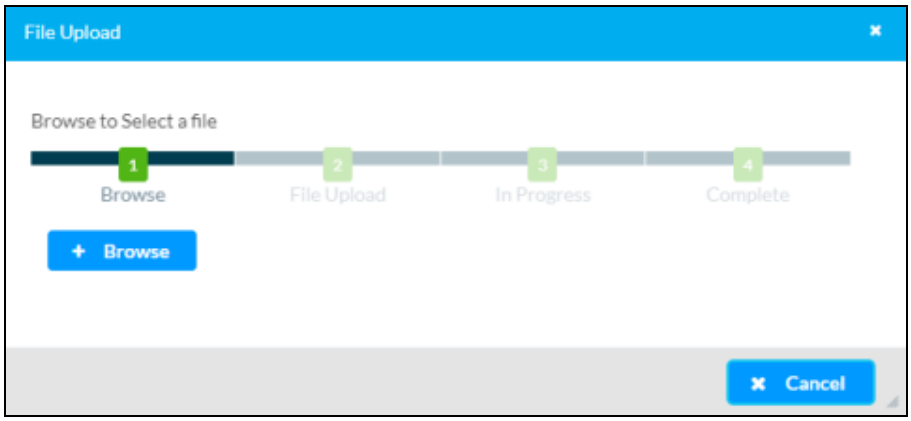
The second tab available in this window is the **User EDIDs** tab. By default, the table will populate with **No records found**.



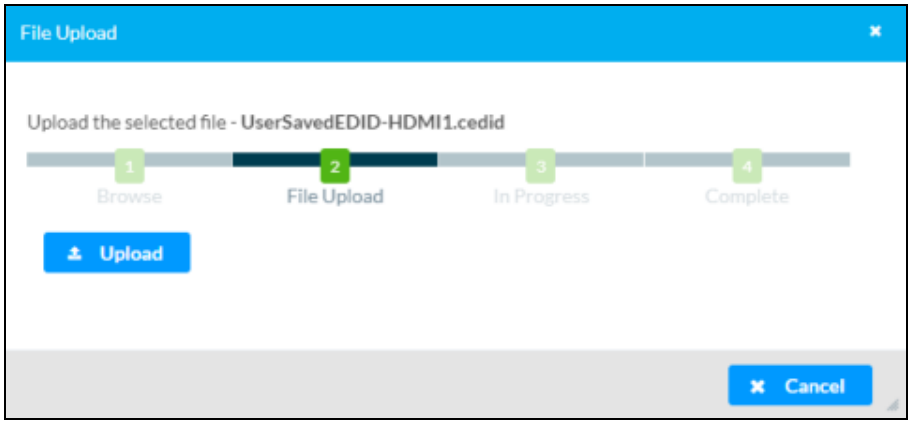
To add a **User EDID** file:

1. Select **+ Add EDID** at the top right of the table. The **File Upload** screen will appear.
2. Select **+ Browse**. Locate the desired .cedid file, then select **Upload** to upload it to the DM NVX device.

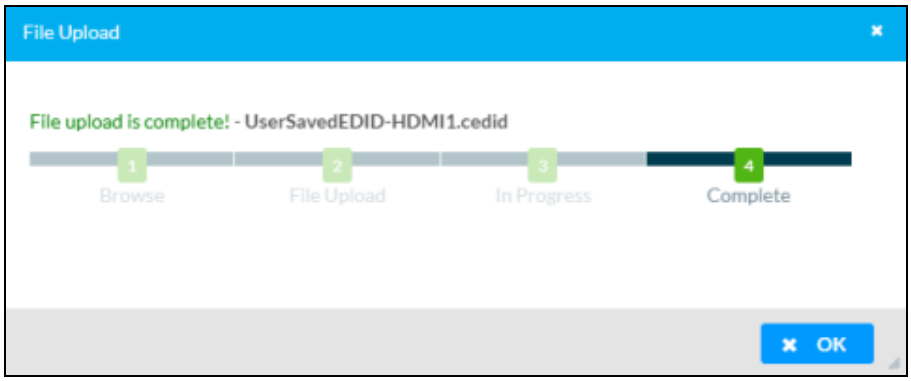
   Browse for and select a .cedid file



   Upload the selected file



   Wait for the upload to complete, then select OK

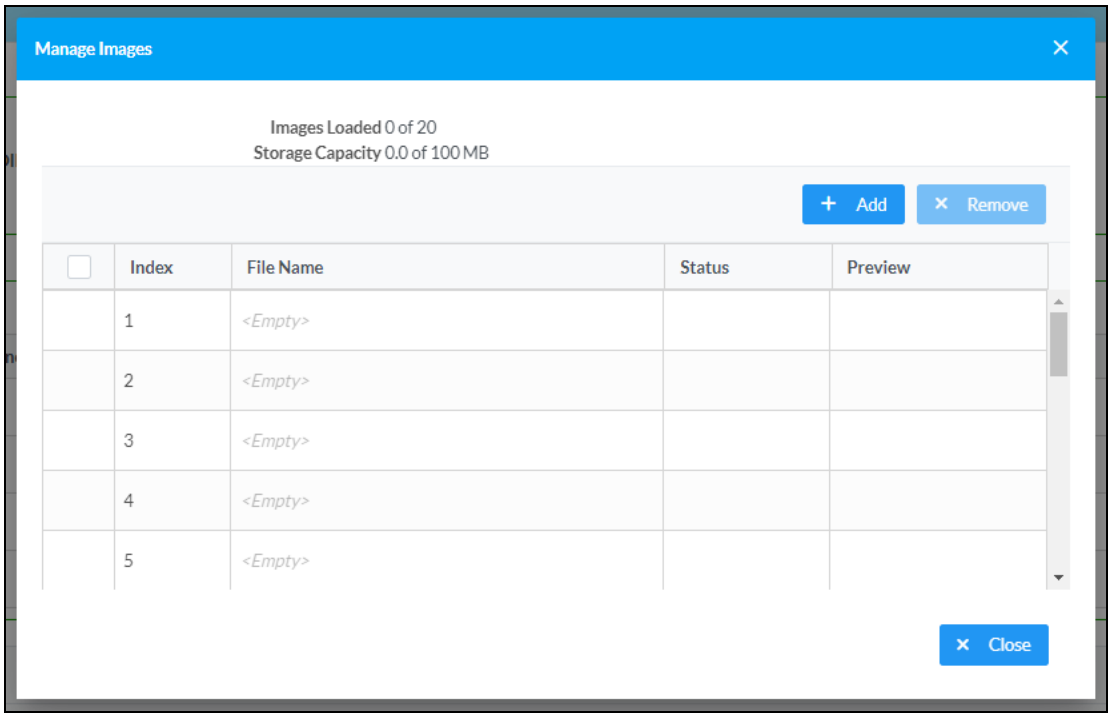


3. Select **OK** to return to the **Manage EDIDs** window. The uploaded User EDID is now displayed in the table.

To remove a **User EDID** file, select **Delete** in its table row.

Manage Images (Receiver Mode Only)

Select **Manage Images** in the **Action** menu to open the **Manage Images** window. Use this window to add or remove images that can be displayed as backgrounds for the on-screen display feature of the DM NVX device.



To add an image:

1. Select **+ Add**. A **File Upload** window appears.
2. Select **+ Browse**. Locate the desired .jpeg, .jpg, or .png image file, then select **Upload** to upload it to the DM NVX device. The uploaded image will now appear in the **Manage Images** table with a preview and a **Ready** status message. Refer to the **Outputs** heading under Settings on page 512 for information on setting a background image.

To delete an image, select its entry in the table then select **X Remove**.

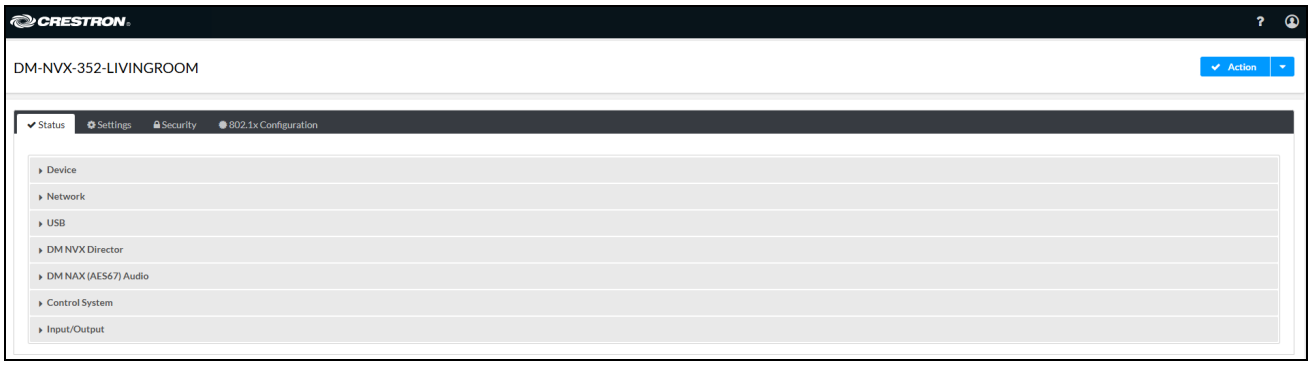
Status

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-350
- DM-NVX-350C
- DM-NVX-351
- DM-NVX-351C
- DM-NVX-352
- DM-NVX-352C

The **Status** page is the first page displayed when opening the interface of the DM NVX device. It displays general information about the device (such as **Model Name**, **Firmware Version**, and **Serial Number**), current network settings (such as **Host Name** and **IP Address**), and the current status of the connectors on the device.

The **Status** page can be accessed at any time by selecting the **Status** tab of the interface.

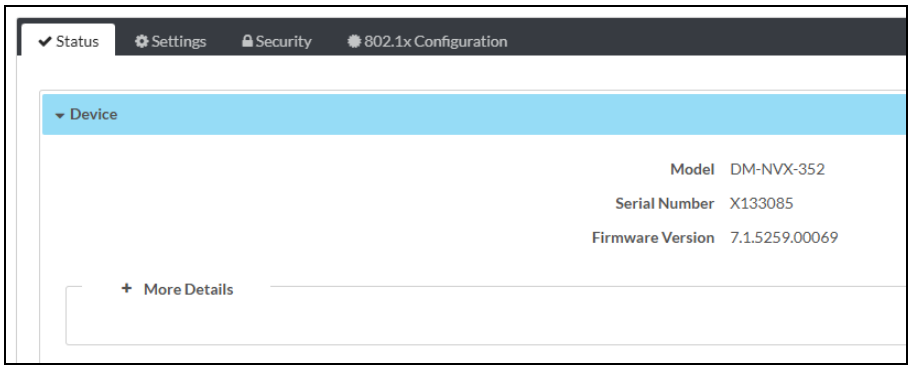


Information displayed on the **Status** page is organized into different sections:

- Device on page 434
- Network on page 434
- USB on page 435
- DM NVX Director on page 435
- DM NAX (AES67) Audio on page 436
- Control System on page 437
- Input/Output on page 437

Device

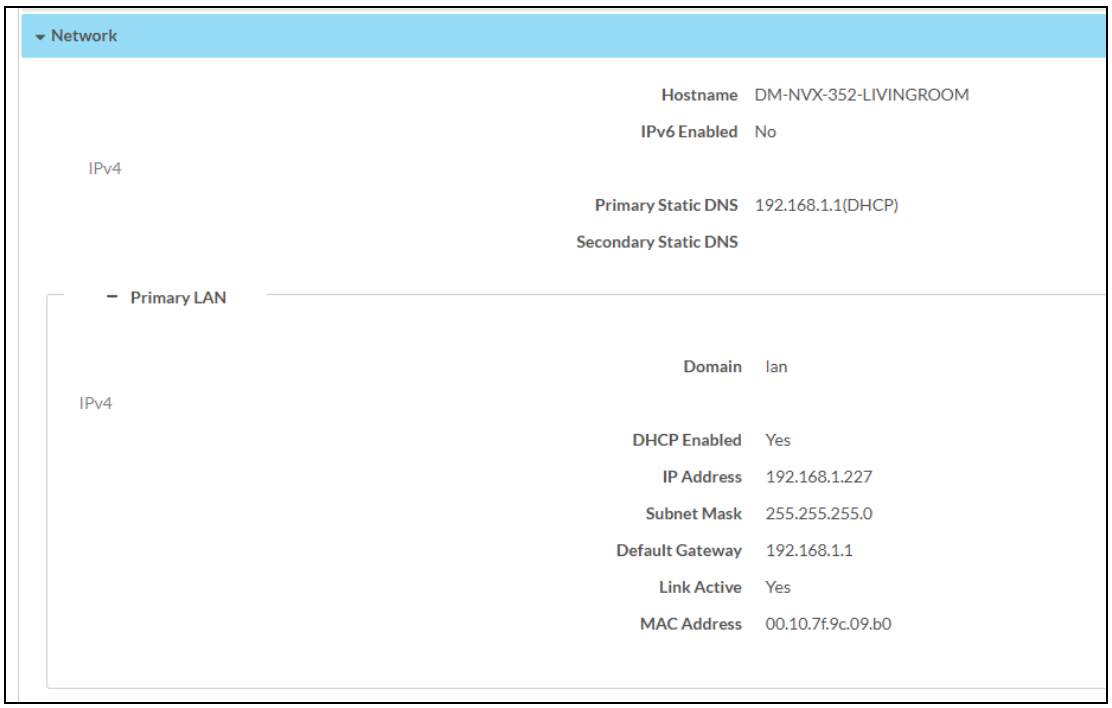
The **Device** accordion displays the **Model**, **Firmware Version**, and **Serial Number** of the DM NVX device.



Select **+ More Details** to review additional information about the device.

Network

The **Network** accordion displays network-related information about the device, including the **Hostname**, **Domain Name**, and **DNS Servers**.



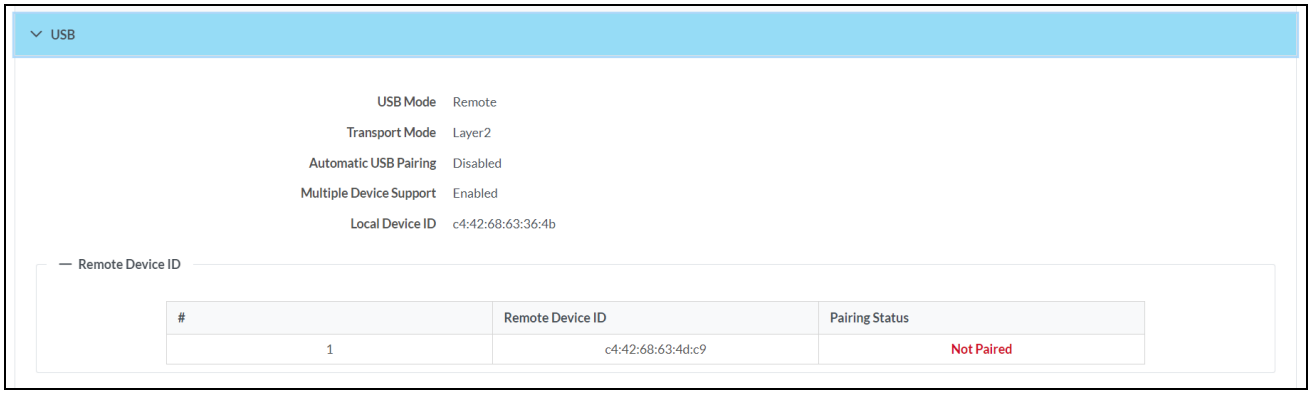
By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-352-00107F9C09B0.

Select **+ Primary LAN** to display additional information regarding the Ethernet port designated as the **Primary LAN**. If **+ Primary LAN** is selected, select **- Primary LAN** to collapse the section.

NOTE: The **Primary LAN** port and other Ethernet port designations are assigned by the **Port Selection** feature. Refer to the **Port Selection** heading under Settings on page 439 for details on configuring the **Port Selection** feature.

USB

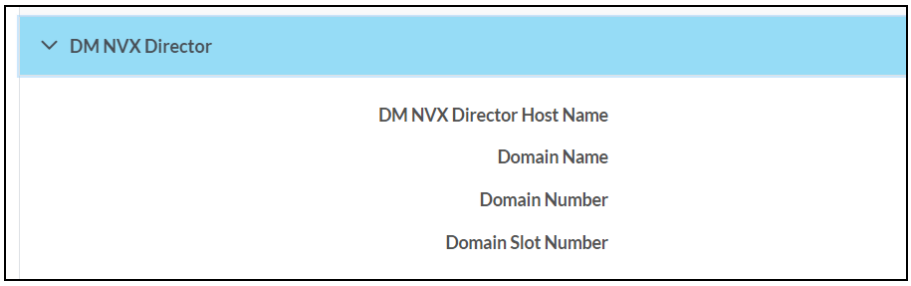
The **USB** accordion displays the **USB Mode**, **Transport Mode**, **Automatic USB Pairing**, **Multiple Device Support**, and **Local Device ID** of the device. Select **+ Remote Device ID** to display a table showing the **#**, **Remote Device ID**, and **Pairing Status** of any devices connected to the DM NVX device by USB.



DM NVX Director

The **DM NVX Director** accordion displays the details of the DM NVX Director switching appliance to which the DM NVX device is claimed.

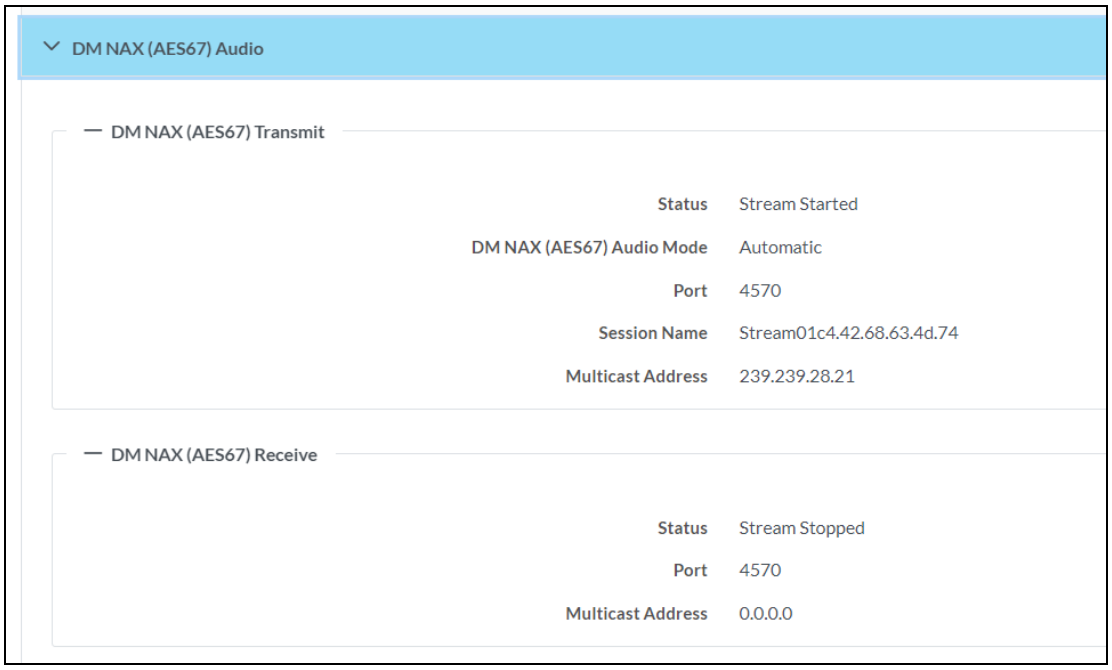
NOTE: If the DM NVX device has not been claimed by a DM NVX Director switching appliance, all fields in this section will be empty.



- **DM NVX Director Host Name:** Displays the host name of the claiming DM NVX Director switching appliance.
- **Domain Name:** Displays the name of the DM NVX Director domain to which the DM-NVX-35X series device belongs.
- **Domain Number:** Displays the number of the DM NVX Director domain to which the DM-NVX-35X series device belongs.
- **Domain Slot Number:** Displays the slot number within the DM NVX Director that refers to this specific DM NVX device.

DM NAX (AES67) Audio

The **DM NAX (AES67) Audio** accordion displays information regarding the **DM NAX (AES67) Transmit** and **DM NAX (AES67) Receive** audio-over-IP (AoIP) signals. This accordion varies slightly depending if the device is in transmitter or receiver mode.



The **DM NAX (AES67) Audio Mode** field will be under the **DM NAX (AES67) Receive** heading if the device is in receiver mode or under the **DM NAX (AES67) Transmit** heading if the device is in transmitter mode. This field displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).

The details displayed for **DM NAX (AES67) Transmit** are:

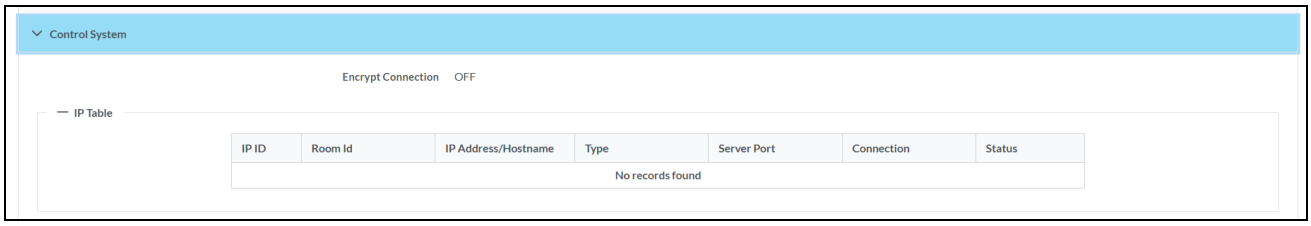
- **Status:** Displays a status message for the transmitting AoIP stream, such as **Stream Stopped**, **Stream Starting**, or **Stream Started**.
- **DM NAX (AES67) Audio Mode:** Displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).
- **Port:** Displays the port of the AoIP transmit stream.
- **Session Name:** Displays the session name of the AoIP transmit stream.
- **Multicast Address:** Displays the multicast address of the AoIP transmit stream.

The details displayed for **DM NAX (AES67) Receive** are:

- **Status:** Displays a status message for the AoIP stream receiver, such as **Connecting**, **Stream Stopped**, or **Stream Started**.
- **Port:** Displays the port of the received AoIP stream.
- **Multicast Address:** Displays the multicast address of the received AoIP stream.

Control System

The **Control System** accordion displays information regarding the connection between the DM NVX device and a control system.

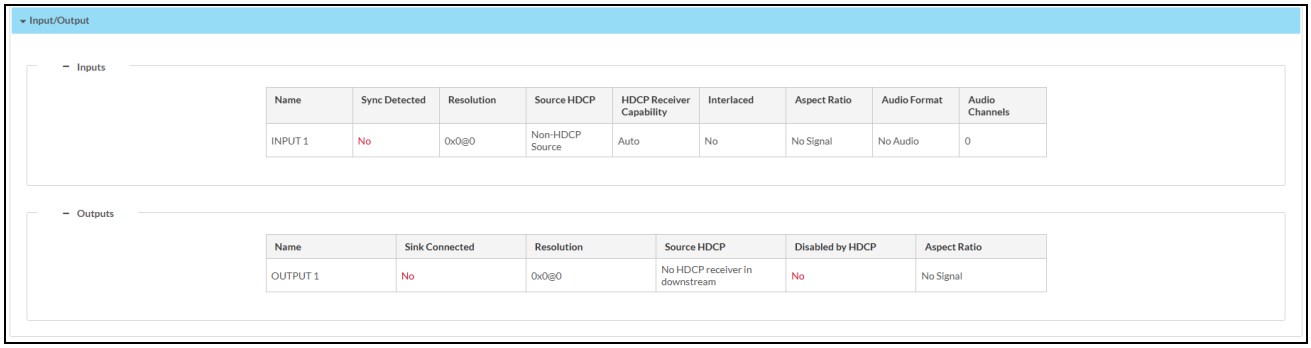


The displayed fields are:

- **Encrypt Connection:** Displays **ON** if the connection is encrypted or **OFF** if it is not.
- **IP ID:** Displays the IP ID of the DM NVX device in its IP table entry of the control system's IP table.
- **Room ID:** Displays the room ID of the DM NVX device in its IP table entry of the control system's IP table.
- **IP Address/Hostname:** Displays the IP address and host name of the control system.
- **Type:** Always displays **Peer** (this is the only relationship the DM NVX device can have to a control system).
- **Server Port:** Displays the port for the connection between the DM NVX device and the control system.
- **Connection:** Always displays **Gway** (this is the only connection type supported between a DM NVX device and a control system).
- **Status:** Displays either **ONLINE** or **OFFLINE** depending on if the DM NVX device is able to communicate with the control system.

Input/Output

The **Input/Output** accordion displays status information regarding the AV input and output connectors.



The displayed fields for **Inputs** are:

- **Name:** Displays the name of the input.
- **Sync Detected:** Displays whether sync is detected at the input (**Yes**) or not (**No**).
- **Resolution:** Displays the resolution and refresh rate of the input video signal.

- **Source HDCP:** Displays the HDCP level of the input video signal.
- **HDCP Receiver Capability:** Displays the HDCP capabilities of the DM NVX device.
- **Interlaced:** Displays **Yes** or **No** depending if the input video signal is interlaced or not.
- **Aspect Ratio:** Displays the aspect ratio of the input video signal.
- **Audio Format:** Displays the audio format of the input signal.
- **Audio Channels:** Displays the number of audio channels in the input signal.

The displayed fields for **Outputs** are:

- **Name:** Displays the name of the output.
- **Sink Connected:** Displays whether a sink (such as a display or projector) is connected to the output (**Yes**) or not (**No**).
- **Resolution:** Displays the current resolution of the video output signal.
- **Source HDCP:** Displays the HDCP level supported by the connected display or projector.
- **Disabled by HDCP:** Displays whether the output is disabled by HDCP (**Yes**) or not (**No**).
- **Aspect Ratio:** Displays the aspect ratio of the video output signal.

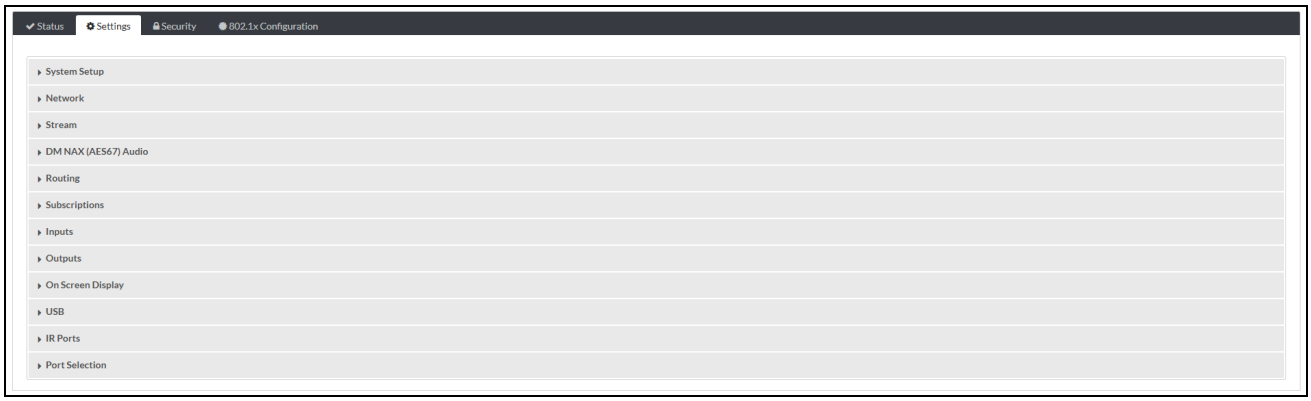
Settings

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-350
- DM-NVX-350C
- DM-NVX-351
- DM-NVX-351C
- DM-NVX-352
- DM-NVX-352C

The **Settings** page enables configuration of the DM NVX device's settings. The **Settings** page can be accessed at any time by selecting the **Settings** tab of the interface.

Settings Page (Receiver Mode Shown)



NOTE: Some settings are available only in encoder (transmitter) or decoder (receiver) mode. Mode requirements are noted in headings below where appropriate.

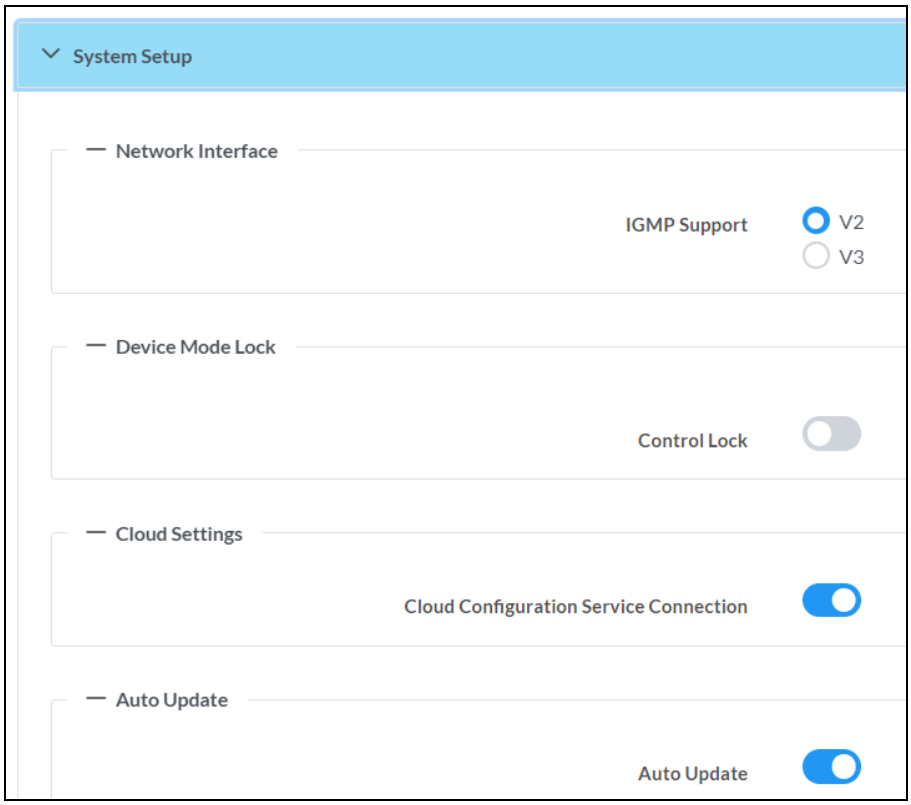
Settings available on the **Settings** page are organized into different sections:

- System Setup on page 440
- Network on page 446
- Stream on page 447
- DM NAX (AES67) Audio on page 456
- Routing on page 458
- Subscriptions (Receiver Mode Only) on page 461
- Inputs on page 463
- Outputs on page 465
- On Screen Display on page 476
- USB on page 477

- IR Ports on page 479
- Port Selection on page 480
- Test Pattern Generator on page 481

System Setup

The **System Setup** accordion contains settings for configuration of the following system functions.



Network Interface

The **Network Interface** section provides a choice between IGMPv2 and IGMPv3 operation. Choose the settings that match the capabilities of the network hardware.

NOTES:

- This setting must match on all DM NVX devices in a system to ensure compatibility.
- DM NVX devices are set to IGMPv2 operation by default.
- Crestron recommends leaving DM NVX systems set to IGMPv2 operation unless the network specifically requires IGMPv3.



To change the **Network Interface** mode:

1. Select **V2** to set the DM NVX device to IGMPv2 operation, or select **V3** to set the device to IGMPv3 operation.
2. Select **Save Changes**. A prompt will appear to reboot the device.
3. Select **Yes, Reboot Now** to reboot the device into the new **Network Interface** mode.

Device Mode Lock

The **Device Mode Lock** section provides a toggle for the **Control Lock** feature.

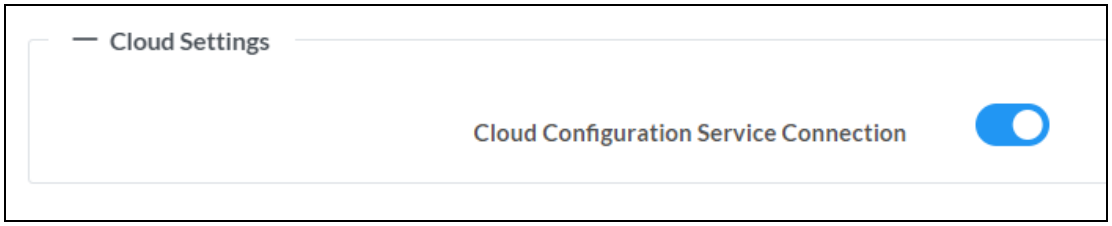


Set the **Control Lock** toggle to the right to lock out the push buttons built in to the DM NVX device.

Set the **Control Lock** toggle to the left to disable the lock, allowing the push buttons to control source routing and device modes.

Cloud Settings

The Cloud Settings section provides a toggle to enable or disable communication with the Crestron XiO Cloud® platform.

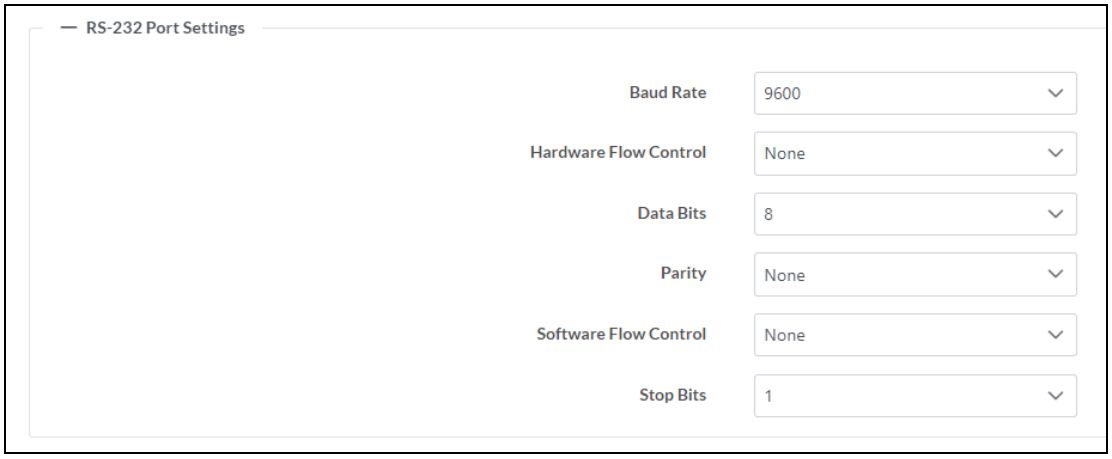


Set the **Cloud Configuration Service Connection** toggle to the right to allow the DM NVX device to communicate with the XiO Cloud platform. Set the toggle to the left to prevent the device from communicating with the XiO Cloud platform.

RS-232 Port Settings

> **NOTE:** This section is not available on card-based models.

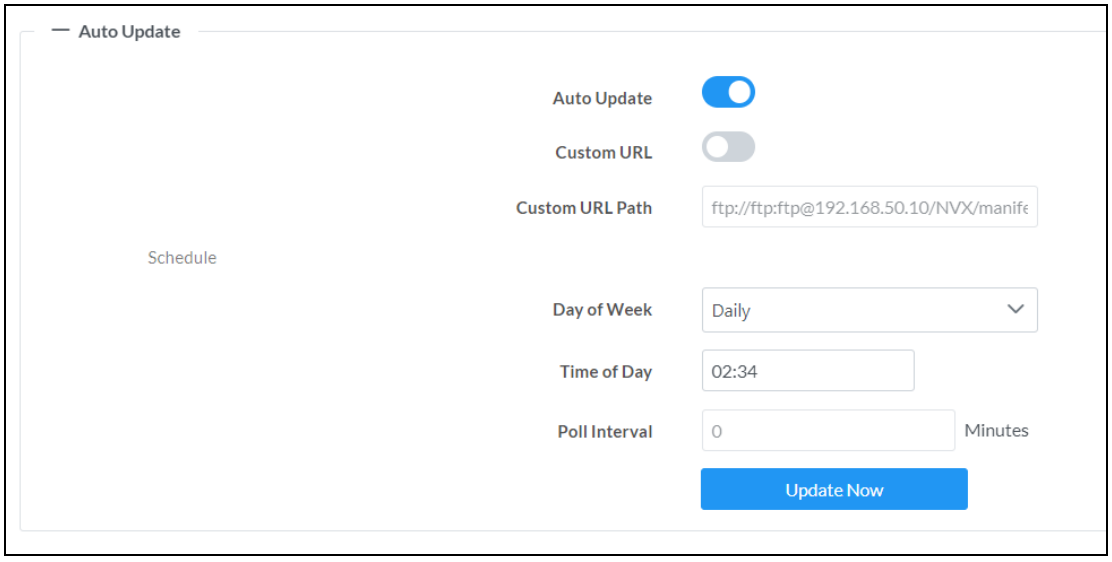
Configure the settings for the built-in RS-232 port of the device in the **RS-232 Port Settings** section.



- **Baud Rate:** Select the baud rate from the drop-down.
- **Hardware Flow Control:** Select the hardware flow control from the drop-down.
- **Data Bits:** Select the number of data bits from the drop-down.
- **Parity:** Select the parity from the drop-down.
- **Software Flow Control:** Select the software flow control from the drop-down.
- **Stop Bits:** Select the number of stop bits from the drop-down.

Auto Update

The DM NVX device can automatically check for and install firmware updates at scheduled intervals via the **Auto Update** feature.



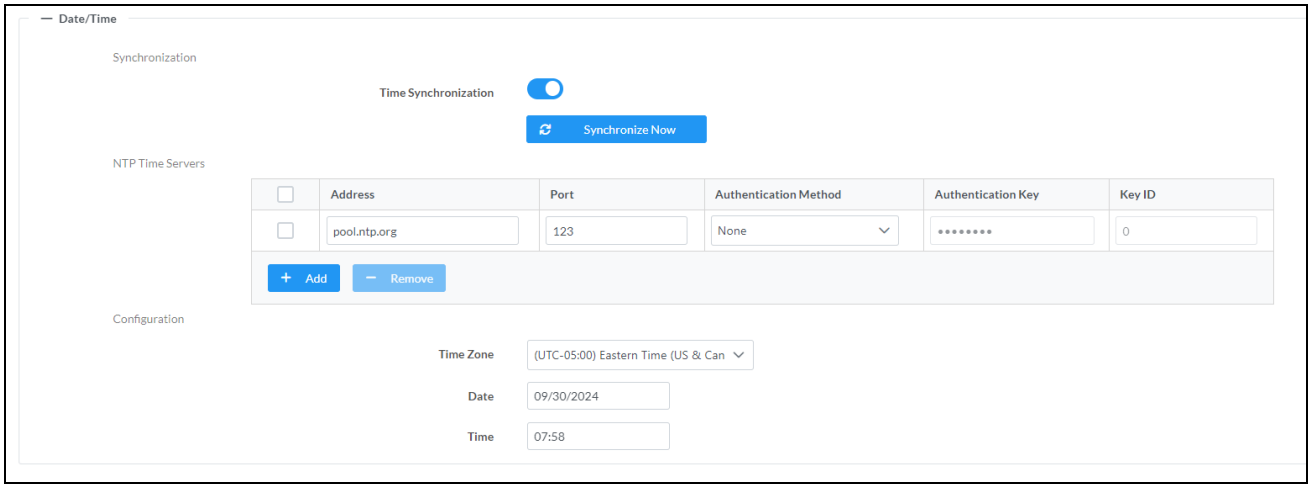
To configure the **Auto Update** feature settings:

1. Set the **Auto Update** toggle to the right to enable the **Auto Update** feature.
2. Define the URL to download the updates by doing either of the following:
    a. Use the default URL to download the updates from the Crestron server.
    b. Use a custom URL. Set the **Custom URL** toggle to the right to enable a custom URL. In the **Custom URL Path** text box, enter the path to a custom manifest file in the FTP or SFTP URL format. Use the Crestron Auto Update Tool to generate a custom manifest file, then store the file on an FTP (File Transfer Protocol) or SFTP (Secure File Transfer Protocol) server.
3. Set a schedule for the automatic firmware update by doing either of the following:
    a. Select the desired **Day of Week** and **Time of Day** (24-hour format) values.
    b. Set the **Poll Interval** by entering a value from 60 to 65535 minutes. A value of 0 disables the **Poll Interval**.
4. Select **Save Changes**.

Selecting **Update Now** causes the device to check for a firmware update immediately. If a schedule was set in step 3 above, that schedule still remains in effect.

Date/Time

Use the **Date/Time** section to configure the date and time settings of the DM NVX device.



Synchronization

1. Set the **Time Synchronization** toggle to the right to enable or left to disable time synchronization. By default, time synchronization is enabled.
2. In the **NTP Time Servers** table, enter the URL of a NTP (Network Time Protocol) or SNTP (Simple Network Time Protocol) server. Up to three time servers can be added on a device.
3. Select **Synchronize Now** to perform time synchronization between the device's internal clock and the time server.

Configuration

1. Open the **Time Zone** drop-down menu to select the applicable time zone.
2. In the **Date** field, enter the current date.

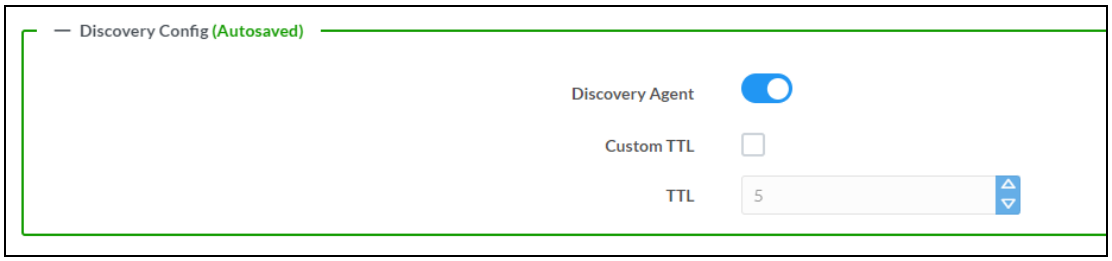
3. In the **Time (24hr Format)** field, enter the current time in 24-hour format.

Select **Save Changes** to save the settings.

Select **Revert** from the **Action** drop-down menu to revert to the previous settings without saving.

Discovery Config

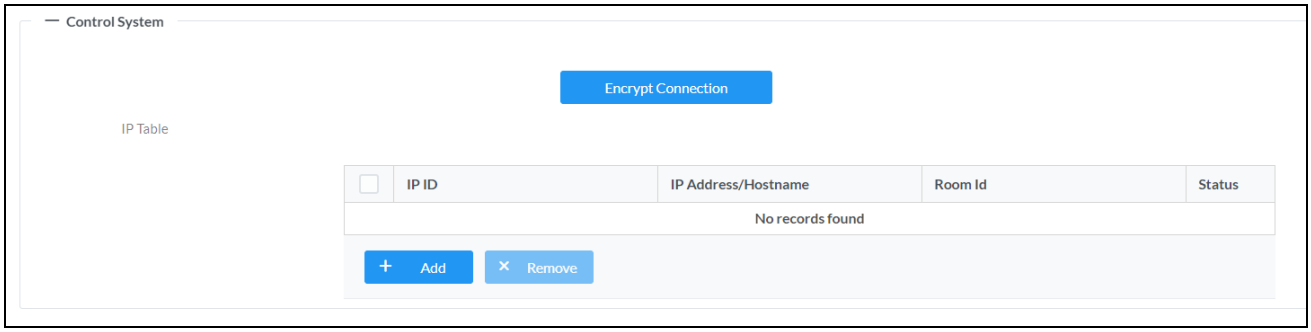
The **Discovery Config** section provides settings to customize how the DM NVX device and its streams can be discovered on the LAN.



Set the **Discovery Agent** toggle to the right to allow streams from the device to be discoverable on the network or to the left to prevent network discovery. When **Discovery Agent** is enabled, the streams from the DM NVX device are displayed in the **Available Streams** list of other receivers.

Select the **Custom TTL** option and enter a value in the **TTL** field if a custom Time-to-live (TTL) value is required on the network. The default **TTL** value is 5.

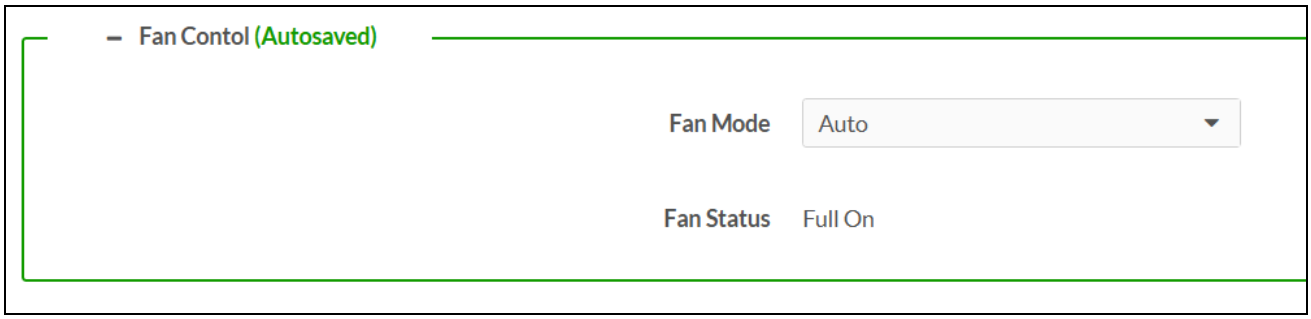
Control System



1. Select **Encrypt Connection** to navigate to the **Security** tab to configure encryption settings.
   a. Enter a username in the **Control System Username** field.
   b. Enter a password in the **Control System Password** field.
2. Select **+ Add** to add an IP table entry to the **IP Table**.
   a. Enter the Room ID in the **Room ID** field.
   b. Enter the IP ID of the DM NVX device in the **IP ID** field.
   c. Enter the IP address or hostname of the control system in the **IP Address/Hostname** field.
3. Select **Save Changes** to save the new entries. The **Control System Save** message box appears, indicating that the control system settings were saved successfully. Select **Revert** to revert to the previous settings without saving.

Fan Control (Receiver Mode Only)

> **NOTE:** This section is not available on card-based models.



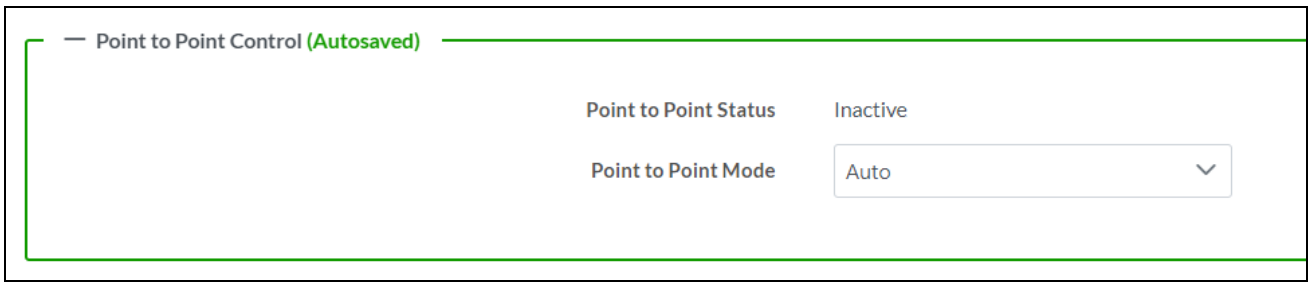
Select an option from the **Fan Mode** drop-down:

- **Auto:** The fan automatically turns on when either of these conditions are met:
  - A video stream is present.
  - The internal temperature of the device exceeds the normal operating range.
- **Always On:** The fan runs continuously regardless of video stream status and internal temperature.

Fan Status is a read-only field that will either read **Full On** to indicate that the fan is running or **Off** to indicate that the fan is not running.

Point to Point Control

The **Point to Point Control** section allows enabling or disabling point-to-point streaming of AV-over-IP between this device and another directly-connected DM NVX device without the need for a control system.



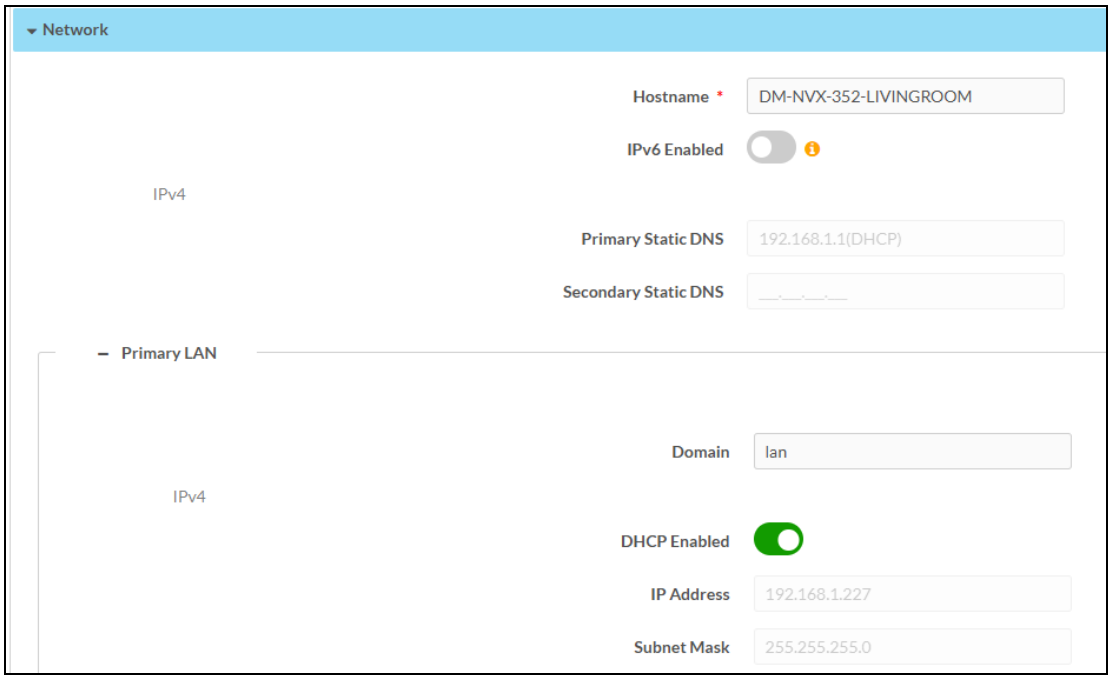
Point to Point Status is a read-only field that indicates whether point-to-point mode is **Active** or **Inactive**.

Select an option from the **Point to Point Mode** drop-down:

- **Auto:** (Default setting) Each 1000BASE-T port of the device detects whether it is connected directly to another DM NVX device or to a 1000BASE-T switch. If a direct connection between a DM NVX encoder and decoder is detected, point-to-point streaming is automatically initiated.
- **Disable:** Disables point-to-point streaming.

Network

The **Network** accordion contains network-related settings for the DM NVX device, including the **Hostname**, **Domain**, **Primary Static DNS**, and **Secondary Static DNS**.



NOTE: By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-352-00107F9C09B0.

Primary LAN

The **Primary LAN** subheading contains settings for **DHCP**, **IP Address**, **Subnet Mask**, and **Default Gateway** of the Ethernet adapter assigned as the **Primary LAN** via the **Port Selection** feature.

NOTE: Other LAN subheadings appear when the built-in Ethernet ports are given traffic designations via the **Port Selection** feature. Refer to Port Selection on page 480 for more information on designating specific traffic to specific Ethernet ports. The same settings are available for the additional LAN subheadings that are available for **Primary LAN**.

Set the **DHCP** toggle to the right to enable **DHCP** or left to disable **DHCP**. This determines whether the IP address of the **Primary LAN** port is to be assigned by a DHCP (Dynamic Host Configuration Protocol) server.

- **Enabled:** When DHCP is enabled (default setting), the IP address of the Primary LAN port is automatically assigned by a DHCP server on the local area network (LAN).

- **Disabled:** When DHCP is disabled, manually enter information in the following fields:
  - **Primary Static DNS:** Enter a primary DNS IP address.
  - **Secondary Static DNS:** Enter a secondary DNS IP address.
  - **IP Address:** Enter a unique IP address for the Primary LAN port.
  - **Subnet Mask:** Enter the subnet mask that is set on the network connected to the Primary LAN port.
  - **Default Gateway:** Enter the IP address that is to be used as the Primary LAN network's gateway.

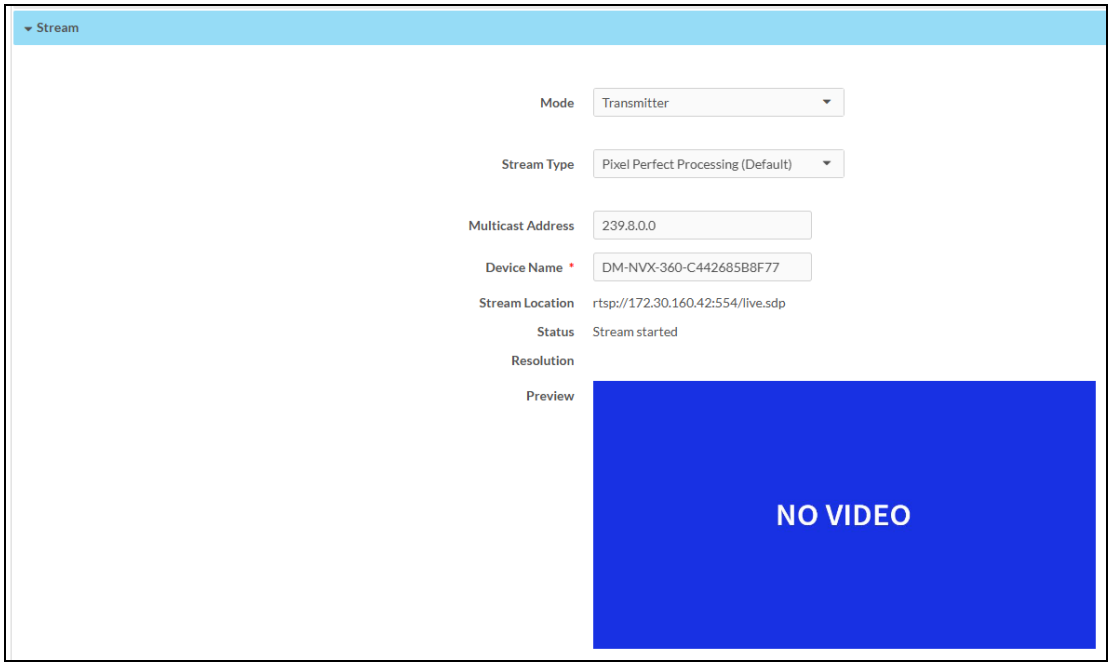
To save any new network entries, select **Save Changes**.

Stream

The settings available under the **Stream** accordion vary depending on whether the device is operating as a encoder (transmitter) or decoder (receiver).

Stream Settings (Transmitter Mode)

Sample Stream Settings (Transmitter Mode)



Configure the basic stream settings:

- **Mode:** Select either **Receiver** or **Transmitter** from the drop-down. Selecting a new mode requires a reboot of the device. Select **Save Changes** to apply the new mode and reboot the device.
- **Stream Type:** Select either **Pixel Perfect Processing** (if transmitting to other DM NVX 4K60 4:4:4 capable endpoints) or **DM-NVX-D10/D20** (if transmitting to a decoder in the D10/D20/D200 family of DM NVX decoders).

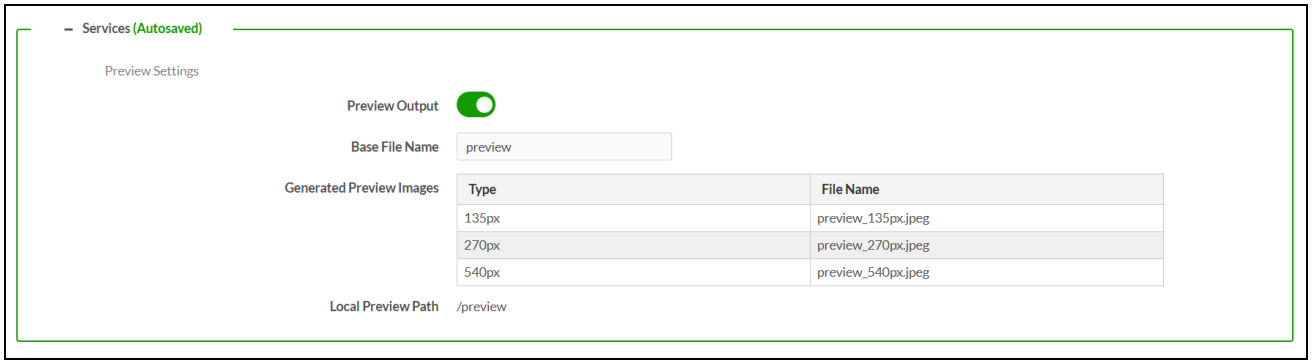
- **Multicast Address:** Sets the multicast address of the outgoing stream.
  - The secondary audio stream from the DM NVX device will consume the next multicast address above the value entered here. For example, a **Multicast Address** of 239.10.0.1 will result in a secondary audio stream address of 239.10.0.2.

> **CAUTION:** Ensure the value entered for **Multicast Address** is unique on the network. Duplicate multicast addresses will result in traffic collision and downstream receivers will fail to receive content.

> **NOTES:**
>
> - DM NVX devices can have a multicast transmit address anywhere in the range from 239.0.0.0 to 239.127.255.255. Starting at 239.1.0.0 is recommended to avoid common multicast MAC address conflicts.
> - DM NAX audio-over-IP devices use a multicast range from 239.8.0.1 to 239.127.255.255.

- **Device Name:** Displays the name of the DM NVX device. A custom name can also be entered in this text box. By default, this will match the hostname.
- **Stream Location:** Displays the network location of the stream.
- **Status:** Displays the status of the network stream (for example, **Stream starting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the outgoing stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

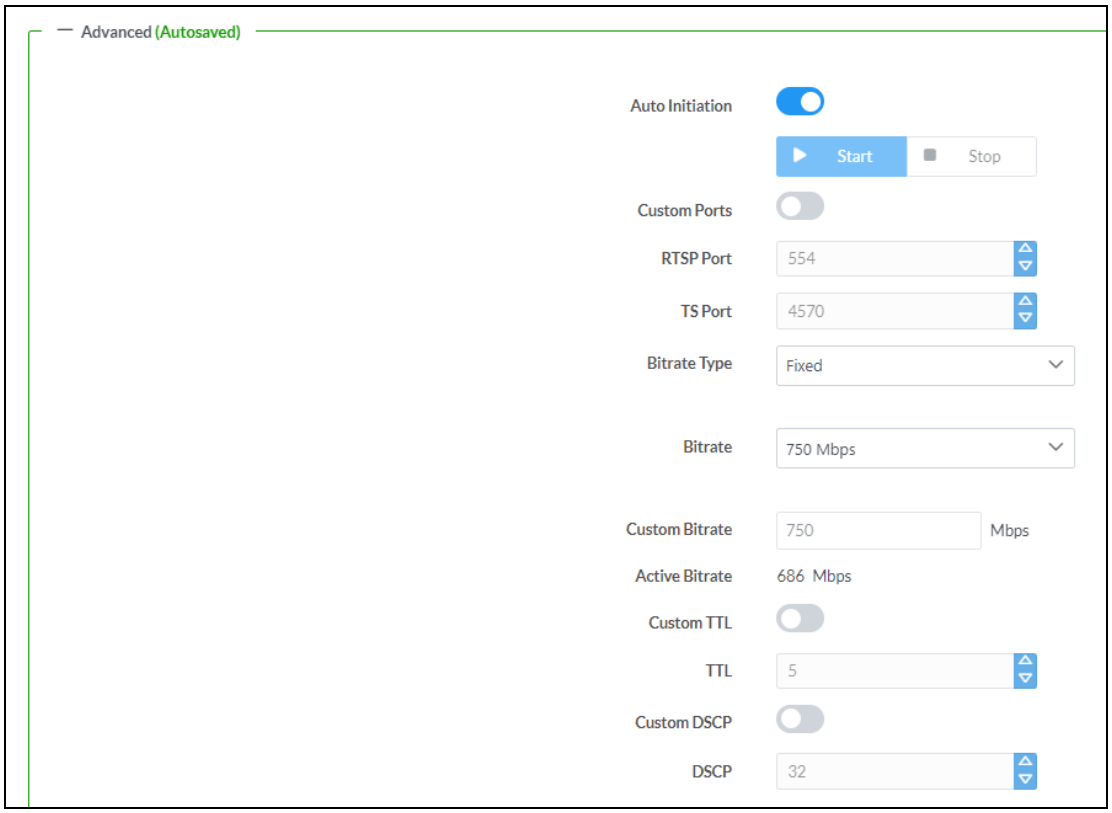
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the transmitting AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to configure a custom RTSP or TS port for the transmitting DM NVX stream. Set the toggle to the left to use the default values for both ports (the default RTSP port value is 554 and the default TS port value is 4570).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.
  - Enter a custom TS port in the **TS Port** field.

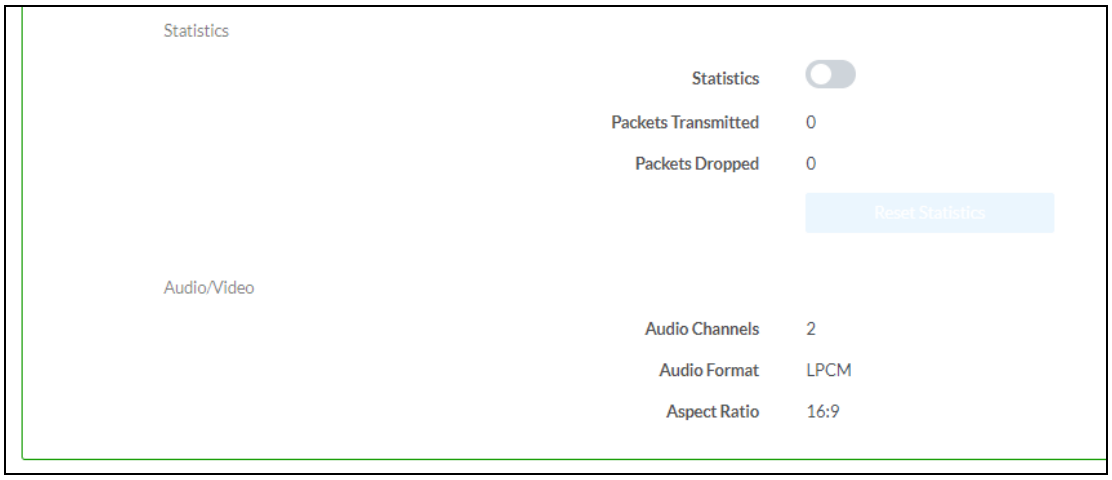
  > **NOTE:** Valid values for both custom port fields range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **Bitrate Type:** Select **Fixed**, **Variable**, or **Custom** from the drop-down.
    - **Fixed:** The transmitting DM NVX stream always meets the bitrate specified by the **Bitrate** drop-down. The default and recommended bitrate value is 750 Mbps.
    - **Variable:** The bitrate of the transmitting DM NVX stream is dynamic based on the resolution of the stream content. Selecting **Variable** will disable the **Bitrate** drop-down and **Custom Bitrate** text entry field.
    - **Custom:** The transmitting DM NVX stream always meets the bitrate specified by the **Custom Bitrate** text entry field. The default and recommended bitrate value is 750 Mbps.
- **Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Fixed**.
- **Custom Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Custom**.
- **Active Bitrate:** Displays the current bitrate of the transmitting DM NVX stream.
- **Custom TTL:** Multicast Time-to-live (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.

  Select the **Custom TTL** checkbox to enter a custom TTL value for the DM NVX stream in the **TTL** field.
- **TTL:** Enter a value from 1 to 255. The default TTL value is 5.
- **Custom DSCP:** To implement Quality of Service (QoS), IP networks use Differentiated Services Code Point (DSCP) values. Within an IP packet header, the DSCP is a value from 0 to 63 that maps to a certain traffic classification. Based on IT department policies and network switch configurations, DSCP values are used to determine the treatment of specific packets in router queues, the routes of traffic flows, and per-hop behavior. By default, DSCP for DM NVX AV-over-IP is set to 32.

  Select the **Custom DSCP** checkbox to enter a custom DSCP value for the DM NVX stream's AV-over-IP packets in the **DSCP** field

  > **NOTE:** Only change the DSCP value if required by IT department policies or if necessitated by poor network performance. Refer to AV-over-IP Network Design on page 871 for network performance troubleshooting tips.

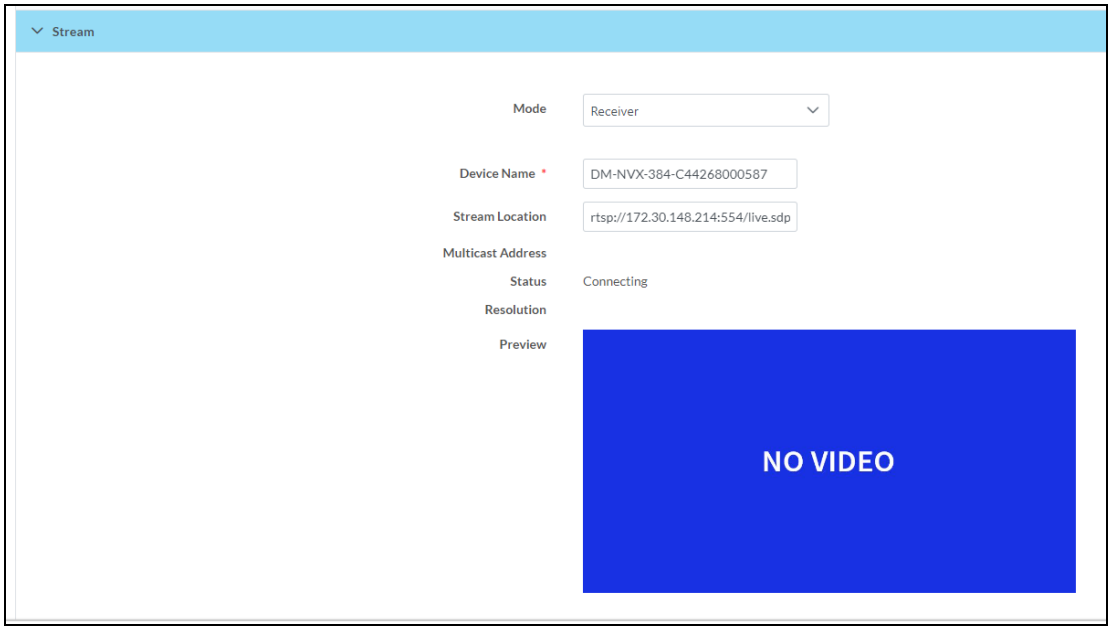


The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the transmitting DM NVX stream:
  - **Packets Transmitted** will display the total number of packets transmitting by the DM NVX device as part of the outgoing DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - Select **Reset Statistics** to set both **Packets Transmitted** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the transmitting DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the transmitting DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the transmitting DM NVX stream.

Stream Settings (Receiver Mode)

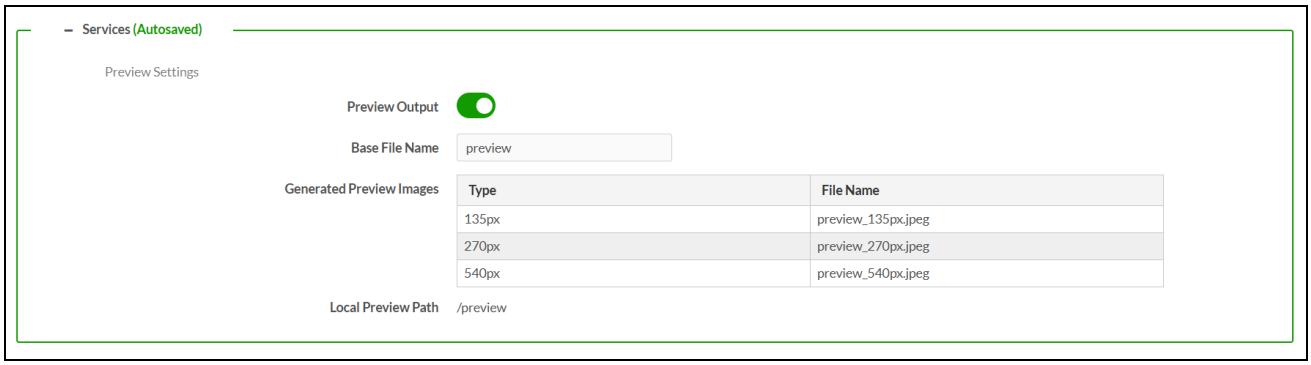
Sample Stream Settings (Receiver Mode)



Configure the basic stream settings:

- **Mode:** Select either **Receiver** or **Transmitter** from the drop-down. Selecting a new mode requires a reboot of the device. Select **Save Changes** to apply the new mode and reboot the device.
- **Device Name:** Displays the name of the upstream DM NVX device. By default, this will match the hostname.
- **Stream Location:** Displays the network location of the incoming stream. A stream location can also be manually entered by typing in this text field.
- **Multicast Address:** Displays the multicast address of the incoming stream.
- **Status:** Displays the status of the network stream (for example, **Connecting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the incoming stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

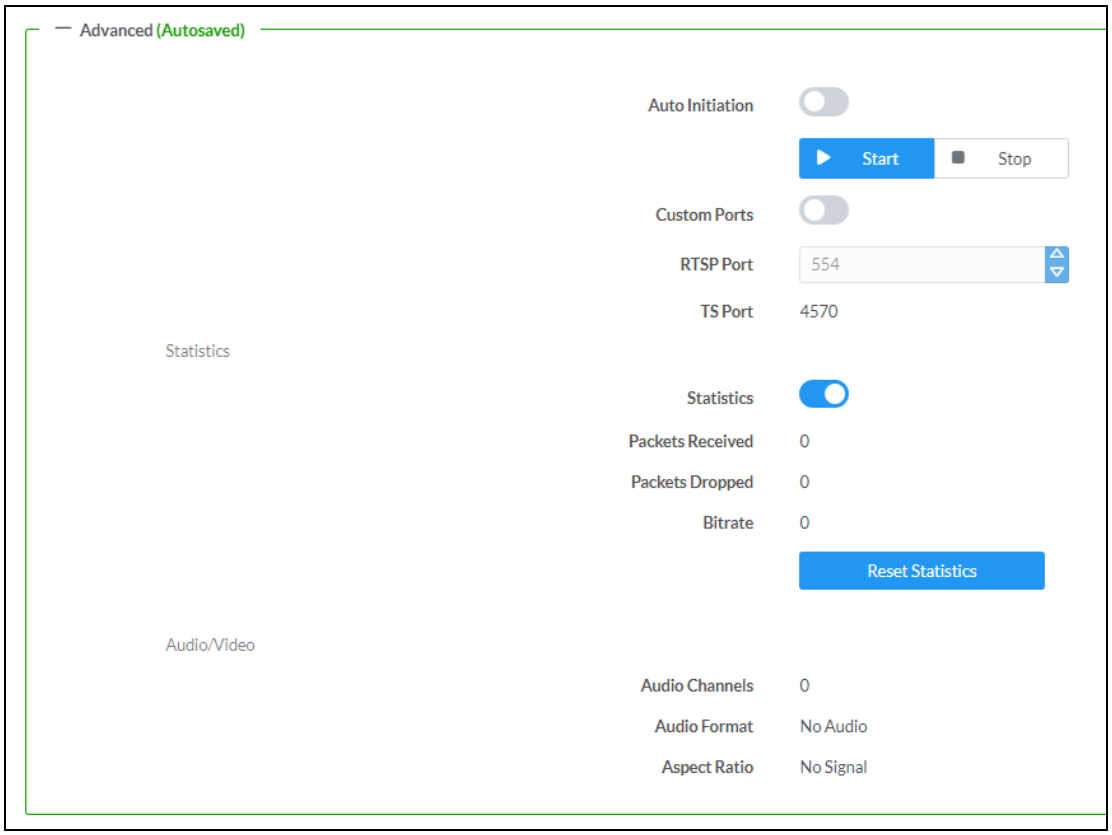
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the incoming AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to set a custom RTSP port to connect to an incoming DM NVX stream. Set the toggle to the left to use the default port values (the default RTSP port value is 554).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.

  > **NOTE:** Valid values for the custom port field range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **TS Port:** Displays the default TS port value (4570).

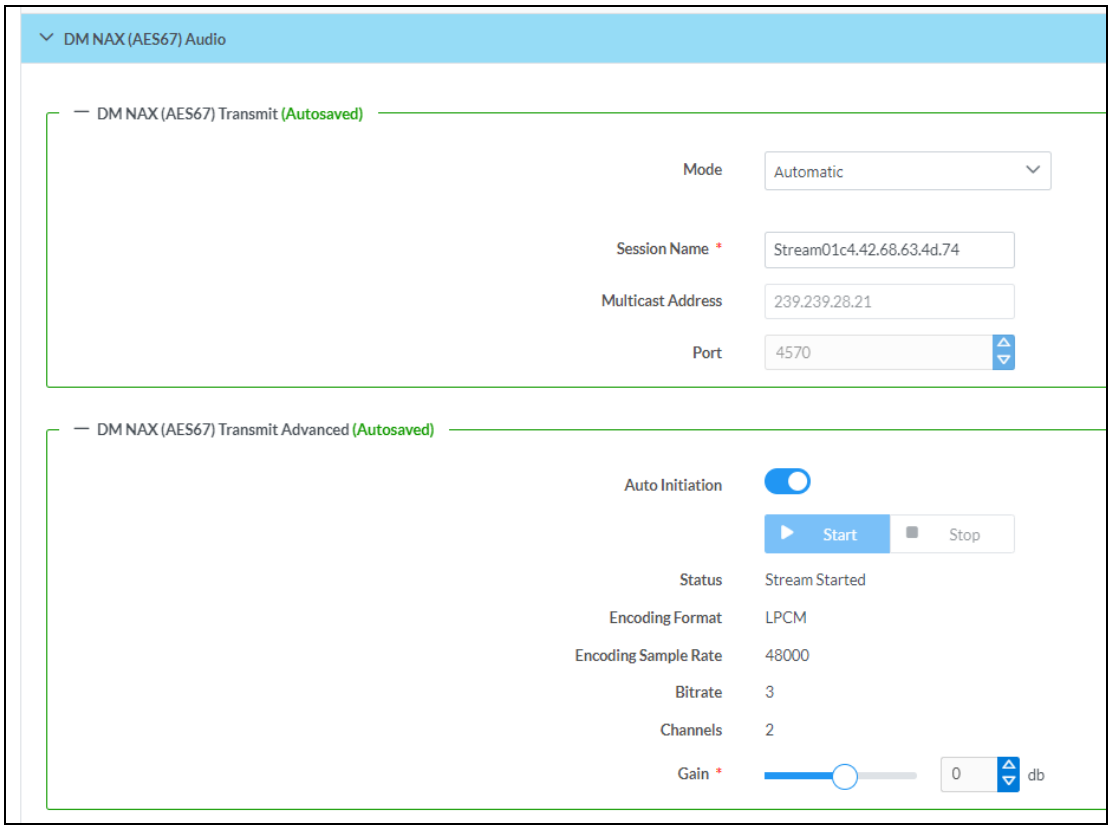
The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the incoming DM NVX stream:
    - **Packets Received** will display the total number of packets received by the DM NVX device as part of the incoming DM NVX stream.
    - **Packets Dropped** will display the total number of dropped packets.
    - **Bitrate** will display the current bitrate of the incoming DM NVX stream.
    - Select **Reset Statistics** to set both **Packets Received** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the incoming DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the incoming DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the incoming DM NVX stream.

DM NAX (AES67) Audio

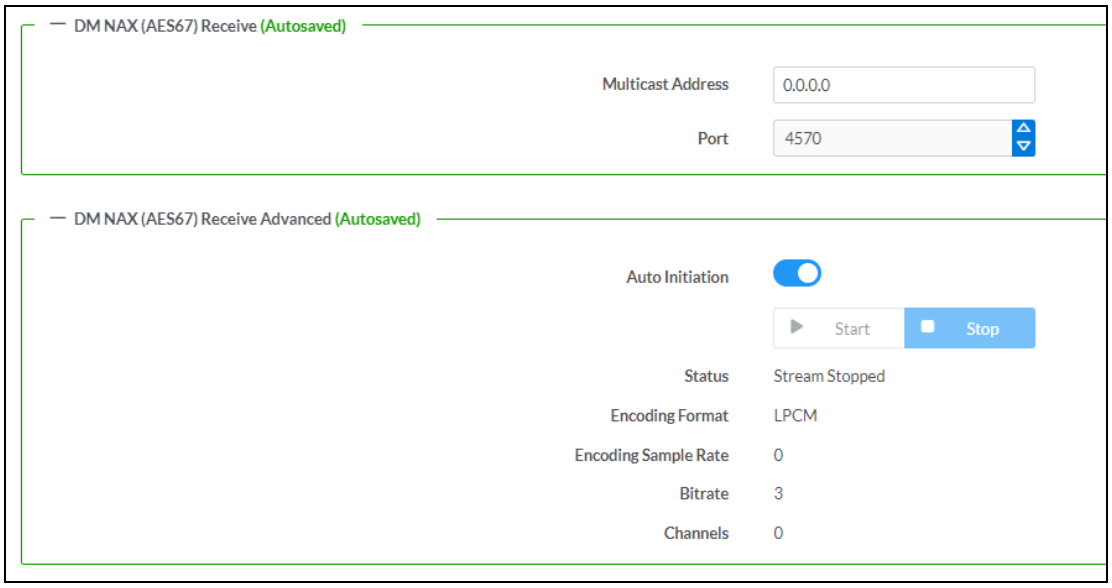
DM NVX devices natively support DM NAX® audio-over-IP technology, which is built off the standards of AES67. AES67 support allows a selected audio source to be transmitted as a 2-channel AES67 stream while another 2-channel AES67 audio stream is received from another AES67-capable device or Crestron DM NAX device.

Use the **DM NAX (AES67) Audio** accordion to configure the DM NAX audio-over-IP transmit and receive streams of the DM NVX device.



To configure the **DM NAX (AES67) Transmit** stream:

1. Select a stream addressing mode from the **Mode** drop-down:
    - **Automatic** adds 1 to the outgoing video stream multicast address to generate the DM NAX transmit multicast address. For example, if the video multicast address is 239.8.0.1, the DM NAX (AES67) multicast address is automatically set to 239.8.0.2.
    - **Manual** requires the multicast address of the transmitting DM NAX stream to be set manually. Selecting **Manual** enables the **Multicast Address** and **Port** text entry fields.
    - **Disabled** turns off DM NAX transmission from the DM NVX device.
2. Set a custom session name in the **Session Name** text entry field. This is similar to setting a hostname for an IP address on the LAN. The session name will appear in addition to the multicast address when the DM NAX audio-over-IP stream is discovered on the network.
3. If the **Mode** is set to **Manual**, enter custom values in the **Multicast Address** and **Port** text entry fields.
4. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the DM NAX transmit stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.
5. Adjust the **Gain** slider to configure the audio level compensation on the transmitting DM NAX stream from -10 to +10 dB.

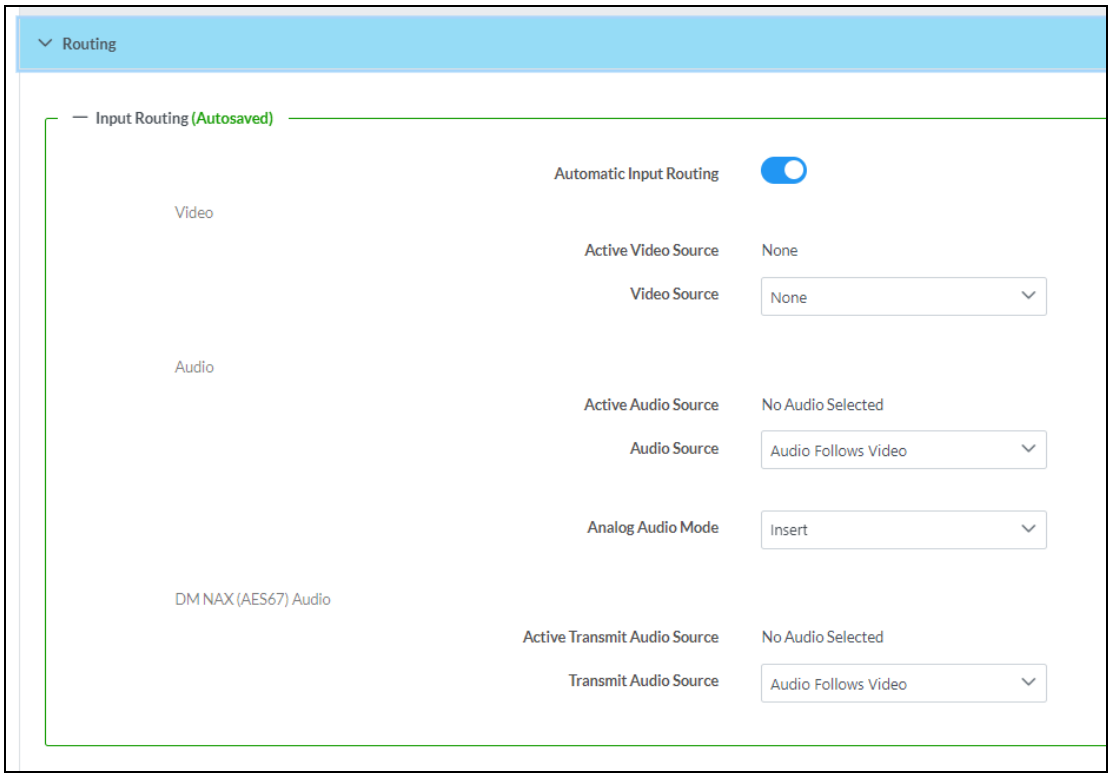


To configure the **DM NAX (AES67) Receive** stream:

1. Enter a valid multicast IP address in the **Multicast Address** field.
2. Enter the port value of the stream in the **Port** field.
3. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the incoming DM NAX stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

Routing

Use the **Routing** accordion to configure the audio and video routing behavior of the DM NVX device's internal switcher, secondary audio stream, and DM NVX AV-over-IP receiver.



Input Routing

The **Input Routing** section provides settings relating to the internal video switcher and secondary audio stream of the device:

Set the **Automatic Input Routing** toggle to the right to have the device route the HDMI input automatically by signal detection. Set the toggle to the left to manually set the active source via the drop-down menus or a control system program.

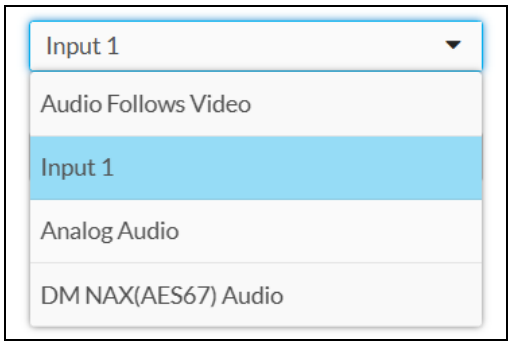
The fields under the **Video** subheading refer specifically to video signal routing:

- The **Active Video Source** read-only field displays the name of the currently active video source.
- Use the **Video Source** drop-down to manually set an active video source from between **None** and **Input 1**.

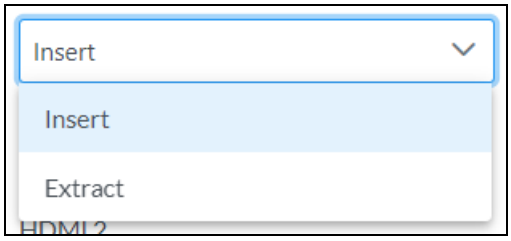
The fields under the **Audio** subheading refer specifically to audio signal routing, which can be handled separately from video routing.

- The **Active Audio Source** read-only field displays the name of the currently active audio source. This reflects the audio that is embedded in the HDMI output (in Receiver mode) or DM NVX AV-over-IP stream (in Transmit mode) of the device, as well as the audio that transmits from the analog audio connector when **Analog Audio Mode** is set to **Extract**.

- Use the **Audio Source** drop-down to manually set an active audio source from among **Audio Follows Video**, **Input 1**, **Analog Audio**, and **DM NAX (AES67) Audio**.

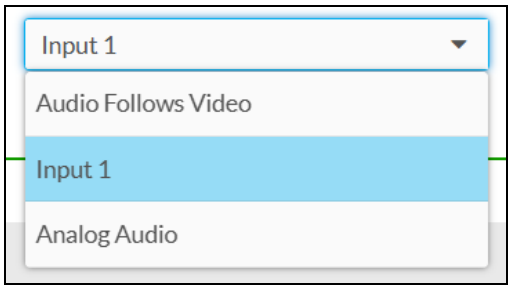


- Use the **Analog Audio Mode** drop-down to select between **Insert** or **Extract**.
  - In **Insert** mode, the analog audio connector will function as an input and the incoming audio signal can be selected as the **Audio Source**.
  - In **Extract** mode, the analog audio connector will function as an output and will transmit the audio signal selected as **Active Audio Source**.



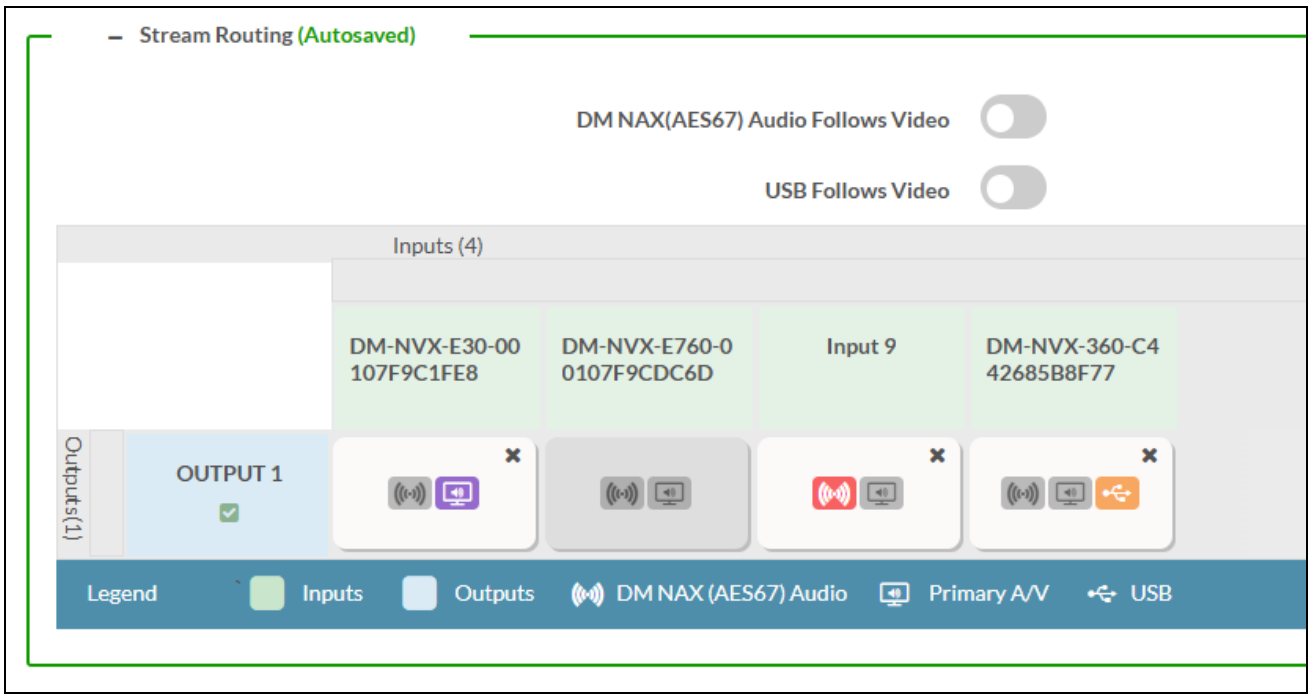
The fields under the **DM NAX (AES67) Audio** subheading refer to the secondary audio stream of the DM NVX device. This is a discrete audio path that is not affected by the **Audio Source** or **Analog Audio Mode** settings.

- The **Active Transmit Audio Source** read-only field displays the name of the audio source currently transmitting on the AES67 secondary audio stream.
- Use the **Transmit Audio Source** drop-down to manually set an AES67 audio source from among **Audio Follows Video**, **Input 1**, and **Analog Audio**.



Stream Routing (Receiver Mode Only)

The **Stream Routing** section houses the routing matrix for audio, video, and USB signals that can be received over the network.



NOTE: In order for the routing matrix to appear, at least one subscription must be added from the **Subscriptions** accordion. Refer to Subscriptions (Receiver Mode Only) on page 461 for information on adding subscriptions.

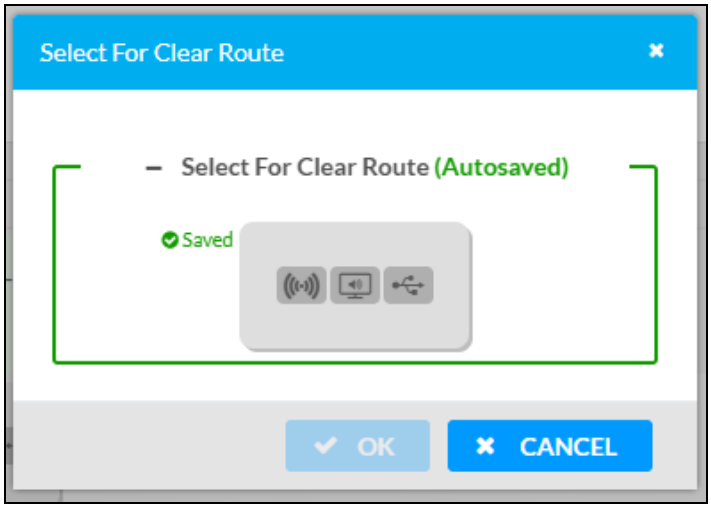
Configure the toggles to establish preferred routing settings:

- Set the **DM NAX (AES67) Audio Follows Video** toggle to the right to have the secondary audio stream match the same routes as the primary AV stream. Set the toggle to the left to manage the secondary audio stream routing independently of the primary AV stream.
- Set the **USB Follows Video** toggle to the right to have USB routes match the routing of the primary AV stream. Set the toggle to the left to manage USB routing independently of the primary AV stream.

Use the routing matrix to establish or break signal routes:

- To route an AV-over-IP stream to the DM NVX device, select the **Primary A/V** icon in that stream's matrix column. If either the **DM NAX (AES67) Audio Follows Video** or **USB Follows Video** toggles are set to the right, their respective icons will also be selected automatically for that stream.
- To route a DM NAX (AES67) stream to the DM NVX device, select the **DM NAX (AES67) Audio** icon in that stream's matrix column. To manage this independently of the AV-over-IP stream, the **DM NAX (AES67) Audio Follows Video** toggle must be set to the left.

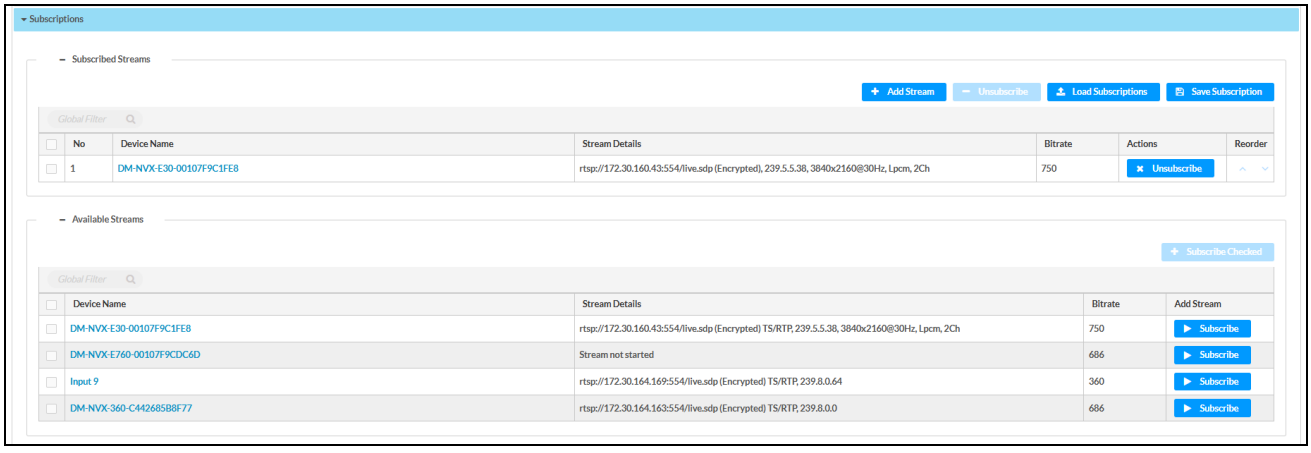
- To route a USB signal to the DM NVX device, select the **USB** icon in that stream's matrix column. This icon is only available on USB-capable endpoints. To manage this independently of the AV-over-IP stream, the **USB Follows Video** toggle must be set to the left.
- To clear a route, do one of the following:
  - Select the ✖ icon for a given input to clear all routes from that input.
  - Select the ☑ icon for a given output to clear routes from that input. A **Select For Clear Route** window appears.



Select any or all of the signal types to clear all routes of those types from the output, then select **OK** to clear those routes or **Cancel** to cancel the operation.

Subscriptions (Receiver Mode Only)

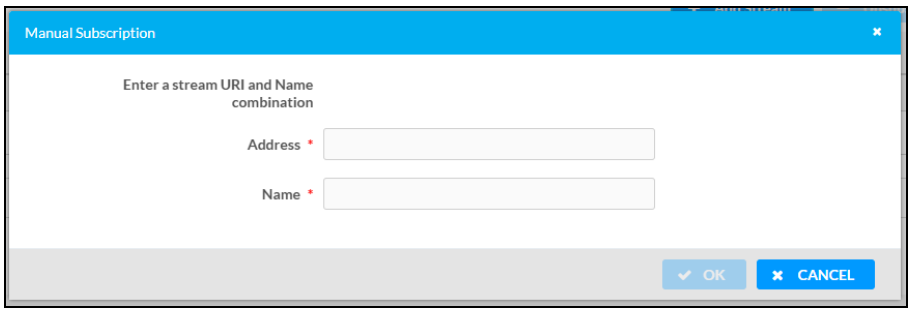
The **Subscriptions** accordion allows the DM NVX receiver to subscribe to discovered network AV-over-IP streams for quick routing and switching without having to manually enter multicast addresses or session names.



The **Subscribed Streams** table displays all network streams that the device is subscribed to. These streams are also available in the routing matrix in the **Routing** accordion. Refer to Stream Routing (Receiver Mode Only) on page 460 for information on routing a subscribed stream.

To add a stream to the table, do either of the following:

- Select **+ Add Stream**. A **Manual Subscription** window appears.



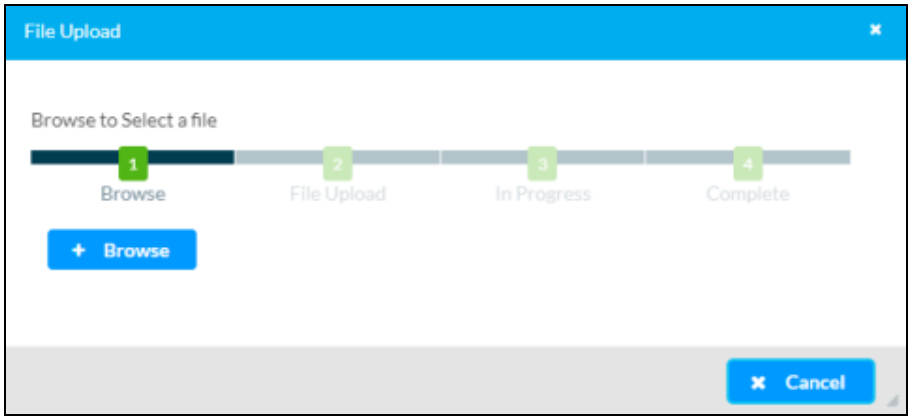
  - Enter the multicast address of the stream in the **Address** field.
  - Enter the device name of the transmitting device in the **Name** field.
  - Select **✓ OK** to add the stream to the **Subscribed Streams** list or select **X Cancel** to cancel the operation.
- Select the **Subscribe** button for a stream listed in the **Available Streams** table.

To add multiple streams to the table at once, select the checkbox for each desired stream in the **Available Streams** table, then select **+ Subscribe Checked**.

To remove a stream from the table, select **x Unsubscribe** in its table row. To remove multiple streams at once, select the checkbox for each stream in the **Subscribed Streams** table, then select **- Unsubscribe** at the top of the table.

The **Subscribed Streams** table can also be exported as a .xml file to other DM NVX receivers. This allows the subscription process to be performed even more efficiently on other receivers. To export the table and upload it to another receiver:

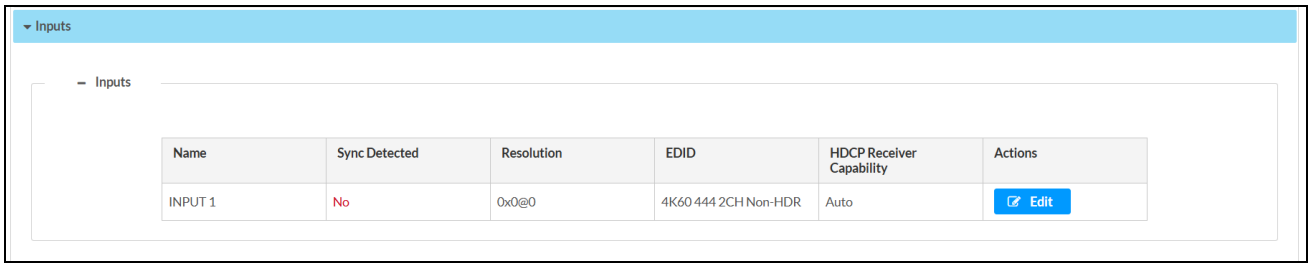
1. Subscribe to all of the desired network streams.
2. Select **Save Subscription** at the top of the **Subscribed Streams** table. A .xml file will be downloaded to the connected PC.
3. Log in to the next DM NVX receiver's web interface and navigate to its **Subscriptions** accordion.
4. Select **Load Subscriptions** at the top of the **Subscribed Streams** table. A **File Upload** window appears.



5. Select **+ Browse**. Locate the .xml file, then select **Upload** to upload it to the DM NVX device. When the upload completes, the window will close and the interface will return to the **Subscriptions** accordion with the **Subscribed Streams** table filled out.

Inputs

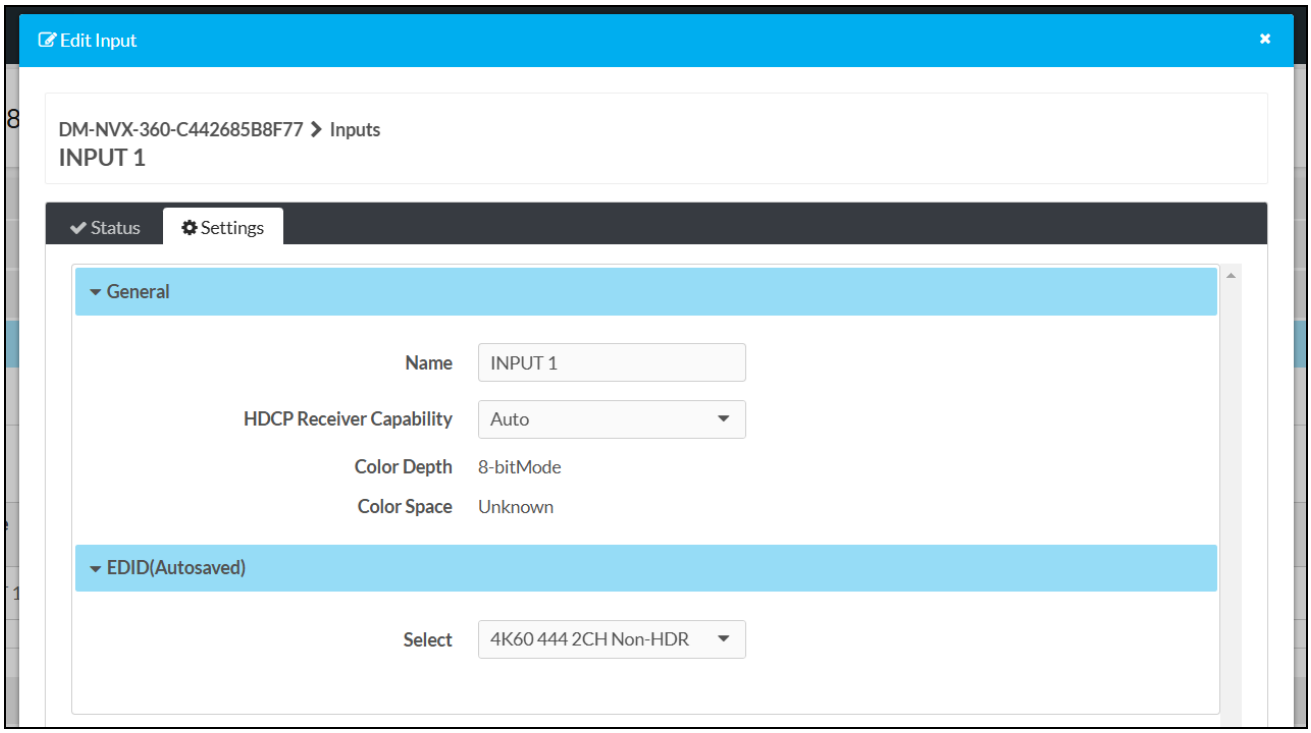
The **Inputs** accordion contains source resolution and EDID information as well as input configuration options for the local input connector on the DM NVX device.



To configure the input, select the **Edit** button. An **Edit Input** window appears.

Edit Input

The **Edit Input** window will open to the **Settings** tab by default. This tab enables configuration of the available input settings for the HDMI input.



The **General** accordion is open by default.

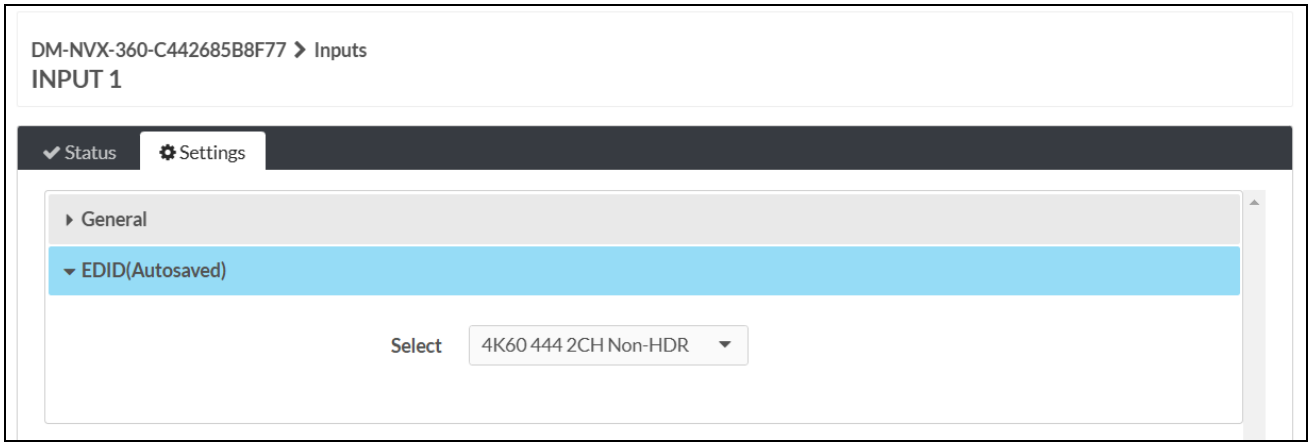
Enter a friendly name for the input in the **Name** text entry field.

Use the **HDCP Receiver Capability** drop-down to select **Auto** or a specific HDCP version. The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display.

NOTE: Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

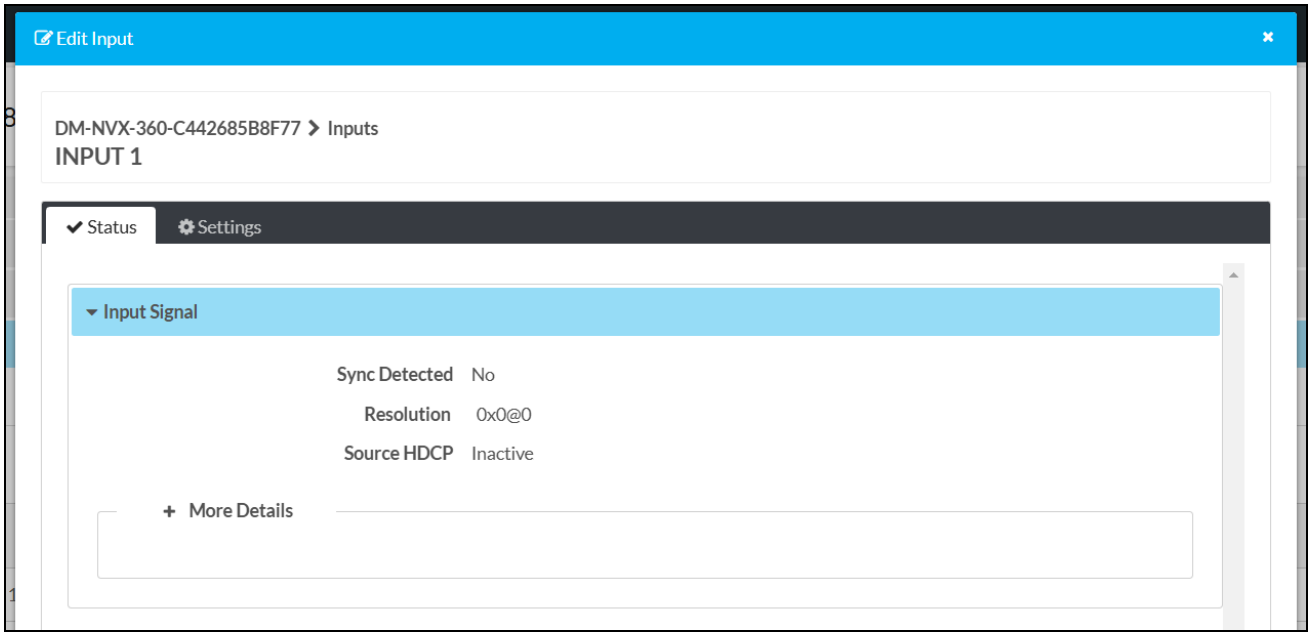
The **Color Depth** and **Color Space** fields are read-only and depend on the incoming video signal.

Select the **EDID** accordion to access EDID settings specific to the selected input.



Use the **Select** drop-down to apply a specific EDID file to the selected input. All built-in and custom EDIDs are available in this list. Refer to Action on page 424 for more information on loading custom EDIDs to this list.

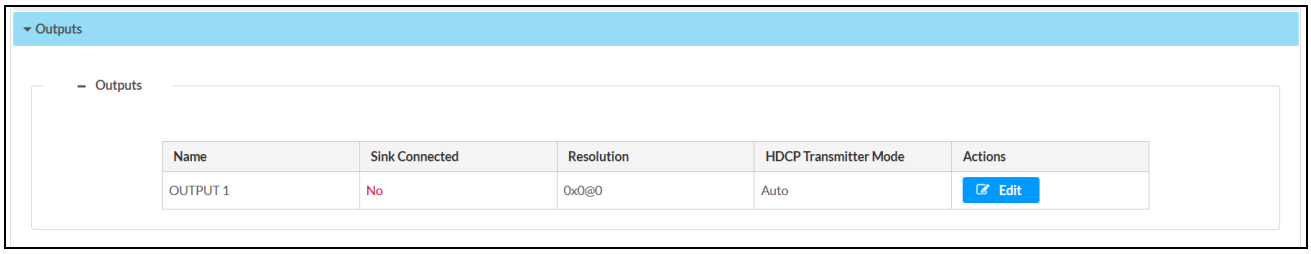
Select the **Status** tab to reference sync, resolution, HDCP, and audio information for the connector and input source.



Use **OK** or **Cancel** to return to the **Settings** page. Select **OK** to apply any changes made in the **Edit Input** window or select **Cancel** to discard the changes.

Outputs

The **Outputs** accordion contains status information and an **Edit** option for the local HDMI output connector on the DM NVX device.

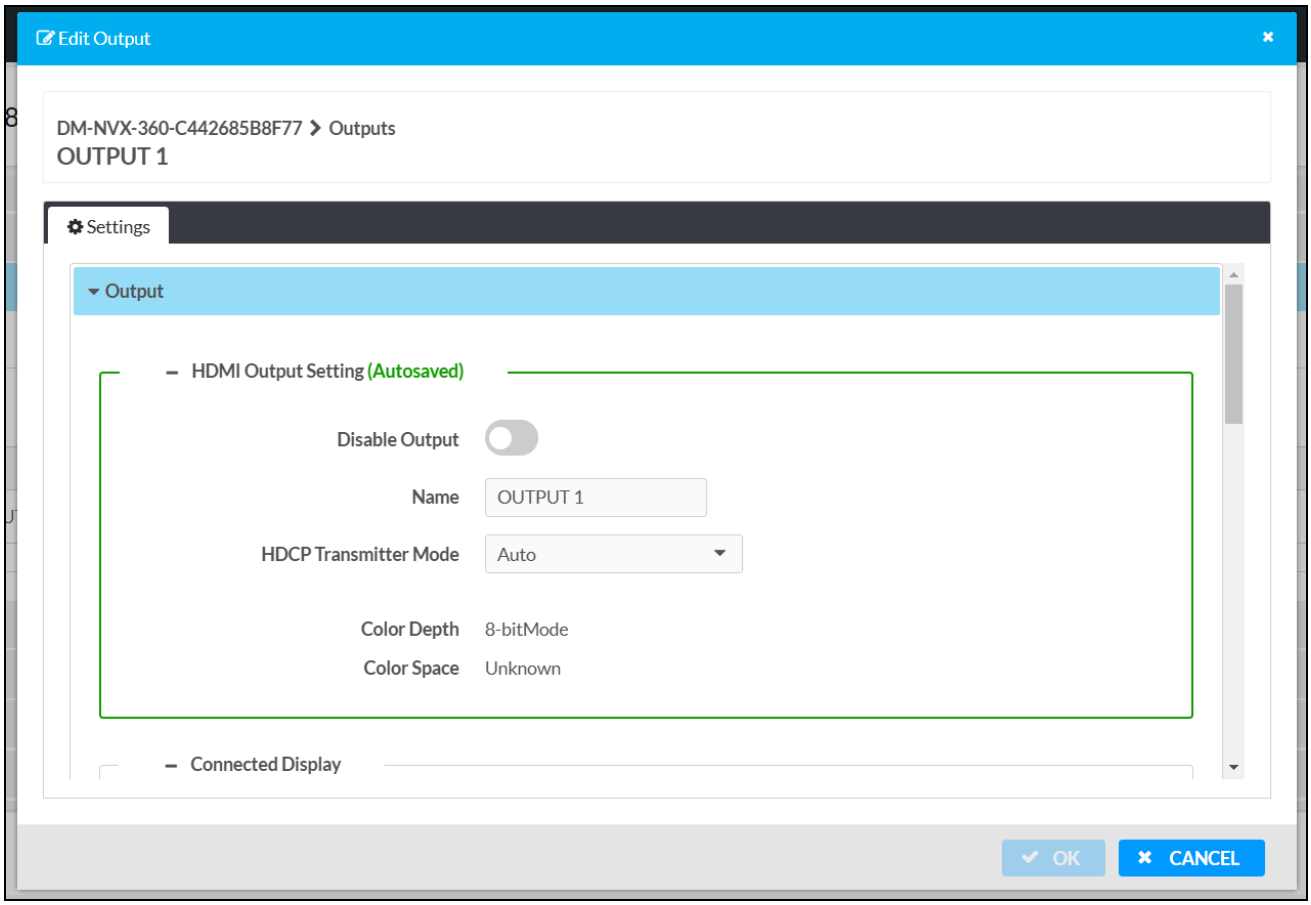


To configure the output, select the **Edit** button. An **Edit Output** window appears. The settings available in the **Edit Output** window depend on which mode the DM NVX device is in:

- Edit Output - Output Accordion (Transmitter Mode) on page 465
- Edit Output - Output Accordion (Receiver Mode) on page 469

Edit Output - Output Accordion (Transmitter Mode)

The **Output** accordion is open by default.

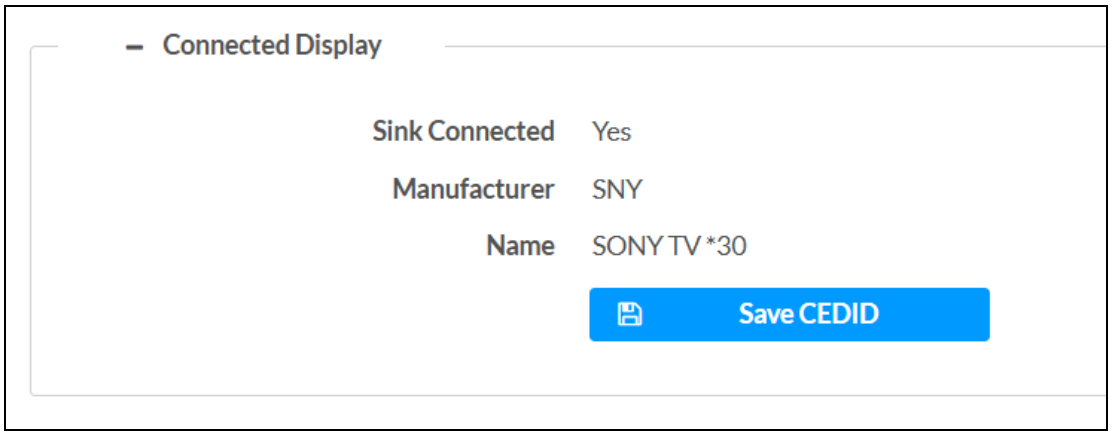


HDMI Output Settings

Configure basic settings under the **HDMI Output Setting** subheading:

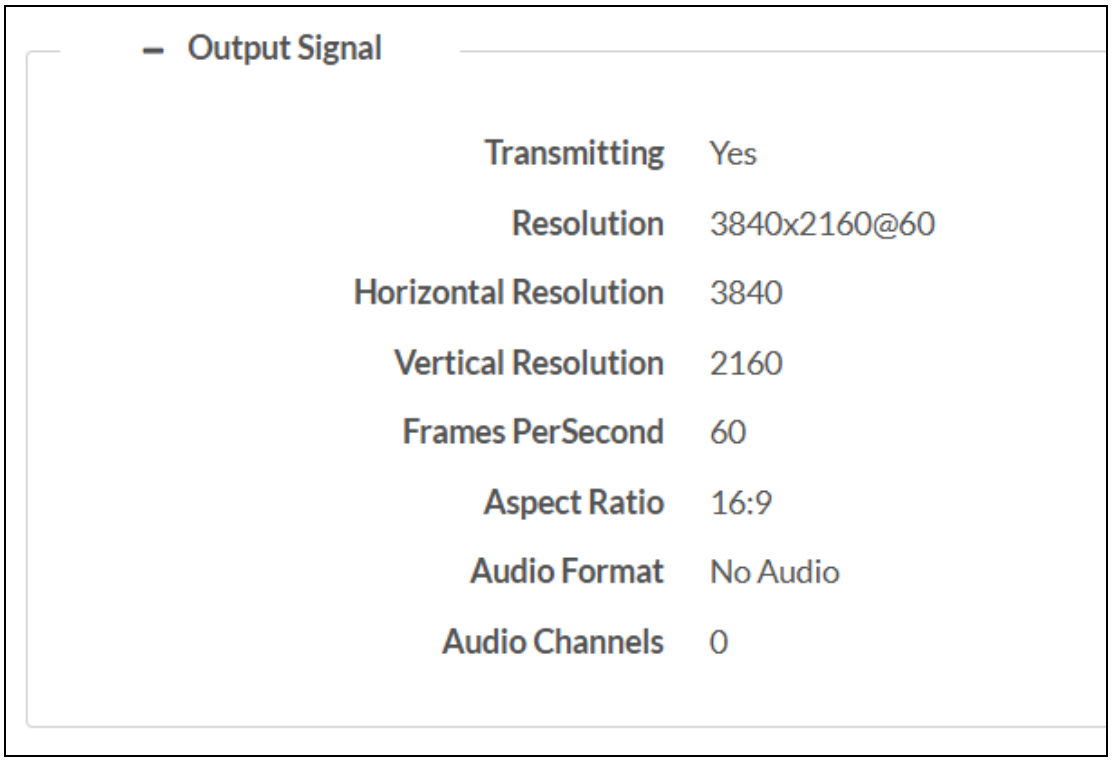
- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Enter a friendly name for the output in the **Name** text entry field.
- Use the **HDCP Transmitter Mode** drop-down to select between:
  - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
  - **FollowInput:** The HDCP level of the output will match the HDCP level of the input connector currently routed to the output.
  - **Always:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the output.
  - **Never:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.

Connected Display



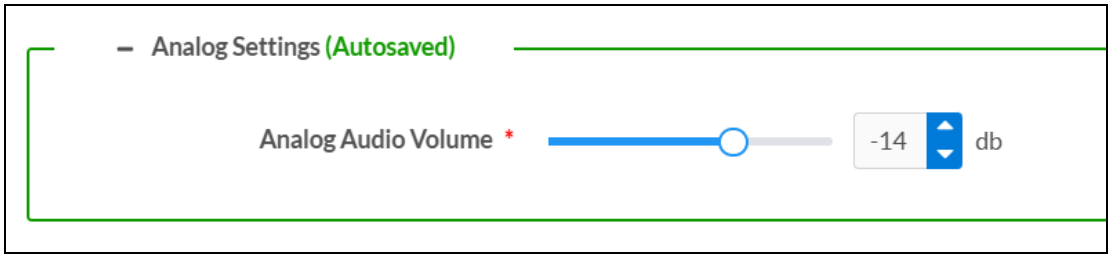
The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 424 for more information on loading custom EDID files.

Output Signal



The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.

Analog Settings

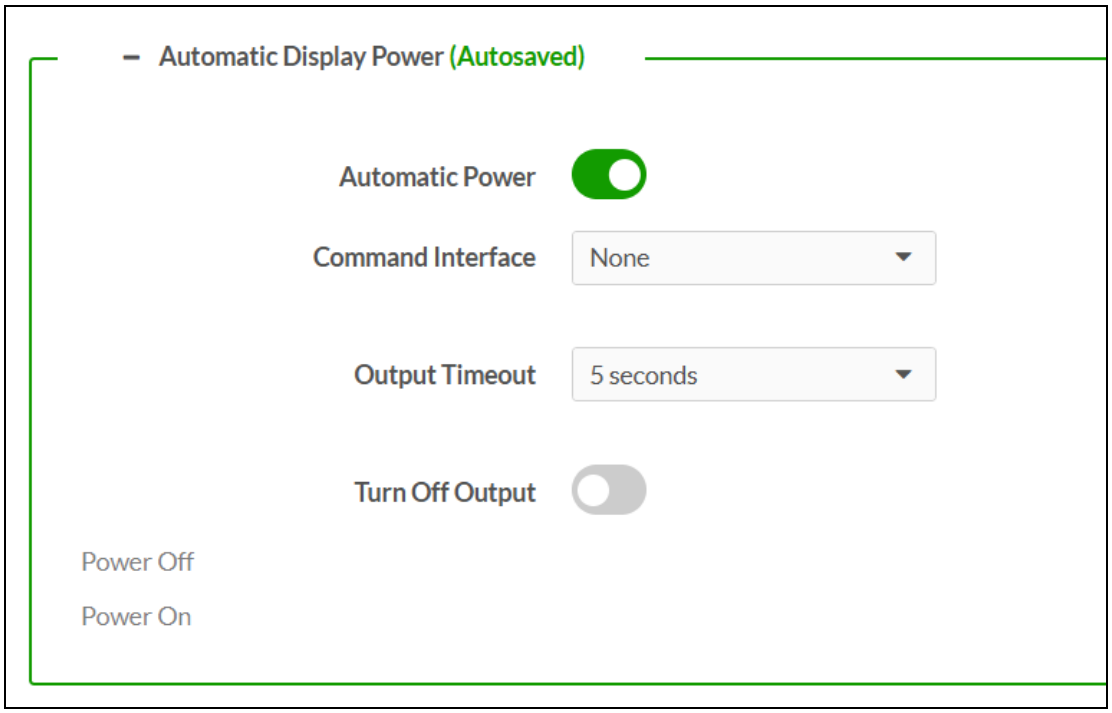


To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

Automatic Display Power



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

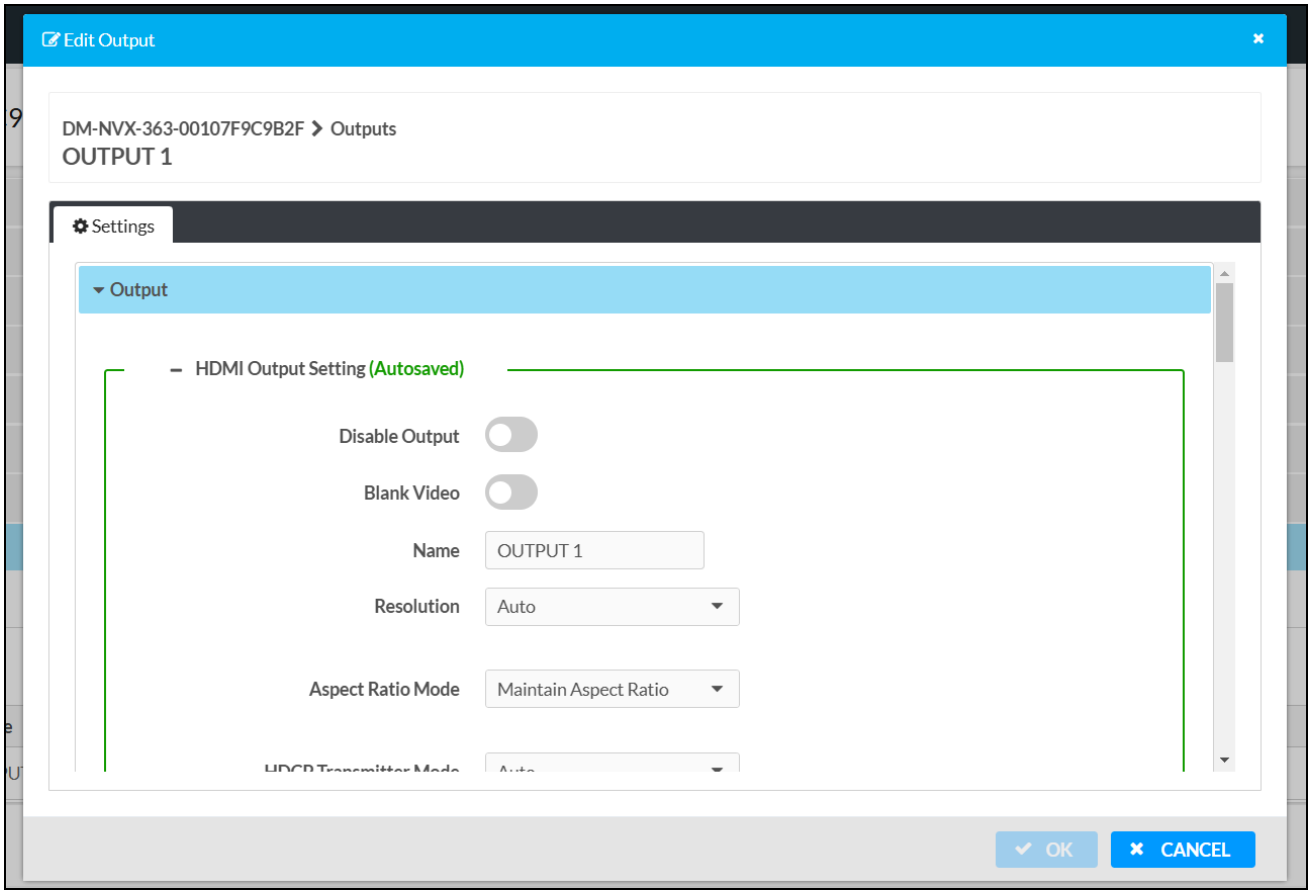
Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**

> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Edit Output - Output Accordion (Receiver Mode)

The **Output** accordion is open by default.



HDMI Output Settings

Configure basic settings under the **HDMI Output Setting** subheading:

- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Set the **Blank Output** toggle to the right to transmit a full-screen black video signal. Set the toggle to the left to transmit the video signal of the selected input.
- Enter a friendly name for the output in the **Name** text entry field.
- Use the **Resolution** drop-down to select between **Auto** or any of the available fixed resolutions to have the internal scaler either match the highest possible resolution of the display or the selected fixed resolution.

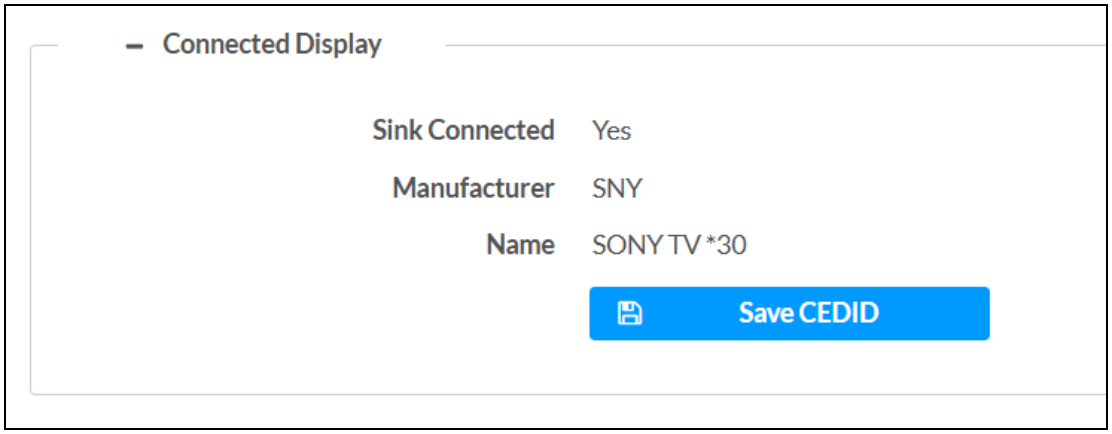
- Use the **Aspect Ratio Mode** drop-down to select between:
  - **Maintain Aspect Ratio:** The aspect ratio of the source signal is preserved at the output. This may result in letter-boxing or pillar-boxing black bars at the edges of the display area.
  - **Stretch To Fit:** The aspect ratio of the source signal is stretched to fit the aspect ratio of the display. This may distort the image of the incoming video signal.
  - **1:1 Pixel Mapping:** The source signal is mapped 1:1 at the display without any aspect ratio scaling. This will preserve the aspect ratio of the source signal, but may not fill the entire display area, resulting in black borders around the image.
  - **Zoom:** The aspect ratio of the source signal is zoomed in to meet the full height or width capabilities of the display, whichever is greater than the incoming signal. This may crop out parts of the incoming video signal.
- Use the **HDCP Transmitter Mode** drop-down to select between:
  - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
  - **Follow Input:** The HDCP level of the output will be forced to the supported HDCP level of the local input.
  - **Force Highest:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the entire signal chain.
  - **Never Authenticate:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.
- Use the **Max Color Depth** drop-down to limit the color depth to a specific bit depth.
- Use the **Color Space Mode** drop-down to select between **Auto** or a specific color mode to force the output signal to.

> **NOTE:** The options available in the **Max Color Depth** and **Color Space Mode** drop-downs may be limited by the resolution of the output signal. Refer to the maximum supported resolutions table in DM-NVX-352 Specifications on page 257 for information on supported depths and spaces at each maximum resolution.

- The **Color Depth** and **Color Space** fields are read-only values that display the current depth and space of the video output signal, respectively.
- Use the **Underscan** drop-down to select an underscan percentage from between **0%**, **2.5%**, **5%**, **7.5%**, or **Custom**.
  - A value of **0%** will maintain the size of the source image area relative to the full video resolution and will preserve the image aspect ratio. Each higher value will shrink the size of the source image within its resolution while still preserving its aspect ratio. Any pixels outside of the image area in the full resolution will be filled by a black border.
  - When **Custom** is selected, the **Set Custom Underscan** text entry field will become available.
- Use the **Set Custom Underscan** field to enter an underscan percentage from 1 to 10% in integer values. This field is only available when **Custom** is selected in the **Underscan** drop-down.
- Set the **Disable Video Timeout** toggle to the right to prevent the output signal from turning off when a source signal is no longer detected. Set the toggle to the left to enable a video timeout. When the toggle is set to the left, the **Set Video Timeout** text box will become available.

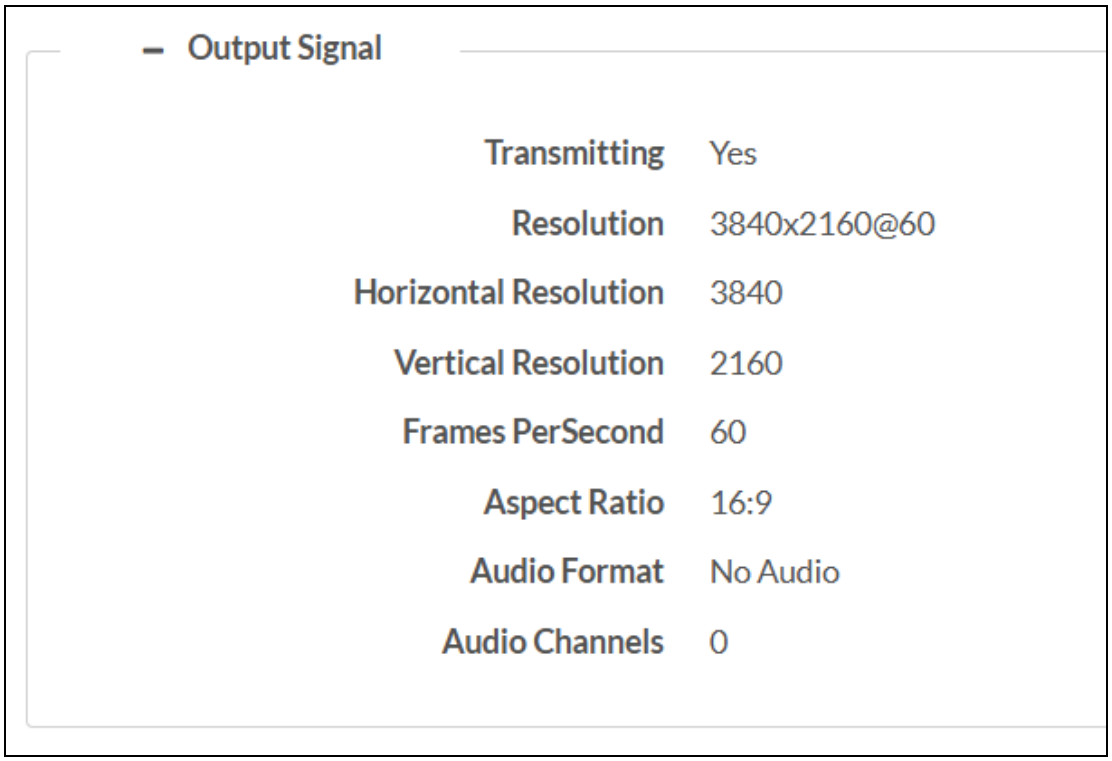
- Use the **Set Video Timeout** text box to determine how long the device will wait to disable the HDMI output after an input video signal is no longer detected. Enter a time in seconds or use the arrows to set the timeout. By default, the timeout is set to 0 seconds. This text box is only available when the **Disable Video Timeout** toggle is set to the left.

Connected Display



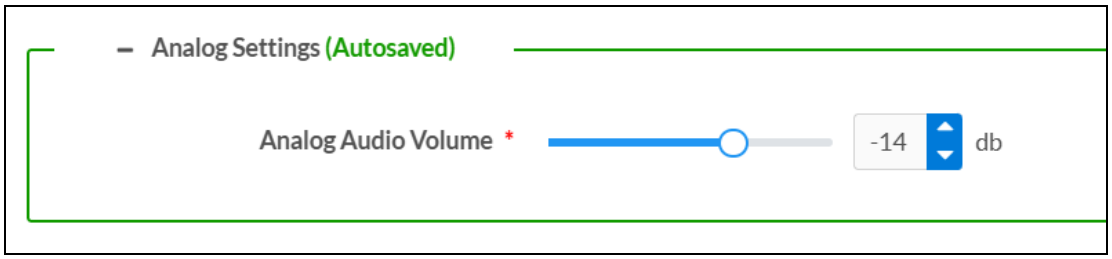
The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 424 for more information on loading custom EDID files.

Output Signal



The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.

Analog Settings

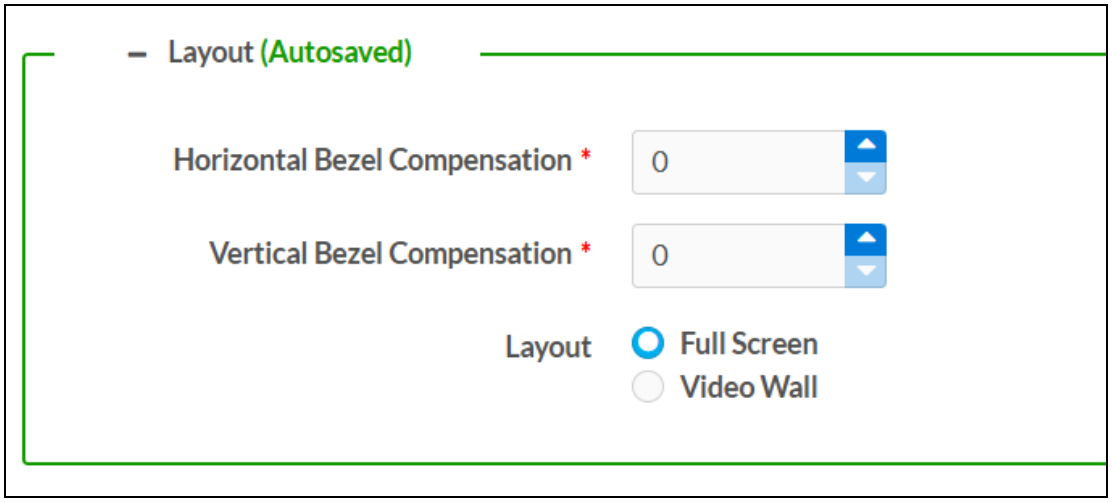


To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

Layout



Use the settings under the **Layout** subheading to manage the bezel compensation of the output signal and to enable video wall mode.

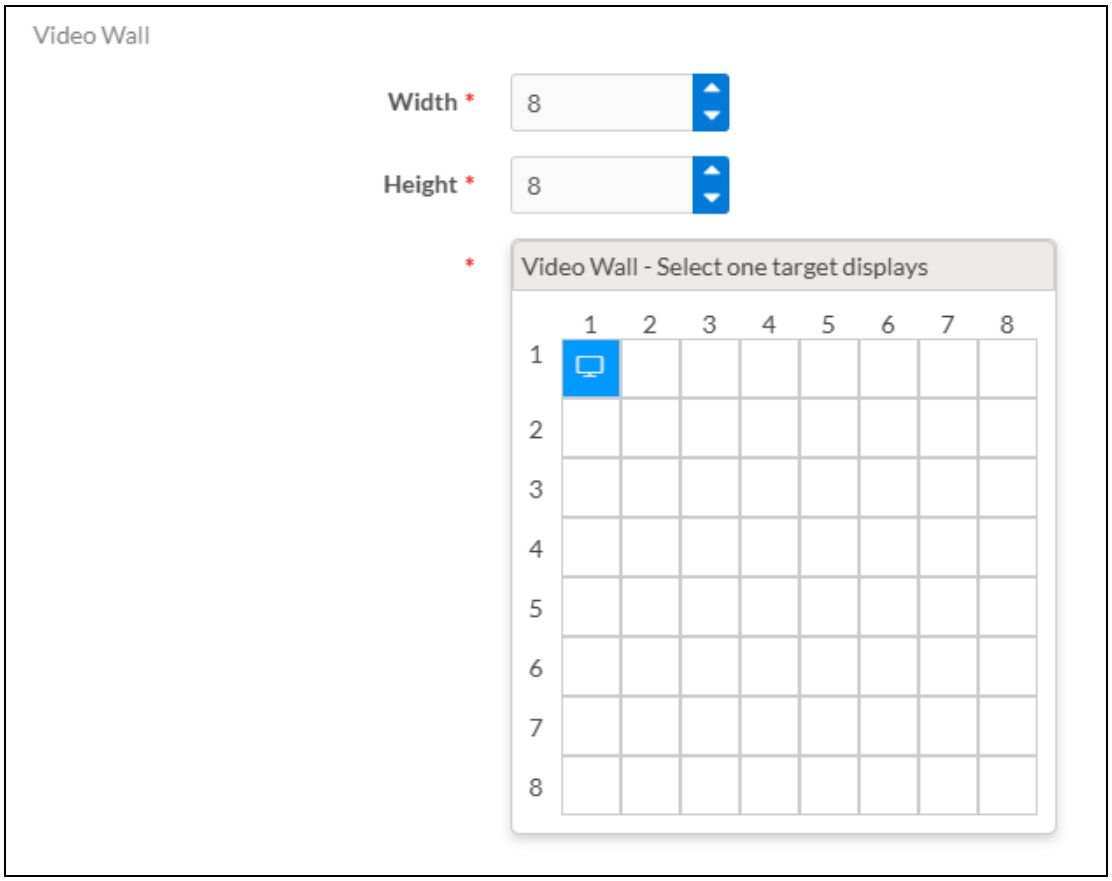
The **Bezel Compensation** fields allow the output signal to compensate for the width of the bezels on the display to provide a more seamless appearance in video wall mode. To adjust the bezel compensation:

- Use the arrows or enter a value in the **Horizontal Bezel Compensation** field. This sets the width of the bezels on the left and right of the display. Values range from 0 to 500 pixels.
- Use the arrows or enter a value in the **Vertical Bezel Compensation** field. This sets the height of the bezels on the top and bottom of the display. Values range from 0 to 500 pixels.

Multiple DM NVX decoder devices with output scalers can be combined to form a video wall composed of up to 64 individual displays (8 columns by 8 rows). A separate scaling decoder is required for each display. To enable video wall mode, select **Video Wall** from the **Layout** options.

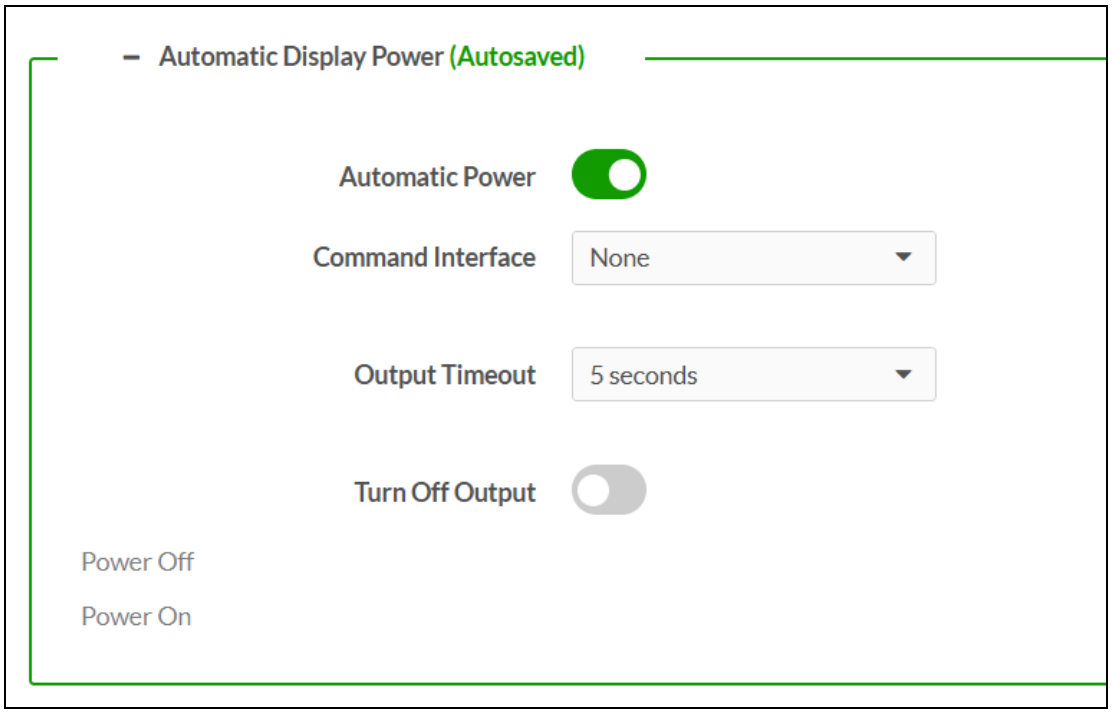
To configure the video wall:

1. Use the arrows or enter a value to set the **Width** text box to the desired number of columns of displays. Values range from 1 to 8. The default value is 1.
2. Use the arrows or enter a value to set the **Height** text box to the desired number of rows of displays. Values range from 1 to 8. The default value is 1.
3. Select the desired location for the current DM NVX device among the video wall by selecting its corresponding rectangle. In the image below, the DM NVX decoder being configured will output video to the top left display in an 8x8 video wall.



4. Repeat this process on all DM NVX decoders in the video wall.

Automatic Display Power



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**.

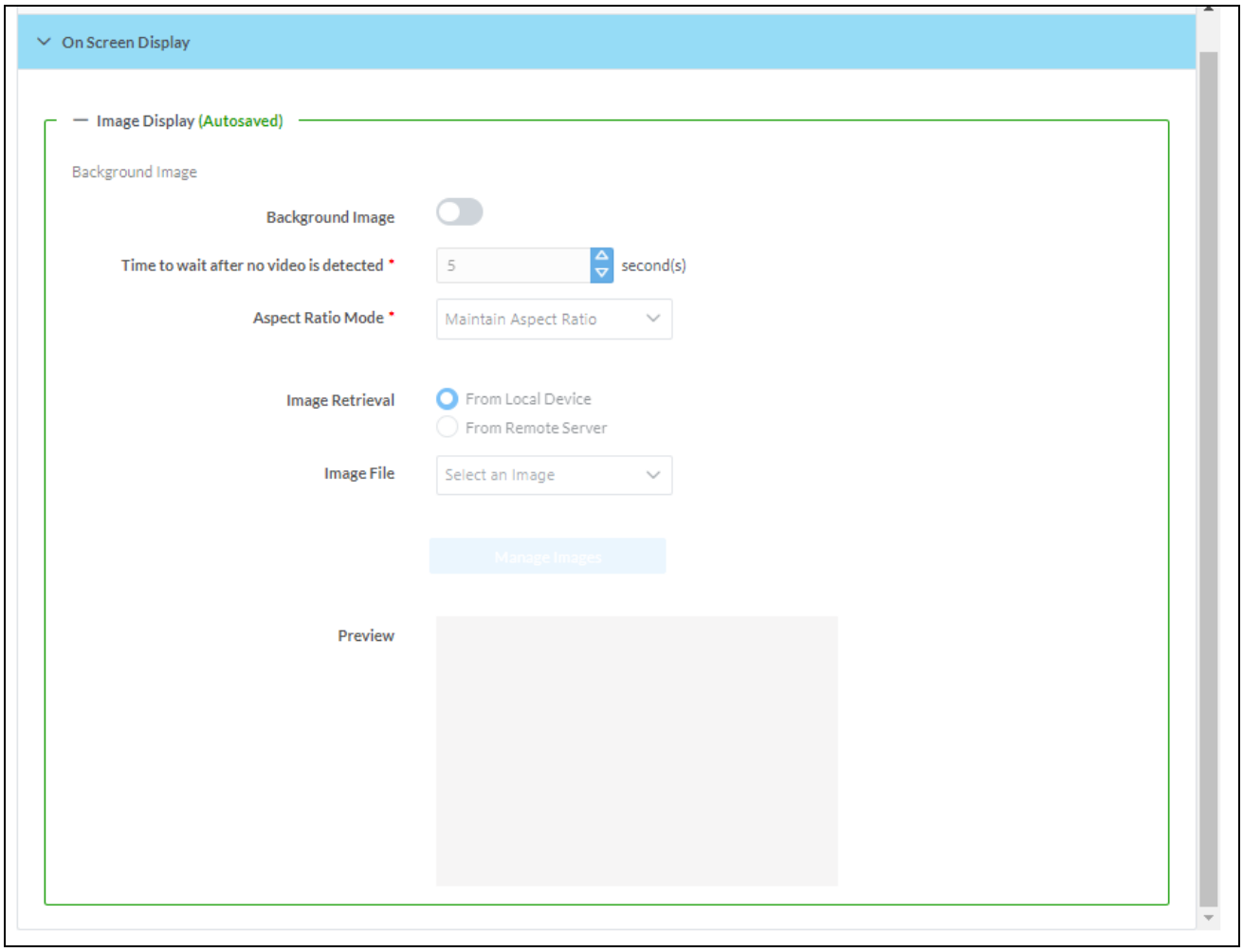
> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Edit Output - On Screen Display Accordion (Receiver Mode)

Select the **On Screen Display** accordion to expand it. This accordion houses the **Image Display** settings that allow a static background image to be shown on the connected display.

> **CAUTION:** Displaying a static image for extended periods of time may result in image burn-in on any type of connected display. Consult documentation from the display manufacturer to determine recommended timeout or image refresh settings to avoid burn-in.



To configure the **Image Display** settings:

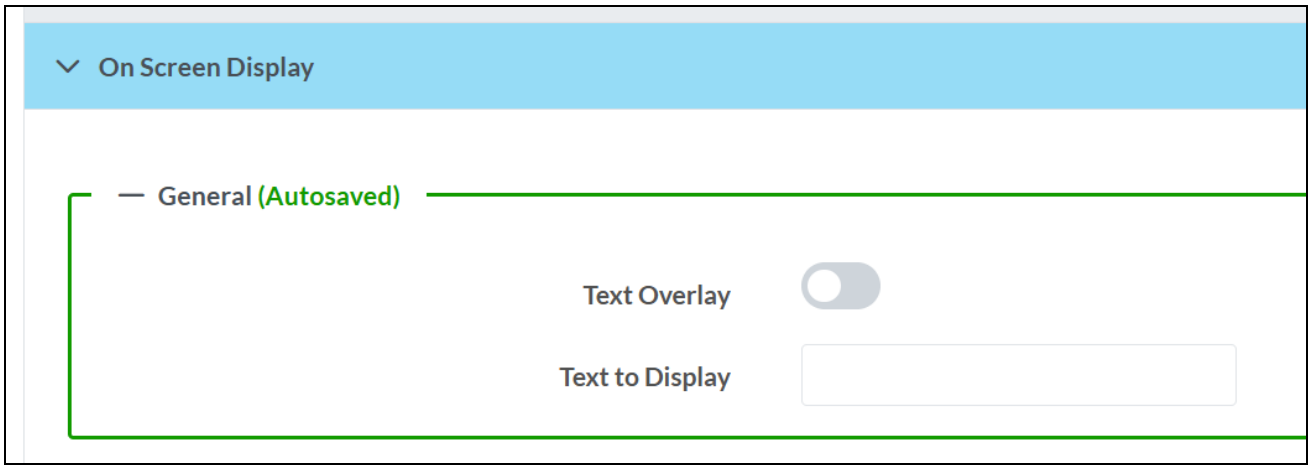
1. Set the **Background Image** toggle to the right to display a background image on the connected display, and to make all the other settings in the accordion available for configuration.
2. Enter a value in the **Time to wait after no video is detected** field from 5 seconds to 65,535 seconds to determine how long the device will wait after input signal is no longer detected before displaying the background image.
3. Use the **Aspect Ratio Mode** drop-down to select one of the following:
    - **Maintain Aspect Ratio:** The aspect ratio of the background image is preserved at the output. This may result in letterboxing or pillarboxing black bars at the edges of the display area.
    - **Stretch:** The aspect ratio of the background image is stretched to fit the aspect ratio of the display. This may distort the background image.
    - **1:1:** The background image is mapped 1:1 at the display without any aspect ratio scaling. This will preserve the aspect ratio of the image, but may not fill the entire display area, resulting in black borders around the image.

4. Select an option for **Image Retrieval**:
    - **From Local Device:** Select this option if an image stored locally on the DM NVX device will be used as the background image. Select the desired image from the **Image File** drop-down. To load custom images to the DM NVX device, select **Manage Images** from the **Edit Output** window or from the **Action** menu. Refer to Action on page 424 for more information.
    - **From Remote Server:** Select this option if an image hosted on a network server will be used as the background image. Enter the network file path to the image in the **Remote Path** field.
        - This option also allows the DM NVX device to refresh the image at a given interval. To have the DM NVX refresh the image, select the **Refresh** checkbox below the **Image Preview**, then enter a refresh rate in minutes from 1 to 65,535 minutes. The default refresh rate is 60 minutes.

To disable the background image, set the **Background Image** toggle to the left.

On Screen Display

The **On Screen Display** accordion enables setting a text string to overlay onto the video output signal.

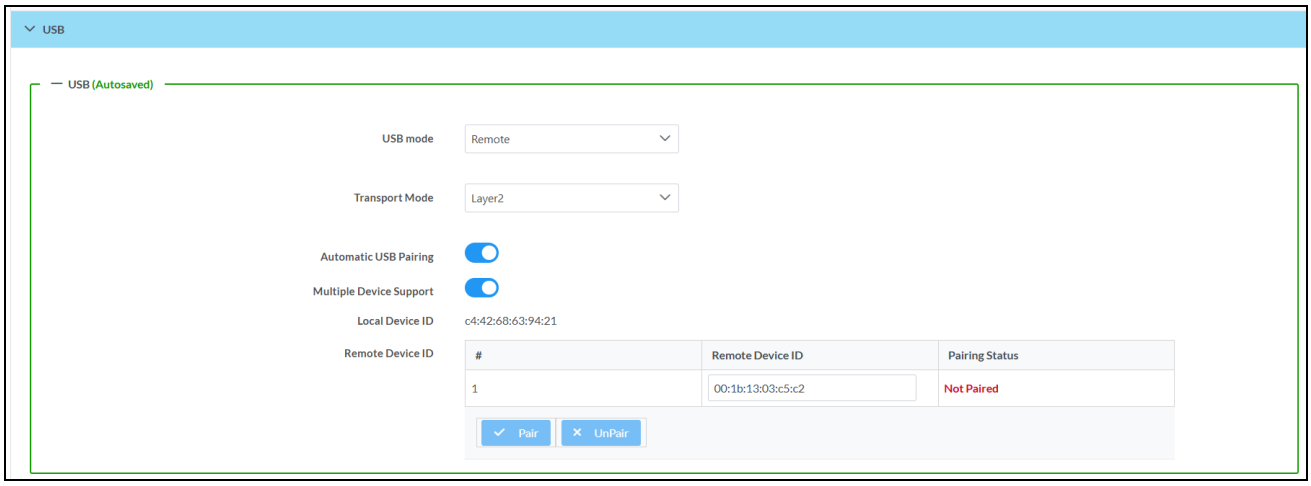


To add a text string to the video output signal:

1. Set the **Text Overlay** toggle to the right to enable the feature.
2. Enter the desired text string in the **Text to Display** field.

USB

Use the **USB** accordion to configure USB-over-Ethernet settings for the DM NVX device.



To configure USB routing, follow the steps below. These steps must be repeated on both devices in a given USB pairing for the two devices to pair successfully:

1. Select a **USB mode** from the drop-down:
   - In **Local** mode, USB signals from another **Remote** device on the network are extended to the **DEVICE** connector of the DM NVX device.
   - In **Remote** mode, USB devices connected to the **HOST** ports are extended over the network to a **Local** device.
2. Select a **Transport Mode** from the drop-down:
   - **Layer 2**: Enables Layer 2 transport of USB 2.0 data. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), DM-NVX-38X(C), and DM NUX USB-over-Ethernet devices (DM-NUX-L2 and DM-NUX-R2). Devices will pair via MAC address.
   - **Layer 3**: Enables Layer 3 transport of USB 2.0 data across VLANs. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), and DM-NVX-38X(C) devices. Devices will pair via IP address.

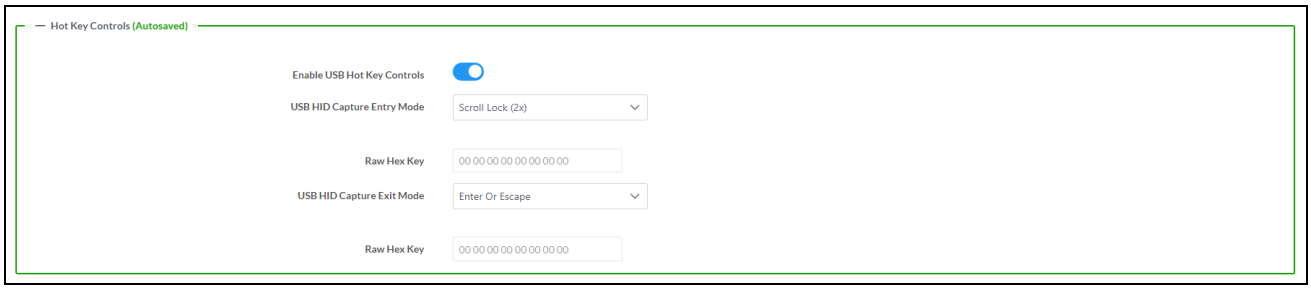
     > **NOTE:** This mode is not compatible with DM NUX USB-over-Ethernet devices.
3. Set the **Automatic USB Pairing** toggle to the right to enable or left to disable **Automatic Pairing**. With **Automatic Pairing** enabled, once a **Remote Device ID** is entered in the **Remote Device ID** table, and the corresponding device also has the matching **Remote Device ID** entered in its table, the devices will pair automatically.
4. Set the **Multiple Device Support** toggle to the right to right to enable or left to disable **Multiple Device Support**. If the device is set to **Local** mode and **Layer 2** transport, **Multiple Device Support** allows it to receive USB data from up to seven **Remote** extenders. A hub must be used to connect devices to the **TO DEVICE** port of each DM NVX **Remote** extender.

5. Enter the applicable ID strings in the **Remote Device ID** table:
    - If the device is set to **Local** mode and **Layer 2** transport, enter the MAC address of each remote extender. **Multiple Device Support** must be enabled to enter more than one remote extender.
    - If the device is set to **Local** mode and **Layer 3** transport, enter the IP address of the remote extender.
    - If the device is set to **Remote** mode and **Layer 2** transport, enter the MAC address of the local extender.
    - If the device is set to **Remote** mode and **Layer 3** transport, enter the IP address of the local extender.
6. Once the ID strings have been entered on both the local and remote devices, select **Pair** to pair the devices. If **Automatic USB Pairing** is enabled, pairing will occur automatically once the ID strings have been entered.

To remove pairing between DM NVX devices:

- If **Automatic USB Pairing** is disabled, select **UnPair**.
- If **Automatic USB Pairing** is enabled and **Layer 2** transport is selected, enter a MAC address of 00:00:00:00:00:00 in the **Remote Device ID** field.
- If **Automatic USB Pairing** is enabled and **Layer 3** transport is selected, enter an unused IP address in the **Remote Device ID** field.

The **Hot Key Controls** portion of the accordion provides settings for entering and exiting USB HID capture mode. USB HID capture mode allows HID keyboard presses to output serial data from the USB Hotkey symbol of the DM NVX device's SIMPL Windows device definition. Refer to the USB Hotkey symbol help file for more information on using this symbol in a SIMPL Windows control system program.



To configure the **Hot Key Controls** settings:

1. Set the **Enable USB Hot Key Controls** toggle to the right to enable the **USB HID Capture Entry Mode** and **USB HID Capture Exit Mode** hot keys. Set the toggle to the left to disable the hot keys.
2. Select a **USB HID Capture Entry Mode** hot key option from the drop-down. This is the HID keyboard key (or combination of keys) that will put the **USB Hotkey** SIMPL symbol into HID capture mode. While in this mode, any HID keyboard presses will output as raw hex data on the **Message_F** serial join of the symbol.
    a. If **Custom** was selected from the drop-down, enter the serial data for the key (or keys) into the **Raw Hex Key** text entry. This data can be pulled from the **USB Hotkey** SIMPL symbol's **Message_F** serial join via the SIMPL Debugger utility in Crestron Toolbox™ software.

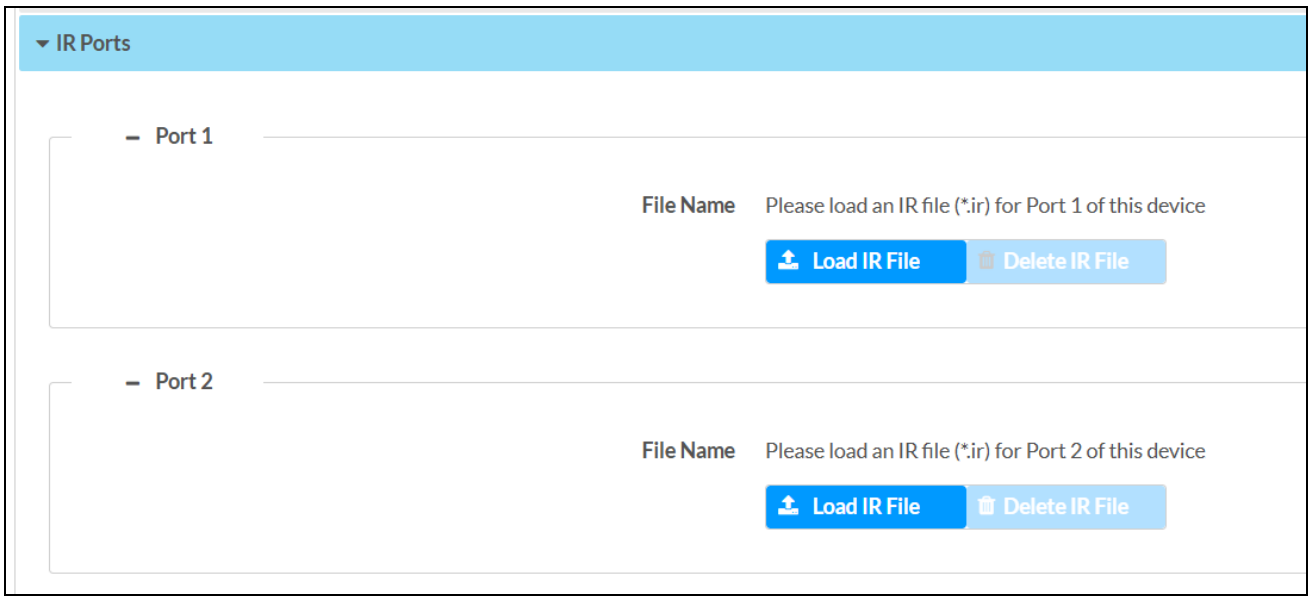
3. Select a **USB HID Capture Exit Mode** hot key option from the drop-down. This is the HID keyboard key (or combination of keys) that will exit the **USB Hotkey** SIMPL symbol from HID capture mode.
    a. If **Custom** was selected from the drop-down, enter the serial data for the key (or keys) into the **Raw Hex Key** text entry. This data can be pulled from the **USB Hotkey** SIMPL symbol's **Message_F** serial join via the SIMPL Debugger utility in Crestron Toolbox™ software.

> **NOTE:** While in **USB HID Capture Mode**, all HID data from a connected keyboard is output as raw hex data from the SIMPL symbol's **Message_F** serial join instead of being forwarded to a connected Host device.

IR Ports

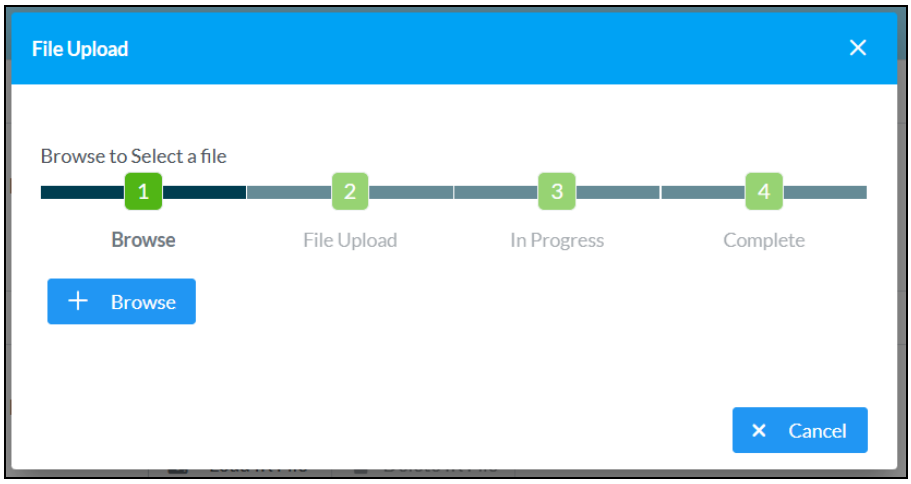
> **NOTE:** This accordion is not available on card-based models.

The **IR Ports** accordion allows custom IR files containing device commands to be uploaded to the DM NVX device for each IR connector. Custom IR files can be generated via the Device Learner utility within Crestron Toolbox software. Each IR port can hold only one IR file at a time. IR files must be loaded to each port individually.



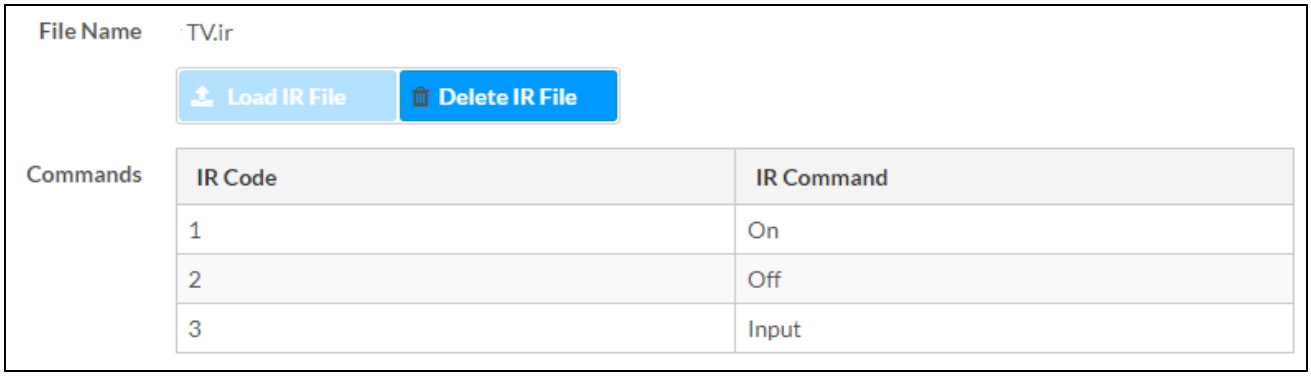
To upload an IR file to a given IR port:

1. Select **Load IR File**.
2. In the **File Upload** window that appears, select **+ Browse**.



3. Locate and select the desired IR file, then select **Open**. The selected file name is displayed.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The IR file is now loaded to the IR port.

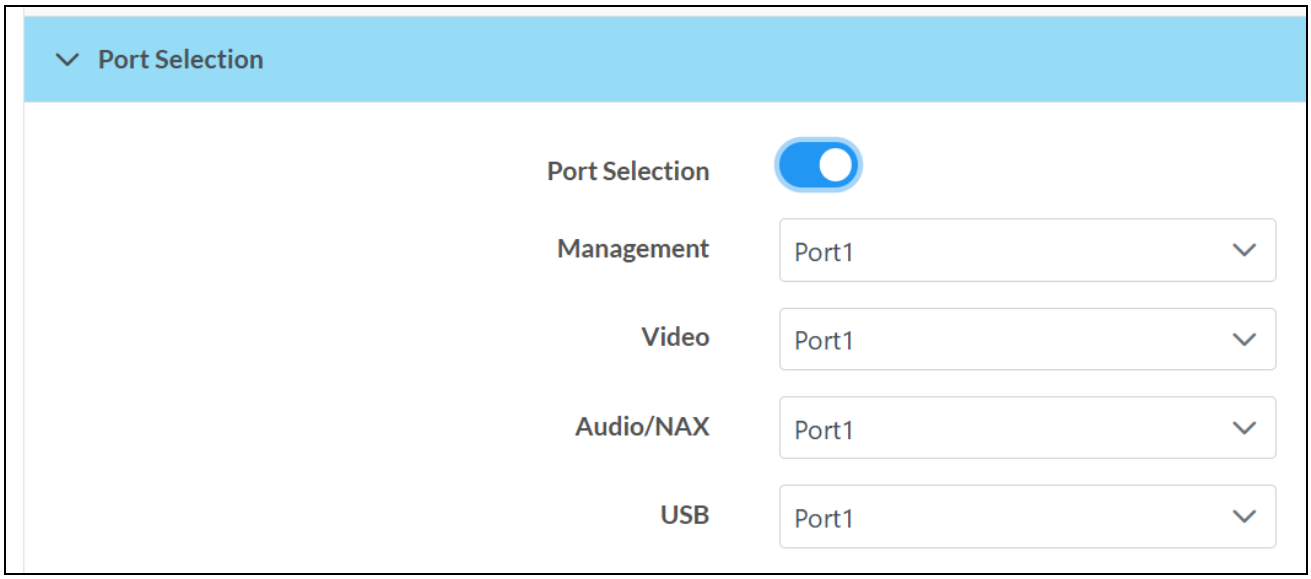
Once the IR file is uploaded, its filename will appear next to the IR port it was uploaded to. A read-only table showing all included commands will also appear and populate.



To delete an IR file from a given IR port, select **Delete IR File**.

Port Selection

The **Port Selection** feature allows the device's internal network traffic to be managed and segregated based on traffic type. Internal VLANs are used to segment device management, video, AES67, and USB traffic to discrete Ethernet ports. With **Port Selection** disabled, the additional Ethernet ports of the DM NVX device can be used as courtesy ports to extend the connected LAN to a local network device. With **Port Selection** enabled on all DM NVX devices on a network, traffic types can be physically separated from the control network onto dedicated networks.



To configure **Port Selection**:

1. Set the **Port Selection** toggle to the right to enable **Port Selection**. Set the toggle to the left to disable **Port Selection**. By default, **Port Selection** is disabled.
2. With **Port Selection** enabled:
    a. Select an Ethernet port from the **Management** drop-down to designate it to handle network traffic relating to device configuration and connection to a control system.
    b. Select an Ethernet port from the **Video** drop-down to designate it to handle the DM NVX AV-over-IP streaming network traffic.
    c. Select an Ethernet port from the **Audio/NAX** drop-down to designate it to handle DM NAX (AES67) audio-over-IP streaming network traffic.

    > **NOTE:** The audio signal in the primary DM NVX AV-over-IP stream will still traverse the port designated by the **Video** drop-down. The **Audio/NAX** drop-down only designates the port for the secondary audio stream.

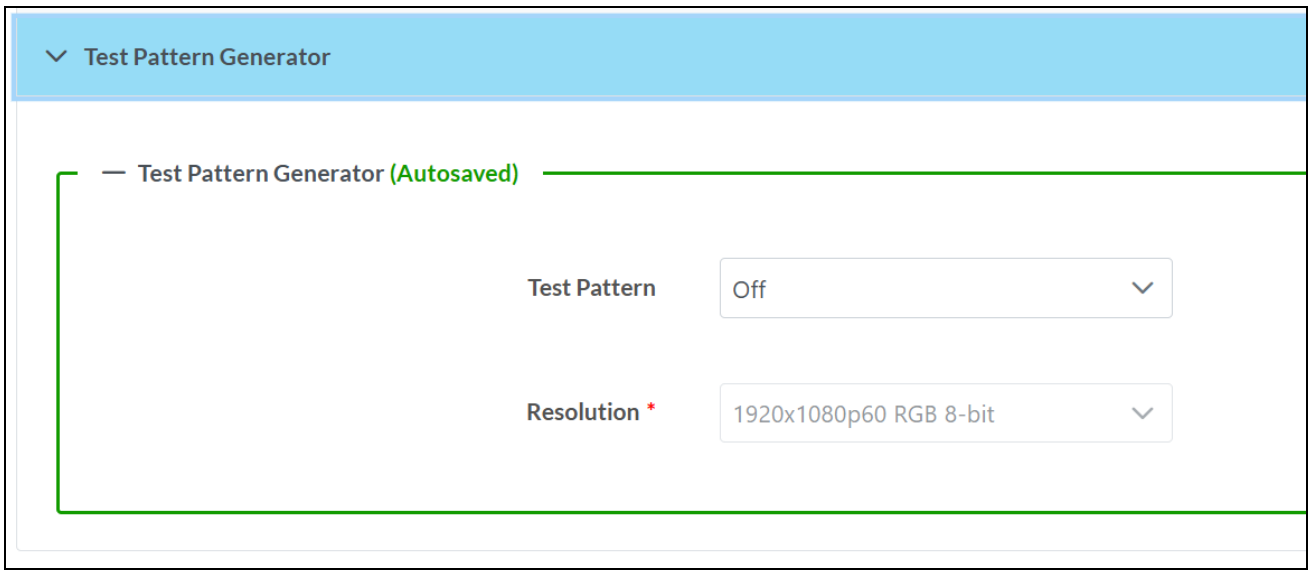
    d. Select an Ethernet port from the **Dante** drop-down to designate it to handle Dante audio-over-IP streaming network traffic (DM-NVX-352 and DM-NVX-352C only).
    e. Select an Ethernet port from the **USB** drop-down to designate it to handle USB-over-Ethernet traffic.
3. Select **Save** to apply the new settings.

    > **NOTE:** Changes to **Port Selection** will require a device reboot.

Test Pattern Generator

The **Test Pattern Generator** accordion contains settings for enabling various video test patterns to replace the DM NVX AV-over-IP video output signal.

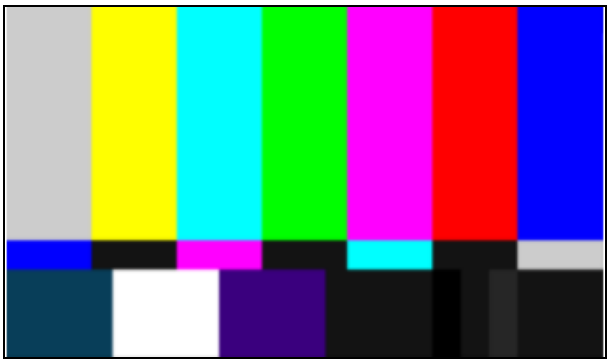
NOTE: The **Test Pattern Generator** accordion is only available when the device is set to **Transmitter** mode.

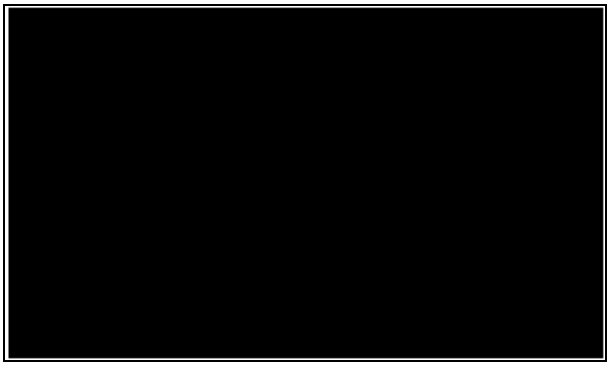
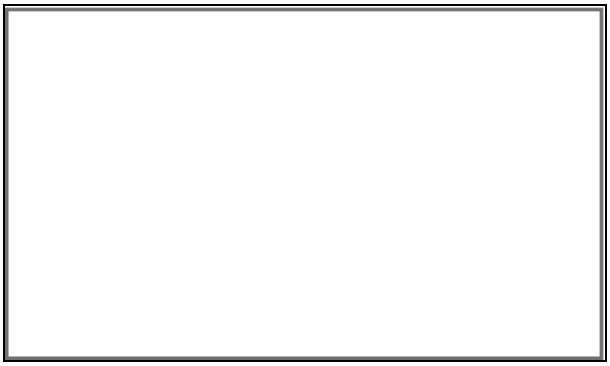
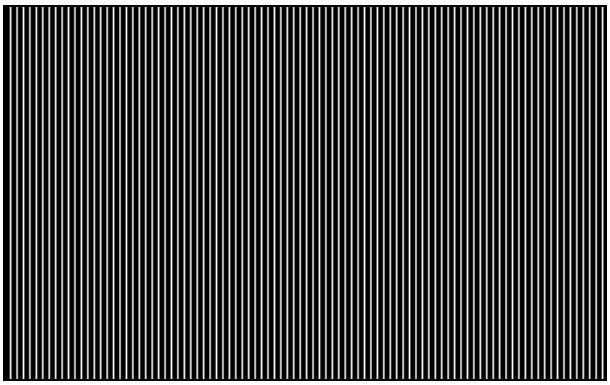
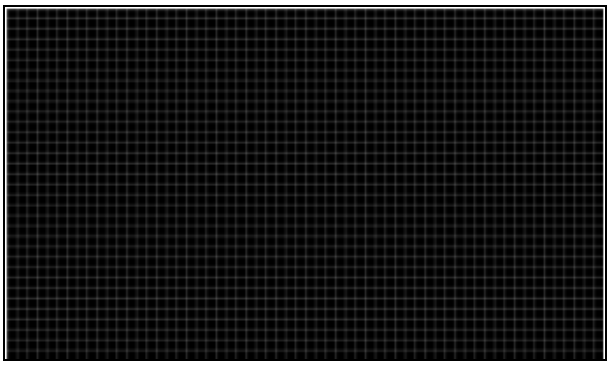


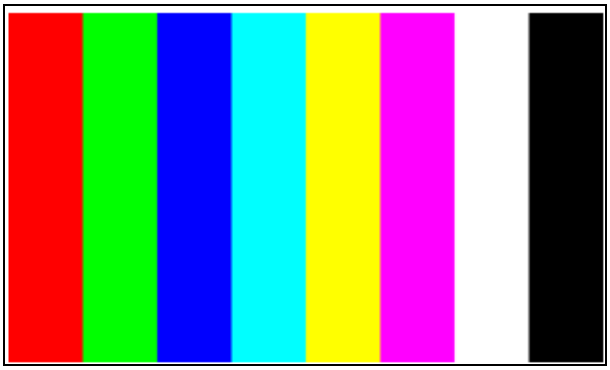
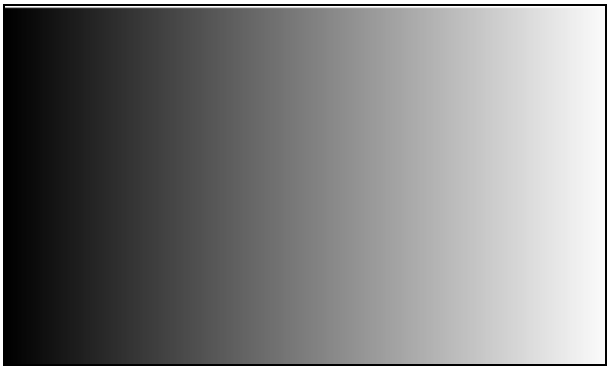
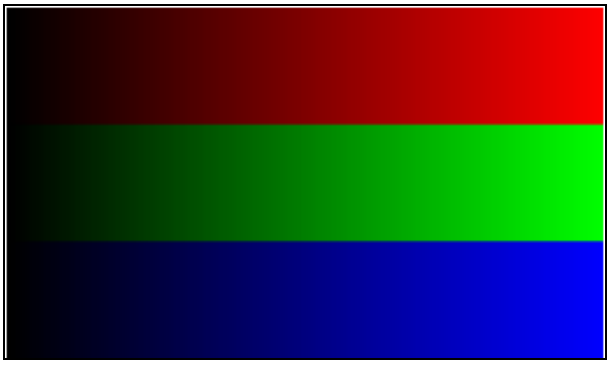
To set a test pattern:

1. Use the **Test Pattern** drop-down to select an available pattern from among **Off**, **SMPTE ColorBars**, **Black**, **White**, **Vertical Lines**, **Grid**, **Color Bars**, **Gray Gradient**, **RGB Gradient**, and **Frequency Adjust**. Refer to the table below for a reference of each pattern.
2. Use the **Resolution** drop-down to select a resolution for the selected test patten.

Available Test Patterns

SMPTE ColorBars	

Black	
White	
Vertical Lines	
Grid	

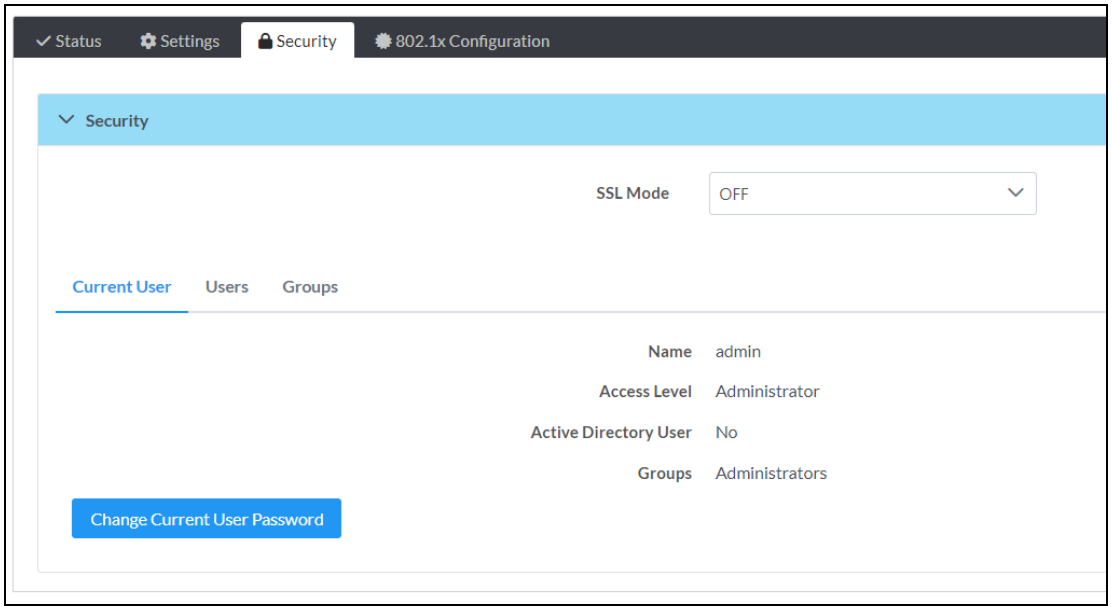
Color Bars	
Gray Gradient	
RGB Gradient	
Frequency Adjust	

Security

NOTE: This section applies to the following models:

- DM-NVX-350
- DM-NVX-350C
- DM-NVX-351
- DM-NVX-351C
- DM-NVX-352
- DM-NVX-352C

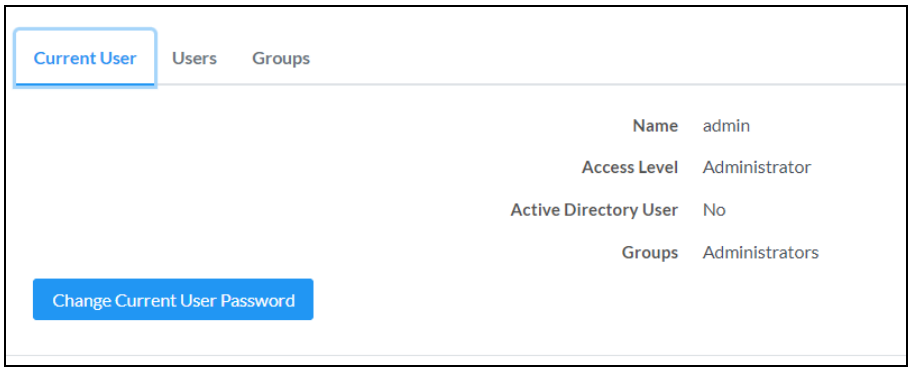
Select the **Security** tab to configure security for users and groups and to allow different levels of access to the DM NVX device functions. By default, security is disabled.



Select **Encrypt and Validate**, **Encrypt**, or **OFF** from the **SSL Mode** drop-down menu to specify whether to use encryption. By default, **SSL Mode** is set to **OFF**.

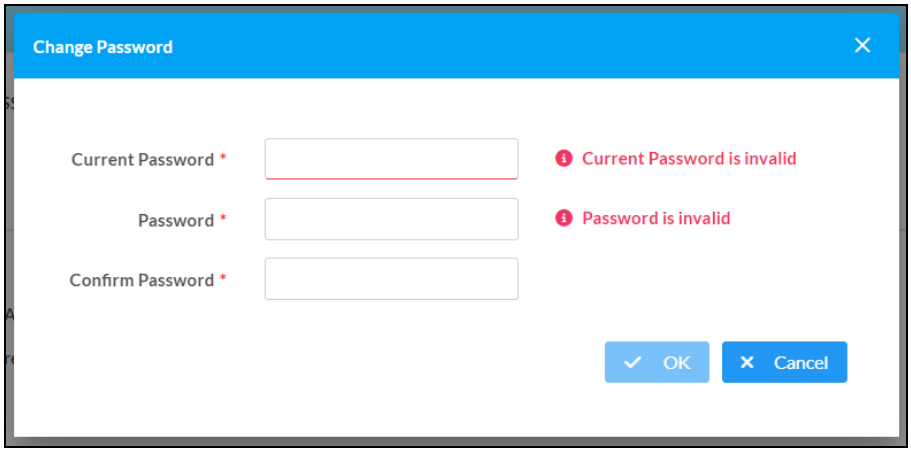
Current User

Select the **Current User** tab to view read-only information or to change the password for the current user.



To change the password for the current user account:

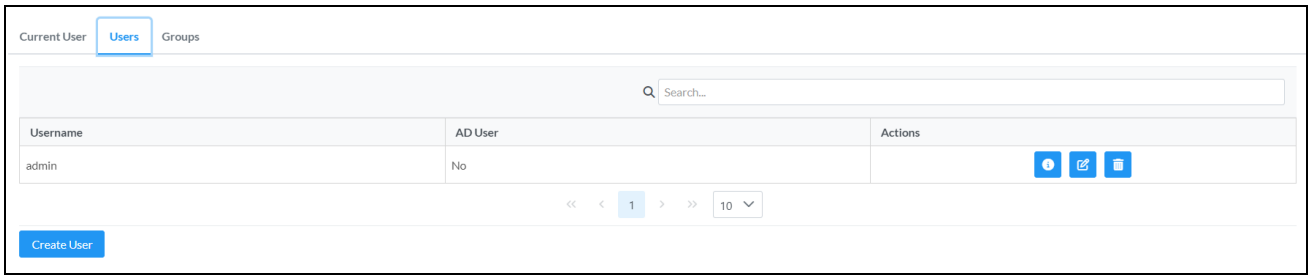
1. Select **Change Current User Password**.
2. In the **Change Password** dialog, enter the current password in the **Current Password** field, the new password in the **Password** field, and then re-enter the same new password in the **Confirm Password** field.



3. Select **OK** to save or select **Cancel** to cancel the changes.

Users

Select the **Users** tab to view and edit user settings. The **Users** tab can be used to add or remove local and Active Directory users and preview information about them.



Use the **Search Users** field to enter search term(s) and display users that match the search criteria.

If users listed in the **Users** table span across multiple pages, navigate through the list by selecting a page number or by using the left or right arrows at the bottom of the **Users** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 users by using the drop-down to the right of the navigation arrows.

Information about existing users is displayed in table format and the following details are provided for each user.

- **Username:** Displays the name of the user.
- **AD User:** Displays whether the user requires authentication using Active Directory.

Select the information icon in the **Actions** column to view detailed user information, or select the delete icon to delete a user.

To create a new user, select **Create User**.

Create a New Local User

To create a new local user:

1. Select **Create User** in the **Users** tab.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field. A valid user name can consist of alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
   c. Assign the access level by selecting one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the left (disabled).

3. Select **OK** to save or select **Cancel** to cancel the changes.

Grant Access to an Active Directory User

Users cannot be created or removed from the Active Directory server, but access can be granted to an existing user in the Active Directory server.

To grant access to an Active Directory user, you can either add the user to a local group on the DM NVX device, or add the Active Directory group(s) that they are a member of to the DM NVX device. Refer to Grant Access to an Active Directory Group on page 490 for steps on granting access to a group.

To grant access to an Active Directory user directly:

1. Select **Create User**.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field in the format "Domain\UserName", for example "crestronlabs.com\JohnSmith". Valid user names can contain alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Select one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the right (enabled).

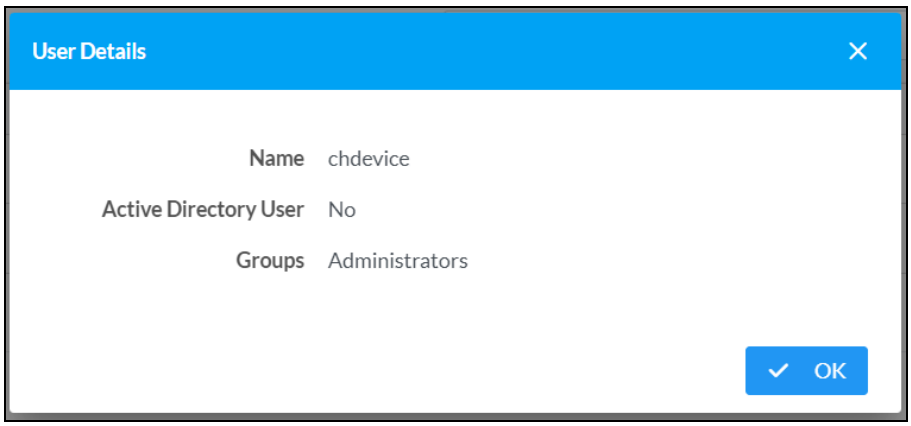
3. Select **OK** to save or select **Cancel** to cancel the changes.

Delete a User

To delete a user, select the trashcan icon in the **Actions** column. Select **Yes** when prompted to delete the user or **No** to cancel the deletion.

View User Details

Select the information icon in the **Actions** column to view information for the selected user. The **User Details** dialog displays the following information for the selected user.



The fields displayed in the **User Details** window are:

- **Name:** Displays the name of the selected user.
- **Active Directory User:** Displays whether the user is an Active Directory user.
- **Group:** Displays group(s) the selected user is part of.

Select **OK** to close the **User Details** window and return to the **Users** tab.

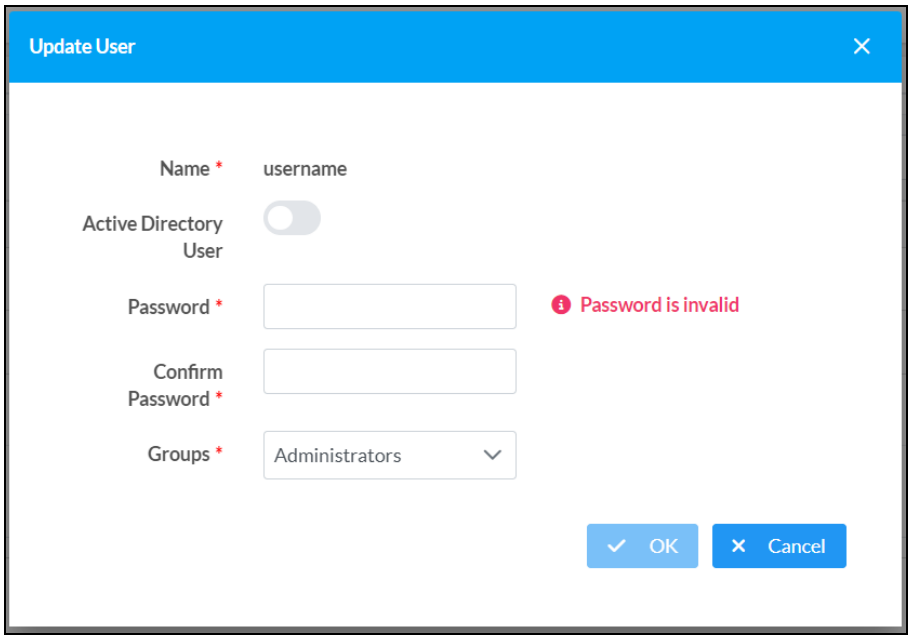
Update User Details

To update the details for an existing user:

1. Select the edit icon in the **Actions** column to update information for the selected user.
2. Set the **Active Directory User** toggle to the right if the user is an Active Directory user, or to the left if the user is not.
3. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
4. Select one or more groups to assign the user to from the **Groups** drop-down list. Deselect any groups to remove the user from those groups.

   > **NOTE:** After a user is removed from a group, they lose any access rights associated with that group.

5. Select **OK** to save or select **Cancel** to cancel the changes.

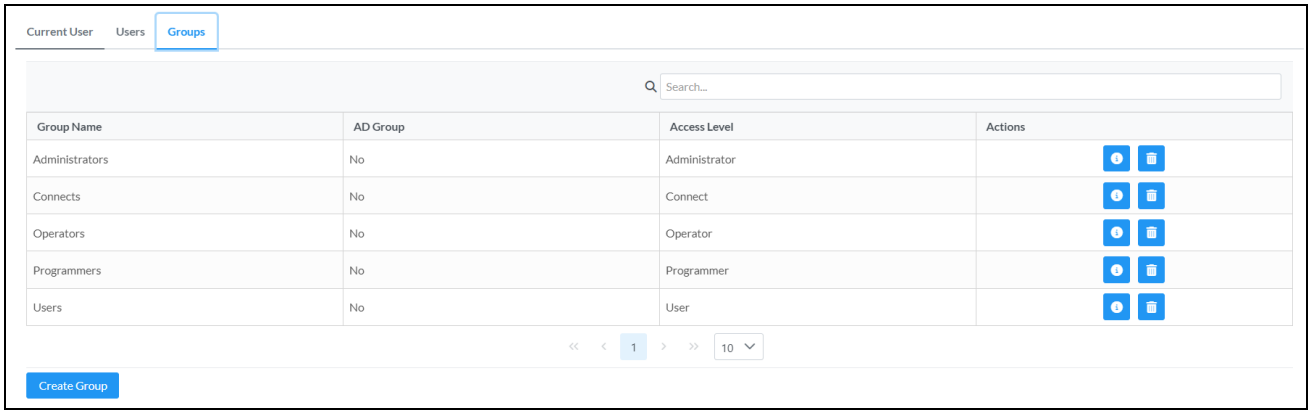


NOTE: The **Name** field is a read-only field that displays the username for the selected user. To change a username, the user must be deleted and a new user must be added.

Groups

Select the **Groups** tab to view and edit group settings. The **Groups** tab can be used to add local and Active Directory groups, remove local and Active Directory groups, and preview information about a group.

Use the **Search Groups** field to enter search term(s) and display groups that match the search criteria.



If groups listed in the **Groups** table span across multiple pages, navigate through the groups by selecting a page number or by using the left or right arrows at the bottom of the **Groups** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 groups by using the drop-down to the right of the navigation arrows.

Existing groups are displayed in a table and the following information is provided for each group:

- **Group Name:** Displays the name of the group.
- **AD Group:** Displays whether the group requires authentication using Active Directory.
- **Access Level:** Displays the predefined access level assigned to the group (Administrator, Programmer, Operator, User, or Connect).

Select the information icon in the **Actions** column to view detailed group information, or select the delete icon to delete a group.

Select **Create Group** in the **Groups** tab to create new group.

Create a Local Group

To create a local group:

1. Select **Create Group**.
2. In the **Create Group** dialog, enter the following:
   a. Enter the group name in the **Name** field.
   b. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the left (disabled).
3. Select **OK** to save. Select **Cancel** to cancel the changes.

Grant Access to an Active Directory Group

A group cannot be created or removed from the Active Directory server, but access can be granted to an existing Active Directory group.

Once the group is added, all members of that group will have access to the DM NVX device.

To grant access to an Active Directory group:

1. Select **Create Group**.
2. In the **Create Group** dialog enter the following:
   a. Enter the group name in the **Name** field (for example, "Engineering Group").

   > **NOTE:** Group names are case sensitive, and a space is a valid character that can be used in group names.
3. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the right (enabled).
4. Select **OK** to save. Select **Cancel** to cancel the changes.

Delete a Group

Select the trashcan icon in the **Actions** column to delete a group. Select **Yes** when prompted to delete the group or **No** to cancel the deletion.

When a group is deleted, users in the group are not removed from the device or Active Directory server. However, because a user's access level is inherited from a group(s), users within the deleted group will lose access rights associated with the group.

View Group Details

Select the information icon in the **Actions** column to view information for the selected group. The **Group Details** dialog lists the following information for the selected group:

- **Name:** Displays the name of the group.
- **Access Level:** Displays the access level of the group and its users.
- **Active Directory Group:** Displays whether the group is an Active Directory group.

Select **OK** to close the **Group Details** dialog and return to the **Groups** tab.

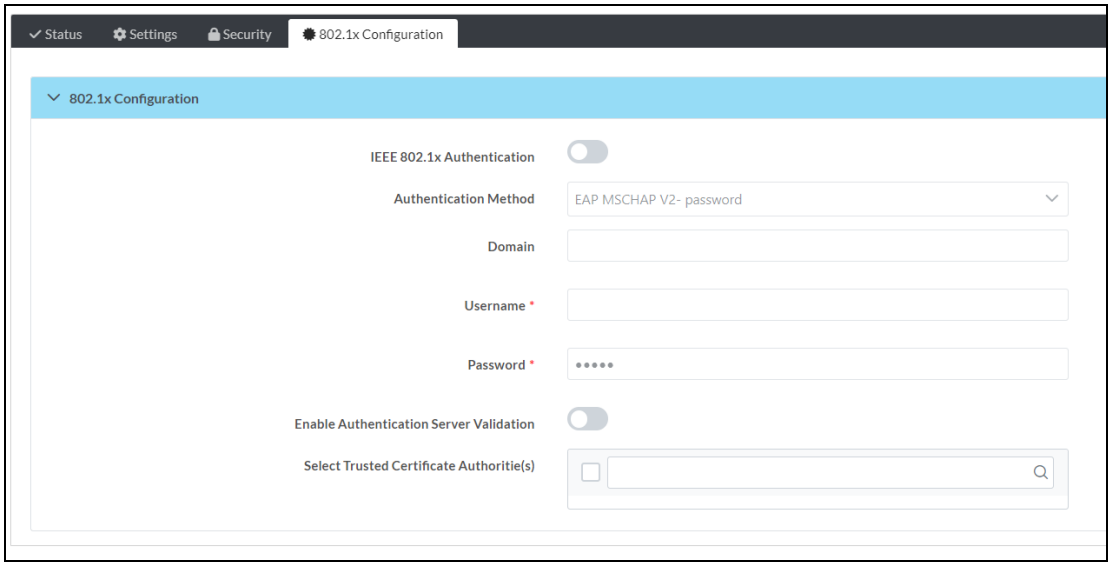
802.1X Configuration

NOTE: This section applies to the following models:

- DM-NVX-350
- DM-NVX-350C
- DM-NVX-351
- DM-NVX-351C
- DM-NVX-352
- DM-NVX-352C

DM NVX devices have built-in support for the 802.1X standard (an IEEE network standard designed to enhance the security of wireless and Ethernet LANs, relying on the exchange of messages between the device and the network's host, or authentication server), allowing communication with the authentication server and access to protected corporate networks.

The **802.1X Configuration** page can be accessed at any time by selecting the **802.1X Configuration** tab of the interface.



Configure the Device for 802.1X Authentication

To configure the DM NVX device for 802.1X Authentication:

1. Set the **IEEE 802.1X Authentication** toggle to the right. This will enable all options on the 802.1X dialog.
2. Select an **Authentication Method**: Choose between **EAP-TLS Certificate** or **EAP-MSCHAP V2 Password** according to the network administrator's requirement.

3. Do one of the following:
    a. If **EAP-TLS Certificate** was selected: Select **Action/Manage Certificates** to upload the required machine certificate. The machine certificate is an encrypted file that will be supplied by the network administrator, along with the certificate password.
    b. If EAP-MSCHAP V2 Password was selected: Enter the username and password supplied by the network administrator into the **Username** and **Password** fields, respectively. This method does not require the use of a machine certificate, only the user name and password credentials.
4. If you enabled the **Enable Authentication Server Validation** option, this will enable the **Select Trusted Certificate Authoritie(s)** list box which contains signed Trusted Certificate Authorities (CAs) preloaded onto the DM NVX device.

    Select the check box next to each CA whose certificate can be used for server validation, as specified by the network administrator.

    If the network does not use any of the listed certificates, the network administrator must provide a certificate, which must be uploaded manually via the **Manage Certificates** function in the **Action** menu. Refer to Action on page 424 for more information on the **Manage Certificates** function.
5. If required, type the domain name of the network in the **Domain** field.
6. When the 802.1X settings are configured as desired, select **Save Changes** to save the changes to the device and reboot it. Select **Revert** to cancel any changes.

Configuration (DM-NVX-36X Models)

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-360
- DM-NVX-360C
- DM-NVX-363
- DM-NVX-363C

Web Interface Configuration

The web interface of a DM NVX AV-over-IP device allows for the viewing of status information as well as the configuration of local device settings.

Access the Web Interface

To access the web interface, refer to either of the following:

- Access the Web Interface with a Web Browser on page 494
- Access the Web Interface with the Crestron Toolbox™ Application on page 496

The web interface runs in a web browser. The following web browser versions are supported:

Operating System and Supported Web Browsers

OPERATING SYSTEM	SUPPORTED WEB BROWSERS
Windows® operating system	Chrome™ web browser, version 31 and later
	Firefox® web browser, version 31 and later
	Internet Explorer web browser, version 11 and later
	Microsoft Edge web browser
macOS® operating system	Safari® web browser, version 6 and later
	Chrome web browser, version 31 and later
	Firefox web browser, version 31 and later

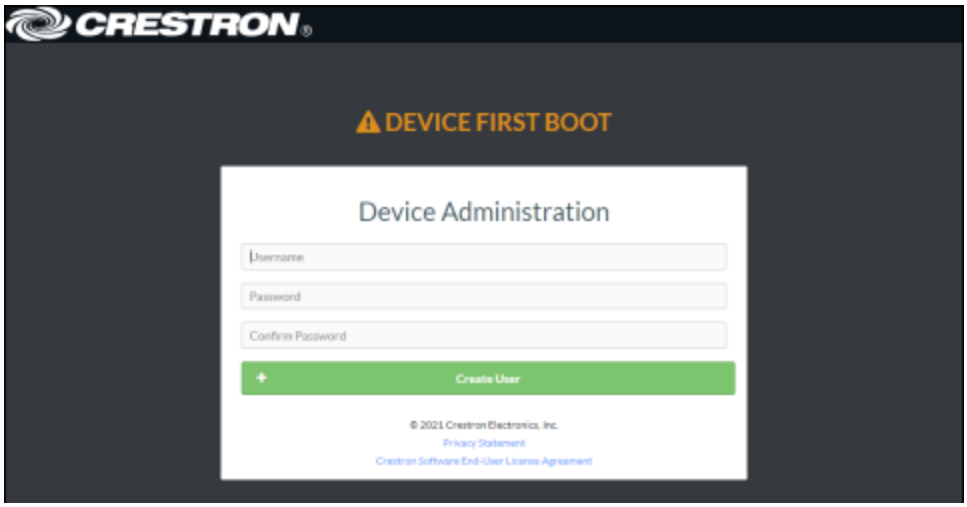
Access the Web Interface with a Web Browser

To access the web interface:

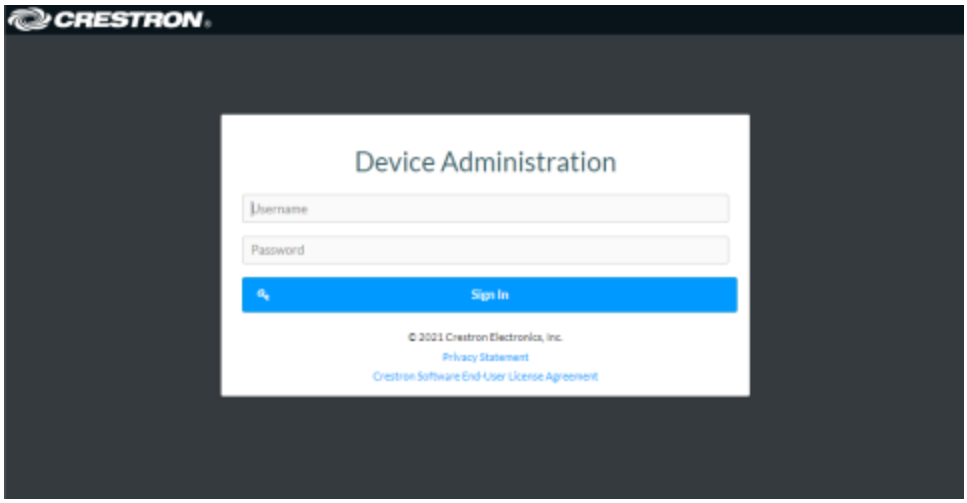
1. Enter the IP address of the DM NVX device into a web browser.

   NOTE: To obtain the IP address, use the Device Discovery Tool utility in Crestron Toolbox™ software or an IP scanner application.

2. If accessing the device for the first time, a prompt to create an administrator account will be displayed along with a **DEVICE FIRST BOOT** message. To create the first admin account:
    a. Enter a username in the **Username** field.
    b. Enter a password in the **Password** field.
    c. Re-enter the same password in the **Confirm Password** field.



    d. Select **Create User**. A new **Device Administration** page appears with an option to **Sign In** instead of **Create User**.



3. Enter the username in the **Username** field.
4. Enter the password in the **Password** field.
5. Select **Sign In**.

Access the Web Interface with the Crestron Toolbox™ Application

To access the web interface by opening a web browser from the Crestron Toolbox™ application:

1. Open the Crestron Toolbox application.
2. Select **Device Discovery Tool** from the **Tools** menu or select the Device Discovery Tool icon in the toolbar. Once the utility loads, the DM NVX device will be discovered on the network and listed in the device list on the left side of the screen. The device's host name, IP address, and firmware version are displayed.

   > **NOTE:** If there is security software running on the computer, a security alert might be displayed when the Crestron Toolbox application attempts to connect to the network. Make sure to allow the connection, so that the Device Discovery Tool can be used.

3. Select the device from the discovered devices list.
4. Enter the device credentials in the **Authentication Required** dialog that opens, then select **Log In**.
5. Select **Web Configuration**.

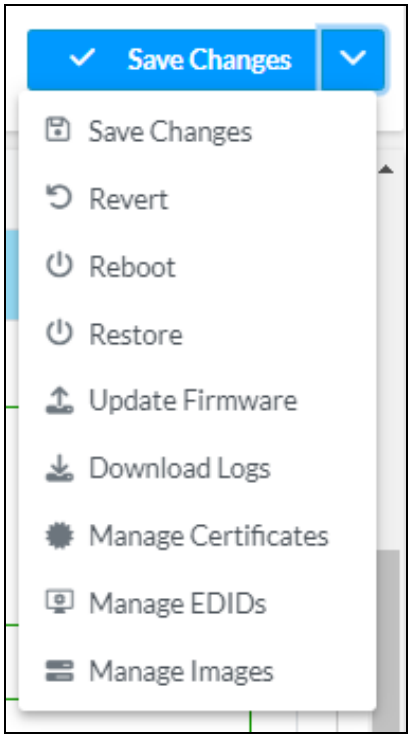
Action

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-360
- DM-NVX-360C
- DM-NVX-363
- DM-NVX-363C

The **Action** drop-down menu is displayed at the top right side of the web interface and provides quick access to these common device functions:

- Save Changes on page 498
- Revert on page 498
- Reboot on page 498
- Restore on page 498
- Update Firmware on page 499
- Download Logs on page 499
- Manage Certificates on page 499
- Manage EDIDs on page 502
- Manage Images (Receiver Mode Only) on page 505



Save Changes

Select **Save Changes** to save any changes made to the configuration settings.

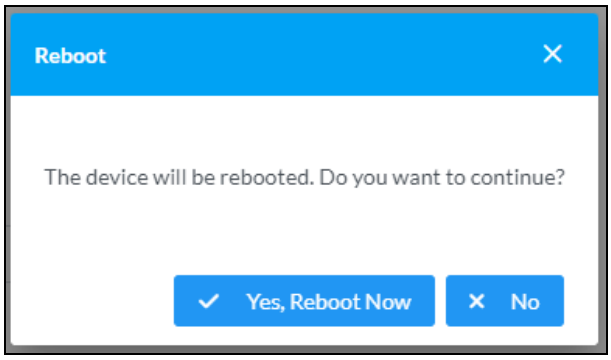
Revert

Select **Revert** to revert the device back to the last saved configuration.

Reboot

Certain changes to the settings may require a reboot to take effect. To reboot the device:

1. Select **Reboot** in the **Action** menu. The **Reboot** confirmation message box appears.



2. Select **Yes, Reboot Now** to reboot the device. The **Reboot** status message box appears. Wait for the device reboot to complete before attempting to reconnect to the web interface. Alternatively, select **No** to cancel the reboot operation.

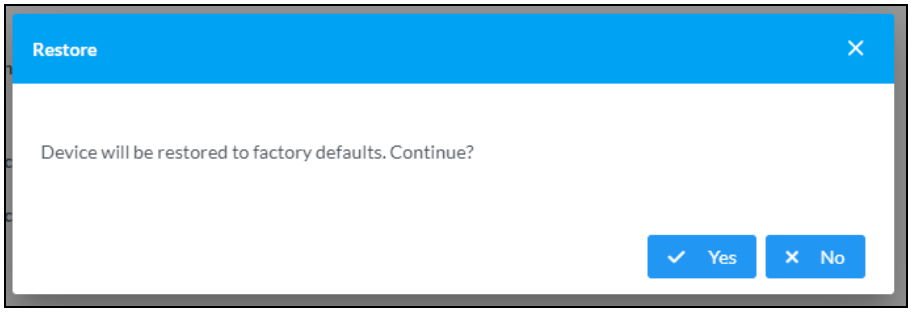
Restore

The DM NVX device can be restored to factory default settings from the **Action** menu.

> **NOTE:** The **Restore** procedure will wipe all settings from the device, including network settings. If a static IP address is set, restoring the device to factory default settings will clear this address and DHCP will be enabled instead.

To restore the device to factory defaults:

1. Select **Restore** in the **Action** menu. The **Restore** confirmation message box appears.



2. Select **Yes** to restore the device to factory default settings. Select **No** to cancel the restore operation. When **Yes** is selected, the **Restore** status message box appears. Wait for the device restore to complete before attempting to reconnect to the web interface.

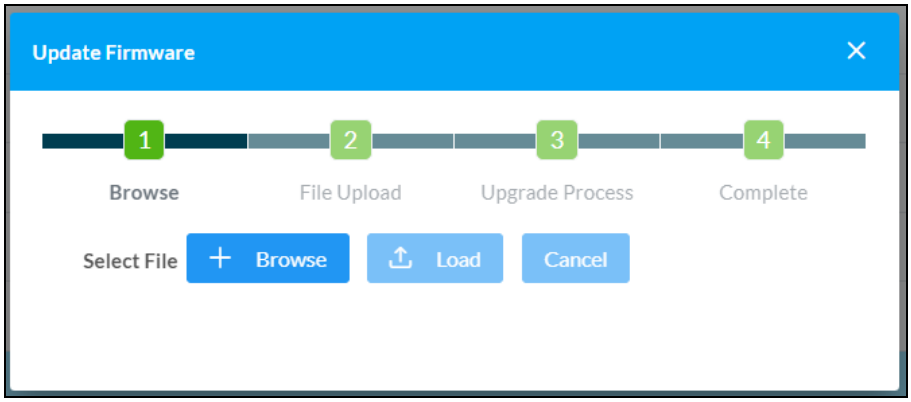
   > **NOTE:** Once the device is restored, it may have a new IP address. If reconnecting to the original address does not work, use the Device Discovery Tool in Crestron Toolbox software or an IP scanner application to find the device's new IP address.

If the web interface is not accessible, the device can also be restored to factory default settings via a hardware-based procedure (refer to DM-NVX-360 and DM-NVX-363 Installation on page 374). Card-based DM NVX devices can also be restored from the front panel menu of the DMF-CI-8.

Update Firmware

To update the firmware of the device:

1. Select **Update Firmware** in the **Action** menu.
2. In the **Update Firmware** window that appears, select **+ Browse**.



3. Locate and select the desired firmware file, then select **Open**. The selected firmware file name is displayed in the **Update Firmware** window.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The firmware update is now complete, and the web interface will return to the main log-in page.

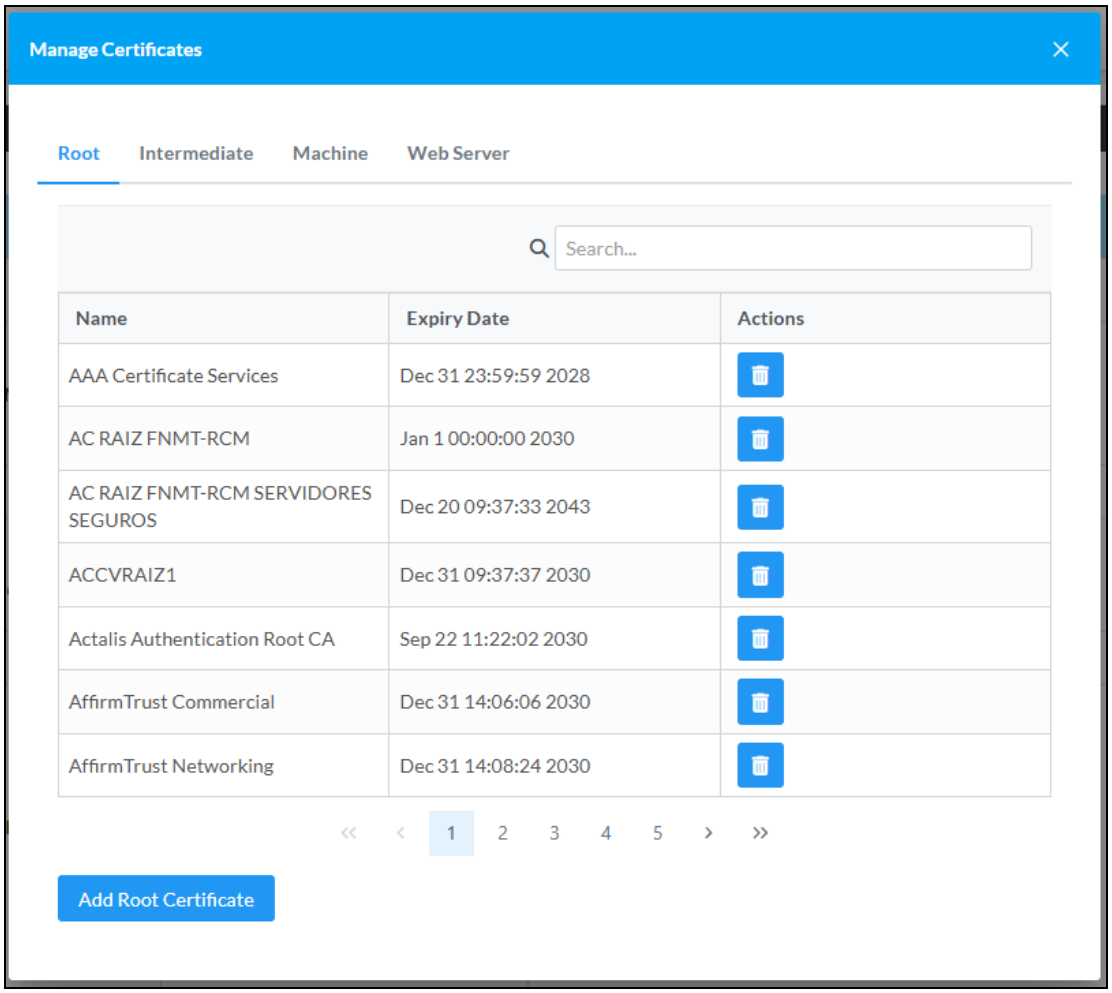
Download Logs

Select **Download Logs** in the **Action** menu to download the device message logs for diagnostic purposes.

The log file is downloaded to the Downloads folder of the PC.

Manage Certificates

Select **Manage Certificates** in the **Action** menu to open the **Manage Certificates** window. Use this window to add or remove certificates used in 802.1x authentication and other protected network functions.



The following certificate tabs are available in the **Manage Certificates** window:

- **Root:** The Root certificate is used by the DM NVX device to validate the network's authentication server. The device has a variety of Root certificates, self-signed by trusted CAs (Certificate Authorities) preloaded into the device. Root certificates must be self-signed.
- **Intermediate:** The Intermediate store holds non self-signed certificates that are used to validate the authentication server. These certificates will be provided by the network administrator if the network does not use self-signed Root certificates.
- **Machine:** The Machine certificate is an encrypted PFX file that is used by the authentication server to validate the identity of the DM NVX device. The machine certificate will be provided by the network administrator, along with the certificate password. For 802.1x, only one machine certificate can reside on the device.
- **Web Server:** The Web Server certificate is a digital file that contains information about the identity of the web server.

Add Certificates

To add a certificate:

1. Select the corresponding certificate tab.
2. Select **Add [Type] Certificate**.

3. Select **+ Browse**.
4. Locate and select the file, then select **Open**.

   > **NOTE:** If the selected certificate is a machine certificate, enter the password provided by the network administrator.

5. Select **OK**. This will add the certificate to the list in the **Manage Certificates** window, displaying the file name and expiration date. The certificate is now available for selection and can be loaded to the device.

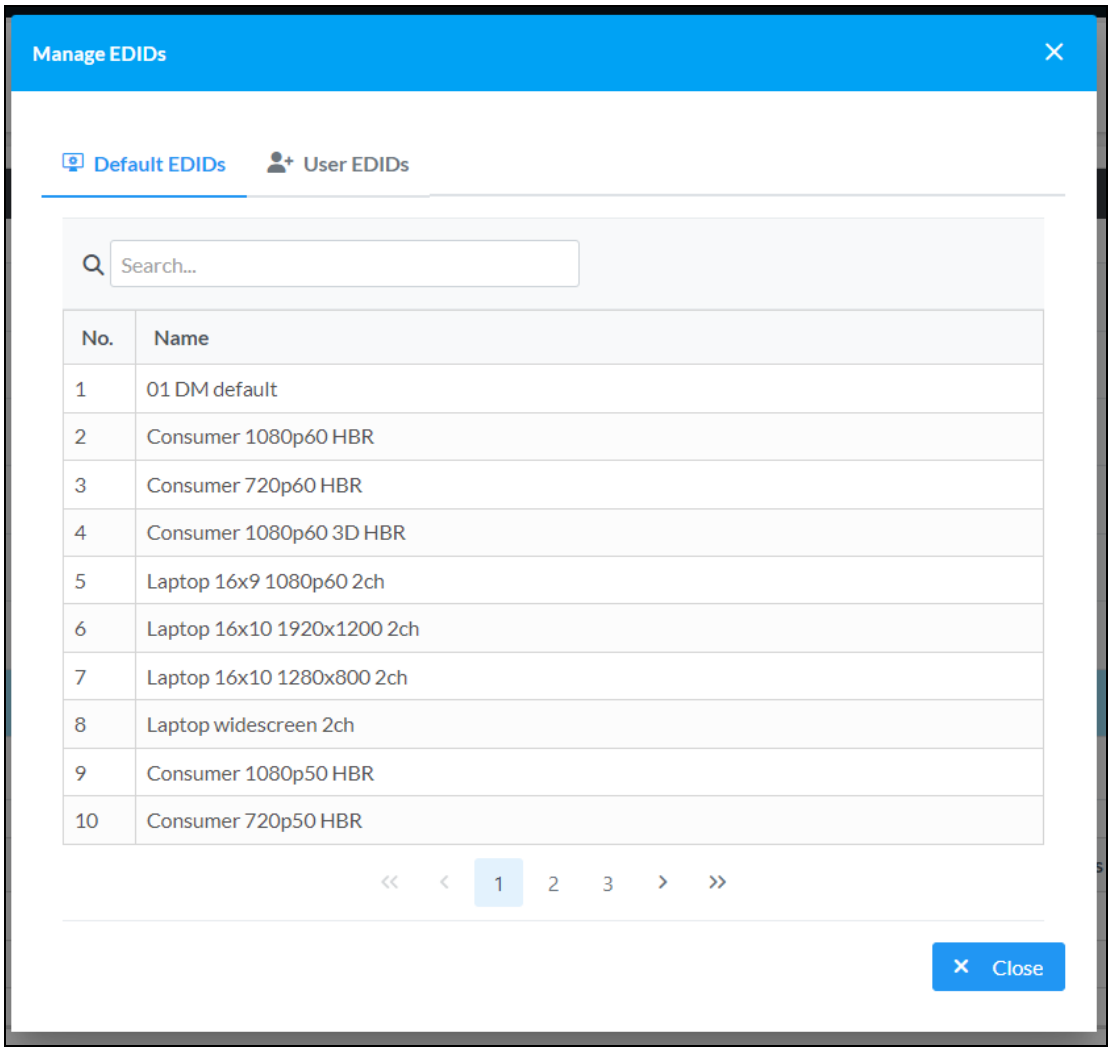
Delete Certificates

To delete a certificate:

1. Select the corresponding certificate tab.
2. Select the trashcan icon in the **Actions** column and the row of the certificate to be deleted.
3. Select **Yes** when prompted to delete the certificate or **No** to cancel the deletion.

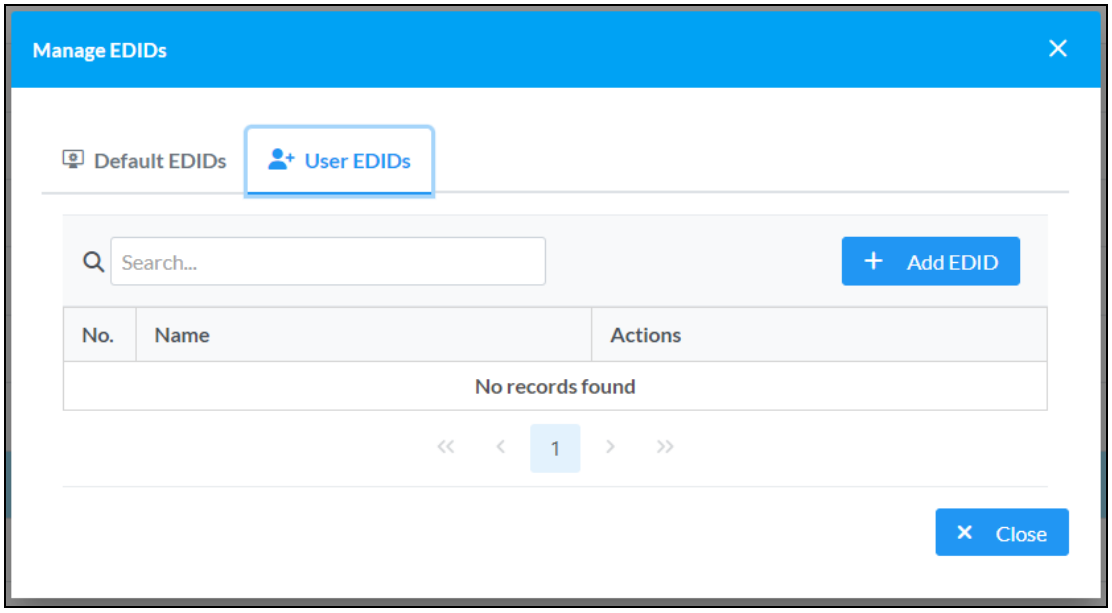
Manage EDIDs

Select **Manage EDIDs** in the **Action** menu to open the **Manage EDIDs** window. Use this window to add, remove, or browse which EDIDs are available for the AV inputs and outputs of the DM NVX device.



The default tab that will open in this window is the **Default EDIDs** tab. This tab is read only, and provides a list of all default EDIDs available on the DM NVX device as part of the firmware. Use the **Search...** text entry field to filter the list of EDIDs by name. Default EDIDs cannot be removed from the device.

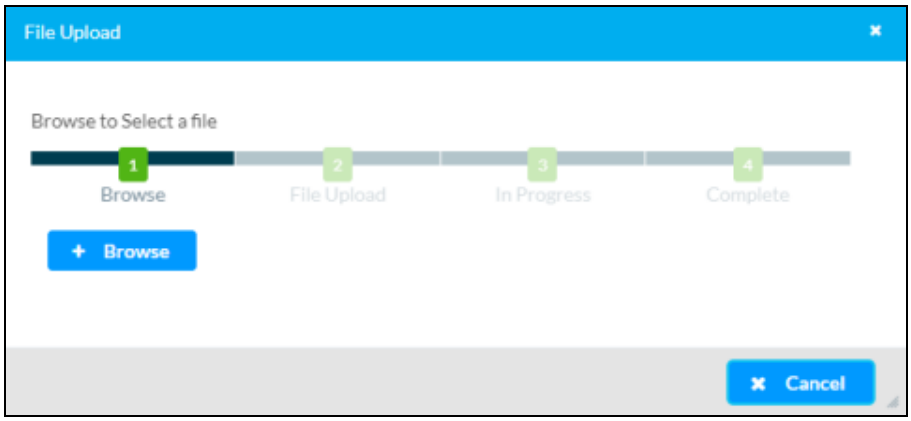
The second tab available in this window is the **User EDIDs** tab. By default, the table will populate with **No records found**.



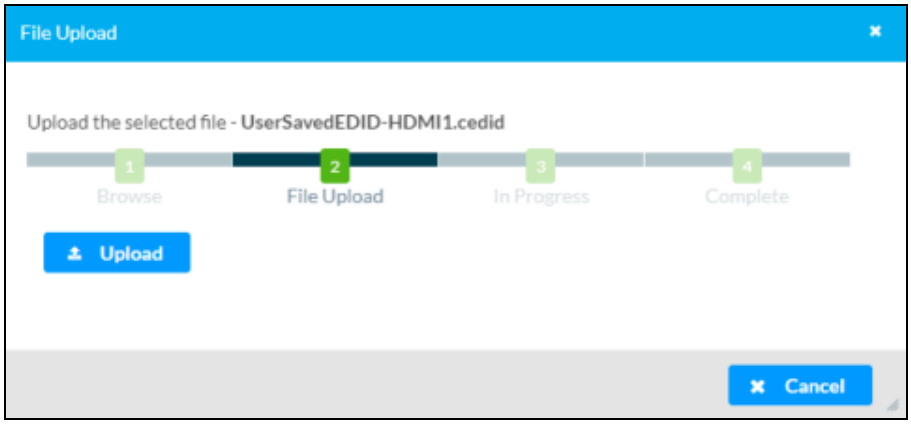
To add a **User EDID** file:

1. Select **+ Add EDID** at the top right of the table. The **File Upload** screen will appear.
2. Select **+ Browse**. Locate the desired .cedid file, then select **Upload** to upload it to the DM NVX device.

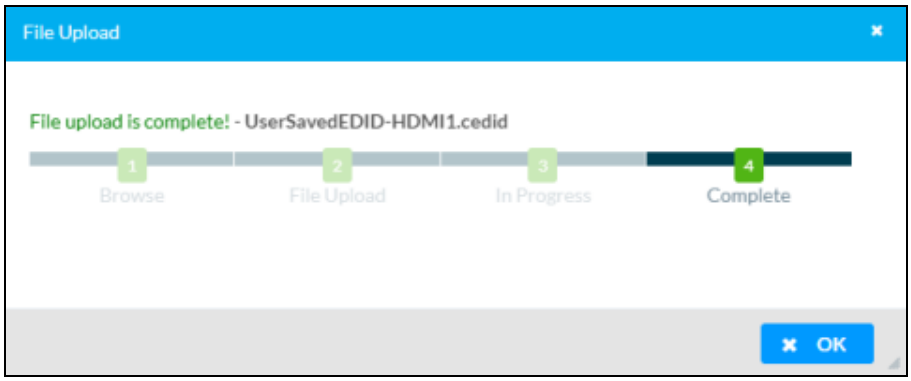
   Browse for and select a .cedid file

   Upload the selected file

   Wait for the upload to complete, then select OK

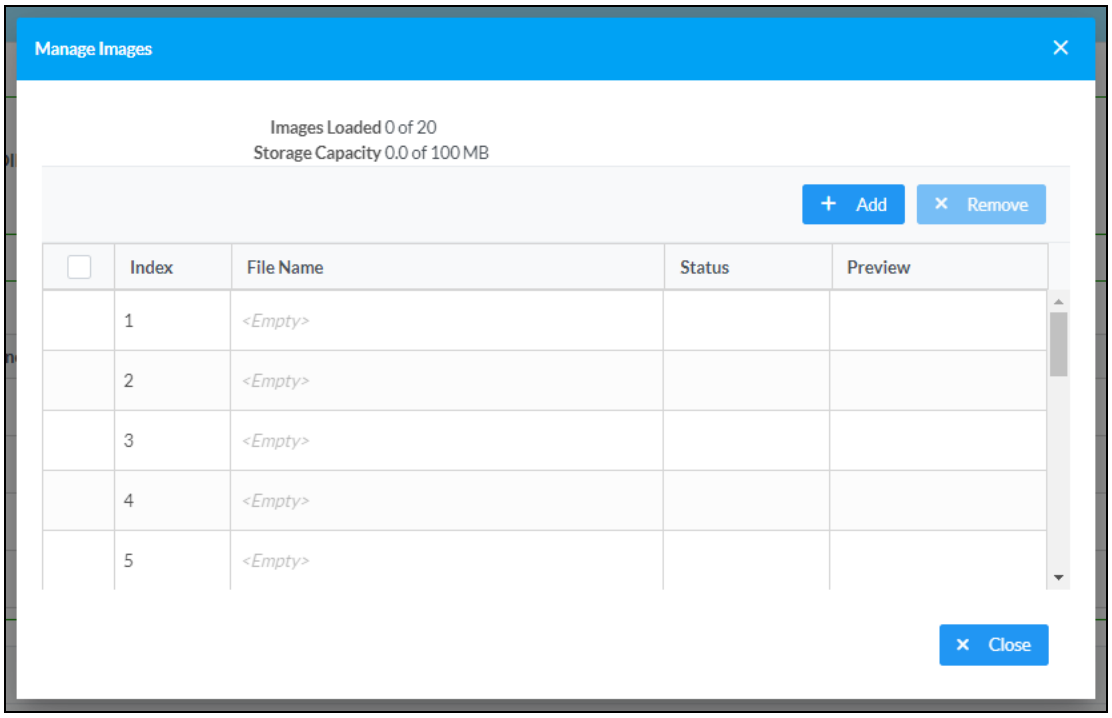
   

3. Select **OK** to return to the **Manage EDIDs** window. The uploaded User EDID is now displayed in the table.

To remove a **User EDID** file, select **Delete** in its table row.

Manage Images (Receiver Mode Only)

Select **Manage Images** in the **Action** menu to open the **Manage Images** window. Use this window to add or remove images that can be displayed as backgrounds for the on-screen display feature of the DM NVX device.



To add an image:

1. Select **+ Add**. A **File Upload** window appears.
2. Select **+ Browse**. Locate the desired .jpeg, .jpg, or .png image file, then select **Upload** to upload it to the DM NVX device. The uploaded image will now appear in the **Manage Images** table with a preview and a **Ready** status message. Refer to the **Outputs** heading under Settings on page 512 for information on setting a background image.

To delete an image, select its entry in the table then select **X Remove**.

Status

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-360
- DM-NVX-360C
- DM-NVX-363
- DM-NVX-363C

The **Status** page is the first page displayed when opening the interface of the DM NVX device. It displays general information about the device (such as **Model Name**, **Firmware Version**, and **Serial Number**), current network settings (such as **Host Name** and **IP Address**), and the current status of the connectors on the device.

The **Status** page can be accessed at any time by selecting the **Status** tab of the interface.

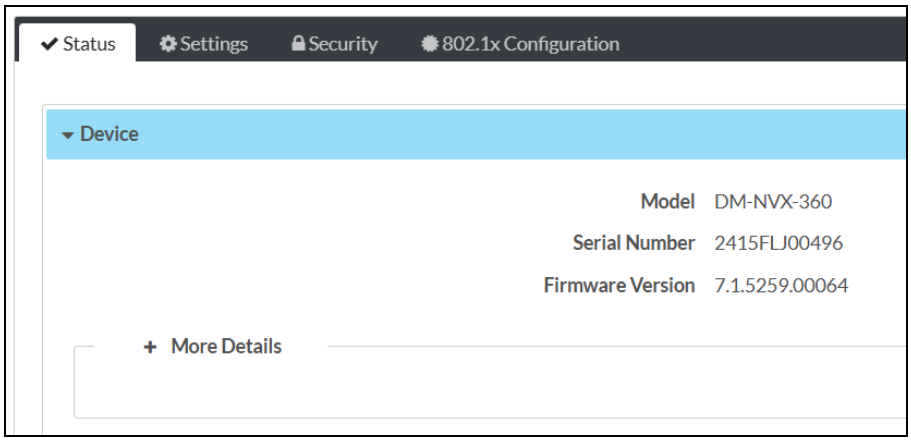


Information displayed on the **Status** page is organized into different sections:

- Device on page 507
- Network on page 507
- USB on page 508
- DM NVX Director on page 508
- DM NAX (AES67) Audio on page 509
- Control System on page 510
- Input/Output on page 510

Device

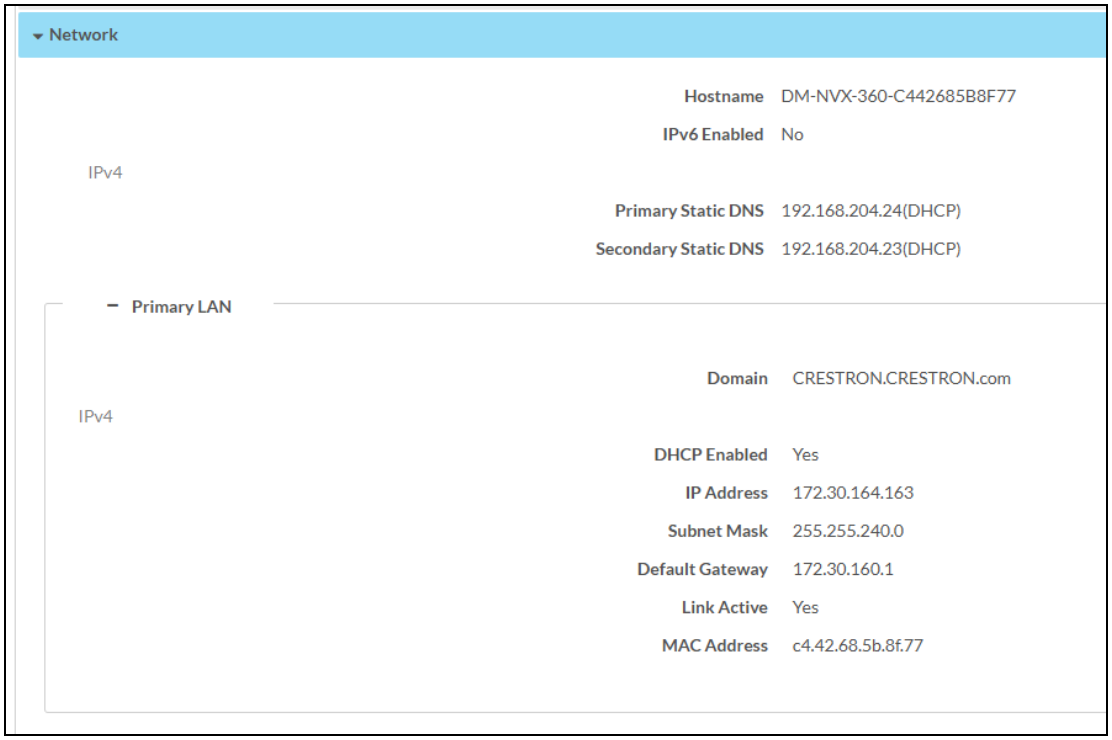
The **Device** accordion displays the **Model**, **Firmware Version**, and **Serial Number** of the DM NVX device.



Select **+ More Details** to review additional information about the device.

Network

The **Network** accordion displays network-related information about the device, including the **Hostname**, **Domain Name**, and **DNS Servers**.



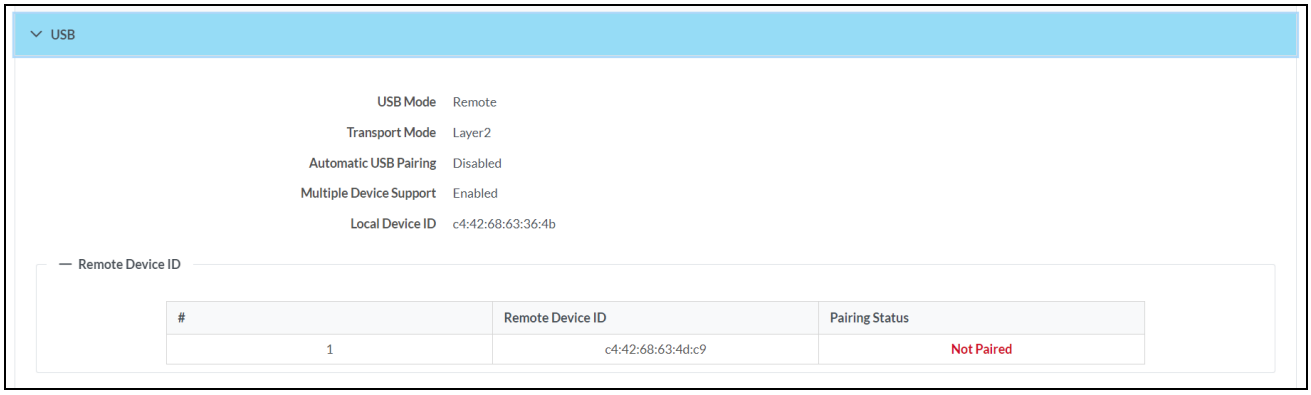
By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-360-C442685B8F77.

Select **+ Primary LAN** to display additional information regarding the Ethernet port designated as the **Primary LAN**. If **+ Primary LAN** is selected, select **- Primary LAN** to collapse the section.

NOTE: The **Primary LAN** port and other Ethernet port designations are assigned by the **Port Selection** feature. Refer to the **Port Selection** heading under Settings on page 512 for details on configuring the **Port Selection** feature.

USB

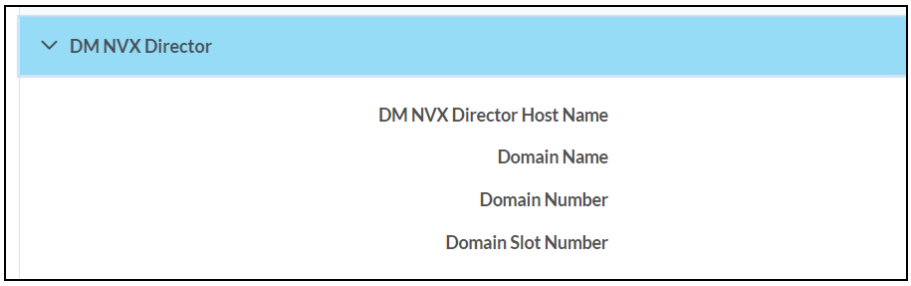
The **USB** accordion displays the **USB Mode**, **Transport Mode**, **Automatic USB Pairing**, **Multiple Device Support**, and **Local Device ID** of the device. Select **+ Remote Device ID** to display a table showing the **#**, **Remote Device ID**, and **Pairing Status** of any devices connected to the DM NVX device by USB.



DM NVX Director

The **DM NVX Director** accordion displays the details of the DM NVX Director switching appliance to which the DM NVX device is claimed.

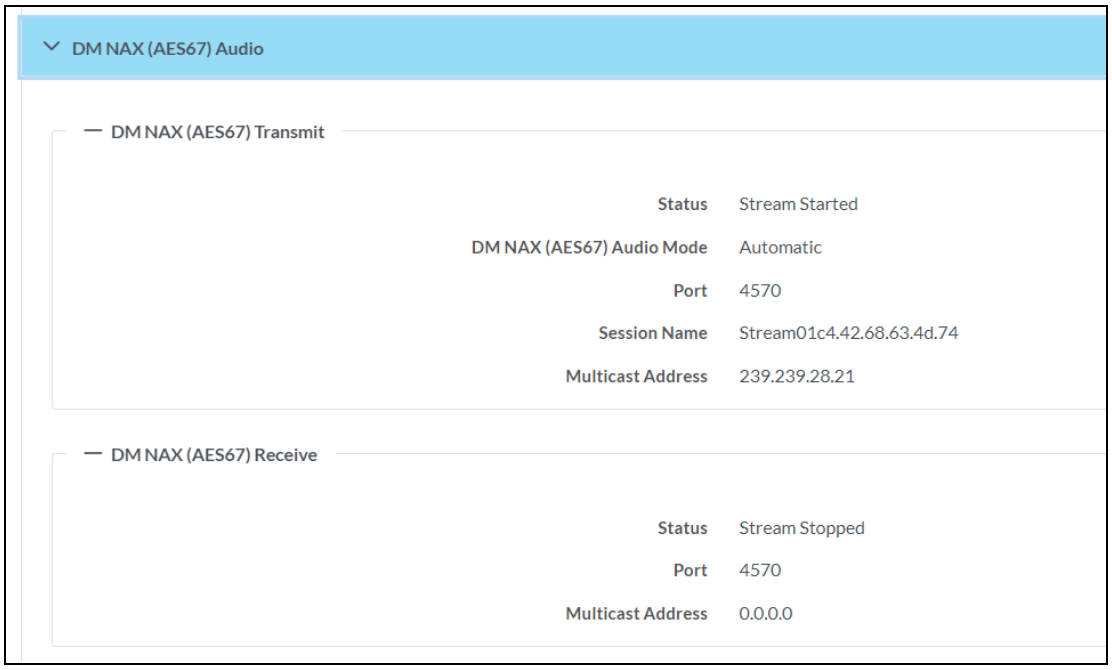
NOTE: If the DM NVX device has not been claimed by a DM NVX Director switching appliance, all fields in this section will be empty.



- **DM NVX Director Host Name:** Displays the host name of the claiming DM NVX Director switching appliance.
- **Domain Name:** Displays the name of the DM NVX Director domain to which the DM-NVX-36X series device belongs.
- **Domain Number:** Displays the number of the DM NVX Director domain to which the DM-NVX-36X series device belongs.
- **Domain Slot Number:** Displays the slot number within the DM NVX Director that refers to this specific DM NVX device.

DM NAX (AES67) Audio

The **DM NAX (AES67) Audio** accordion displays information regarding the **DM NAX (AES67) Transmit** and **DM NAX (AES67) Receive** audio-over-IP (AoIP) signals. This accordion varies slightly depending if the device is in transmitter or receiver mode.



The **DM NAX (AES67) Audio Mode** field will be under the **DM NAX (AES67) Receive** heading if the device is in receiver mode or under the **DM NAX (AES67) Transmit** heading if the device is in transmitter mode. This field displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).

The details displayed for **DM NAX (AES67) Transmit** are:

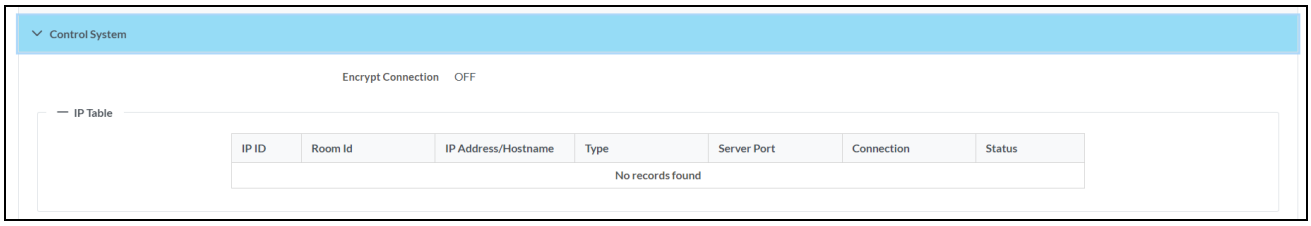
- **Status:** Displays a status message for the transmitting AoIP stream, such as **Stream Stopped**, **Stream Starting**, or **Stream Started**.
- **DM NAX (AES67) Audio Mode:** Displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).
- **Port:** Displays the port of the AoIP transmit stream.
- **Session Name:** Displays the session name of the AoIP transmit stream.
- **Multicast Address:** Displays the multicast address of the AoIP transmit stream.

The details displayed for **DM NAX (AES67) Receive** are:

- **Status:** Displays a status message for the AoIP stream receiver, such as **Connecting**, **Stream Stopped**, or **Stream Started**.
- **Port:** Displays the port of the received AoIP stream.
- **Multicast Address:** Displays the multicast address of the received AoIP stream.

Control System

The **Control System** accordion displays information regarding the connection between the DM NVX device and a control system.

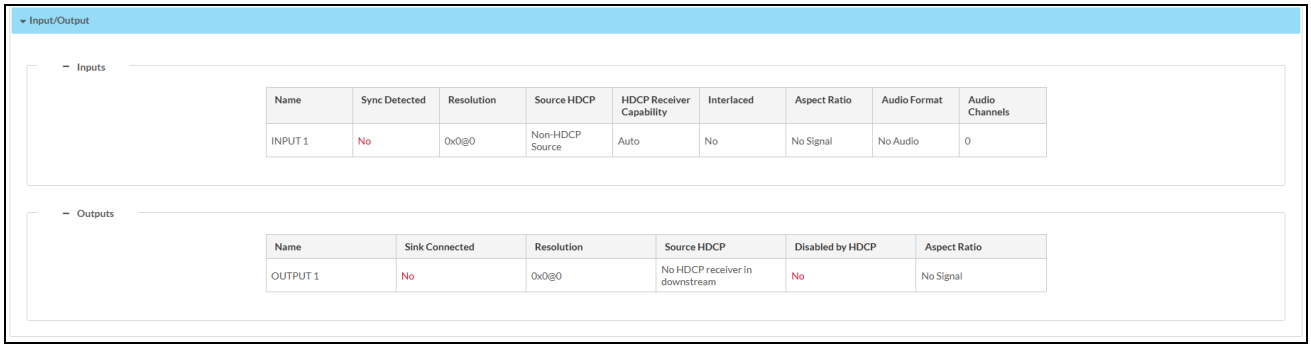


The displayed fields are:

- **Encrypt Connection:** Displays **ON** if the connection is encrypted or **OFF** if it is not.
- **IP ID:** Displays the IP ID of the DM NVX device in its IP table entry of the control system's IP table.
- **Room ID:** Displays the room ID of the DM NVX device in its IP table entry of the control system's IP table.
- **IP Address/Hostname:** Displays the IP address and host name of the control system.
- **Type:** Always displays **Peer** (this is the only relationship the DM NVX device can have to a control system).
- **Server Port:** Displays the port for the connection between the DM NVX device and the control system.
- **Connection:** Always displays **Gway** (this is the only connection type supported between a DM NVX device and a control system).
- **Status:** Displays either **ONLINE** or **OFFLINE** depending on if the DM NVX device is able to communicate with the control system.

Input/Output

The **Input/Output** accordion displays status information regarding the AV input and output connectors.



The displayed fields for **Inputs** are:

- **Name:** Displays the name of the input.
- **Sync Detected:** Displays whether sync is detected at the input (**Yes**) or not (**No**).
- **Resolution:** Displays the resolution and refresh rate of the input video signal.

- **Source HDCP:** Displays the HDCP level of the input video signal.
- **HDCP Receiver Capability:** Displays the HDCP capabilities of the DM NVX device.
- **Interlaced:** Displays **Yes** or **No** depending if the input video signal is interlaced or not.
- **Aspect Ratio:** Displays the aspect ratio of the input video signal.
- **Audio Format:** Displays the audio format of the input signal.
- **Audio Channels:** Displays the number of audio channels in the input signal.

The displayed fields for **Outputs** are:

- **Name:** Displays the name of the output.
- **Sink Connected:** Displays whether a sink (such as a display or projector) is connected to the output (**Yes**) or not (**No**).
- **Resolution:** Displays the current resolution of the video output signal.
- **Source HDCP:** Displays the HDCP level supported by the connected display or projector.
- **Disabled by HDCP:** Displays whether the output is disabled by HDCP (**Yes**) or not (**No**).
- **Aspect Ratio:** Displays the aspect ratio of the video output signal.

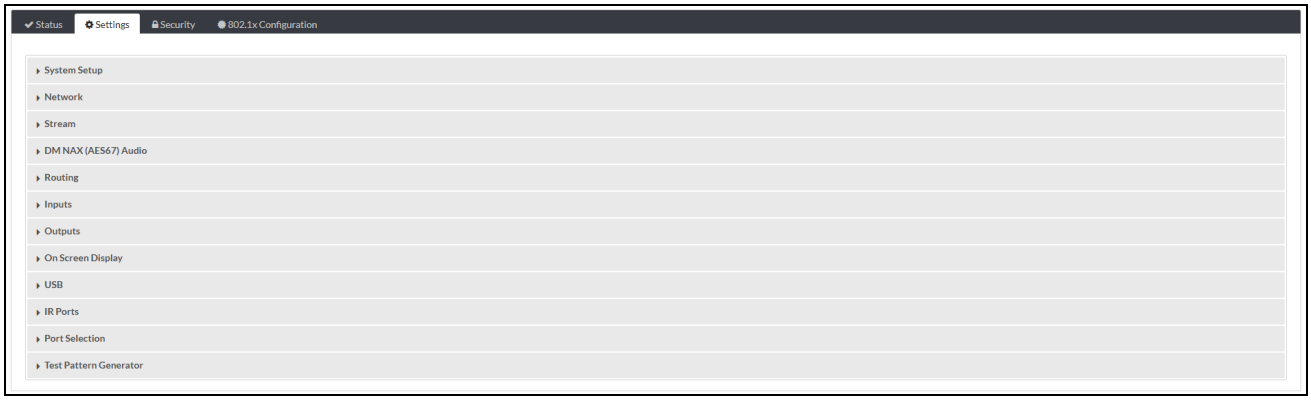
Settings

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-360
- DM-NVX-360C
- DM-NVX-363
- DM-NVX-363C

The **Settings** page enables configuration of the DM NVX device's settings. The **Settings** page can be accessed at any time by selecting the **Settings** tab of the interface.

Settings Page (Transmitter Mode Shown)



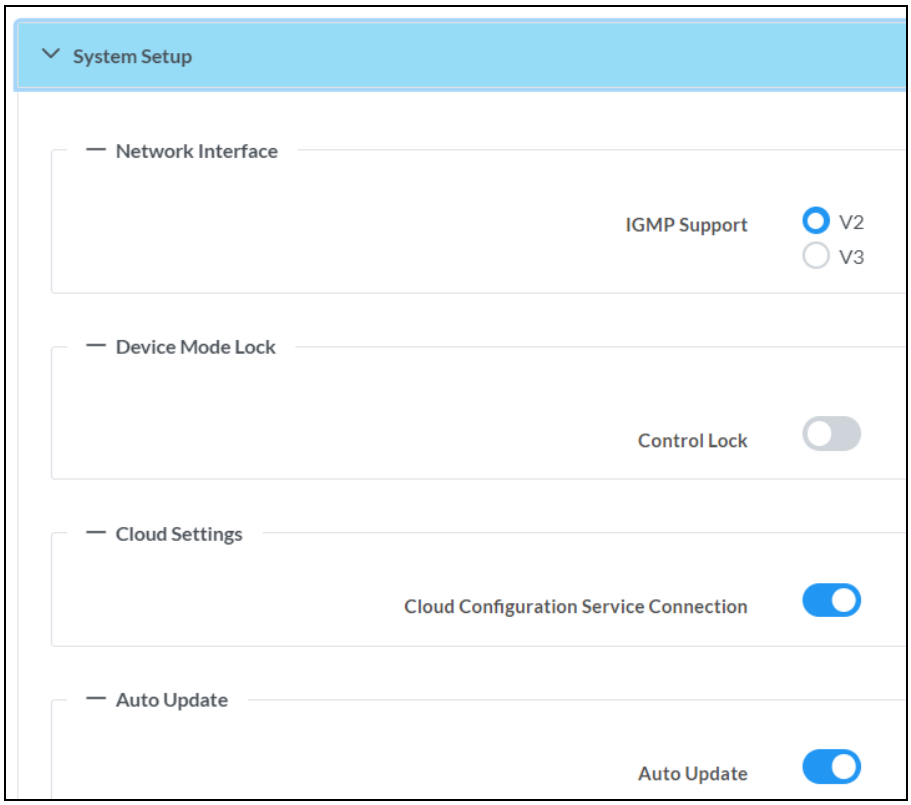
NOTE: Some settings are available only in encoder (transmitter) or decoder (receiver) mode. Mode requirements are noted in headings below where appropriate.

Settings available on the **Settings** page are organized into different sections:

- System Setup on page 513
- Network on page 519
- Stream on page 520
- DM NAX (AES67) Audio on page 529
- Routing on page 531
- Subscriptions (Receiver Mode Only) on page 534
- Inputs on page 536
- Outputs on page 538
- On Screen Display on page 549
- USB on page 550
- IR Ports on page 552
- Port Selection on page 553
- Test Pattern Generator on page 554

System Setup

The **System Setup** accordion contains settings for configuration of the following system functions.



Network Interface

The **Network Interface** section provides a choice between IGMPv2 and IGMPv3 operation. Choose the settings that match the capabilities of the network hardware.

NOTES:

- This setting must match on all DM NVX devices in a system to ensure compatibility.
- DM NVX devices are set to IGMPv2 operation by default.
- Crestron recommends leaving DM NVX systems set to IGMPv2 operation unless the network specifically requires IGMPv3.



To change the **Network Interface** mode:

1. Select **V2** to set the DM NVX device to IGMPv2 operation, or select **V3** to set the device to IGMPv3 operation.
2. Select **Save Changes**. A prompt will appear to reboot the device.
3. Select **Yes, Reboot Now** to reboot the device into the new **Network Interface** mode.

Device Mode Lock

The **Device Mode Lock** section provides a toggle for the **Control Lock** feature.

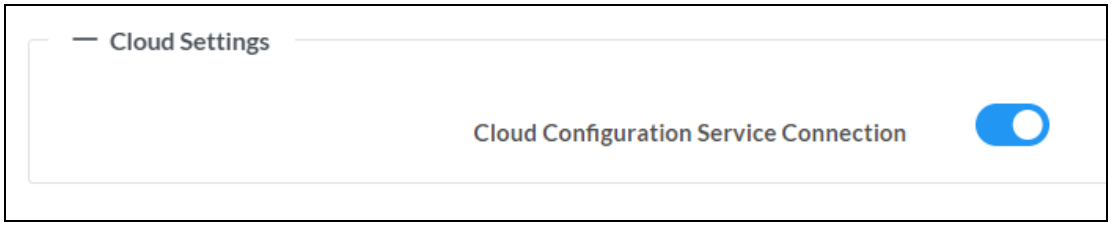


Set the **Control Lock** toggle to the right to lock out the push buttons built in to the DM NVX device.

Set the **Control Lock** toggle to the left to disable the lock, allowing the push buttons to control source routing and device modes.

Cloud Settings

The Cloud Settings section provides a toggle to enable or disable communication with the Crestron XiO Cloud® platform.

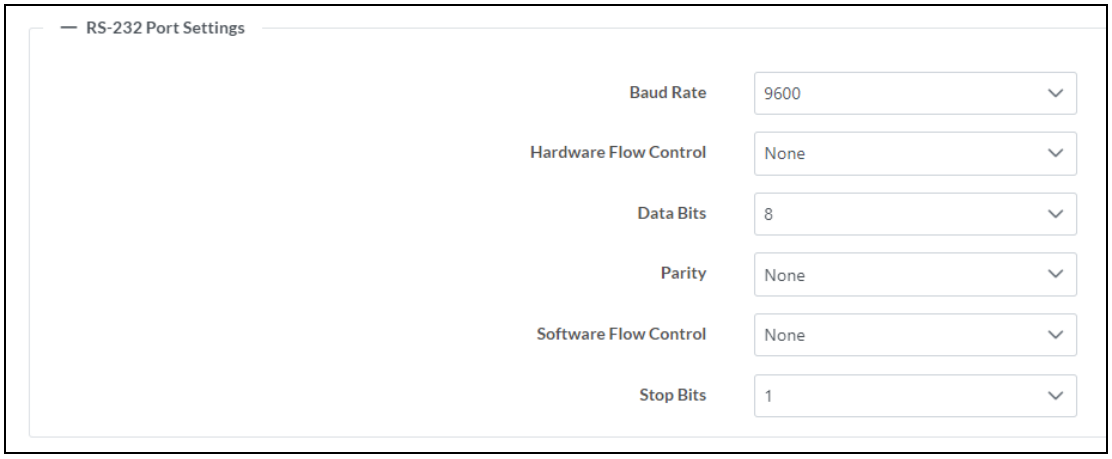


Set the **Cloud Configuration Service Connection** toggle to the right to allow the DM NVX device to communicate with the XiO Cloud platform. Set the toggle to the left to prevent the device from communicating with the XiO Cloud platform.

RS-232 Port Settings

> **NOTE:** This section is not available on card-based models.

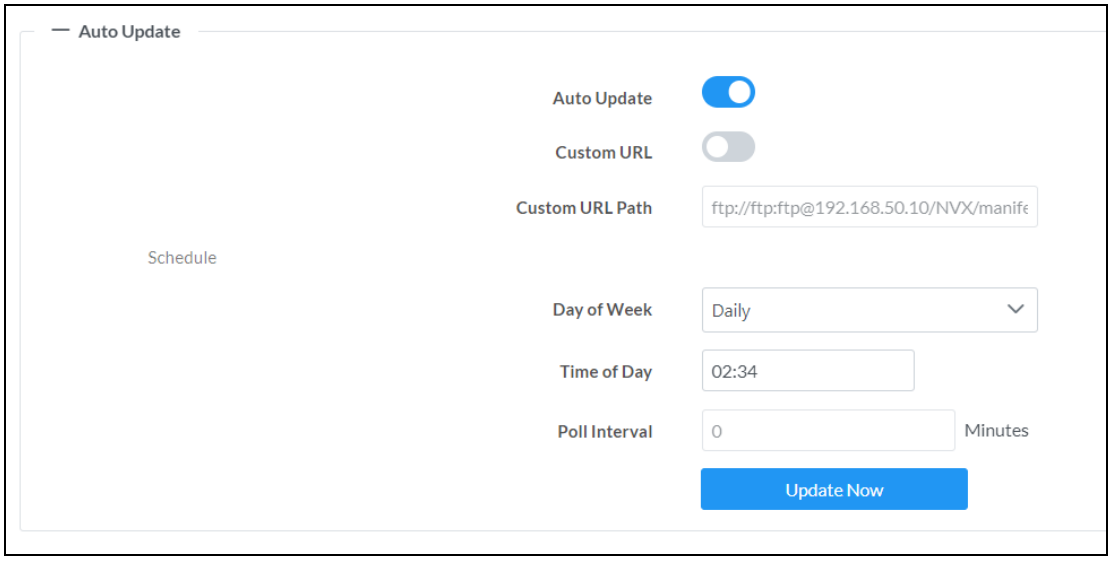
Configure the settings for the built-in RS-232 port of the device in the **RS-232 Port Settings** section.



- **Baud Rate:** Select the baud rate from the drop-down.
- **Hardware Flow Control:** Select the hardware flow control from the drop-down.
- **Data Bits:** Select the number of data bits from the drop-down.
- **Parity:** Select the parity from the drop-down.
- **Software Flow Control:** Select the software flow control from the drop-down.
- **Stop Bits:** Select the number of stop bits from the drop-down.

Auto Update

The DM NVX device can automatically check for and install firmware updates at scheduled intervals via the **Auto Update** feature.



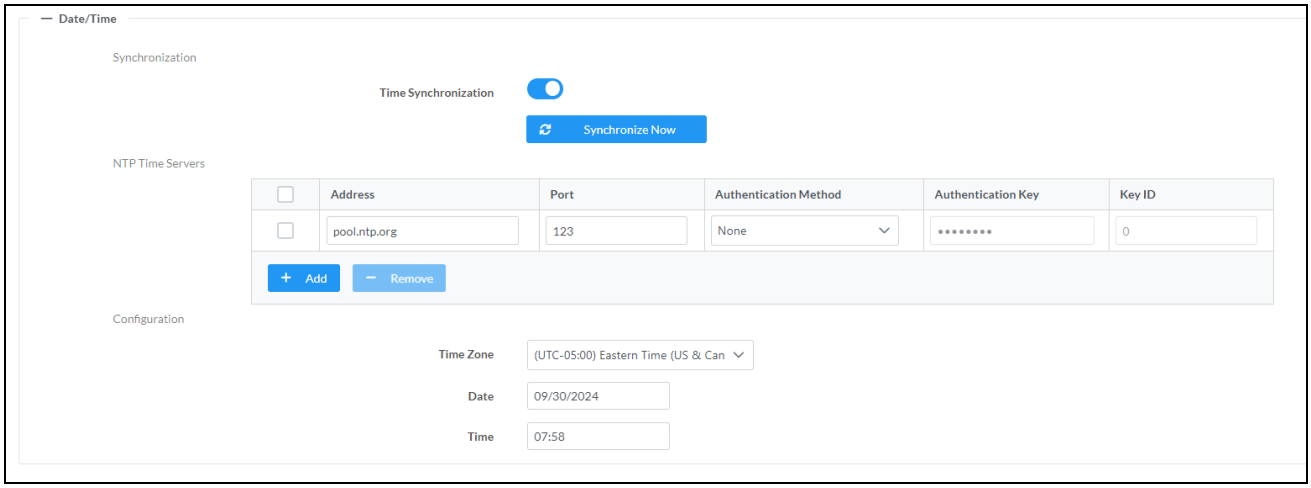
To configure the **Auto Update** feature settings:

1. Set the **Auto Update** toggle to the right to enable the **Auto Update** feature.
2. Define the URL to download the updates by doing either of the following:
    a. Use the default URL to download the updates from the Crestron server.
    b. Use a custom URL. Set the **Custom URL** toggle to the right to enable a custom URL. In the **Custom URL Path** text box, enter the path to a custom manifest file in the FTP or SFTP URL format. Use the Crestron Auto Update Tool to generate a custom manifest file, then store the file on an FTP (File Transfer Protocol) or SFTP (Secure File Transfer Protocol) server.
3. Set a schedule for the automatic firmware update by doing either of the following:
    a. Select the desired **Day of Week** and **Time of Day** (24-hour format) values.
    b. Set the **Poll Interval** by entering a value from 60 to 65535 minutes. A value of 0 disables the **Poll Interval**.
4. Select **Save Changes**.

Selecting **Update Now** causes the device to check for a firmware update immediately. If a schedule was set in step 3 above, that schedule still remains in effect.

Date/Time

Use the **Date/Time** section to configure the date and time settings of the DM NVX device.



Synchronization

1. Set the **Time Synchronization** toggle to the right to enable or left to disable time synchronization. By default, time synchronization is enabled.
2. In the **NTP Time Servers** table, enter the URL of a NTP (Network Time Protocol) or SNTP (Simple Network Time Protocol) server. Up to three time servers can be added on a device.
3. Select **Synchronize Now** to perform time synchronization between the device's internal clock and the time server.

Configuration

1. Open the **Time Zone** drop-down menu to select the applicable time zone.
2. In the **Date** field, enter the current date.

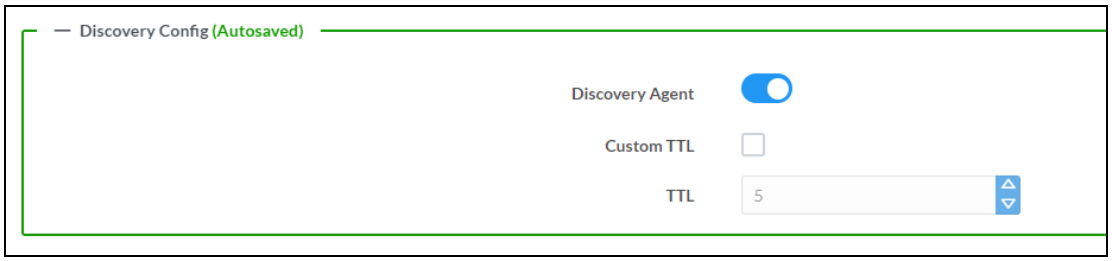
3. In the **Time (24hr Format)** field, enter the current time in 24-hour format.

Select **Save Changes** to save the settings.

Select **Revert** from the **Action** drop-down menu to revert to the previous settings without saving.

Discovery Config

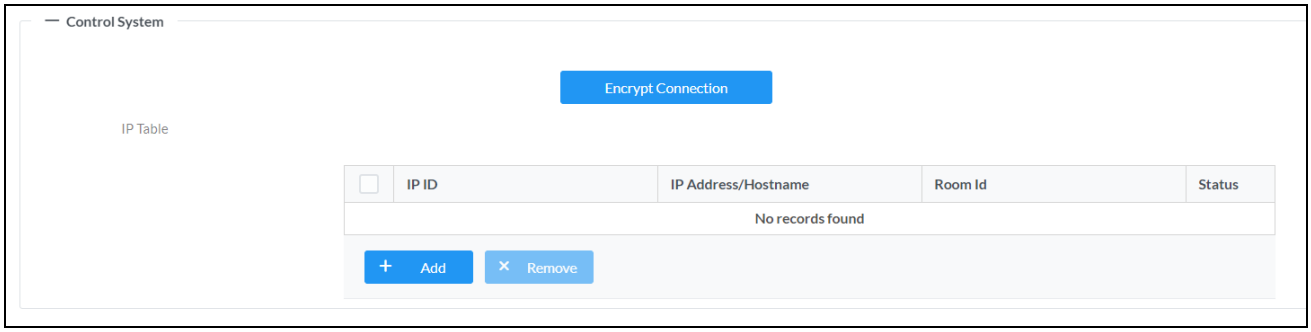
The **Discovery Config** section provides settings to customize how the DM NVX device and its streams can be discovered on the LAN.



Set the **Discovery Agent** toggle to the right to allow streams from the device to be discoverable on the network or to the left to prevent network discovery. When **Discovery Agent** is enabled, the streams from the DM NVX device are displayed in the **Available Streams** list of other receivers.

Select the **Custom TTL** option and enter a value in the **TTL** field if a custom Time-to-live (TTL) value is required on the network. The default **TTL** value is 5.

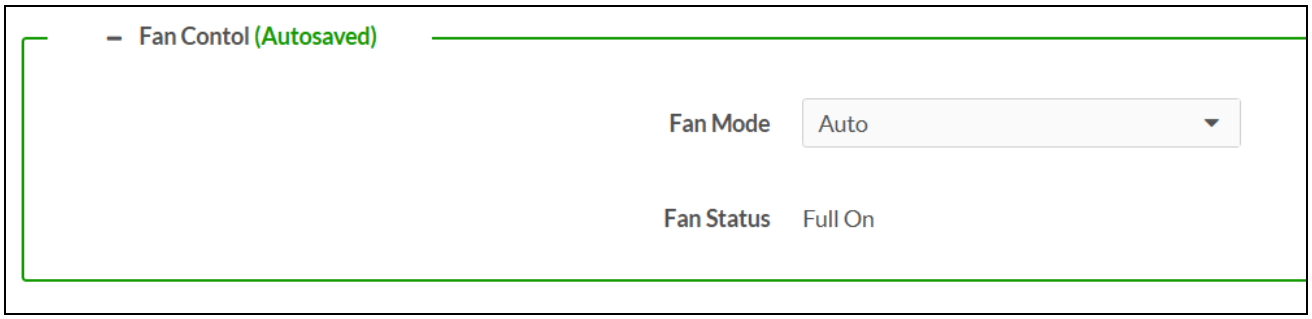
Control System



1. Select **Encrypt Connection** to navigate to the **Security** tab to configure encryption settings.
    a. Enter a username in the **Control System Username** field.
    b. Enter a password in the **Control System Password** field.
2. Select **+ Add** to add an IP table entry to the **IP Table**.
    a. Enter the Room ID in the **Room ID** field.
    b. Enter the IP ID of the DM NVX device in the **IP ID** field.
    c. Enter the IP address or hostname of the control system in the **IP Address/Hostname** field.
3. Select **Save Changes** to save the new entries. The **Control System Save** message box appears, indicating that the control system settings were saved successfully. Select **Revert** to revert to the previous settings without saving.

Fan Control (Receiver Mode Only)

NOTE: This section is not available on card-based models.



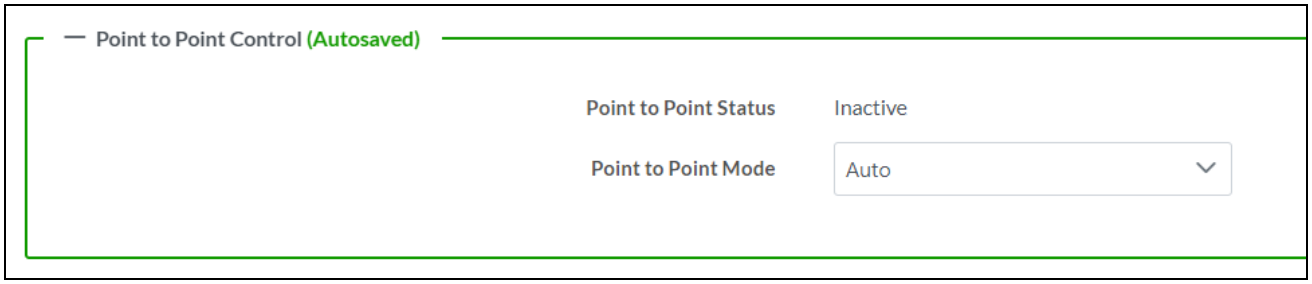
Select an option from the **Fan Mode** drop-down:

- **Auto:** The fan automatically turns on when either of these conditions are met:
  - A video stream is present.
  - The internal temperature of the device exceeds the normal operating range.
- **Always On:** The fan runs continuously regardless of video stream status and internal temperature.

Fan Status is a read-only field that will either read **Full On** to indicate that the fan is running or **Off** to indicate that the fan is not running.

Point to Point Control

The **Point to Point Control** section allows enabling or disabling point-to-point streaming of AV-over-IP between this device and another directly-connected DM NVX device without the need for a control system.



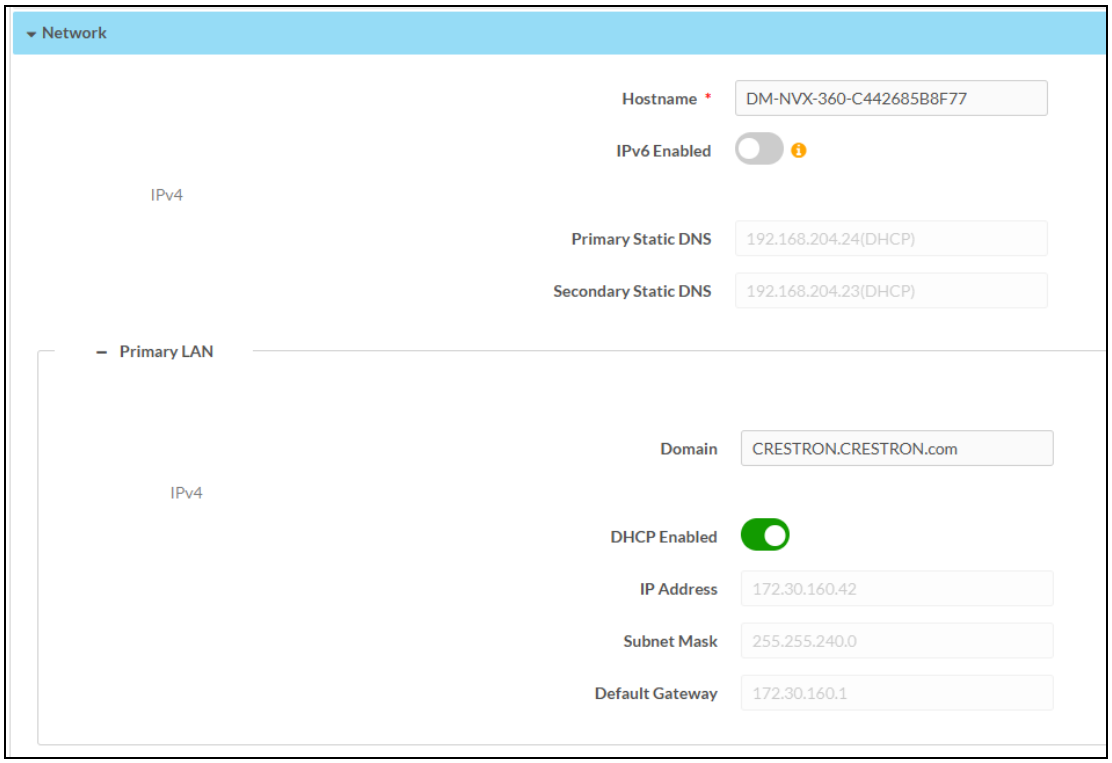
Point to Point Status is a read-only field that indicates whether point-to-point mode is **Active** or **Inactive**.

Select an option from the **Point to Point Mode** drop-down:

- **Auto:** (Default setting) Each 1000BASE-T port of the device detects whether it is connected directly to another DM NVX device or to a 1000BASE-T switch. If a direct connection between a DM NVX encoder and decoder is detected, point-to-point streaming is automatically initiated.
- **Disable:** Disables point-to-point streaming.

Network

The **Network** accordion contains network-related settings for the DM NVX device, including the **Hostname**, **Domain**, **Primary Static DNS**, and **Secondary Static DNS**.



NOTE: By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-360-C442685B8F77.

Primary LAN

The **Primary LAN** subheading contains settings for **DHCP**, **IP Address**, **Subnet Mask**, and **Default Gateway** of the Ethernet adapter assigned as the **Primary LAN** via the **Port Selection** feature.

NOTE: Other LAN subheadings appear when the built-in Ethernet ports are given traffic designations via the **Port Selection** feature. Refer to Port Selection on page 553 for more information on designating specific traffic to specific Ethernet ports. The same settings are available for the additional LAN subheadings that are available for **Primary LAN**.

Set the **DHCP** toggle to the right to enable **DHCP** or left to disable **DHCP**. This determines whether the IP address of the **Primary LAN** port is to be assigned by a DHCP (Dynamic Host Configuration Protocol) server.

- **Enabled:** When DHCP is enabled (default setting), the IP address of the Primary LAN port is automatically assigned by a DHCP server on the local area network (LAN).

- **Disabled:** When DHCP is disabled, manually enter information in the following fields:
  - **Primary Static DNS:** Enter a primary DNS IP address.
  - **Secondary Static DNS:** Enter a secondary DNS IP address.
  - **IP Address:** Enter a unique IP address for the Primary LAN port.
  - **Subnet Mask:** Enter the subnet mask that is set on the network connected to the Primary LAN port.
  - **Default Gateway:** Enter the IP address that is to be used as the Primary LAN network's gateway.

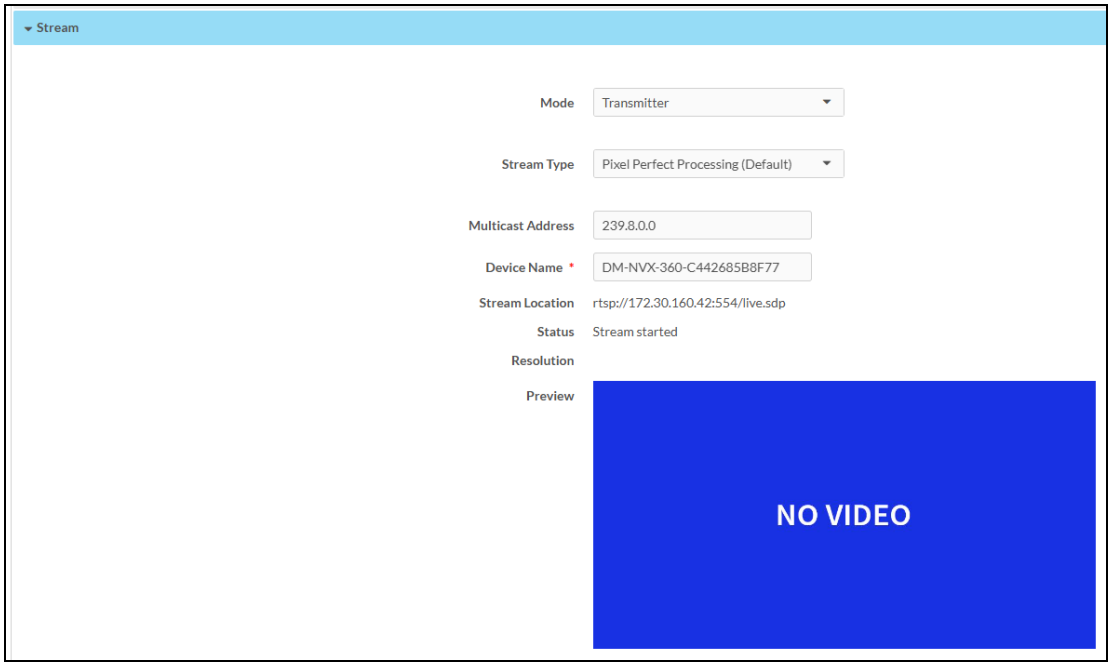
To save any new network entries, select **Save Changes**.

Stream

The settings available under the **Stream** accordion vary depending on whether the device is operating as a encoder (transmitter) or decoder (receiver).

Stream Settings (Transmitter Mode)

Sample Stream Settings (Transmitter Mode)



Configure the basic stream settings:

- **Mode:** Select either **Receiver** or **Transmitter** from the drop-down. Selecting a new mode requires a reboot of the device. Select **Save Changes** to apply the new mode and reboot the device.
- **Stream Type:** Select either **Pixel Perfect Processing** (if transmitting to other DM NVX 4K60 4:4:4 capable endpoints) or **DM-NVX-D10/D20** (if transmitting to a decoder in the D10/D20/D200 family of DM NVX decoders).

- **Multicast Address:** Sets the multicast address of the outgoing stream.
  - The secondary audio stream from the DM NVX device will consume the next multicast address above the value entered here. For example, a **Multicast Address** of 239.10.0.1 will result in a secondary audio stream address of 239.10.0.2.

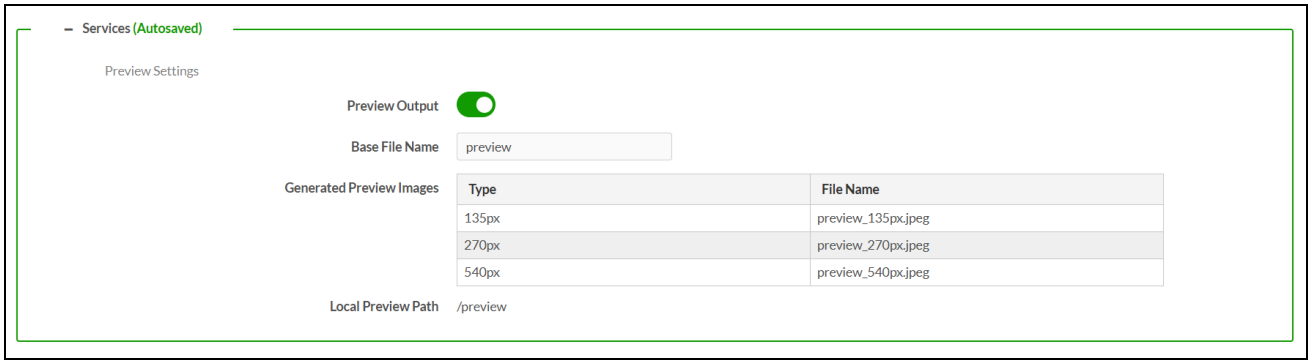
CAUTION: Ensure the value entered for **Multicast Address** is unique on the network. Duplicate multicast addresses will result in traffic collision and downstream receivers will fail to receive content.

NOTES:

- DM NVX devices can have a multicast transmit address anywhere in the range from 239.0.0.0 to 239.127.255.255. Starting at 239.1.0.0 is recommended to avoid common multicast MAC address conflicts.
- DM NAX audio-over-IP devices use a multicast range from 239.8.0.1 to 239.127.255.255.

- **Device Name:** Displays the name of the DM NVX device. A custom name can also be entered in this text box. By default, this will match the hostname.
- **Stream Location:** Displays the network location of the stream.
- **Status:** Displays the status of the network stream (for example, **Stream starting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the outgoing stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

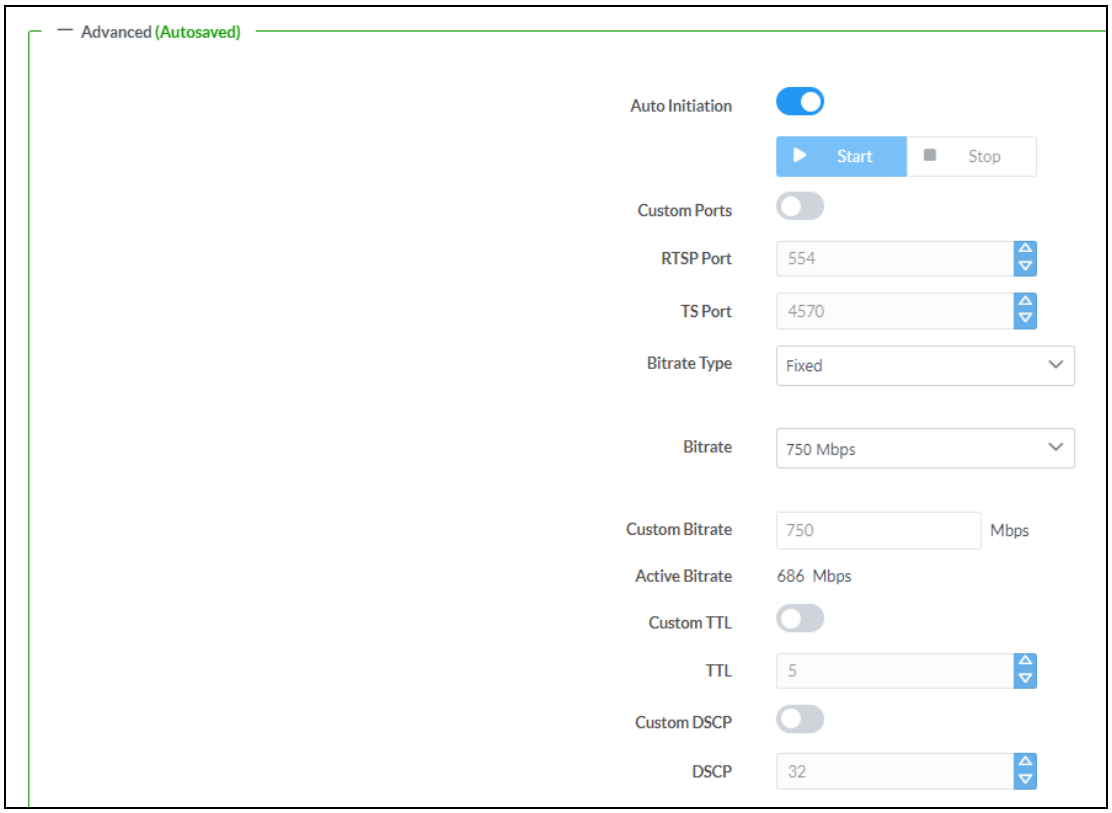
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the transmitting AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to configure a custom RTSP or TS port for the transmitting DM NVX stream. Set the toggle to the left to use the default values for both ports (the default RTSP port value is 554 and the default TS port value is 4570).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.
  - Enter a custom TS port in the **TS Port** field.

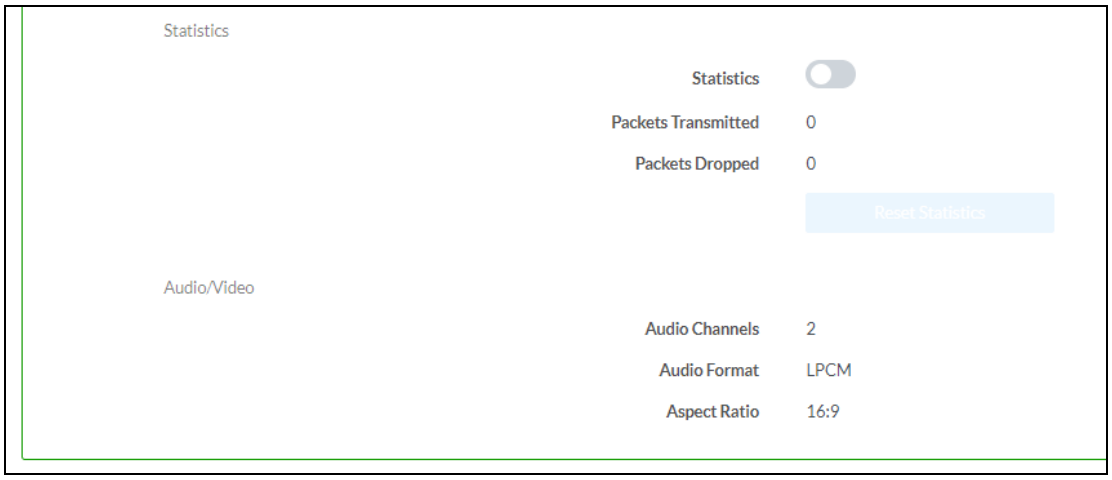
  > **NOTE:** Valid values for both custom port fields range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **Bitrate Type:** Select **Fixed**, **Variable**, or **Custom** from the drop-down.
  - **Fixed:** The transmitting DM NVX stream always meets the bitrate specified by the **Bitrate** drop-down. The default and recommended bitrate value is 750 Mbps.
  - **Variable:** The bitrate of the transmitting DM NVX stream is dynamic based on the resolution of the stream content. Selecting **Variable** will disable the **Bitrate** drop-down and **Custom Bitrate** text entry field.
  - **Custom:** The transmitting DM NVX stream always meets the bitrate specified by the **Custom Bitrate** text entry field. The default and recommended bitrate value is 750 Mbps.
- **Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Fixed**.
- **Custom Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Custom**.
- **Active Bitrate:** Displays the current bitrate of the transmitting DM NVX stream.
- **Custom TTL:** Multicast Time-to-live (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.

  Select the **Custom TTL** checkbox to enter a custom TTL value for the DM NVX stream in the **TTL** field.
- **TTL:** Enter a value from 1 to 255. The default TTL value is 5.
- **Custom DSCP:** To implement Quality of Service (QoS), IP networks use Differentiated Services Code Point (DSCP) values. Within an IP packet header, the DSCP is a value from 0 to 63 that maps to a certain traffic classification. Based on IT department policies and network switch configurations, DSCP values are used to determine the treatment of specific packets in router queues, the routes of traffic flows, and per-hop behavior. By default, DSCP for DM NVX AV-over-IP is set to 32.

  Select the **Custom DSCP** checkbox to enter a custom DSCP value for the DM NVX stream's AV-over-IP packets in the **DSCP** field

  > **NOTE:** Only change the DSCP value if required by IT department policies or if necessitated by poor network performance. Refer to AV-over-IP Network Design on page 871 for network performance troubleshooting tips.

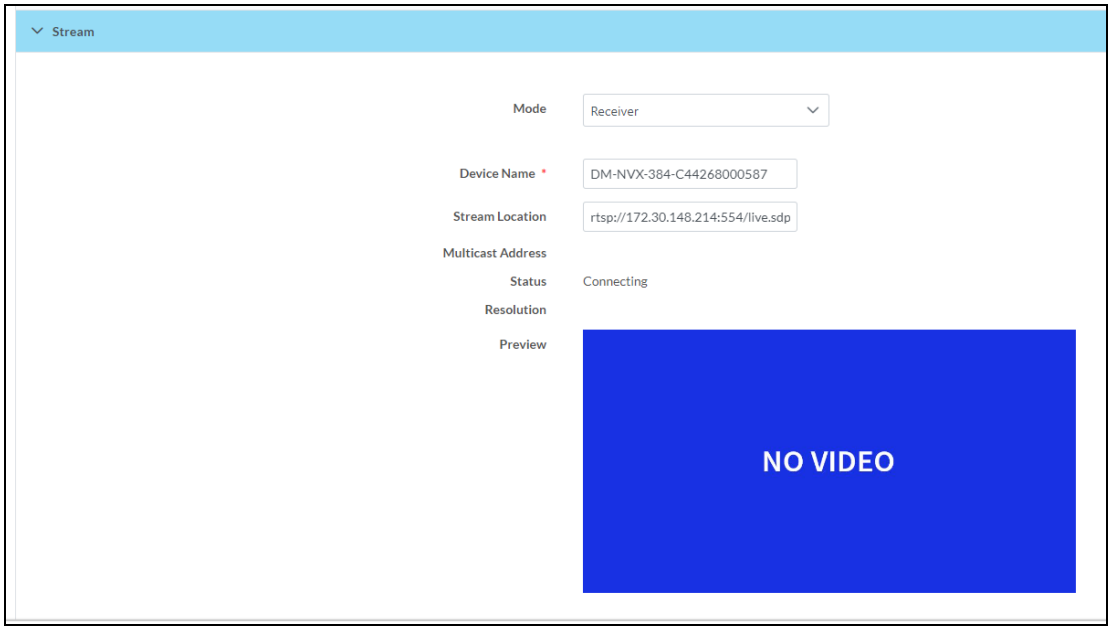


The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the transmitting DM NVX stream:
  - **Packets Transmitted** will display the total number of packets transmitting by the DM NVX device as part of the outgoing DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - Select **Reset Statistics** to set both **Packets Transmitted** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the transmitting DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the transmitting DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the transmitting DM NVX stream.

Stream Settings (Receiver Mode)

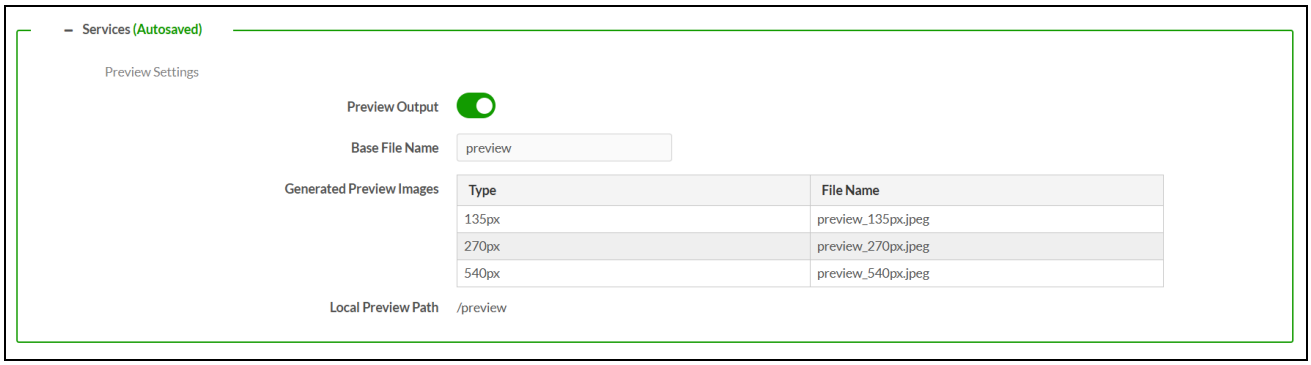
Sample Stream Settings (Receiver Mode)



Configure the basic stream settings:

- **Mode:** Select either **Receiver** or **Transmitter** from the drop-down. Selecting a new mode requires a reboot of the device. Select **Save Changes** to apply the new mode and reboot the device.
- **Device Name:** Displays the name of the upstream DM NVX device. By default, this will match the hostname.
- **Stream Location:** Displays the network location of the incoming stream. A stream location can also be manually entered by typing in this text field.
- **Multicast Address:** Displays the multicast address of the incoming stream.
- **Status:** Displays the status of the network stream (for example, **Connecting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the incoming stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

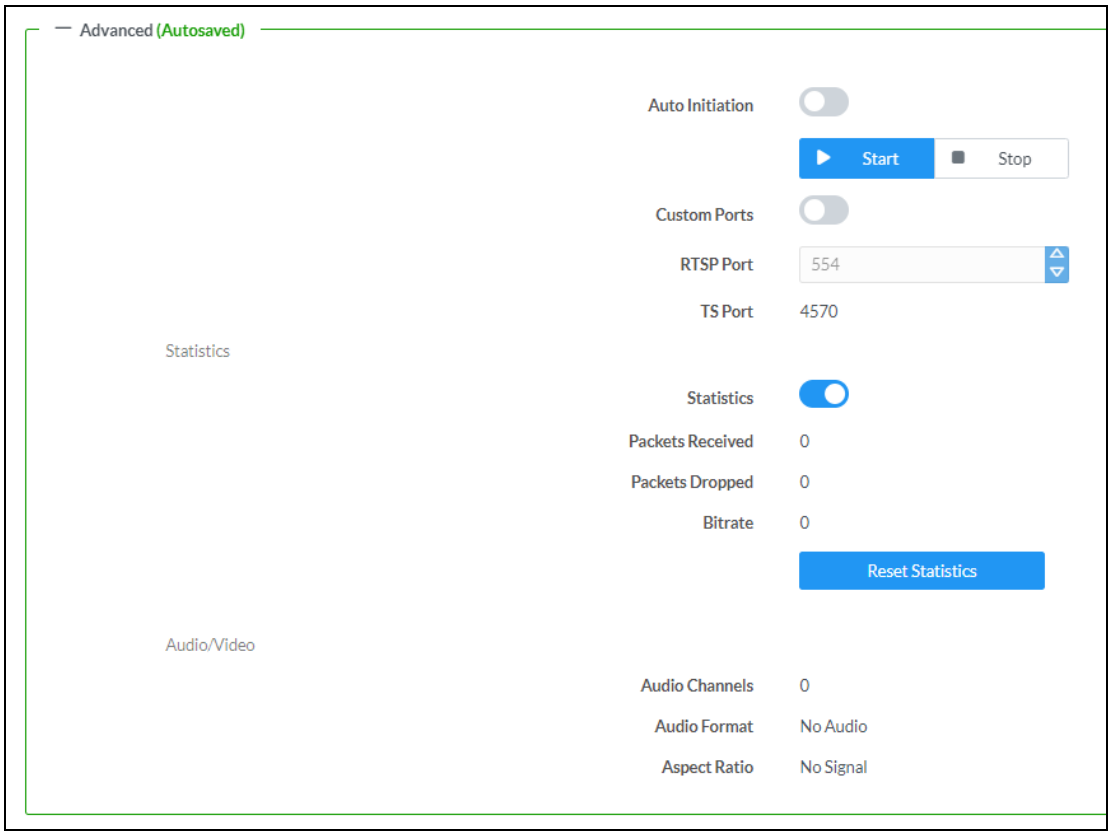
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the incoming AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to set a custom RTSP port to connect to an incoming DM NVX stream. Set the toggle to the left to use the default port values (the default RTSP port value is 554).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.

  > **NOTE:** Valid values for the custom port field range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **TS Port:** Displays the default TS port value (4570).

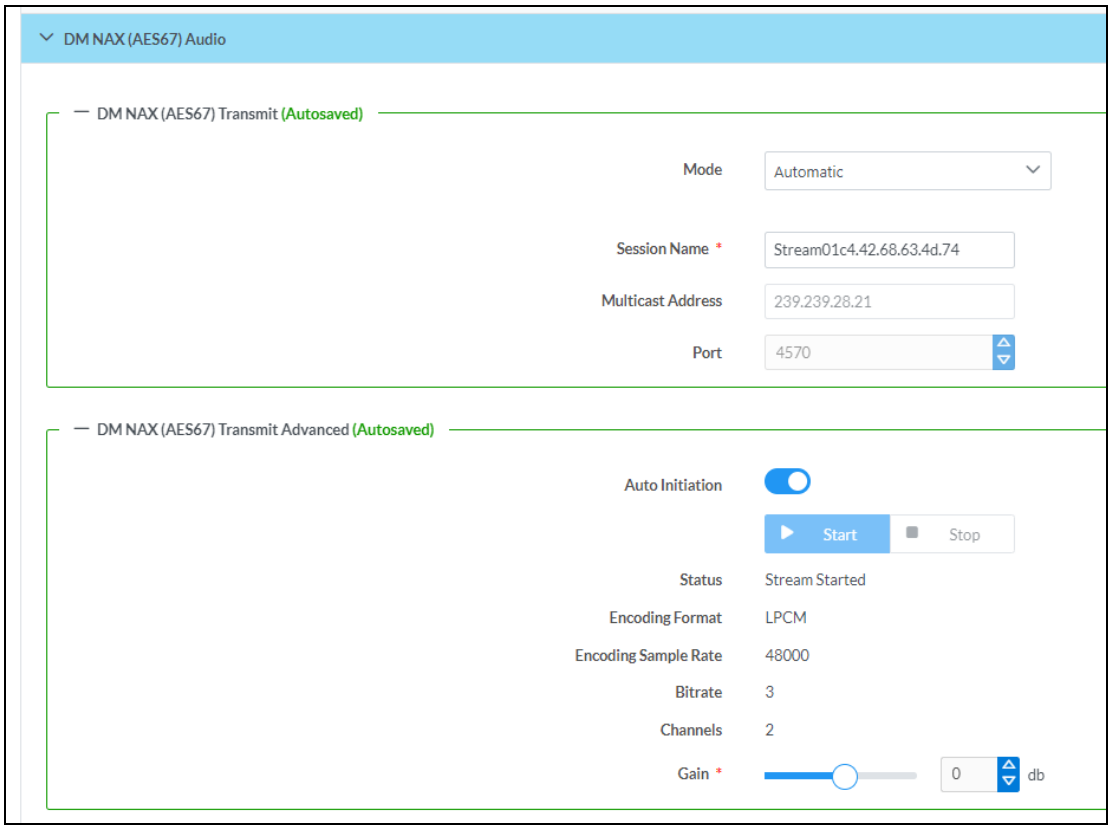
The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the incoming DM NVX stream:
  - **Packets Received** will display the total number of packets received by the DM NVX device as part of the incoming DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - **Bitrate** will display the current bitrate of the incoming DM NVX stream.
  - Select **Reset Statistics** to set both **Packets Received** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the incoming DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the incoming DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the incoming DM NVX stream.

DM NAX (AES67) Audio

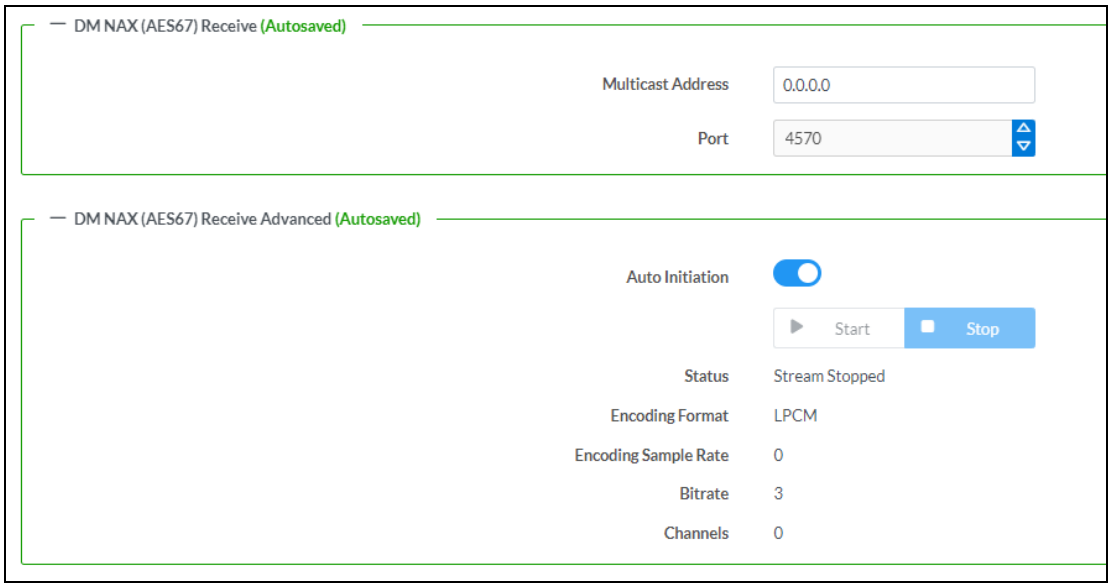
DM NVX devices natively support DM NAX® audio-over-IP technology, which is built off the standards of AES67. AES67 support allows a selected audio source to be transmitted as a 2-channel AES67 stream while another 2-channel AES67 audio stream is received from another AES67-capable device or Crestron DM NAX device.

Use the **DM NAX (AES67) Audio** accordion to configure the DM NAX audio-over-IP transmit and receive streams of the DM NVX device.



To configure the **DM NAX (AES67) Transmit** stream:

1. Select a stream addressing mode from the **Mode** drop-down:
   - **Automatic** adds 1 to the outgoing video stream multicast address to generate the DM NAX transmit multicast address. For example, if the video multicast address is 239.8.0.1, the DM NAX (AES67) multicast address is automatically set to 239.8.0.2.
   - **Manual** requires the multicast address of the transmitting DM NAX stream to be set manually. Selecting **Manual** enables the **Multicast Address** and **Port** text entry fields.
   - **Disabled** turns off DM NAX transmission from the DM NVX device.
2. Set a custom session name in the **Session Name** text entry field. This is similar to setting a hostname for an IP address on the LAN. The session name will appear in addition to the multicast address when the DM NAX audio-over-IP stream is discovered on the network.
3. If the **Mode** is set to **Manual**, enter custom values in the **Multicast Address** and **Port** text entry fields.
4. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the DM NAX transmit stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.
5. Adjust the **Gain** slider to configure the audio level compensation on the transmitting DM NAX stream from -10 to +10 dB.

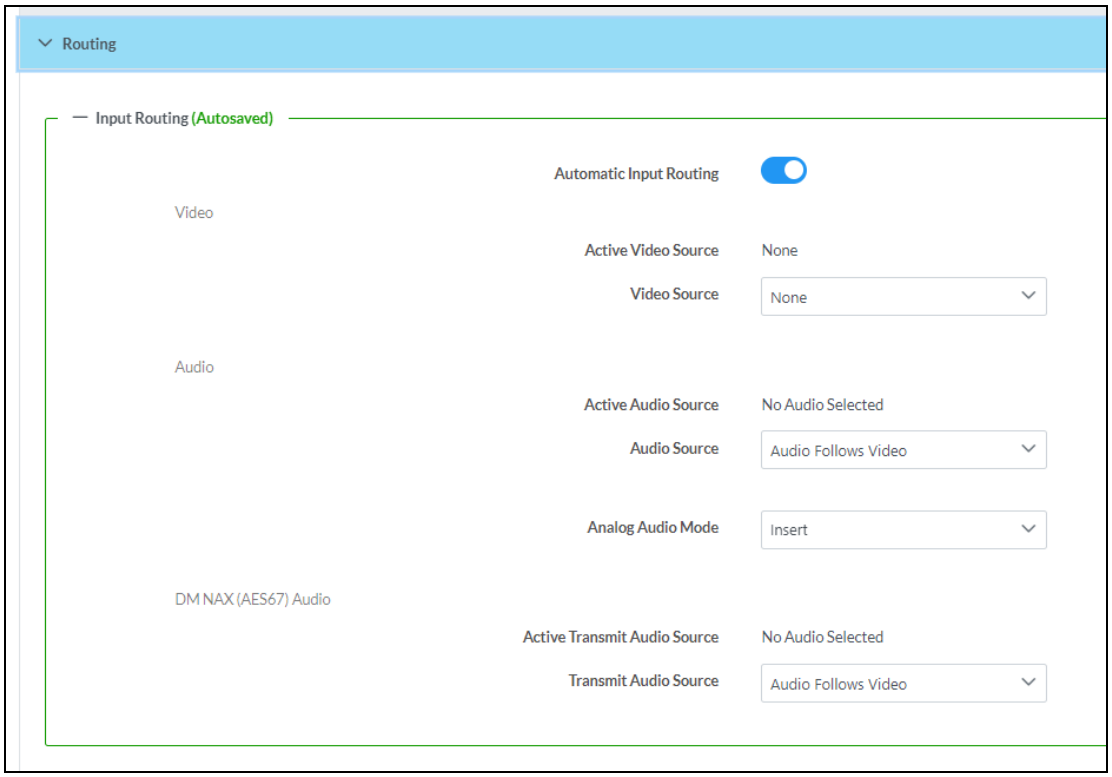


To configure the **DM NAX (AES67) Receive** stream:

1. Enter a valid multicast IP address in the **Multicast Address** field.
2. Enter the port value of the stream in the **Port** field.
3. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the incoming DM NAX stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

Routing

Use the **Routing** accordion to configure the audio and video routing behavior of the DM NVX device's internal switcher, secondary audio stream, and DM NVX AV-over-IP receiver.



Input Routing

The **Input Routing** section provides settings relating to the internal video switcher and secondary audio stream of the device:

Set the **Automatic Input Routing** toggle to the right to have the device route the HDMI input automatically by signal detection. Set the toggle to the left to manually set the active source via the drop-down menus or a control system program.

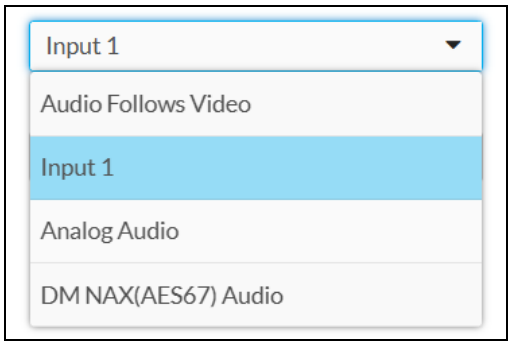
The fields under the **Video** subheading refer specifically to video signal routing:

- The **Active Video Source** read-only field displays the name of the currently active video source.
- Use the **Video Source** drop-down to manually set an active video source from between **None** and **Input 1**.

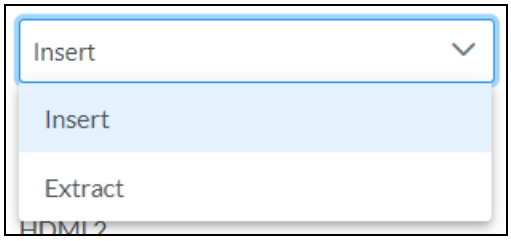
The fields under the **Audio** subheading refer specifically to audio signal routing, which can be handled separately from video routing.

- The **Active Audio Source** read-only field displays the name of the currently active audio source. This reflects the audio that is embedded in the HDMI output (in Receiver mode) or DM NVX AV-over-IP stream (in Transmit mode) of the device, as well as the audio that transmits from the analog audio connector when **Analog Audio Mode** is set to **Extract**.

- Use the **Audio Source** drop-down to manually set an active audio source from among **Audio Follows Video**, **Input 1**, **Analog Audio**, and **DM NAX (AES67) Audio**.

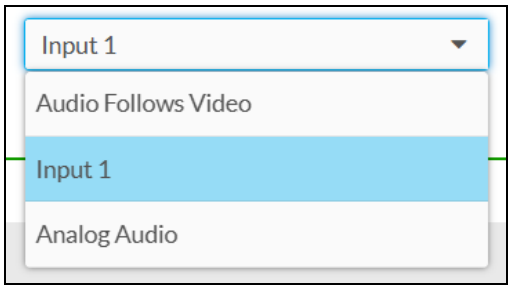


- Use the **Analog Audio Mode** drop-down to select between **Insert** or **Extract**.
  - In **Insert** mode, the analog audio connector will function as an input and the incoming audio signal can be selected as the **Audio Source**.
  - In **Extract** mode, the analog audio connector will function as an output and will transmit the audio signal selected as **Active Audio Source**.



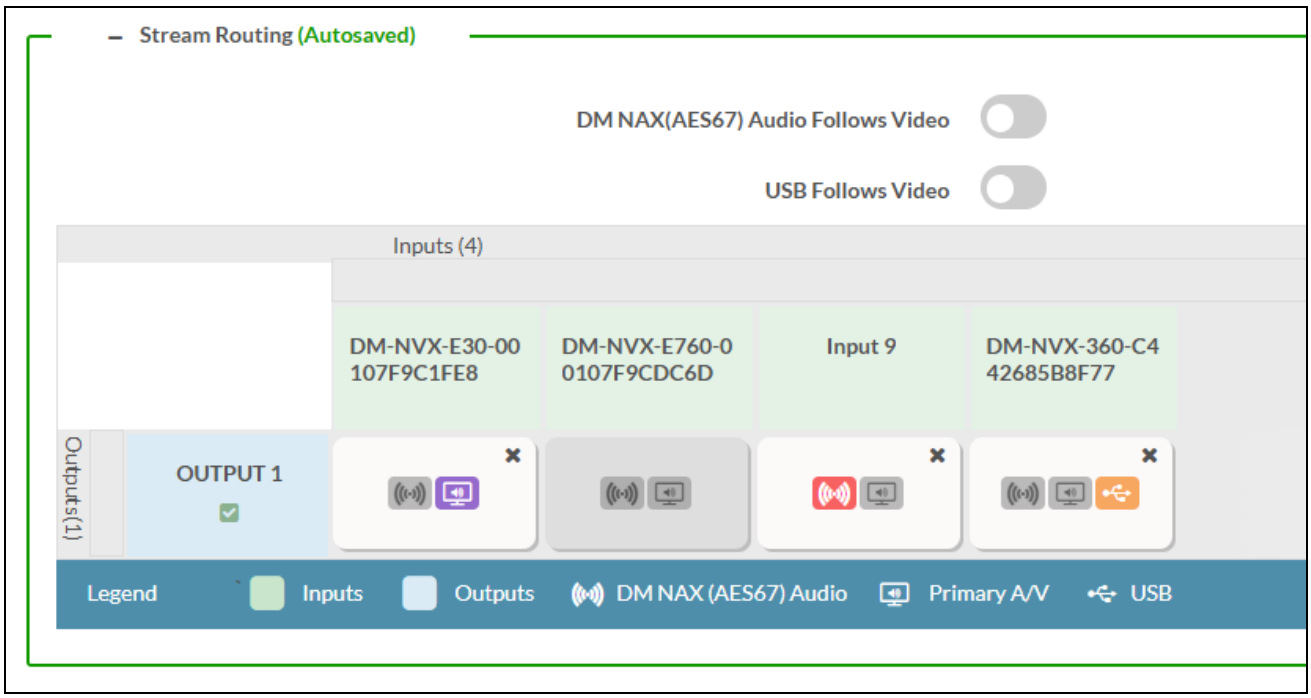
The fields under the **DM NAX (AES67) Audio** subheading refer to the secondary audio stream of the DM NVX device. This is a discrete audio path that is not affected by the **Audio Source** or **Analog Audio Mode** settings.

- The **Active Transmit Audio Source** read-only field displays the name of the audio source currently transmitting on the AES67 secondary audio stream.
- Use the **Transmit Audio Source** drop-down to manually set an AES67 audio source from among **Audio Follows Video**, **Input 1**, and **Analog Audio**.



Stream Routing (Receiver Mode Only)

The **Stream Routing** section houses the routing matrix for audio, video, and USB signals that can be received over the network.



NOTE: In order for the routing matrix to appear, at least one subscription must be added from the **Subscriptions** accordion. Refer to Subscriptions (Receiver Mode Only) on page 534 for information on adding subscriptions.

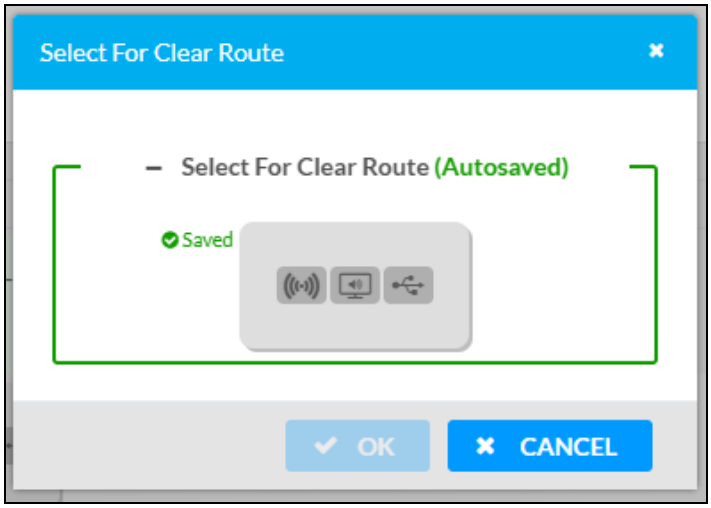
Configure the toggles to establish preferred routing settings:

- Set the **DM NAX (AES67) Audio Follows Video** toggle to the right to have the secondary audio stream match the same routes as the primary AV stream. Set the toggle to the left to manage the secondary audio stream routing independently of the primary AV stream.
- Set the **USB Follows Video** toggle to the right to have USB routes match the routing of the primary AV stream. Set the toggle to the left to manage USB routing independently of the primary AV stream.

Use the routing matrix to establish or break signal routes:

- To route an AV-over-IP stream to the DM NVX device, select the **Primary A/V** icon in that stream's matrix column. If either the **DM NAX (AES67) Audio Follows Video** or **USB Follows Video** toggles are set to the right, their respective icons will also be selected automatically for that stream.
- To route a DM NAX (AES67) stream to the DM NVX device, select the **DM NAX (AES67) Audio** icon in that stream's matrix column. To manage this independently of the AV-over-IP stream, the **DM NAX (AES67) Audio Follows Video** toggle must be set to the left.

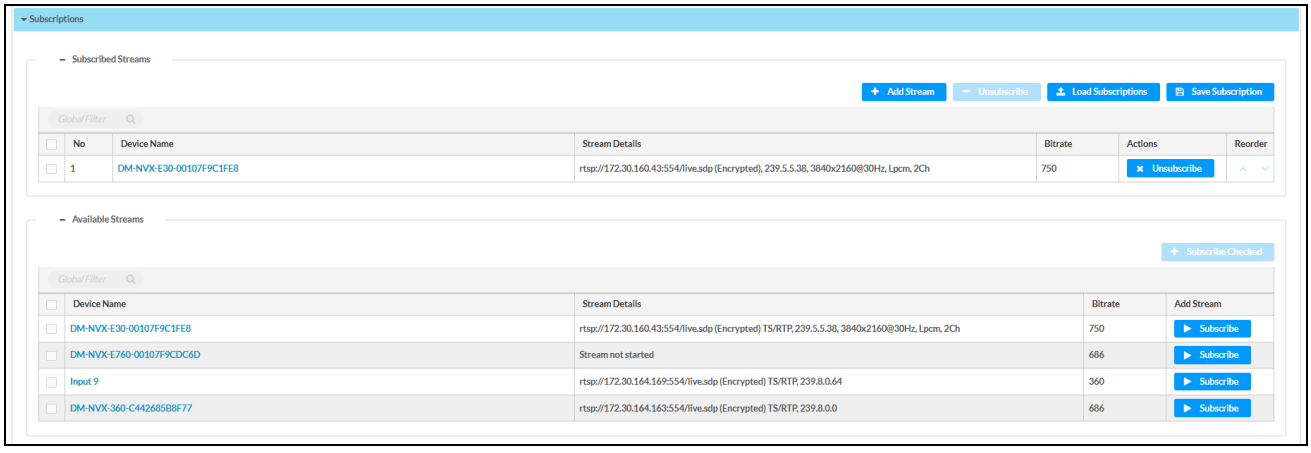
- To route a USB signal to the DM NVX device, select the **USB** icon in that stream's matrix column. This icon is only available on USB-capable endpoints. To manage this independently of the AV-over-IP stream, the **USB Follows Video** toggle must be set to the left.
- To clear a route, do one of the following:
  - Select the ✖ icon for a given input to clear all routes from that input.
  - Select the ☑ icon for a given output to clear routes from that input. A **Select For Clear Route** window appears.



Select any or all of the signal types to clear all routes of those types from the output, then select **OK** to clear those routes or **Cancel** to cancel the operation.

Subscriptions (Receiver Mode Only)

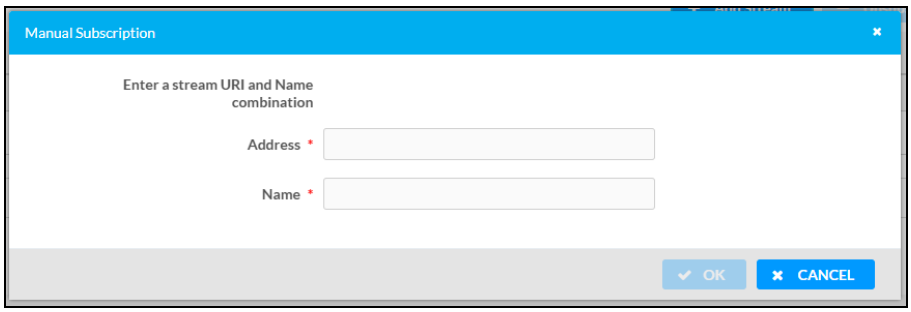
The **Subscriptions** accordion allows the DM NVX receiver to subscribe to discovered network AV-over-IP streams for quick routing and switching without having to manually enter multicast addresses or session names.



The **Subscribed Streams** table displays all network streams that the device is subscribed to. These streams are also available in the routing matrix in the **Routing** accordion. Refer to Stream Routing (Receiver Mode Only) on page 533 for information on routing a subscribed stream.

To add a stream to the table, do either of the following:

- Select **+ Add Stream**. A **Manual Subscription** window appears.



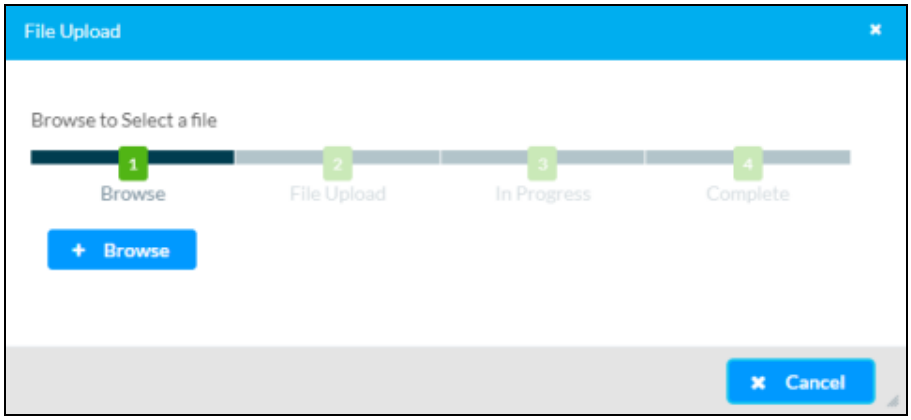
  - Enter the multicast address of the stream in the **Address** field.
  - Enter the device name of the transmitting device in the **Name** field.
  - Select **√ OK** to add the stream to the **Subscribed Streams** list or select **X Cancel** to cancel the operation.
- Select the **Subscribe** button for a stream listed in the **Available Streams** table.

To add multiple streams to the table at once, select the checkbox for each desired stream in the **Available Streams** table, then select **+ Subscribe Checked**.

To remove a stream from the table, select **x Unsubscribe** in its table row. To remove multiple streams at once, select the checkbox for each stream in the **Subscribed Streams** table, then select **- Unsubscribe** at the top of the table.

The **Subscribed Streams** table can also be exported as a .xml file to other DM NVX receivers. This allows the subscription process to be performed even more efficiently on other receivers. To export the table and upload it to another receiver:

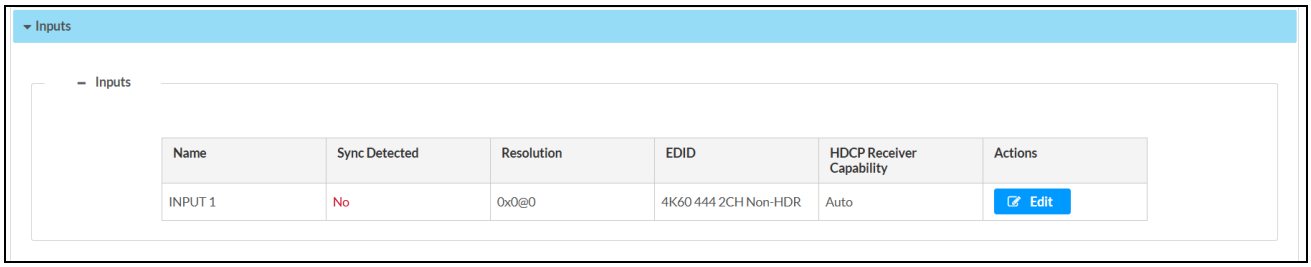
1. Subscribe to all of the desired network streams.
2. Select **Save Subscription** at the top of the **Subscribed Streams** table. A .xml file will be downloaded to the connected PC.
3. Log in to the next DM NVX receiver's web interface and navigate to its **Subscriptions** accordion.
4. Select **Load Subscriptions** at the top of the **Subscribed Streams** table. A **File Upload** window appears.



5. Select **+ Browse**. Locate the .xml file, then select **Upload** to upload it to the DM NVX device. When the upload completes, the window will close and the interface will return to the **Subscriptions** accordion with the **Subscribed Streams** table filled out.

Inputs

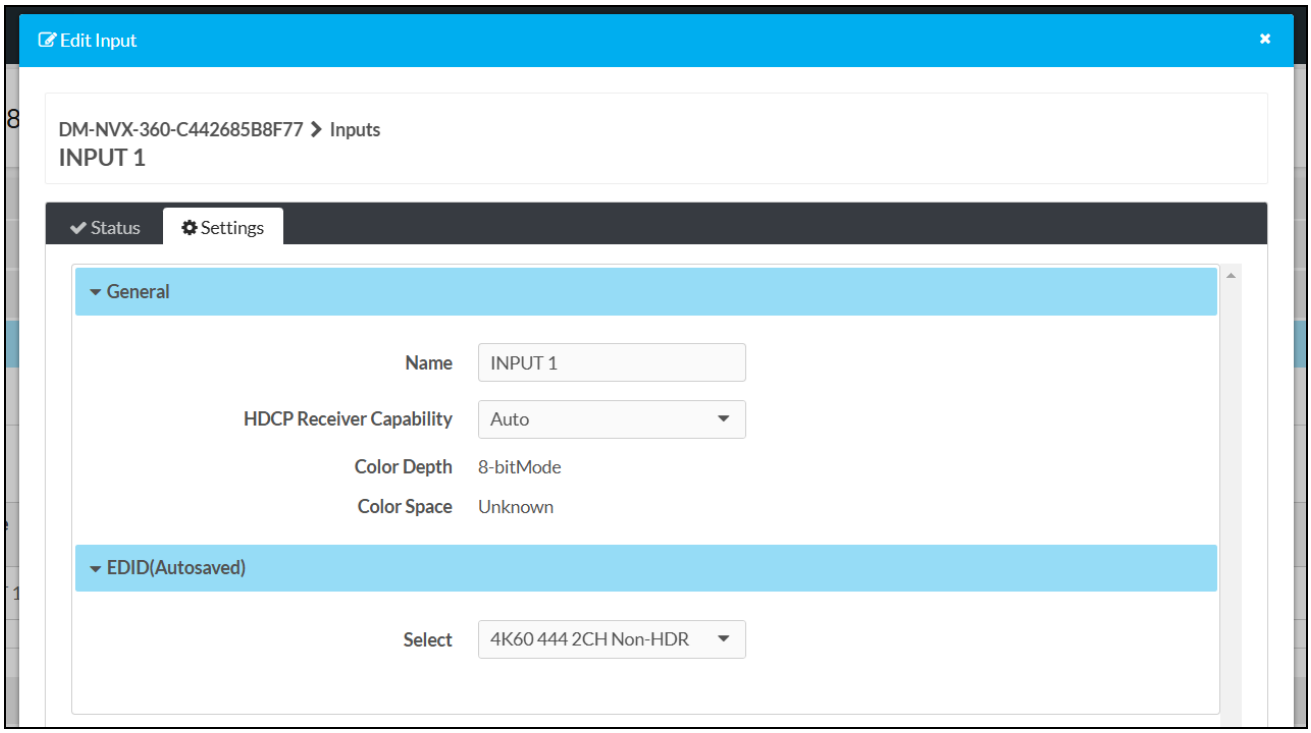
The **Inputs** accordion contains source resolution and EDID information as well as input configuration options for the local input connector on the DM NVX device.



To configure the input, select the **Edit** button. An **Edit Input** window appears.

Edit Input

The **Edit Input** window will open to the **Settings** tab by default. This tab enables configuration of the available input settings for the HDMI input.



The **General** accordion is open by default.

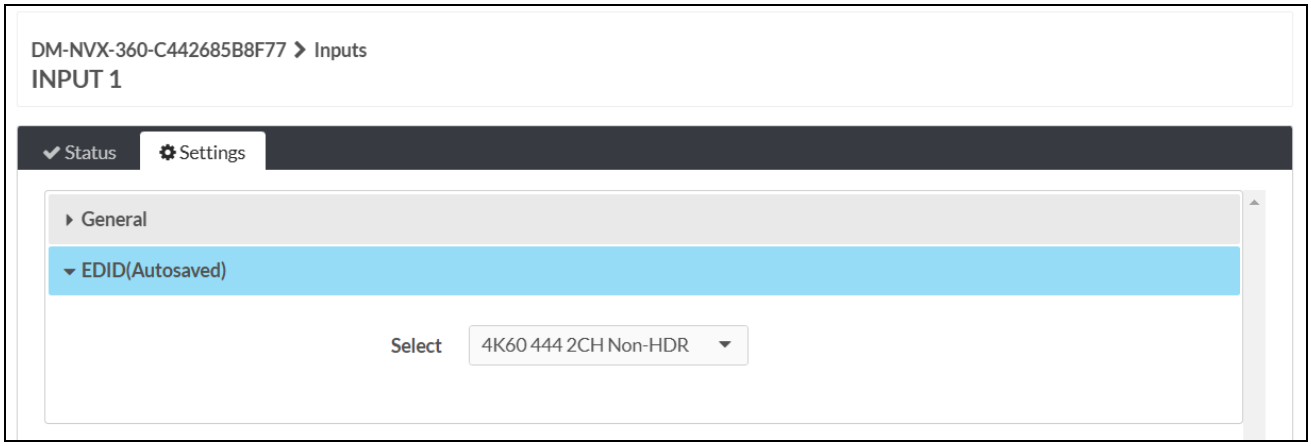
Enter a friendly name for the input in the **Name** text entry field.

Use the **HDCP Receiver Capability** drop-down to select **Auto** or a specific HDCP version. The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display.

NOTE: Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

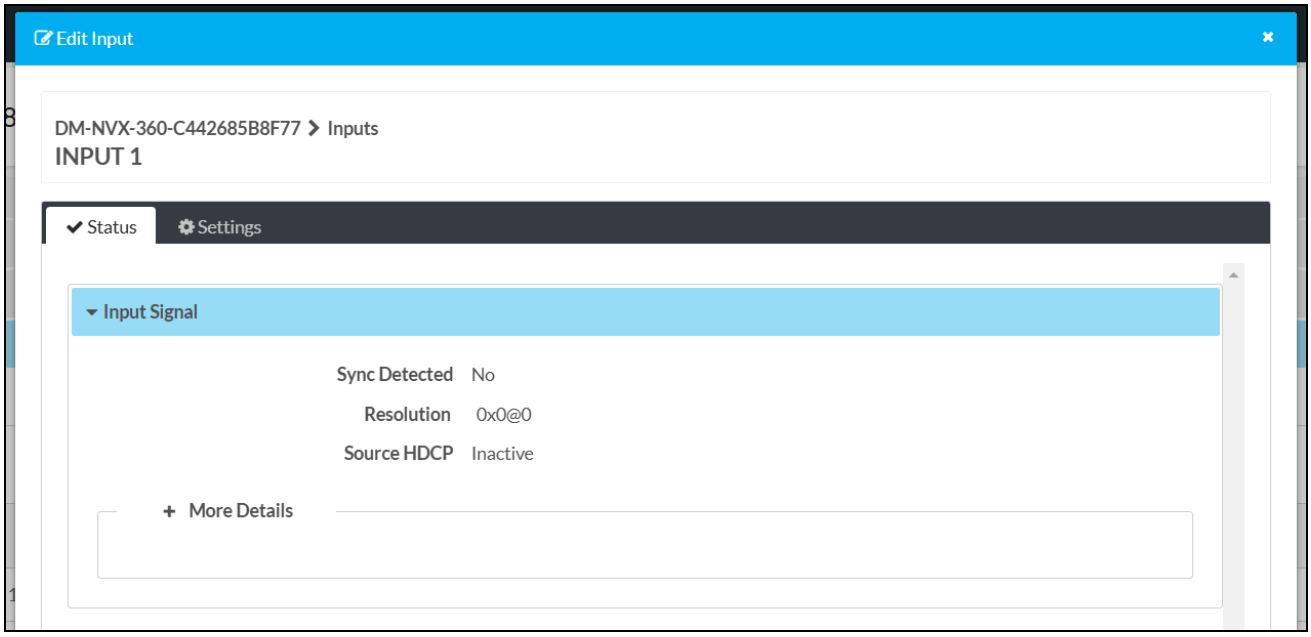
The **Color Depth** and **Color Space** fields are read-only and depend on the incoming video signal.

Select the **EDID** accordion to access EDID settings specific to the selected input.



Use the **Select** drop-down to apply a specific EDID file to the selected input. All built-in and custom EDIDs are available in this list. Refer to Action on page 497 for more information on loading custom EDIDs to this list.

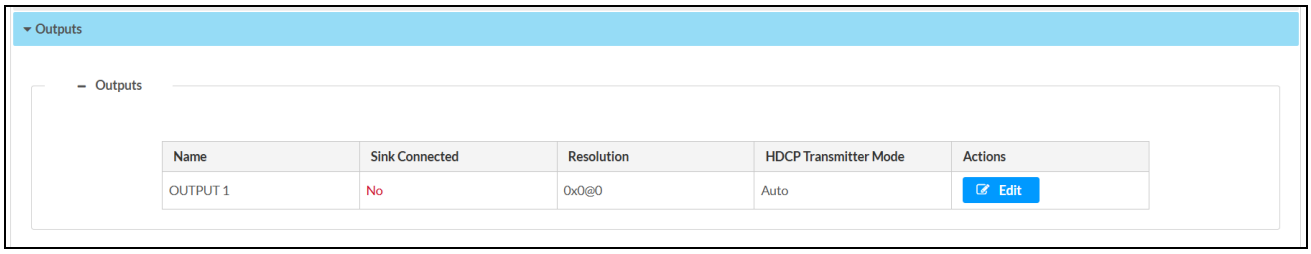
Select the **Status** tab to reference sync, resolution, HDCP, and audio information for the connector and input source.



Use **OK** or **Cancel** to return to the **Settings** page. Select **OK** to apply any changes made in the **Edit Input** window or select **Cancel** to discard the changes.

Outputs

The **Outputs** accordion contains status information and an **Edit** option for the local HDMI output connector on the DM NVX device.

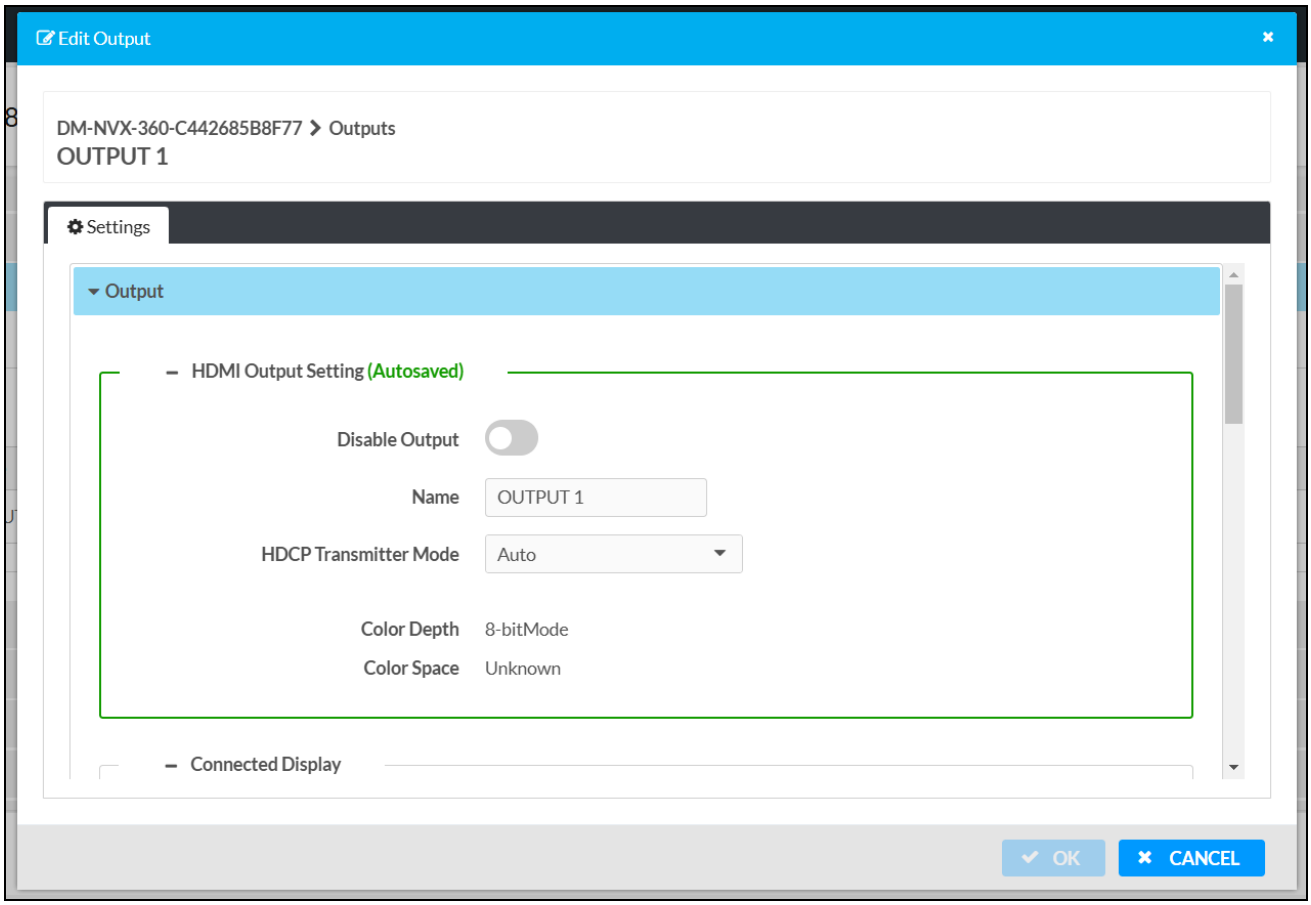


To configure the output, select the **Edit** button. An **Edit Output** window appears. The settings available in the **Edit Output** window depend on which mode the DM NVX device is in:

- Edit Output - Output Accordion (Transmitter Mode) on page 538
- Edit Output - Output Accordion (Receiver Mode) on page 542

Edit Output - Output Accordion (Transmitter Mode)

The **Output** accordion is open by default.

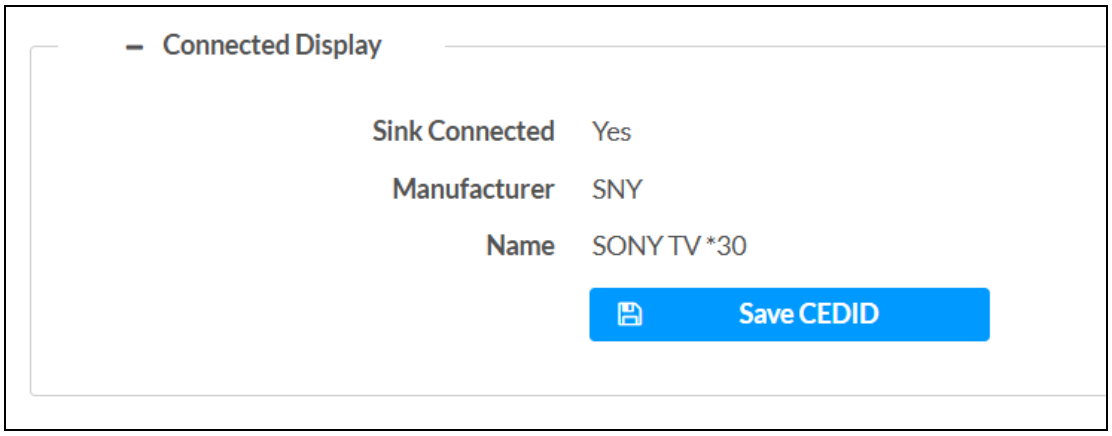


HDMI Output Settings

Configure basic settings under the **HDMI Output Setting** subheading:

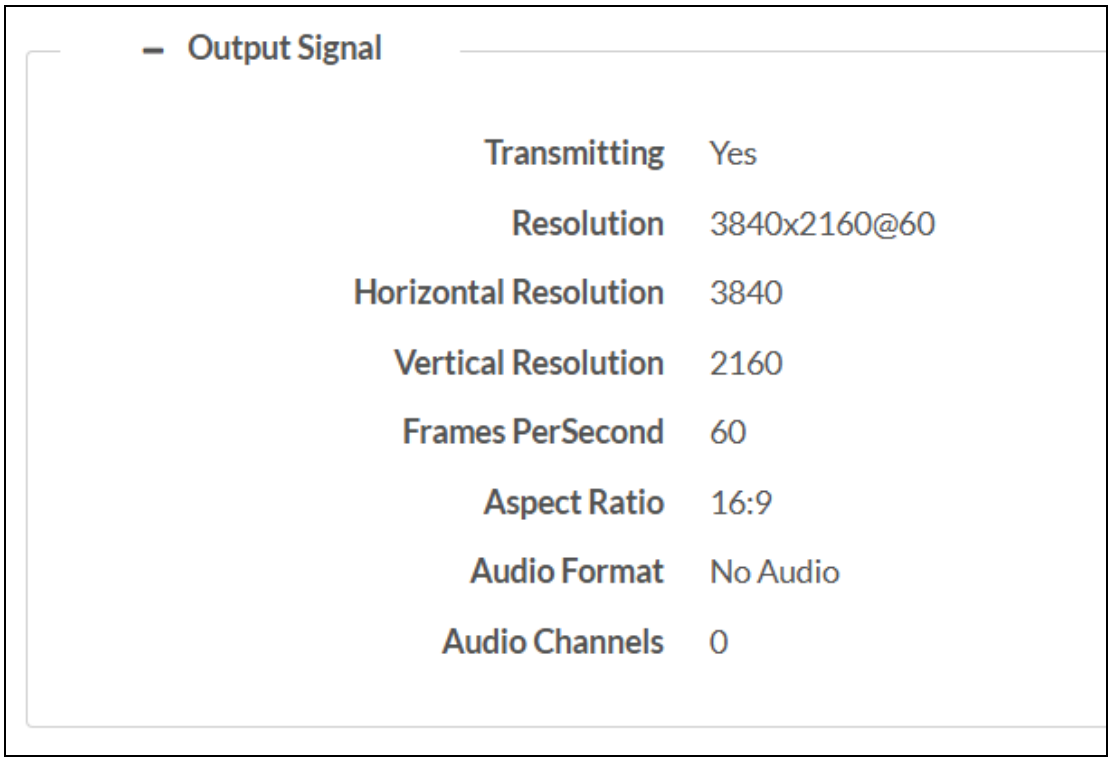
- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Enter a friendly name for the output in the **Name** text entry field.
- Use the **HDCP Transmitter Mode** drop-down to select between:
  - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
  - **FollowInput:** The HDCP level of the output will match the HDCP level of the input connector currently routed to the output.
  - **Always:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the output.
  - **Never:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.

Connected Display



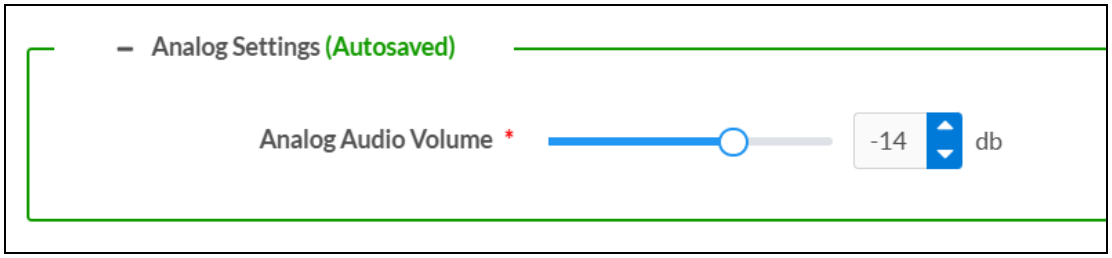
The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 497 for more information on loading custom EDID files.

Output Signal



The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.

Analog Settings

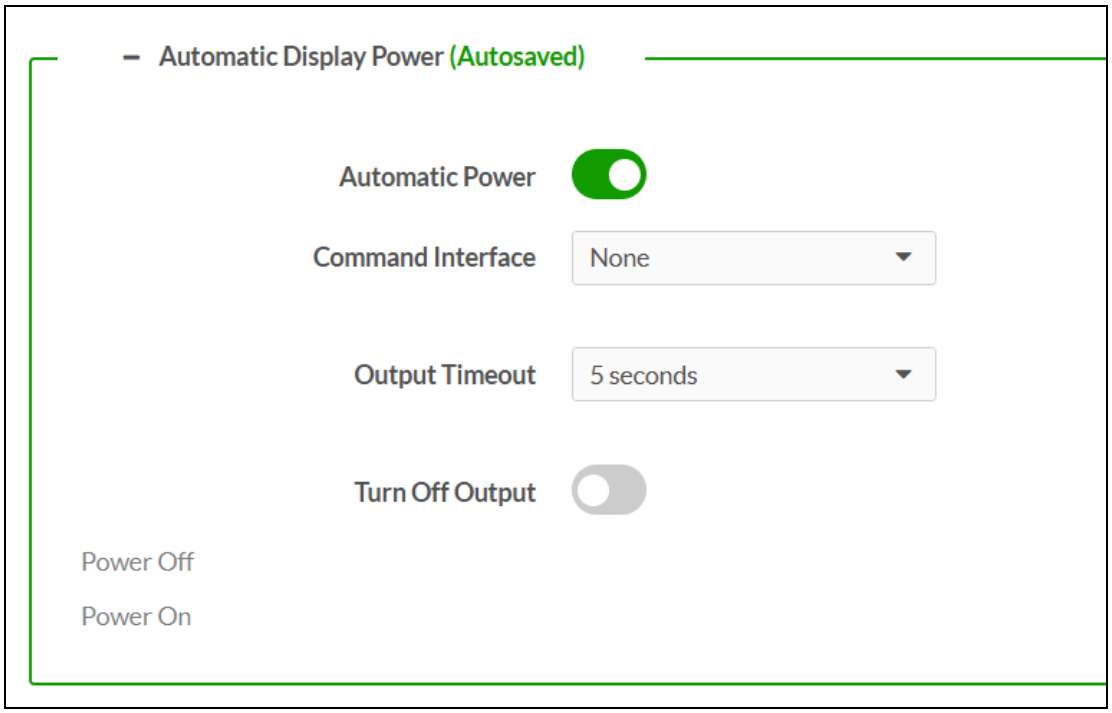


To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

Automatic Display Power



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

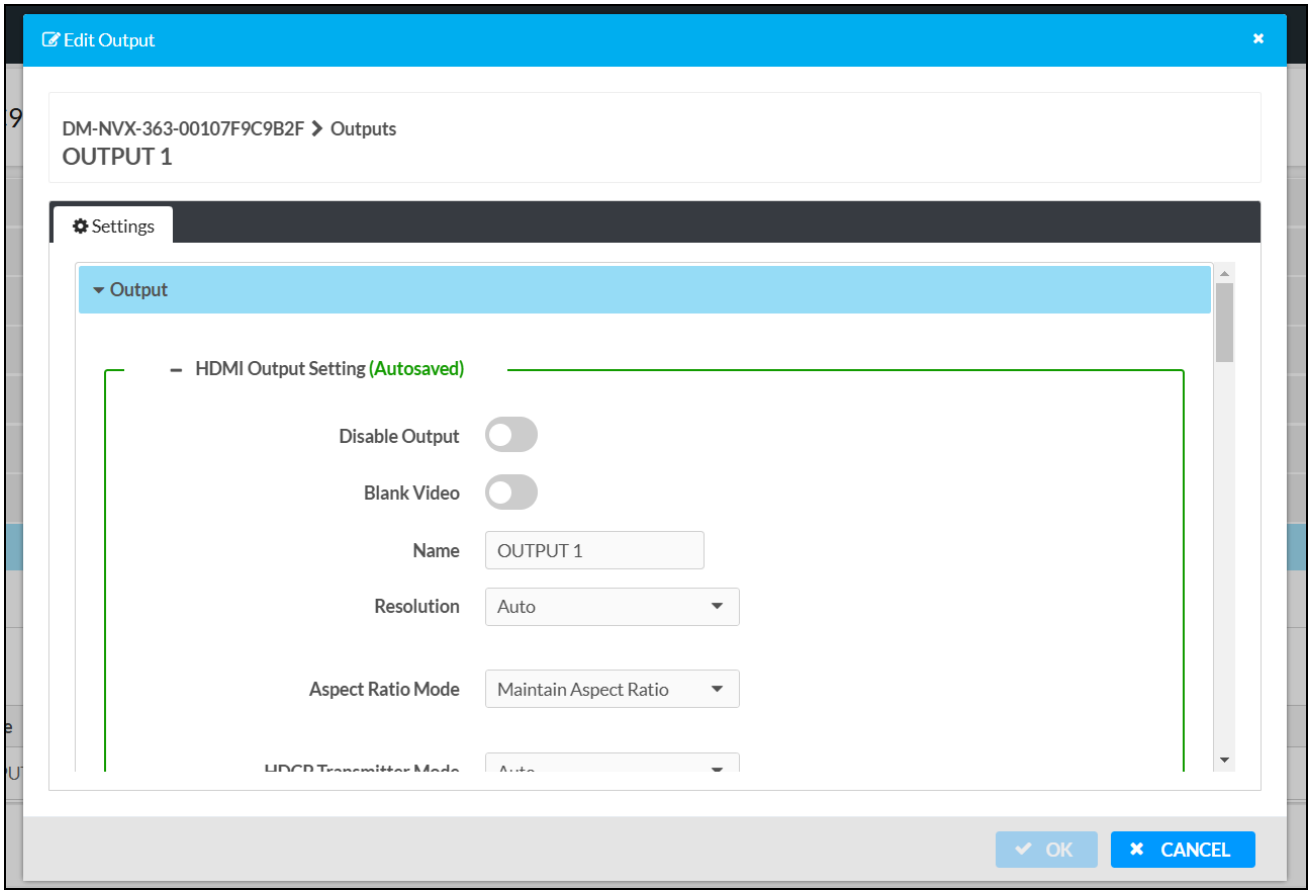
Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**

> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Edit Output - Output Accordion (Receiver Mode)

The **Output** accordion is open by default.



HDMI Output Settings

Configure basic settings under the **HDMI Output Setting** subheading:

- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Set the **Blank Output** toggle to the right to transmit a full-screen black video signal. Set the toggle to the left to transmit the video signal of the selected input.
- Enter a friendly name for the output in the **Name** text entry field.
- Use the **Resolution** drop-down to select between **Auto** or any of the available fixed resolutions to have the internal scaler either match the highest possible resolution of the display or the selected fixed resolution.

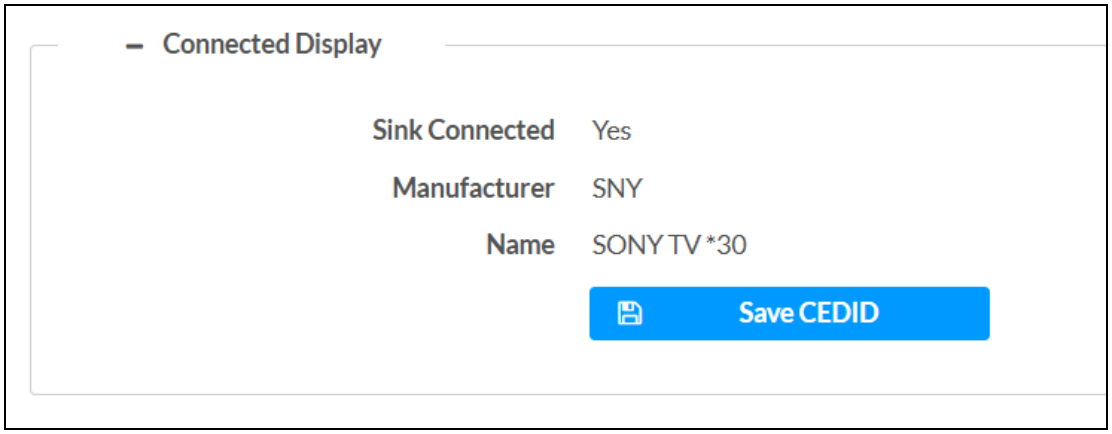
- Use the **Aspect Ratio Mode** drop-down to select between:
  - **Maintain Aspect Ratio:** The aspect ratio of the source signal is preserved at the output. This may result in letter-boxing or pillar-boxing black bars at the edges of the display area.
  - **Stretch To Fit:** The aspect ratio of the source signal is stretched to fit the aspect ratio of the display. This may distort the image of the incoming video signal.
  - **1:1 Pixel Mapping:** The source signal is mapped 1:1 at the display without any aspect ratio scaling. This will preserve the aspect ratio of the source signal, but may not fill the entire display area, resulting in black borders around the image.
  - **Zoom:** The aspect ratio of the source signal is zoomed in to meet the full height or width capabilities of the display, whichever is greater than the incoming signal. This may crop out parts of the incoming video signal.
- Use the **HDCP Transmitter Mode** drop-down to select between:
  - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
  - **Follow Input:** The HDCP level of the output will be forced to the supported HDCP level of the local input.
  - **Force Highest:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the entire signal chain.
  - **Never Authenticate:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.
- Use the **Max Color Depth** drop-down to limit the color depth to a specific bit depth.
- Use the **Color Space Mode** drop-down to select between **Auto** or a specific color mode to force the output signal to.

> **NOTE:** The options available in the **Max Color Depth** and **Color Space Mode** drop-downs may be limited by the resolution of the output signal. Refer to the maximum supported resolutions table in DM-NVX-363 Specifications on page 271 for information on supported depths and spaces at each maximum resolution.

- The **Color Depth** and **Color Space** fields are read-only values that display the current depth and space of the video output signal, respectively.
- Use the **Underscan** drop-down to select an underscan percentage from between **0%**, **2.5%**, **5%**, **7.5%**, or **Custom**.
  - A value of **0%** will maintain the size of the source image area relative to the full video resolution and will preserve the image aspect ratio. Each higher value will shrink the size of the source image within its resolution while still preserving its aspect ratio. Any pixels outside of the image area in the full resolution will be filled by a black border.
  - When **Custom** is selected, the **Set Custom Underscan** text entry field will become available.
- Use the **Set Custom Underscan** field to enter an underscan percentage from 1 to 10% in integer values. This field is only available when **Custom** is selected in the **Underscan** drop-down.
- Set the **Disable Video Timeout** toggle to the right to prevent the output signal from turning off when a source signal is no longer detected. Set the toggle to the left to enable a video timeout. When the toggle is set to the left, the **Set Video Timeout** text box will become available.

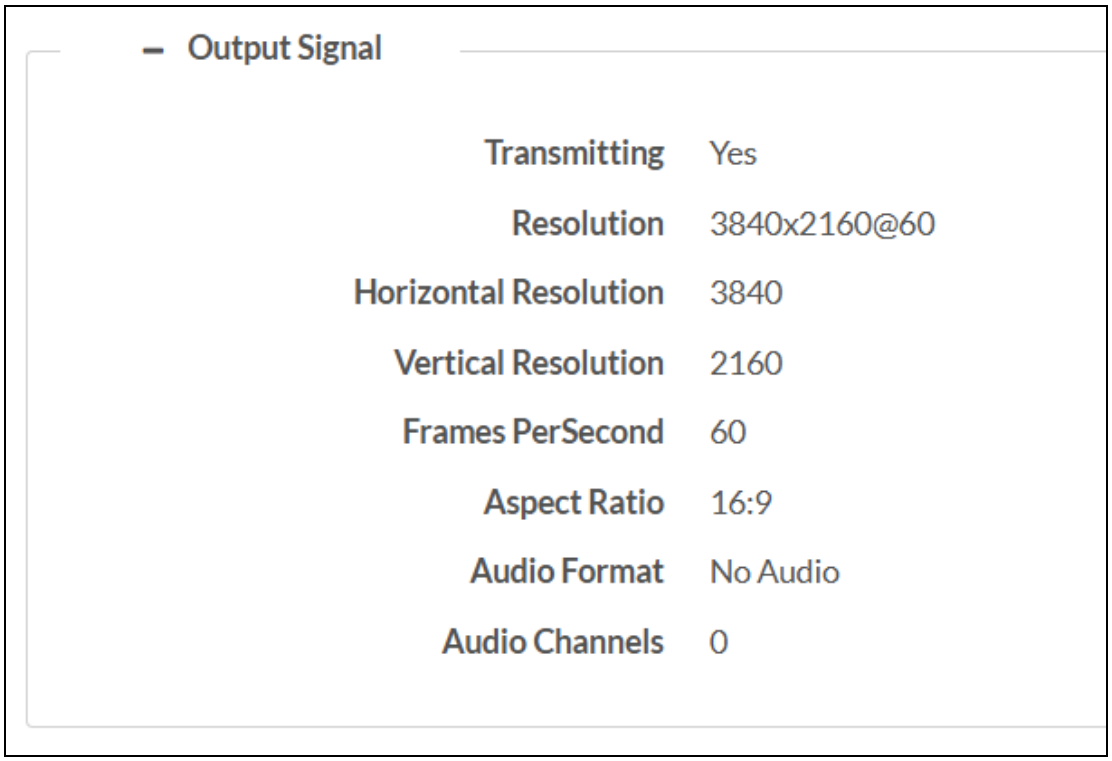
- Use the **Set Video Timeout** text box to determine how long the device will wait to disable the HDMI output after an input video signal is no longer detected. Enter a time in seconds or use the arrows to set the timeout. By default, the timeout is set to 0 seconds. This text box is only available when the **Disable Video Timeout** toggle is set to the left.

Connected Display



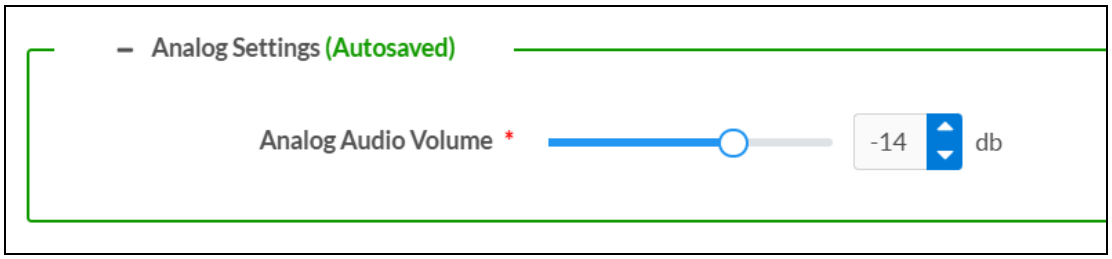
The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 497 for more information on loading custom EDID files.

Output Signal



The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.

Analog Settings

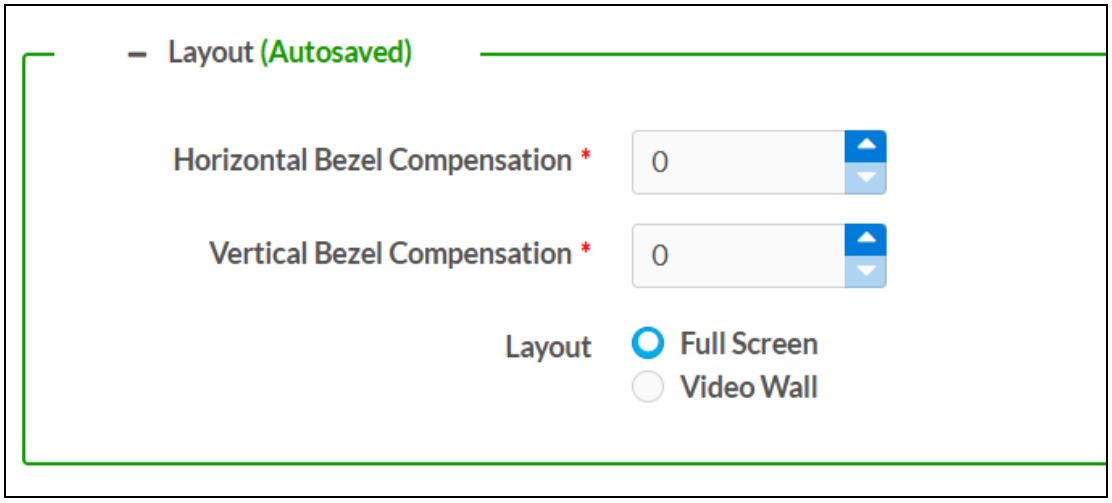


To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

Layout



Use the settings under the **Layout** subheading to manage the bezel compensation of the output signal and to enable video wall mode.

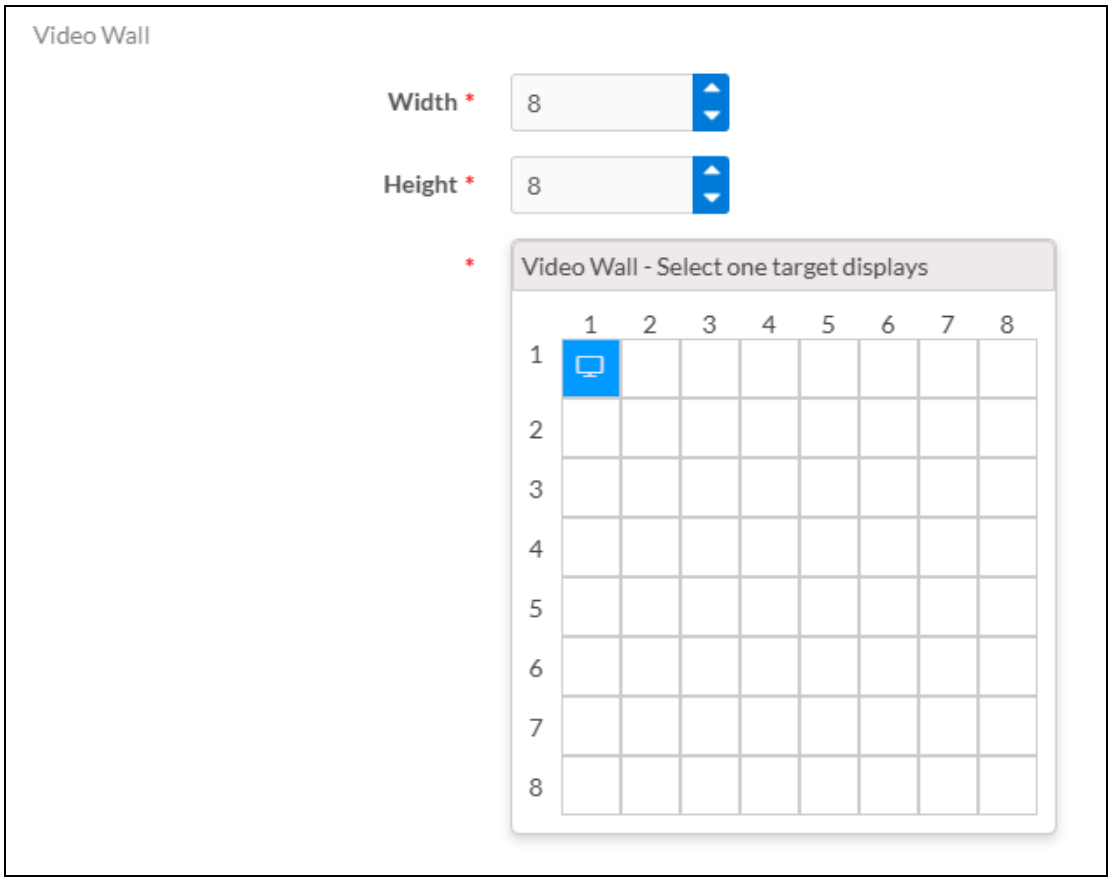
The **Bezel Compensation** fields allow the output signal to compensate for the width of the bezels on the display to provide a more seamless appearance in video wall mode. To adjust the bezel compensation:

- Use the arrows or enter a value in the **Horizontal Bezel Compensation** field. This sets the width of the bezels on the left and right of the display. Values range from 0 to 500 pixels.
- Use the arrows or enter a value in the **Vertical Bezel Compensation** field. This sets the height of the bezels on the top and bottom of the display. Values range from 0 to 500 pixels.

Multiple DM NVX decoder devices with output scalers can be combined to form a video wall composed of up to 64 individual displays (8 columns by 8 rows). A separate scaling decoder is required for each display. To enable video wall mode, select **Video Wall** from the **Layout** options.

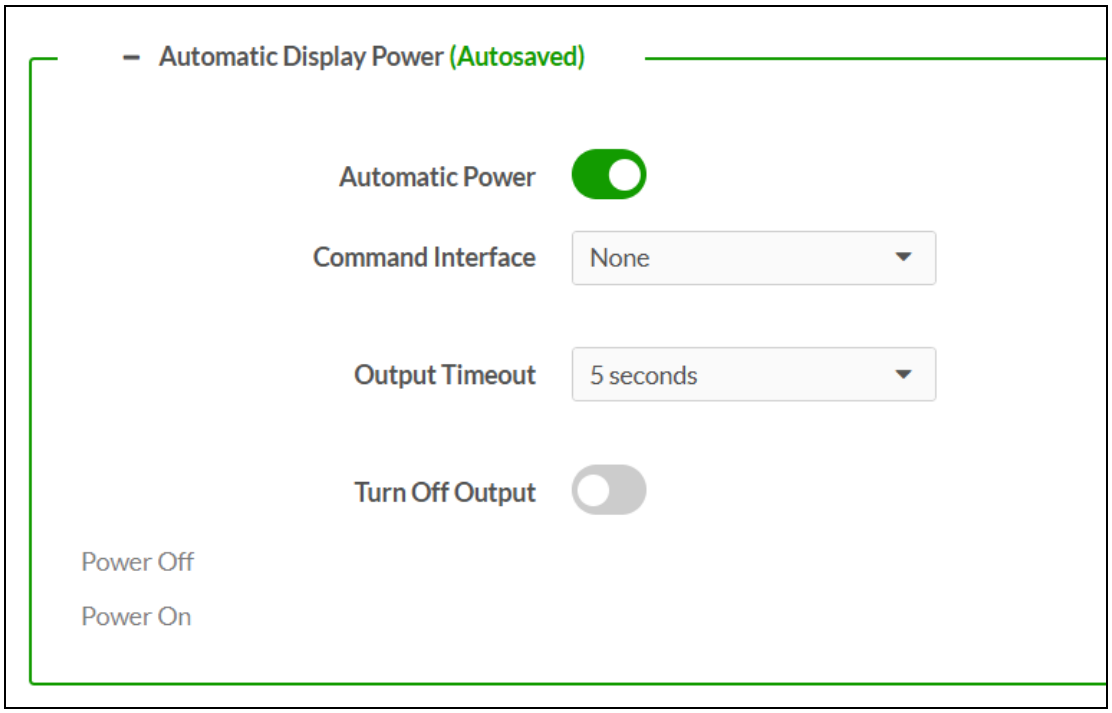
To configure the video wall:

1. Use the arrows or enter a value to set the **Width** text box to the desired number of columns of displays. Values range from 1 to 8. The default value is 1.
2. Use the arrows or enter a value to set the **Height** text box to the desired number of rows of displays. Values range from 1 to 8. The default value is 1.
3. Select the desired location for the current DM NVX device among the video wall by selecting its corresponding rectangle. In the image below, the DM NVX decoder being configured will output video to the top left display in an 8x8 video wall.



4. Repeat this process on all DM NVX decoders in the video wall.

Automatic Display Power



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**.

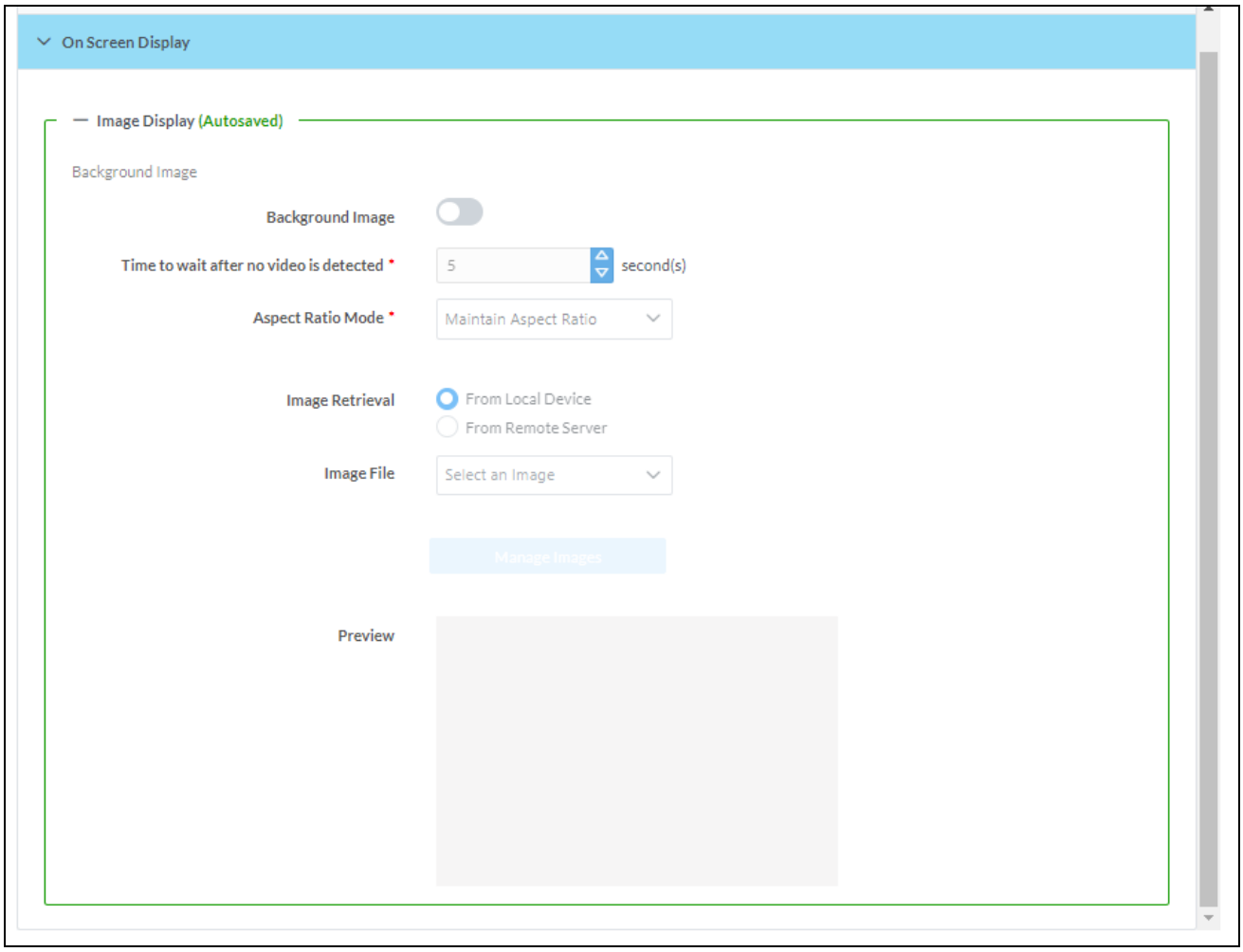
> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Edit Output - On Screen Display Accordion (Receiver Mode)

Select the **On Screen Display** accordion to expand it. This accordion houses the **Image Display** settings that allow a static background image to be shown on the connected display.

> **CAUTION:** Displaying a static image for extended periods of time may result in image burn-in on any type of connected display. Consult documentation from the display manufacturer to determine recommended timeout or image refresh settings to avoid burn-in.



To configure the **Image Display** settings:

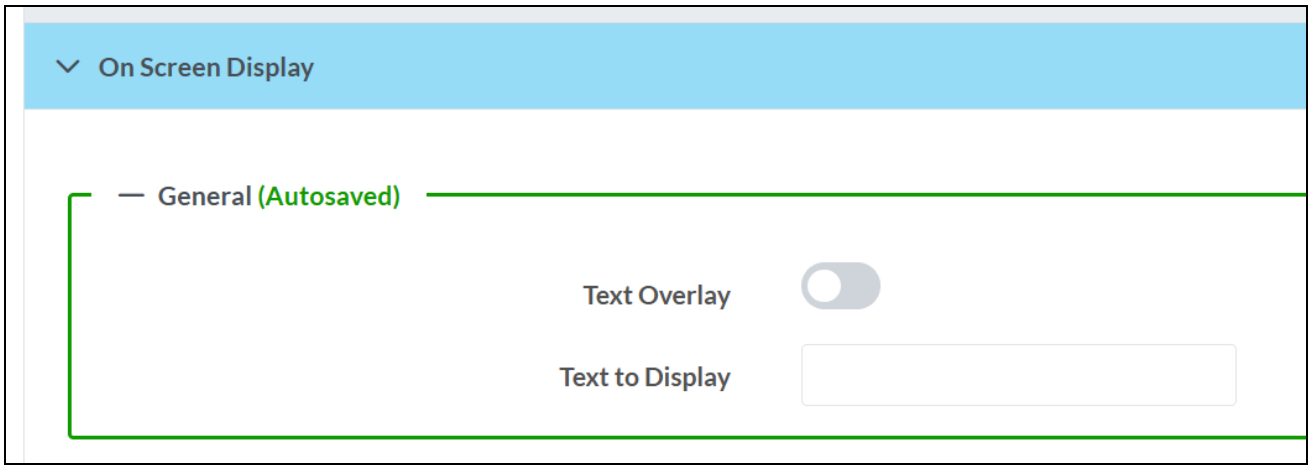
1. Set the **Background Image** toggle to the right to display a background image on the connected display, and to make all the other settings in the accordion available for configuration.
2. Enter a value in the **Time to wait after no video is detected** field from 5 seconds to 65,535 seconds to determine how long the device will wait after input signal is no longer detected before displaying the background image.
3. Use the **Aspect Ratio Mode** drop-down to select one of the following:
    - **Maintain Aspect Ratio:** The aspect ratio of the background image is preserved at the output. This may result in letterboxing or pillarboxing black bars at the edges of the display area.
    - **Stretch:** The aspect ratio of the background image is stretched to fit the aspect ratio of the display. This may distort the background image.
    - **1:1:** The background image is mapped 1:1 at the display without any aspect ratio scaling. This will preserve the aspect ratio of the image, but may not fill the entire display area, resulting in black borders around the image.

4. Select an option for **Image Retrieval**:
    - **From Local Device:** Select this option if an image stored locally on the DM NVX device will be used as the background image. Select the desired image from the **Image File** drop-down. To load custom images to the DM NVX device, select **Manage Images** from the **Edit Output** window or from the **Action** menu. Refer to Action on page 497 for more information.
    - **From Remote Server:** Select this option if an image hosted on a network server will be used as the background image. Enter the network file path to the image in the **Remote Path** field.
        - This option also allows the DM NVX device to refresh the image at a given interval. To have the DM NVX refresh the image, select the **Refresh** checkbox below the **Image Preview**, then enter a refresh rate in minutes from 1 to 65,535 minutes. The default refresh rate is 60 minutes.

To disable the background image, set the **Background Image** toggle to the left.

On Screen Display

The **On Screen Display** accordion enables setting a text string to overlay onto the video output signal.

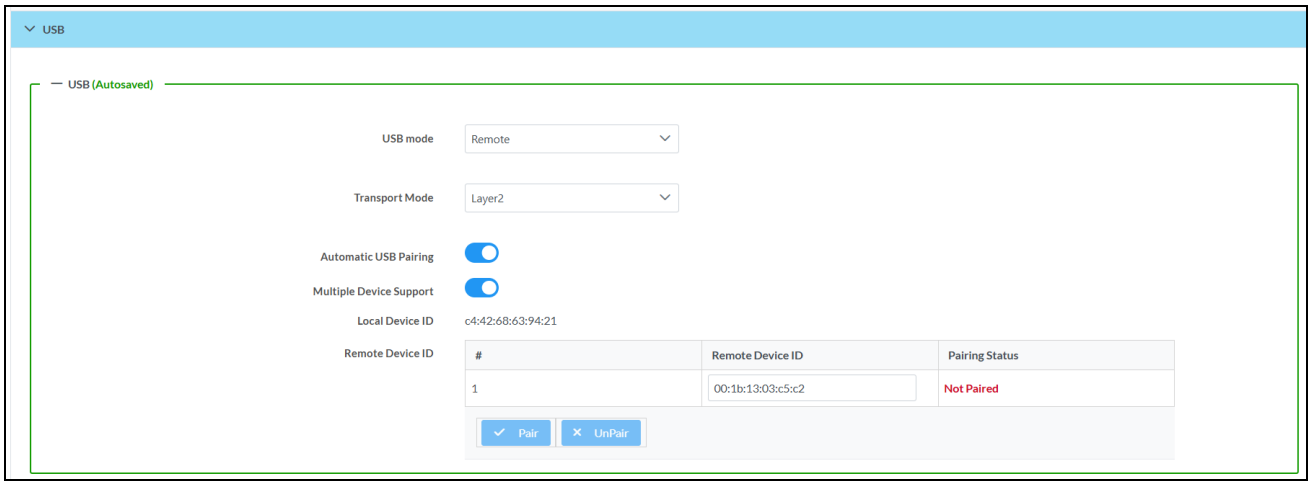


To add a text string to the video output signal:

1. Set the **Text Overlay** toggle to the right to enable the feature.
2. Enter the desired text string in the **Text to Display** field.

USB

Use the **USB** accordion to configure USB-over-Ethernet settings for the DM NVX device.



To configure USB routing, follow the steps below. These steps must be repeated on both devices in a given USB pairing for the two devices to pair successfully:

1. Select a **USB mode** from the drop-down:
   - In **Local** mode, USB signals from another **Remote** device on the network are extended to the **DEVICE** connector of the DM NVX device.
   - In **Remote** mode, USB devices connected to the **HOST** ports are extended over the network to a **Local** device.
2. Select a **Transport Mode** from the drop-down:
   - **Layer 2**: Enables Layer 2 transport of USB 2.0 data. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), DM-NVX-38X(C), and DM NUX USB-over-Ethernet devices (DM-NUX-L2 and DM-NUX-R2). Devices will pair via MAC address.
   - **Layer 3**: Enables Layer 3 transport of USB 2.0 data across VLANs. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), and DM-NVX-38X(C) devices. Devices will pair via IP address.

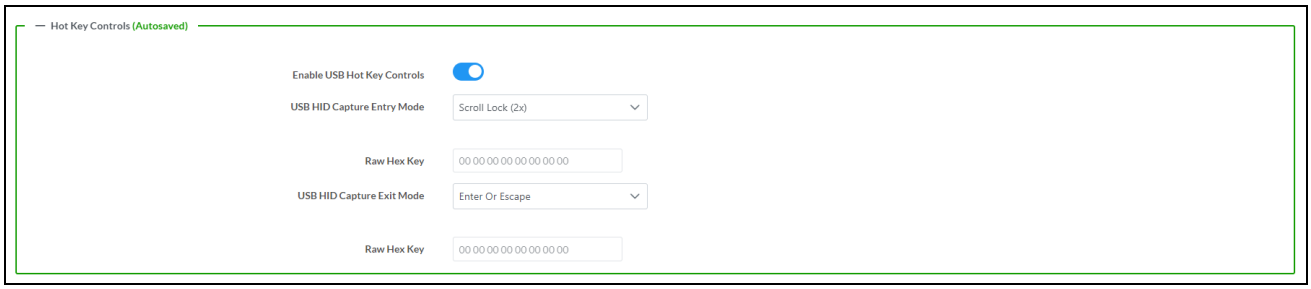
     > **NOTE:** This mode is not compatible with DM NUX USB-over-Ethernet devices.
3. Set the **Automatic USB Pairing** toggle to the right to enable or left to disable **Automatic Pairing**. With **Automatic Pairing** enabled, once a **Remote Device ID** is entered in the **Remote Device ID** table, and the corresponding device also has the matching **Remote Device ID** entered in its table, the devices will pair automatically.
4. Set the **Multiple Device Support** toggle to the right to right to enable or left to disable **Multiple Device Support**. If the device is set to **Local** mode and **Layer 2** transport, **Multiple Device Support** allows it to receive USB data from up to seven **Remote** extenders. A hub must be used to connect devices to the **TO DEVICE** port of each DM NVX **Remote** extender.

5. Enter the applicable ID strings in the **Remote Device ID** table:
    - If the device is set to **Local** mode and **Layer 2** transport, enter the MAC address of each remote extender. **Multiple Device Support** must be enabled to enter more than one remote extender.
    - If the device is set to **Local** mode and **Layer 3** transport, enter the IP address of the remote extender.
    - If the device is set to **Remote** mode and **Layer 2** transport, enter the MAC address of the local extender.
    - If the device is set to **Remote** mode and **Layer 3** transport, enter the IP address of the local extender.
6. Once the ID strings have been entered on both the local and remote devices, select **Pair** to pair the devices. If **Automatic USB Pairing** is enabled, pairing will occur automatically once the ID strings have been entered.

To remove pairing between DM NVX devices:

- If **Automatic USB Pairing** is disabled, select **UnPair**.
- If **Automatic USB Pairing** is enabled and **Layer 2** transport is selected, enter a MAC address of 00:00:00:00:00:00 in the **Remote Device ID** field.
- If **Automatic USB Pairing** is enabled and **Layer 3** transport is selected, enter an unused IP address in the **Remote Device ID** field.

The **Hot Key Controls** portion of the accordion provides settings for entering and exiting USB HID capture mode. USB HID capture mode allows HID keyboard presses to output serial data from the USB Hotkey symbol of the DM NVX device's SIMPL Windows device definition. Refer to the USB Hotkey symbol help file for more information on using this symbol in a SIMPL Windows control system program.



To configure the **Hot Key Controls** settings:

1. Set the **Enable USB Hot Key Controls** toggle to the right to enable the **USB HID Capture Entry Mode** and **USB HID Capture Exit Mode** hot keys. Set the toggle to the left to disable the hot keys.
2. Select a **USB HID Capture Entry Mode** hot key option from the drop-down. This is the HID keyboard key (or combination of keys) that will put the **USB Hotkey** SIMPL symbol into HID capture mode. While in this mode, any HID keyboard presses will output as raw hex data on the **Message_F** serial join of the symbol.
    a. If **Custom** was selected from the drop-down, enter the serial data for the key (or keys) into the **Raw Hex Key** text entry. This data can be pulled from the **USB Hotkey** SIMPL symbol's **Message_F** serial join via the SIMPL Debugger utility in Crestron Toolbox™ software.

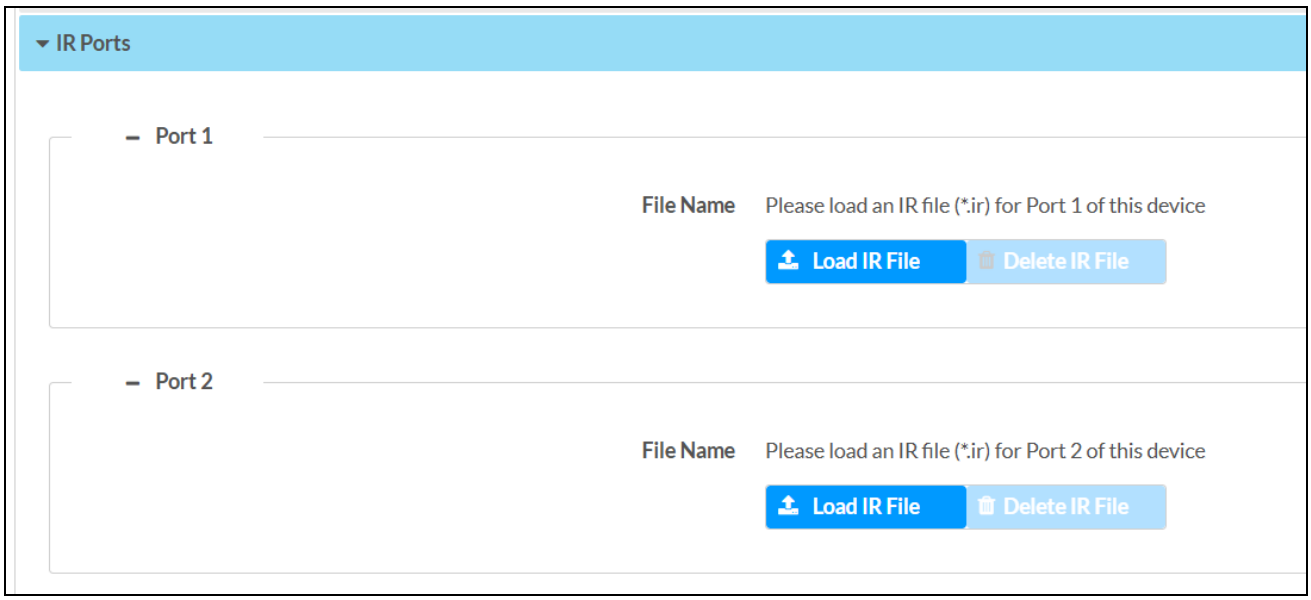
3. Select a **USB HID Capture Exit Mode** hot key option from the drop-down. This is the HID keyboard key (or combination of keys) that will exit the **USB Hotkey** SIMPL symbol from HID capture mode.
    a. If **Custom** was selected from the drop-down, enter the serial data for the key (or keys) into the **Raw Hex Key** text entry. This data can be pulled from the **USB Hotkey** SIMPL symbol's **Message_F** serial join via the SIMPL Debugger utility in Crestron Toolbox™ software.

> **NOTE:** While in **USB HID Capture Mode**, all HID data from a connected keyboard is output as raw hex data from the SIMPL symbol's **Message_F** serial join instead of being forwarded to a connected Host device.

IR Ports

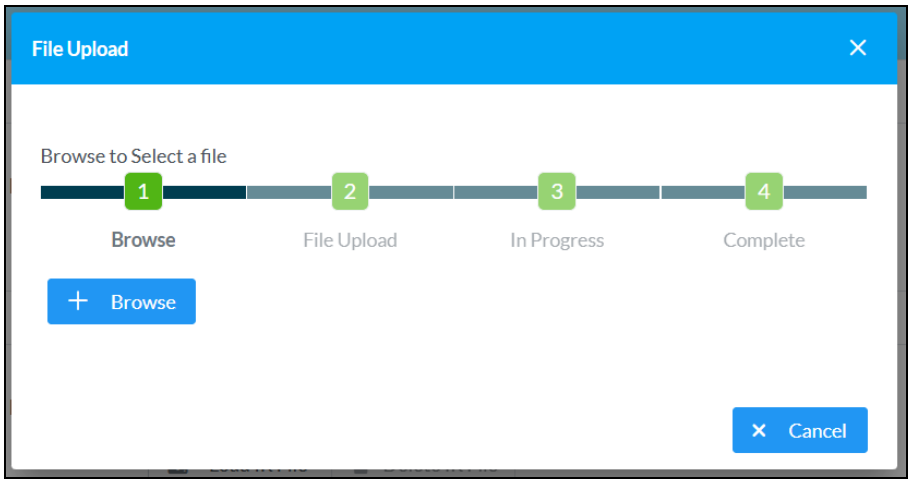
> **NOTE:** This accordion is not available on card-based models.

The **IR Ports** accordion allows custom IR files containing device commands to be uploaded to the DM NVX device for each IR connector. Custom IR files can be generated via the Device Learner utility within Crestron Toolbox software. Each IR port can hold only one IR file at a time. IR files must be loaded to each port individually.



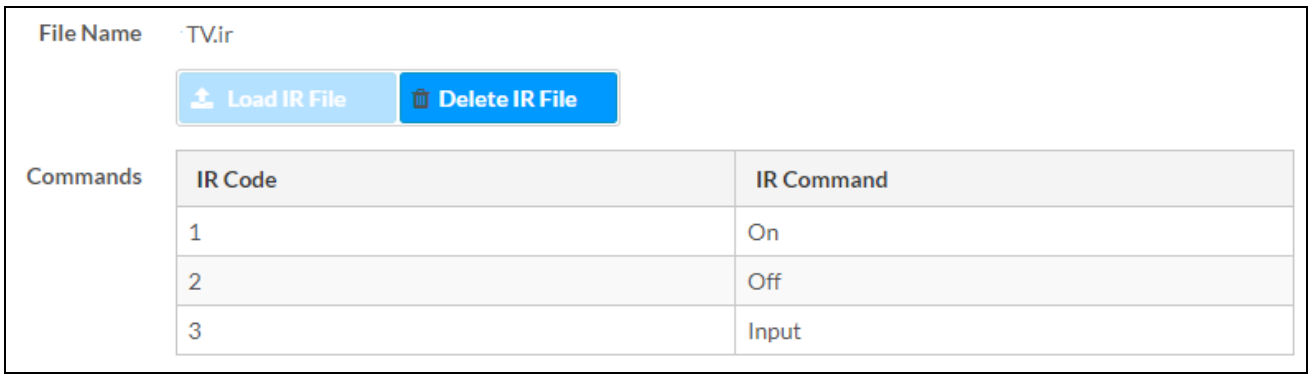
To upload an IR file to a given IR port:

1. Select **Load IR File**.
2. In the **File Upload** window that appears, select **+ Browse**.



3. Locate and select the desired IR file, then select **Open**. The selected file name is displayed.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The IR file is now loaded to the IR port.

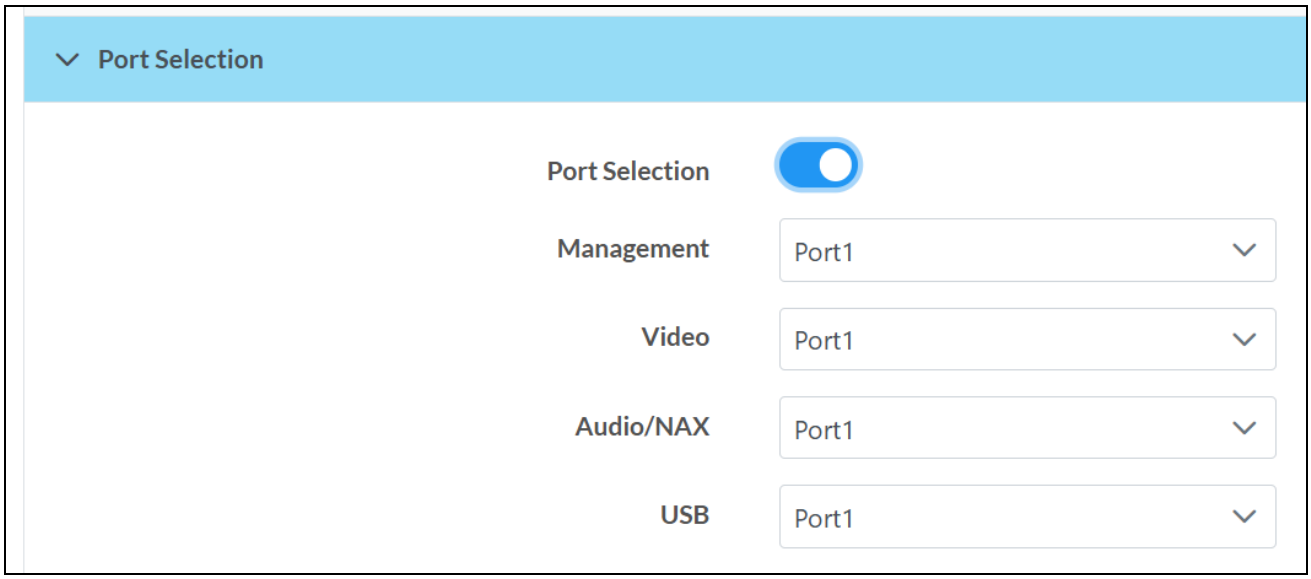
Once the IR file is uploaded, its filename will appear next to the IR port it was uploaded to. A read-only table showing all included commands will also appear and populate.



To delete an IR file from a given IR port, select **Delete IR File**.

Port Selection

The **Port Selection** feature allows the device's internal network traffic to be managed and segregated based on traffic type. Internal VLANs are used to segment device management, video, AES67, and USB traffic to discrete Ethernet ports. With **Port Selection** disabled, the additional Ethernet ports of the DM NVX device can be used as courtesy ports to extend the connected LAN to a local network device. With **Port Selection** enabled on all DM NVX devices on a network, traffic types can be physically separated from the control network onto dedicated networks.



To configure **Port Selection**:

1. Set the **Port Selection** toggle to the right to enable **Port Selection**. Set the toggle to the left to disable **Port Selection**. By default, **Port Selection** is disabled.
2. With **Port Selection** enabled:
   a. Select an Ethernet port from the **Management** drop-down to designate it to handle network traffic relating to device configuration and connection to a control system.
   b. Select an Ethernet port from the **Video** drop-down to designate it to handle the DM NVX AV-over-IP streaming network traffic.
   c. Select an Ethernet port from the **Audio/NAX** drop-down to designate it to handle DM NAX (AES67) audio-over-IP streaming network traffic.

      > **NOTE:** The audio signal in the primary DM NVX AV-over-IP stream will still traverse the port designated by the **Video** drop-down. The **Audio/NAX** drop-down only designates the port for the secondary audio stream.

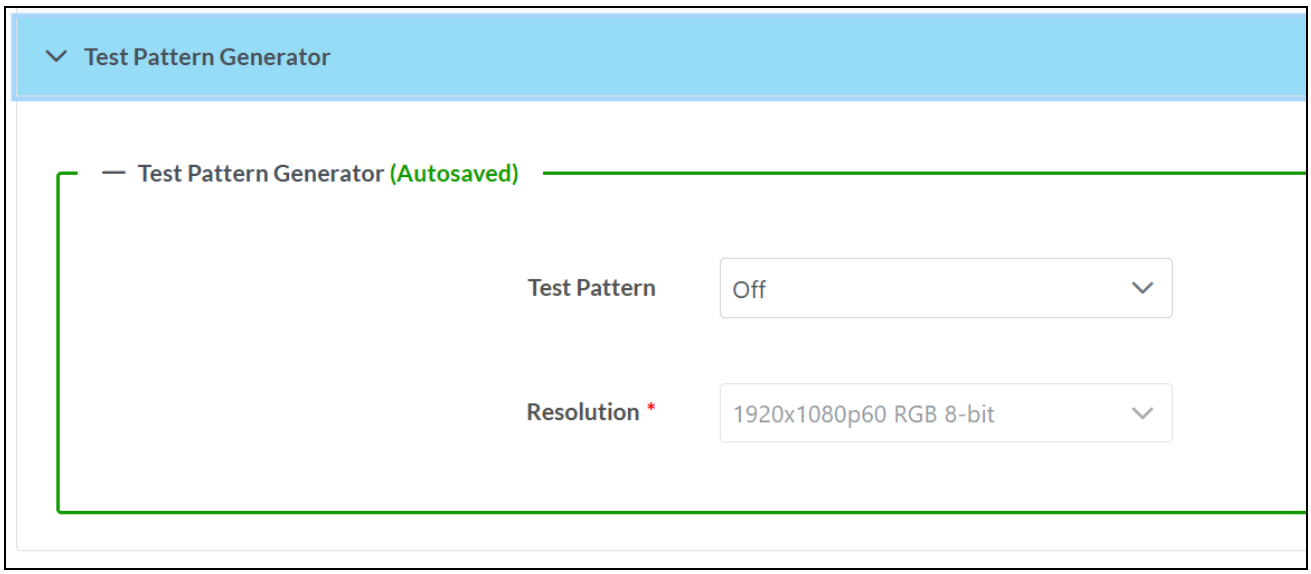
   d. Select an Ethernet port from the **Dante** drop-down to designate it to handle Dante audio-over-IP streaming network traffic (DM-NVX-363 and DM-NVX-363C only).
   e. Select an Ethernet port from the **USB** drop-down to designate it to handle USB-over-Ethernet traffic.
3. Select **Save** to apply the new settings.

   > **NOTE:** Changes to **Port Selection** will require a device reboot.

Test Pattern Generator

The **Test Pattern Generator** accordion contains settings for enabling various video test patterns to replace the DM NVX AV-over-IP video output signal.

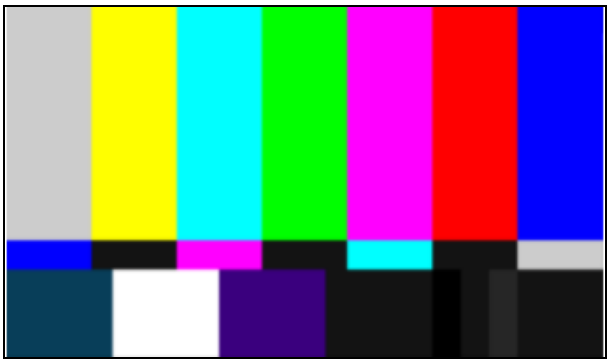
NOTE: The **Test Pattern Generator** accordion is only available when the device is set to **Transmitter** mode.

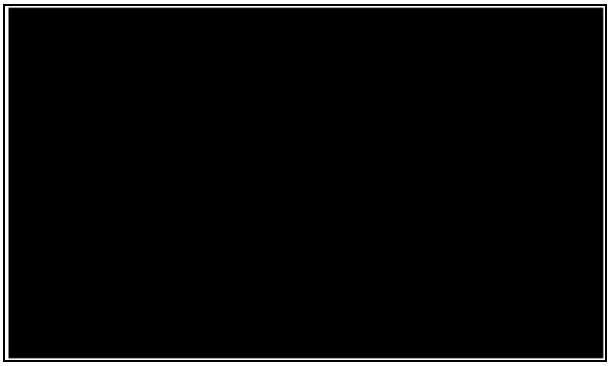
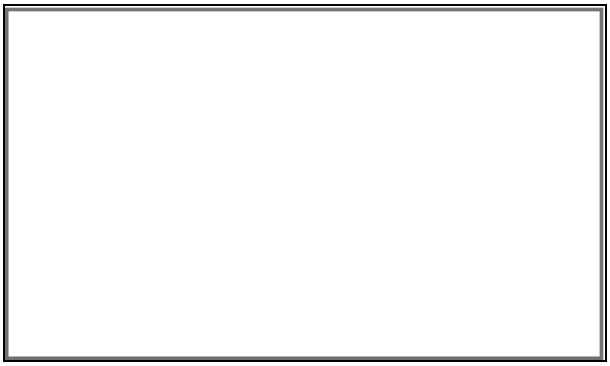
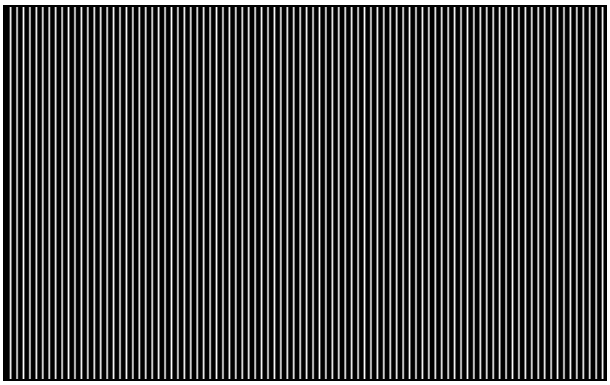
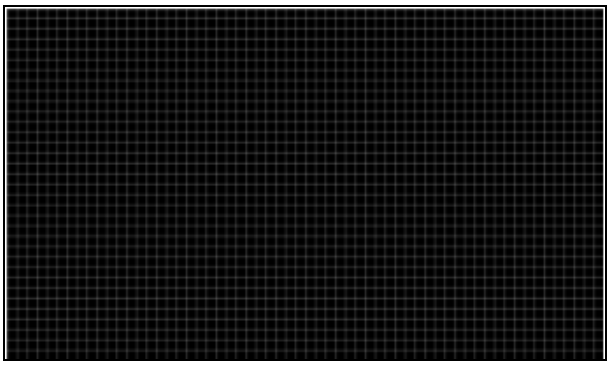


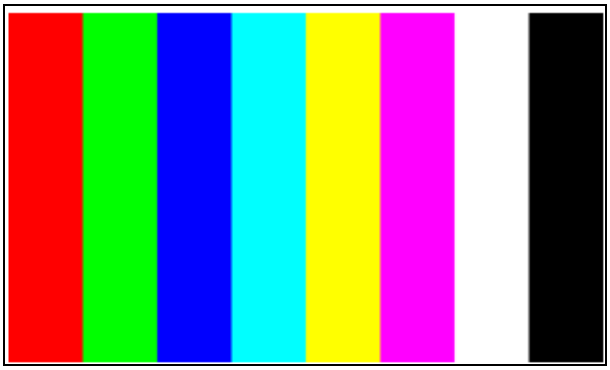
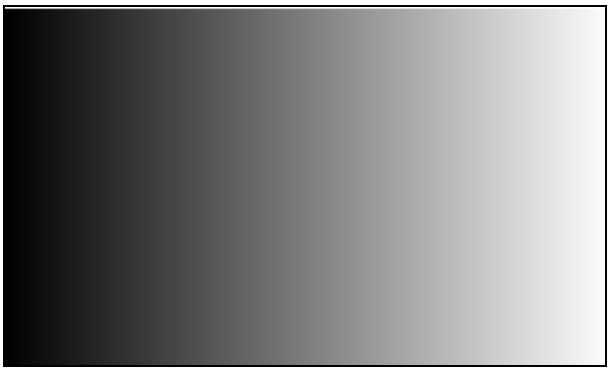
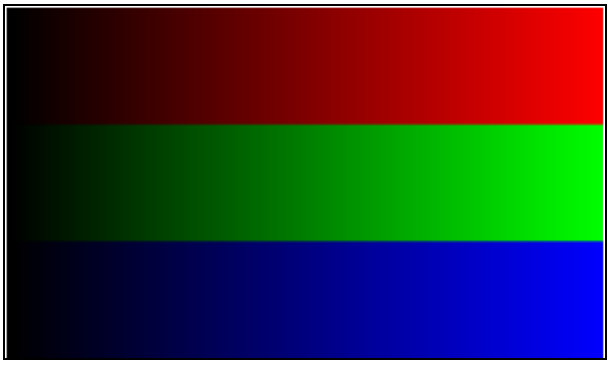
To set a test pattern:

1. Use the **Test Pattern** drop-down to select an available pattern from among **Off**, **SMPTE ColorBars**, **Black**, **White**, **Vertical Lines**, **Grid**, **Color Bars**, **Gray Gradient**, **RGB Gradient**, and **Frequency Adjust**. Refer to the table below for a reference of each pattern.
2. Use the **Resolution** drop-down to select a resolution for the selected test patten.

Available Test Patterns

SMPTE ColorBars	

Black	
White	
Vertical Lines	
Grid	

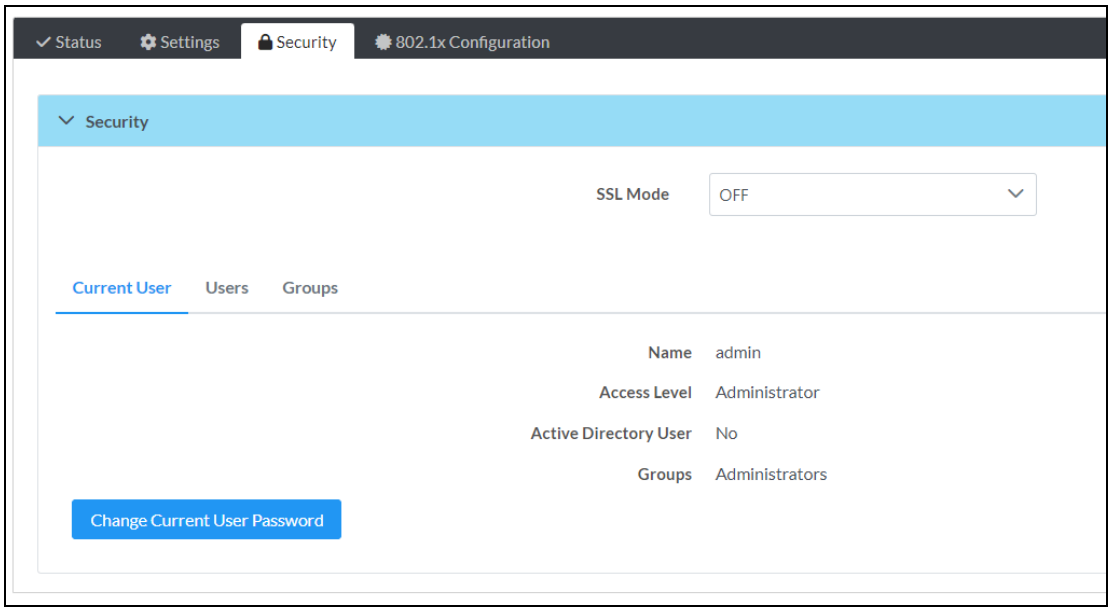
Color Bars	
Gray Gradient	
RGB Gradient	
Frequency Adjust	

Security

NOTE: This section applies to the following models:

- DM-NVX-360
- DM-NVX-360C
- DM-NVX-363
- DM-NVX-363C

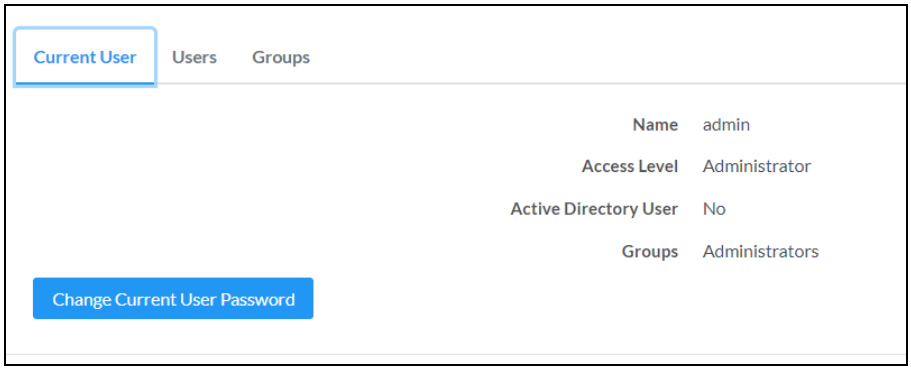
Select the **Security** tab to configure security for users and groups and to allow different levels of access to the DM NVX device functions. By default, security is disabled.



Select **Encrypt and Validate**, **Encrypt**, or **OFF** from the **SSL Mode** drop-down menu to specify whether to use encryption. By default, **SSL Mode** is set to **OFF**.

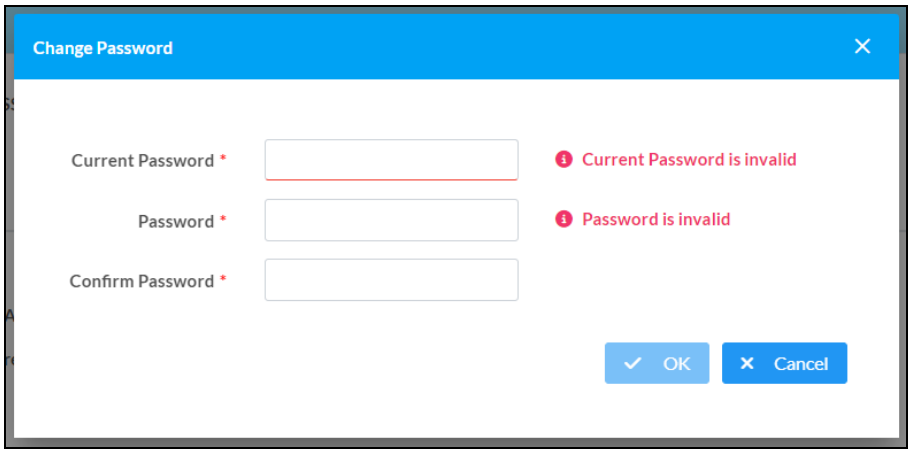
Current User

Select the **Current User** tab to view read-only information or to change the password for the current user.



To change the password for the current user account:

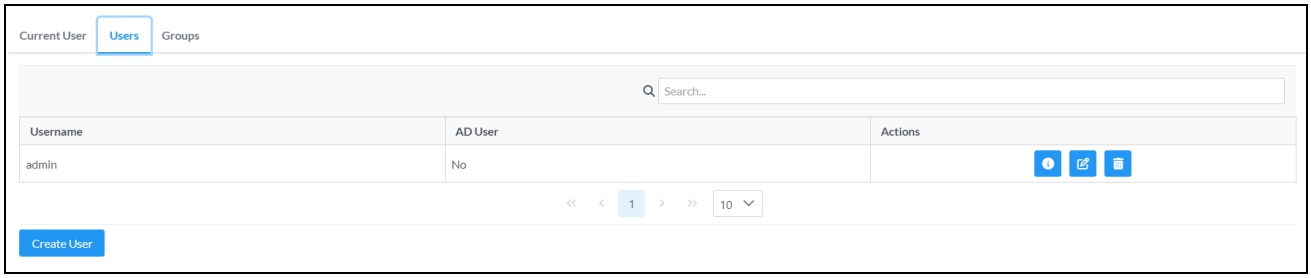
1. Select **Change Current User Password**.
2. In the **Change Password** dialog, enter the current password in the **Current Password** field, the new password in the **Password** field, and then re-enter the same new password in the **Confirm Password** field.



3. Select **OK** to save or select **Cancel** to cancel the changes.

Users

Select the **Users** tab to view and edit user settings. The **Users** tab can be used to add or remove local and Active Directory users and preview information about them.



Use the **Search Users** field to enter search term(s) and display users that match the search criteria.

If users listed in the **Users** table span across multiple pages, navigate through the list by selecting a page number or by using the left or right arrows at the bottom of the **Users** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 users by using the drop-down to the right of the navigation arrows.

Information about existing users is displayed in table format and the following details are provided for each user.

- **Username:** Displays the name of the user.
- **AD User:** Displays whether the user requires authentication using Active Directory.

Select the information icon in the **Actions** column to view detailed user information, or select the delete icon to delete a user.

To create a new user, select **Create User**.

Create a New Local User

To create a new local user:

1. Select **Create User** in the **Users** tab.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field. A valid user name can consist of alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
   c. Assign the access level by selecting one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the left (disabled).

3. Select **OK** to save or select **Cancel** to cancel the changes.

Grant Access to an Active Directory User

Users cannot be created or removed from the Active Directory server, but access can be granted to an existing user in the Active Directory server.

To grant access to an Active Directory user, you can either add the user to a local group on the DM NVX device, or add the Active Directory group(s) that they are a member of to the DM NVX device. Refer to Grant Access to an Active Directory Group on page 563 for steps on granting access to a group.

To grant access to an Active Directory user directly:

1. Select **Create User**.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field in the format "Domain\UserName", for example "crestronlabs.com\JohnSmith". Valid user names can contain alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Select one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the right (enabled).

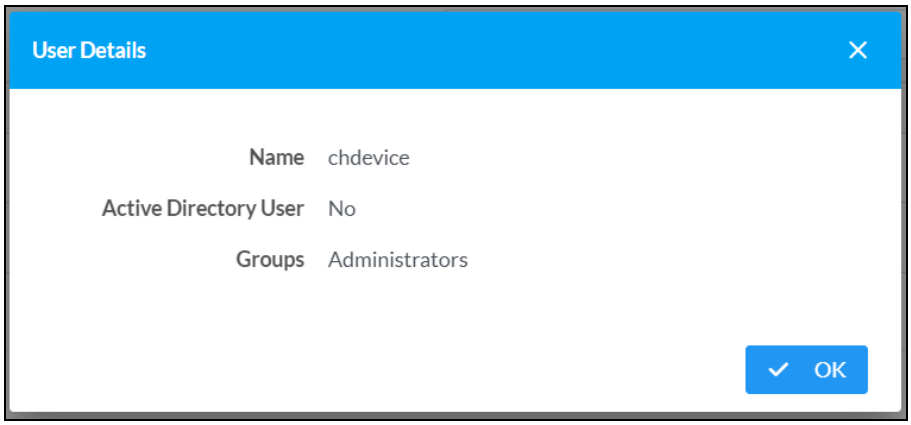
3. Select **OK** to save or select **Cancel** to cancel the changes.

Delete a User

To delete a user, select the trashcan icon in the **Actions** column. Select **Yes** when prompted to delete the user or **No** to cancel the deletion.

View User Details

Select the information icon in the **Actions** column to view information for the selected user. The **User Details** dialog displays the following information for the selected user.



The fields displayed in the **User Details** window are:

- **Name:** Displays the name of the selected user.
- **Active Directory User:** Displays whether the user is an Active Directory user.
- **Group:** Displays group(s) the selected user is part of.

Select **OK** to close the **User Details** window and return to the **Users** tab.

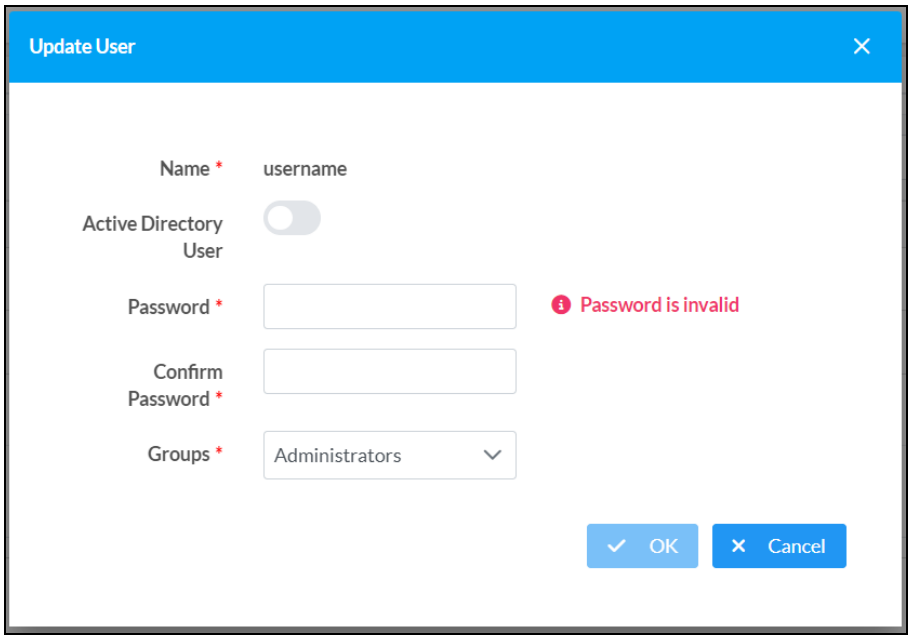
Update User Details

To update the details for an existing user:

1. Select the edit icon in the **Actions** column to update information for the selected user.
2. Set the **Active Directory User** toggle to the right if the user is an Active Directory user, or to the left if the user is not.
3. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
4. Select one or more groups to assign the user to from the **Groups** drop-down list. Deselect any groups to remove the user from those groups.

   > **NOTE:** After a user is removed from a group, they lose any access rights associated with that group.

5. Select **OK** to save or select **Cancel** to cancel the changes.

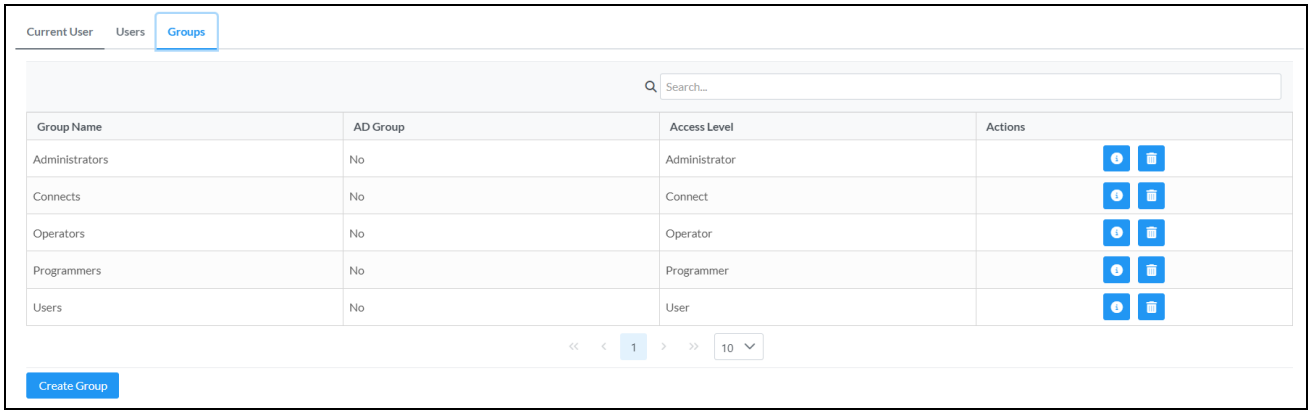


NOTE: The **Name** field is a read-only field that displays the username for the selected user. To change a username, the user must be deleted and a new user must be added.

Groups

Select the **Groups** tab to view and edit group settings. The **Groups** tab can be used to add local and Active Directory groups, remove local and Active Directory groups, and preview information about a group.

Use the **Search Groups** field to enter search term(s) and display groups that match the search criteria.



If groups listed in the **Groups** table span across multiple pages, navigate through the groups by selecting a page number or by using the left or right arrows at the bottom of the **Groups** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 groups by using the drop-down to the right of the navigation arrows.

Existing groups are displayed in a table and the following information is provided for each group:

- **Group Name:** Displays the name of the group.
- **AD Group:** Displays whether the group requires authentication using Active Directory.
- **Access Level:** Displays the predefined access level assigned to the group (Administrator, Programmer, Operator, User, or Connect).

Select the information icon in the **Actions** column to view detailed group information, or select the delete icon to delete a group.

Select **Create Group** in the **Groups** tab to create new group.

Create a Local Group

To create a local group:

1. Select **Create Group**.
2. In the **Create Group** dialog, enter the following:
   a. Enter the group name in the **Name** field.
   b. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the left (disabled).
3. Select **OK** to save. Select **Cancel** to cancel the changes.

Grant Access to an Active Directory Group

A group cannot be created or removed from the Active Directory server, but access can be granted to an existing Active Directory group.

Once the group is added, all members of that group will have access to the DM NVX device.

To grant access to an Active Directory group:

1. Select **Create Group**.
2. In the **Create Group** dialog enter the following:
   a. Enter the group name in the **Name** field (for example, "Engineering Group").

   > **NOTE:** Group names are case sensitive, and a space is a valid character that can be used in group names.
3. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the right (enabled).
4. Select **OK** to save. Select **Cancel** to cancel the changes.

Delete a Group

Select the trashcan icon in the **Actions** column to delete a group. Select **Yes** when prompted to delete the group or **No** to cancel the deletion.

When a group is deleted, users in the group are not removed from the device or Active Directory server. However, because a user's access level is inherited from a group(s), users within the deleted group will lose access rights associated with the group.

View Group Details

Select the information icon in the **Actions** column to view information for the selected group. The **Group Details** dialog lists the following information for the selected group:

- **Name:** Displays the name of the group.
- **Access Level:** Displays the access level of the group and its users.
- **Active Directory Group:** Displays whether the group is an Active Directory group.

Select **OK** to close the **Group Details** dialog and return to the **Groups** tab.

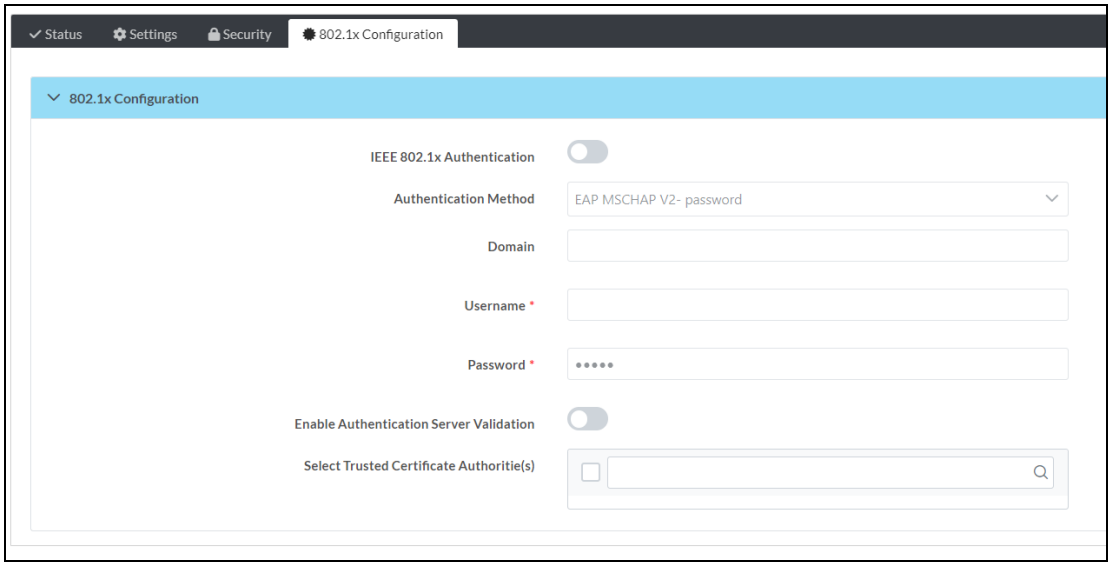
802.1X Configuration

NOTE: This section applies to the following models:

- DM-NVX-360
- DM-NVX-360C
- DM-NVX-363
- DM-NVX-363C

DM NVX devices have built-in support for the 802.1X standard (an IEEE network standard designed to enhance the security of wireless and Ethernet LANs, relying on the exchange of messages between the device and the network's host, or authentication server), allowing communication with the authentication server and access to protected corporate networks.

The **802.1X Configuration** page can be accessed at any time by selecting the **802.1X Configuration** tab of the interface.



Configure the Device for 802.1X Authentication

To configure the DM NVX device for 802.1X Authentication:

1. Set the **IEEE 802.1X Authentication** toggle to the right. This will enable all options on the 802.1X dialog.
2. Select an **Authentication Method**: Choose between **EAP-TLS Certificate** or **EAP-MSCHAP V2 Password** according to the network administrator's requirement.

3. Do one of the following:
    a. If **EAP-TLS Certificate** was selected: Select **Action/Manage Certificates** to upload the required machine certificate. The machine certificate is an encrypted file that will be supplied by the network administrator, along with the certificate password.
    b. If EAP-MSCHAP V2 Password was selected: Enter the username and password supplied by the network administrator into the **Username** and **Password** fields, respectively. This method does not require the use of a machine certificate, only the user name and password credentials.
4. If you enabled the **Enable Authentication Server Validation** option, this will enable the **Select Trusted Certificate Authoritie(s)** list box which contains signed Trusted Certificate Authorities (CAs) preloaded onto the DM NVX device.

    Select the check box next to each CA whose certificate can be used for server validation, as specified by the network administrator.

    If the network does not use any of the listed certificates, the network administrator must provide a certificate, which must be uploaded manually via the **Manage Certificates** function in the **Action** menu. Refer to Action on page 497 for more information on the **Manage Certificates** function.
5. If required, type the domain name of the network in the **Domain** field.
6. When the 802.1X settings are configured as desired, select **Save Changes** to save the changes to the device and reboot it. Select **Revert** to cancel any changes.

Configuration (DM-NVX-38X Models)

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-384
- DM-NVX-384C
- DM-NVX-385
- DM-NVX-385C

Web Interface Configuration

The web interface of a DM NVX AV-over-IP device allows for the viewing of status information as well as the configuration of local device settings.

Access the Web Interface

To access the web interface, refer to either of the following:

- Access the Web Interface with a Web Browser on page 567
- Access the Web Interface with the Crestron Toolbox™ Application on page 569

The web interface runs in a web browser. The following web browser versions are supported:

Operating System and Supported Web Browsers

OPERATING SYSTEM	SUPPORTED WEB BROWSERS
Windows® operating system	Chrome™ web browser, version 31 and later
	Firefox® web browser, version 31 and later
	Internet Explorer web browser, version 11 and later
	Microsoft Edge web browser
macOS® operating system	Safari® web browser, version 6 and later
	Chrome web browser, version 31 and later
	Firefox web browser, version 31 and later

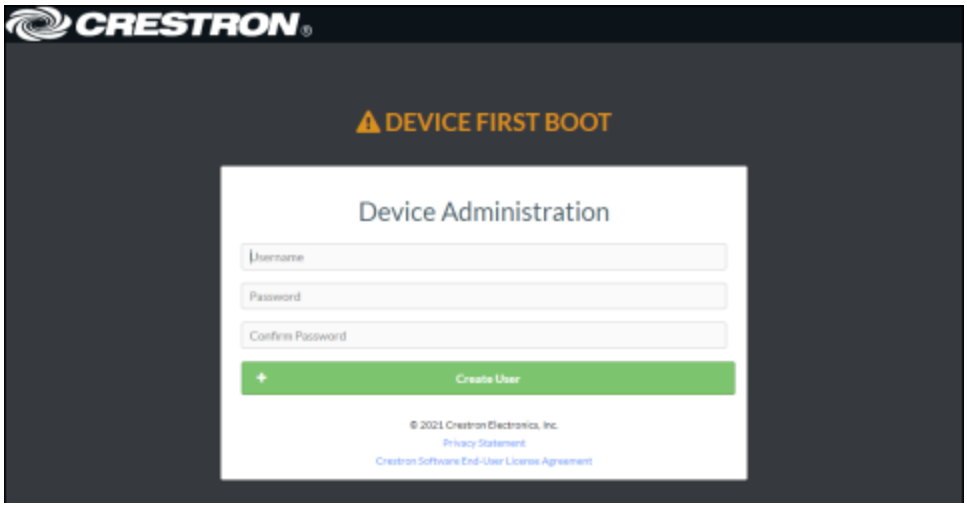
Access the Web Interface with a Web Browser

To access the web interface:

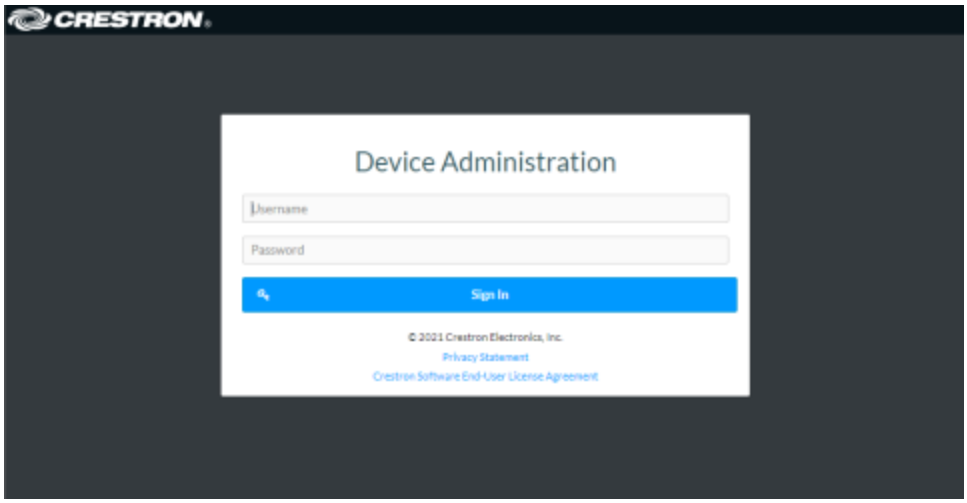
1. Enter the IP address of the DM NVX device into a web browser.

   NOTE: To obtain the IP address, use the Device Discovery Tool utility in Crestron Toolbox™ software or an IP scanner application.

2. If accessing the device for the first time, a prompt to create an administrator account will be displayed along with a **DEVICE FIRST BOOT** message. To create the first admin account:
    a. Enter a username in the **Username** field.
    b. Enter a password in the **Password** field.
    c. Re-enter the same password in the **Confirm Password** field.



    d. Select **Create User**. A new **Device Administration** page appears with an option to **Sign In** instead of **Create User**.



3. Enter the username in the **Username** field.
4. Enter the password in the **Password** field.
5. Select **Sign In**.

Access the Web Interface with the Crestron Toolbox™ Application

To access the web interface by opening a web browser from the Crestron Toolbox™ application:

1. Open the Crestron Toolbox application.
2. Select **Device Discovery Tool** from the **Tools** menu or select the Device Discovery Tool icon in the toolbar. Once the utility loads, the DM NVX device will be discovered on the network and listed in the device list on the left side of the screen. The device's host name, IP address, and firmware version are displayed.

   > **NOTE:** If there is security software running on the computer, a security alert might be displayed when the Crestron Toolbox application attempts to connect to the network. Make sure to allow the connection, so that the Device Discovery Tool can be used.

3. Select the device from the discovered devices list.
4. Enter the device credentials in the **Authentication Required** dialog that opens, then select **Log In**.
5. Select **Web Configuration**.

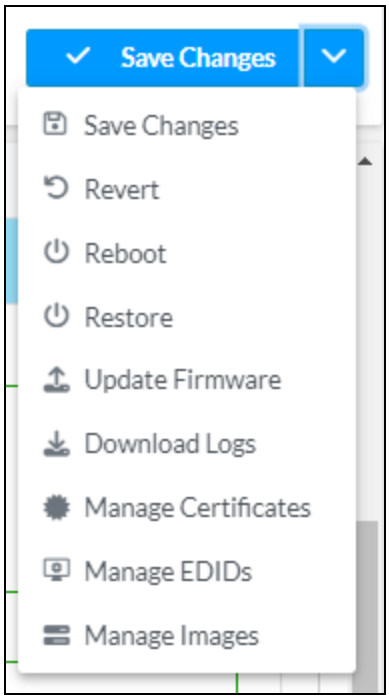
Action

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-384
- DM-NVX-384C

The **Action** drop-down menu is displayed at the top right side of the web interface and provides quick access to these common device functions:

- Save Changes on page 570
- Revert on page 570
- Reboot on page 571
- Restore on page 571
- Update Firmware on page 572
- Download Logs on page 572
- Manage Certificates on page 572
- Manage EDIDs on page 575
- Manage Images (Receiver Mode Only) on page 578



Save Changes

Select **Save Changes** to save any changes made to the configuration settings.

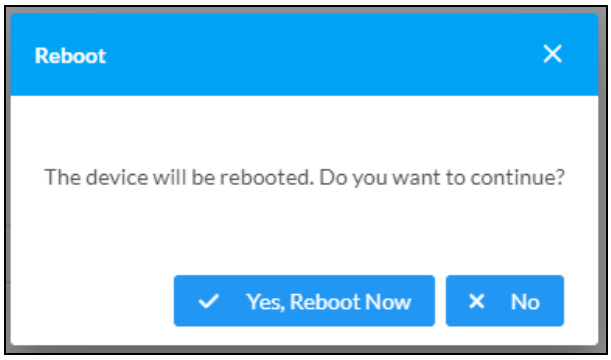
Revert

Select **Revert** to revert the device back to the last saved configuration.

Reboot

Certain changes to the settings may require a reboot to take effect. To reboot the device:

1. Select **Reboot** in the **Action** menu. The **Reboot** confirmation message box appears.



2. Select **Yes, Reboot Now** to reboot the device. The **Reboot** status message box appears. Wait for the device reboot to complete before attempting to reconnect to the web interface. Alternatively, select **No** to cancel the reboot operation.

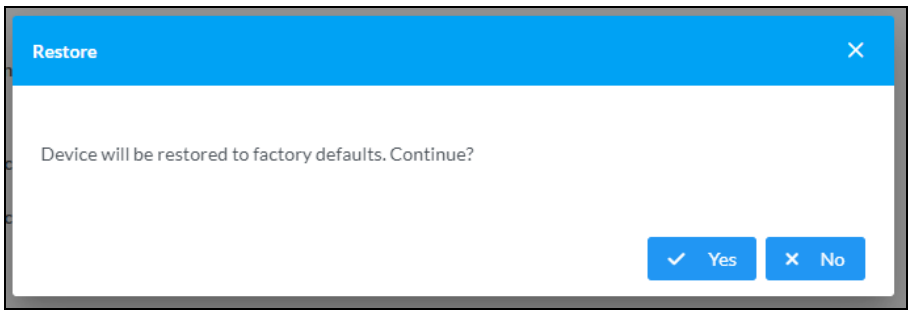
Restore

The DM NVX device can be restored to factory default settings from the **Action** menu.

> **NOTE:** The **Restore** procedure will wipe all settings from the device, including network settings. If a static IP address is set, restoring the device to factory default settings will clear this address and DHCP will be enabled instead.

To restore the device to factory defaults:

1. Select **Restore** in the **Action** menu. The **Restore** confirmation message box appears.



2. Select **Yes** to restore the device to factory default settings. Select **No** to cancel the restore operation. When **Yes** is selected, the **Restore** status message box appears. Wait for the device restore to complete before attempting to reconnect to the web interface.

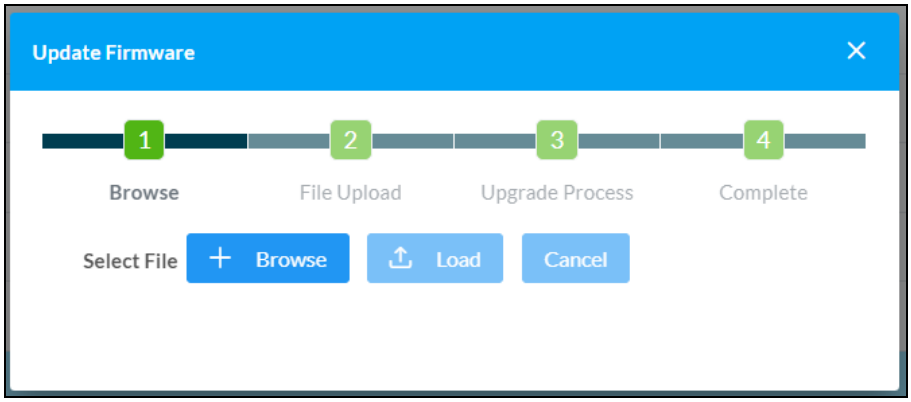
   > **NOTE:** Once the device is restored, it may have a new IP address. If reconnecting to the original address does not work, use the Device Discovery Tool in Crestron Toolbox software or an IP scanner application to find the device's new IP address.

If the web interface is not accessible, the device can also be restored to factory default settings via a hardware-based procedure (refer to DM-NVX-384 and DM-NVX-385 Installation on page 382). Card-based DM NVX devices can also be restored from the front panel menu of the DMF-CI-8.

Update Firmware

To update the firmware of the device:

1. Select **Update Firmware** in the **Action** menu.
2. In the **Update Firmware** window that appears, select **+ Browse**.



3. Locate and select the desired firmware file, then select **Open**. The selected firmware file name is displayed in the **Update Firmware** window.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The firmware update is now complete, and the web interface will return to the main log-in page.

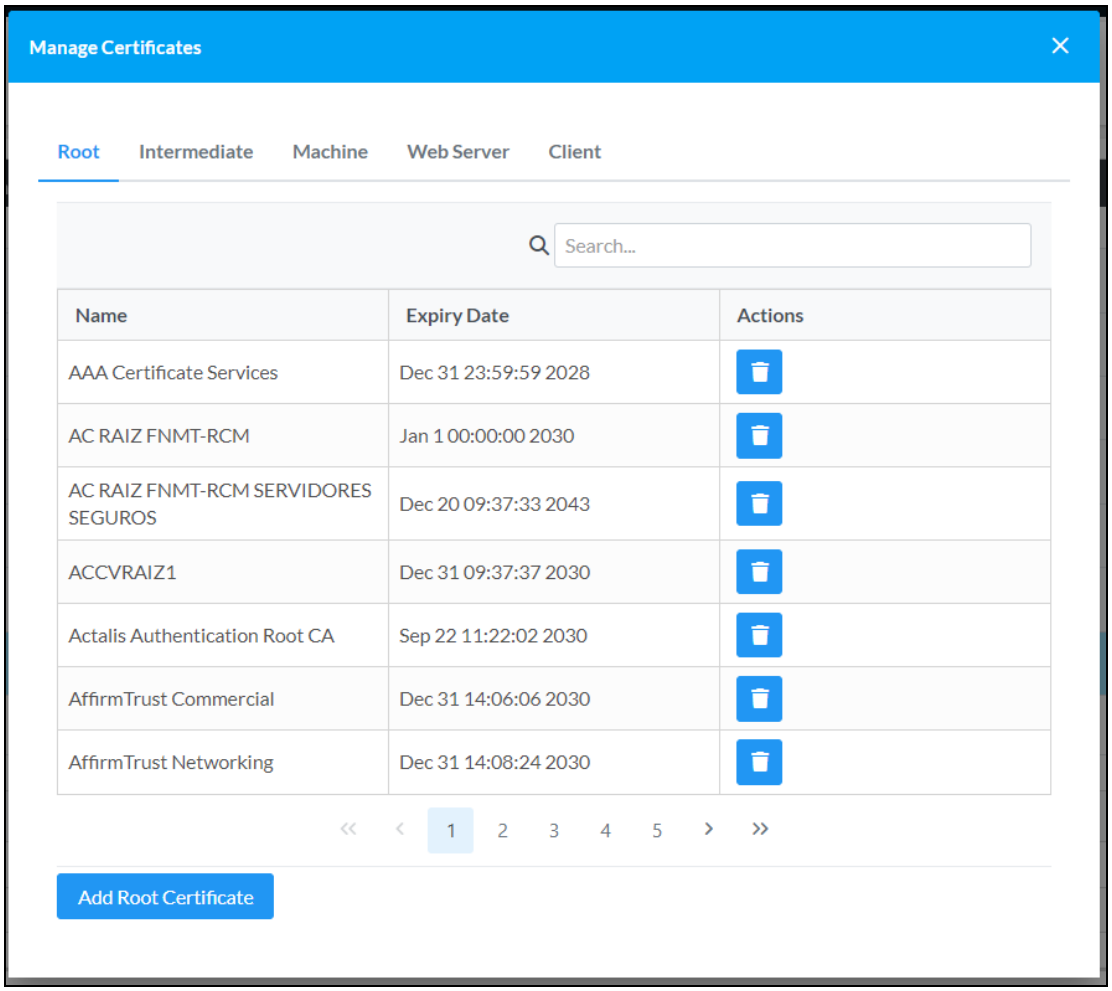
Download Logs

Select **Download Logs** in the **Action** menu to download the device message logs for diagnostic purposes.

The log file is downloaded to the Downloads folder of the PC.

Manage Certificates

Select **Manage Certificates** in the **Action** menu to open the **Manage Certificates** window. Use this window to add or remove certificates used in 802.1x authentication and other protected network functions.



The following certificate tabs are available in the **Manage Certificates** window:

- **Root:** The Root certificate is used by the DM NVX device to validate the network's authentication server. The device has a variety of Root certificates, self-signed by trusted CAs (Certificate Authorities) preloaded into the device. Root certificates must be self-signed.
- **Intermediate:** The Intermediate store holds non self-signed certificates that are used to validate the authentication server. These certificates will be provided by the network administrator if the network does not use self-signed Root certificates.
- **Machine:** The Machine certificate is an encrypted PFX file that is used by the authentication server to validate the identity of the DM NVX device. The machine certificate will be provided by the network administrator, along with the certificate password. For 802.1x, only one machine certificate can reside on the device.
- **Web Server:** The Web Server certificate is a digital file that contains information about the identity of the web server.
- **Client:** A Client certificate is a file that allows the DM NVX device to identify itself to another server on the network. There are no Client certificates loaded by default to a DM NVX device, as they can only be required by local network devices.

Add Certificates

To add a certificate:

1. Select the corresponding certificate tab.
2. Select **Add [Type] Certificate**.
3. Select **+ Browse**.
4. Locate and select the file, then select **Open**.

   > **NOTE:** If the selected certificate is a machine certificate, enter the password provided by the network administrator.

5. Select **OK**. This will add the certificate to the list in the **Manage Certificates** window, displaying the file name and expiration date. The certificate is now available for selection and can be loaded to the device.

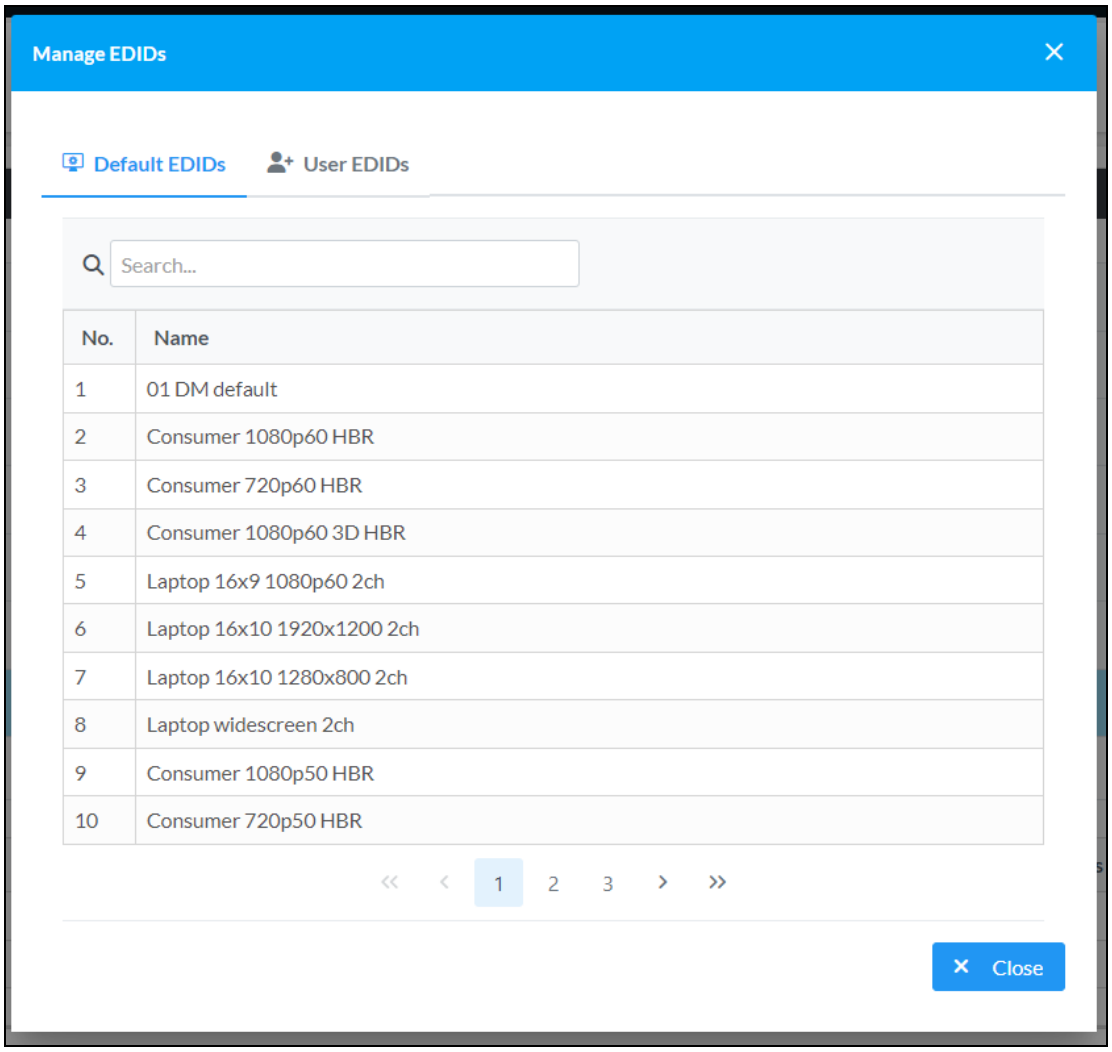
Delete Certificates

To delete a certificate:

1. Select the corresponding certificate tab.
2. Select the trashcan icon in the **Actions** column and the row of the certificate to be deleted.
3. Select **Yes** when prompted to delete the certificate or **No** to cancel the deletion.

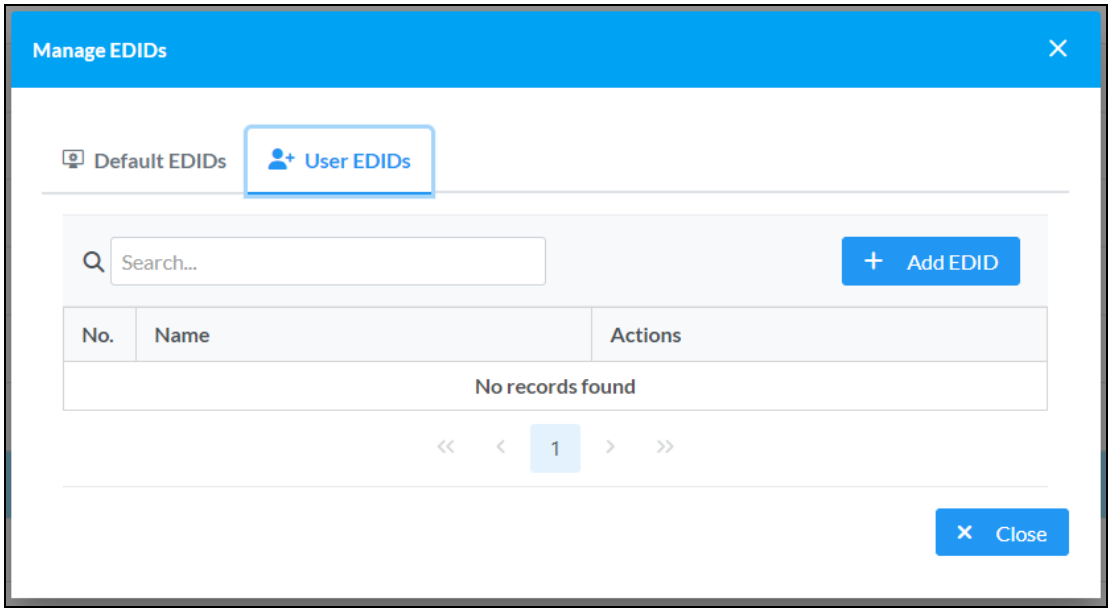
Manage EDIDs

Select **Manage EDIDs** in the **Action** menu to open the **Manage EDIDs** window. Use this window to add, remove, or browse which EDIDs are available for the AV inputs and outputs of the DM NVX device.



The default tab that will open in this window is the **Default EDIDs** tab. This tab is read only, and provides a list of all default EDIDs available on the DM NVX device as part of the firmware. Use the **Search...** text entry field to filter the list of EDIDs by name. Default EDIDs cannot be removed from the device.

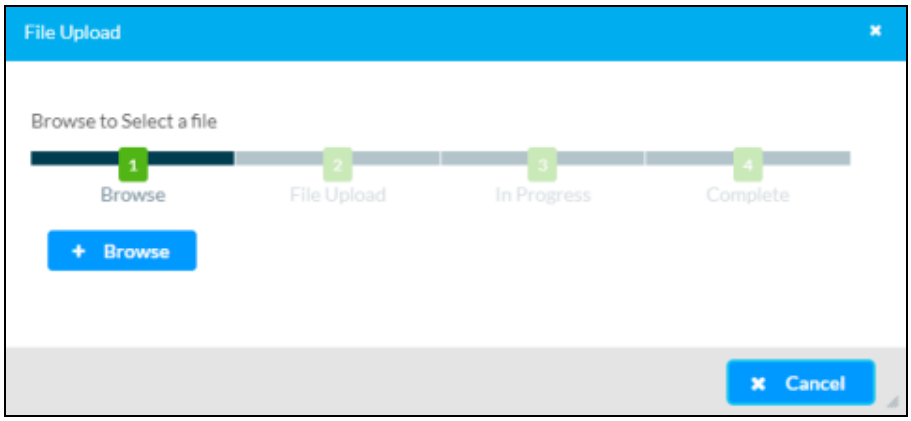
The second tab available in this window is the **User EDIDs** tab. By default, the table will populate with **No records found**.



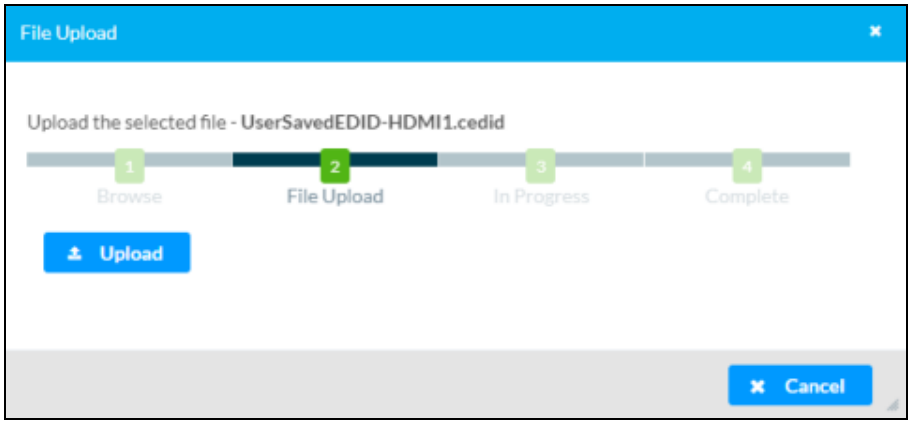
To add a **User EDID** file:

1. Select **+ Add EDID** at the top right of the table. The **File Upload** screen will appear.
2. Select **+ Browse**. Locate the desired .cedid file, then select **Upload** to upload it to the DM NVX device.

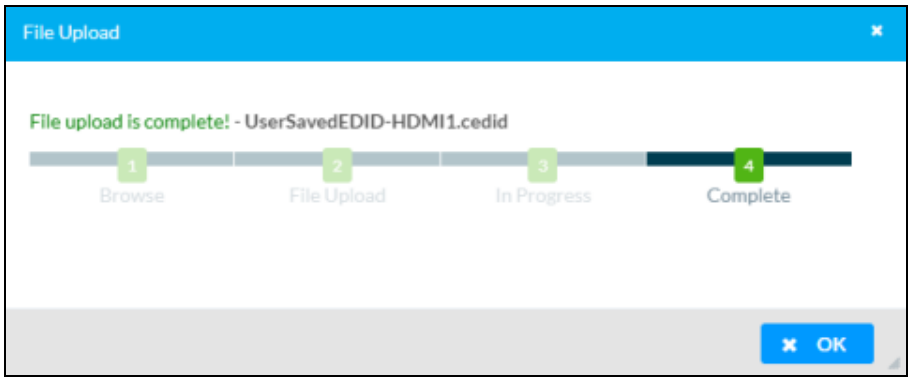
   Browse for and select a .cedid file

   Upload the selected file

   Wait for the upload to complete, then select OK

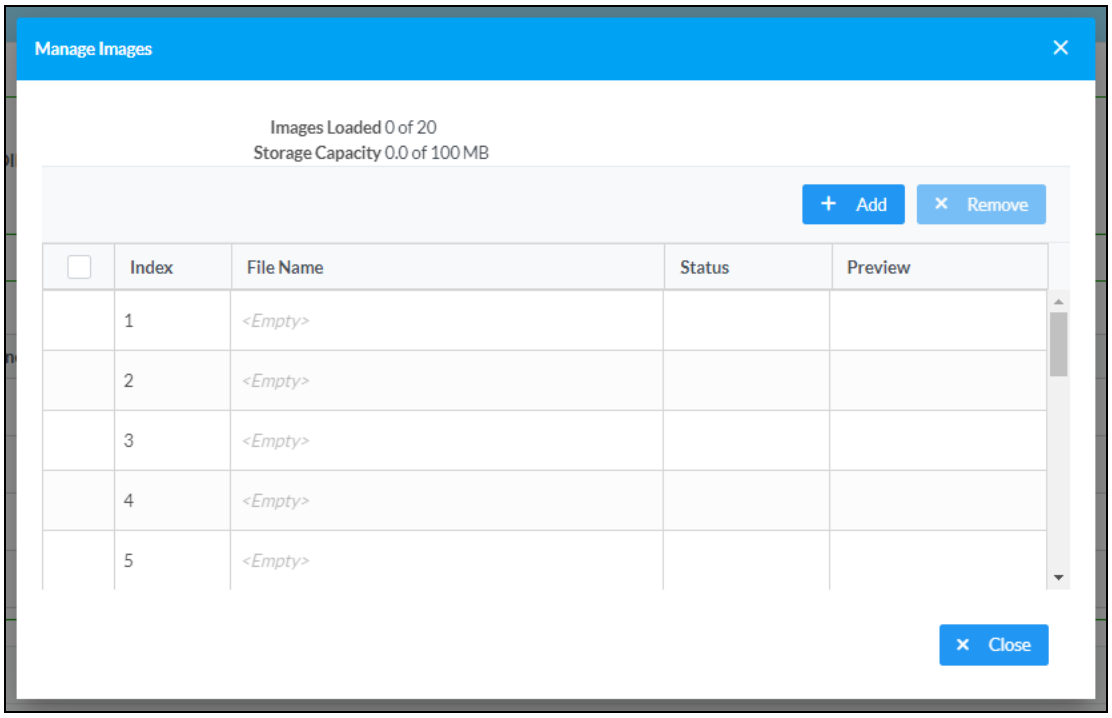
   

3. Select **OK** to return to the **Manage EDIDs** window. The uploaded User EDID is now displayed in the table.

To remove a **User EDID** file, select **Delete** in its table row.

Manage Images (Receiver Mode Only)

Select **Manage Images** in the **Action** menu to open the **Manage Images** window. Use this window to add or remove images that can be displayed as backgrounds for the on-screen display feature of the DM NVX device.



To add an image:

1. Select **+ Add**. A **File Upload** window appears.
2. Select **+ Browse**. Locate the desired .jpeg, .jpg, or .png image file, then select **Upload** to upload it to the DM NVX device. The uploaded image will now appear in the **Manage Images** table with a preview and a **Ready** status message. Refer to the **Outputs** heading under Settings on page 585 for information on setting a background image.

To delete an image, select its entry in the table then select **X Remove**.

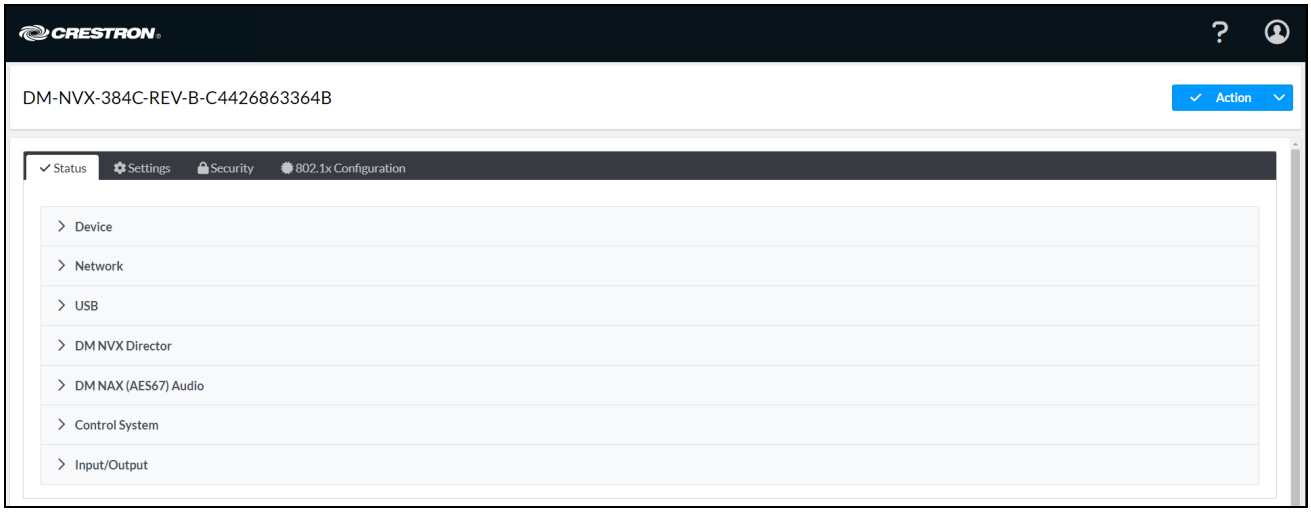
Status

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-384
- DM-NVX-384C
- DM-NVX-385
- DM-NVX-385C

The **Status** page is the first page displayed when opening the interface of the DM NVX device. It displays general information about the device (such as **Model Name**, **Firmware Version**, and **Serial Number**), current network settings (such as **Host Name** and **IP Address**), and the current status of the connectors on the device.

The **Status** page can be accessed at any time by selecting the **Status** tab of the interface.

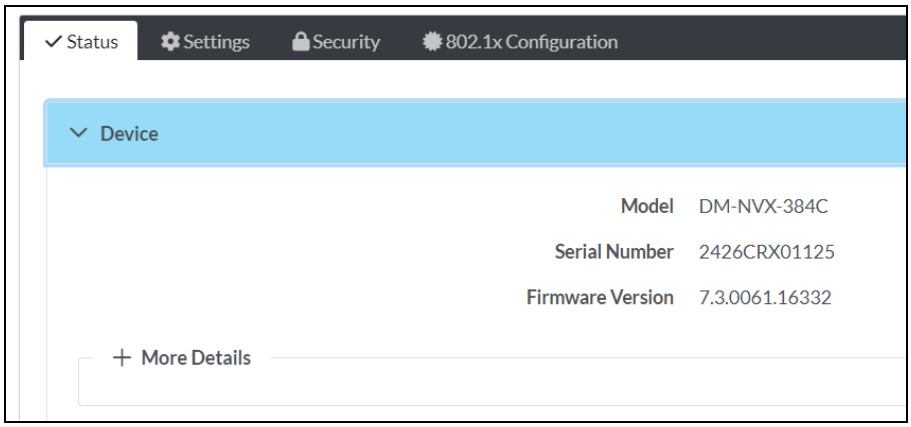


Information displayed on the **Status** page is organized into different sections:

- Device on page 580
- Network on page 580
- USB on page 581
- DM NVX Director on page 581
- DM NAX (AES67) Audio on page 582
- Control System on page 583
- Input/Output on page 583

Device

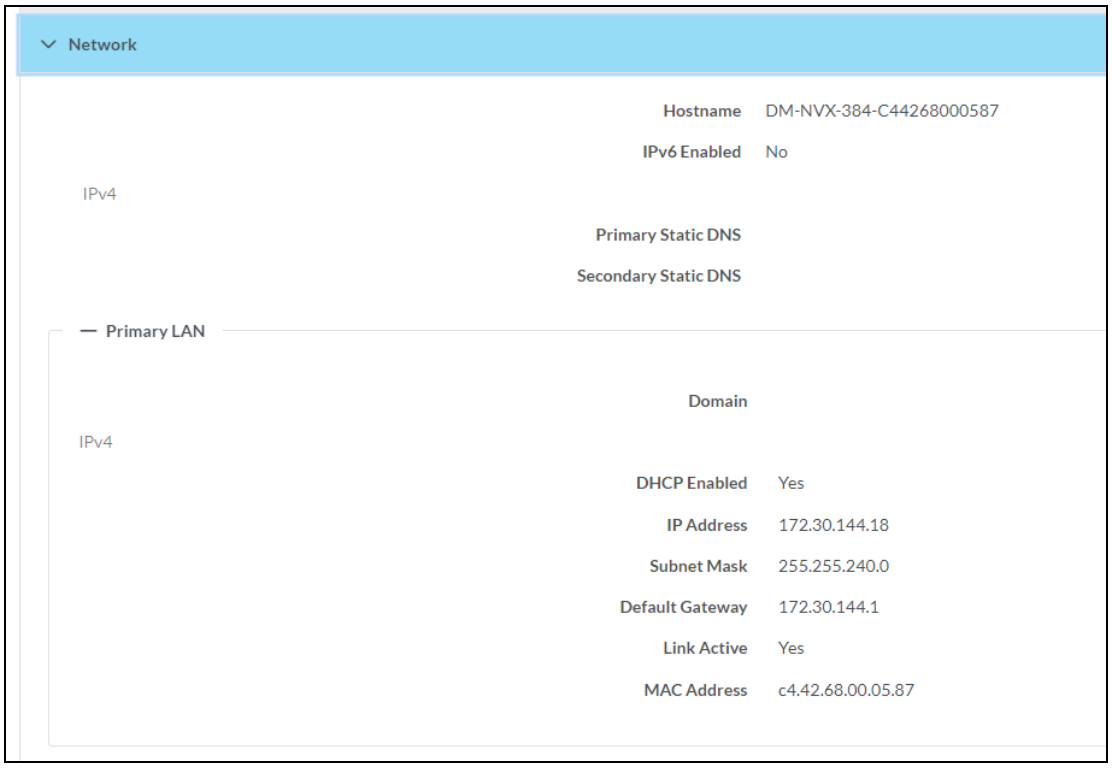
The **Device** accordion displays the **Model**, **Firmware Version**, and **Serial Number** of the DM NVX device.



Select **+ More Details** to review additional information about the device.

Network

The **Network** accordion displays network-related information about the device, including the **Hostname**, **Domain Name**, and **DNS Servers**.



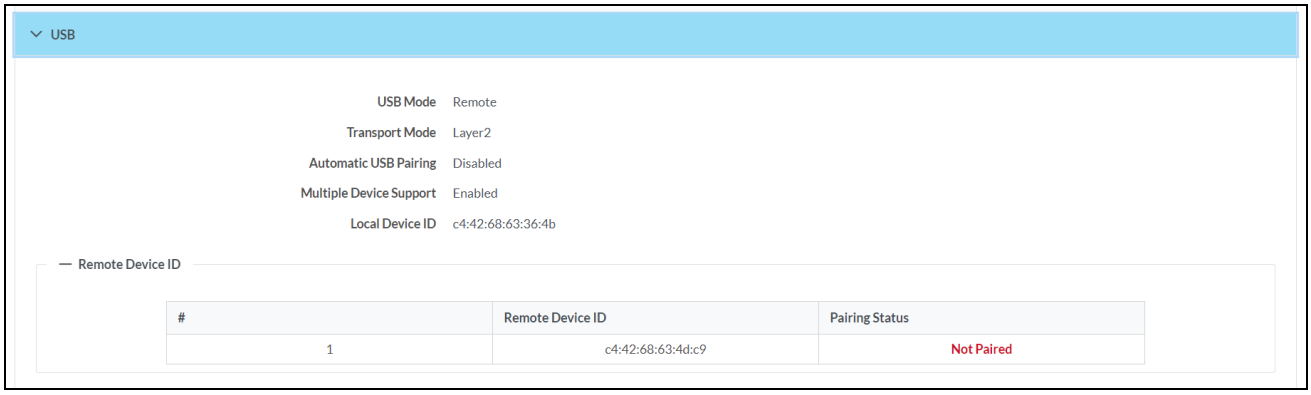
By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-384-C44268000587.

Select **+ Primary LAN** to display additional information regarding the Ethernet port designated as the **Primary LAN**. If **+ Primary LAN** is selected, select **- Primary LAN** to collapse the section.

NOTE: The **Primary LAN** port and other Ethernet port designations are assigned by the **Port Selection** feature. Refer to the **Port Selection** heading under Settings on page 585 for details on configuring the **Port Selection** feature.

USB

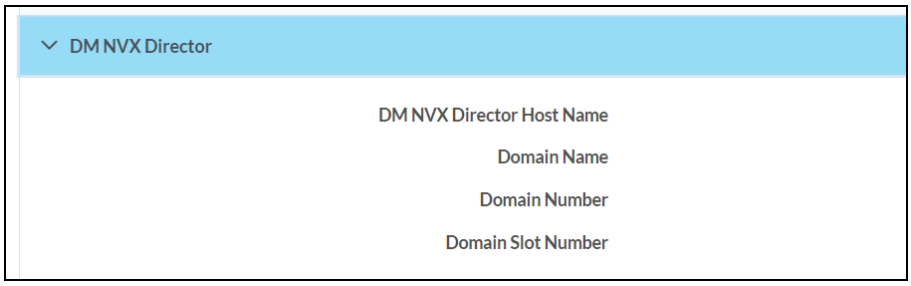
The **USB** accordion displays the **USB Mode**, **Transport Mode**, **Automatic USB Pairing**, **Multiple Device Support**, and **Local Device ID** of the device. Select **+ Remote Device ID** to display a table showing the **#**, **Remote Device ID**, and **Pairing Status** of any devices connected to the DM NVX device by USB.



DM NVX Director

The **DM NVX Director** accordion displays the details of the DM NVX Director switching appliance to which the DM NVX device is claimed.

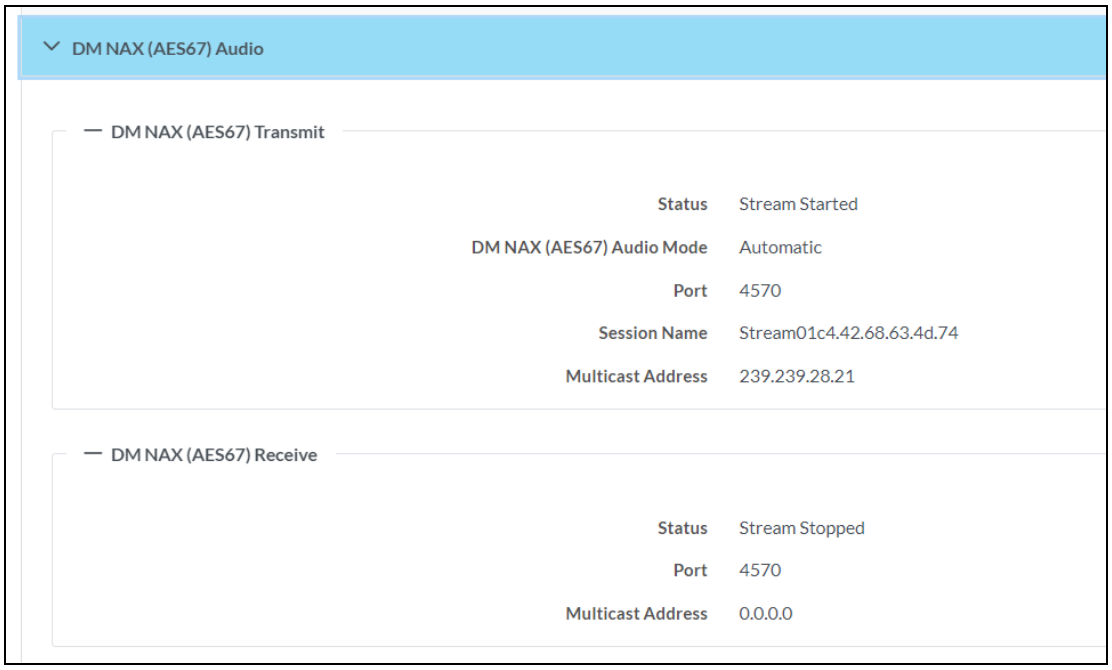
NOTE: If the DM NVX device has not been claimed by a DM NVX Director switching appliance, all fields in this section will be empty.



- **DM NVX Director Host Name:** Displays the host name of the claiming DM NVX Director switching appliance.
- **Domain Name:** Displays the name of the DM NVX Director domain to which the DM-NVX-38X series device belongs.
- **Domain Number:** Displays the number of the DM NVX Director domain to which the DM-NVX-38X series device belongs.
- **Domain Slot Number:** Displays the slot number within the DM NVX Director that refers to this specific DM NVX device.

DM NAX (AES67) Audio

The **DM NAX (AES67) Audio** accordion displays information regarding the **DM NAX (AES67) Transmit** and **DM NAX (AES67) Receive** audio-over-IP (AoIP) signals. This accordion varies slightly depending if the device is in transmitter or receiver mode.



The **DM NAX (AES67) Audio Mode** field will be under the **DM NAX (AES67) Receive** heading if the device is in receiver mode or under the **DM NAX (AES67) Transmit** heading if the device is in transmitter mode. This field displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).

The details displayed for **DM NAX (AES67) Transmit** are:

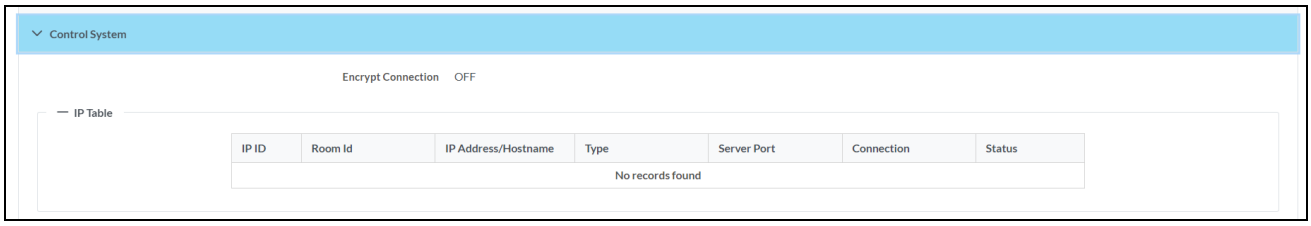
- **Status:** Displays a status message for the transmitting AoIP stream, such as **Stream Stopped**, **Stream Starting**, or **Stream Started**.
- **DM NAX (AES67) Audio Mode:** Displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).
- **Port:** Displays the port of the AoIP transmit stream.
- **Session Name:** Displays the session name of the AoIP transmit stream.
- **Multicast Address:** Displays the multicast address of the AoIP transmit stream.

The details displayed for **DM NAX (AES67) Receive** are:

- **Status:** Displays a status message for the AoIP stream receiver, such as **Connecting**, **Stream Stopped**, or **Stream Started**.
- **Port:** Displays the port of the received AoIP stream.
- **Multicast Address:** Displays the multicast address of the received AoIP stream.

Control System

The **Control System** accordion displays information regarding the connection between the DM NVX device and a control system.

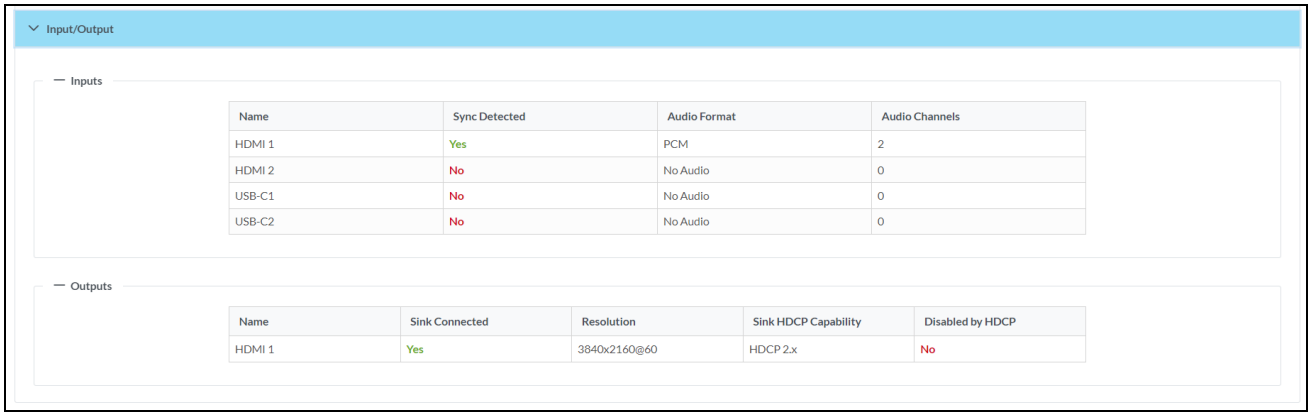


The displayed fields are:

- **Encrypt Connection:** Displays **ON** if the connection is encrypted or **OFF** if it is not.
- **IP ID:** Displays the IP ID of the DM NVX device in its IP table entry of the control system's IP table.
- **Room ID:** Displays the room ID of the DM NVX device in its IP table entry of the control system's IP table.
- **IP Address/Hostname:** Displays the IP address and host name of the control system.
- **Type:** Always displays **Peer** (this is the only relationship the DM NVX device can have to a control system).
- **Server Port:** Displays the port for the connection between the DM NVX device and the control system.
- **Connection:** Always displays **Gway** (this is the only connection type supported between a DM NVX device and a control system).
- **Status:** Displays either **ONLINE** or **OFFLINE** depending on if the DM NVX device is able to communicate with the control system.

Input/Output

The **Input/Output** accordion displays status information regarding the AV input and output connectors.



The displayed fields for **Inputs** are:

- **Name:** Displays the name of the input.
- **Sync Detected:** Displays whether sync is detected at the input (**Yes**) or not (**No**).

- **Audio Format:** Displays the audio format of the input signal.
- **Audio Channels:** Displays the number of audio channels in the input signal.

The displayed fields for **Outputs** are:

- **Name:** Displays the name of the output.
- **Sink Connected:** Displays whether a sink (such as a display or projector) is connected to the output (**Yes**) or not (**No**).
- **Resolution:** Displays the current resolution of the video output signal.
- **Sink HDCP Capability:** Displays the HDCP level supported by the connected display or projector.
- **Disabled by HDCP:** Displays whether the output is disabled by HDCP (**Yes**) or not (**No**).

Settings

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-384
- DM-NVX-384C
- DM-NVX-385
- DM-NVX-385C

The **Settings** page enables configuration of the DM NVX device's settings. The **Settings** page can be accessed at any time by selecting the **Settings** tab of the interface.

Settings Page (Transmitter Mode Shown)



NOTE: Some settings are available only in encoder (transmitter) or decoder (receiver) mode. Mode requirements are noted in headings below where appropriate.

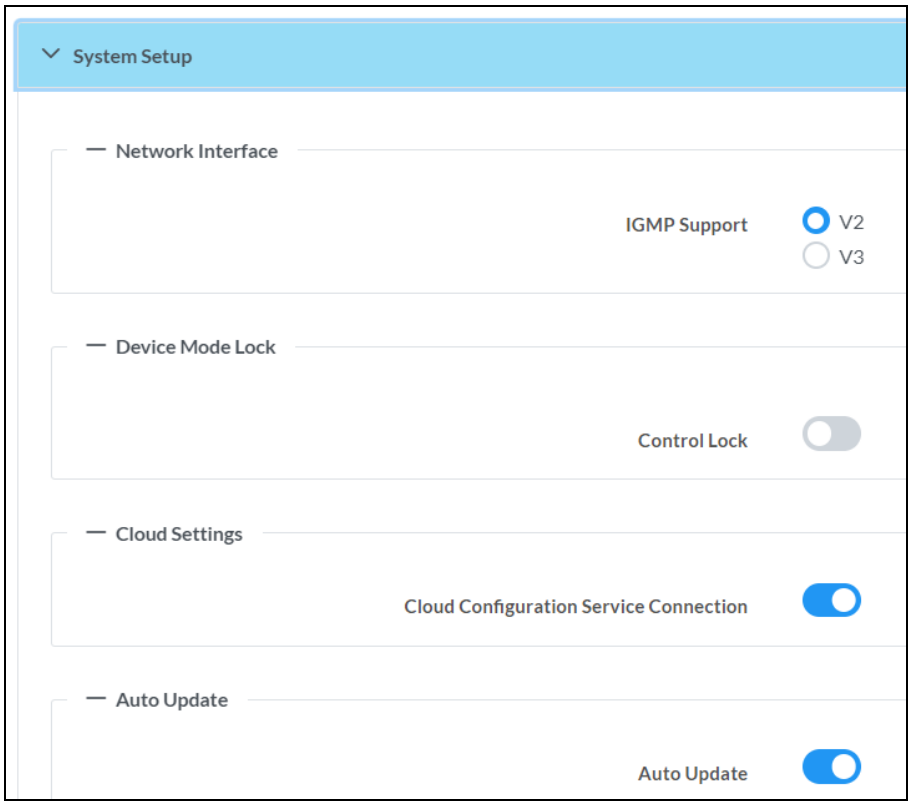
Settings available on the **Settings** page are organized into different sections:

- System Setup on page 586
- Network on page 592
- Stream on page 593
- DM NAX (AES67) Audio on page 603
- Routing on page 605
- Subscriptions (Receiver Mode Only) on page 632
- Inputs on page 633
- Outputs on page 638
- On Screen Display on page 650
- USB on page 651

- IR Ports on page 653
- Port Selection on page 654
- Test Pattern Generator on page 655

System Setup

The **System Setup** accordion contains settings for configuration of the following system functions.



Network Interface

The **Network Interface** section provides a choice between IGMPv2 and IGMPv3 operation. Choose the settings that match the capabilities of the network hardware.

NOTES:

- This setting must match on all DM NVX devices in a system to ensure compatibility.
- DM NVX devices are set to IGMPv2 operation by default.
- Crestron recommends leaving DM NVX systems set to IGMPv2 operation unless the network specifically requires IGMPv3.



To change the **Network Interface** mode:

1. Select **V2** to set the DM NVX device to IGMPv2 operation, or select **V3** to set the device to IGMPv3 operation.
2. Select **Save Changes**. A prompt will appear to reboot the device.
3. Select **Yes, Reboot Now** to reboot the device into the new **Network Interface** mode.

Device Mode Lock

The **Device Mode Lock** section provides a toggle for the **Control Lock** feature.

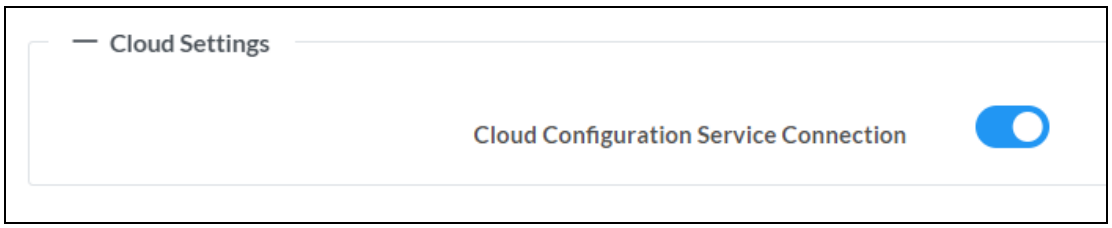


Set the **Control Lock** toggle to the right to lock out the push buttons built in to the DM NVX device.

Set the **Control Lock** toggle to the left to disable the lock, allowing the push buttons to control source routing and device modes.

Cloud Settings

The Cloud Settings section provides a toggle to enable or disable communication with the Crestron XiO Cloud® platform.

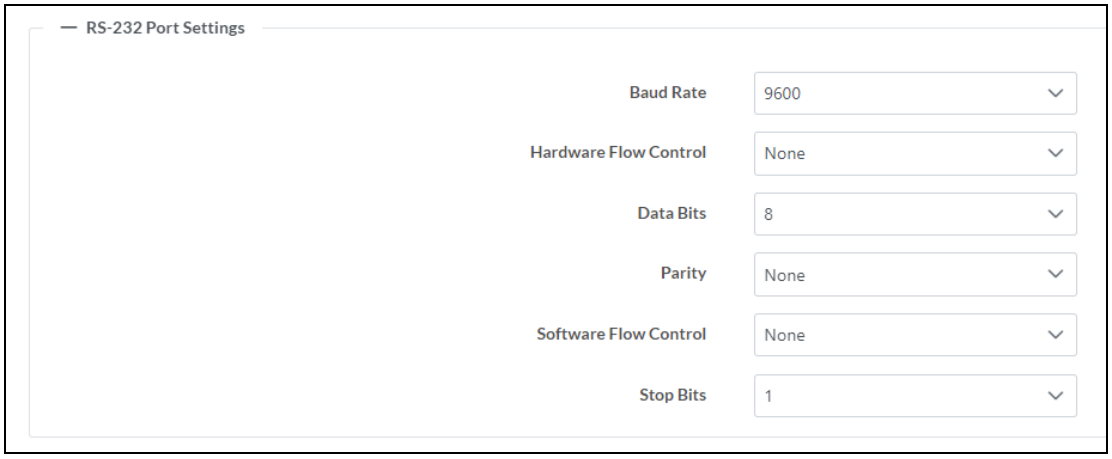


Set the **Cloud Configuration Service Connection** toggle to the right to allow the DM NVX device to communicate with the XiO Cloud platform. Set the toggle to the left to prevent the device from communicating with the XiO Cloud platform.

RS-232 Port Settings

> **NOTE:** This section is not available on card-based models.

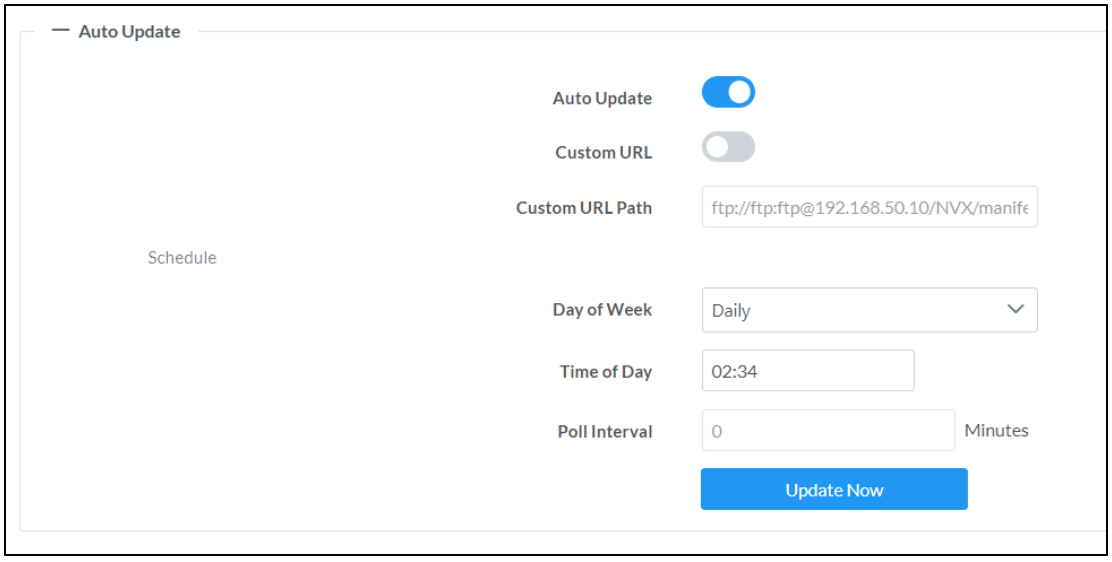
Configure the settings for the built-in RS-232 port of the device in the **RS-232 Port Settings** section.



- **Baud Rate:** Select the baud rate from the drop-down.
- **Hardware Flow Control:** Select the hardware flow control from the drop-down.
- **Data Bits:** Select the number of data bits from the drop-down.
- **Parity:** Select the parity from the drop-down.
- **Software Flow Control:** Select the software flow control from the drop-down.
- **Stop Bits:** Select the number of stop bits from the drop-down.

Auto Update

The DM NVX device can automatically check for and install firmware updates at scheduled intervals via the **Auto Update** feature.



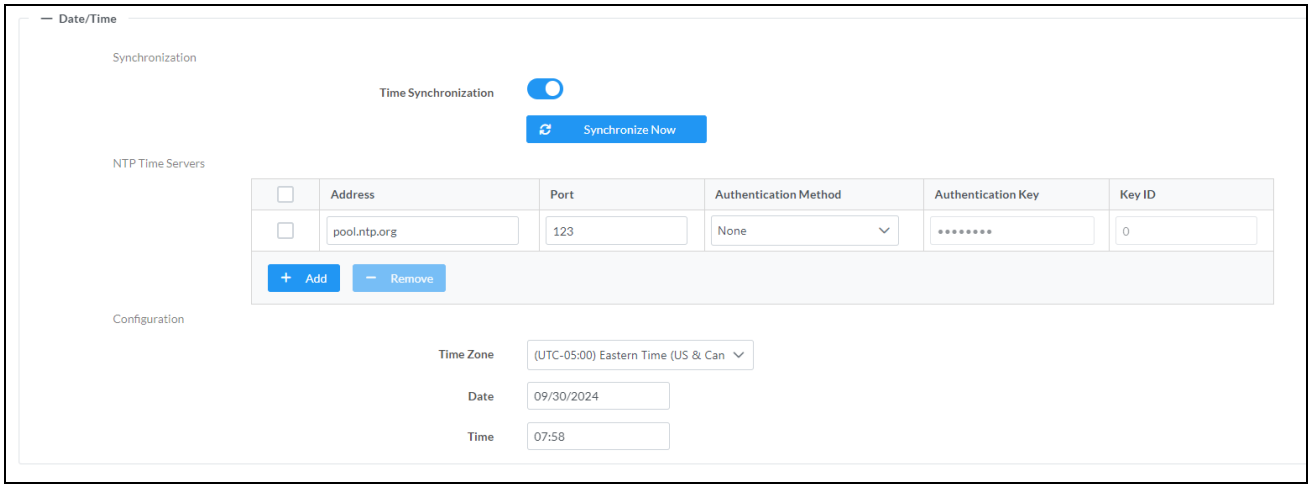
To configure the **Auto Update** feature settings:

1. Set the **Auto Update** toggle to the right to enable the **Auto Update** feature.
2. Define the URL to download the updates by doing either of the following:
    a. Use the default URL to download the updates from the Crestron server.
    b. Use a custom URL. Set the **Custom URL** toggle to the right to enable a custom URL. In the **Custom URL Path** text box, enter the path to a custom manifest file in the FTP or SFTP URL format. Use the Crestron Auto Update Tool to generate a custom manifest file, then store the file on an FTP (File Transfer Protocol) or SFTP (Secure File Transfer Protocol) server.
3. Set a schedule for the automatic firmware update by doing either of the following:
    a. Select the desired **Day of Week** and **Time of Day** (24-hour format) values.
    b. Set the **Poll Interval** by entering a value from 60 to 65535 minutes. A value of 0 disables the **Poll Interval**.
4. Select **Save Changes**.

Selecting **Update Now** causes the device to check for a firmware update immediately. If a schedule was set in step 3 above, that schedule still remains in effect.

Date/Time

Use the **Date/Time** section to configure the date and time settings of the DM NVX device.



Synchronization

1. Set the **Time Synchronization** toggle to the right to enable or left to disable time synchronization. By default, time synchronization is enabled.
2. In the **NTP Time Servers** table, enter the URL of a NTP (Network Time Protocol) or SNTP (Simple Network Time Protocol) server. Up to three time servers can be added on a device.
3. Select **Synchronize Now** to perform time synchronization between the device's internal clock and the time server.

Configuration

1. Open the **Time Zone** drop-down menu to select the applicable time zone.
2. In the **Date** field, enter the current date.

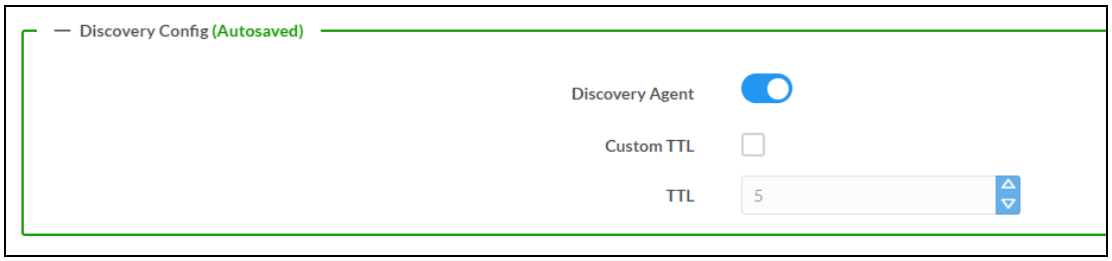
3. In the **Time (24hr Format)** field, enter the current time in 24-hour format.

Select **Save Changes** to save the settings.

Select **Revert** from the **Action** drop-down menu to revert to the previous settings without saving.

Discovery Config

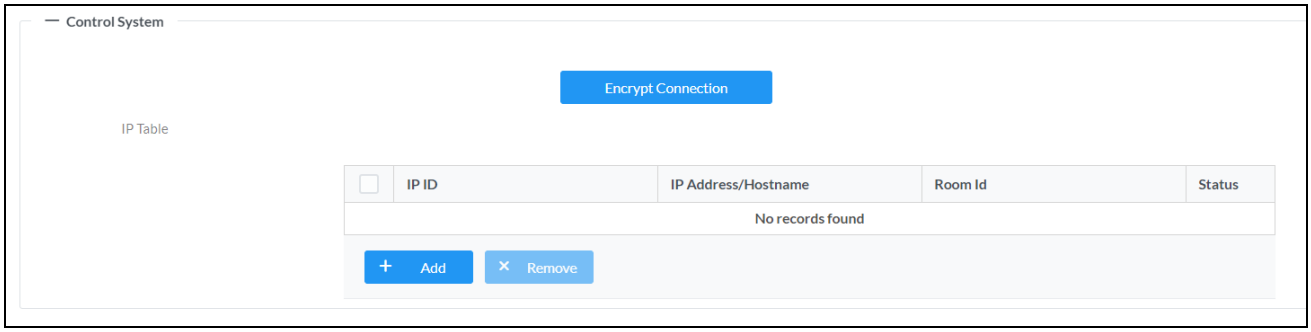
The **Discovery Config** section provides settings to customize how the DM NVX device and its streams can be discovered on the LAN.



Set the **Discovery Agent** toggle to the right to allow streams from the device to be discoverable on the network or to the left to prevent network discovery. When **Discovery Agent** is enabled, the streams from the DM NVX device are displayed in the **Available Streams** list of other receivers.

Select the **Custom TTL** option and enter a value in the **TTL** field if a custom Time-to-live (TTL) value is required on the network. The default **TTL** value is 5.

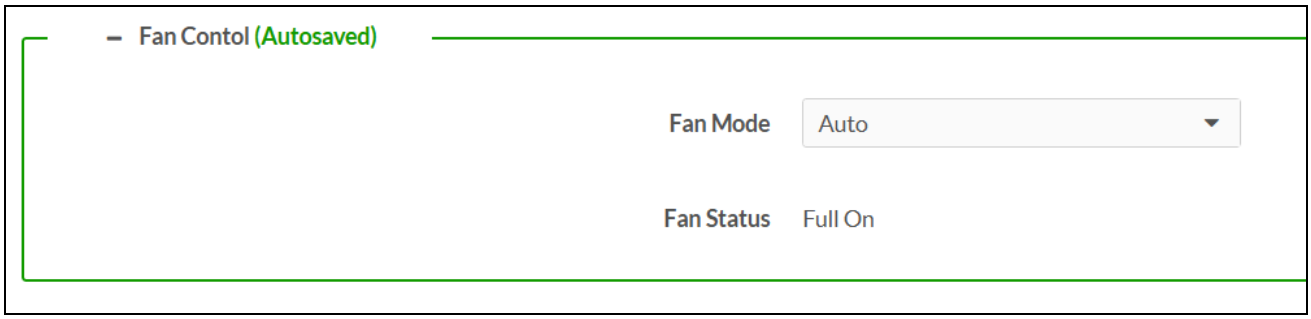
Control System



1. Select **Encrypt Connection** to navigate to the **Security** tab to configure encryption settings.
   a. Enter a username in the **Control System Username** field.
   b. Enter a password in the **Control System Password** field.
2. Select **+ Add** to add an IP table entry to the **IP Table**.
   a. Enter the Room ID in the **Room ID** field.
   b. Enter the IP ID of the DM NVX device in the **IP ID** field.
   c. Enter the IP address or hostname of the control system in the **IP Address/Hostname** field.
3. Select **Save Changes** to save the new entries. The **Control System Save** message box appears, indicating that the control system settings were saved successfully. Select **Revert** to revert to the previous settings without saving.

Fan Control (Receiver Mode Only)

> **NOTE:** This section is not available on card-based models.



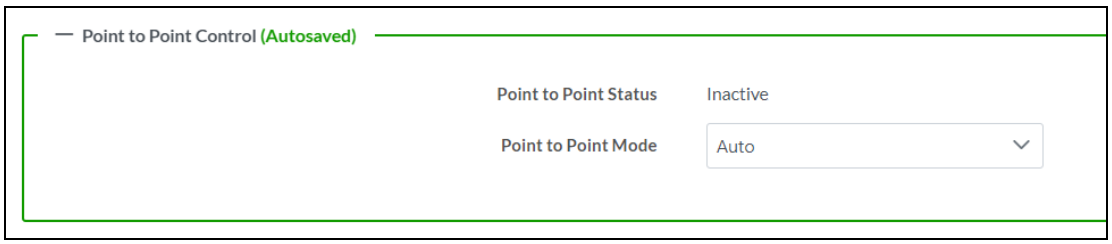
Select an option from the **Fan Mode** drop-down:

- **Auto:** The fan automatically turns on when either of these conditions are met:
  - A video stream is present.
  - The internal temperature of the device exceeds the normal operating range.
- **Always On:** The fan runs continuously regardless of video stream status and internal temperature.

Fan Status is a read-only field that will either read **Full On** to indicate that the fan is running or **Off** to indicate that the fan is not running.

Point to Point Control

The **Point to Point Control** section allows enabling or disabling point-to-point streaming of AV-over-IP between this device and another directly-connected DM NVX device without the need for a control system.



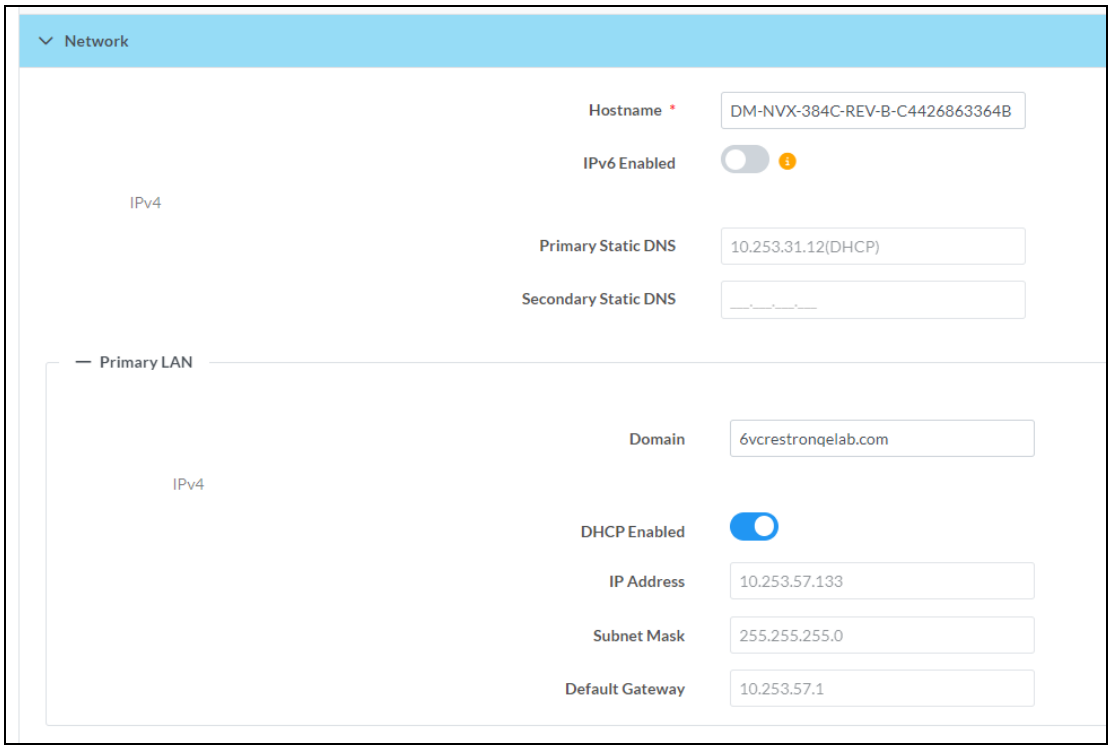
Point to Point Status is a read-only field that indicates whether point-to-point mode is **Active** or **Inactive**.

Select an option from the **Point to Point Mode** drop-down:

- **Auto:** (Default setting) Each 1000BASE-T port of the device detects whether it is connected directly to another DM NVX device or to a 1000BASE-T switch. If a direct connection between a DM NVX encoder and decoder is detected, point-to-point streaming is automatically initiated.
- **Disable:** Disables point-to-point streaming.

Network

The **Network** accordion contains network-related settings for the DM NVX device, including the **Hostname**, **Domain**, **Primary Static DNS**, and **Secondary Static DNS**.



NOTE: By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-384-C44268000587.

Primary LAN

The **Primary LAN** subheading contains settings for **DHCP**, **IP Address**, **Subnet Mask**, and **Default Gateway** of the Ethernet adapter assigned as the **Primary LAN** via the **Port Selection** feature.

NOTE: Other LAN subheadings appear when the built-in Ethernet ports are given traffic designations via the **Port Selection** feature. Refer to Port Selection on page 654 for more information on designating specific traffic to specific Ethernet ports. The same settings are available for the additional LAN subheadings that are available for **Primary LAN**.

Set the **DHCP** toggle to the right to enable **DHCP** or left to disable **DHCP**. This determines whether the IP address of the **Primary LAN** port is to be assigned by a DHCP (Dynamic Host Configuration Protocol) server.

- **Enabled:** When DHCP is enabled (default setting), the IP address of the Primary LAN port is automatically assigned by a DHCP server on the local area network (LAN).

- **Disabled:** When DHCP is disabled, manually enter information in the following fields:
  - **Primary Static DNS:** Enter a primary DNS IP address.
  - **Secondary Static DNS:** Enter a secondary DNS IP address.
  - **IP Address:** Enter a unique IP address for the Primary LAN port.
  - **Subnet Mask:** Enter the subnet mask that is set on the network connected to the Primary LAN port.
  - **Default Gateway:** Enter the IP address that is to be used as the Primary LAN network's gateway.

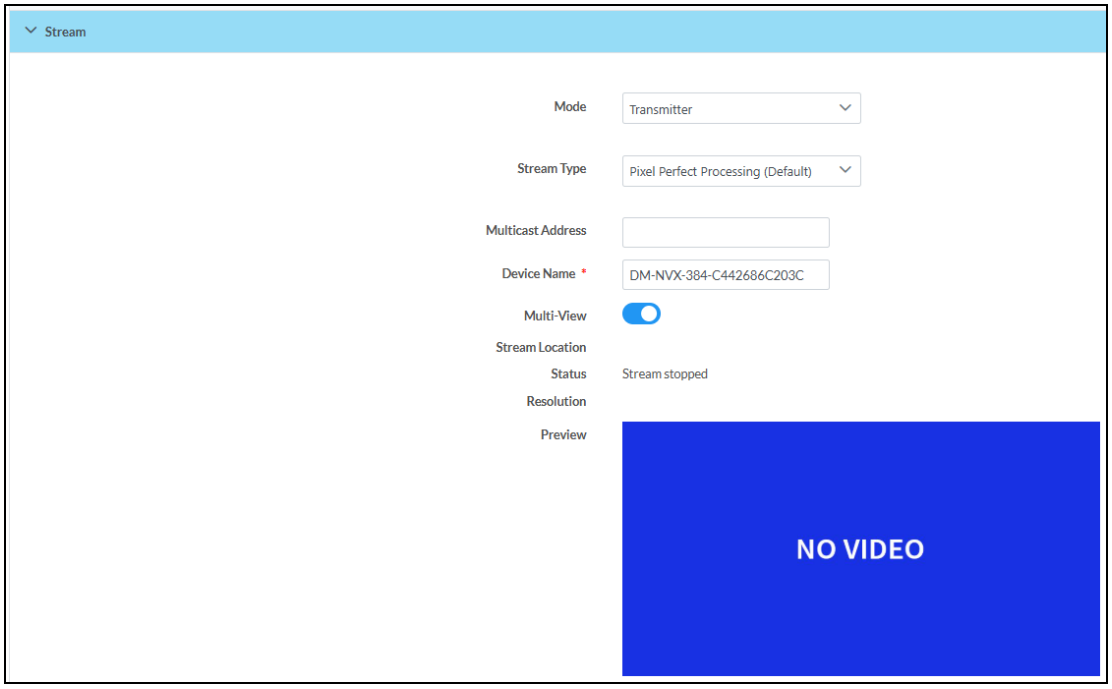
To save any new network entries, select **Save Changes**.

Stream

The settings available under the **Stream** accordion vary depending on whether the device is operating as a encoder (transmitter) or decoder (receiver).

Stream Settings (Transmitter Mode)

Sample Stream Settings (Transmitter Mode)



Configure the basic stream settings:

- **Mode:** Select either **Receiver** or **Transmitter** from the drop-down. Selecting a new mode requires a reboot of the device. Select **Save Changes** to apply the new mode and reboot the device.
- **Stream Type:** Select either **Pixel Perfect Processing** (if transmitting to other DM NVX 4K60 4:4:4 capable endpoints) or **DM-NVX-D10/D20** (if transmitting to a decoder in the D10/D20/D200 family of DM NVX decoders).

- **Multicast Address:** Sets the multicast address of the outgoing stream.
    - The secondary audio stream from the DM NVX device will consume the next multicast address above the value entered here. For example, a **Multicast Address** of 239.10.0.1 will result in a secondary audio stream address of 239.10.0.2.
    - If Multiview is enabled, a third multicast address will be consumed at the next value above the audio stream. For example, a **Multicast Address** of 239.10.0.1 will result in a secondary audio stream address of 239.10.0.2 and a Multiview stream address of 239.10.0.3. Multiview receivers must subscribe to this third stream to include this transmitter's video signal in a Multiview output.

CAUTION: Ensure the value entered for **Multicast Address** is unique on the network. Duplicate multicast addresses will result in traffic collision and downstream receivers will fail to receive content. Also ensure that unique addresses are available for the secondary audio stream and Multiview stream (if enabled).

NOTES:

- DM NVX devices can have a multicast transmit address anywhere in the range from 239.0.0.0 to 239.127.255.255. Starting at 239.1.0.0 is recommended to avoid common multicast MAC address conflicts.
- DM NAX audio-over-IP devices use a multicast range from 239.8.0.1 to 239.127.255.255.

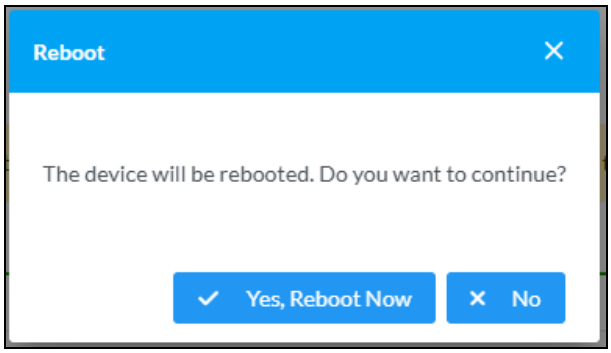
- **Device Name:** Displays the name of the DM NVX device. A custom name can also be entered in this text box. By default, this will match the hostname.

- **Multi-View:** Enables or disables the Multiview feature. **Multi-View** is disabled by default. With **Multi-View** enabled, the encoder transmits an additional video stream that can only be received by Multiview capable decoders.

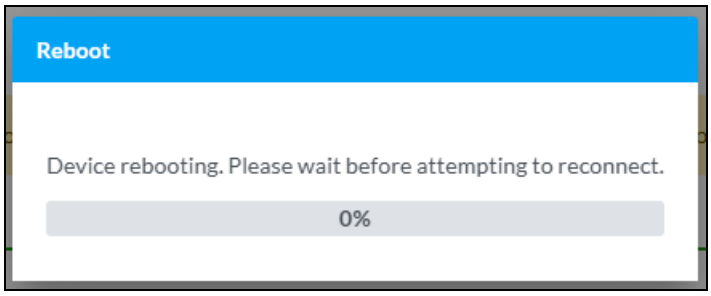
  CAUTION: Enabling Multiview will consume an additional multicast transmit address. While assigning multicast addresses to devices on the network, ensure that three addresses are reserved for each Multiview transmitter. Refer to the **Multicast Address** field above for more information.

  To enable Multiview:

  1. Set the **Multi-View** toggle to the right. A **Reboot** confirmation dialog box will appear.

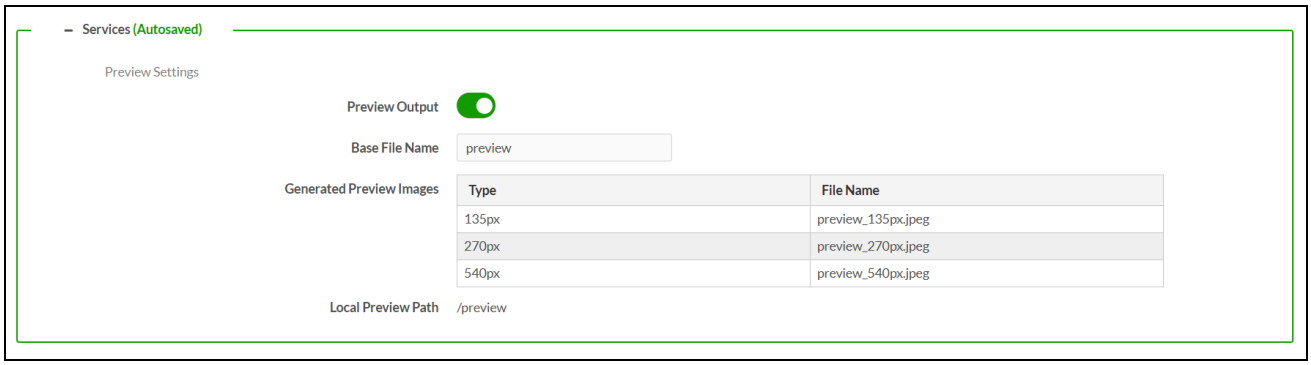
  2. Select **Yes, Reboot Now** to reboot the device or select **No** to cancel the change. If **Yes, Reboot Now** was selected, a **Reboot** status box will appear.

  3. Wait for the device to fully reboot before attempting to log in to the user interface. Once the reboot has completed, a Multiview video stream can begin transmitting from the device.

- **Stream Location:** Displays the network location of the stream.
- **Status:** Displays the status of the network stream (for example, **Stream starting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the outgoing stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

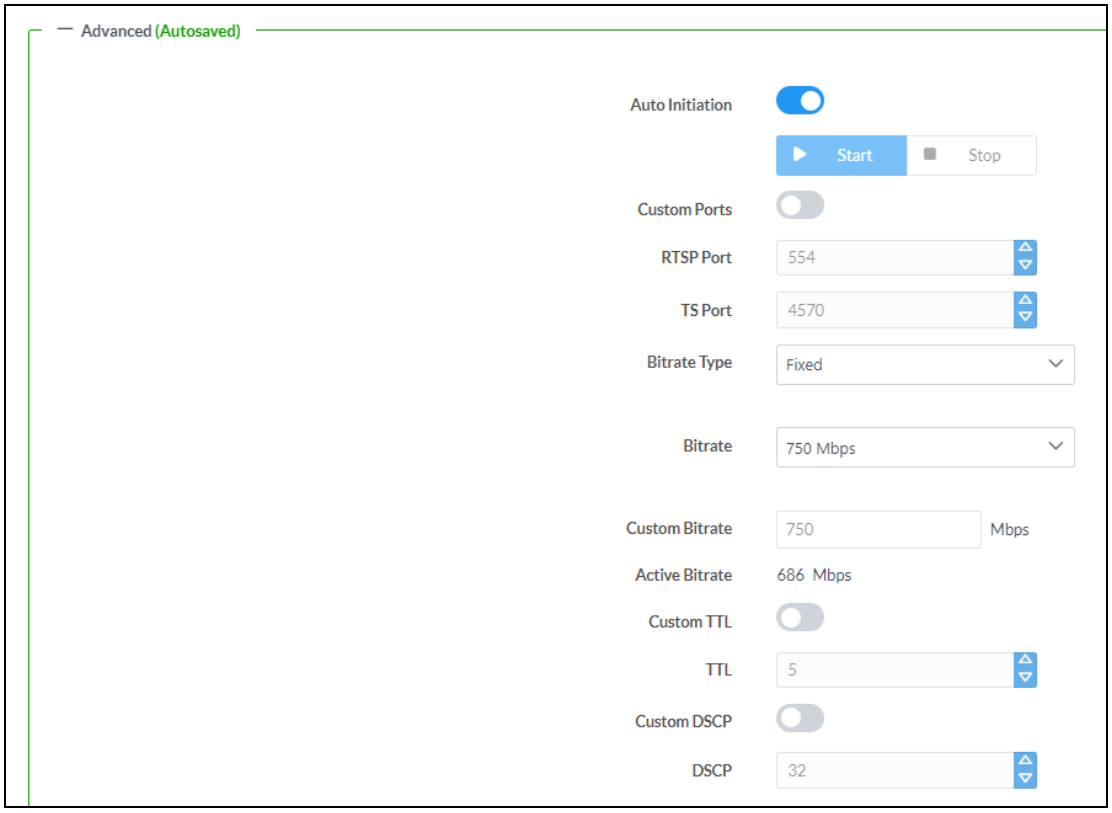
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the transmitting AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to configure a custom RTSP or TS port for the transmitting DM NVX stream. Set the toggle to the left to use the default values for both ports (the default RTSP port value is 554 and the default TS port value is 4570).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.
  - Enter a custom TS port in the **TS Port** field.

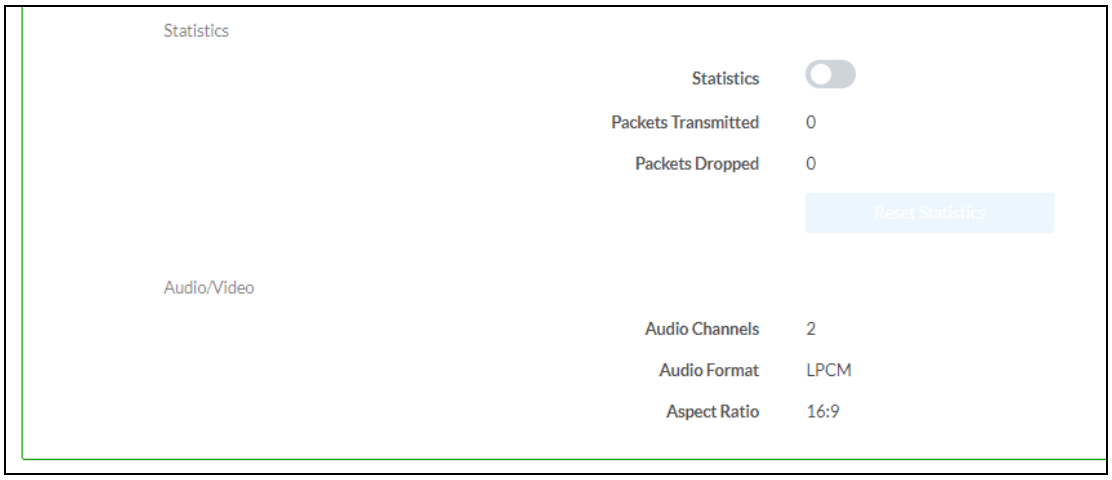
  > **NOTE:** Valid values for both custom port fields range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **Bitrate Type:** Select **Fixed**, **Variable**, or **Custom** from the drop-down:
  - **Fixed:** The transmitting DM NVX stream always meets the bitrate specified by the **Bitrate** drop-down. The default and recommended bitrate value is 750 Mbps.
  - **Variable:** The bitrate of the transmitting DM NVX stream is dynamic based on the resolution of the stream content. Selecting **Variable** will disable the **Bitrate** drop-down and **Custom Bitrate** text entry field.
  - **Custom:** The transmitting DM NVX stream always meets the bitrate specified by the **Custom Bitrate** text entry field. The default and recommended bitrate value is 750 Mbps.
- **Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Fixed**.
- **Custom Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Custom**.
- **Active Bitrate:** Displays the current bitrate of the transmitting DM NVX stream.
- **Custom TTL:** Multicast Time-to-live (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.

  Select the **Custom TTL** checkbox to enter a custom TTL value for the DM NVX stream in the **TTL** field.
- **TTL:** Enter a value from 1 to 255. The default TTL value is 5.
- **Custom DSCP:** To implement Quality of Service (QoS), IP networks use Differentiated Services Code Point (DSCP) values. Within an IP packet header, the DSCP is a value from 0 to 63 that maps to a certain traffic classification. Based on IT department policies and network switch configurations, DSCP values are used to determine the treatment of specific packets in router queues, the routes of traffic flows, and per-hop behavior. By default, DSCP for DM NVX AV-over-IP is set to 32.

  Select the **Custom DSCP** checkbox to enter a custom DSCP value for the DM NVX stream's AV-over-IP packets in the **DSCP** field

  > **NOTE:** Only change the DSCP value if required by IT department policies or if necessitated by poor network performance. Refer to AV-over-IP Network Design on page 871 for network performance troubleshooting tips.

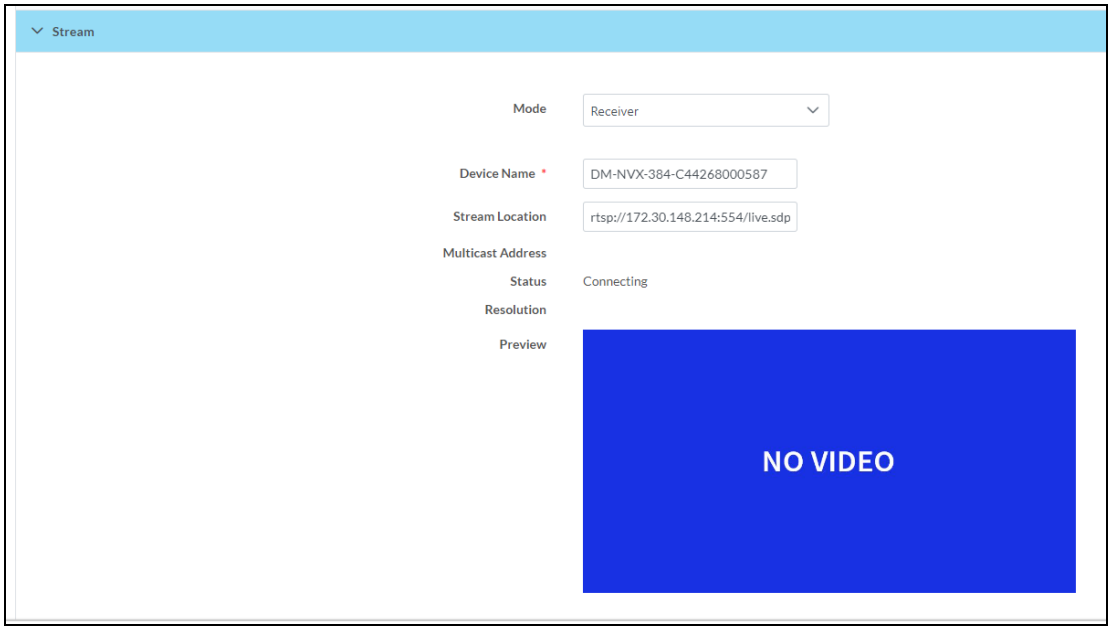


The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the transmitting DM NVX stream:
    - **Packets Transmitted** will display the total number of packets transmitting by the DM NVX device as part of the outgoing DM NVX stream.
    - **Packets Dropped** will display the total number of dropped packets.
    - Select **Reset Statistics** to set both **Packets Transmitted** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the transmitting DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the transmitting DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the transmitting DM NVX stream.

Stream Settings (Receiver Mode)

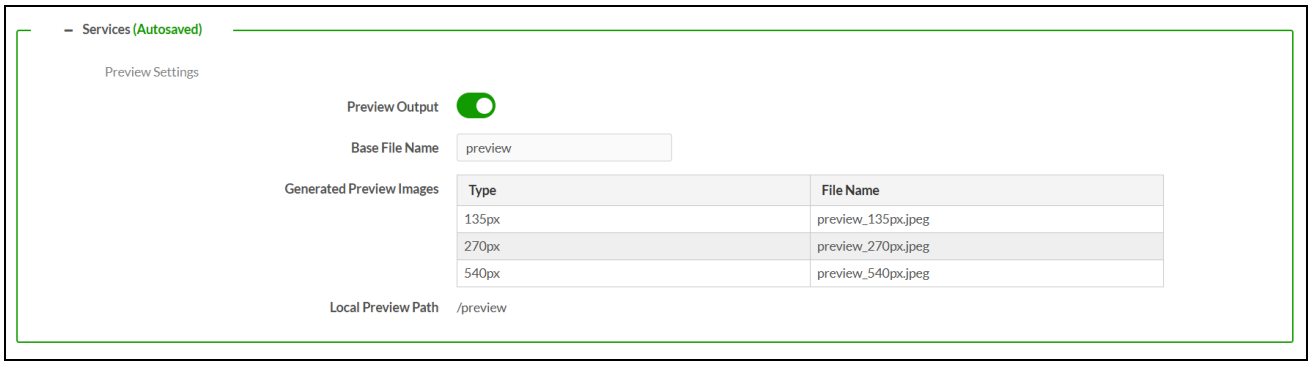
Sample Stream Settings (Receiver Mode)



Configure the basic stream settings:

- **Mode:** Select either **Receiver** or **Transmitter** from the drop-down. Selecting a new mode requires a reboot of the device. Select **Save Changes** to apply the new mode and reboot the device.
- **Device Name:** Displays the name of the upstream DM NVX device. By default, this will match the hostname.
- **Stream Location:** Displays the network location of the incoming stream. A stream location can also be manually entered by typing in this text field.
- **Multicast Address:** Displays the multicast address of the incoming stream.
- **Status:** Displays the status of the network stream (for example, **Connecting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the incoming stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

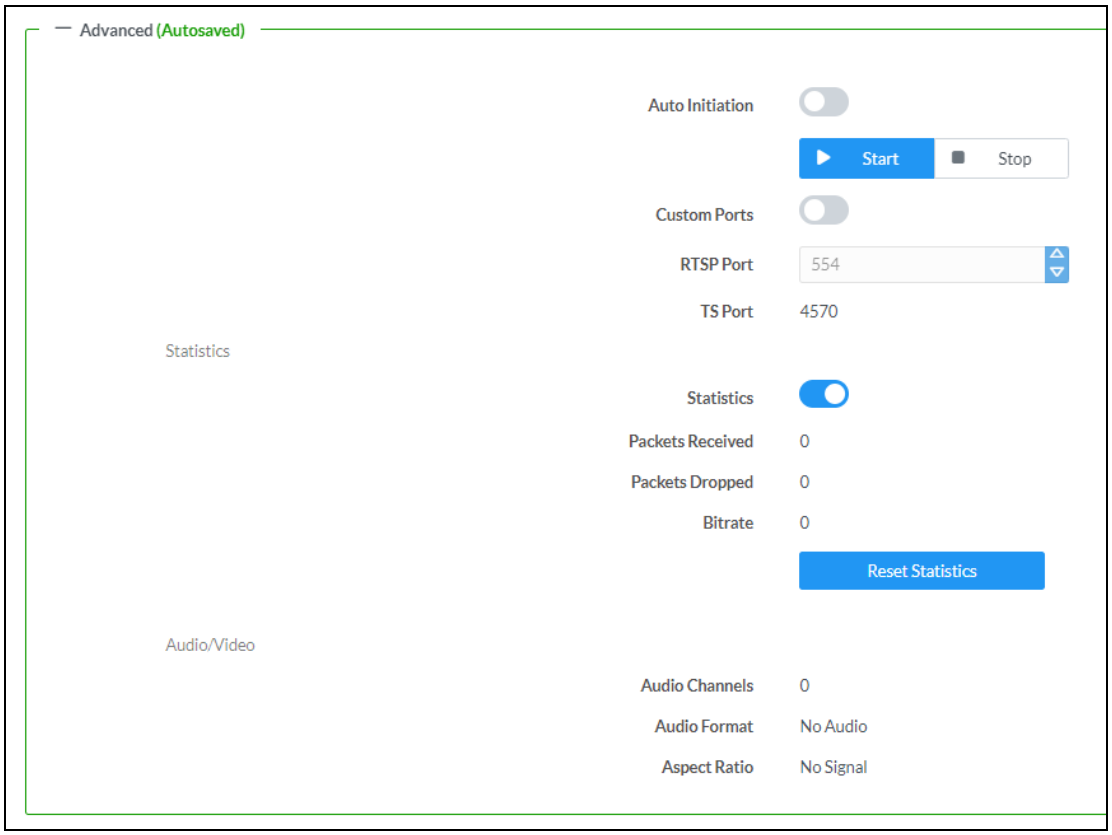
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the incoming AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to set a custom RTSP port to connect to an incoming DM NVX stream. Set the toggle to the left to use the default port values (the default RTSP port value is 554).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.

  > **NOTE:** Valid values for the custom port field range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **TS Port:** Displays the default TS port value (4570).

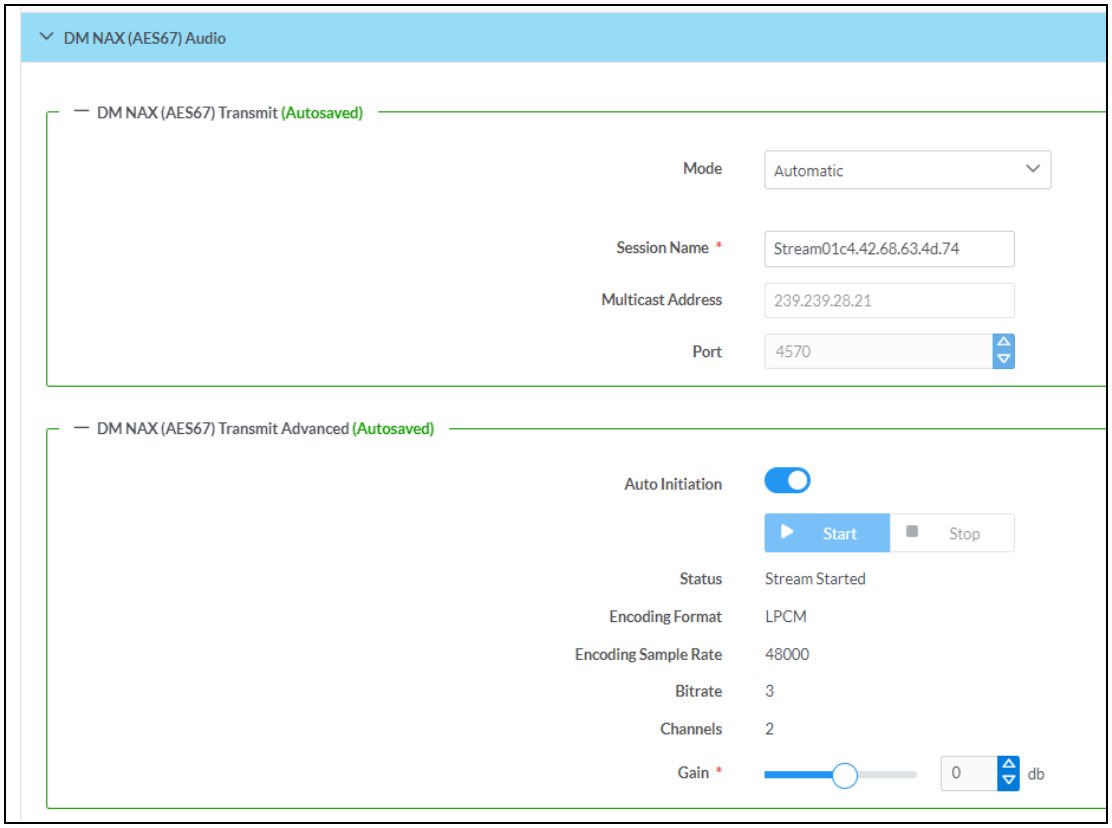
The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the incoming DM NVX stream:
  - **Packets Received** will display the total number of packets received by the DM NVX device as part of the incoming DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - **Bitrate** will display the current bitrate of the incoming DM NVX stream.
  - Select **Reset Statistics** to set both **Packets Received** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the incoming DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the incoming DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the incoming DM NVX stream.

DM NAX (AES67) Audio

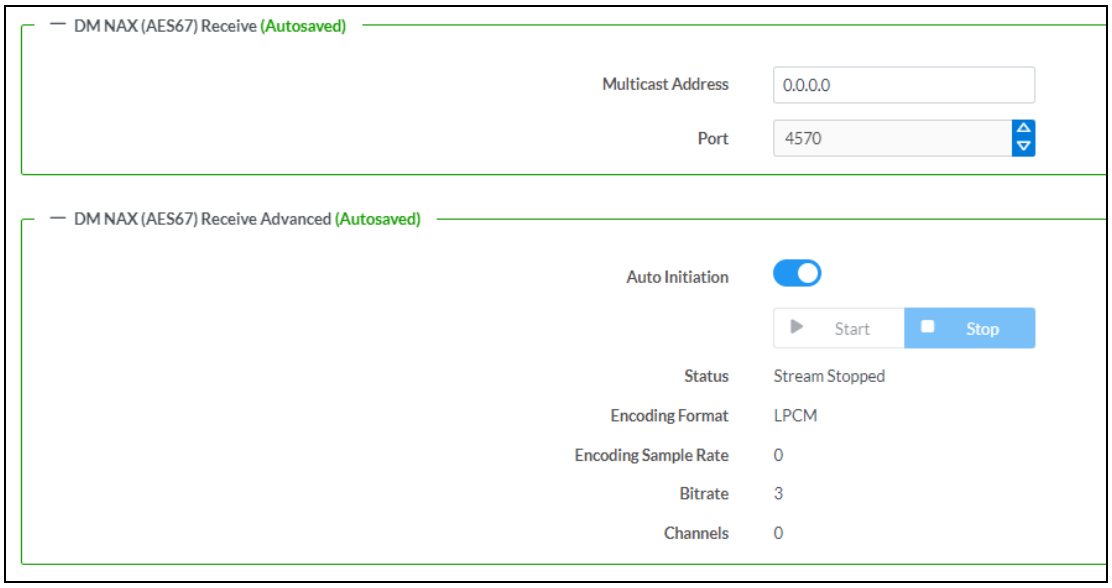
DM NVX devices natively support DM NAX® audio-over-IP technology, which is built off the standards of AES67. AES67 support allows a selected audio source to be transmitted as a 2-channel AES67 stream while another 2-channel AES67 audio stream is received from another AES67-capable device or Crestron DM NAX device.

Use the **DM NAX (AES67) Audio** accordion to configure the DM NAX audio-over-IP transmit and receive streams of the DM NVX device.



To configure the **DM NAX (AES67) Transmit** stream:

1. Select a stream addressing mode from the **Mode** drop-down:
    - **Automatic** adds 1 to the outgoing video stream multicast address to generate the DM NAX transmit multicast address. For example, if the video multicast address is 239.8.0.1, the DM NAX (AES67) multicast address is automatically set to 239.8.0.2.
    - **Manual** requires the multicast address of the transmitting DM NAX stream to be set manually. Selecting **Manual** enables the **Multicast Address** and **Port** text entry fields.
    - **Disabled** turns off DM NAX transmission from the DM NVX device.
2. Set a custom session name in the **Session Name** text entry field. This is similar to setting a hostname for an IP address on the LAN. The session name will appear in addition to the multicast address when the DM NAX audio-over-IP stream is discovered on the network.
3. If the **Mode** is set to **Manual**, enter custom values in the **Multicast Address** and **Port** text entry fields.
4. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the DM NAX transmit stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.
5. Adjust the **Gain** slider to configure the audio level compensation on the transmitting DM NAX stream from -10 to +10 dB.

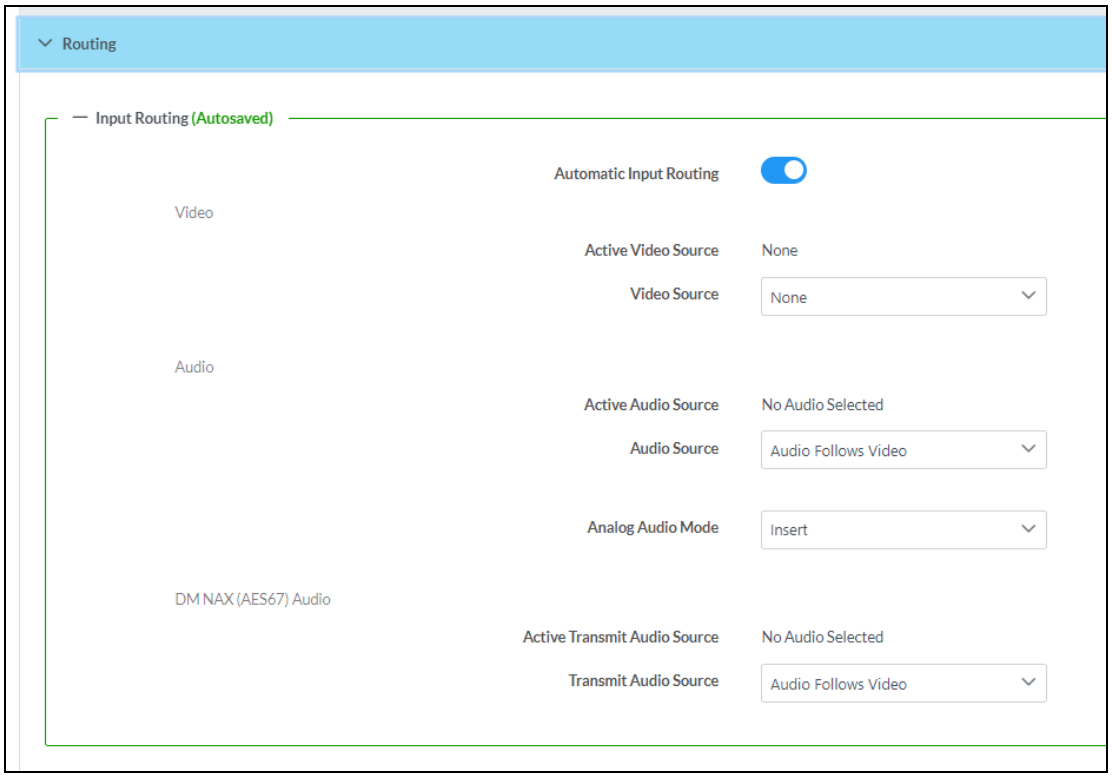


To configure the **DM NAX (AES67) Receive** stream:

1. Enter a valid multicast IP address in the **Multicast Address** field.
2. Enter the port value of the stream in the **Port** field.
3. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the incoming DM NAX stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

Routing

Use the **Routing** accordion to configure the audio and video routing behavior of the DM NVX device's internal switcher, secondary audio stream, and DM NVX AV-over-IP receiver.



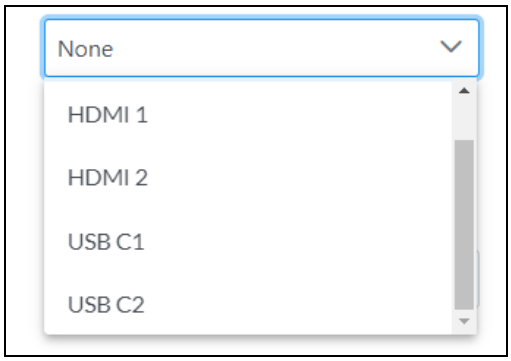
Input Routing

The **Input Routing** section provides settings relating to the internal video switcher and secondary audio stream of the device:

Set the **Automatic Input Routing** toggle to the right to have the internal video switcher determine the active video source automatically by signal detection. Set the toggle to the left to manually set the active source via the drop-down menus or a control system program.

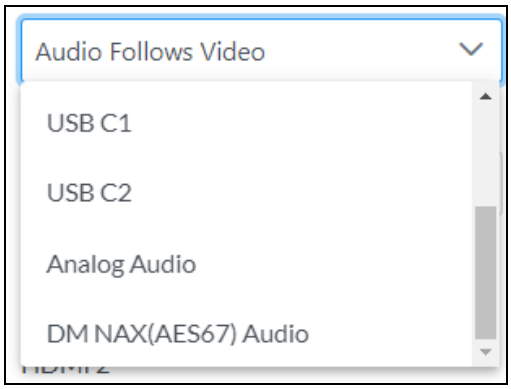
The fields under the **Video** subheading refer specifically to video signal routing:

- The **Active Video Source** read-only field displays the name of the currently active video source.
- Use the **Video Source** drop-down to manually set an active video source from among **None**, **HDMI 1**, **HDMI 2**, **USB C1**, and **USB C2**.

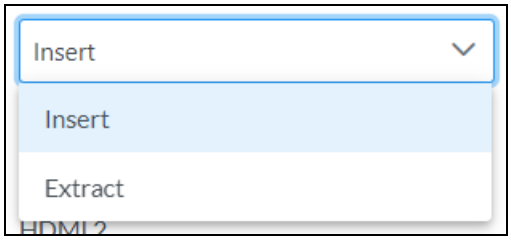


The fields under the **Audio** subheading refer specifically to audio signal routing, which can be handled separately from video routing.

- The **Active Audio Source** read-only field displays the name of the currently active audio source. This reflects the audio that is embedded in the HDMI output (in Receiver mode) or DM NVX AV-over-IP stream (in Transmit mode) of the device, as well as the audio that transmits from the analog audio connector when **Analog Audio Mode** is set to **Extract**.
- Use the **Audio Source** drop-down to manually set an active audio source from among **Audio Follows Video**, **HDMI 1**, **HDMI 2**, **USB C1**, **USB C2**, **Analog Audio**, and **DM NAX (AES67) Audio**.

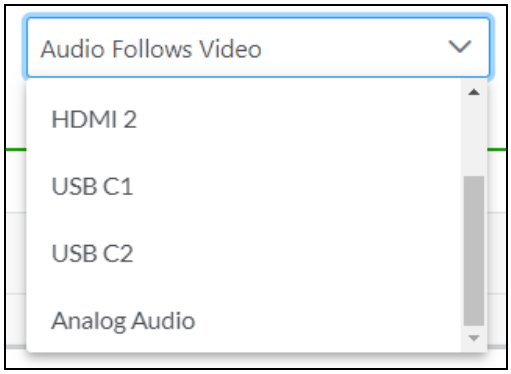


- Use the **Analog Audio Mode** drop-down to select between **Insert** or **Extract**.
  - In **Insert** mode, the analog audio connector will function as an input and the incoming audio signal can be selected as the **Audio Source**.
  - In **Extract** mode, the analog audio connector will function as an output and will transmit the audio signal selected as **Active Audio Source**.



The fields under the **DM NAX (AES67) Audio** subheading refer to the secondary audio stream of the DM NVX device. This is a discrete audio path that is not affected by the **Audio Source** or **Analog Audio Mode** settings.

- The **Active Transmit Audio Source** read-only field displays the name of the audio source currently transmitting on the AES67 secondary audio stream.
- Use the **Transmit Audio Source** drop-down to manually set an AES67 audio source from among **Audio Follows Video**, **HDMI 1**, **HDMI 2**, **USB C1**, **USB C2**, and **Analog Audio**.



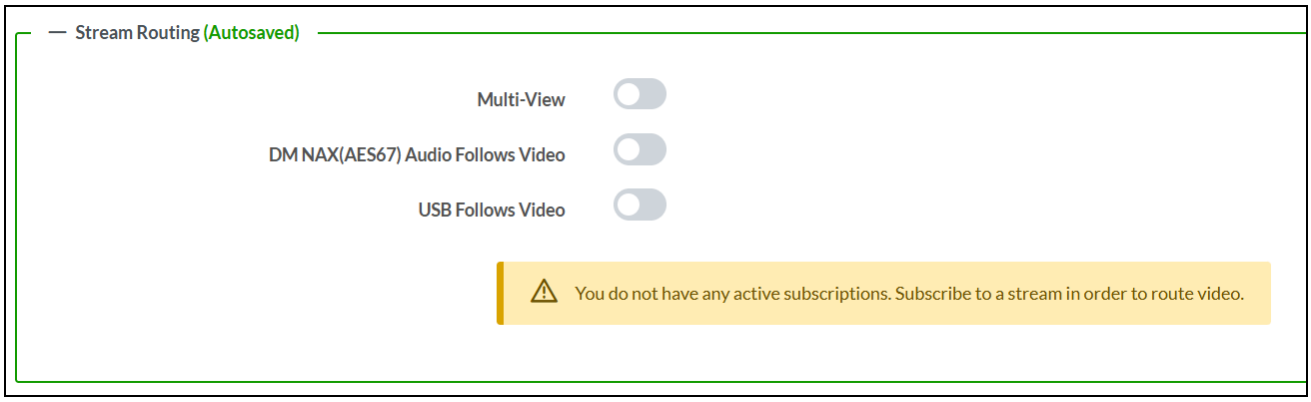
Stream Routing (Receiver Mode Only)

The **Stream Routing** section houses the Multiview feature as well as the routing matrix for audio, video, and USB signals that can be received over the network.

The settings available in this section will vary depending on whether Multiview is enabled or disabled. Refer to the sections below for more information on the available settings:

- Stream Routing with Multiview Disabled on page 608
- Stream Routing with Multiview Enabled on page 609

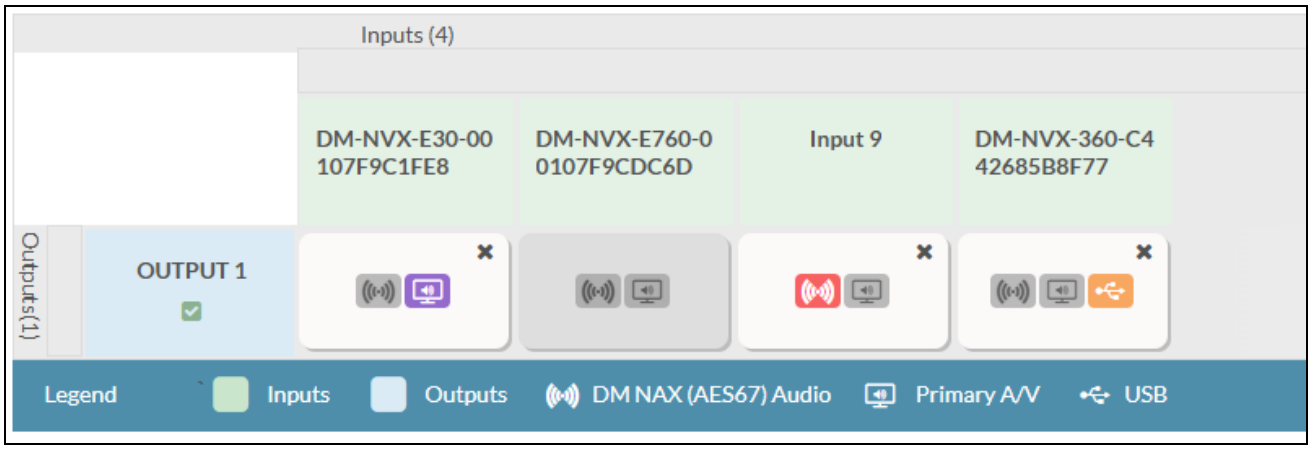
Stream Routing with Multiview Disabled



Configure the **Follows** toggles to establish preferred routing settings:

- Set the **DM NAX (AES67) Audio Follows Video** toggle to the right to have the secondary audio stream match the same routes as the primary AV stream. Set the toggle to the left to manage the secondary audio stream routing independently of the primary AV stream.
- Set the **USB Follows Video** toggle to the right to have USB routes match the routing of the primary AV stream. Set the toggle to the left to manage USB routing independently of the primary AV stream.

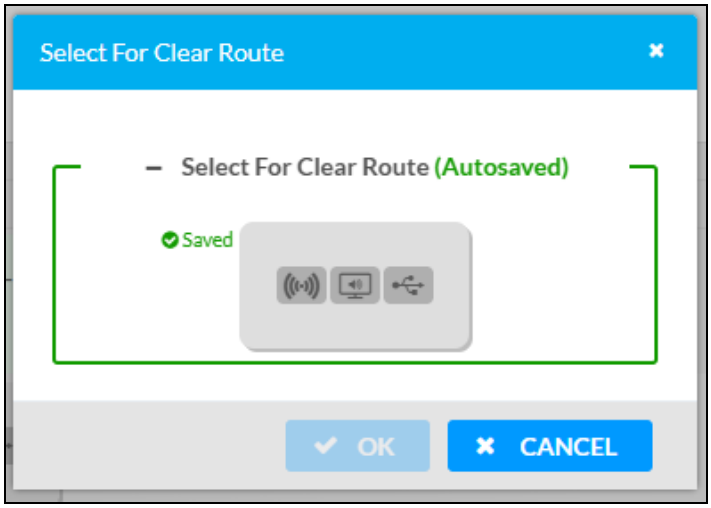
NOTE: In order for the routing matrix to appear, at least one subscription must be added from the **Subscriptions** accordion. Refer to Subscriptions (Receiver Mode Only) on page 632 for information on adding subscriptions.



Use the routing matrix to establish or break signal routes:

- To route an AV-over-IP stream to the DM NVX device, select the **Primary A/V** icon in that stream's matrix column. If either the **DM NAX (AES67) Audio Follows Video** or **USB Follows Video** toggles are set to the right, their respective icons (and signals) will also be selected automatically for that stream.

- To route a DM NAX (AES67) stream to the DM NVX device, select the **DM NAX (AES67) Audio** icon in that stream's matrix column. To manage this independently of the AV-over-IP stream, the **DM NAX (AES67) Audio Follows Video** toggle must be set to the left.
- To route a USB signal to the DM NVX device, select the **USB** icon in that stream's matrix column. This icon is only available on USB-capable endpoints. To manage this independently of the AV-over-IP stream, the **USB Follows Video** toggle must be set to the left.
- To clear a route, do one of the following:
  - Select the ✖ icon for a given input to clear all routes from that input.
  - Select the ☑ icon for a given output to clear routes from that output. A **Select For Clear Route** window appears.



Select any or all of the signal types to clear all routes of those types from the output, then select **OK** to clear those routes or **Cancel** to cancel the operation.

Stream Routing with Multiview Enabled

The Multiview feature allows multiple incoming DM NVX AV streams to be combined into the output video signal.

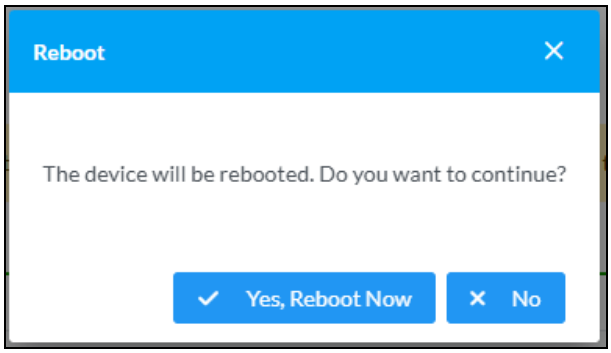
NOTES:

- Multiview requires firmware version 7.3.5 or higher, and is only available on DM-NVX-38X models.
- HDR10, HDR10+, and Dolby Vision are not supported when Multiview is enabled.

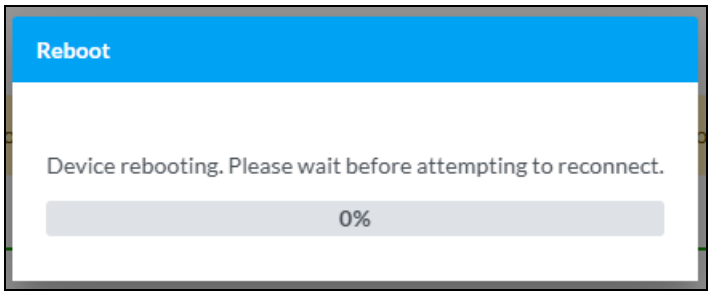
Enable Multiview

Multiview is disabled by default. To enable it:

1. Set the **Multi-View** toggle to the right. A **Reboot** confirmation dialog box will appear.

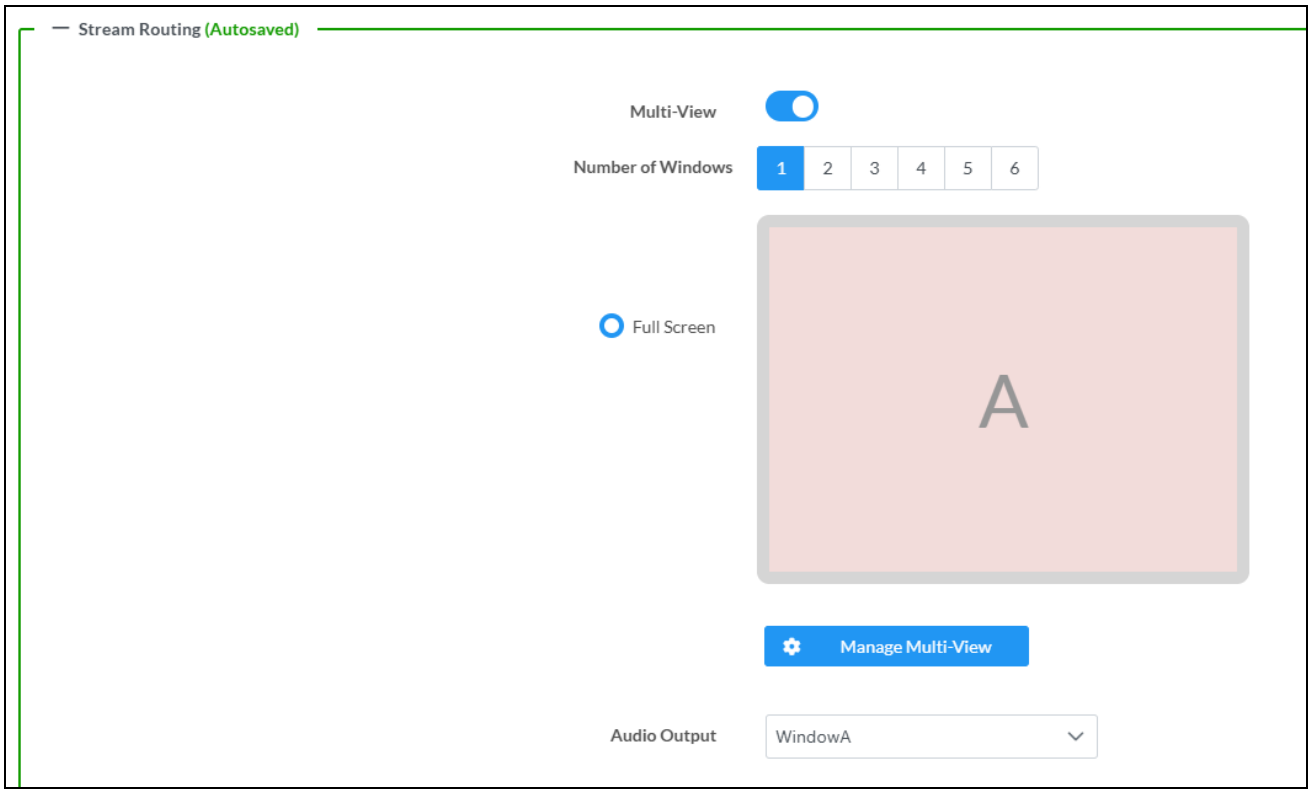


2. Select **Yes, Reboot Now** to reboot the device or select **No** to cancel the change. If **Yes, Reboot Now** was selected, a **Reboot** status box will appear.



3. Wait for the device to fully reboot before attempting to log in to the user interface. Once the reboot has completed, further Multiview settings will be available in the **Stream Routing** section.

Stream Routing Section with Multiview Enabled



Configure Multiview Layouts

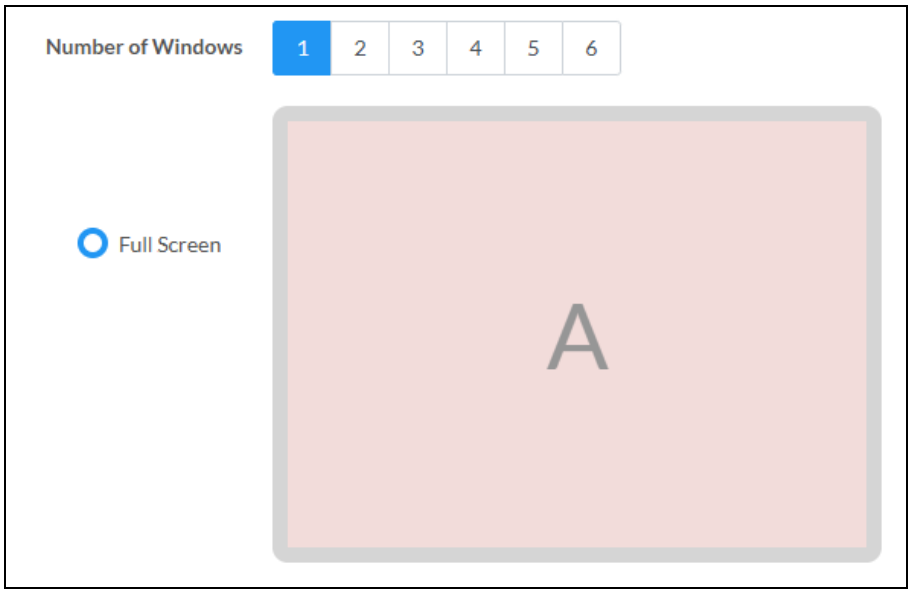
Configure the following settings to customize the Multiview output layout:

- **Number of Windows:** Select a number from **1** to **6** to choose how many windows will be created within the output video signal. Each window can receive a discrete video signal via the routing matrix.

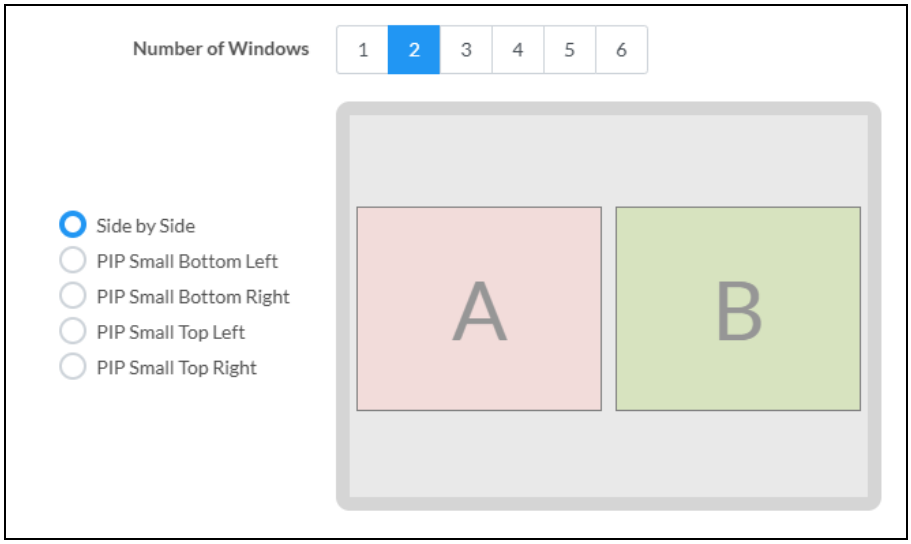
- Depending on how many windows are available, select a layout option.

  NOTE: The visual representations of the layout options in the interface are not to scale. All windows in each layout are locked to a 16:9 aspect ratio.

  - With **Number of Windows** set to **1**, only the **Full Screen** layout option is available. A single window will take up the entire screen space of the output video signal.

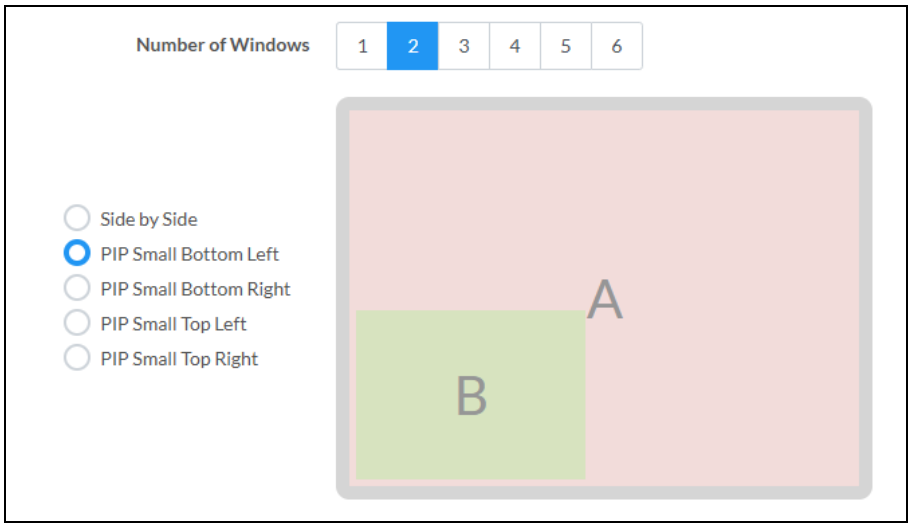


- With **Number of Windows** set to **2**, five layout options are available:
  - **Side by Side:** Two equally-sized windows are placed side-by-side. Black bars at the top and bottom will fill the remaining screen space of the output video signal.

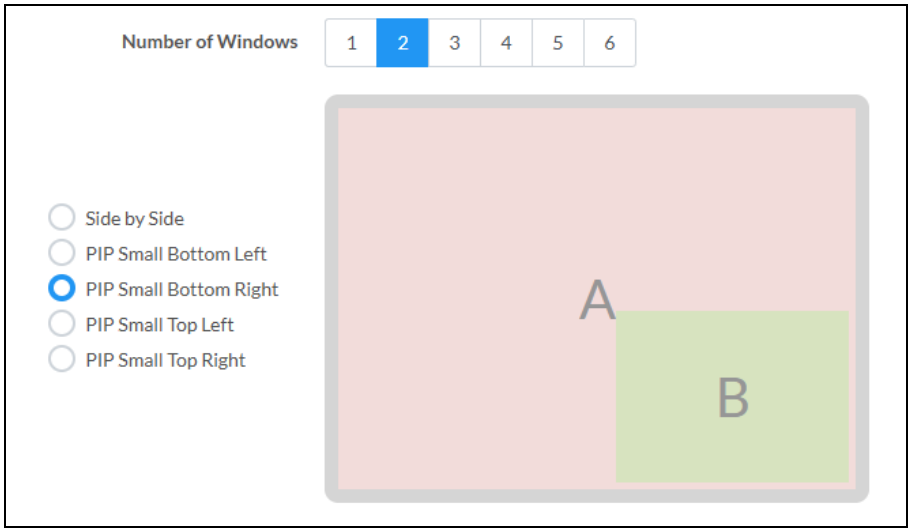


- **PIP (Four Variants):** One full screen window is placed behind one small window in one of the four corners of the output video signal.

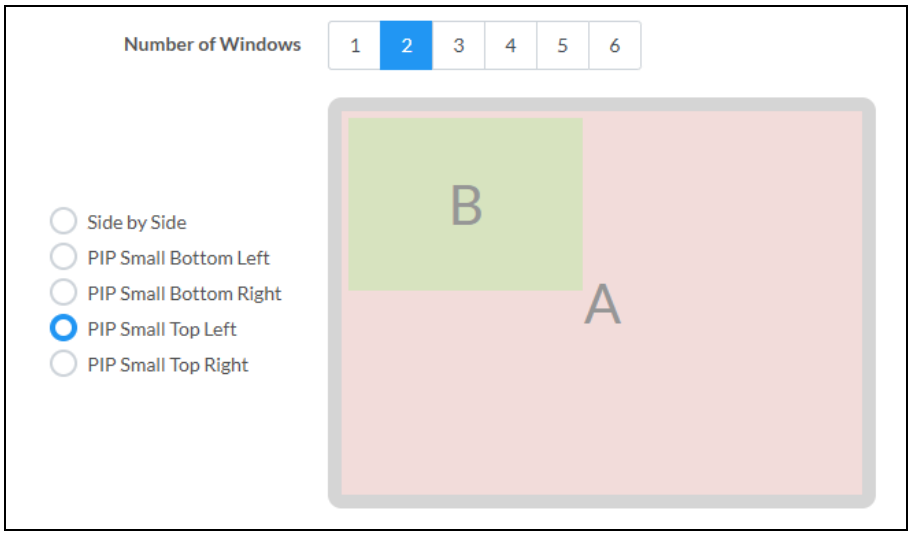
PIP Small Bottom Left



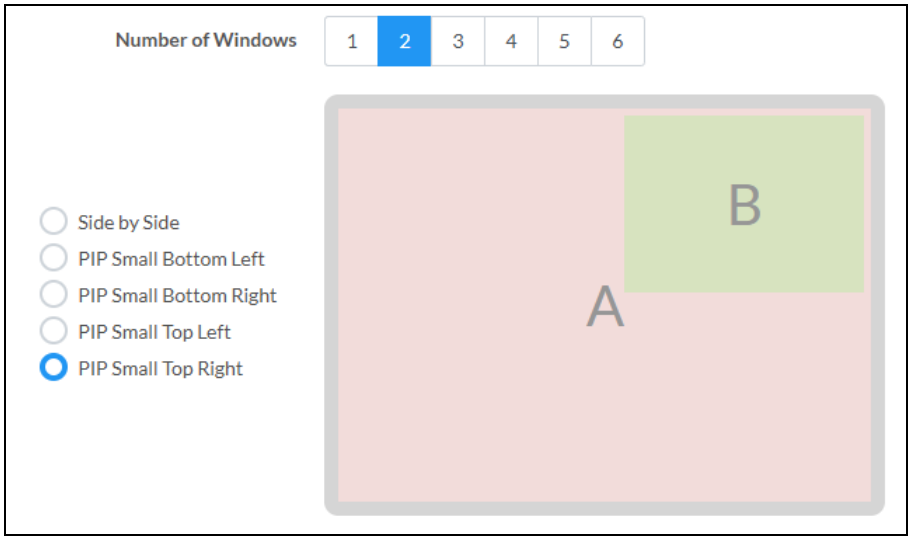
PIP Small Bottom Right



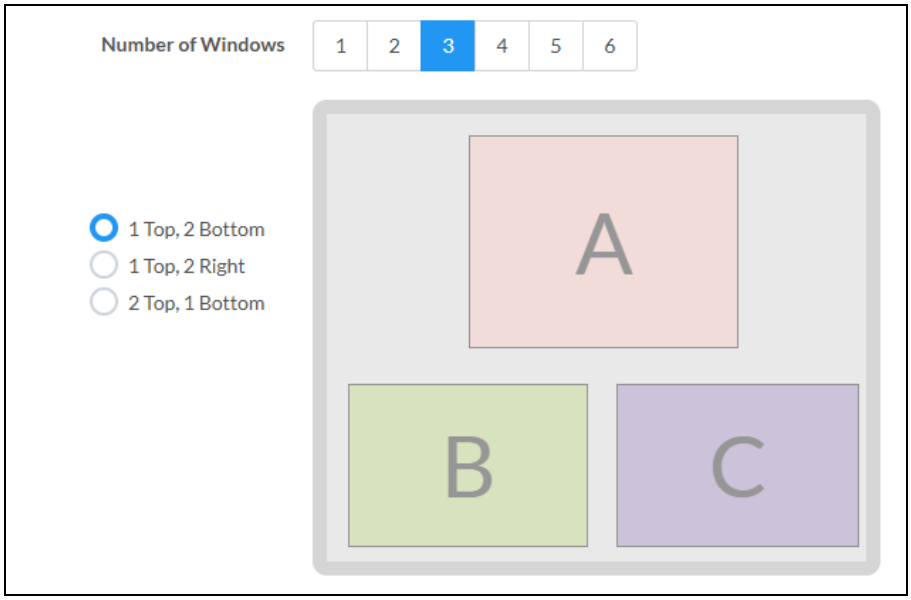
PIP Small Top Left



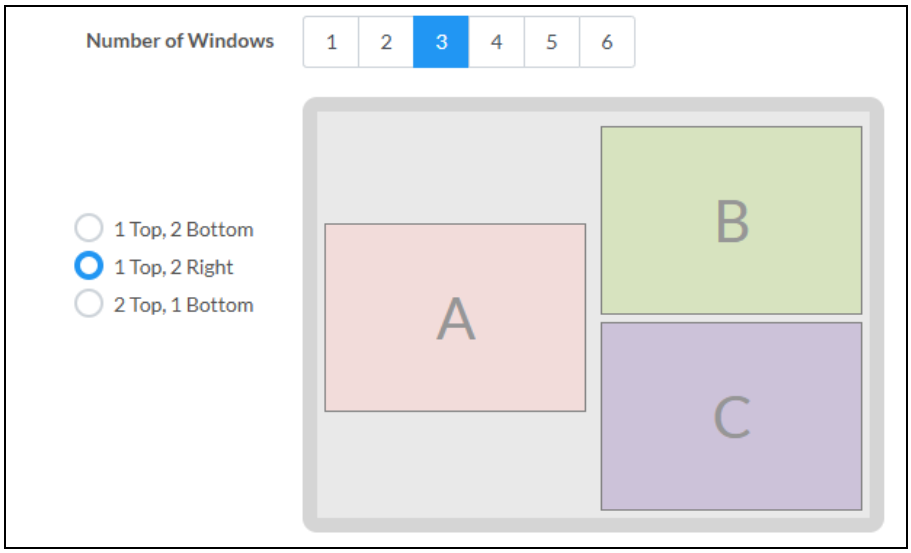
PIP Small Top Right



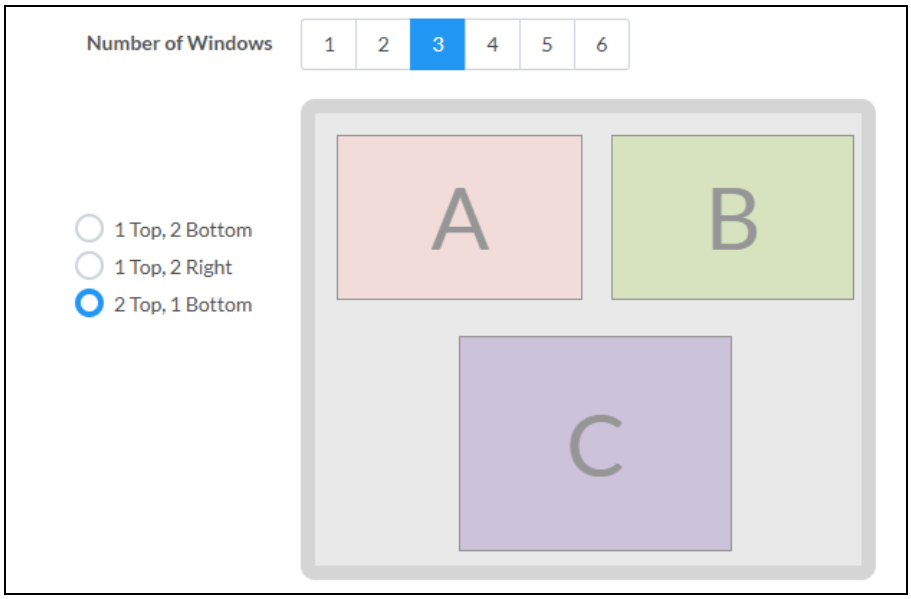
- With **Number of Windows** set to **3**, three layout options are available:
  - **1 Top, 2 Bottom:** Three equally-sized windows are stacked with one window on top and two on the bottom. Black bars to the left and right of the top window will fill the remaining screen space of the output video signal.



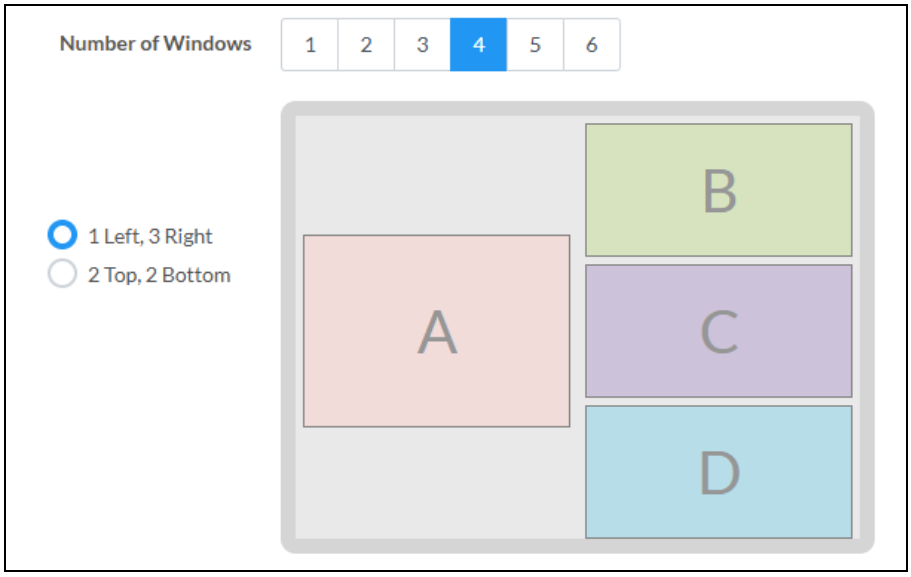
  - **1 Top, 2 Right:** Three equally-sized windows are placed with one window to the left and two stacked in a column on the right. Black bars at the top and bottom of the left window will fill the remaining screen space of the output video signal.



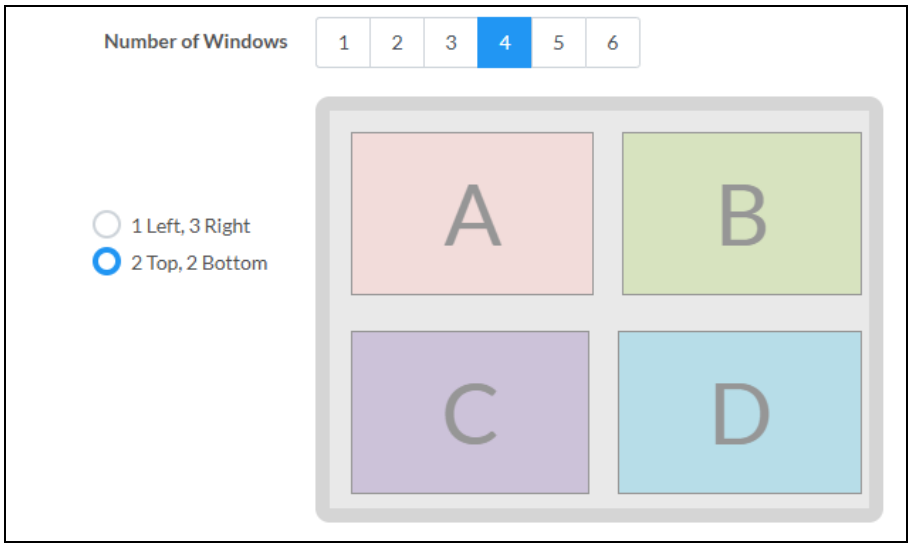
- **2 Top, 1 Bottom:** Three equally-sized windows are stacked with two windows on top and one on the bottom. Black bars to the left and right of the bottom window will fill the remaining screen space of the output video signal.



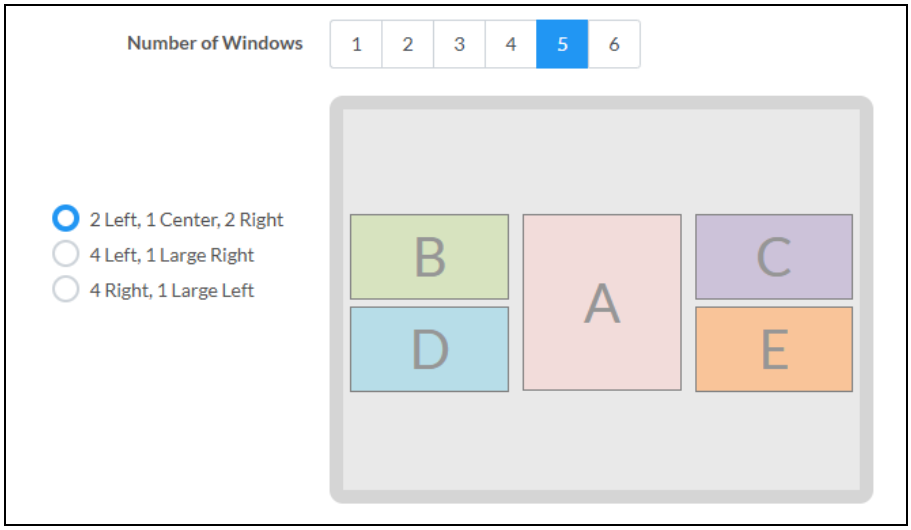
- With **Number of Windows** set to **4**, two layout options are available:
  - **1 Left, 3 Right:** One larger window is placed to the left and three smaller windows are stacked in a column on the right. Black bars at the top and bottom of the larger window will fill the remaining screen space of the output video signal.



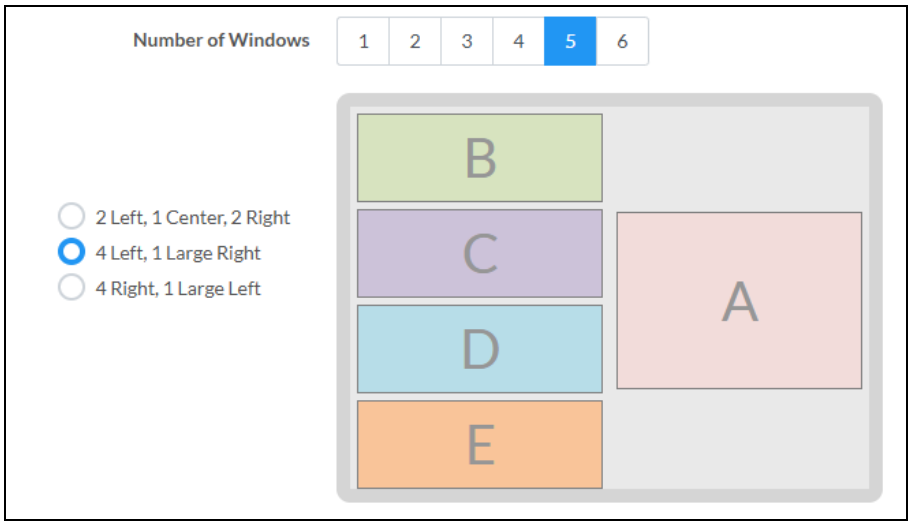
  - **2 Top, 2 Bottom:** Four equally-sized windows are placed in four quadrants to fill the entire screen space of the output video signal.



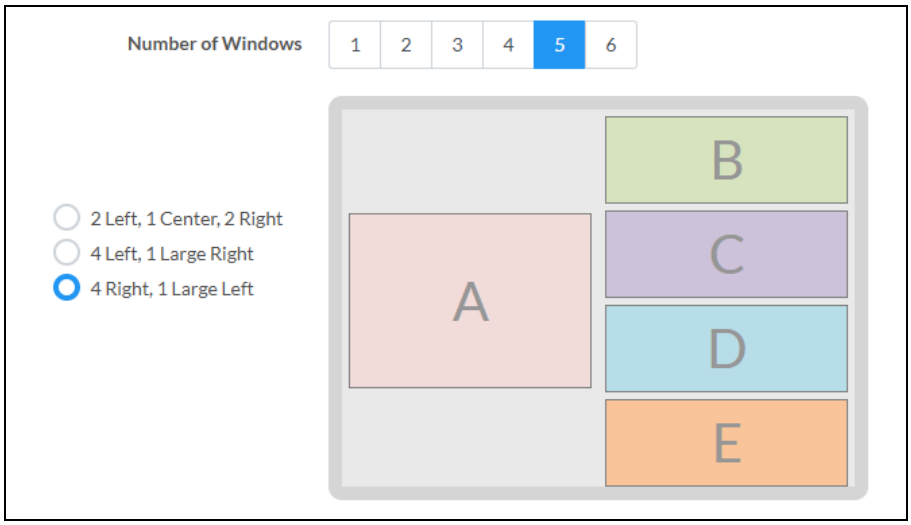
- With **Number of Windows** set to **5**, three layout options are available:
  - **2 Left, 1 Center, 2 Right:** One larger window is placed in the center of the output video signal, flanked by two columns of two smaller windows on each side. Black bars at the top and bottom will fill the remaining screen space of the video output signal.



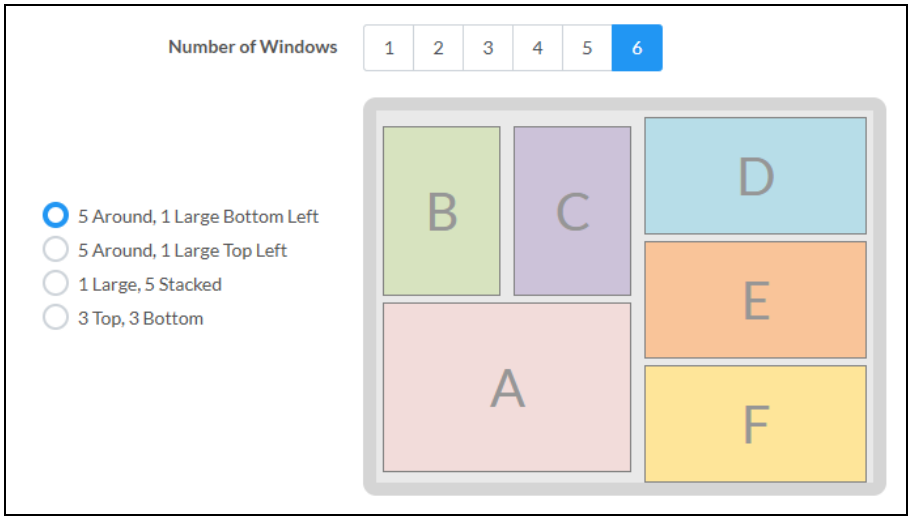
  - **4 Left, 1 Large Right:** One larger window is placed to the right and four smaller windows are stacked in a column on the left. Black bars at the top and bottom of the larger window will fill the remaining screen space of the output video signal.



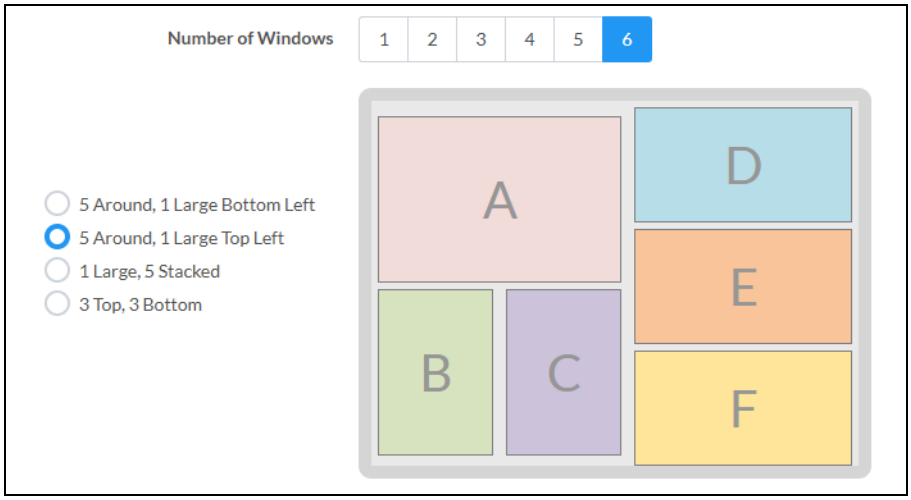
- **4 Right, 1 Large Left:** One larger window is placed to the left and four smaller windows are stacked in a column on the right. Black bars at the top and bottom of the larger window will fill the remaining screen space of the output video signal.



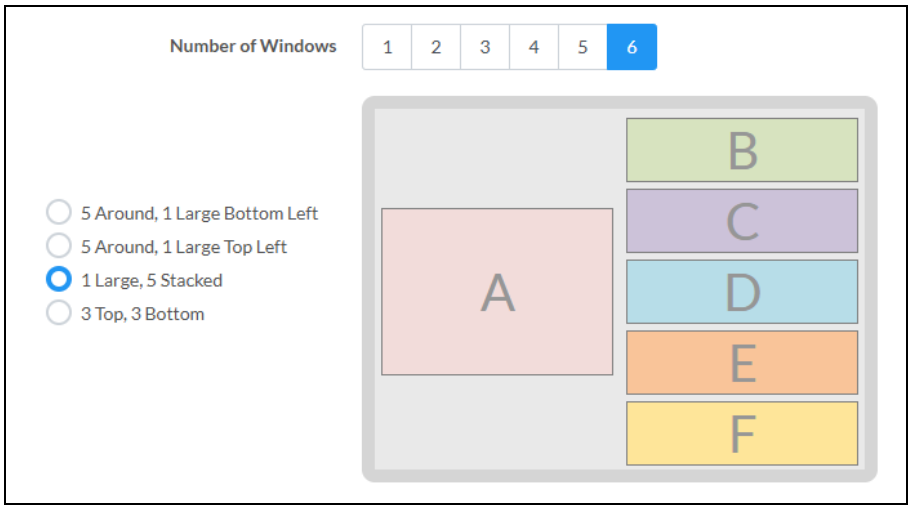
- With **Number of Windows** set to **6**, four layout options are available:
  - **5 Around, 1 Large Bottom Left:** One larger window is placed in the bottom left quadrant of the video output signal, with two smaller windows above it in the upper left quadrant and three windows stacked in a column on the right. The windows in this layout will fill the entire screen space of the output video signal.



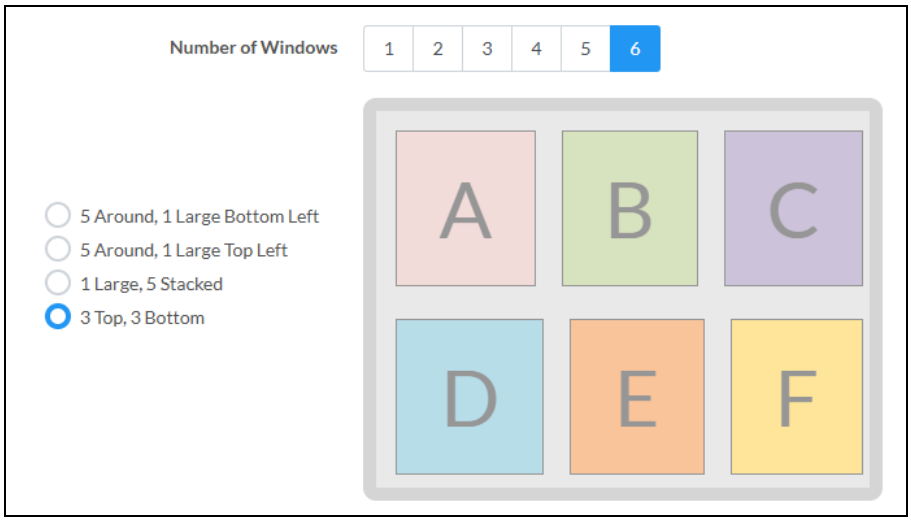
  - **5 Around, 1 Large Top Left:** One larger window is placed in the top left quadrant of the video output signal, with two smaller windows below it in the bottom left quadrant and three windows stacked in a column on the right. The windows in this layout will fill the entire screen space of the output video signal.



- **1 Large, 5 Stacked:** One larger window is placed to the left and five smaller windows are stacked in a column on the right. Black bars at the top and bottom of the larger window will fill the remaining screen space of the output video signal.

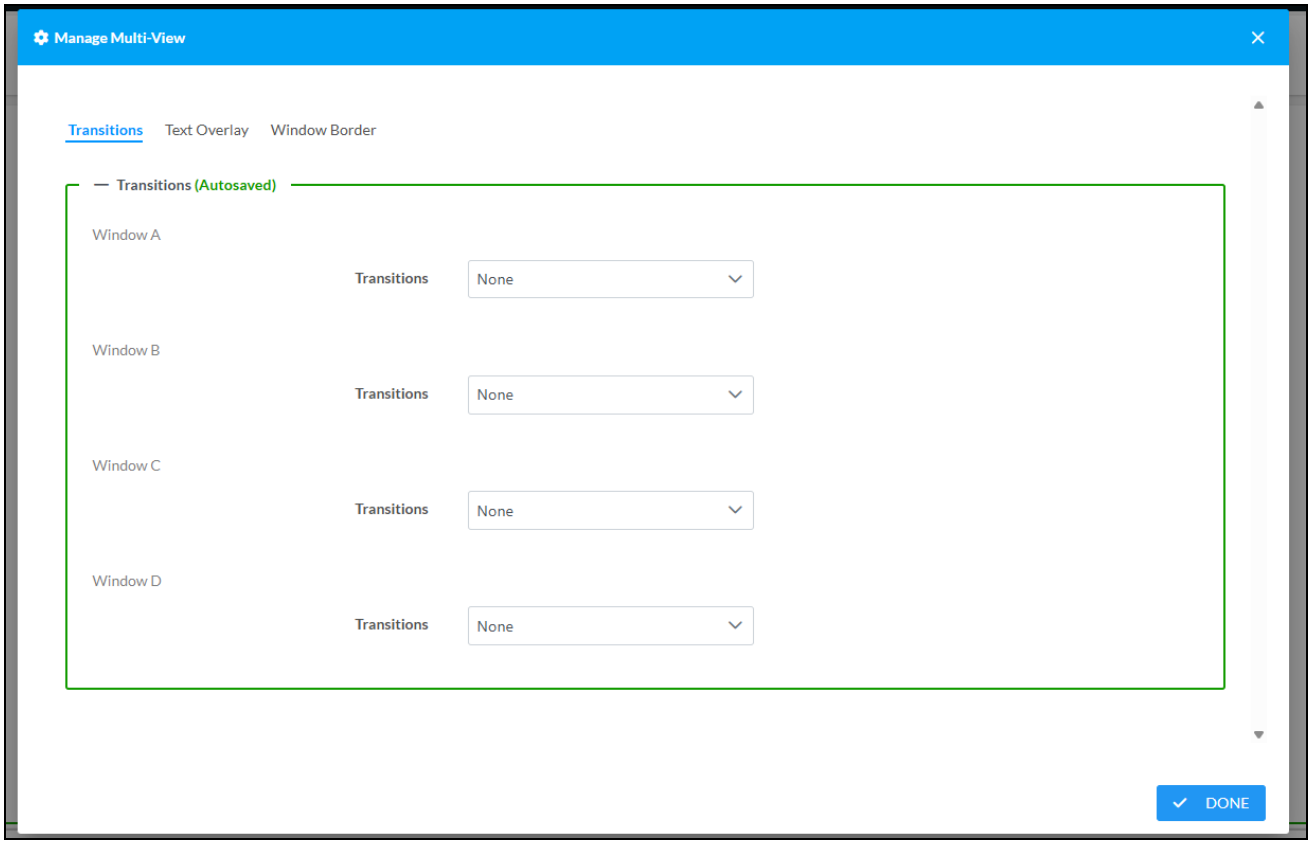


- **3 Top 3 Bottom:** Six equally-sized windows are arranged in two rows of three, with black bars at the top and bottom to fill the remaining screen space of the output video signal.



Manage Multiview Settings

Select **Manage Multi-View** to access additional Multiview settings. A **Manage Multi-View** window appears.



The **Manage Multi-View** window is organized into three tabs: **Transitions**, **Text Overlay**, and **Window Border**. The **Transitions** tab is selected by default.

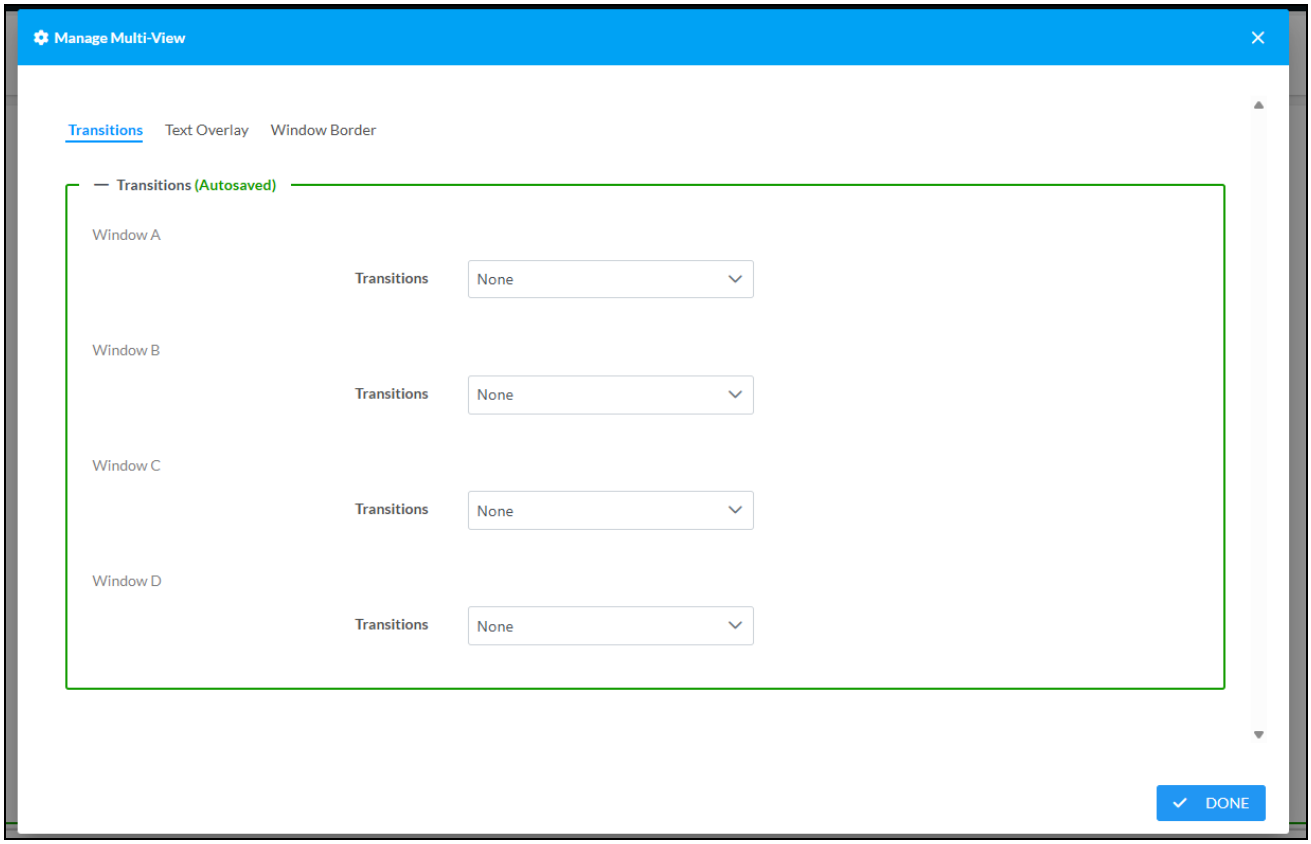
Refer to the sections below for information on configuring the settings on each tab:

- Configure Transitions on page 624
- Configure the Text Overlay on page 624
- Configure the Window Border on page 627

Select **DONE** at the bottom right of the window after configuring these settings to dismiss the **Manage Multi-View** window and return to the main **Settings** tab.

Configure Transitions

The **Transitions** tab includes an entry for each window in the Multiview output and provides an associated **Transitions** drop-down. This feature allows for transitions that are more gradual or aesthetically pleasing than instantaneous cuts during real-time video switching (for example, a fade, wipe, or zoom transition).



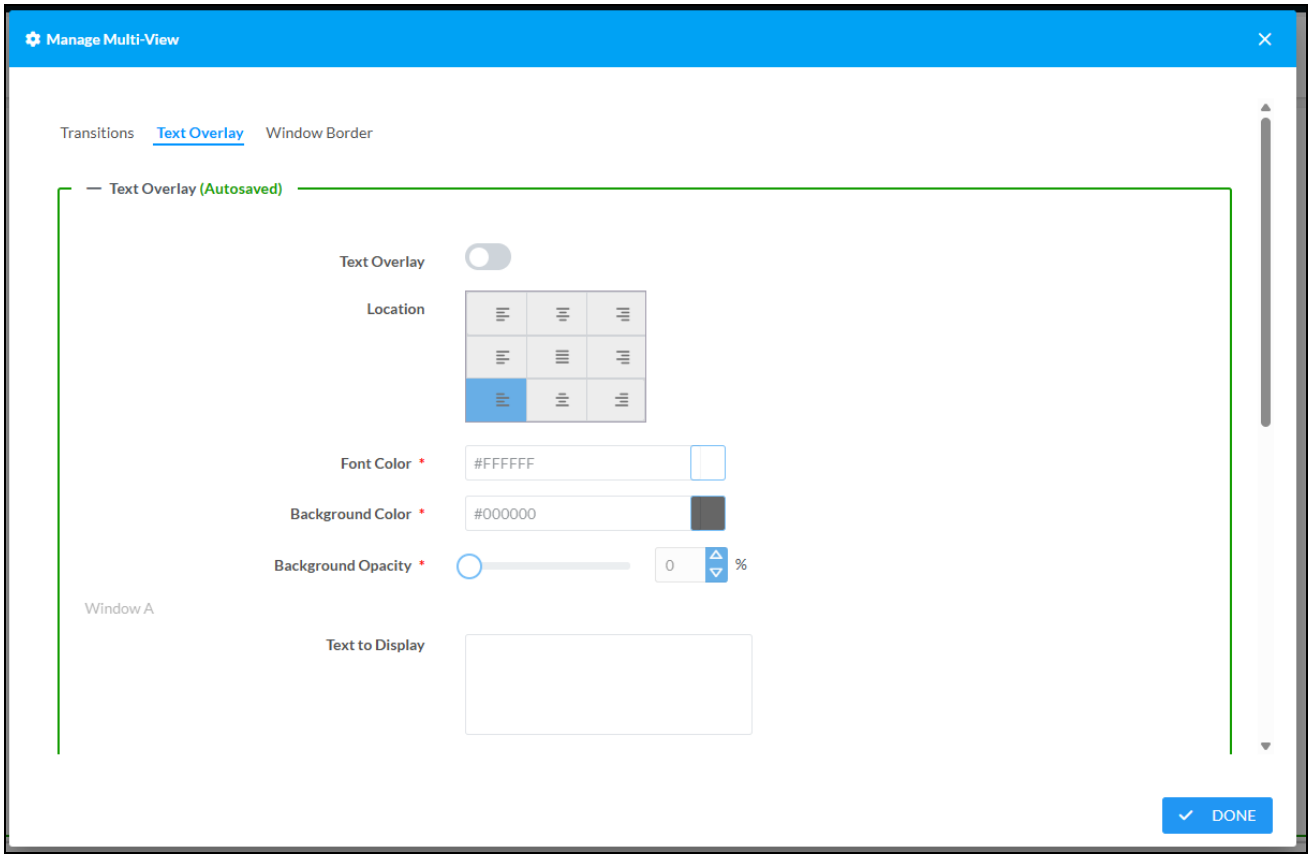
Select an option from the **Transitions** drop-down to play that transition any time a new signal is routed to that window. For example, with **Fade** selected for **Window A**, a visual fade from the old signal to a new signal will occur any time a new video signal is routed to Window A.

> **TIP:** Select **None** from the drop-down to have the old signal cut to the new signal instantly. **None** is selected by default.

Configure the Text Overlay

The **Text Overlay** tab contains settings for adding text onto the video signals in each window of the Multiview output. When combined with custom programming, this feature can provide context-specific friendly names for routed sources, such as "Camera 1," "Cable Box," or "News."

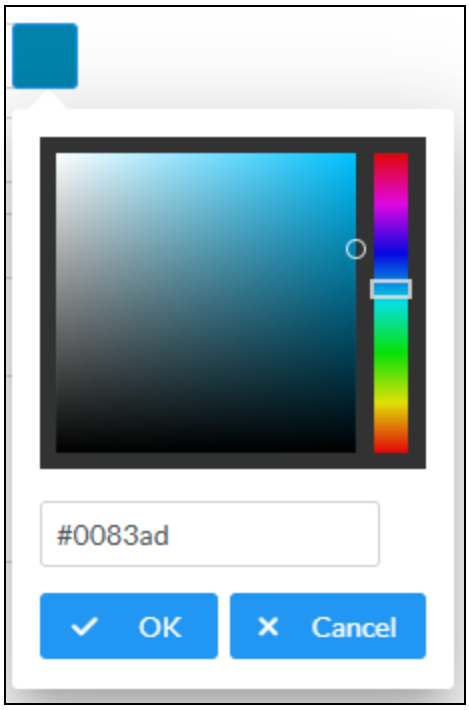
Select the **Text Overlay** tab at the top of the **Manage Multi-View** window to access these settings.



To add and configure text within Multiview windows:

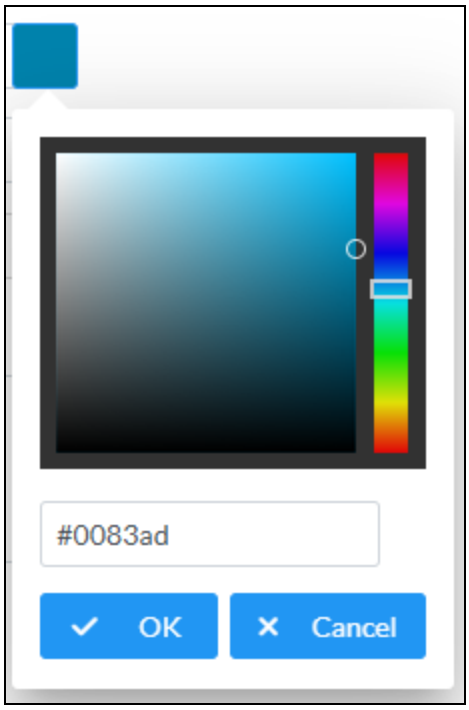
1. Set the **Text Overlay** toggle to the right position to enable the text overlay. Set the toggle to the left position to disable the text overlay.
2. Choose where to display the text within the window by selecting an option on the **Location** grid. This setting will be applied to all windows in the Multiview output.

3. Set a font color by doing one of the following:
    - Enter a six-character hexidecimal color code in the **Font Color** text entry field.
    - Select the box to the right of the **Font Color** text entry field to open the color picker widget, then do one of the following:
        - Use the slider on the right to select a hue, then select a shade from the box on the left.
        - Enter a six-character hexidecimal color code in the text entry field at the bottom.



Select **OK** to confirm the color or select **Cancel** to cancel the operation.

4. Set a background color by doing one of the following:
    - Enter a six-character hexidecimal color code in the **Background Color** text entry field.
    - Select the box to the right of the **Background Color** text entry field to open the color picker widget, then do one of the following:
        - Use the slider on the right to select a hue, then select a shade from the box on the left.
        - Enter a six-character hexidecimal color code in the text entry field at the bottom.

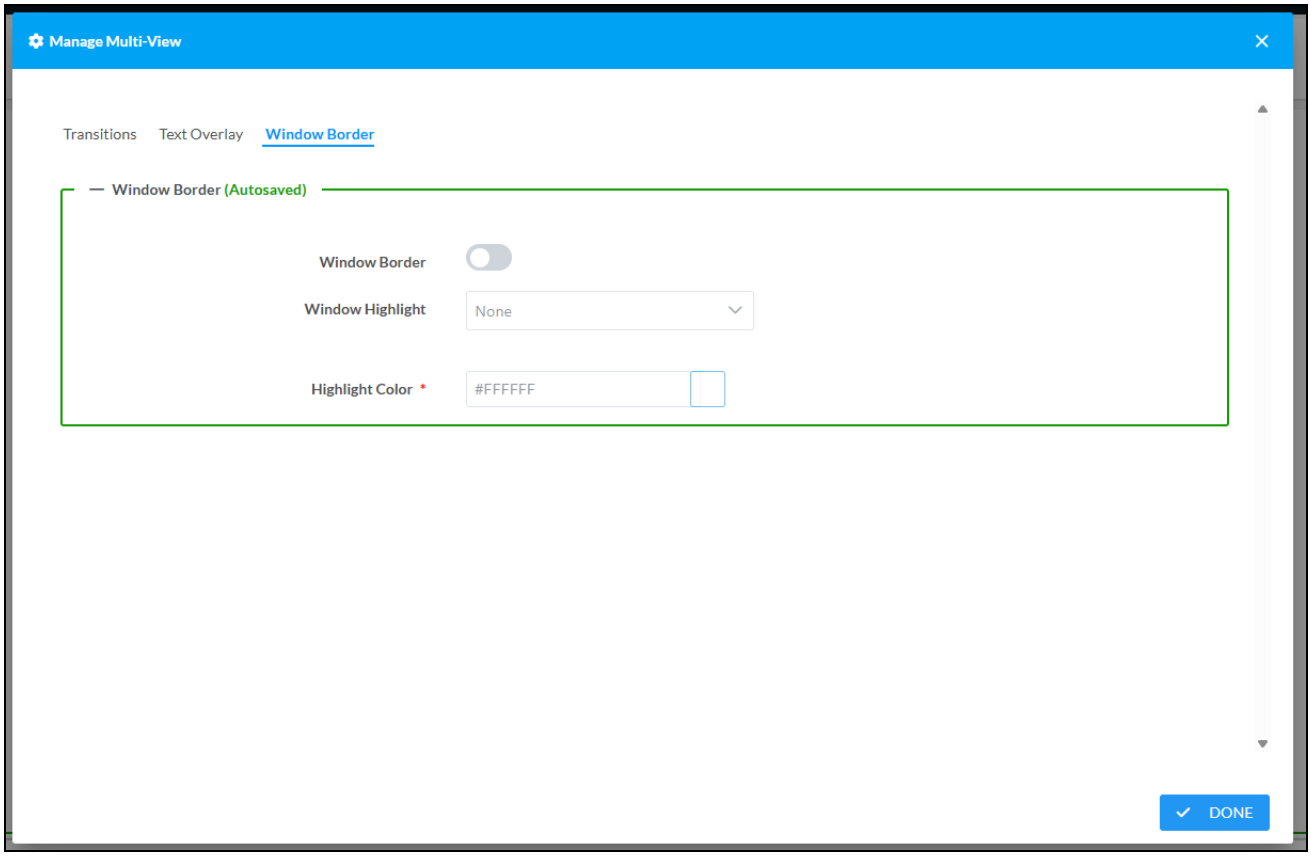


    Select **OK** to confirm the color or select **Cancel** to cancel the operation.
5. Use the **Background Opacity** slider or text entry field to adjust the opacity of the text background. The opacity is set to **0** by default.
6. For each window of the Multiview output, enter up to 18 characters of text in its **Text to Display** text entry field. Leave this box blank for any windows that should not have a text overlay.

Configure the Window Border

A window border can be enabled to highlight one window within the layout at a time. When combined with custom programming and a remote control or other interface, this feature can simplify source routing by showing which window is currently selected.

Select the **Window Border** tab at the top of the **Manage Multi-View** window to access these settings.

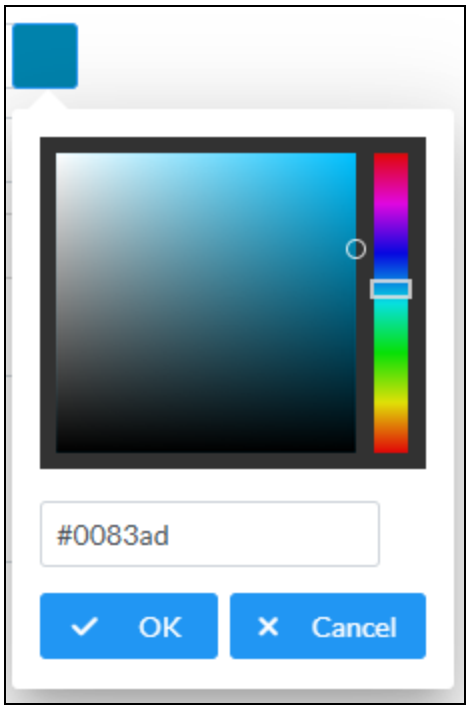


To configure the window border:

1. Set the **Window Border** toggle to the right position to enable the border. Set the toggle to the left position to disable the border.
2. Select a window (**Window A** through **Window F** depending on the layout) from the **Window Highlight** drop-down to highlight a specific window with the border, or select **None** to hide the border until another window is selected.

   > **TIP:** Use the **Window Highlight** drop-down to test that the window border is enabled and that the color is set as desired. During real-time user interactions, highlighting windows should be driven by custom programming instead. Refer to the DM-NVX-384 symbol help file for more information.

3. Set a border color by doing one of the following:
    - Enter a six-character hexidecimal color code in the **Highlight Color** text entry field.
    - Select the box to the right of the **Highlight Color** text entry field to open the color picker widget, then do one of the following:
        - Use the slider on the right to select a hue, then select a shade from the box on the left.
        - Enter a six-character hexidecimal color code in the text entry field at the bottom.

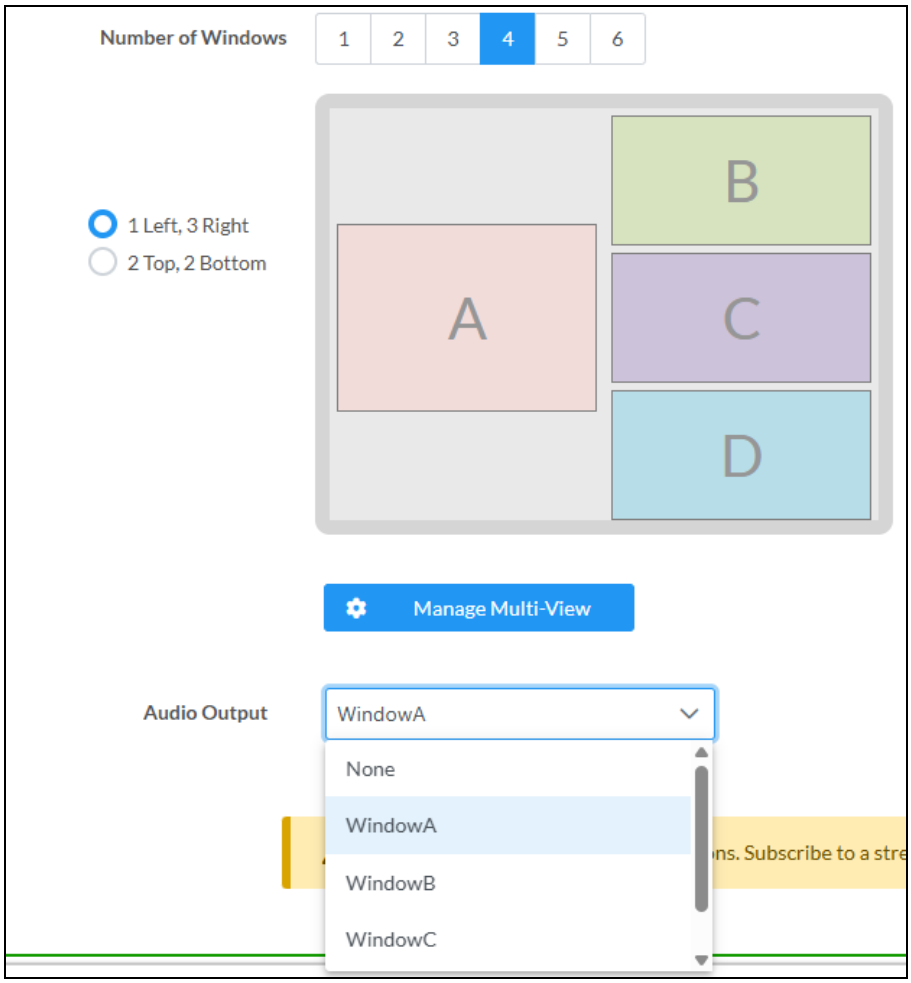


Select **OK** to confirm the color or select **Cancel** to cancel the operation.

Select an Audio Source

While the Multiview feature allows multiple video signals to be combined into the output of the DM NVX device, only one audio signal can be played back at a time.

> **NOTE:** With Multiview enabled, only audio formats up to 5.1 are supported. This is true for Dolby Digital, DTS, and LPCM.

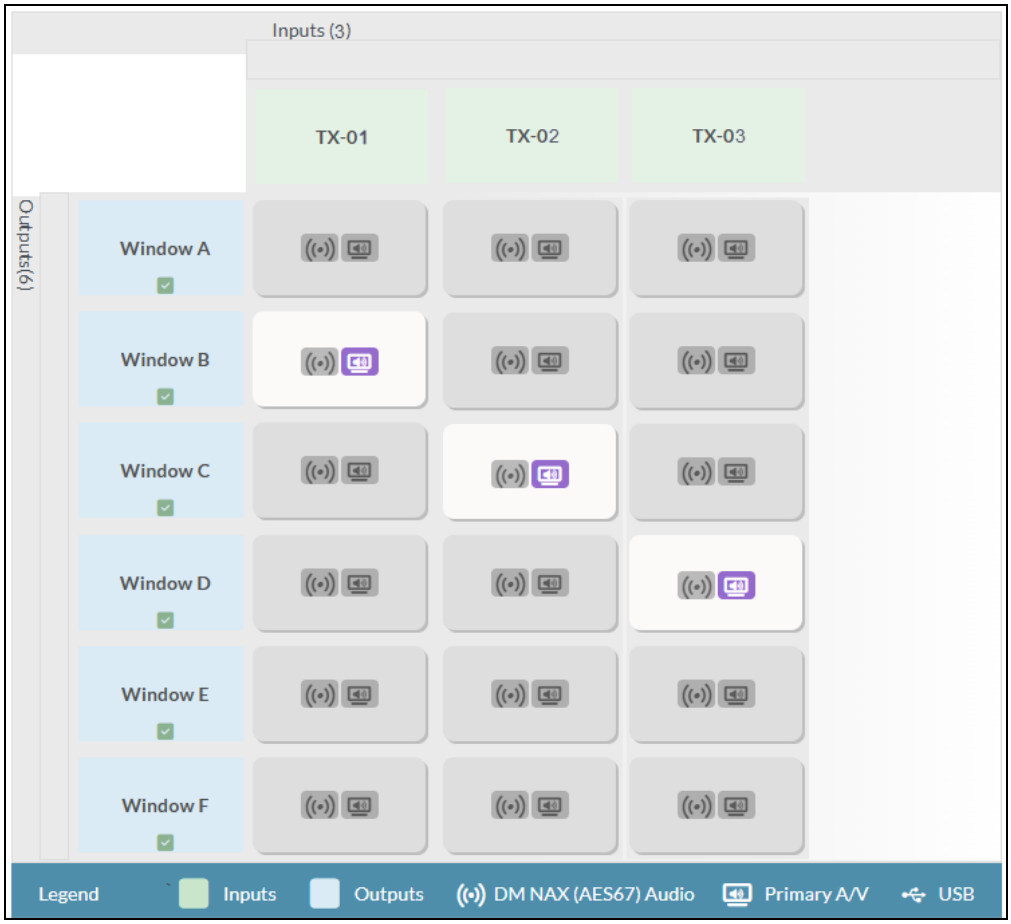


Select a window option from the **Audio Output** drop-down to play back the audio signal routed to that window, or select **None** to stop audio playback at the output.

In order for audio to play back when a window is selected, that window must also have an audio signal routed to it. Refer to Route Signals on page 631 for information on using the routing matrix to route an audio signal to a window.

Route Signals

Use the routing matrix to select which DM NVX video stream will be displayed in each window. Each available and subscribed video stream is represented by a column, and each window is represented by a row.



NOTE: In order for the routing matrix to appear, at least one subscription must be added from the **Subscriptions** accordion. Refer to Subscriptions (Receiver Mode Only) on page 632 for information on adding subscriptions.

Use the routing matrix to establish or break signal routes:

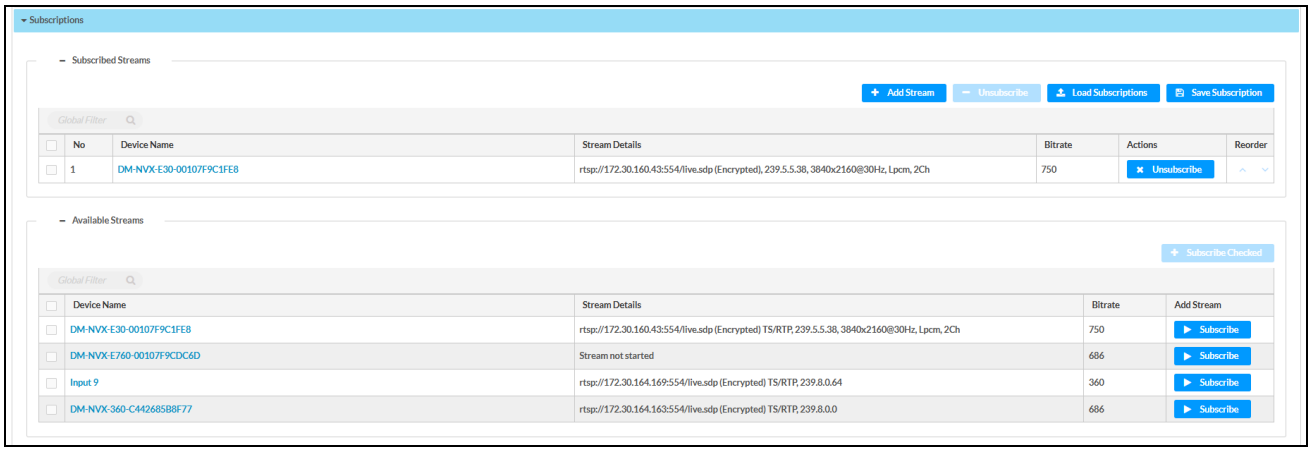
- To route a video-over-IP stream to a window, select the **Primary A/V** icon in that stream's matrix column.
- To route an audio-over-IP stream to a window, select the **DM NAX (AES67) Audio** icon in that stream's matrix column.

  NOTE: Multiple audio-over-IP streams can be routed to different windows via the matrix, but only one can be heard at the output at a time. Use the **Audio Output** drop-down to set which window's audio source is heard at the output. Refer to Select an Audio Source on page 629.

To clear a route, select the icon for any currently routed signal. The icon will revert to being grayed out to indicate that the route was cleared.

Subscriptions (Receiver Mode Only)

The **Subscriptions** accordion allows the DM NVX receiver to subscribe to discovered network AV-over-IP streams for quick routing and switching without having to manually enter multicast addresses or session names.



The **Subscribed Streams** table displays all network streams that the device is subscribed to. These streams are also available in the routing matrix in the **Routing** accordion. Refer to Stream Routing (Receiver Mode Only) on page 607 for information on routing a subscribed stream.

To add a stream to the table, do either of the following:

- Select **+ Add Stream**. A **Manual Subscription** window appears.



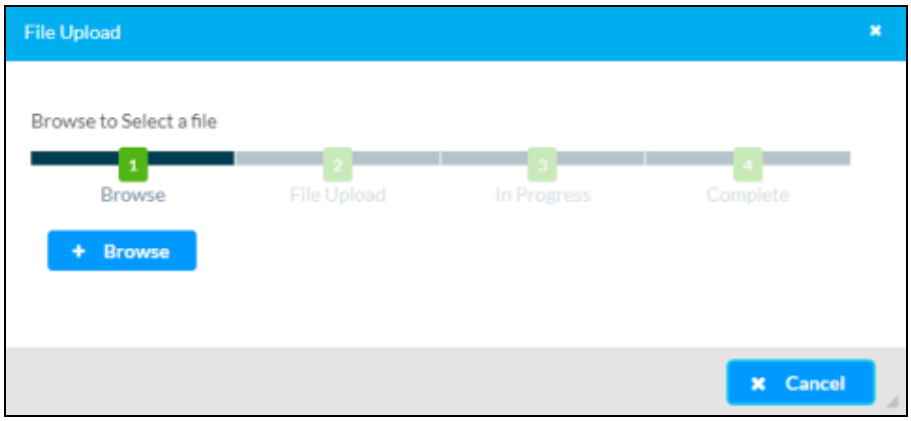
  - Enter the multicast address of the stream in the **Address** field.
  - Enter the device name of the transmitting device in the **Name** field.
  - Select **✓ OK** to add the stream to the **Subscribed Streams** list or select **X Cancel** to cancel the operation.
- Select the **Subscribe** button for a stream listed in the **Available Streams** table.

To add multiple streams to the table at once, select the checkbox for each desired stream in the **Available Streams** table, then select **+ Subscribe Checked**.

To remove a stream from the table, select **x Unsubscribe** in its table row. To remove multiple streams at once, select the checkbox for each stream in the **Subscribed Streams** table, then select **- Unsubscribe** at the top of the table.

The **Subscribed Streams** table can also be exported as a .xml file to other DM NVX receivers. This allows the subscription process to be performed even more efficiently on other receivers. To export the table and upload it to another receiver:

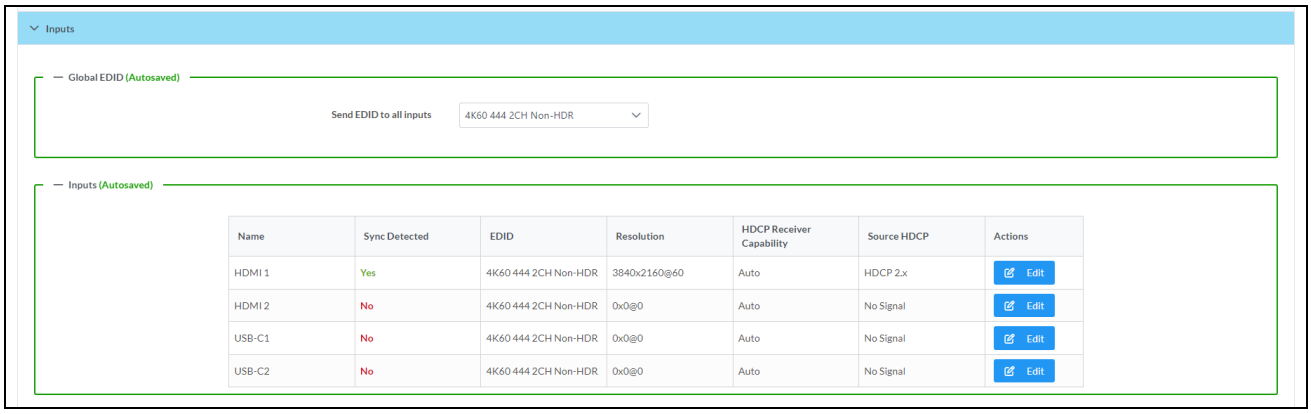
1. Subscribe to all of the desired network streams.
2. Select **Save Subscription** at the top of the **Subscribed Streams** table. A .xml file will be downloaded to the connected PC.
3. Log in to the next DM NVX receiver's web interface and navigate to its **Subscriptions** accordion.
4. Select **Load Subscriptions** at the top of the **Subscribed Streams** table. A **File Upload** window appears.



5. Select **+ Browse**. Locate the .xml file, then select **Upload** to upload it to the DM NVX device. When the upload completes, the window will close and the interface will return to the **Subscriptions** accordion with the **Subscribed Streams** table filled out.

Inputs

The **Inputs** accordion contains EDID settings and individual input configuration options for the local input connectors on the DM NVX device.

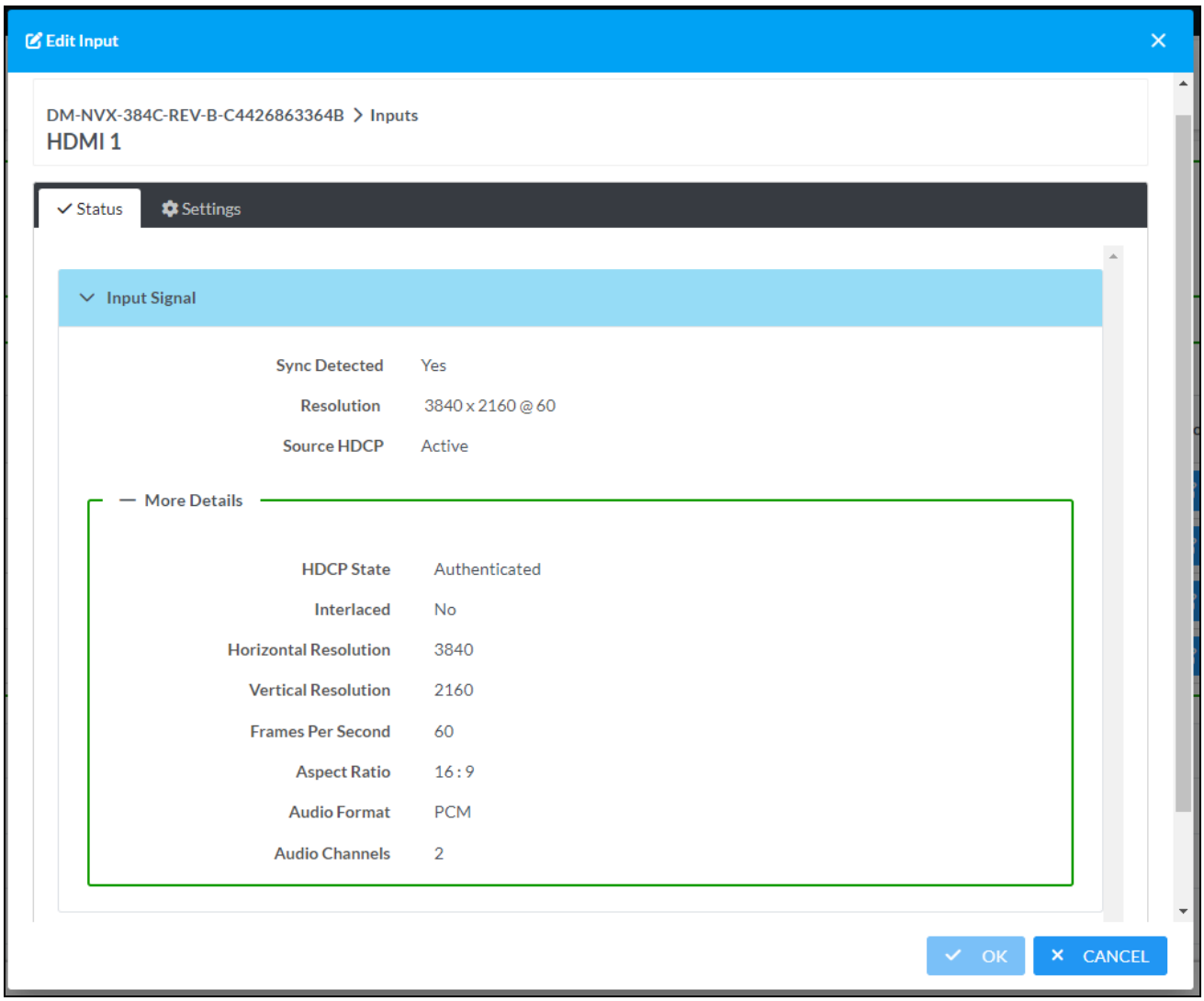


Use the **Send EDID to all Inputs** drop-down under the **Global EDID** subheading to send a specific EDID file to all of the local inputs of the DM NVX device.

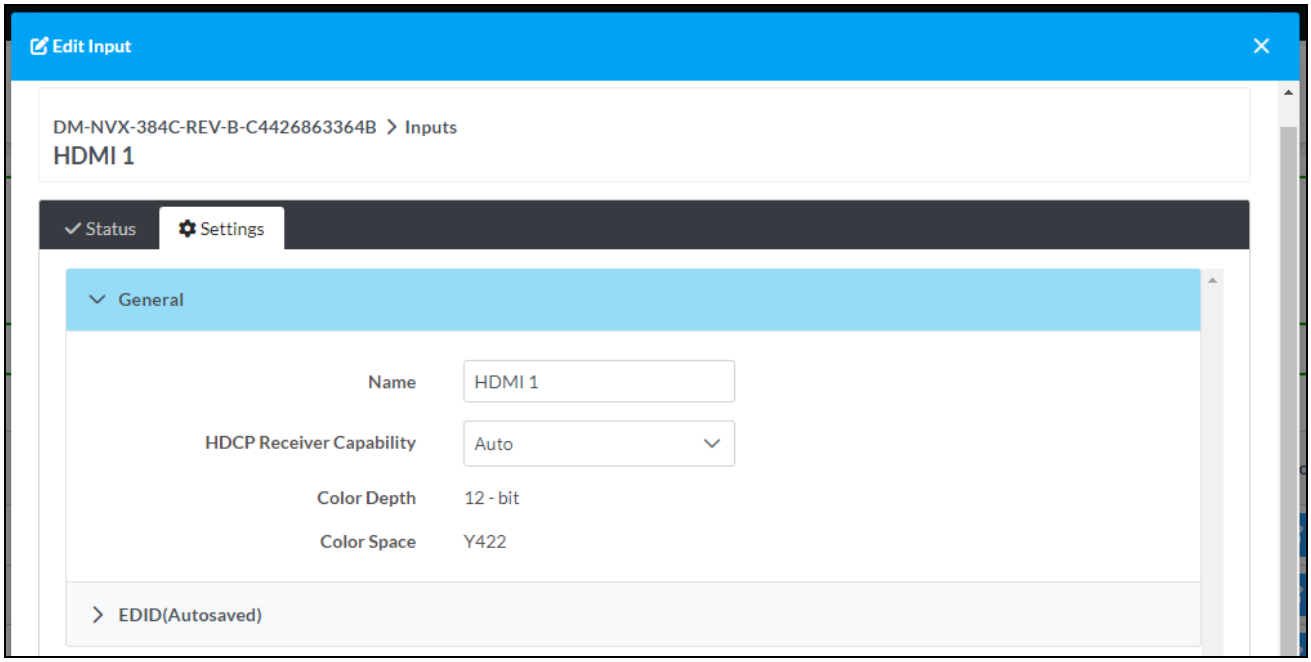
To configure an input individually, select its respective **Edit** button. An **Edit Input** window appears. The settings available in the **Edit Input** window depend on the input connector type.

Edit Input (HDMI Input)

The **Edit Input** window will open to the **Status** tab by default. This tab displays sync, resolution, HDCP, and audio information for the connector and input source.



Select the **Settings** tab to configure the available input settings for the HDMI input.



The **General** accordion is open by default.

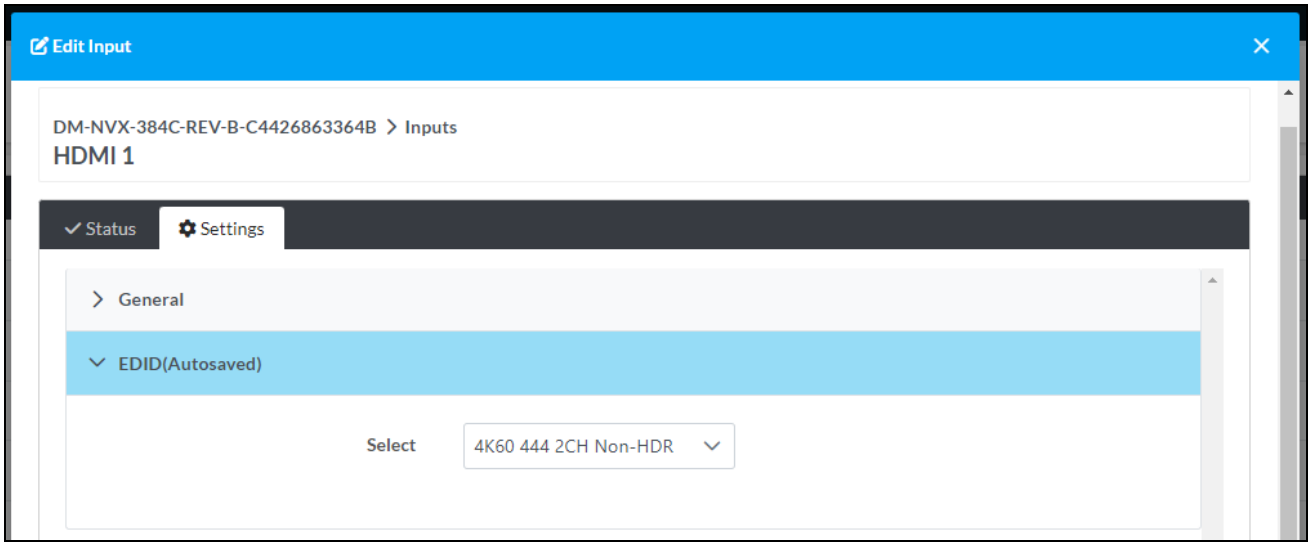
Enter a friendly name for the input in the **Name** text entry field.

Use the **HDCP Receiver Capability** drop-down to select **Auto** or a specific HDCP version. The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display.

> **NOTE:** Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

The **Color Depth** and **Color Space** fields are read-only and depend on the incoming video signal.

Select the **EDID** accordion to access EDID settings specific to the selected input.

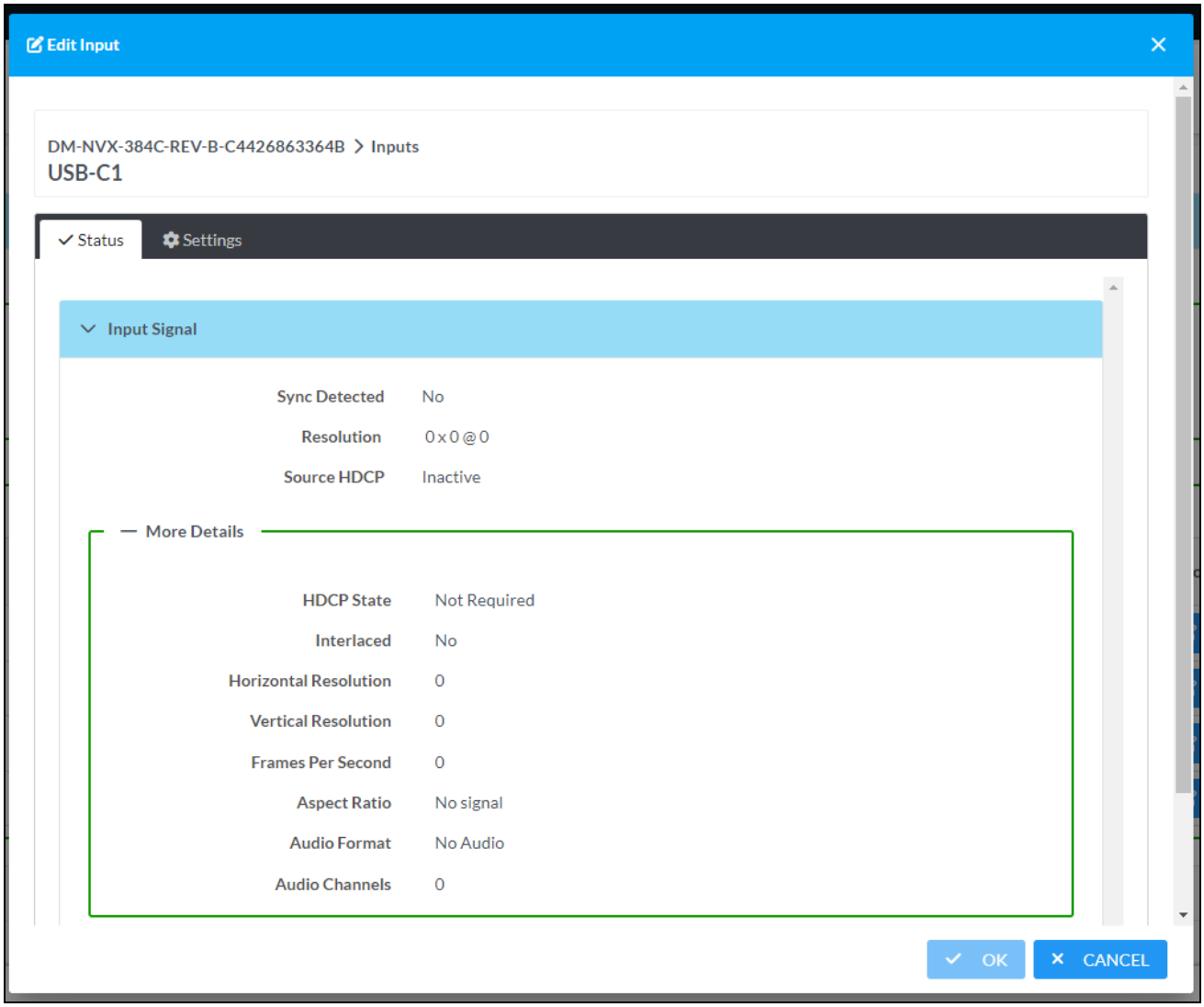


Use the **Select** drop-down to apply a specific EDID file to the selected input. All built-in and custom EDIDs are available in this list. Refer to Action on page 570 for more information on loading custom EDIDs to this list.

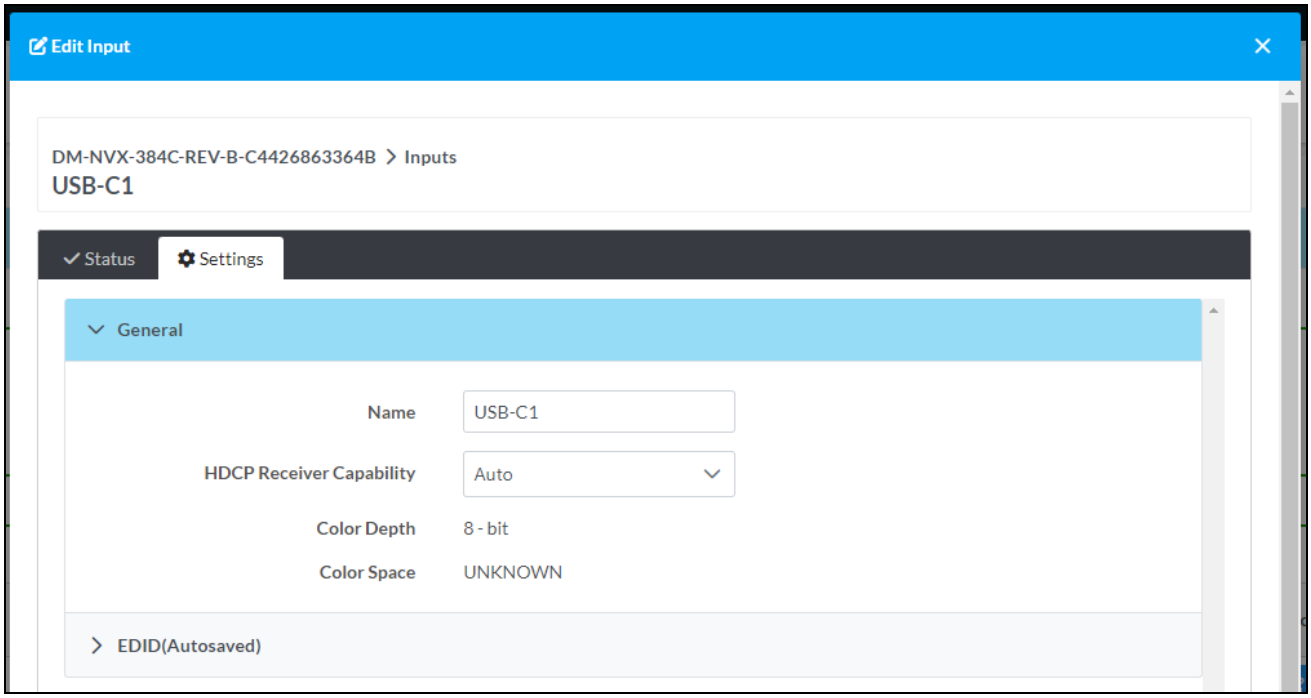
Use **OK** or **Cancel** to return to the **Settings** page. Select **OK** to apply any changes made in the **Edit Input** window or select **Cancel** to discard the changes.

Edit Input (USB-C Input)

The **Edit Input** window will open to the **Status** tab by default. This tab displays sync, resolution, HDCP, and audio information for the connector and input source.



Select the **Settings** tab to configure the available input settings for the USB-C input.



The **General** accordion is open by default.

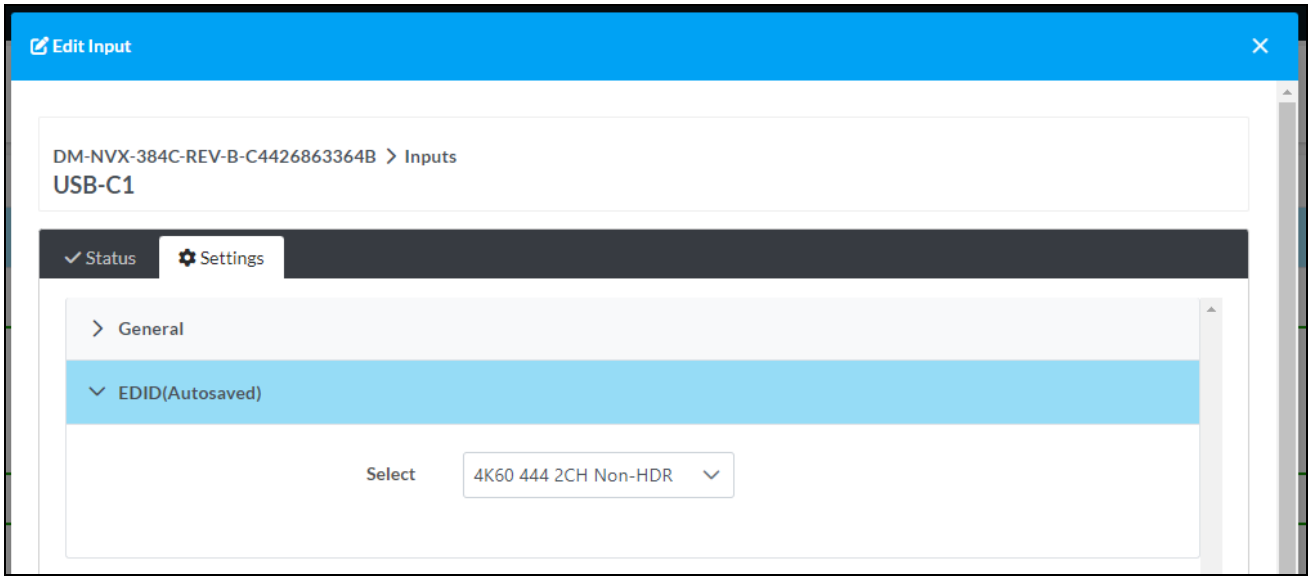
Enter a friendly name for the input in the **Name** text entry field.

Use the **HDCP Receiver Capability** drop-down to select **Auto** or a specific HDCP version (**HDCP 1.4** or **HDCP 2.x**). The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display.

> **NOTE:** Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

The **Color Depth** and **Color Space** fields are read-only and depend on the incoming video signal.

Select the **EDID** accordion to access EDID settings specific to the selected input.

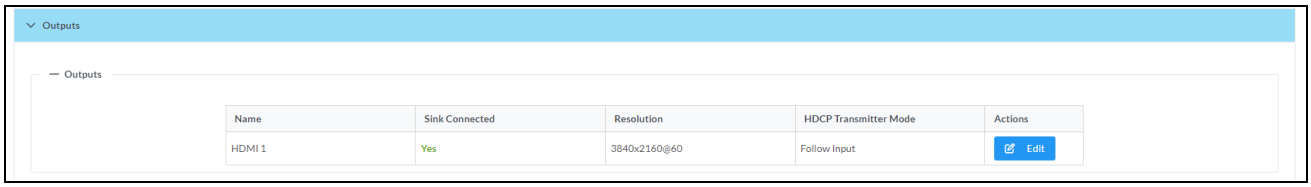


Use the **Select** drop-down to apply a specific EDID file to the selected input. All built-in and custom EDIDs are available in this list. Refer to Action on page 570 for more information on loading custom EDIDs to this list.

Use **OK** or **Cancel** to return to the **Settings** page. Select **OK** to apply any changes made in the **Edit Input** window or select **Cancel** to discard the changes.

Outputs

The **Outputs** accordion contains status information and an **Edit** option for the local HDMI output connector on the DM NVX device.

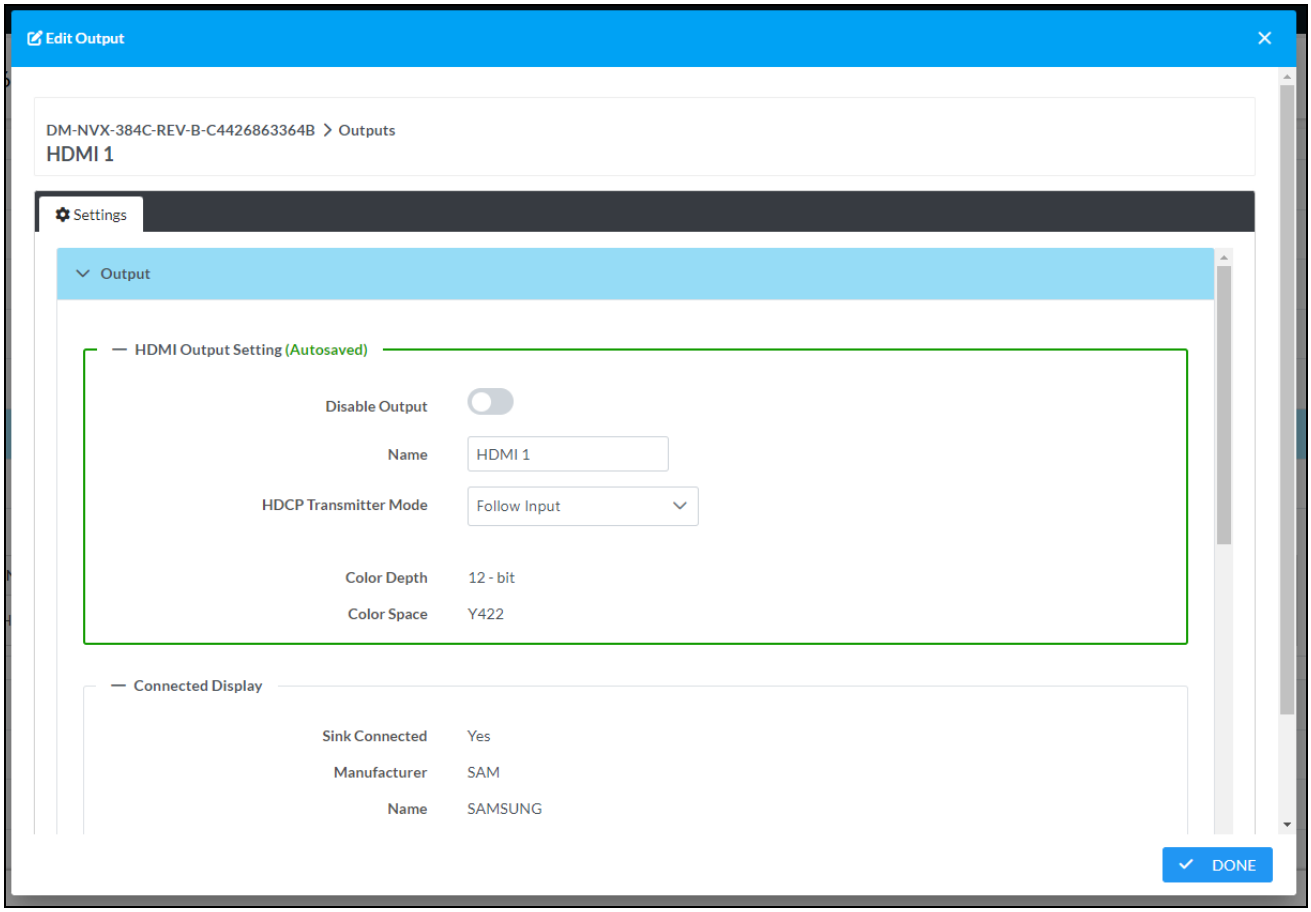


To configure the output, select the **Edit** button. An **Edit Output** window appears. The settings available in the **Edit Output** window depend on which mode the DM NVX device is in:

- Edit Output - Output Accordion (Transmitter Mode) on page 639
- Edit Output - Output Accordion (Receiver Mode) on page 642

Edit Output - Output Accordion (Transmitter Mode)

The **Output** accordion is open by default.

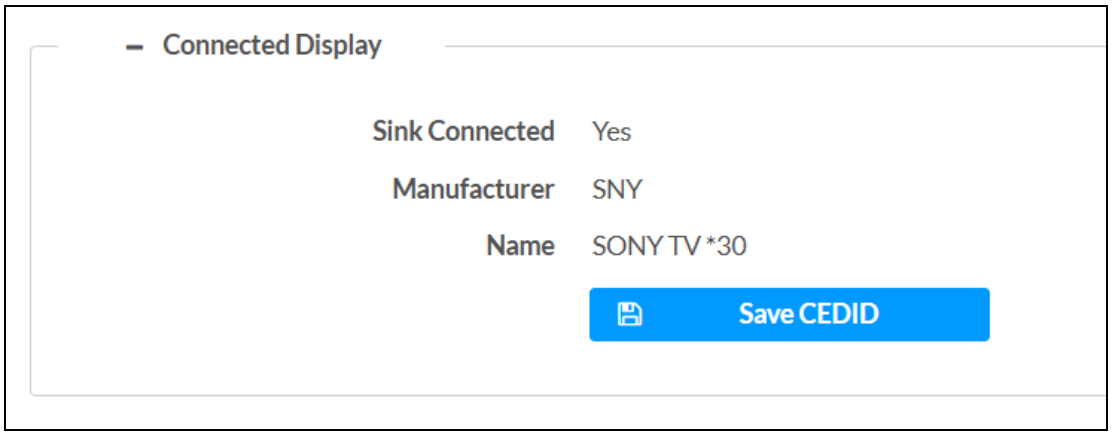


HDMI Output Settings

Configure basic settings under the **HDMI Output Setting** subheading:

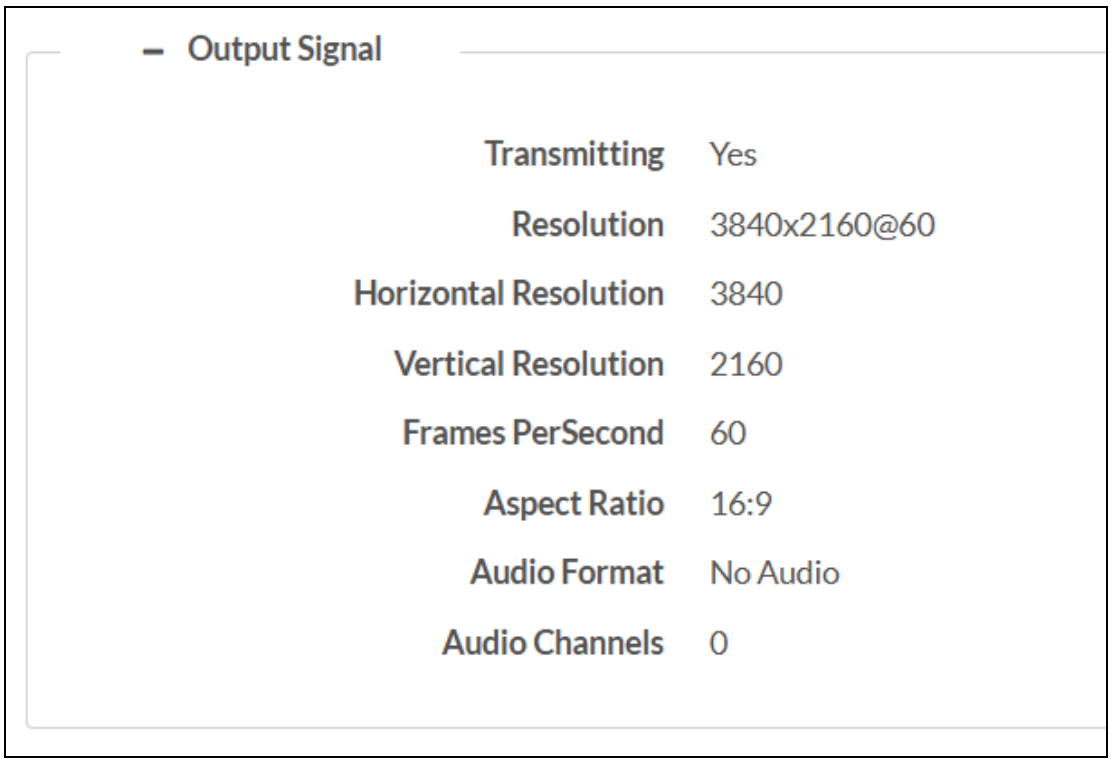
- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Enter a friendly name for the output in the **Name** text entry field.
- Use the **HDCP Transmitter Mode** drop-down to select between:
    - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
    - **Follow Input:** The HDCP level of the output will be forced to the supported HDCP level of the local input.
    - **Force Highest:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the entire signal chain.
    - **Never Authenticate:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.

Connected Display



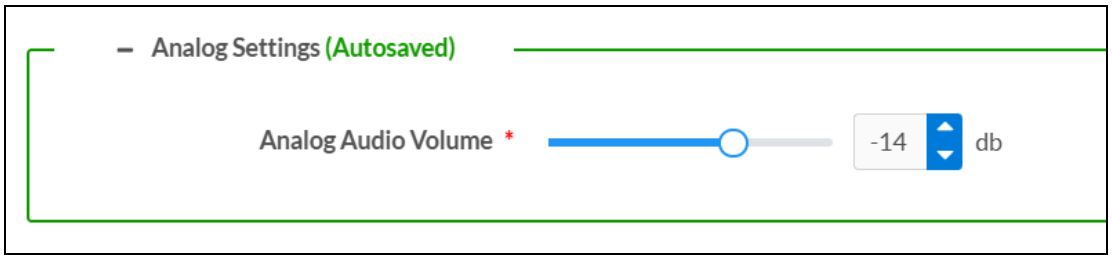
The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 570 for more information on loading custom EDID files.

Output Signal



The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.

Analog Settings

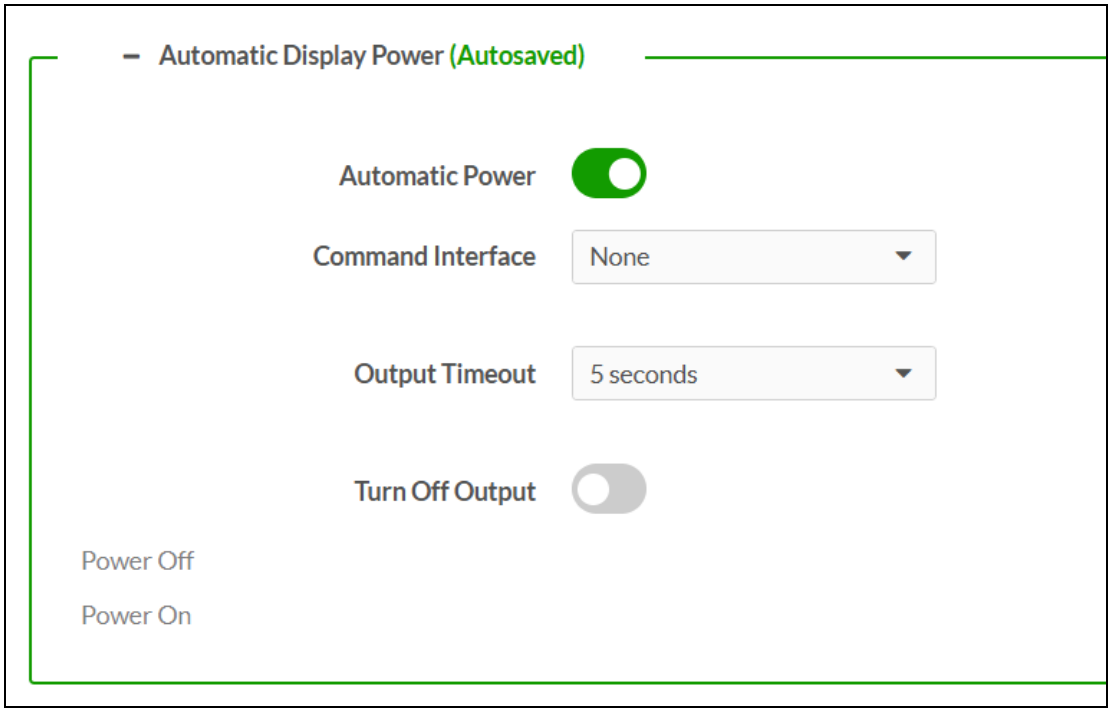


To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

Automatic Display Power



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

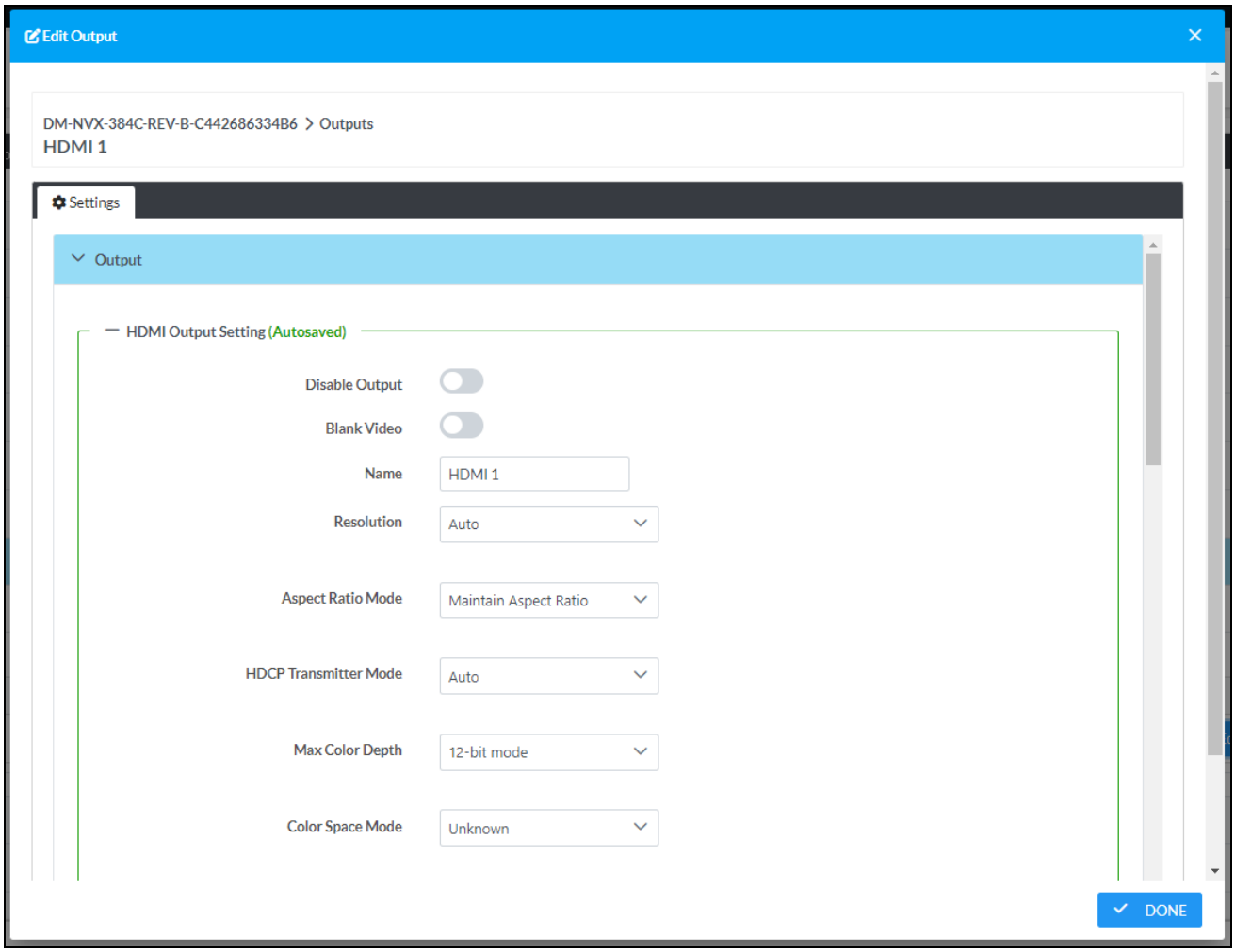
Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**

> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Edit Output - Output Accordion (Receiver Mode)

The **Output** accordion is open by default.



HDMI Output Settings

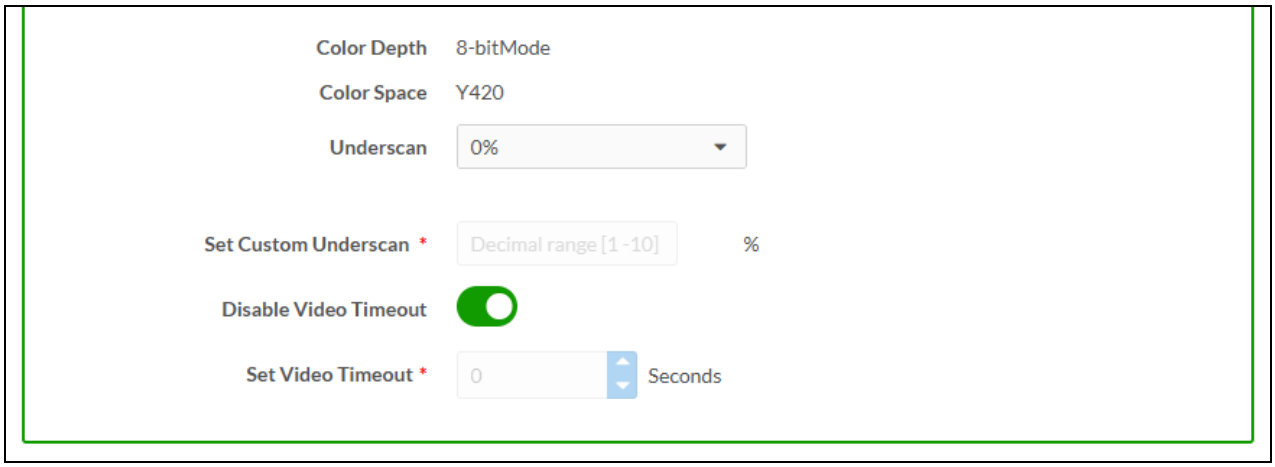
Configure basic settings under the **HDMI Output Setting** subheading:

- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Set the **Blank Video** toggle to the right to transmit a full-screen black video signal. Set the toggle to the left to transmit the video signal of the selected input.
- Enter a friendly name for the output in the **Name** text entry field.
- Use the **Resolution** drop-down to select between **Auto** or any of the available fixed resolutions. This enables the internal scaler to either match the highest possible resolution of the display or the selected fixed resolution.

- Use the **Aspect Ratio Mode** drop-down to select between:
  - **Maintain Aspect Ratio:** The aspect ratio of the source signal is preserved at the output. This may result in letter-boxing or pillar-boxing black bars at the edges of the display area.
  - **Stretch To Fit:** The aspect ratio of the source signal is stretched to fit the aspect ratio of the display. This may distort the image of the incoming video signal.
  - **1:1 Pixel Mapping:** The source signal is mapped 1:1 at the display without any aspect ratio scaling. This will preserve the aspect ratio of the source signal, but may not fill the entire display area, resulting in black borders around the image.
  - **Zoom:** The aspect ratio of the source signal is zoomed in to meet the full height or width capabilities of the display, whichever is greater than the incoming signal. This may crop out parts of the incoming video signal.
- Use the **HDCP Transmitter Mode** drop-down to select between:
  - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
  - **Follow Input:** The HDCP level of the output will be forced to the supported HDCP level of the local input.
  - **Force Highest:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the entire signal chain.
  - **Never Authenticate:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.
- Use the **Max Color Depth** drop-down to limit the color depth to a specific bit depth.
- Use the **Color Space Mode** drop-down to select between **Auto** or a specific color mode to force the output signal to.

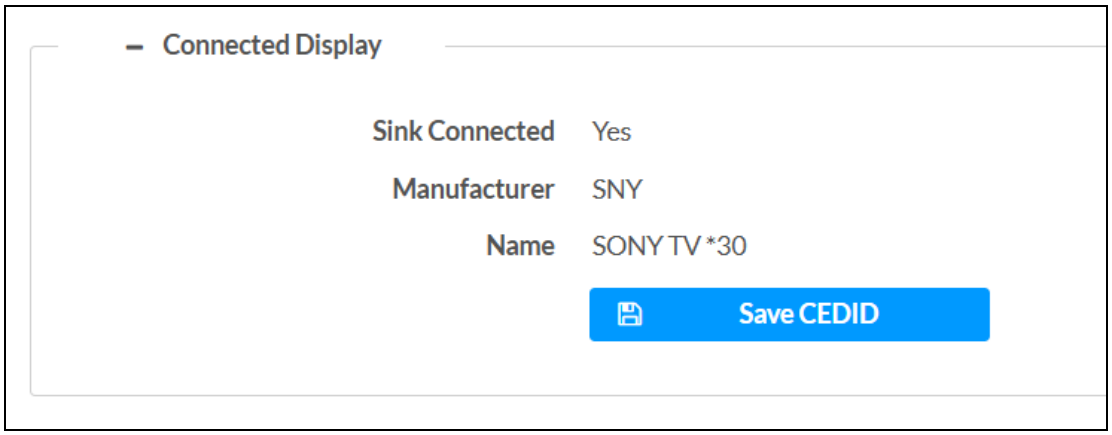
> **NOTE:** The options available in the **Max Color Depth** and **Color Space Mode** drop-downs may be limited by the resolution of the output signal. Refer to the maximum supported resolutions table in DM-NVX-384 Specifications on page 278 for information on supported depths and spaces at each maximum resolution.

- The **Color Depth** and **Color Space** fields are read-only values that display the current depth and space of the video output signal, respectively.



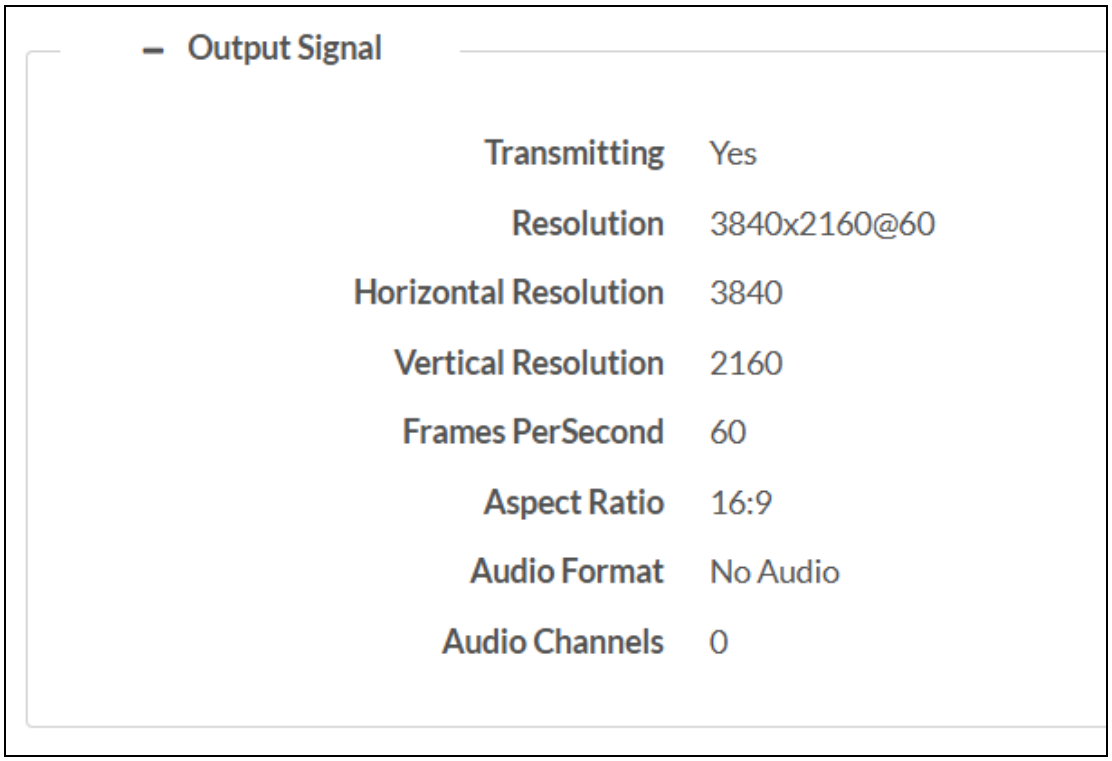
- Use the **Underscan** drop-down to select an underscan percentage from between **0%**, **2.5%**, **5%**, **7.5%**, or **Custom**.
    - Selecting **0%** will maintain the size of the source image area relative to the full video resolution and will preserve the image aspect ratio. Selecting higher values will shrink the size of the source image within its resolution while still preserving its aspect ratio. Any pixels outside of the image area in the full resolution will be filled by a black border.
    - When **Custom** is selected, the **Set Custom Underscan** text entry field will become available.
- Use the **Set Custom Underscan** field to enter an underscan percentage from 1 to 10% in integer values. This field is only available when **Custom** is selected in the **Underscan** drop-down.
- Set the **Disable Video Timeout** toggle to the right to prevent the output signal from turning off when a source signal is no longer detected. Set the toggle to the left to enable a video timeout. When the toggle is set to the left, the **Set Video Timeout** text box will become available.
- Use the **Set Video Timeout** text box to determine how long the device will wait to disable the HDMI output after an input video signal is no longer detected. Enter a time in seconds or use the arrows to set the timeout. By default, the timeout is set to 0 seconds. This text box is only available when the **Disable Video Timeout** toggle is set to the left.

Connected Display



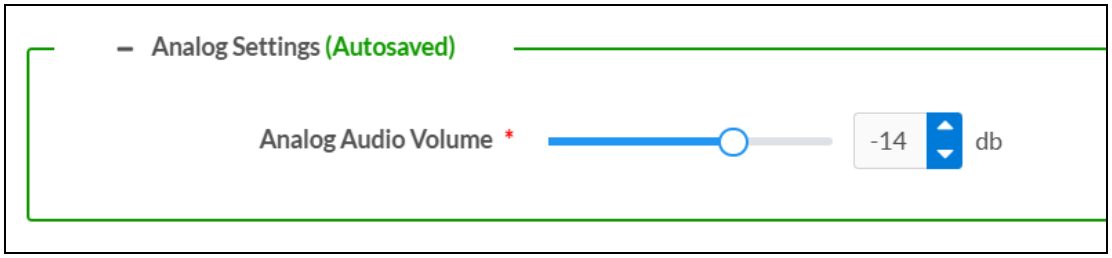
The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 570 for more information on loading custom EDID files.

Output Signal



The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.

Analog Settings

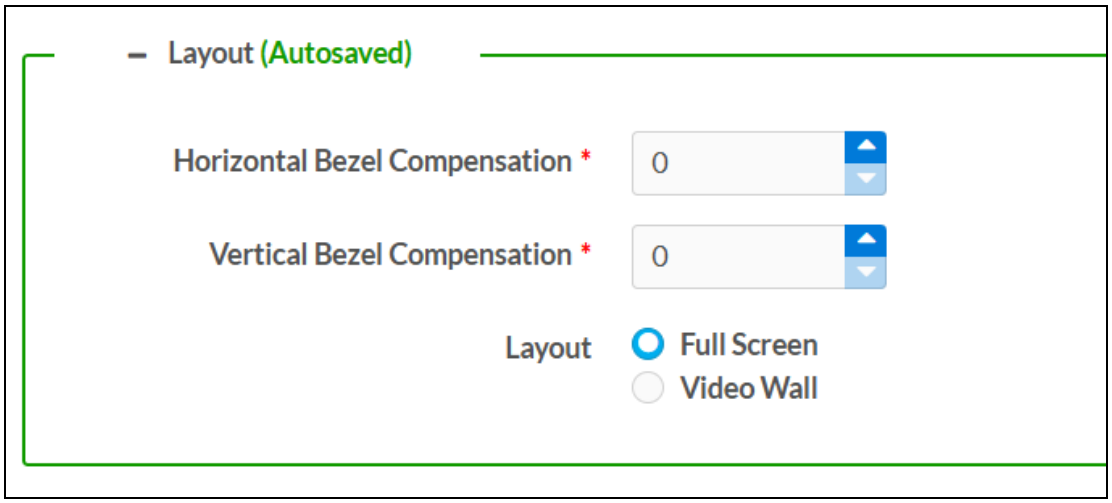


To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

Layout



Use the settings under the **Layout** subheading to manage the bezel compensation of the output signal and to enable video wall mode.

The **Bezel Compensation** fields allow the output signal to compensate for the width of the bezels on the display to provide a more seamless appearance in video wall mode.

To adjust the bezel compensation:

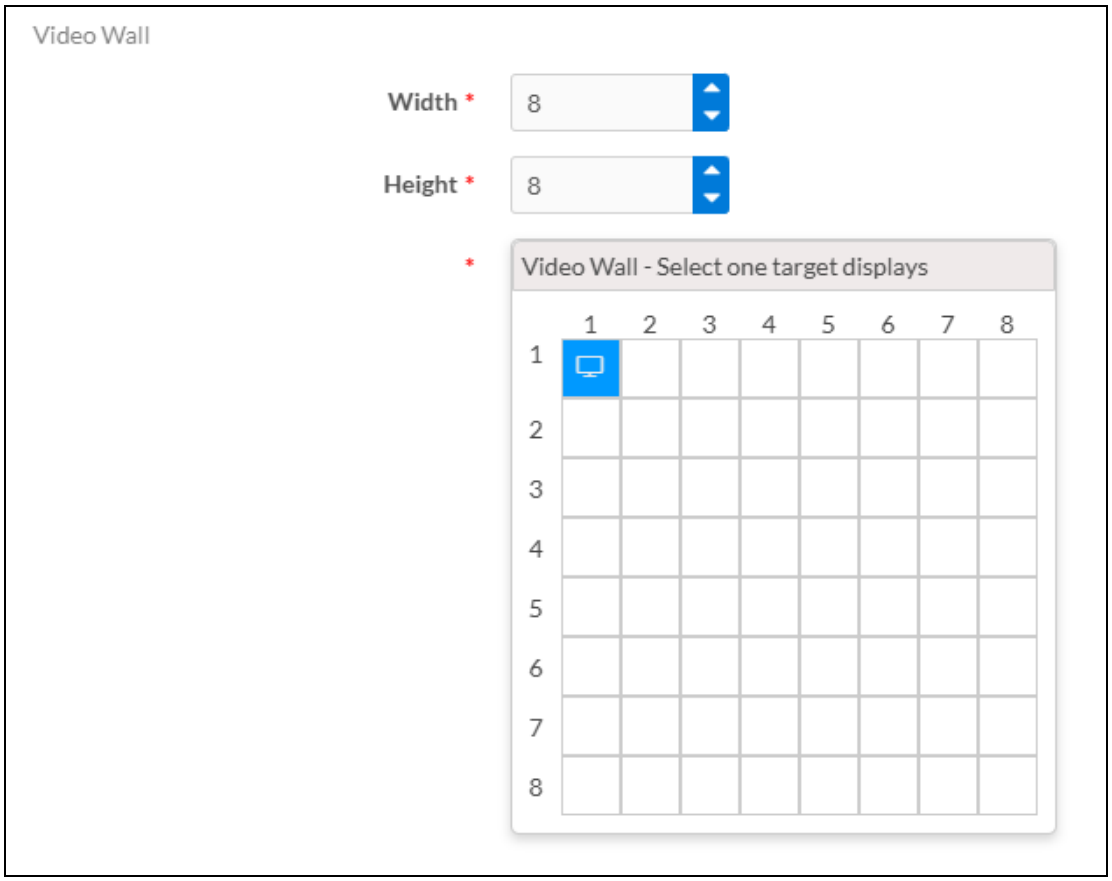
- Use the arrows or enter a value in the **Horizontal Bezel Compensation** field. This sets the width of the bezels on the left and right of the display. Values range from 0 to 500 pixels.
- Use the arrows or enter a value in the **Vertical Bezel Compensation** field. This sets the height of the bezels on the top and bottom of the display. Values range from 0 to 500 pixels.

Multiple DM NVX decoder devices with output scalers can be combined to form a video wall composed of up to 64 individual displays (8 columns by 8 rows). A separate scaling decoder is required for each display. To enable video wall mode, select **Video Wall** from the **Layout** options.

To configure the video wall:

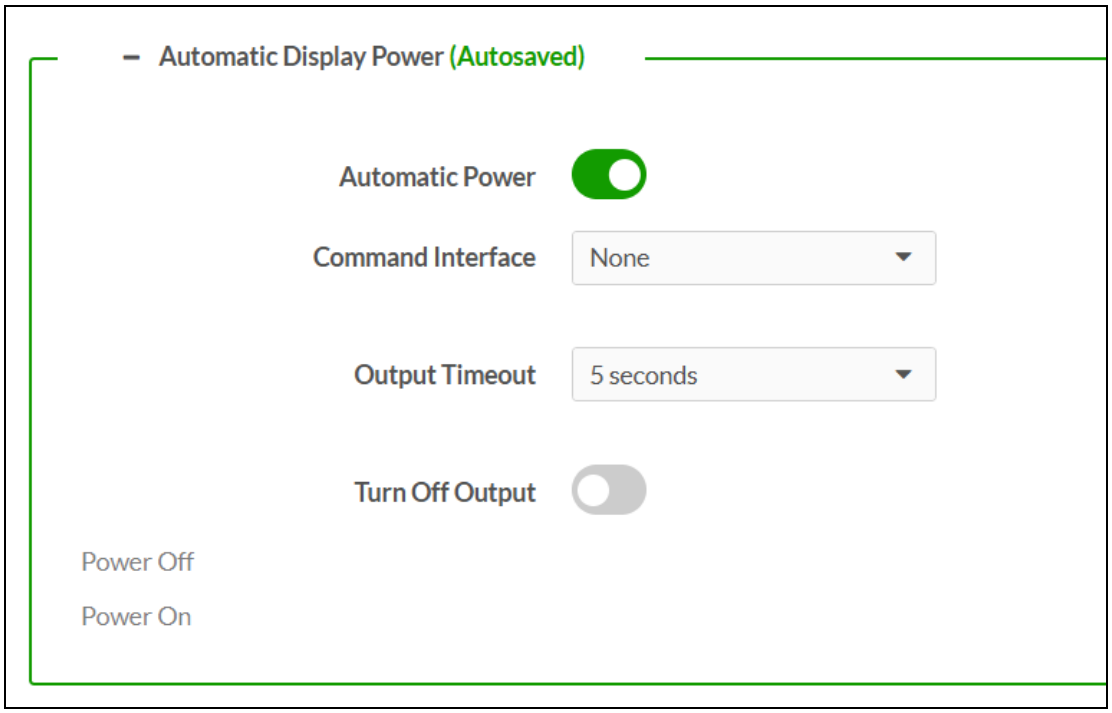
1. Use the arrows or enter a value to set the **Width** text box to the desired number of columns of displays. Values range from 1 to 8. The default value is 1.
2. Use the arrows or enter a value to set the **Height** text box to the desired number of rows of displays. Values range from 1 to 8. The default value is 1.

3. Select the desired location for the current DM NVX device among the video wall by selecting its corresponding rectangle. In the image below, the DM NVX decoder being configured will output video to the top left display in an 8x8 video wall.



4. Repeat this process on all DM NVX decoders in the video wall.

Automatic Display Power



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**.

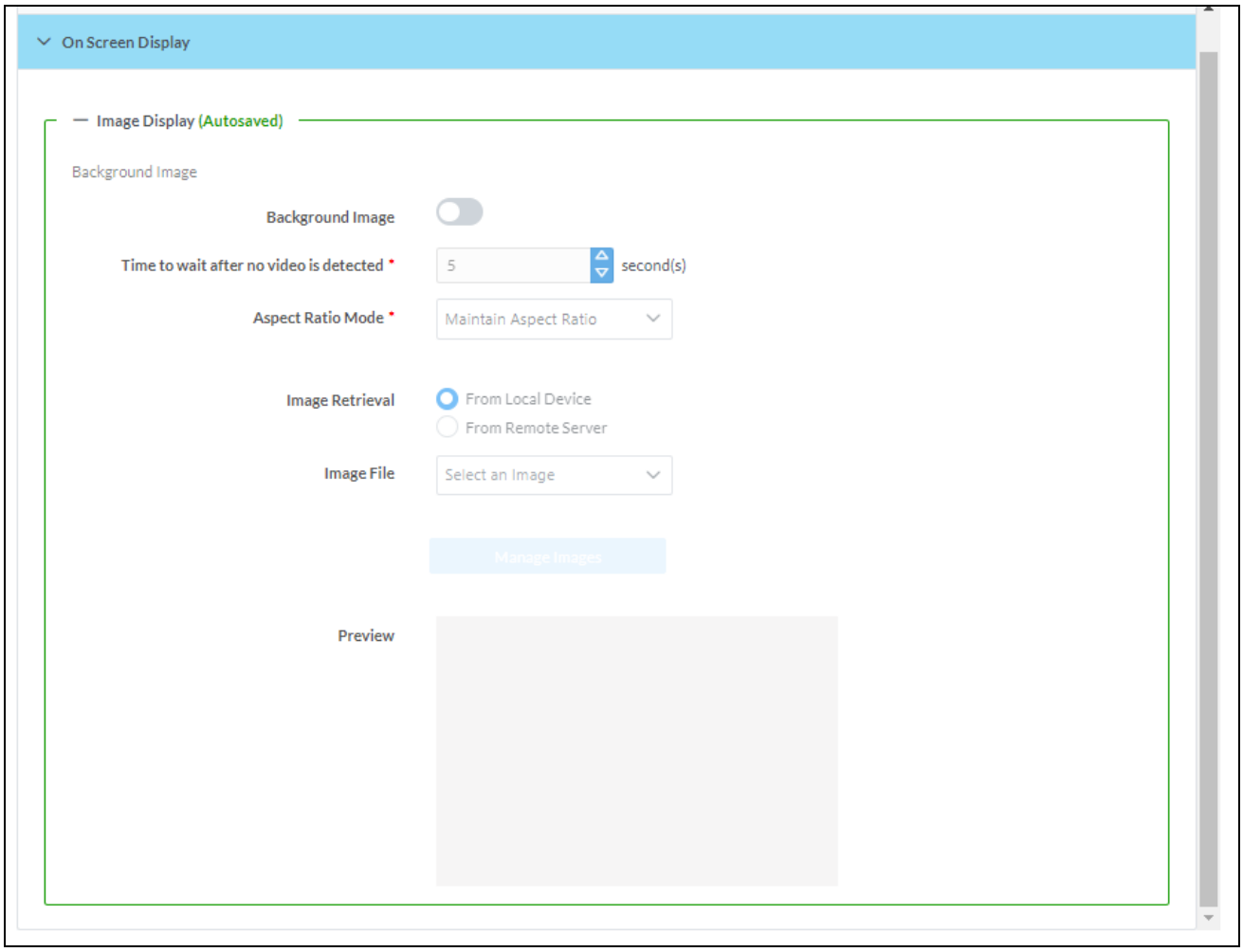
> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Edit Output - On Screen Display Accordion (Receiver Mode)

Select the **On Screen Display** accordion to expand it. This accordion houses the **Image Display** settings that allow a static background image to be shown on the connected display.

> **CAUTION:** Displaying a static image for extended periods of time may result in image burn-in on any type of connected display. Consult documentation from the display manufacturer to determine recommended timeout or image refresh settings to avoid burn-in.



To configure the **Image Display** settings:

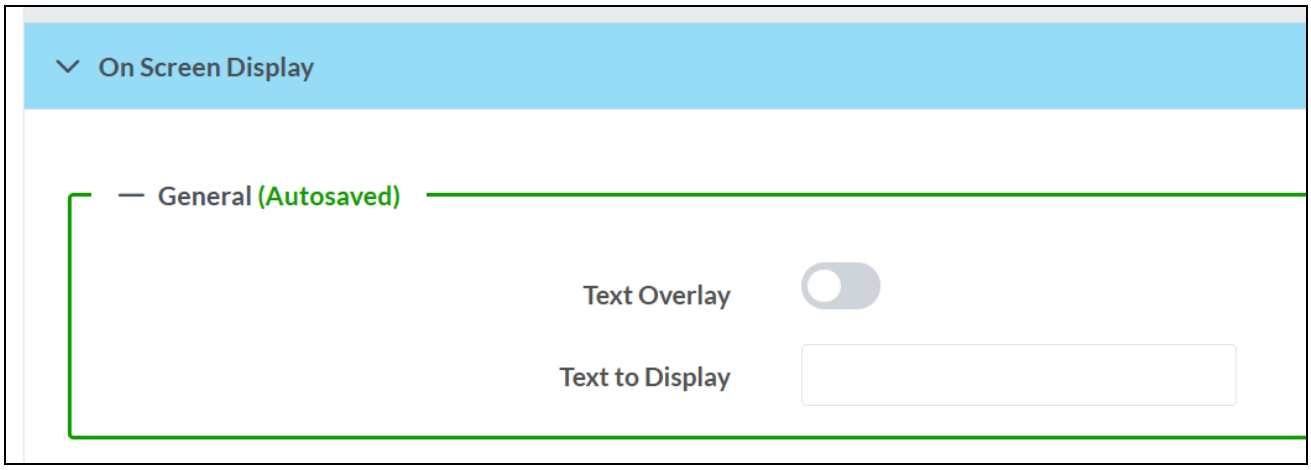
1. Set the **Background Image** toggle to the right to display a background image on the connected display, and to make all the other settings in the accordion available for configuration.
2. Enter a value in the **Time to wait after no video is detected** field from 5 seconds to 65,535 seconds to determine how long the device will wait after input signal is no longer detected before displaying the background image.
3. Use the **Aspect Ratio Mode** drop-down to select one of the following:
    - **Maintain Aspect Ratio:** The aspect ratio of the background image is preserved at the output. This may result in letterboxing or pillarboxing black bars at the edges of the display area.
    - **Stretch:** The aspect ratio of the background image is stretched to fit the aspect ratio of the display. This may distort the background image.
    - **1:1:** The background image is mapped 1:1 at the display without any aspect ratio scaling. This will preserve the aspect ratio of the image, but may not fill the entire display area, resulting in black borders around the image.

4. Select an option for **Image Retrieval**:
    - **From Local Device:** Select this option if an image stored locally on the DM NVX device will be used as the background image. Select the desired image from the **Image File** drop-down. To load custom images to the DM NVX device, select **Manage Images** from the **Edit Output** window or from the **Action** menu. Refer to Action on page 570 for more information.
    - **From Remote Server:** Select this option if an image hosted on a network server will be used as the background image. Enter the network file path to the image in the **Remote Path** field.
        - This option also allows the DM NVX device to refresh the image at a given interval. To have the DM NVX refresh the image, select the **Refresh** checkbox below the **Image Preview**, then enter a refresh rate in minutes from 1 to 65,535 minutes. The default refresh rate is 60 minutes.

To disable the background image, set the **Background Image** toggle to the left.

On Screen Display

The **On Screen Display** accordion enables setting a text string to overlay onto the video output signal.

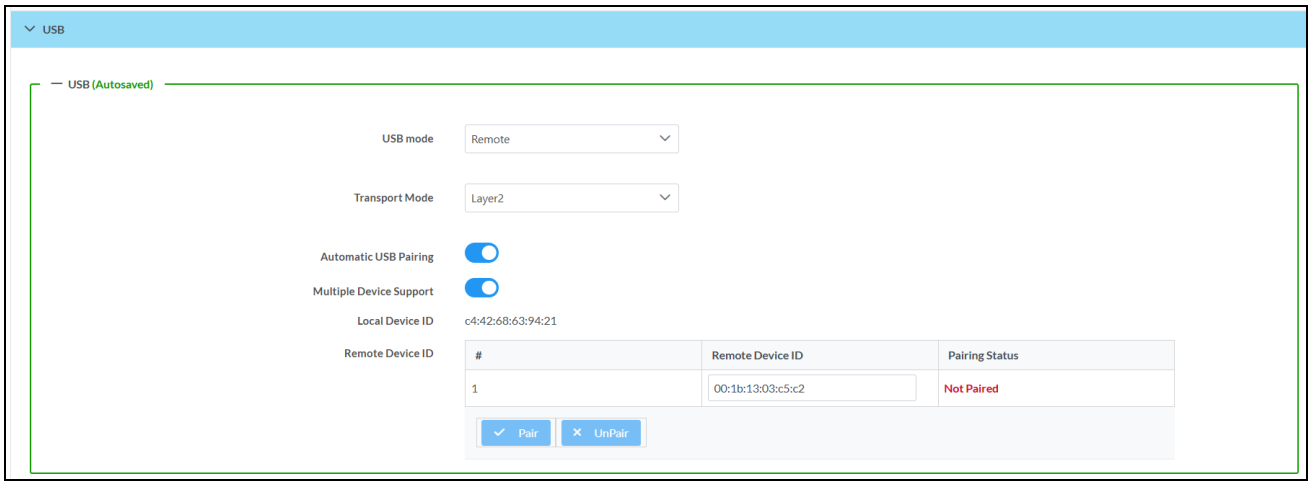


To add a text string to the video output signal:

1. Set the **Text Overlay** toggle to the right to enable the feature.
2. Enter the desired text string in the **Text to Display** field.

USB

Use the **USB** accordion to configure USB-over-Ethernet and USB hot key settings for the DM NVX device.



To configure USB routing, follow the steps below. These steps must be repeated on both devices in a given USB pairing for the two devices to pair successfully:

1. Select a **USB mode** from the drop-down:
   - In **Local** mode, USB signals from another **Remote** device on the network are extended to the **TO HOST DP-S USB2 (IN 3-4)** connectors of the DM NVX device.
   - In **Remote** mode, USB devices connected to the **USB2 TO DEVICE** and **HID TO DEVICE** ports are extended over the network to a **Local** device.
2. Select a **Transport Mode** from the drop-down:
   - **Layer 2**: Enables Layer 2 transport of USB 2.0 data. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), DM-NVX-38X(C), and DM NUX USB-over-Ethernet devices (DM-NUX-L2 and DM-NUX-R2). Devices will pair via MAC address.
   - **Layer 3**: Enables Layer 3 transport of USB 2.0 data across VLANs. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), and DM-NVX-38X(C) devices. Devices will pair via IP address.

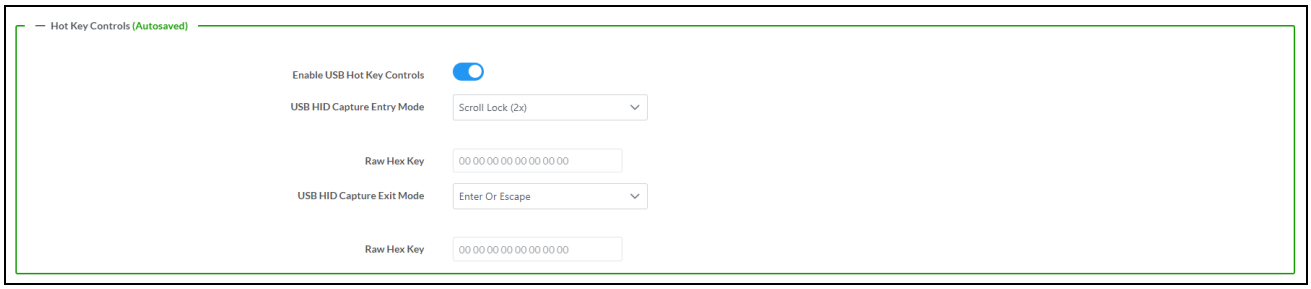
     > **NOTE:** This mode is not compatible with DM NUX USB-over-Ethernet devices.
3. Set the **Automatic USB Pairing** toggle to the right to enable or left to disable **Automatic Pairing**. With **Automatic Pairing** enabled, once a **Remote Device ID** is entered in the **Remote Device ID** table, and the corresponding device also has the matching **Remote Device ID** entered in its table, the devices will pair automatically.
4. Set the **Multiple Device Support** toggle to the right to right to enable or left to disable **Multiple Device Support**. If the device is set to **Local** mode and **Layer 2** transport, **Multiple Device Support** allows it to receive USB data from up to seven **Remote** extenders. A hub must be used to connect devices to the **TO DEVICE** port of each DM NVX **Remote** extender.

5. Enter the applicable ID strings in the **Remote Device ID** table:
    - If the device is set to **Local** mode and **Layer 2** transport, enter the MAC address of each remote extender. **Multiple Device Support** must be enabled to enter more than one remote extender.
    - If the device is set to **Local** mode and **Layer 3** transport, enter the IP address of the remote extender.
    - If the device is set to **Remote** mode and **Layer 2** transport, enter the MAC address of the local extender.
    - If the device is set to **Remote** mode and **Layer 3** transport, enter the IP address of the local extender.
6. Once the ID strings have been entered on both the local and remote devices, select **Pair** to pair the devices. If **Automatic USB Pairing** is enabled, pairing will occur automatically once the ID strings have been entered.

To remove pairing between DM NVX devices:

- If **Automatic USB Pairing** is disabled, select **UnPair**.
- If **Automatic USB Pairing** is enabled and **Layer 2** transport is selected, enter a MAC address of 00:00:00:00:00:00 in the **Remote Device ID** field.
- If **Automatic USB Pairing** is enabled and **Layer 3** transport is selected, enter an unused IP address in the **Remote Device ID** field.

The **Hot Key Controls** portion of the accordion provides settings for entering and exiting USB HID capture mode. USB HID capture mode allows HID keyboard presses to output serial data from the USB Hotkey symbol of the DM NVX device's SIMPL Windows device definition. Refer to the USB Hotkey symbol help file for more information on using this symbol in a SIMPL Windows control system program.



To configure the **Hot Key Controls** settings:

1. Set the **Enable USB Hot Key Controls** toggle to the right to enable the **USB HID Capture Entry Mode** and **USB HID Capture Exit Mode** hot keys. Set the toggle to the left to disable the hot keys.
2. Select a **USB HID Capture Entry Mode** hot key option from the drop-down. This is the HID keyboard key (or combination of keys) that will put the **USB Hotkey** SIMPL symbol into HID capture mode. While in this mode, any HID keyboard presses will output as raw hex data on the **Message_F** serial join of the symbol.
    a. If **Custom** was selected from the drop-down, enter the serial data for the key (or keys) into the **Raw Hex Key** text entry. This data can be pulled from the **USB Hotkey** SIMPL symbol's **Message_F** serial join via the SIMPL Debugger utility in Crestron Toolbox™ software.

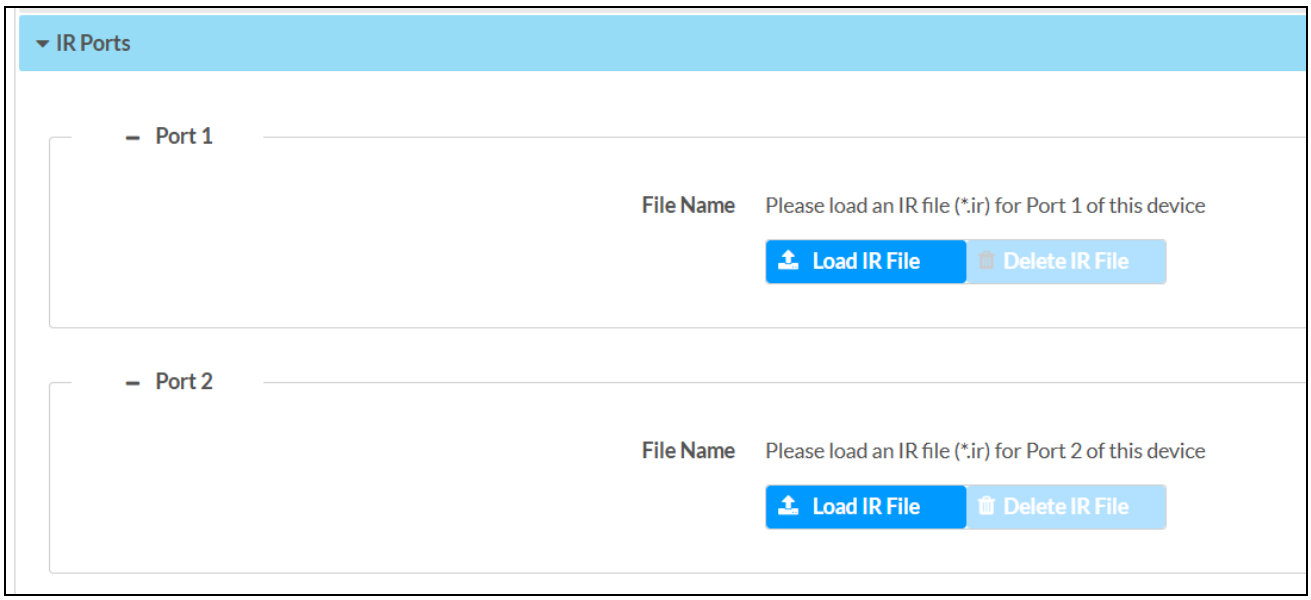
3. Select a **USB HID Capture Exit Mode** hot key option from the drop-down. This is the HID keyboard key (or combination of keys) that will exit the **USB Hotkey** SIMPL symbol from HID capture mode.
    a. If **Custom** was selected from the drop-down, enter the serial data for the key (or keys) into the **Raw Hex Key** text entry. This data can be pulled from the **USB Hotkey** SIMPL symbol's **Message_F** serial join via the SIMPL Debugger utility in Crestron Toolbox™ software.

> **NOTE:** While in **USB HID Capture Mode**, all HID data from a connected keyboard is output as raw hex data from the SIMPL symbol's **Message_F** serial join instead of being forwarded to a connected Host device.

IR Ports

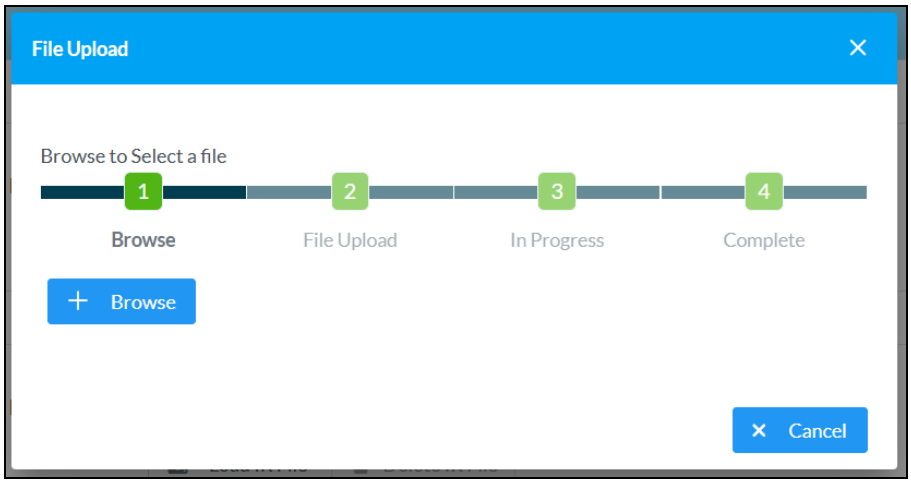
> **NOTE:** This accordion is not available on card-based models.

The **IR Ports** accordion allows custom IR files containing device commands to be uploaded to the DM NVX device for each IR connector. Custom IR files can be generated via the Device Learner utility within Crestron Toolbox software. Each IR port can hold only one IR file at a time. IR files must be loaded to each port individually.



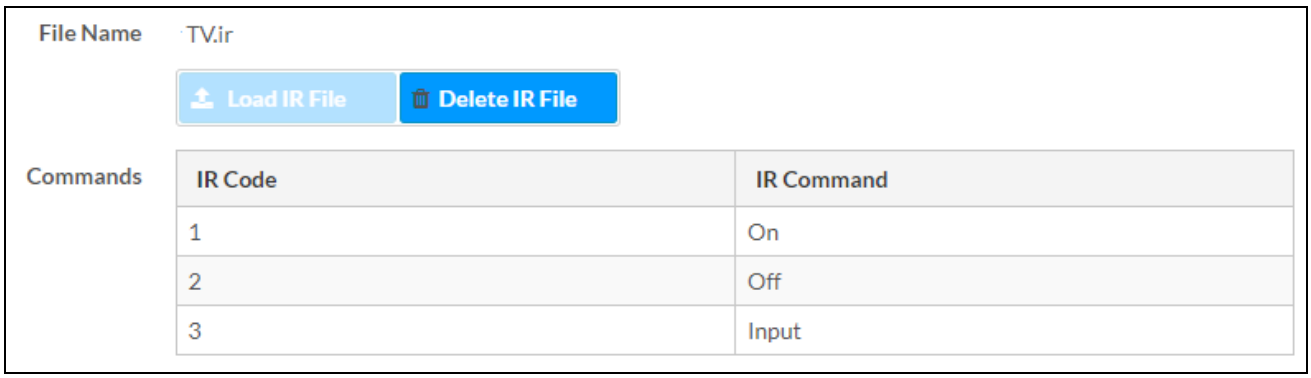
To upload an IR file to a given IR port:

1. Select **Load IR File**.
2. In the **File Upload** window that appears, select **+ Browse**.



3. Locate and select the desired IR file, then select **Open**. The selected file name is displayed.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The IR file is now loaded to the IR port.

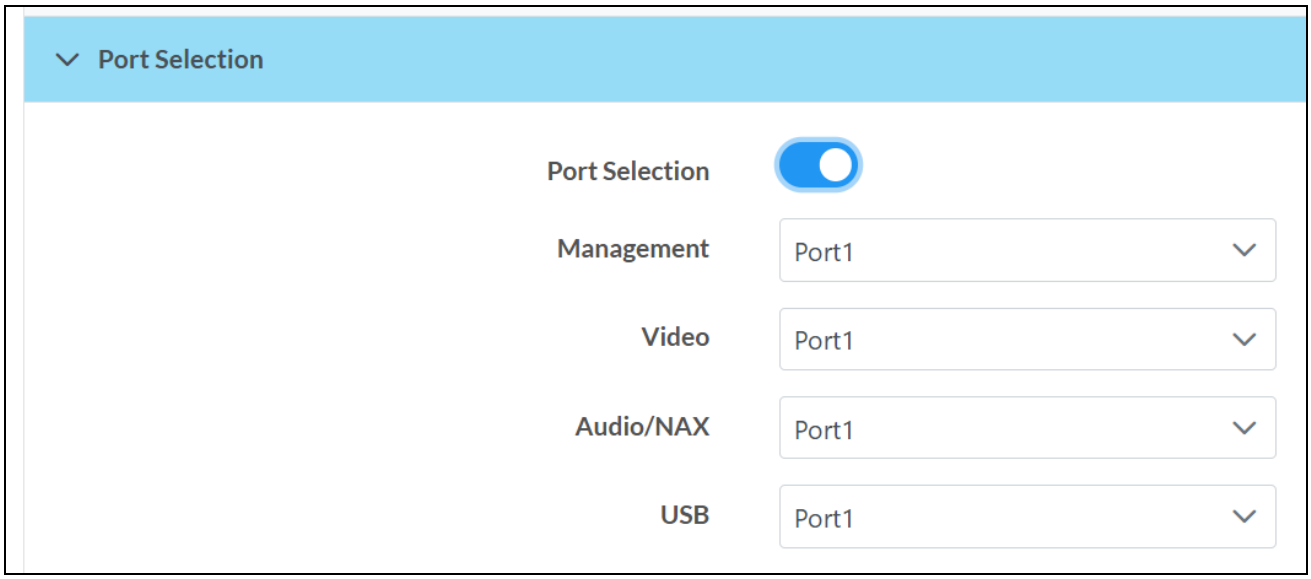
Once the IR file is uploaded, its filename will appear next to the IR port it was uploaded to. A read-only table showing all included commands will also appear and populate.



To delete an IR file from a given IR port, select **Delete IR File**.

Port Selection

The **Port Selection** feature allows the device's internal network traffic to be managed and segregated based on traffic type. Internal VLANs are used to segment device management, video, AES67, and USB traffic to discrete Ethernet ports. With **Port Selection** disabled, the additional Ethernet ports of the DM NVX device can be used as courtesy ports to extend the connected LAN to a local network device. With **Port Selection** enabled on all DM NVX devices on a network, traffic types can be physically separated from the control network onto dedicated networks.



To configure **Port Selection**:

1. Set the **Port Selection** toggle to the right to enable **Port Selection**. Set the toggle to the left to disable **Port Selection**. By default, **Port Selection** is disabled.
2. With **Port Selection** enabled:
    a. Select an Ethernet port from the **Management** drop-down to designate it to handle network traffic relating to device configuration and connection to a control system.
    b. Select an Ethernet port from the **Video** drop-down to designate it to handle the DM NVX AV-over-IP streaming network traffic.
    c. Select an Ethernet port from the **Audio/NAX** drop-down to designate it to handle audio-over-IP streaming network traffic.

    > **NOTE:** The audio signal in the primary DM NVX AV-over-IP stream will still traverse the port designated by the **Video** drop-down. The **Audio/NAX** drop-down only designates the port for the secondary audio stream.

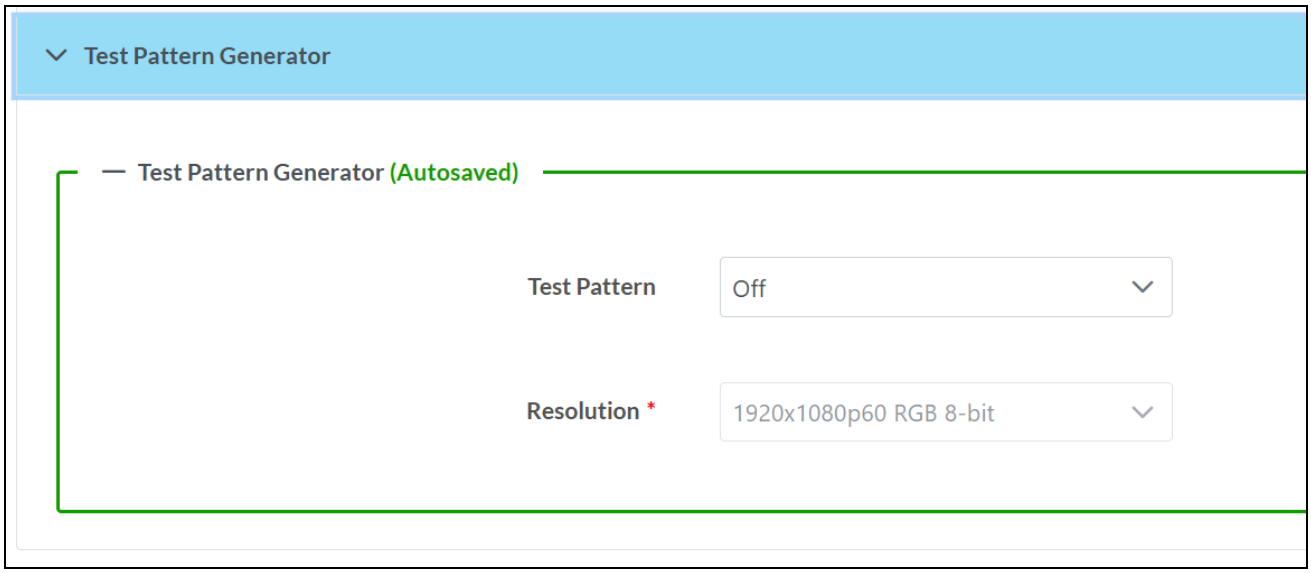
    d. Select an Ethernet port from the **USB** drop-down to designate it to handle USB-over-Ethernet traffic.
3. Select **Save** to apply the new settings.

    > **NOTE:** Changes to **Port Selection** will require a device reboot.

Test Pattern Generator

The **Test Pattern Generator** accordion contains settings for enabling various video test patterns to replace the DM NVX AV-over-IP video output signal.

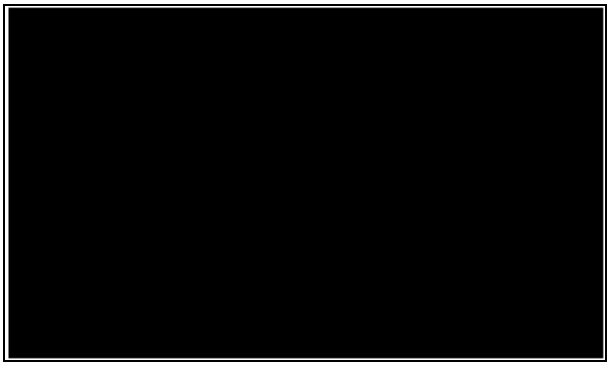
> **NOTE:** The **Test Pattern Generator** accordion is only available when the device is set to **Transmitter** mode.

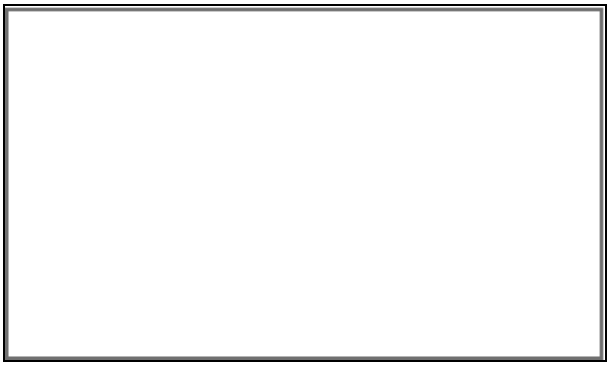
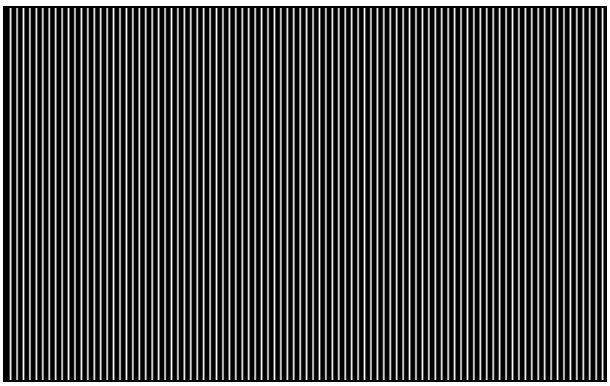
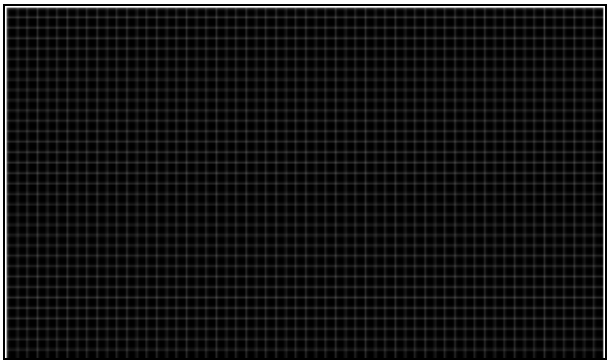
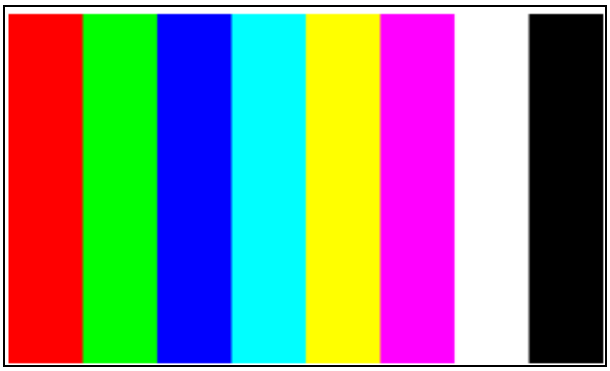


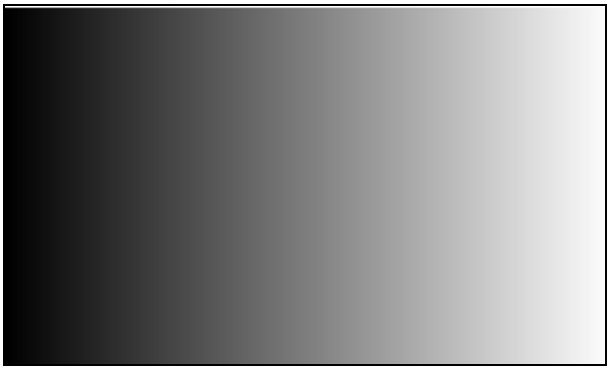
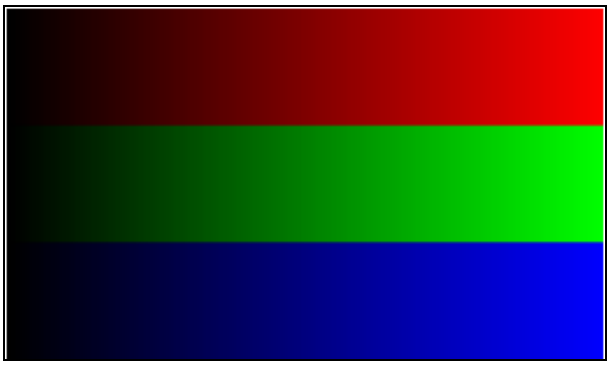
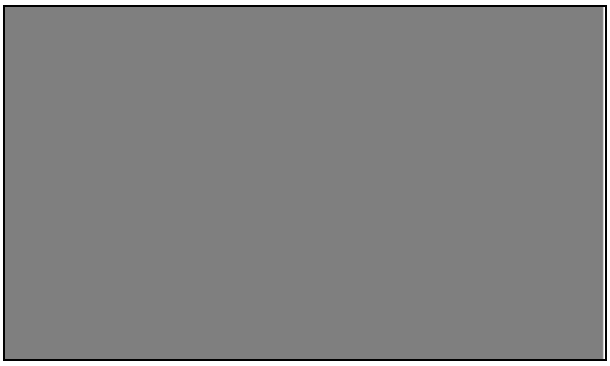
To set a test pattern:

1. Use the **Test Pattern** drop-down to select an available pattern from among **Off**, **SMPTE ColorBars**, **Black**, **White**, **Vertical Lines**, **Grid**, **Color Bars**, **Gray Gradient**, **RGB Gradient**, and **Frequency Adjust**. Refer to the table below for a reference of each pattern.
2. Use the **Resolution** drop-down to select a resolution for the selected test patten.

Available Test Patterns

SMPTE ColorBars	
Black	

White	
Vertical Lines	
Grid	
Color Bars	

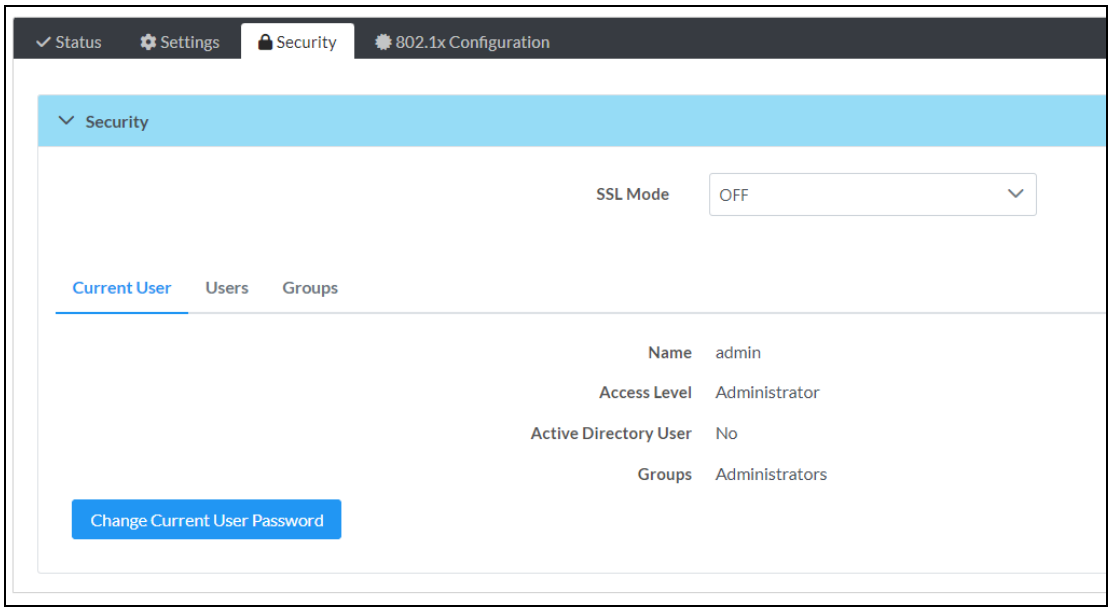
Gray Gradient	
RGB Gradient	
Frequency Adjust	

Security

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-384
- DM-NVX-384C
- DM-NVX-385
- DM-NVX-385C

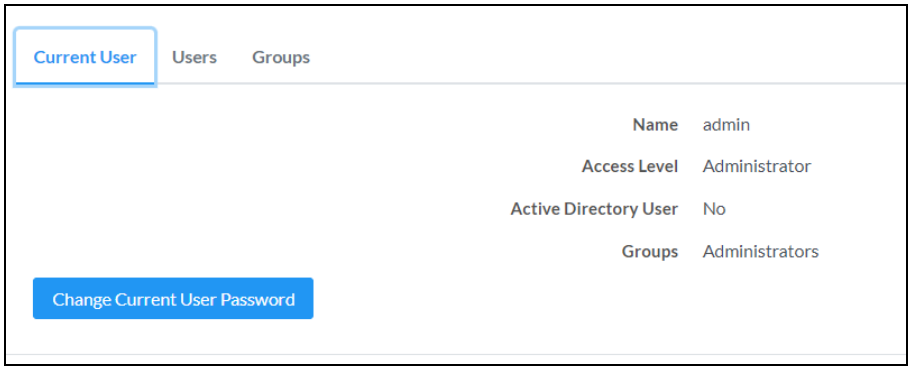
Select the **Security** tab to configure security for users and groups and to allow different levels of access to the DM NVX device functions. By default, security is disabled.



Select **Encrypt and Validate**, **Encrypt**, or **OFF** from the **SSL Mode** drop-down menu to specify whether to use encryption. By default, **SSL Mode** is set to **OFF**.

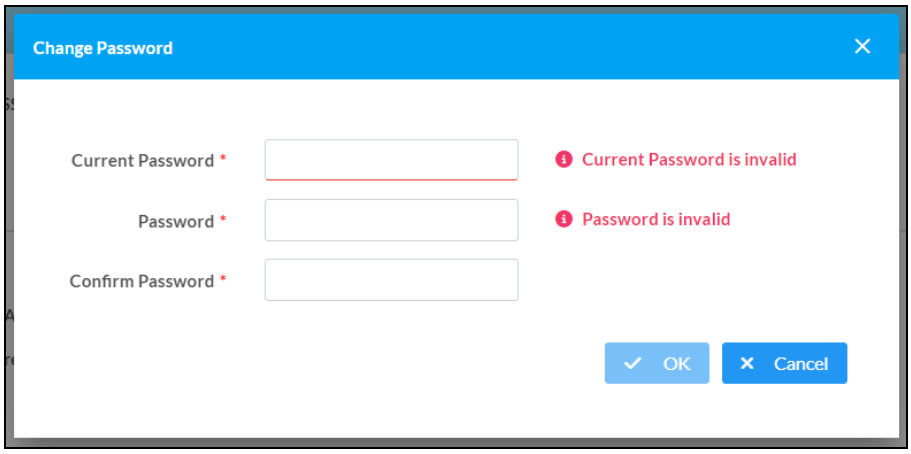
Current User

Select the **Current User** tab to view read-only information or to change the password for the current user.



To change the password for the current user account:

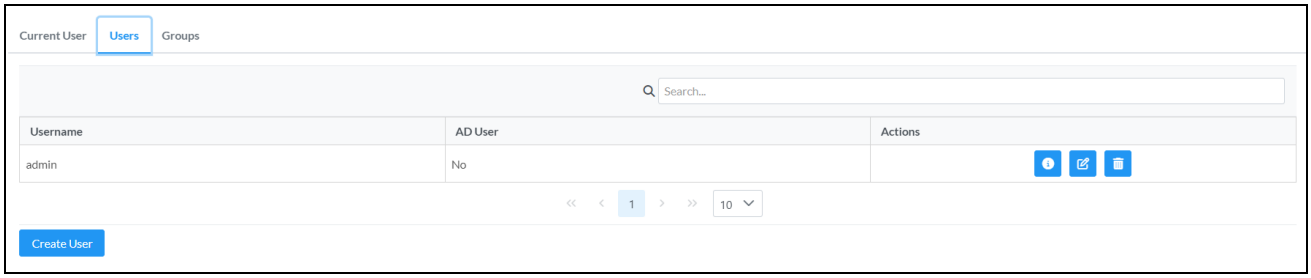
1. Select **Change Current User Password**.
2. In the **Change Password** dialog, enter the current password in the **Current Password** field, the new password in the **Password** field, and then re-enter the same new password in the **Confirm Password** field.



3. Select **OK** to save or select **Cancel** to cancel the changes.

Users

Select the **Users** tab to view and edit user settings. The **Users** tab can be used to add or remove local and Active Directory users and preview information about them.



Use the **Search Users** field to enter search term(s) and display users that match the search criteria.

If users listed in the **Users** table span across multiple pages, navigate through the list by selecting a page number or by using the left or right arrows at the bottom of the **Users** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 users by using the drop-down to the right of the navigation arrows.

Information about existing users is displayed in table format and the following details are provided for each user.

- **Username:** Displays the name of the user.
- **AD User:** Displays whether the user requires authentication using Active Directory.

Select the information icon in the **Actions** column to view detailed user information, or select the delete icon to delete a user.

To create a new user, select **Create User**.

Create a New Local User

To create a new local user:

1. Select **Create User** in the **Users** tab.
2. In the **Create User** dialog, enter the following:
    a. Enter a user name in the **Name** field. A valid user name can consist of alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
    b. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
    c. Assign the access level by selecting one or more groups from the **Groups** drop-down list.

    > **NOTE:** Make sure that the **Active Directory User** toggle is set to the left (disabled).

3. Select **OK** to save or select **Cancel** to cancel the changes.

Grant Access to an Active Directory User

Users cannot be created or removed from the Active Directory server, but access can be granted to an existing user in the Active Directory server.

To grant access to an Active Directory user, you can either add the user to a local group on the DM NVX device, or add the Active Directory group(s) that they are a member of to the DM NVX device. Refer to Grant Access to an Active Directory Group on page 664 for steps on granting access to a group.

To grant access to an Active Directory user directly:

1. Select **Create User**.
2. In the **Create User** dialog, enter the following:
    a. Enter a user name in the **Name** field in the format "Domain\UserName", for example "crestronlabs.com\JohnSmith". Valid user names can contain alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
    b. Select one or more groups from the **Groups** drop-down list.

    > **NOTE:** Make sure that the **Active Directory User** toggle is set to the right (enabled).

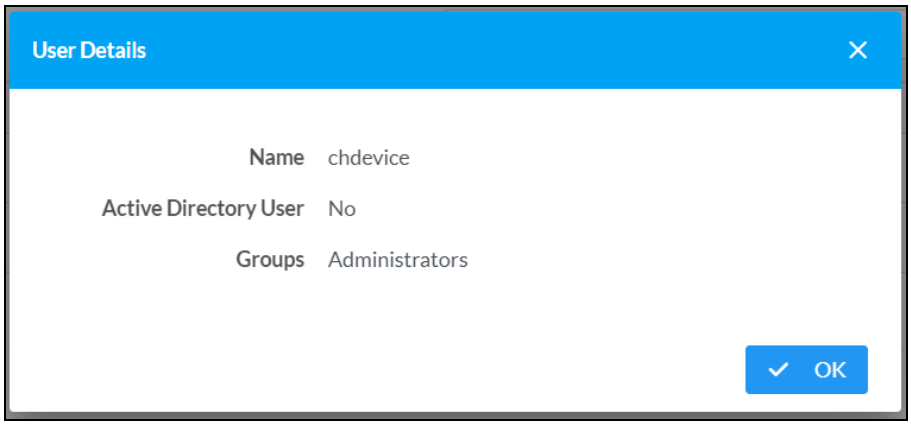
3. Select **OK** to save or select **Cancel** to cancel the changes.

Delete a User

To delete a user, select the trashcan icon in the **Actions** column. Select **Yes** when prompted to delete the user or **No** to cancel the deletion.

View User Details

Select the information icon in the **Actions** column to view information for the selected user. The **User Details** dialog displays the following information for the selected user.



The fields displayed in the **User Details** window are:

- **Name:** Displays the name of the selected user.
- **Active Directory User:** Displays whether the user is an Active Directory user.
- **Group:** Displays group(s) the selected user is part of.

Select **OK** to close the **User Details** window and return to the **Users** tab.

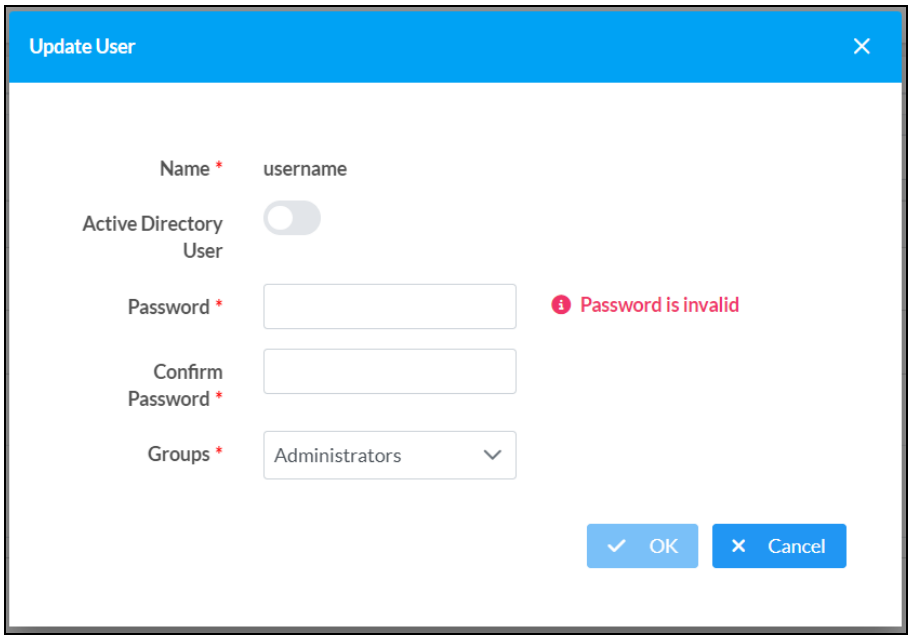
Update User Details

To update the details for an existing user:

1. Select the edit icon in the **Actions** column to update information for the selected user.
2. Set the **Active Directory User** toggle to the right if the user is an Active Directory user, or to the left if the user is not.
3. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
4. Select one or more groups to assign the user to from the **Groups** drop-down list. Deselect any groups to remove the user from those groups.

   > **NOTE:** After a user is removed from a group, they lose any access rights associated with that group.

5. Select **OK** to save or select **Cancel** to cancel the changes.

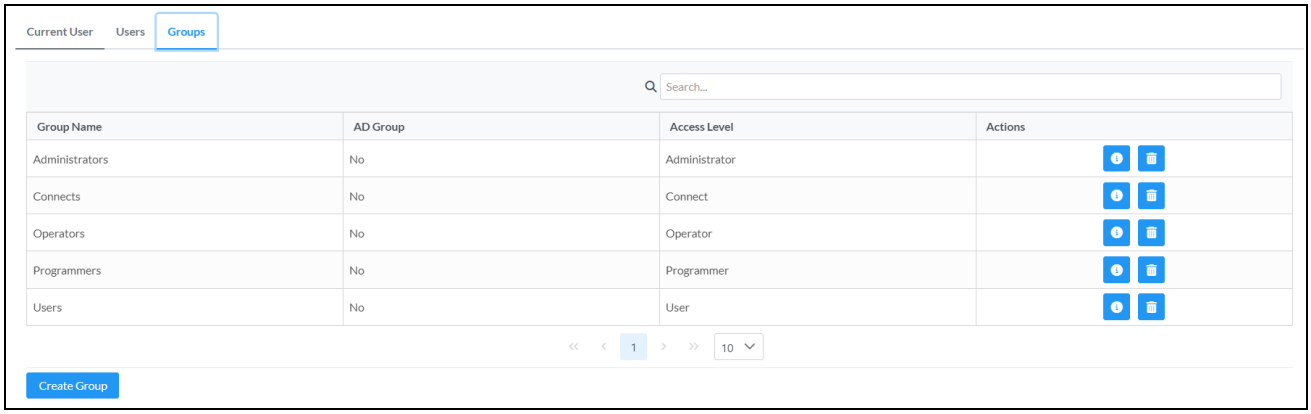


NOTE: The **Name** field is a read-only field that displays the username for the selected user. To change a username, the user must be deleted and a new user must be added.

Groups

Select the **Groups** tab to view and edit group settings. The **Groups** tab can be used to add local and Active Directory groups, remove local and Active Directory groups, and preview information about a group.

Use the **Search Groups** field to enter search term(s) and display groups that match the search criteria.



If groups listed in the **Groups** table span across multiple pages, navigate through the groups by selecting a page number or by using the left or right arrows at the bottom of the **Groups** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 groups by using the drop-down to the right of the navigation arrows.

Existing groups are displayed in a table and the following information is provided for each group:

- **Group Name:** Displays the name of the group.
- **AD Group:** Displays whether the group requires authentication using Active Directory.
- **Access Level:** Displays the predefined access level assigned to the group (Administrator, Programmer, Operator, User, or Connect).

Select the information icon in the **Actions** column to view detailed group information, or select the delete icon to delete a group.

Select **Create Group** in the **Groups** tab to create new group.

Create a Local Group

To create a local group:

1. Select **Create Group**.
2. In the **Create Group** dialog, enter the following:
   a. Enter the group name in the **Name** field.
   b. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the left (disabled).
3. Select **OK** to save. Select **Cancel** to cancel the changes.

Grant Access to an Active Directory Group

A group cannot be created or removed from the Active Directory server, but access can be granted to an existing Active Directory group.

Once the group is added, all members of that group will have access to the DM NVX device.

To grant access to an Active Directory group:

1. Select **Create Group**.
2. In the **Create Group** dialog enter the following:
   a. Enter the group name in the **Name** field (for example, "Engineering Group").

   > **NOTE:** Group names are case sensitive, and a space is a valid character that can be used in group names.
3. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the right (enabled).
4. Select **OK** to save. Select **Cancel** to cancel the changes.

Delete a Group

Select the trashcan icon in the **Actions** column to delete a group. Select **Yes** when prompted to delete the group or **No** to cancel the deletion.

When a group is deleted, users in the group are not removed from the device or Active Directory server. However, because a user's access level is inherited from a group(s), users within the deleted group will lose access rights associated with the group.

View Group Details

Select the information icon in the **Actions** column to view information for the selected group. The **Group Details** dialog lists the following information for the selected group:

- **Name:** Displays the name of the group.
- **Access Level:** Displays the access level of the group and its users.
- **Active Directory Group:** Displays whether the group is an Active Directory group.

Select **OK** to close the **Group Details** dialog and return to the **Groups** tab.

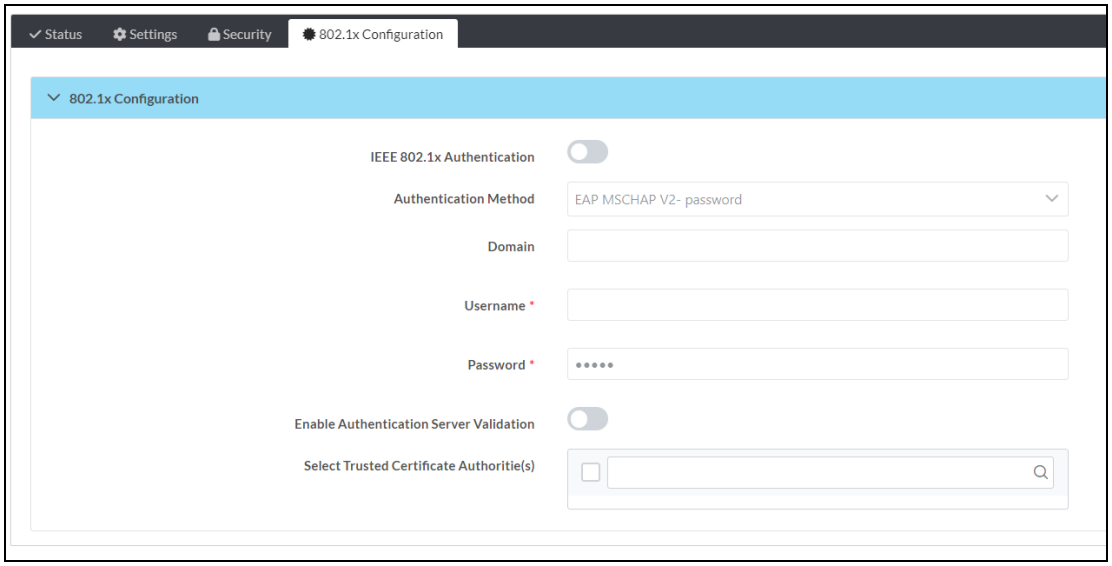
802.1X Configuration

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-384
- DM-NVX-384C
- DM-NVX-385
- DM-NVX-385C

DM NVX devices have built-in support for the 802.1X standard (an IEEE network standard designed to enhance the security of wireless and Ethernet LANs, relying on the exchange of messages between the device and the network's host, or authentication server), allowing communication with the authentication server and access to protected corporate networks.

The **802.1X Configuration** page can be accessed at any time by selecting the **802.1X Configuration** tab of the interface.



Configure the Device for 802.1X Authentication

To configure the DM NVX device for 802.1X Authentication:

1. Set the **IEEE 802.1X Authentication** toggle to the right. This will enable all options on the 802.1X dialog.
2. Select an **Authentication Method**: Choose between **EAP-TLS Certificate** or **EAP-MSCHAP V2 Password** according to the network administrator's requirement.

3. Do one of the following:
    a. If **EAP-TLS Certificate** was selected: Select **Action/Manage Certificates** to upload the required machine certificate. The machine certificate is an encrypted file that will be supplied by the network administrator, along with the certificate password.
    b. If EAP-MSCHAP V2 Password was selected: Enter the username and password supplied by the network administrator into the **Username** and **Password** fields, respectively. This method does not require the use of a machine certificate, only the user name and password credentials.
4. If you enabled the **Enable Authentication Server Validation** option, this will enable the **Select Trusted Certificate Authoritie(s)** list box which contains signed Trusted Certificate Authorities (CAs) preloaded onto the DM NVX device.

    Select the check box next to each CA whose certificate can be used for server validation, as specified by the network administrator.

    If the network does not use any of the listed certificates, the network administrator must provide a certificate, which must be uploaded manually via the **Manage Certificates** function in the **Action** menu. Refer to Action on page 570 for more information on the **Manage Certificates** function.
5. If required, type the domain name of the network in the **Domain** field.
6. When the 802.1X settings are configured as desired, select **Save Changes** to save the changes to the device and reboot it. Select **Revert** to cancel any changes.

Configuration (DM-NVX-D30, E30, and E760 Models)

NOTE: This section applies to the following models:

- DM-NVX-D30
- DM-NVX-D30C
- DM-NVX-E30
- DM-NVX-E30C
- DM-NVX-E760
- DM-NVX-E760C

Web Interface Configuration

The web interface of a DM NVX AV-over-IP device allows for the viewing of status information as well as the configuration of local device settings.

Access the Web Interface

To access the web interface, refer to either of the following:

- Access the Web Interface with a Web Browser on page 669
- Access the Web Interface with the Crestron Toolbox™ Application on page 670

The web interface runs in a web browser. The following web browser versions are supported:

Operating System and Supported Web Browsers

OPERATING SYSTEM	SUPPORTED WEB BROWSERS
Windows® operating system	Chrome™ web browser, version 31 and later
	Firefox® web browser, version 31 and later
	Internet Explorer web browser, version 11 and later
	Microsoft Edge web browser
macOS® operating system	Safari® web browser, version 6 and later
	Chrome web browser, version 31 and later
	Firefox web browser, version 31 and later

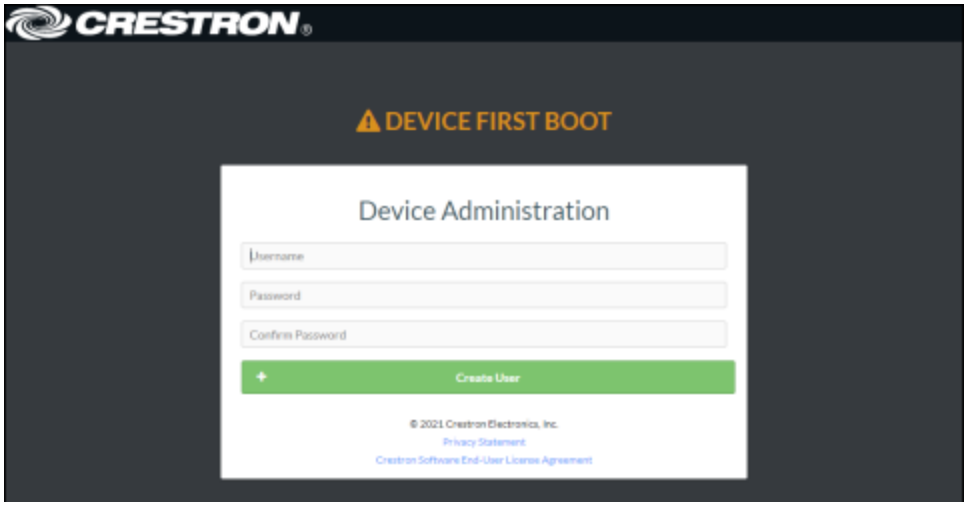
Access the Web Interface with a Web Browser

To access the web interface:

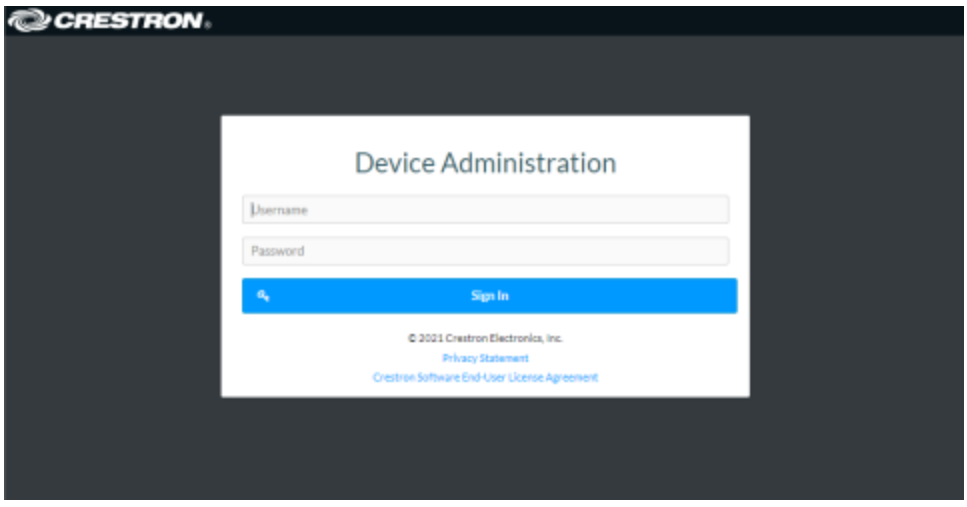
1. Enter the IP address of the DM NVX device into a web browser.

   > **NOTE:** To obtain the IP address, use the Device Discovery Tool utility in Crestron Toolbox™ software or an IP scanner application.

2. If accessing the device for the first time, a prompt to create an administrator account will be displayed along with a **DEVICE FIRST BOOT** message. To create the first admin account:
   a. Enter a username in the **Username** field.
   b. Enter a password in the **Password** field.
   c. Re-enter the same password in the **Confirm Password** field.



   d. Select **Create User**. A new **Device Administration** page appears with an option to **Sign In** instead of **Create User**.



3. Enter the username in the **Username** field.

4. Enter the password in the **Password** field.
5. Select **Sign In**.

Access the Web Interface with the Crestron Toolbox™ Application

To access the web interface by opening a web browser from the Crestron Toolbox™ application:

1. Open the Crestron Toolbox application.
2. Select **Device Discovery Tool** from the **Tools** menu or select the Device Discovery Tool icon in the toolbar. Once the utility loads, the DM NVX device will be discovered on the network and listed in the device list on the left side of the screen. The device's host name, IP address, and firmware version are displayed.

   > **NOTE:** If there is security software running on the computer, a security alert might be displayed when the Crestron Toolbox application attempts to connect to the network. Make sure to allow the connection, so that the Device Discovery Tool can be used.

3. Select the device from the discovered devices list.
4. Enter the device credentials in the **Authentication Required** dialog that opens, then select **Log In**.
5. Select **Web Configuration**.

Action

NOTE: Unless otherwise noted, this section applies to the following models:

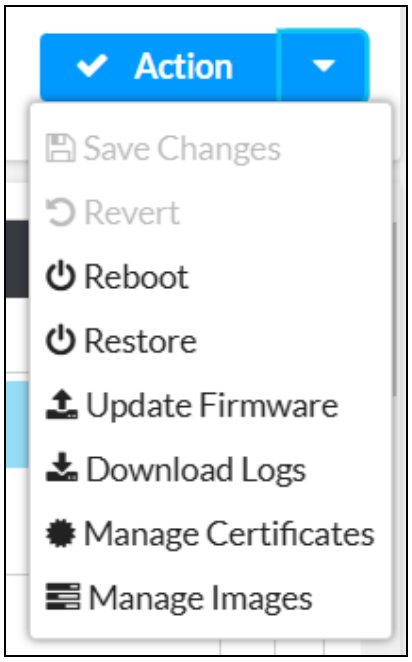
- DM-NVX-D30
- DM-NVX-D30C
- DM-NVX-E30
- DM-NVX-E30C
- DM-NVX-E760
- DM-NVX-E760C

For brevity, the DM-NVX-D30 and DM-NVX-D30C are referred to as the D models, and the remainder are referred to as the E models in this section.

The **Action** drop-down menu is displayed at the top right side of the web interface and provides quick access to these common device functions:

- Save Changes on page 672
- Revert on page 672
- Reboot on page 672
- Restore on page 672
- Update Firmware on page 673
- Download Logs on page 674
- Manage Certificates on page 674
- Manage Images (D Models Only) on page 675
- Manage EDIDs (E Models Only) on page 677

Action Menu (DM-NVX-D30 Shown)



Save Changes

Select **Save Changes** to save any changes made to the configuration settings.

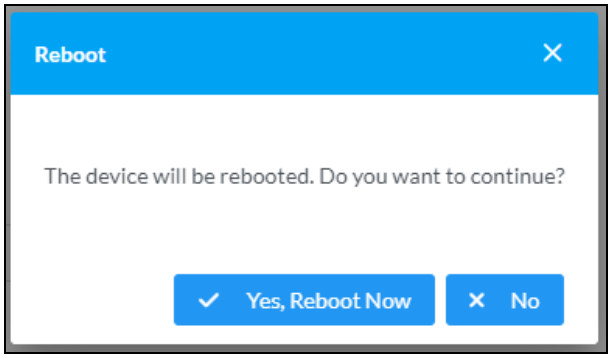
Revert

Select **Revert** to revert the device back to the last saved configuration.

Reboot

Certain changes to the settings may require a reboot to take effect. To reboot the device:

1. Select **Reboot** in the **Action** menu. The **Reboot** confirmation message box appears.



2. Select **Yes, Reboot Now** to reboot the device. The **Reboot** status message box appears. Wait for the device reboot to complete before attempting to reconnect to the web interface. Alternatively, select **No** to cancel the reboot operation.

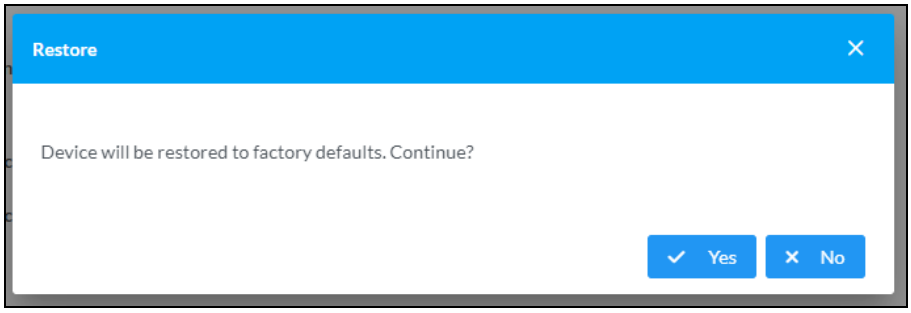
Restore

The DM NVX device can be restored to factory default settings from the **Action** menu.

NOTE: The **Restore** procedure will wipe all settings from the device, including network settings. If a static IP address is set, restoring the device to factory default settings will clear this address and DHCP will be enabled instead.

To restore the device to factory defaults:

1. Select **Restore** in the **Action** menu. The **Restore** confirmation message box appears.



2. Select **Yes** to restore the device to factory default settings. Select **No** to cancel the restore operation. When **Yes** is selected, the **Restore** status message box appears. Wait for the device restore to complete before attempting to reconnect to the web interface.

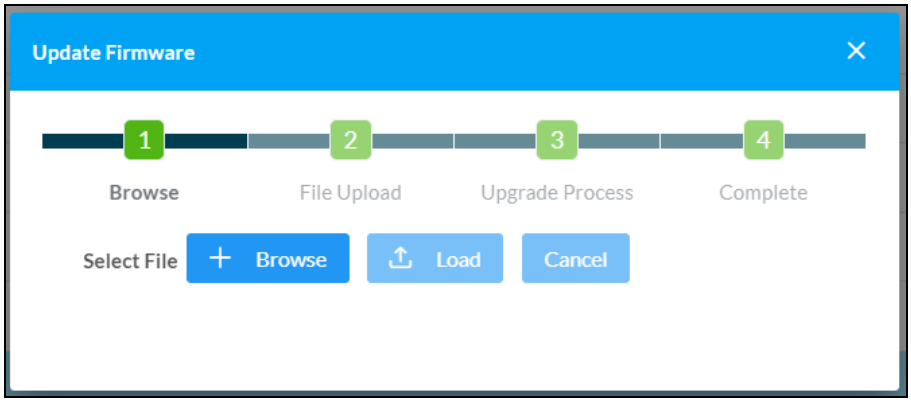
   NOTE: Once the device is restored, it may have a new IP address. If reconnecting to the original address does not work, use the Device Discovery Tool in Crestron Toolbox software or an IP scanner application to find the device's new IP address.

If the web interface is not accessible, the device can also be restored to factory default settings via a hardware-based procedure (refer to DM-NVX-D30 and DM-NVX-E30 Installation on page 401 or DM-NVX-E760 Installation on page 408). Card-based DM NVX devices can also be restored from the front panel menu of the DMF-CI-8.

Update Firmware

To update the firmware of the device:

1. Select **Update Firmware** in the **Action** menu.
2. In the **Update Firmware** window that appears, select **+ Browse**.



3. Locate and select the desired firmware file, then select **Open**. The selected firmware file name is displayed in the **Update Firmware** window.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The firmware update is now complete, and the web interface will return to the main log-in page.

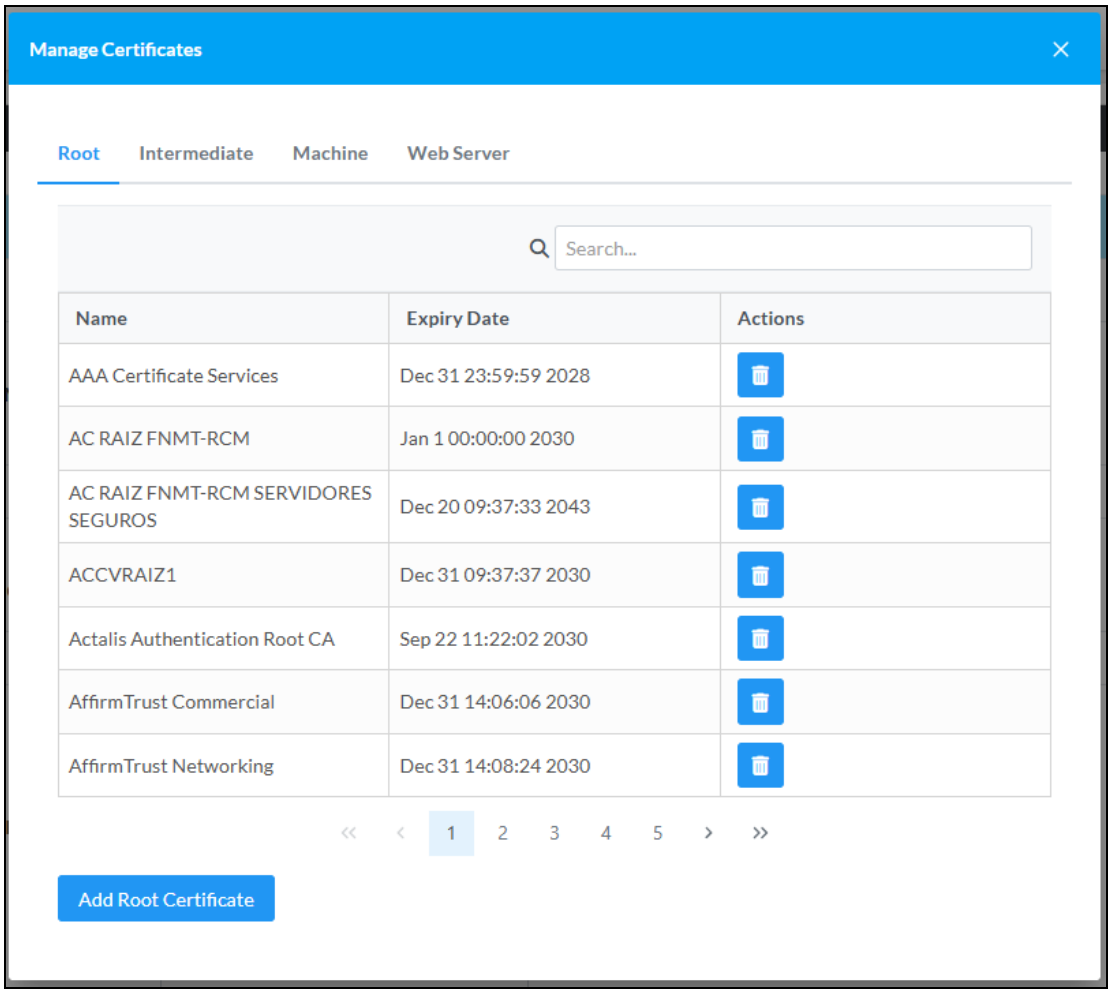
Download Logs

Select **Download Logs** in the **Action** menu to download the device message logs for diagnostic purposes.

The log file is downloaded to the Downloads folder of the PC.

Manage Certificates

Select **Manage Certificates** in the **Action** menu to open the **Manage Certificates** window. Use this window to add or remove certificates used in 802.1x authentication and other protected network functions.



The following certificate tabs are available in the **Manage Certificates** window:

- **Root:** The Root certificate is used by the DM NVX device to validate the network's authentication server. The device has a variety of Root certificates, self-signed by trusted CAs (Certificate Authorities) preloaded into the device. Root certificates must be self-signed.
- **Intermediate:** The Intermediate store holds non self-signed certificates that are used to validate the authentication server. These certificates will be provided by the network administrator if the network does not use self-signed Root certificates.
- **Machine:** The Machine certificate is an encrypted PFX file that is used by the authentication server to validate the identity of the DM NVX device. The machine certificate will be provided by the network administrator, along with the certificate password. For 802.1x, only one machine certificate can reside on the device.
- **Web Server:** The Web Server certificate is a digital file that contains information about the identity of the web server.

Add Certificates

To add a certificate:

1. Select the corresponding certificate tab.
2. Select **Add [Type] Certificate**.
3. Select **+ Browse**.
4. Locate and select the file, then select **Open**.

   > **NOTE:** If the selected certificate is a machine certificate, enter the password provided by the network administrator.

5. Select **OK**. This will add the certificate to the list in the **Manage Certificates** window, displaying the file name and expiration date. The certificate is now available for selection and can be loaded to the device.

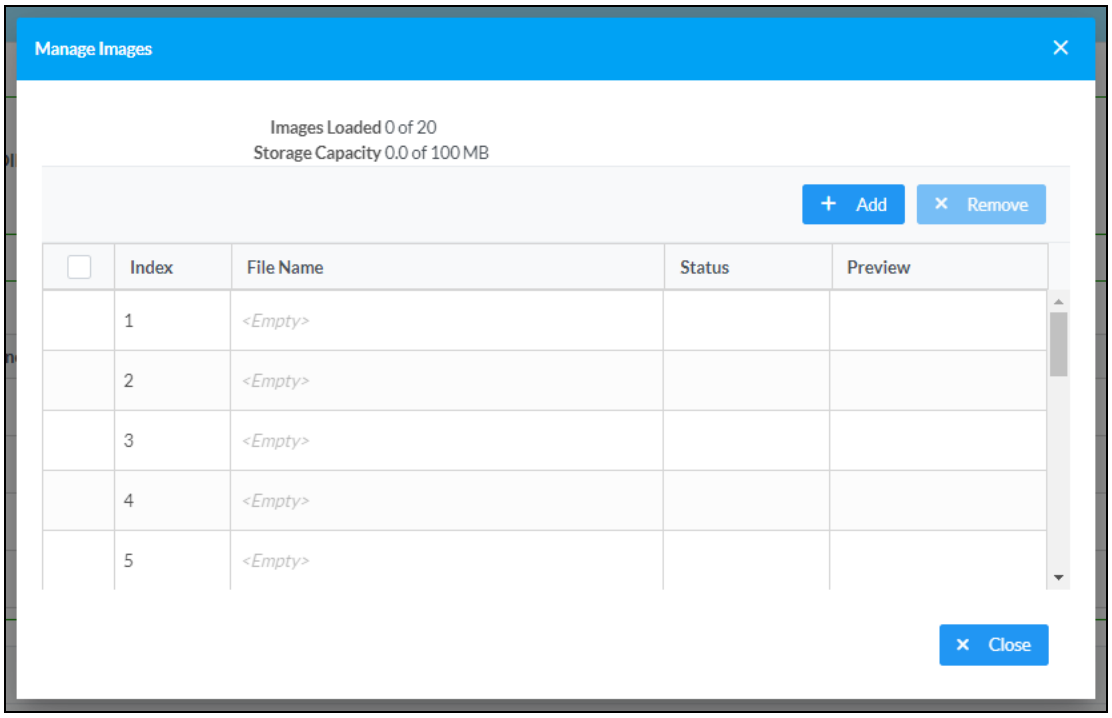
Delete Certificates

To delete a certificate:

1. Select the corresponding certificate tab.
2. Select the trashcan icon in the **Actions** column and the row of the certificate to be deleted.
3. Select **Yes** when prompted to delete the certificate or **No** to cancel the deletion.

Manage Images (D Models Only)

Select **Manage Images** in the **Action** menu to open the **Manage Images** window. Use this window to add or remove images that can be displayed as backgrounds for the on-screen display feature of the DM NVX device.



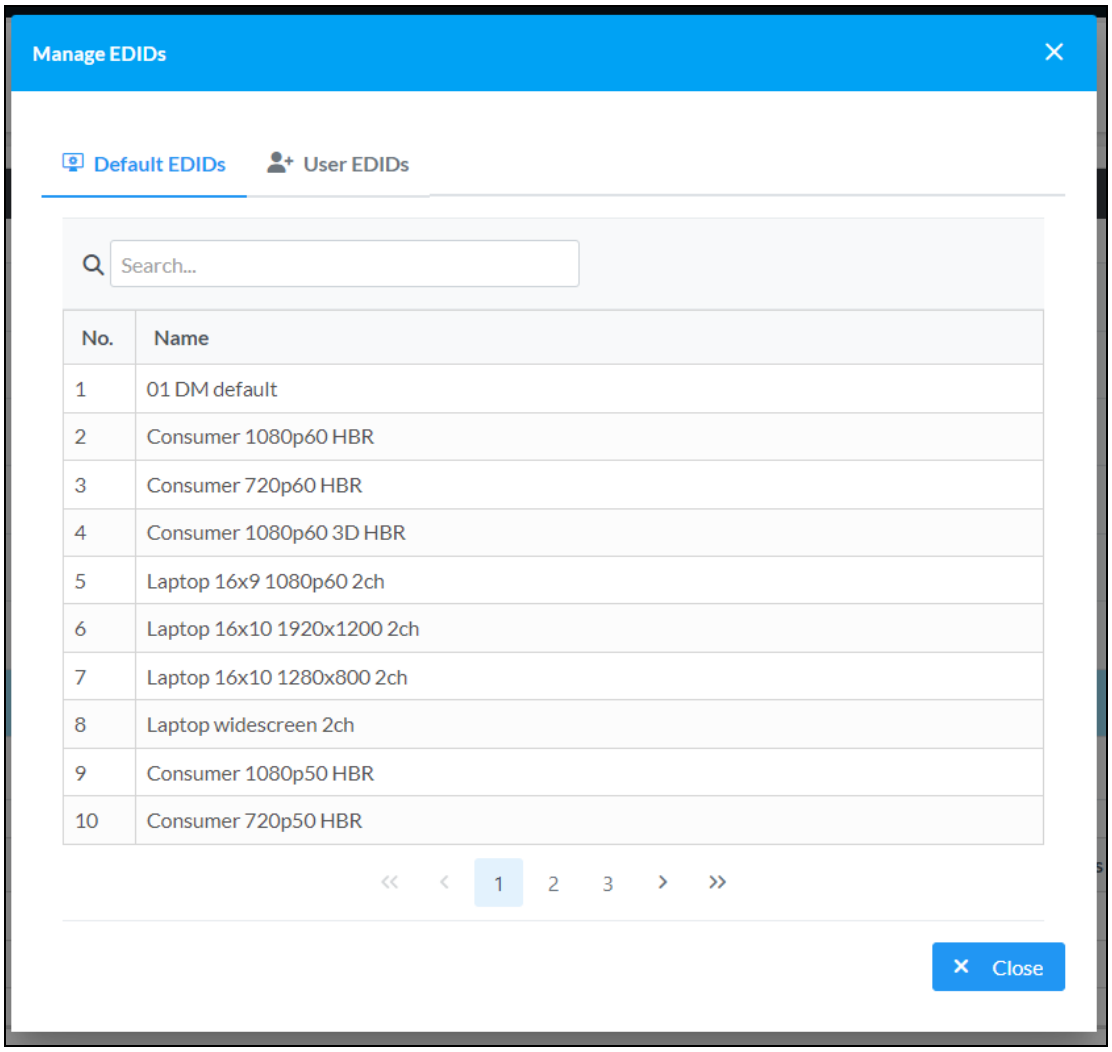
To add an image:

1. Select **+ Add**. A **File Upload** window appears.
2. Select **+ Browse**. Locate the desired .jpeg, .jpg, or .png image file, then select **Upload** to upload it to the DM NVX device. The uploaded image will now appear in the **Manage Images** table with a preview and a **Ready** status message. Refer to the **Outputs** heading under Settings on page 686 for information on setting a background image.

To delete an image, select its entry in the table then select **X Remove**.

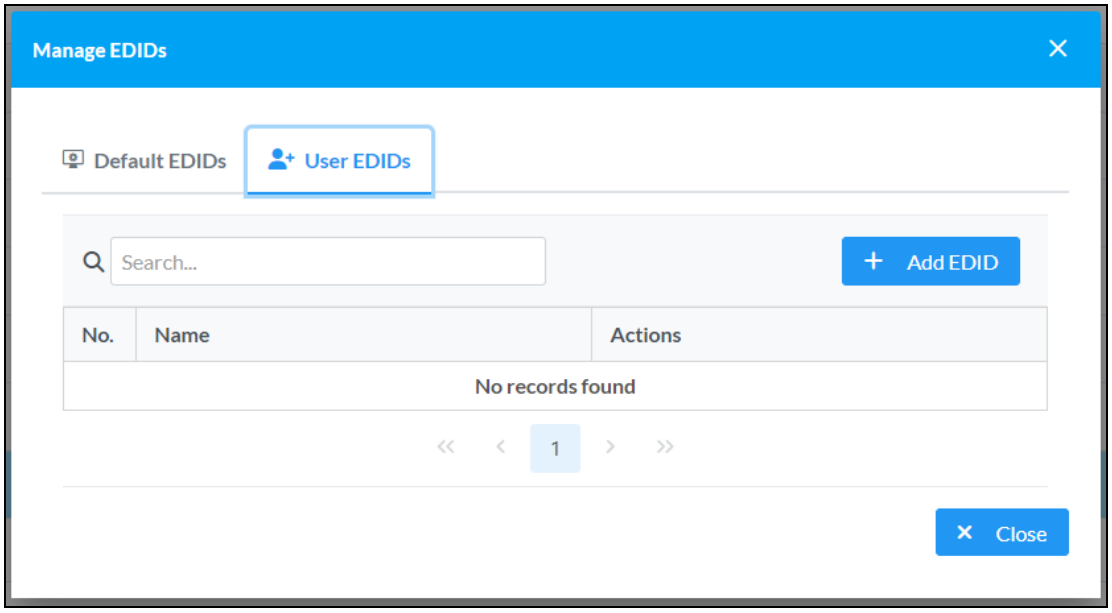
Manage EDIDs (E Models Only)

Select **Manage EDIDs** in the **Action** menu to open the **Manage EDIDs** window. Use this window to add, remove, or browse which EDIDs are available for the AV inputs of the DM NVX device.



The default tab that will open in this window is the **Default EDIDs** tab. This tab is read only, and provides a list of all default EDIDs available on the DM NVX device as part of the firmware. Use the **Search...** text entry field to filter the list of EDIDs by name. Default EDIDs cannot be removed from the device.

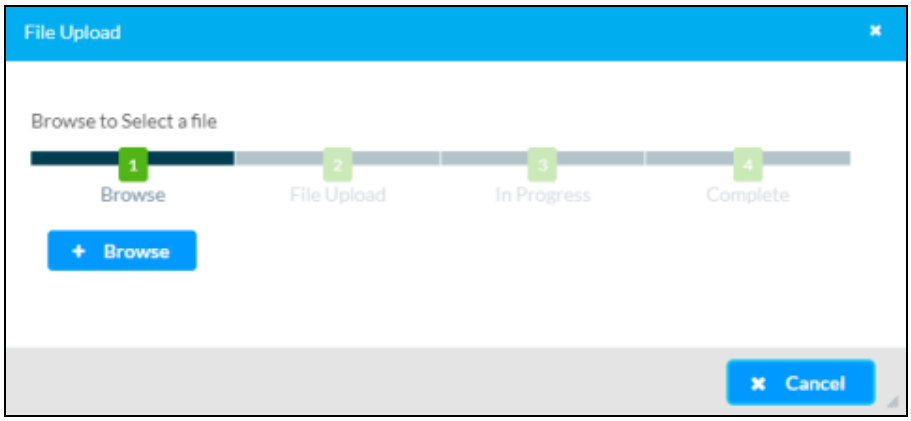
The second tab available in this window is the **User EDIDs** tab. By default, the table will populate with **No records found**.



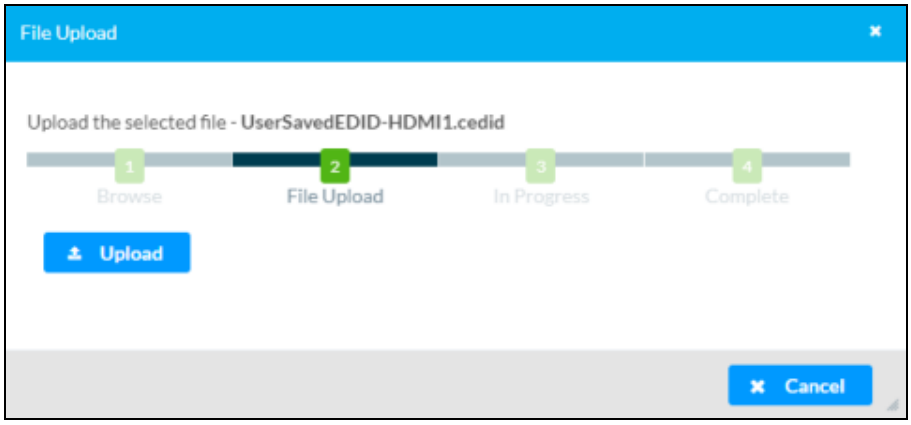
To add a **User EDID** file:

1. Select **+ Add EDID** at the top right of the table. The **File Upload** screen will appear.
2. Select **+ Browse**. Locate the desired .cedid file, then select **Upload** to upload it to the DM NVX device.

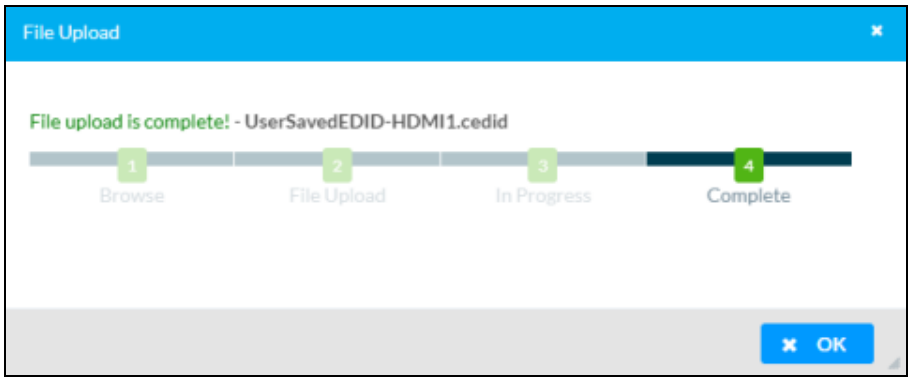
   Browse for and select a .cedid file

   Upload the selected file

   Wait for the upload to complete, then select OK

3. Select **OK** to return to the **Manage EDIDs** window. The uploaded User EDID is now displayed in the table.

To remove a **User EDID** file, select **Delete** in its table row.

Status

NOTE: Unless otherwise noted, this section applies to the following models:

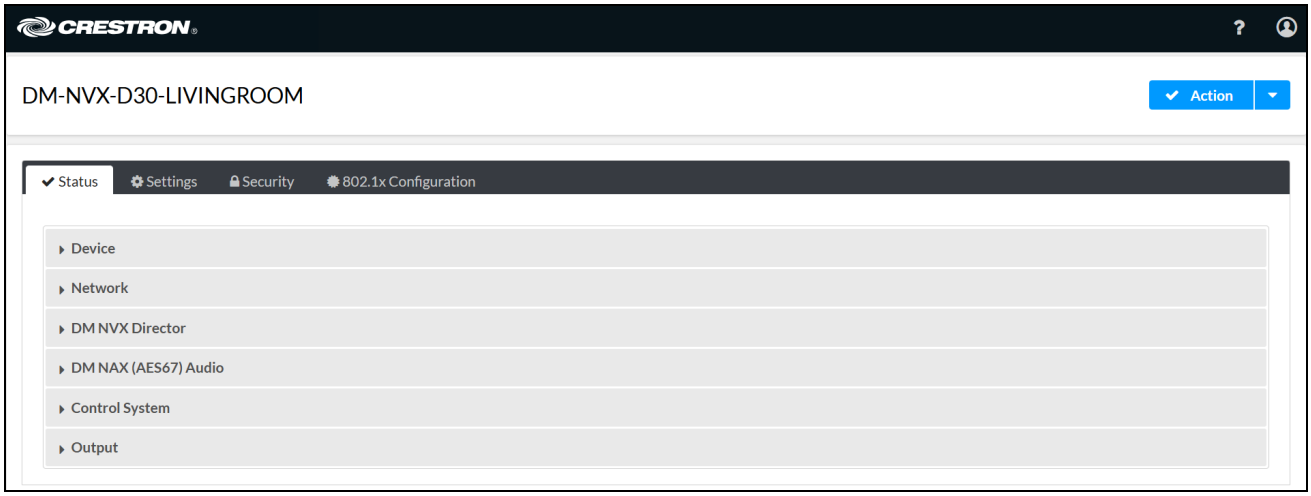
- DM-NVX-D30
- DM-NVX-D30C
- DM-NVX-E30
- DM-NVX-E30C
- DM-NVX-E760
- DM-NVX-E760C

For brevity, the DM-NVX-D30 and DM-NVX-D30C are referred to as the D models, and the remainder are referred to as the E models in this section.

The **Status** page is the first page displayed when opening the interface of the DM NVX device. It displays general information about the device (such as **Model Name**, **Firmware Version**, and **Serial Number**), current network settings (such as **Host Name** and **IP Address**), and the current status of the connectors on the device.

The **Status** page can be accessed at any time by selecting the **Status** tab of the interface.

Status Page (DM-NVX-D30 Shown)

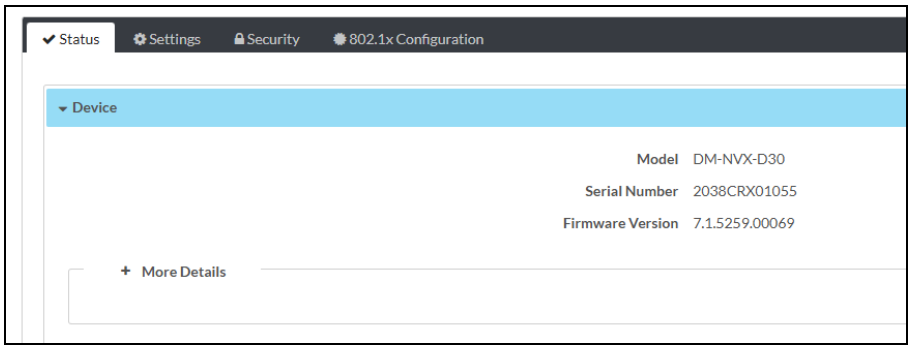


Information displayed on the **Status** page is organized into different sections:

- Device on page 681
- Network on page 681
- DM NVX Director on page 682
- DM NAX (AES67) Audio on page 682
- Control System on page 684
- Output (D Models Only) on page 684
- Input (E Models Only) on page 685

Device

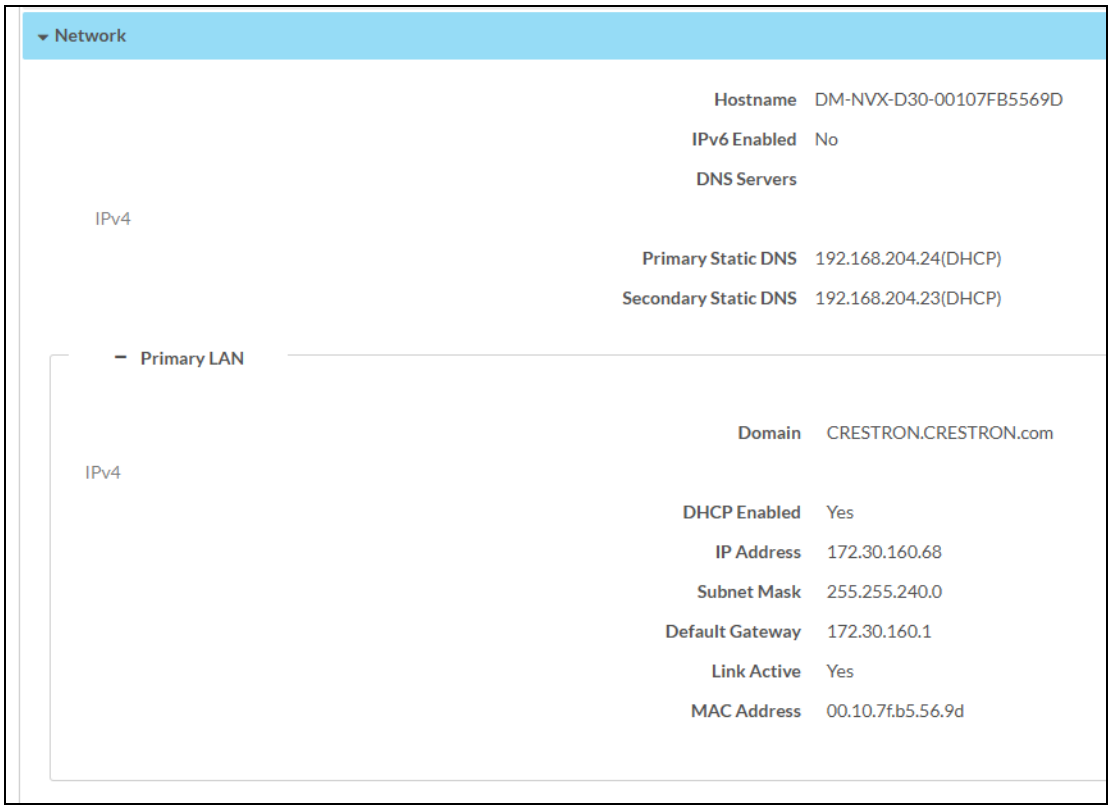
The **Device** accordion displays the **Model**, **Firmware Version**, and **Serial Number** of the DM NVX device.



Select **+ More Details** to review additional information about the device.

Network

The **Network** accordion displays network-related information about the device, including the **Hostname**, **Domain Name**, and **DNS Servers**.



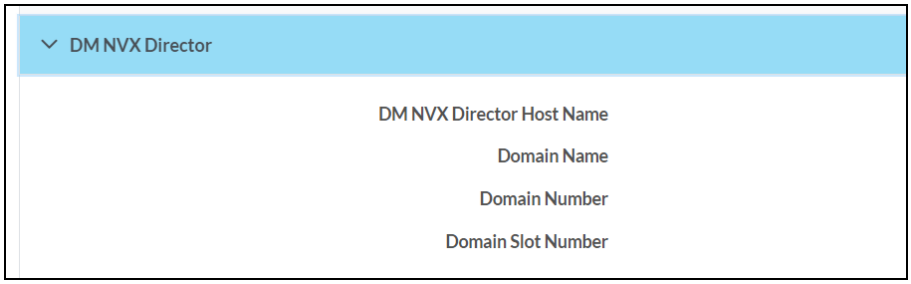
By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-D30-00107FB5569D.

Select **+ Primary LAN** to display additional network information. If **+ Primary LAN** is selected, select **- Primary LAN** to collapse the section.

DM NVX Director

The **DM NVX Director** accordion displays the details of the DM NVX Director switching appliance to which the DM NVX device is claimed.

> **NOTE:** If the DM NVX device has not been claimed by a DM NVX Director switching appliance, all fields in this section will be empty.

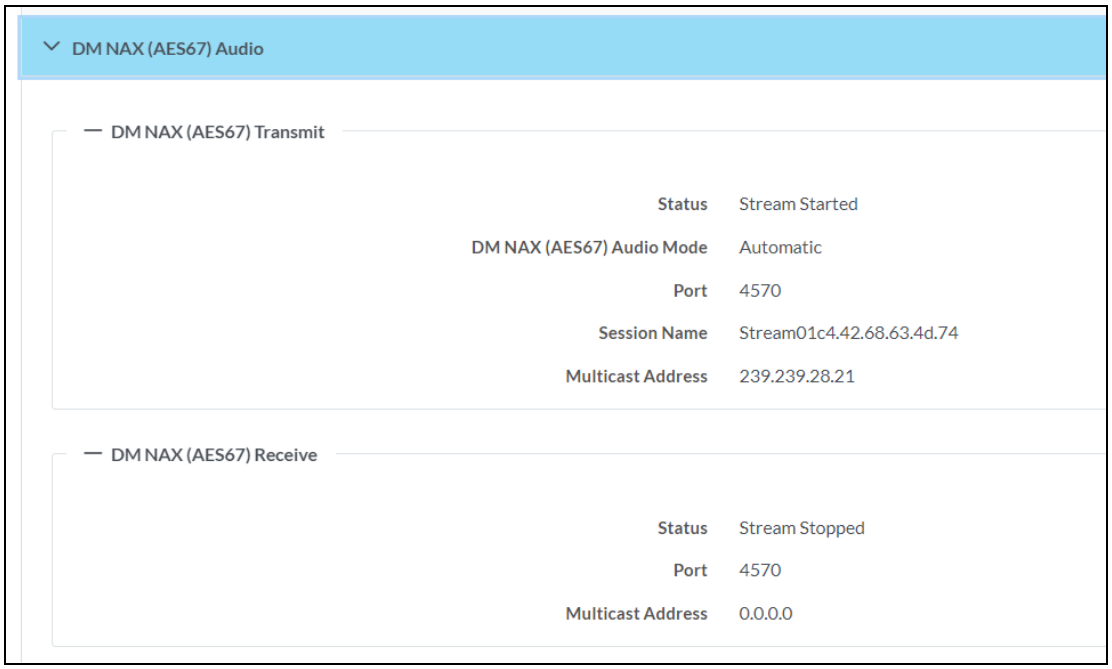


- **DM NVX Director Host Name:** Displays the host name of the claiming DM NVX Director switching appliance.
- **Domain Name:** Displays the name of the DM NVX Director domain to which the encoder or decoder device belongs.
- **Domain Number:** Displays the number of the DM NVX Director domain to which the encoder or decoder device belongs.
- **Domain Slot Number:** Displays the slot number within the DM NVX Director that refers to this specific encoder or decoder device.

DM NAX (AES67) Audio

The **DM NAX (AES67) Audio** accordion displays information regarding the **DM NAX (AES67) Transmit** and **DM NAX (AES67) Receive** audio-over-IP (AoIP) signals. This accordion varies slightly between D models and E models.

DM NAX (AES67) Audio Accordion (DM-NVX-E760 Shown)



The **DM NAX (AES67) Audio Mode** field will be under the **DM NAX (AES67) Receive** heading if the device is a decoder (D model) or under the **DM NAX (AES67) Transmit** heading if the device is an encoder (E model). This field displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).

The details displayed for **DM NAX (AES67) Transmit** are:

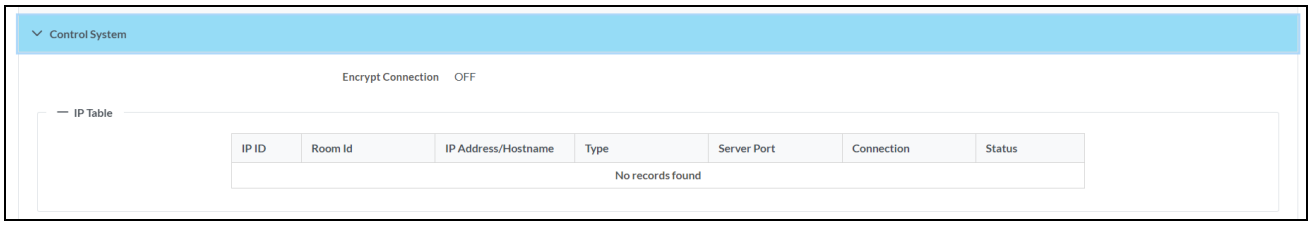
- **Status:** Displays a status message for the transmitting AoIP stream, such as **Stream Stopped**, **Stream Starting**, or **Stream Started**.
- **Port:** Displays the port of the AoIP transmit stream.
- **Session Name:** Displays the session name of the AoIP transmit stream.
- **Multicast Address:** Displays the multicast address of the AoIP transmit stream.

The details displayed for **DM NAX (AES67) Receive** are:

- **Status:** Displays a status message for the AoIP stream receiver, such as **Connecting**, **Stream Stopped**, or **Stream Started**.
- **Port:** Displays the port of the received AoIP stream.
- **Multicast Address:** Displays the multicast address of the received AoIP stream.

Control System

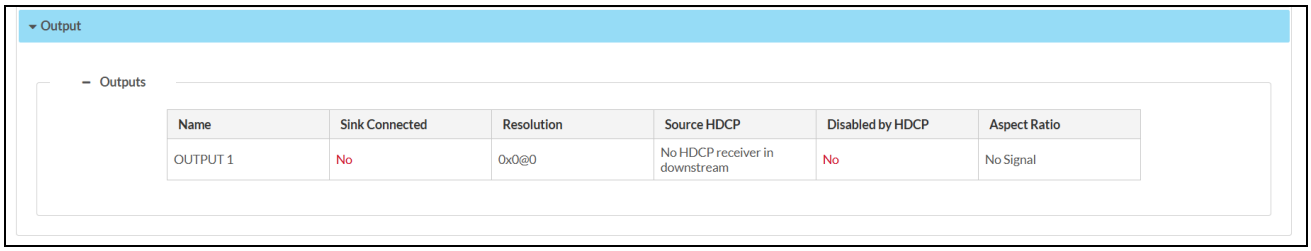
The **Control System** accordion displays information regarding the connection between the DM NVX device and a control system.



The displayed fields are:

- **Encrypt Connection:** Displays **ON** if the connection is encrypted or **OFF** if it is not.
- **IP ID:** Displays the IP ID of the DM NVX device in its IP table entry of the control system's IP table.
- **Room ID:** Displays the room ID of the DM NVX device in its IP table entry of the control system's IP table.
- **IP Address/Hostname:** Displays the IP address and host name of the control system.
- **Type:** Always displays **Peer** (this is the only relationship the DM NVX device can have to a control system).
- **Server Port:** Displays the port for the connection between the DM NVX device and the control system.
- **Connection:** Always displays **Gway** (this is the only connection type supported between a DM NVX device and a control system).
- **Status:** Displays either **ONLINE** or **OFFLINE** depending on if the DM NVX device is able to communicate with the control system.

Output (D Models Only)

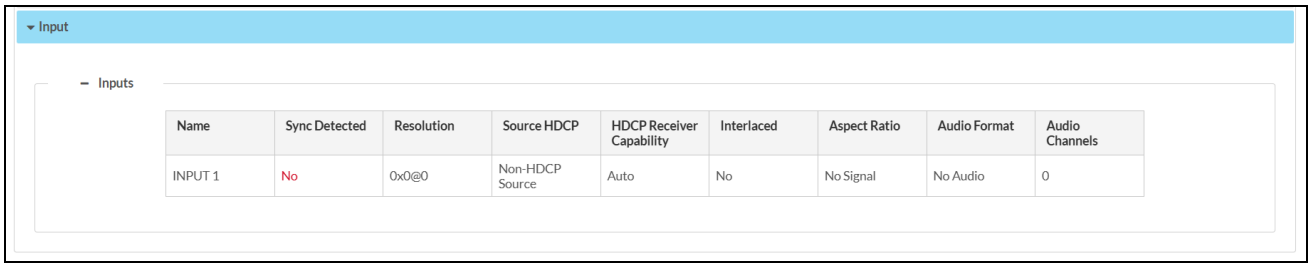


The displayed fields are:

- **Name:** Displays the name of the output.
- **Sink Connected:** Displays whether a sink (such as a display or projector) is connected to the output (**Yes**) or not (**No**).
- **Resolution:** Displays the current resolution of the video output signal.
- **Source HDCP:** Displays the HDCP level supported by the connected display or projector.
- **Disabled by HDCP:** Displays whether the output is disabled by HDCP (**Yes**) or not (**No**).
- **Aspect Ratio:** Displays the aspect ratio of the video output signal.

Input (E Models Only)

The **Input** accordion displays status information regarding the input connector of the DM NVX device.



The displayed fields are:

- **Name:** Displays the name of the input.
- **Sync Detected:** Displays whether sync is detected at the input (**Yes**) or not (**No**).
- **Resolution:** Displays the resolution and refresh rate of the input video signal.
- **Source HDCP:** Displays the HDCP level of the input video signal.
- **HDCP Receiver Capability:** Displays the HDCP capabilities of the DM NVX device.
- **Interlaced:** Displays **Yes** or **No** depending if the input video signal is interlaced or not.
- **Aspect Ratio:** Displays the aspect ratio of the input video signal.
- **Audio Format:** Displays the audio format of the input signal.
- **Audio Channels:** Displays the number of audio channels in the input signal.

Settings

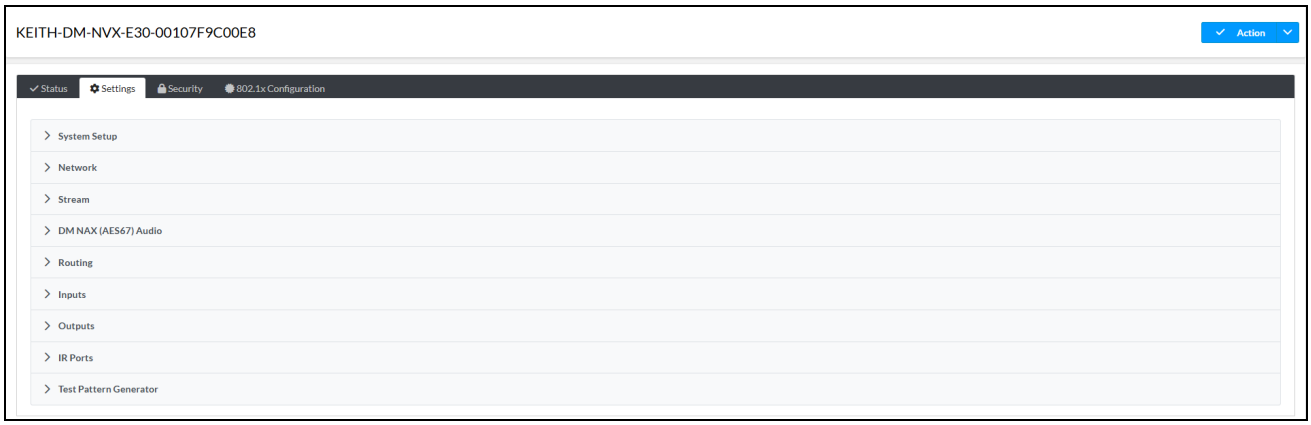
NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-D30
- DM-NVX-D30C
- DM-NVX-E30
- DM-NVX-E30C
- DM-NVX-E760
- DM-NVX-E760C

For brevity, the DM-NVX-D30 and DM-NVX-D30C are referred to as the D models, and the remainder are referred to as the E models in this section.

The **Settings** page enables configuration of the DM NVX device's settings. The **Settings** page can be accessed at any time by selecting the **Settings** tab of the interface.

Settings Page (DM-NVX-E30 Shown)



NOTE: Some settings are specific to the decoder (D models) or encoder (E models) interface. Model requirements are noted in headings below where appropriate.

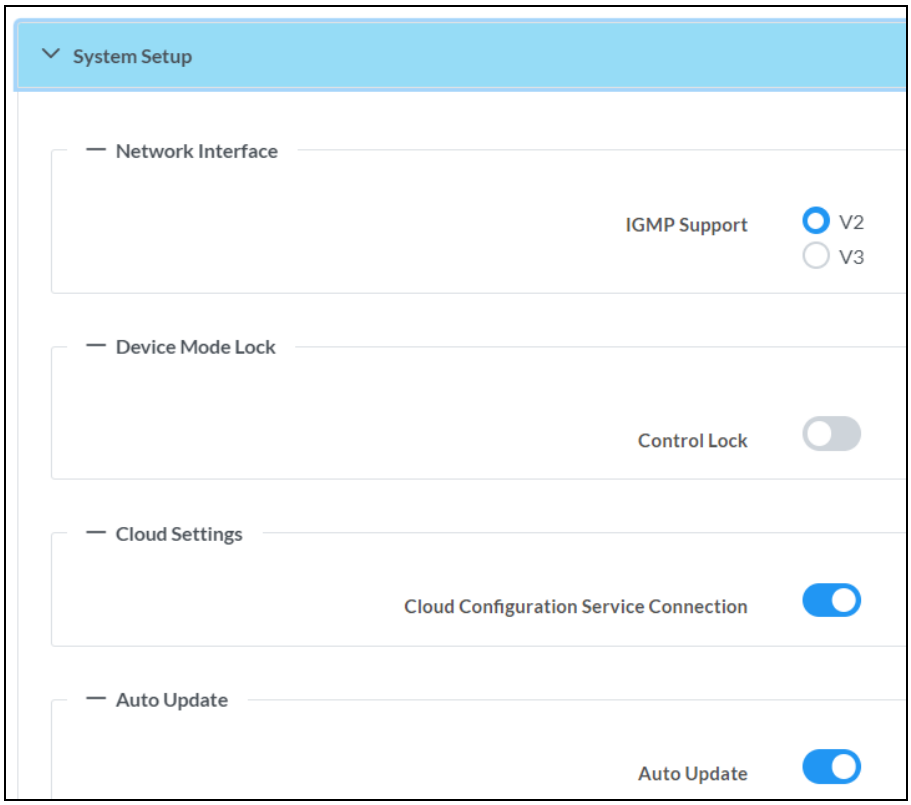
Settings available on the **Settings** page are organized into different sections:

- System Setup on page 687
- Network on page 693
- Stream on page 694
- DM NAX (AES67) Audio on page 702
- Routing on page 704
- Subscriptions (D Models Only) on page 706
- Inputs (E Models Only) on page 708
- Outputs on page 713

- IR Ports on page 719
- Port Selection (E760 Models Only) on page 721
- Test Pattern Generator (E Models Only) on page 722

System Setup

The **System Setup** accordion contains settings for configuration of the following system functions.



Network Interface

The **Network Interface** section provides a choice between IGMPv2 and IGMPv3 operation. Choose the settings that matches the capabilities of the network hardware.

NOTES:

- This setting must match on all DM NVX devices in a system to ensure compatibility.
- DM NVX devices are set to IGMPv2 operation by default.
- Crestron recommends leaving DM NVX systems set to IGMPv2 operation unless the network specifically requires IGMPv3.



To change the **Network Interface** mode:

1. Select **V2** to set the DM NVX device to IGMPv2 operation, or select **V3** to set the device to IGMPv3 operation.
2. Select **Save Changes**. A prompt will appear to reboot the device.
3. Select **Yes, Reboot Now** to reboot the device into the new **Network Interface** mode.

Device Mode Lock

The **Device Mode Lock** section provides a toggle for the **Control Lock** feature.

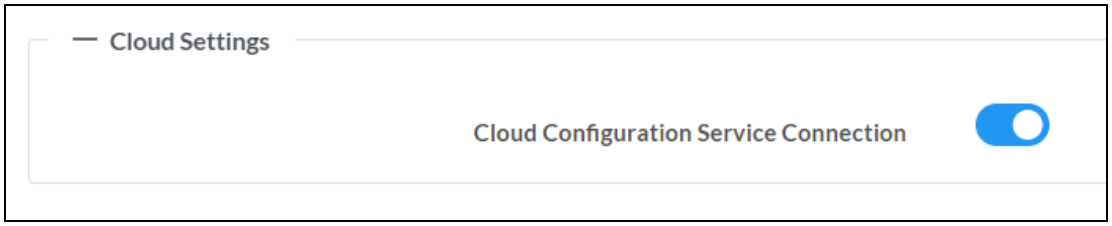


Set the **Control Lock** toggle to the right to lock out the push buttons built in to the DM NVX device.

Set the **Control Lock** toggle to the left to disable the lock, allowing the push buttons to control source routing and device modes.

Cloud Settings

The Cloud Settings section provides a toggle to enable or disable communication with the Crestron XiO Cloud® platform.

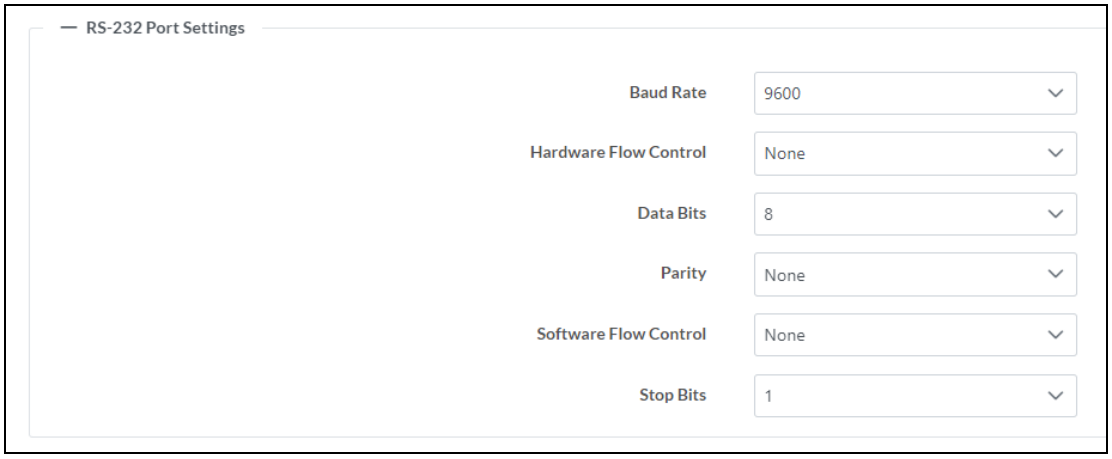


Set the **Cloud Configuration Service Connection** toggle to the right to allow the DM NVX device to communicate with the XiO Cloud platform. Set the toggle to the left to prevent the device from communicating with the XiO Cloud platform.

RS-232 Port Settings

> **NOTE:** This section is not available on card-based models.

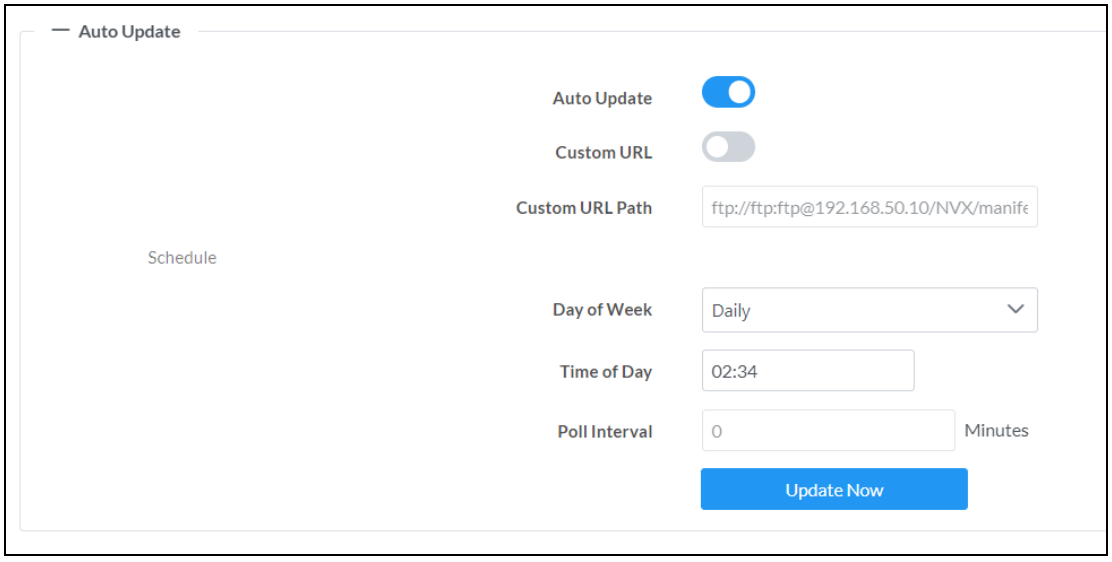
Configure the settings for the built-in RS-232 port of the device in the **RS-232 Port Settings** section.



- **Baud Rate:** Select the baud rate from the drop-down.
- **Hardware Flow Control:** Select the hardware flow control from the drop-down.
- **Data Bits:** Select the number of data bits from the drop-down.
- **Parity:** Select the parity from the drop-down.
- **Software Flow Control:** Select the software flow control from the drop-down.
- **Stop Bits:** Select the number of stop bits from the drop-down.

Auto Update

The DM NVX device can automatically check for and install firmware updates at scheduled intervals via the **Auto Update** feature.



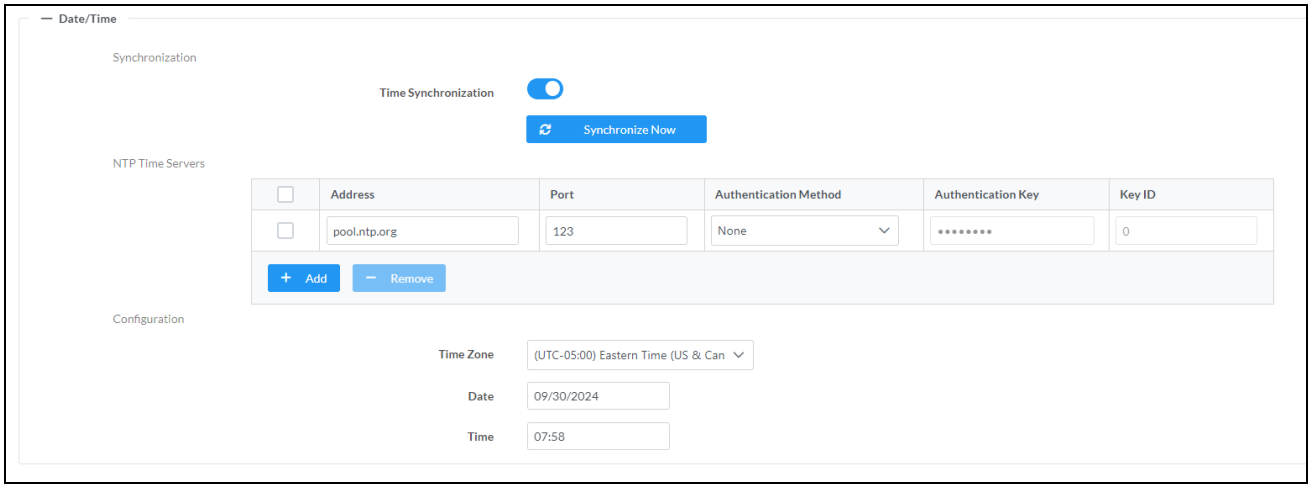
To configure the **Auto Update** feature settings:

1. Set the **Auto Update** toggle to the right to enable the **Auto Update** feature.
2. Define the URL to download the updates by doing either of the following:
    a. Use the default URL to download the updates from the Crestron server.
    b. Use a custom URL. Set the **Custom URL** toggle to the right to enable a custom URL. In the **Custom URL Path** text box, enter the path to a custom manifest file in the FTP or SFTP URL format. Use the Crestron Auto Update Tool to generate a custom manifest file, then store the file on an FTP (File Transfer Protocol) or SFTP (Secure File Transfer Protocol) server.
3. Set a schedule for the automatic firmware update by doing either of the following:
    a. Select the desired **Day of Week** and **Time of Day** (24-hour format) values.
    b. Set the **Poll Interval** by entering a value from 60 to 65535 minutes. A value of 0 disables the **Poll Interval**.
4. Select **Save Changes**.

Selecting **Update Now** causes the device to check for a firmware update immediately. If a schedule was set in step 3 above, that schedule still remains in effect.

Date/Time

Use the **Date/Time** section to configure the date and time settings of the DM NVX device.



Synchronization

1. Set the **Time Synchronization** toggle to the right to enable or left to disable time synchronization. By default, time synchronization is enabled.
2. In the **NTP Time Servers** table, enter the URL of a NTP (Network Time Protocol) or SNTP (Simple Network Time Protocol) server. Up to three time servers can be added on a device.
3. Select **Synchronize Now** to perform time synchronization between the device's internal clock and the time server.

Configuration

1. Open the **Time Zone** drop-down menu to select the applicable time zone.
2. In the **Date** field, enter the current date.

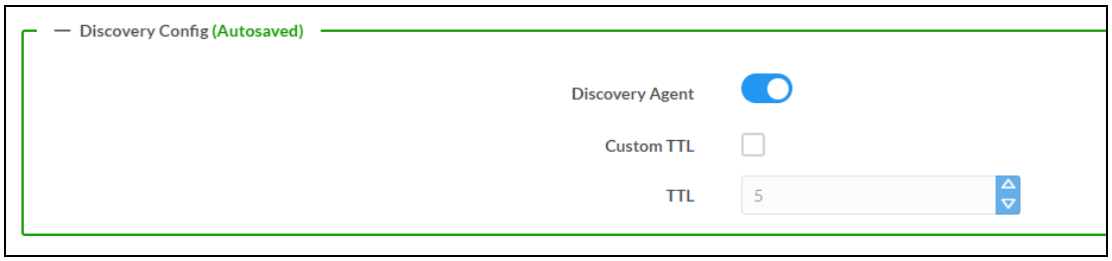
3. In the **Time (24hr Format)** field, enter the current time in 24-hour format.

Select **Save Changes** to save the settings.

Select **Revert** from the **Action** drop-down menu to revert to the previous settings without saving.

Discovery Config

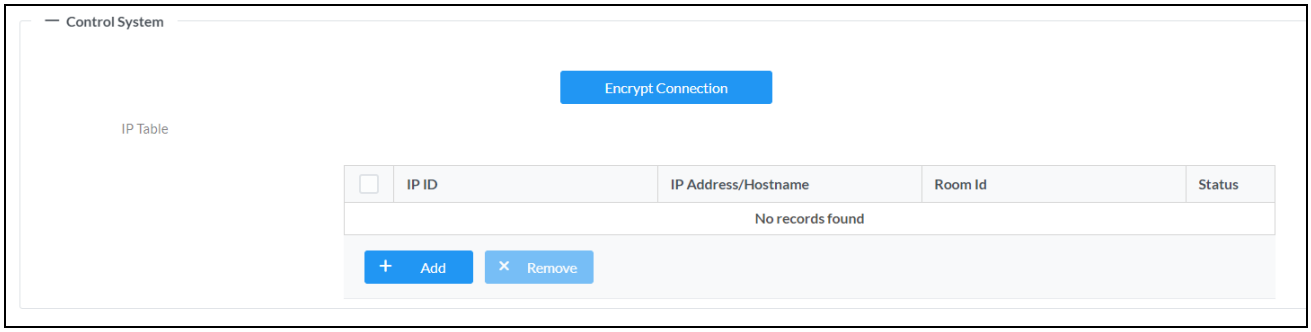
The **Discovery Config** section provides settings to customize how the DM NVX device and its streams can be discovered on the LAN.



Set the **Discovery Agent** toggle to the right to allow streams from the device to be discoverable on the network or to the left to prevent network discovery. When **Discovery Agent** is enabled, the streams from the DM NVX device are displayed in the **Available Streams** list of other receivers.

Select the **Custom TTL** option and enter a value in the **TTL** field if a custom Time-to-live (TTL) value is required on the network. The default **TTL** value is 5.

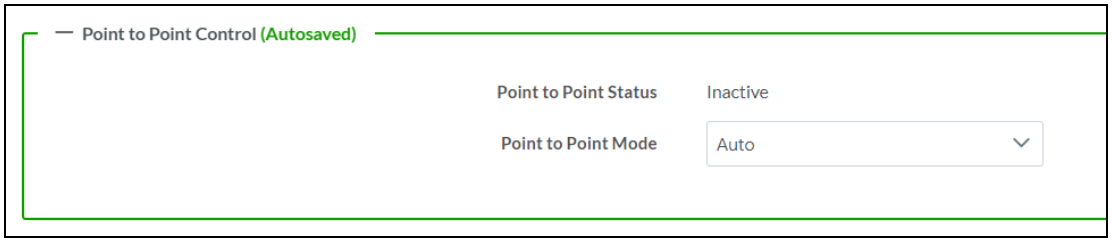
Control System



1. Select **Encrypt Connection** to navigate to the **Security** tab to configure encryption settings.
    a. Enter a username in the **Control System Username** field.
    b. Enter a password in the **Control System Password** field.
2. Select **+ Add** to add an IP table entry to the **IP Table**.
    a. Enter the Room ID in the **Room ID** field.
    b. Enter the IP ID of the DM NVX device in the **IP ID** field.
    c. Enter the IP address or hostname of the control system in the **IP Address/Hostname** field.
3. Select **Save Changes** to save the new entries. The **Control System Save** message box appears, indicating that the control system settings were saved successfully. Select **Revert** to revert to the previous settings without saving.

Point to Point Control

The **Point to Point Control** section allows enabling or disabling point-to-point streaming of AV-over-IP between this device and another directly-connected DM NVX device without the need for a control system.



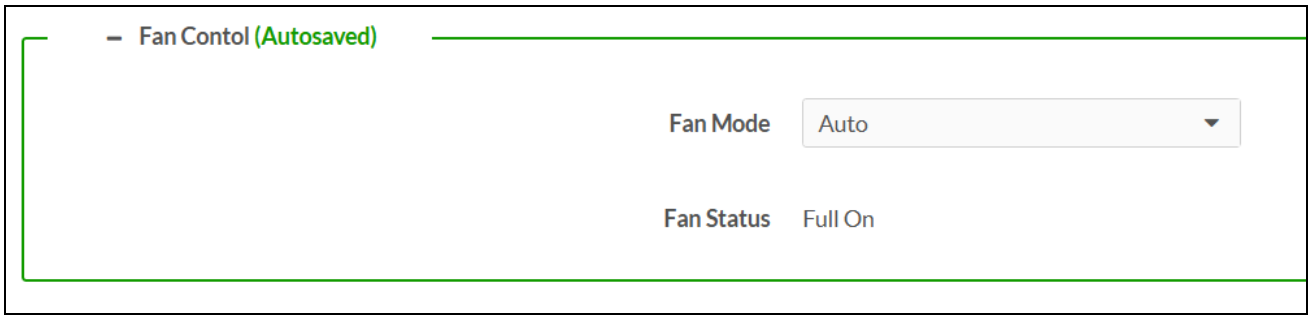
Point to Point Status is a read-only field that indicates whether point-to-point mode is **Active** or **Inactive**.

Select an option from the **Point to Point Mode** drop-down:

- **Auto:** (Default setting) Each 1000BASE-T port of the device detects whether it is connected directly to another DM NVX device or to a 1000BASE-T switch. If a direct connection between a DM NVX encoder and decoder is detected, point-to-point streaming is automatically initiated.
- **Disable:** Disables point-to-point streaming.

Fan Control (DM-NVX-D30 Only)

> **NOTE:** This section is not available on card-based models.



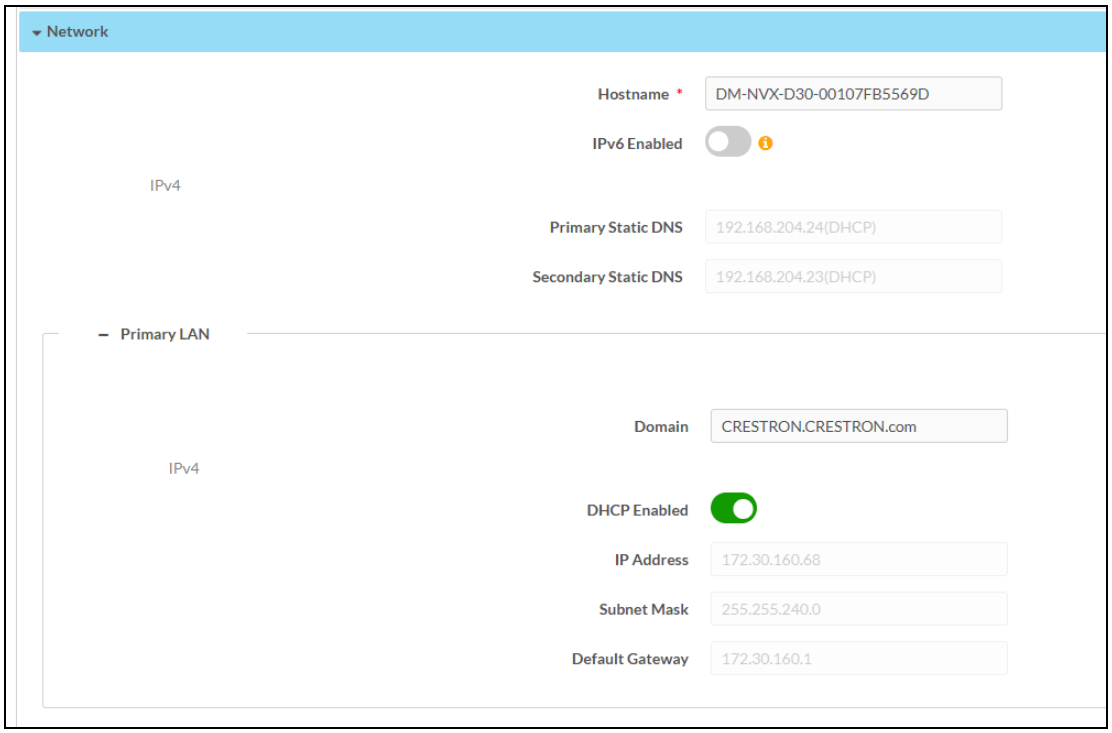
Select an option from the **Fan Mode** drop-down:

- **Auto:** The fan automatically turns on when either of these conditions are met:
  - A video stream is present.
  - The internal temperature of the device exceeds the normal operating range.
- **Always On:** The fan runs continuously regardless of video stream status and internal temperature.

Fan Status is a read-only field that will either read **Full On** to indicate that the fan is running or **Off** to indicate that the fan is not running.

Network

The **Network** accordion contains network-related settings for the DM NVX device, including the **Hostname**, **Domain**, **Primary Static DNS**, and **Secondary Static DNS**.



NOTE: By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-D30-00107FB5569D.

Primary LAN

The **Primary LAN** subheading contains settings for **DHCP**, **IP Address**, **Subnet Mask**, and **Default Gateway** of the Ethernet adapter.

NOTE: On the DM-NVX-E760(C), other LAN subheadings appear when the built-in Ethernet ports are given traffic designations via the **Port Selection** feature. Refer to Port Selection (E760 Models Only) on page 721 for more information on designating specific traffic to specific Ethernet ports. The same settings are available for the additional LAN subheadings that are available for **Primary LAN**.

Set the **DHCP** toggle to the right to enable **DHCP** or left to disable **DHCP**. This determines whether the IP address of the **Primary LAN** port is to be assigned by a DHCP (Dynamic Host Configuration Protocol) server.

- **Enabled:** When DHCP is enabled (default setting), the IP address of the Primary LAN port is automatically assigned by a DHCP server on the local area network (LAN).

- **Disabled:** When DHCP is disabled, manually enter information in the following fields:
  - **Primary Static DNS:** Enter a primary DNS IP address.
  - **Secondary Static DNS:** Enter a secondary DNS IP address.
  - **IP Address:** Enter a unique IP address for the Primary LAN port.
  - **Subnet Mask:** Enter the subnet mask that is set on the network connected to the Primary LAN port.
  - **Default Gateway:** Enter the IP address that is to be used as the Primary LAN network's gateway.

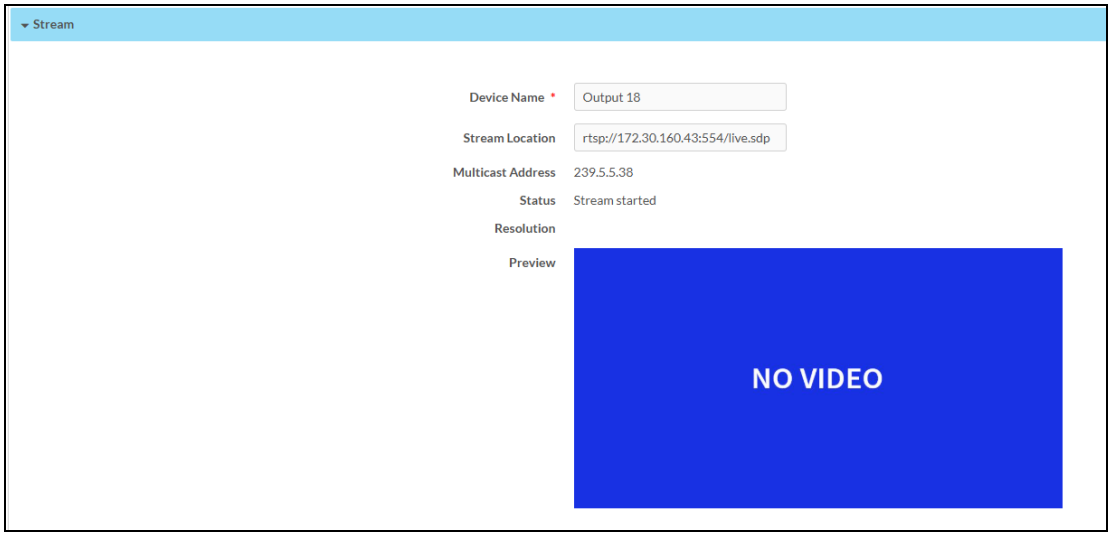
To save any new network entries, select **Save Changes**.

Stream

The settings available under the **Stream** accordion vary depending on whether the device is a decoder (D model) or encoder (E model).

Stream Settings (D Models)

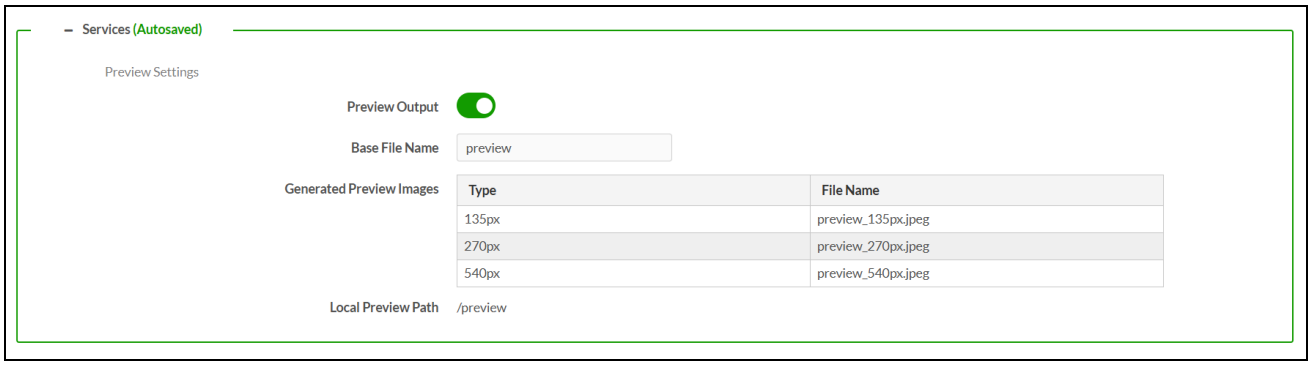
Sample Stream Settings (DM-NVX-D30 Shown)



Configure the basic stream settings:

- **Device Name:** Displays the name of the upstream DM NVX device. By default, this will match the hostname.
- **Multicast Address:** Displays the multicast address of the incoming stream.
- **Stream Location:** Displays the network location of the incoming stream.
- **Status:** Displays the status of the network stream (for example, **Connecting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the incoming stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

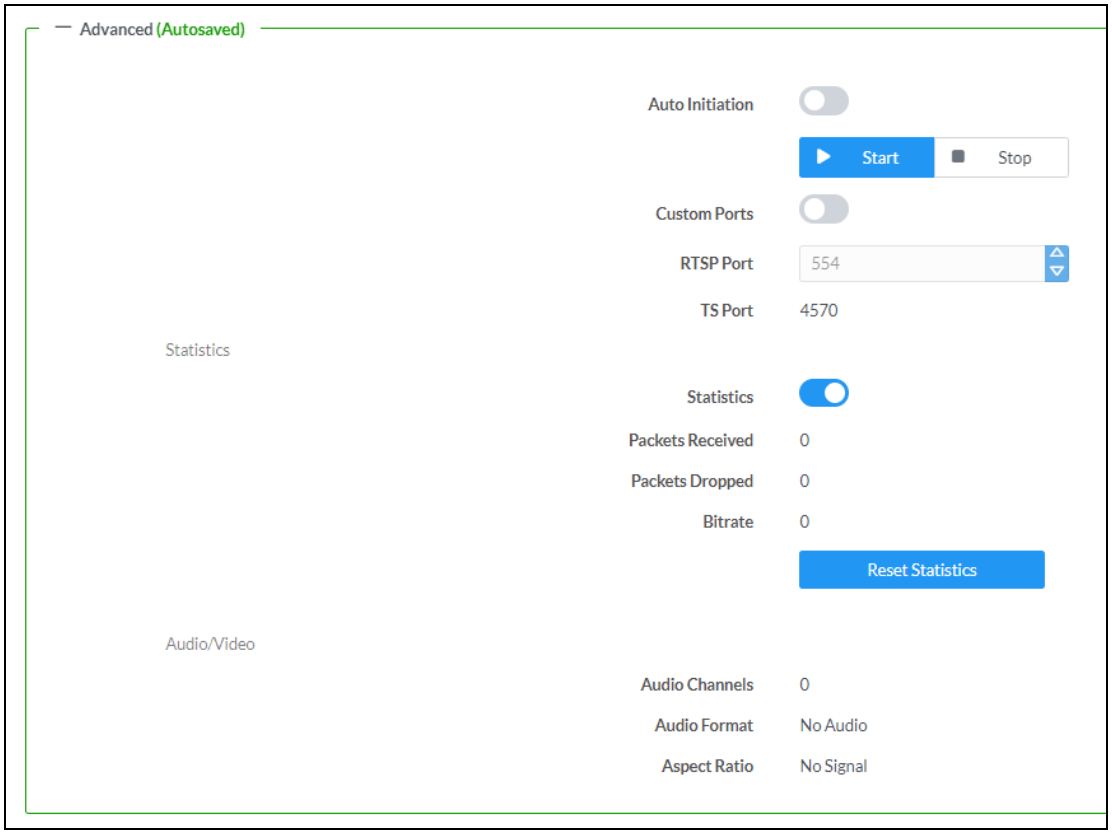
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the incoming AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to set a custom RTSP port to connect to an incoming DM NVX stream. Set the toggle to the left to use the default port values (the default RTSP port value is 554).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.

  > **NOTE:** Valid values for the custom port field range from 1 to 65535. Crestron recommends

> using a custom port value greater than 10000.

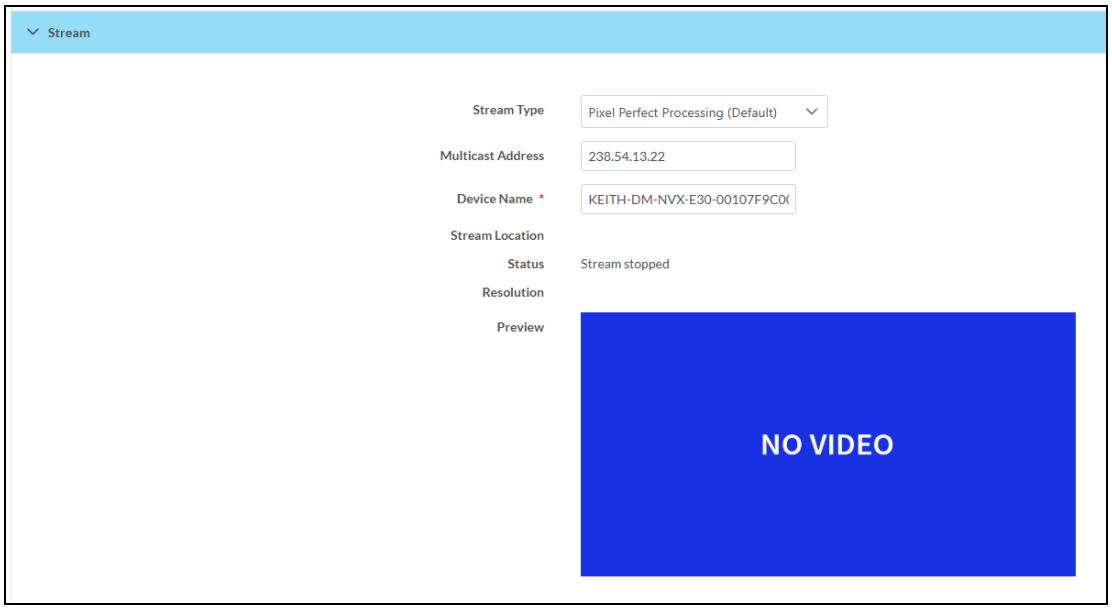
- **TS Port:** Displays the default TS port value (4570).

The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the incoming DM NVX stream:
  - **Packets Received** will display the total number of packets received by the DM NVX device as part of the incoming DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - **Bitrate** will display the current bitrate of the incoming DM NVX stream.
  - Select **Reset Statistics** to set both **Packets Received** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the incoming DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the incoming DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the incoming DM NVX stream.

Stream Settings (E Models)

Sample Stream Settings (DM-NVX-E30 Shown)



Configure the basic stream settings:

- **Stream Type:** Select either **Pixel Perfect Processing** (if transmitting to other DM NVX 4K60 4:4:4 capable endpoints) or **DM-NVX-D10/D20** (if transmitting to a decoder in the D10/D20/D200 family of DM NVX decoders).

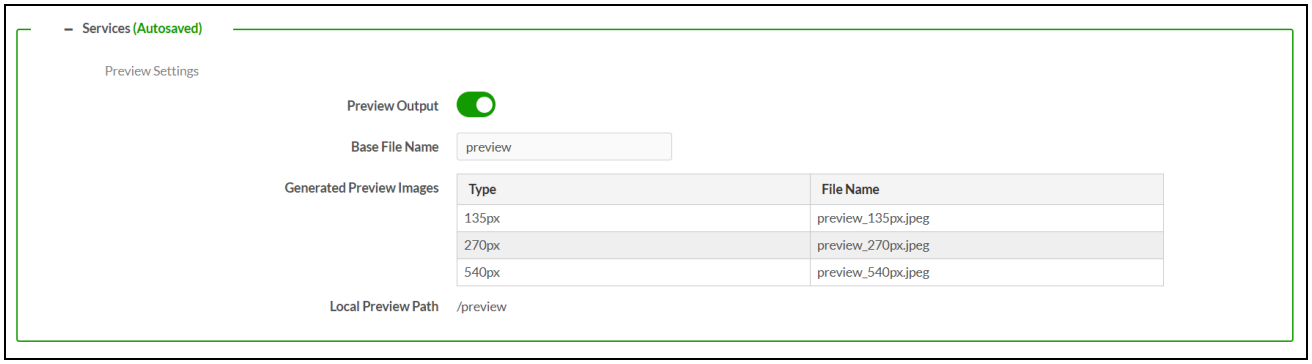
- **Multicast Address:** Sets the multicast address of the outgoing stream.
    - The secondary audio stream from the DM NVX device will consume the next multicast address above the value entered here. For example, a **Multicast Address** of 239.10.0.1 will result in a secondary audio stream address of 239.10.0.2.

> **CAUTION:** Ensure the value entered for **Multicast Address** is unique on the network. Duplicate multicast addresses will result in traffic collision and downstream receivers will fail to receive content.

> **NOTES:**
>
> - DM NVX devices can have a multicast transmit address anywhere in the range from 239.0.0.0 to 239.127.255.255. Starting at 239.1.0.0 is recommended to avoid common multicast MAC address conflicts.
> - DM NAX audio-over-IP devices use a multicast range from 239.8.0.1 to 239.127.255.255.

- **Device Name:** Displays the name of the DM NVX device. A custom name can also be entered in this text box. By default, this will match the hostname.
- **Stream Location:** Displays the network location of the stream.
- **Status:** Displays the status of the network stream (for example, **Stream starting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the outgoing stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Services



The image preview feature of the DM NVX device is configured in the **Services** section of the **Stream** accordion. Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

To configure the image preview feature:

1. Set the **Preview Output** toggle to the right to enable the image preview feature.
2. Enter a prefix to add to the file names of the images that are generated by image preview in the **Base File Name** field.

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 by the **Base File Name** field. If the default base file name of preview is changed, selecting 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.

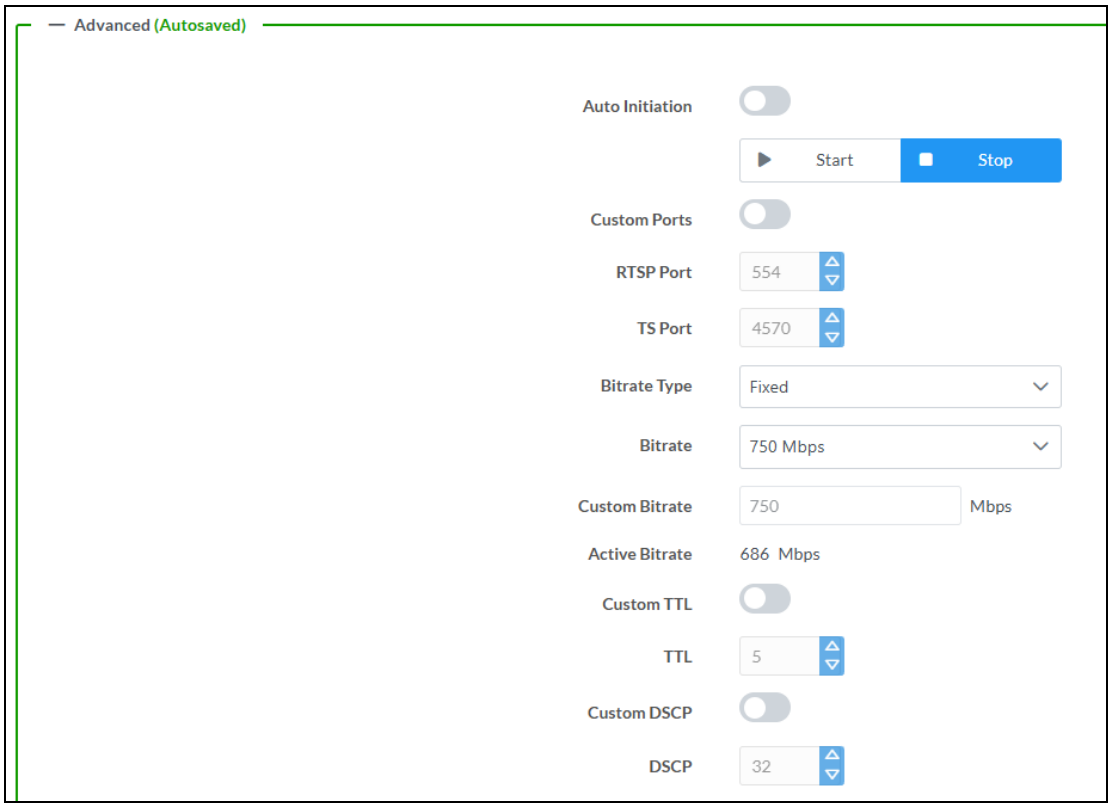
Local Preview Path indicates the **/preview** file path location to which image preview files are saved to the web server of the DM NVX device. An image preview file can be accessed from a web browser on a remote device by entering the following URL:

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.

Advanced

The **Advanced** section provides further configuration of the transmitting AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to configure a custom RTSP port for the transmitting DM NVX stream. Set the toggle to the left to use the default port values for both ports (the default RTSP port value is 554 and the default TS port value is 4570).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.
  - Enter a custom TS port in the **TS Port** field.

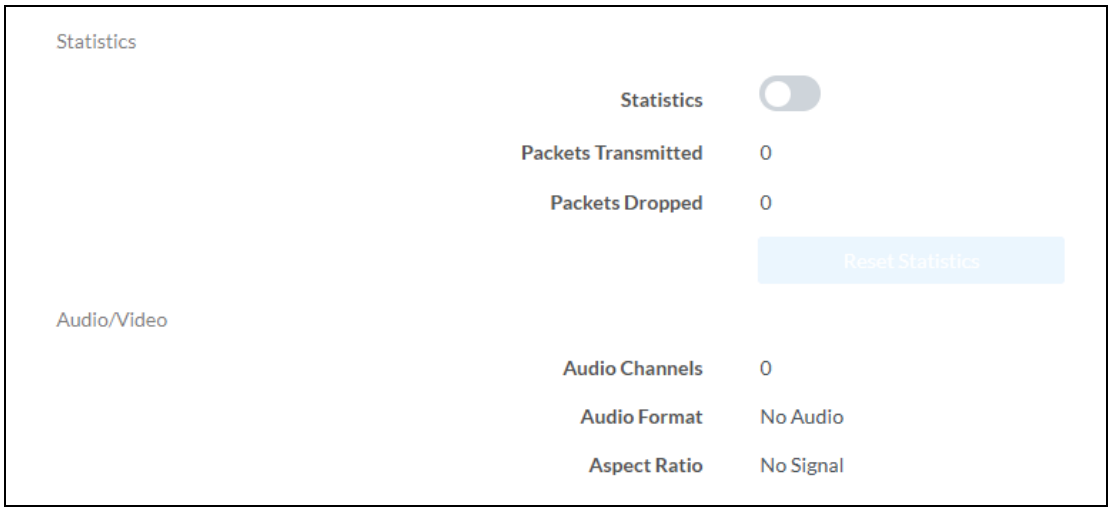
  > **NOTE:** Valid values for both custom port fields range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **Bitrate Type:** Select **Fixed**, **Variable**, or **Custom** from the drop-down.
    - **Fixed:** The transmitting DM NVX stream always meets the bitrate specified by the **Bitrate** drop-down. The default and recommended bitrate value is 750 Mbps.
    - **Variable:** The bitrate of the transmitting DM NVX stream is dynamic based on the resolution of the stream content. Selecting **Variable** will disable the **Bitrate** drop-down and **Custom Bitrate** text entry field.
    - **Custom:** The transmitting DM NVX stream always meets the bitrate specified by the **Custom Bitrate** text entry field. The default and recommended bitrate value is 750 Mbps.
- **Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Fixed**.
- **Custom Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Custom**.
- **Active Bitrate:** Displays the current bitrate of the transmitting DM NVX stream.
- **Custom TTL:** Multicast Time-to-live (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.

  Select the **Custom TTL** checkbox to enter a custom TTL value for the DM NVX stream in the **TTL** field.
- **TTL:** Enter a value from 1 to 255. The default TTL value is 5.
- **Custom DSCP:** To implement Quality of Service (QoS), IP networks use Differentiated Services Code Point (DSCP) values. Within an IP packet header, the DSCP is a value from 0 to 63 that maps to a certain traffic classification. Based on IT department policies and network switch configurations, DSCP values are used to determine the treatment of specific packets in router queues, the routes of traffic flows, and per-hop behavior. By default, DSCP for DM NVX AV-over-IP is set to 32.

  Select the **Custom DSCP** checkbox to enter a custom DSCP value for the DM NVX stream's AV-over-IP packets in the **DSCP** field

  > **NOTE:** Only change the DSCP value if required by IT department policies or if necessitated by poor network performance. Refer to AV-over-IP Network Design on page 871 for network performance troubleshooting tips.



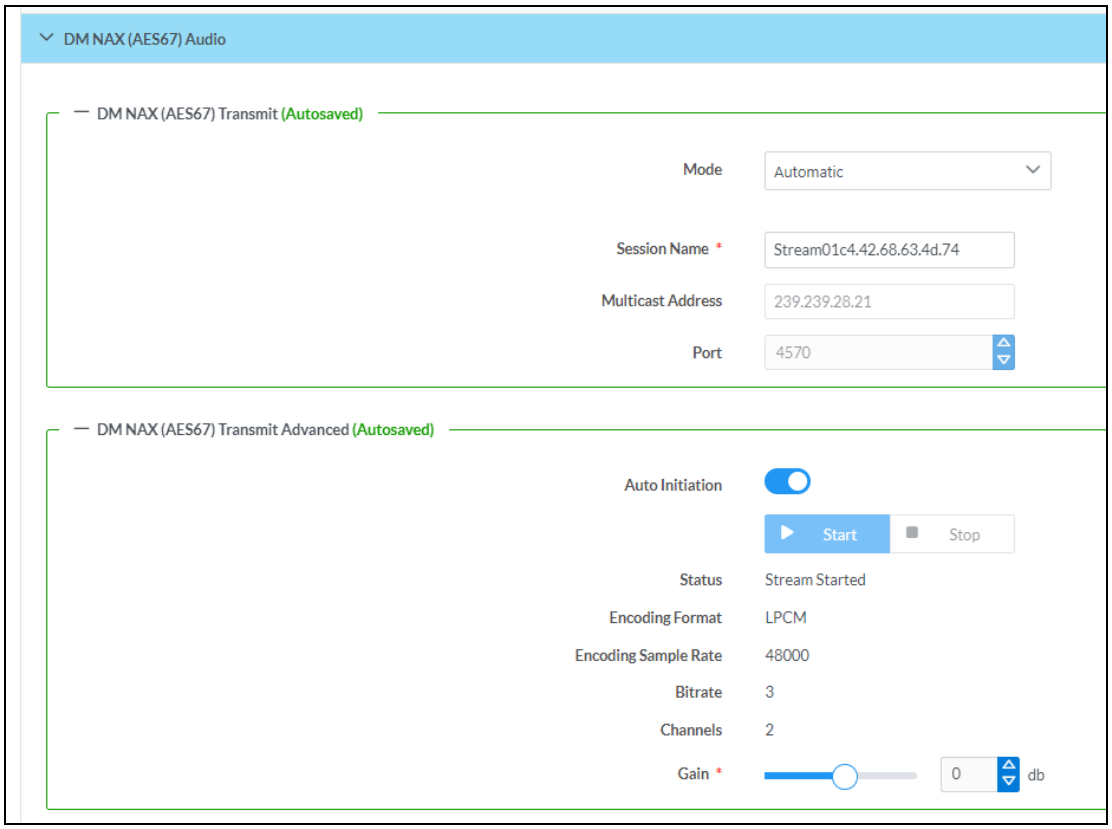
The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the transmitting DM NVX stream:
  - **Packets Transmitted** will display the total number of packets transmitting by the DM NVX device as part of the outgoing DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - Select **Reset Statistics** to set both **Packets Transmitted** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the transmitting DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the transmitting DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the transmitting DM NVX stream.

DM NAX (AES67) Audio

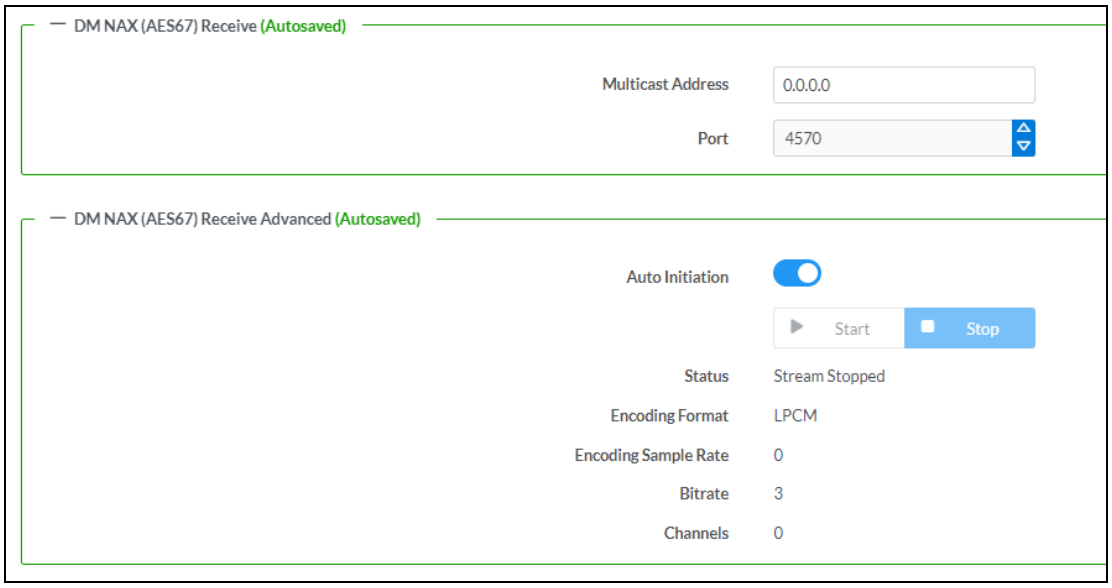
DM NVX devices natively support DM NAX® audio-over-IP technology, which is built off the standards of AES67. AES67 support allows a selected audio source to be transmitted as a 2-channel AES67 stream while another 2-channel AES67 audio stream is received from another AES67-capable device or Crestron DM NAX device.

Use the **DM NAX (AES67) Audio** accordion to configure the DM NAX audio-over-IP transmit and receive streams of the DM NVX device.



To configure the **DM NAX (AES67) Transmit** stream:

1. Select a stream addressing mode from the **Mode** drop-down:
   - **Automatic** adds 1 to the outgoing video stream multicast address to generate the DM NAX transmit 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.
   - **Manual** requires the multicast address of the transmitting DM NAX stream to be set manually. Selecting **Manual** enables the **Multicast Address** and **Port** text entry fields.
   - **Disabled** turns off DM NAX transmission from the DM NVX device.
2. Set a custom session name in the **Session Name** text entry field. This is similar to setting a hostname for an IP address on the LAN. The session name will appear in addition to the multicast address when the DM NAX audio-over-IP stream is discovered on the network.
3. If the **Mode** is set to **Manual**, enter custom values in the **Multicast Address** and **Port** text entry fields.
4. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the DM NAX transmit stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.
5. Adjust the **Gain** slider to configure the audio level compensation on the transmitting DM NAX stream from -10 to +10 dB.

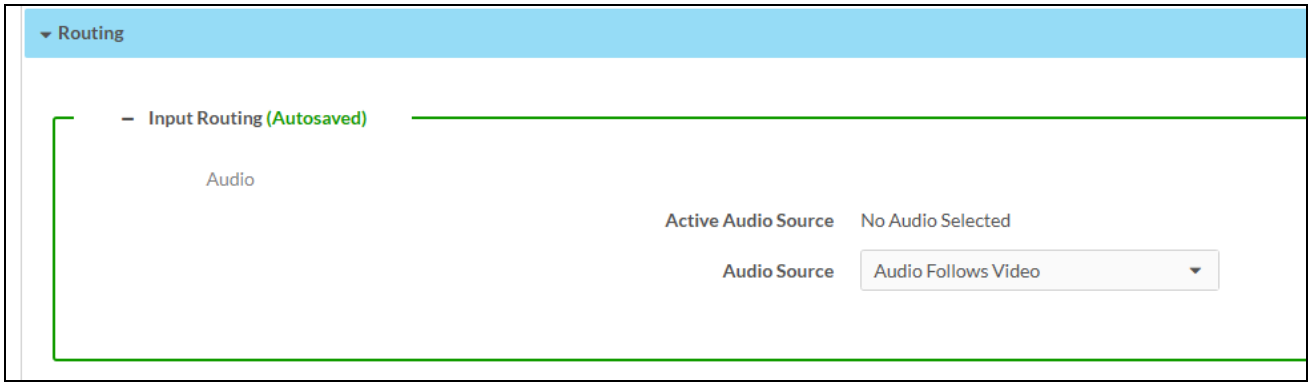


To configure the **DM NAX (AES67) Receive** stream:

1. Enter a valid multicast IP address in the **Multicast Address** field.
2. Enter the port value of the stream in the **Port** field.
3. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the incoming DM NAX stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

Routing

Use the **Routing** accordion to configure the audio and video routing behavior of the DM NVX device's internal switcher and secondary audio stream.



Input Routing

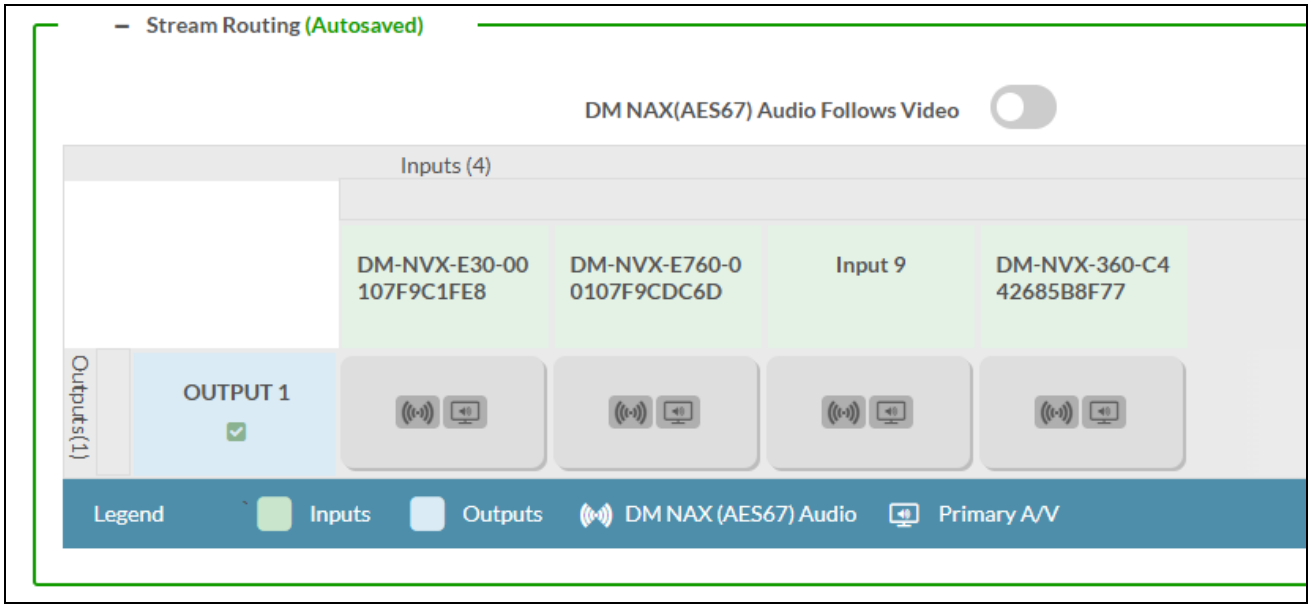
The fields under the **Input Routing** subheading refer specifically to audio signal routing, which can be handled separately from video routing.

- The **Active Audio Source** read-only field displays the name of the currently active audio source. This reflects the audio that is embedded in the HDMI output (for D models) or DM NVX AV-over-IP stream (for E models), as well as the audio that transmits from the analog audio connector.

- The options available for the **Audio Source** drop-down depend on the model:
  - For D models, the options are **Audio Follows Video**, **Primary Stream Audio**, and **DM NAX (AES67) Audio**.
  - For E30 models, the options are **Audio Follows Video**, **HDMI 1**, and **DM NAX (AES67) Audio**.
  - For E760 models, the options are **Audio Follows Video**, **INPUT 1**, and **DM NAX (AES67) Audio**.

Stream Routing (D Models Only)

The **Stream Routing** section houses the routing matrix for audio and video signals that can be received over the network.



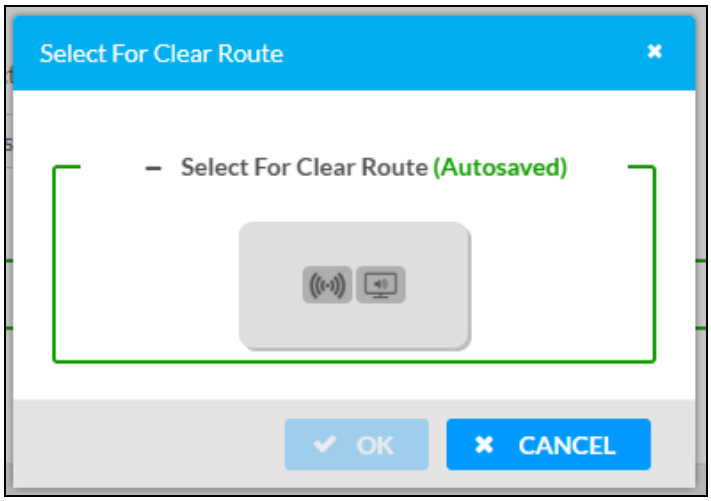
NOTE: In order for the routing matrix to appear, at least one subscription must be added from the **Subscriptions** accordion. Refer to Subscriptions (D Models Only) on page 706 for information on adding subscriptions.

Set the **DM NAX (AES67) Audio Follows Video** toggle to the right to have the secondary audio stream match the same routes as the primary AV stream. Set the toggle to the left to manage the secondary audio stream routing independently of the primary AV stream.

Use the routing matrix to establish or break signal routes:

- To route an AV-over-IP stream to the DM NVX device, select the **Primary A/V** icon in that stream's matrix column. If the **DM NAX (AES67) Audio Follows Video** toggle is set to the right, the **DM NAX (AES67) Audio** icon will also be selected automatically for that stream.
- To route a DM NAX (AES67) stream to the DM NVX device, select the **DM NAX (AES67) Audio** icon in that stream's matrix column. To manage this independently of the AV-over-IP stream, the **DM NAX (AES67) Audio Follows Video** toggle must be set to the left.

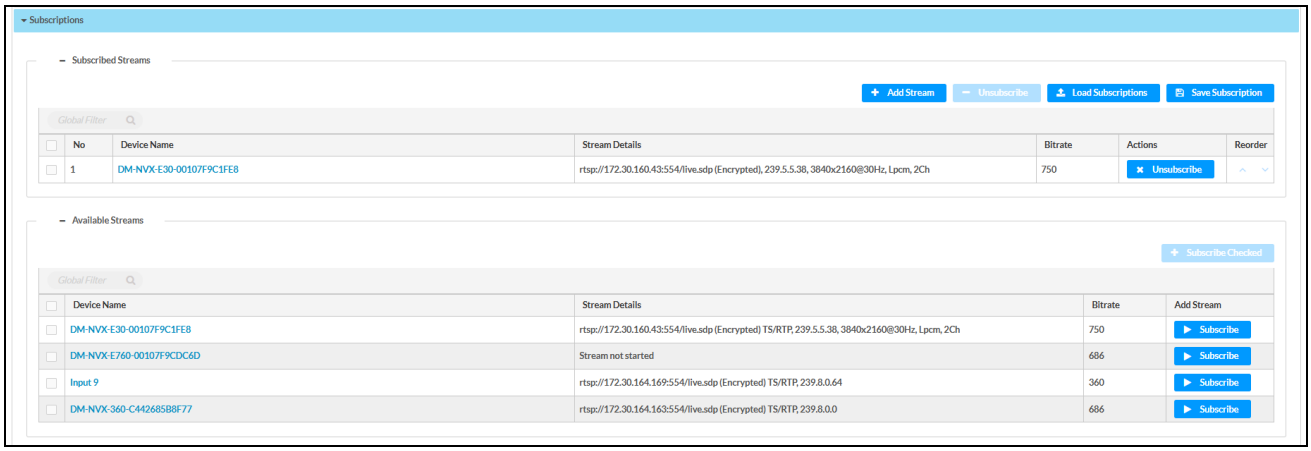
- To clear a route, do one of the following:
  - Select the ✖ icon for a given input to clear all routes from that input.
  - Select the ✔ icon for a given output to clear routes from that input. A **Select For Clear Route** window appears.



Select either or both of the signal types to clear all routes of those types from the output, then select **OK** to clear those routes or **Cancel** to cancel the operation.

Subscriptions (D Models Only)

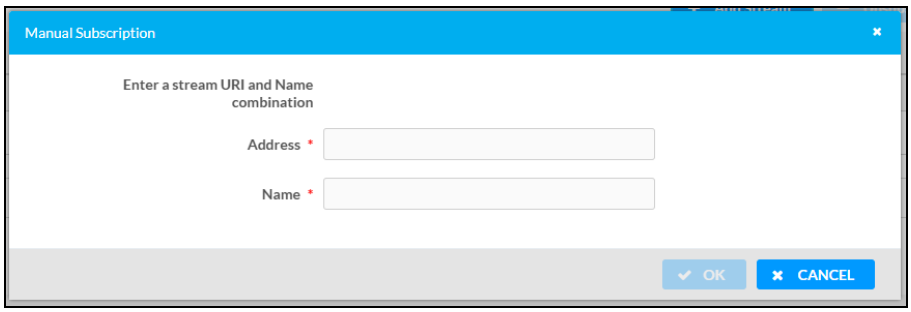
The **Subscriptions** accordion allows the DM NVX receiver to subscribe to discovered network AV-over-IP streams for quick routing and switching without having to manually enter multicast addresses or session names.



The **Subscribed Streams** table displays all network streams that the device is subscribed to. These streams are also available in the routing matrix in the **Routing** accordion. Refer to Stream Routing (D Models Only) on page 705 for information on routing a subscribed stream.

To add a stream to the table, do either of the following:

- Select **+ Add Stream**. A **Manual Subscription** window appears.



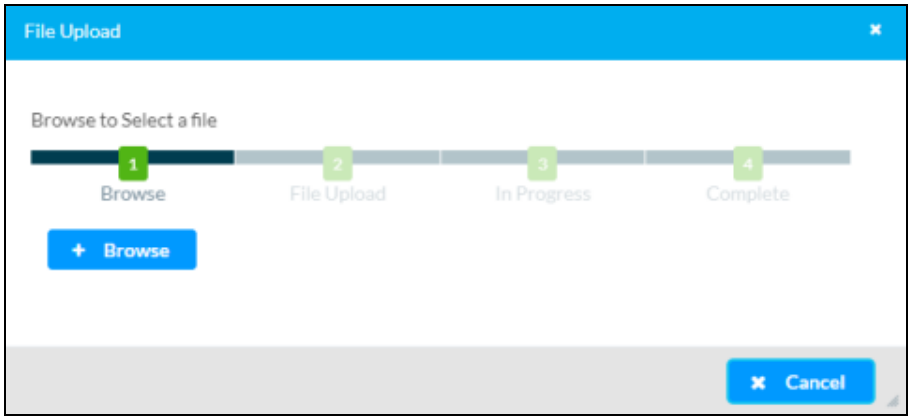
  - Enter the multicast address of the stream in the **Address** field.
  - Enter the device name of the transmitting device in the **Name** field.
  - Select **√ OK** to add the stream to the **Subscribed Streams** list or select **X Cancel** to cancel the operation.
- Select the **Subscribe** button for a stream listed in the **Available Streams** table.

To add multiple streams to the table at once, select the checkbox for each desired stream in the **Available Streams** table, then select **+ Subscribe Checked**.

To remove a stream from the table, select **x Unsubscribe** in its table row. To remove multiple streams at once, select the checkbox for each stream in the **Subscribed Streams** table, then select **- Unsubscribe** at the top of the table.

The **Subscribed Streams** table can also be exported as a .xml file to other DM NVX receivers. This allows the subscription process to be performed even more efficiently on other receivers. To export the table and upload it to another receiver:

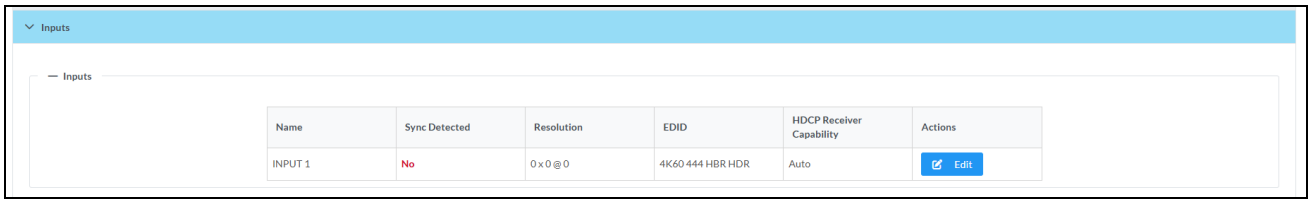
1. Subscribe to all of the desired network streams.
2. Select **Save Subscription** at the top of the **Subscribed Streams** table. A .xml file will be downloaded to the connected PC.
3. Log in to the next DM NVX receiver's web interface and navigate to its **Subscriptions** accordion.
4. Select **Load Subscriptions** at the top of the **Subscribed Streams** table. A **File Upload** window appears.



5. Select **+ Browse**. Locate the .xml file, then select **Upload** to upload it to the DM NVX device. When the upload completes, the window will close and the interface will return to the **Subscriptions** accordion with the **Subscribed Streams** table filled out.

Inputs (E Models Only)

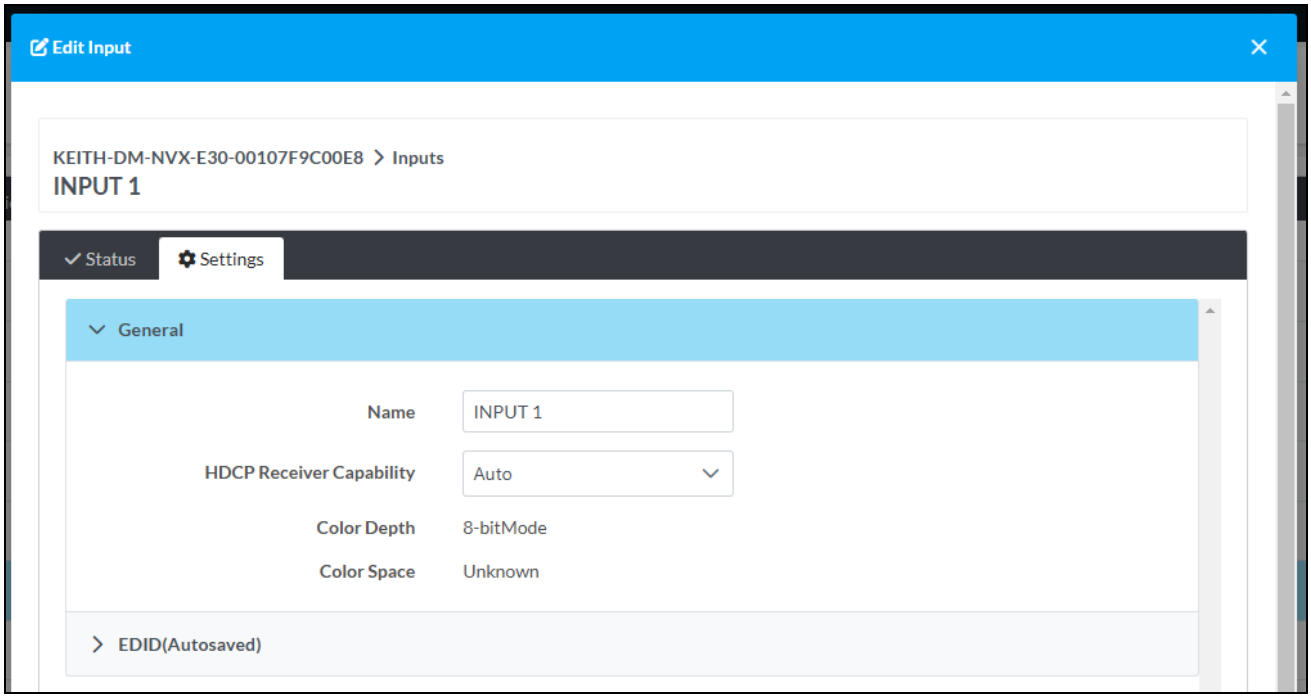
The **Inputs** accordion contains source resolution and EDID information as well as input configuration options for the local input connector on the DM NVX device.



To configure the input, select the **Edit** button. An **Edit Input** window appears. The contents of this window vary between the DM-NVX-E30 models and the DM-NVX-E760 models.

Edit Input - E30 Models

The **Edit Input** window will open to the **Settings** tab by default. This tab enables configuration of the available input settings for the HDMI input.



The **General** accordion is open by default.

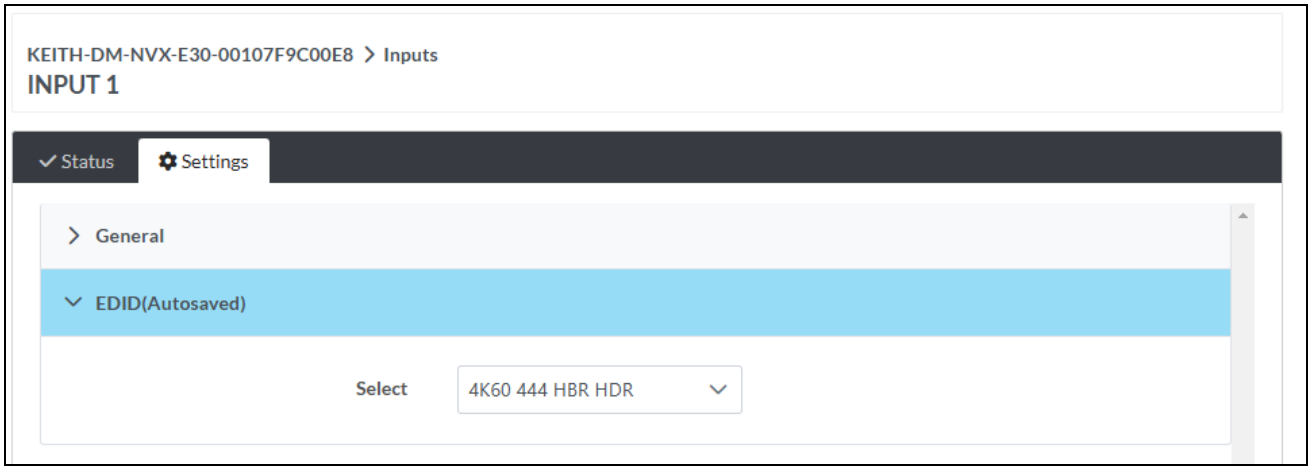
Enter a friendly name for the input in the **Name** text entry field.

Use the **HDCP Receiver Capability** drop-down to select **Auto** or a specific HDCP version. The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display.

NOTE: Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

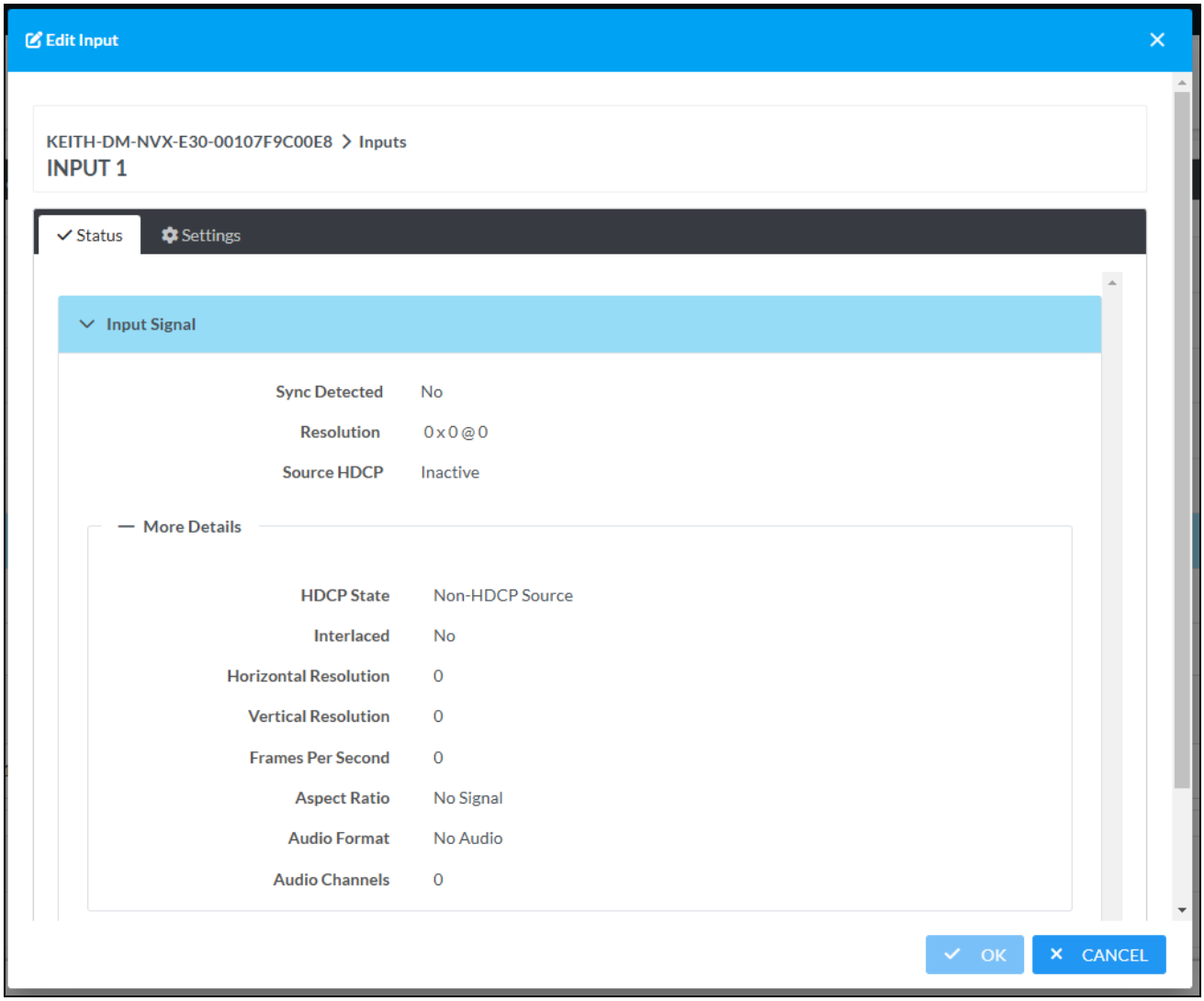
The **Color Depth** and **Color Space** fields are read-only and depend on the incoming video signal.

Select the **EDID** accordion to access EDID settings specific to the selected input.



Use the **Select** drop-down to apply a specific EDID file to the selected input. All built-in and custom EDIDs are available in this list. Refer to Action on page 671 for more information on loading custom EDIDs to this list.

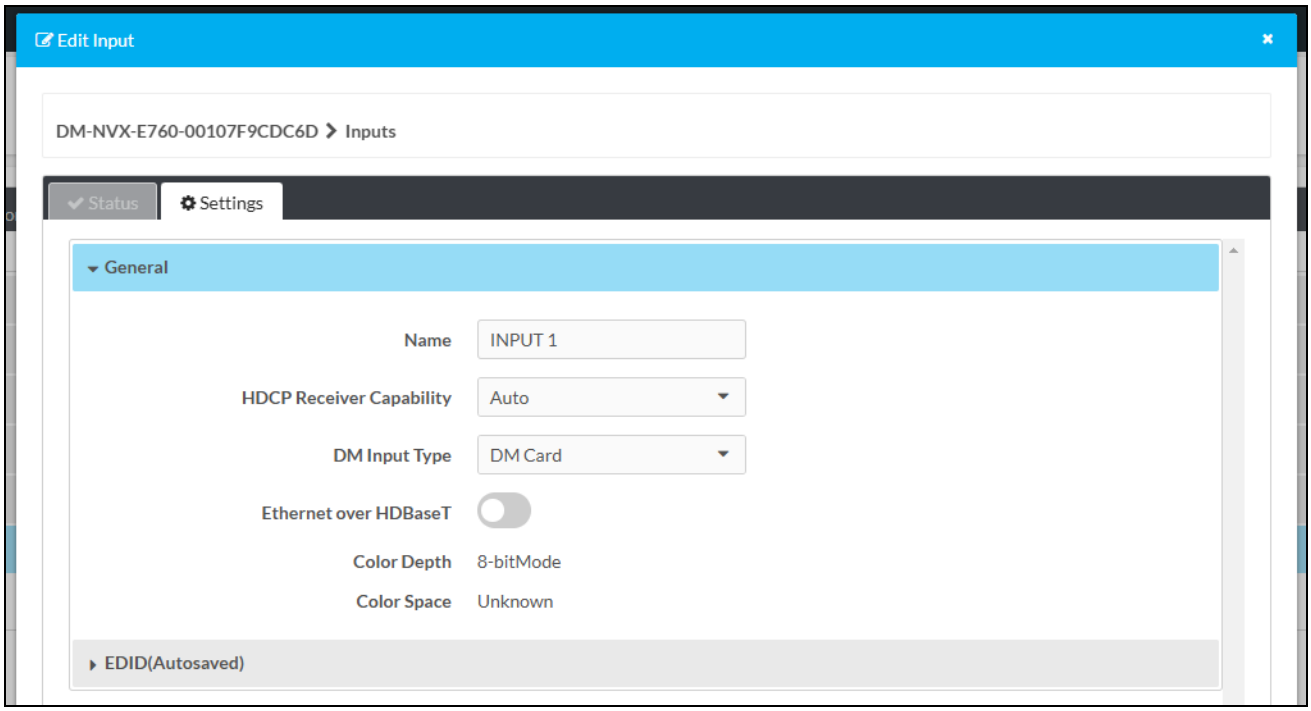
Select the **Status** tab to reference sync, resolution, HDCP, and audio information for the connector and input source.



Use **OK** or **Cancel** to return to the **Settings** page. Select **OK** to apply any changes made in the **Edit Input** window or select **Cancel** to discard the changes.

Edit Input - E760 Models

The **Edit Input** window will open to the **Settings** tab by default. This tab enables configuration of the available input settings for the DM input.



The **General** accordion is open by default. Configure the following settings:

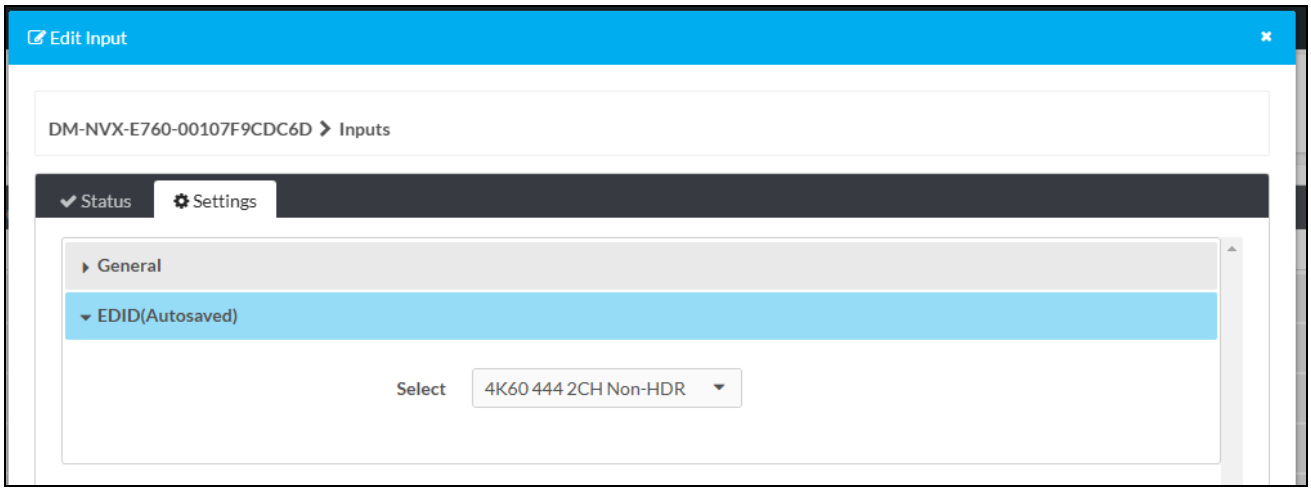
- Enter a friendly name for the input in the **Name** text entry field.
- Use the **HDCP Receiver Capability** drop-down to select **Auto** or a specific HDCP version. The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display

  > **NOTE:** Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

- Use the **DM Input Type** drop-down to select whether the DM input source is a **DM Transmitter**, **DM Lite Transmitter** (now known to as DM Essentials), or a **DM Card**.
- Set the **Ethernet over HDBaseT** toggle to the right to allow the LAN to extend over the HDBaseT connection between the DM source device and the DM NVX device. Set the toggle to the left to prevent the LAN from extending over this connection.

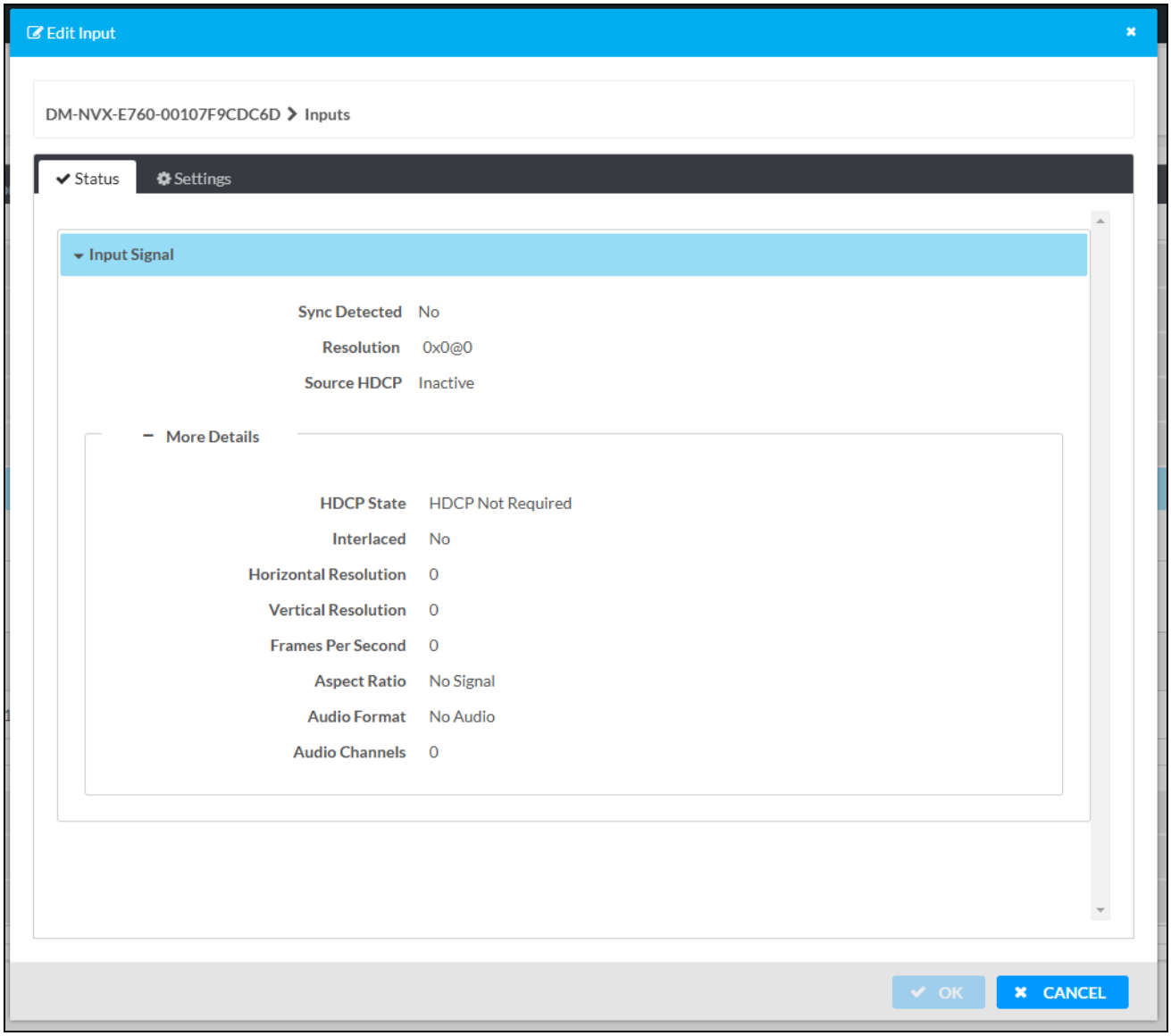
The **Color Depth** and **Color Space** fields are read-only and depend on the incoming video signal.

Select the **EDID** accordion to access EDID settings specific to the selected input.



Use the **Select** drop-down to apply a specific EDID file to the selected input. All built-in and custom EDIDs are available in this list. Refer to Action on page 671 for more information on loading custom EDIDs to this list.

Select the **Status** tab to reference sync, resolution, HDCP, and audio information for the connector and input source.



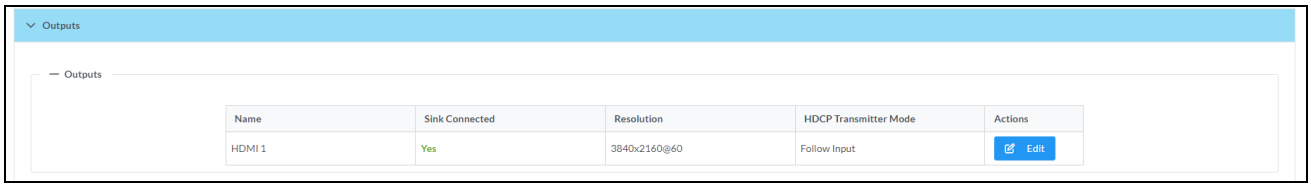
Use **OK** or **Cancel** to return to the **Settings** page. Select **OK** to apply any changes made in the **Edit Input** window or select **Cancel** to discard the changes.

Outputs

The **Outputs** accordion contents depend on whether the device is a decoder (D models) or encoder (E models).

Outputs (D Models)

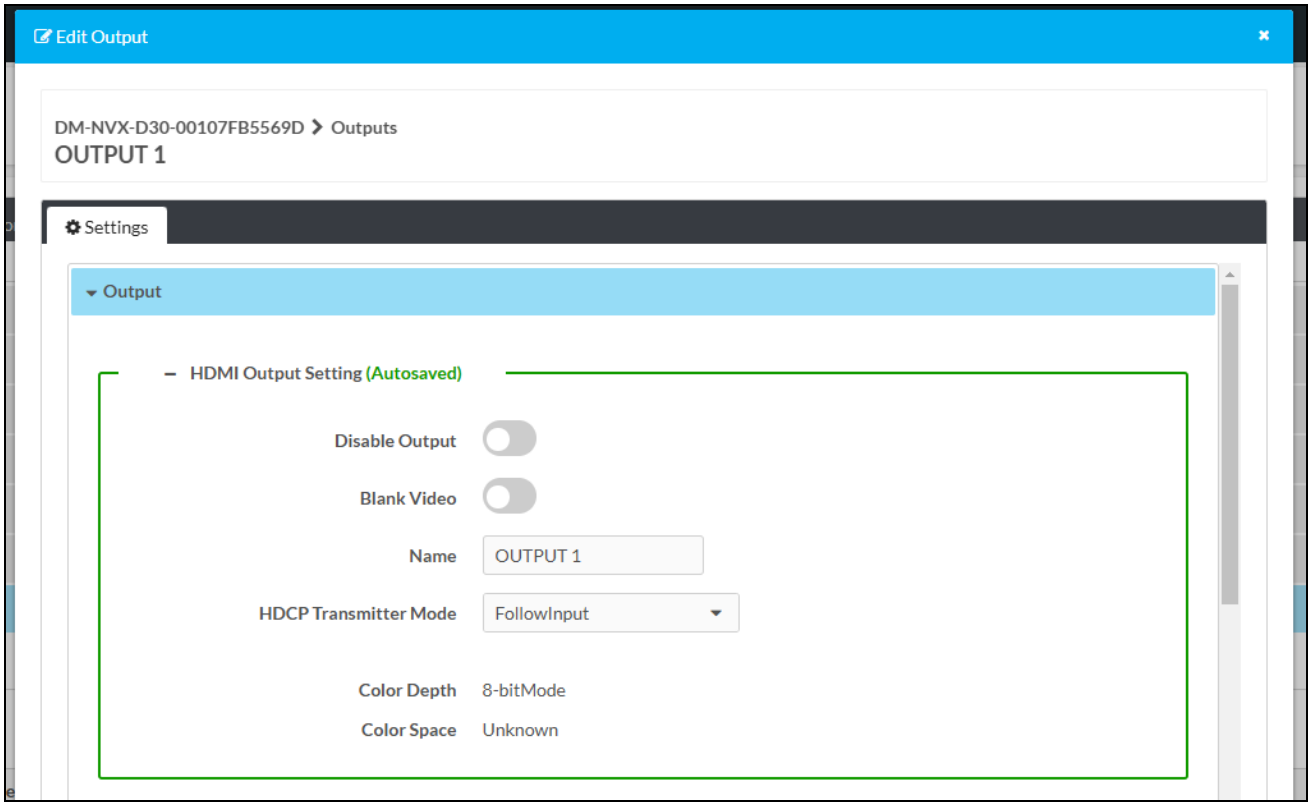
In the interface of a D30 model, the **Outputs** accordion contains status information and an **Edit** option for the local HDMI output connector on the DM NVX device.



To configure the output, select the **Edit** button. An **Edit Output** window appears. The settings available in the **Edit Output** window depend on which mode the DM NVX device is in.

Edit Output - Output Accordion

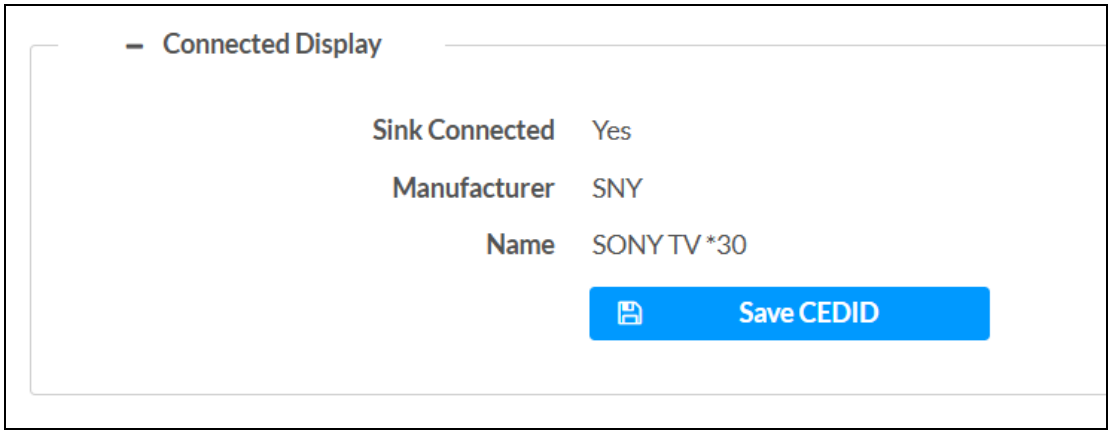
The **Output** accordion is open by default.



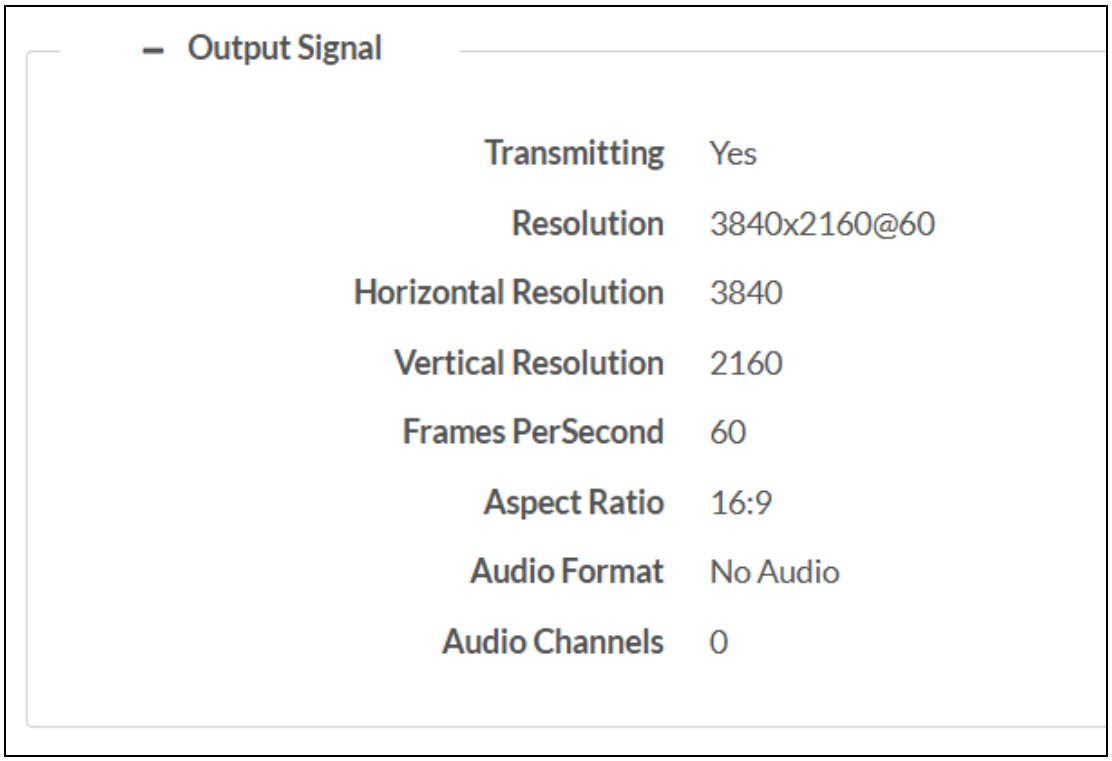
Configure basic settings under the **HDMI Output Setting** subheading:

- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Set the **Blank Video** toggle to the right to transmit a full-screen black video signal. Set the toggle to the left to transmit the video signal of the selected input.
- Enter a friendly name for the output in the **Name** text entry field.

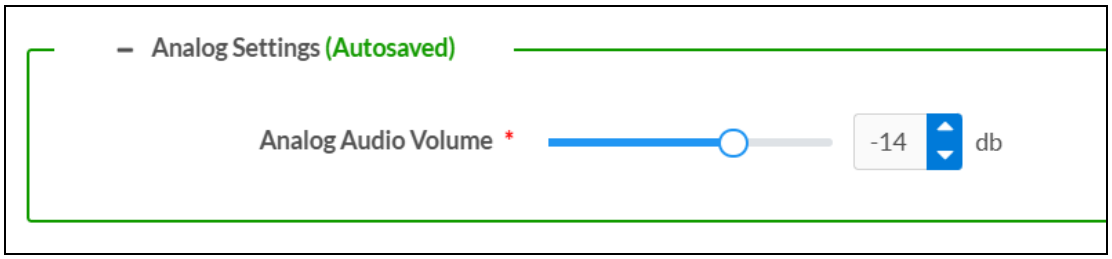
- Use the **HDCP Transmitter Mode** drop-down to select between:
  - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
  - **Follow Input:** The HDCP level of the output will be forced to the supported HDCP level of the local input.
  - **Force Highest:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the entire signal chain.
  - **Never Authenticate:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.
- The **Color Depth** and **Color Space** fields are read-only values that display the current depth and space of the video output signal, respectively.



The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 671 for more information on loading custom EDID files.



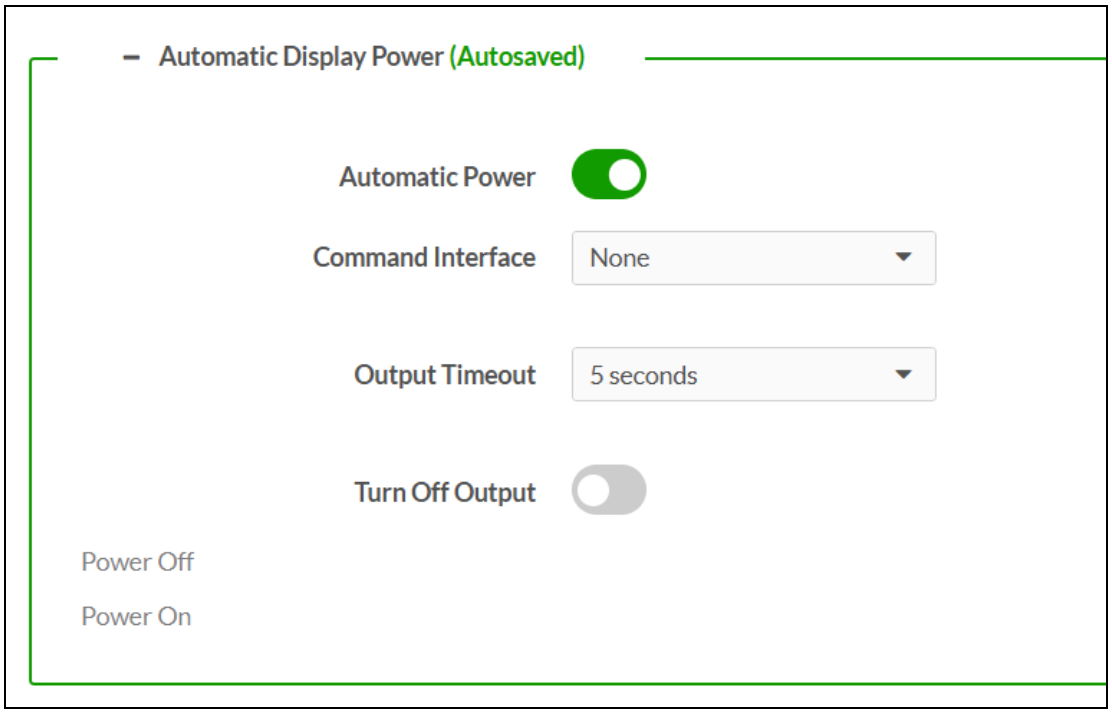
The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.



To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**.

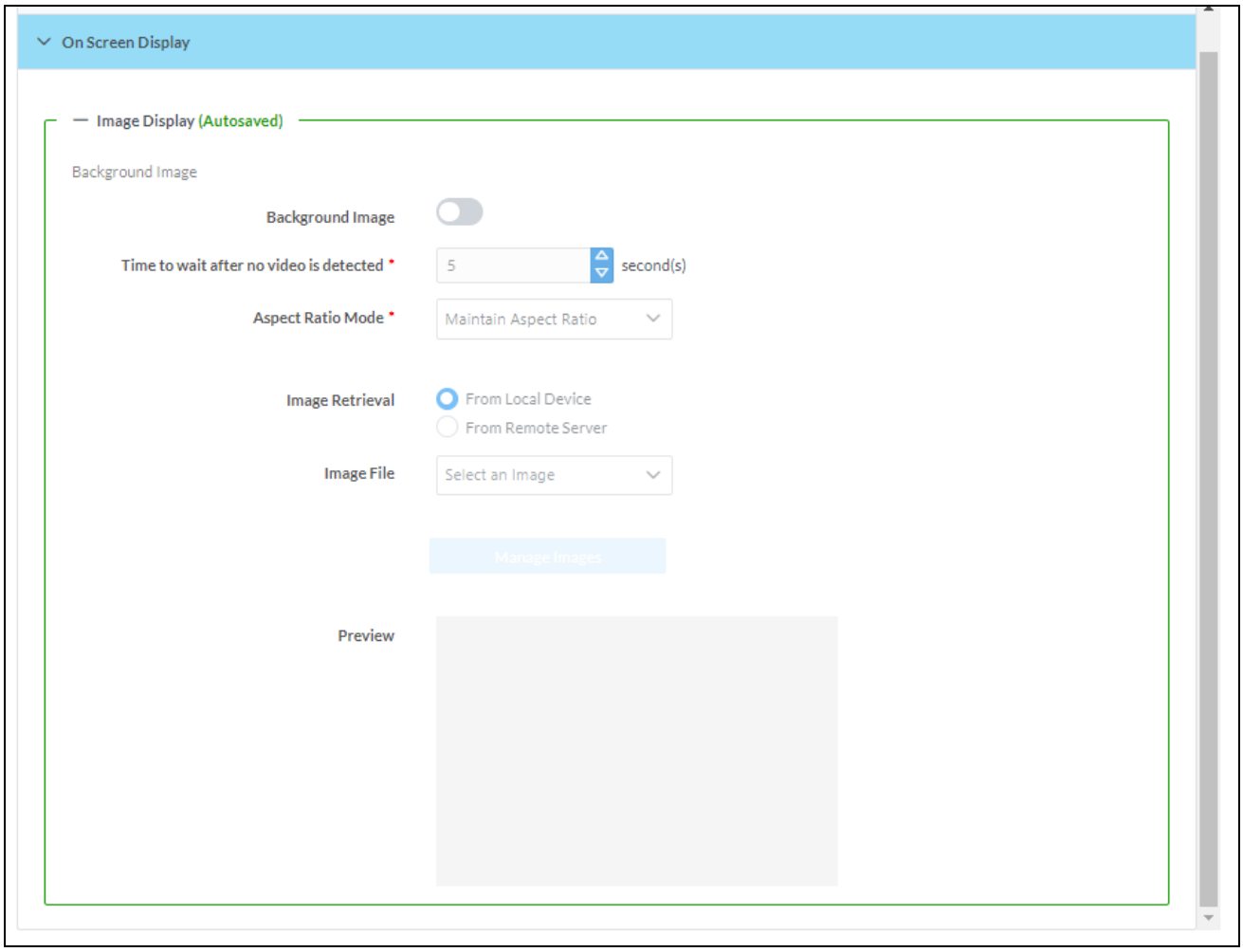
> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Edit Output - On Screen Display Accordion

Select the **On Screen Display** accordion to expand it. This accordion houses the **Image Display** settings that allow a static background image to be shown on the connected display.

> **CAUTION:** Displaying a static image for extended periods of time may result in image burn-in on any type of connected display. Consult documentation from the display manufacturer to determine recommended timeout or image refresh settings to avoid burn-in.



To configure the **Image Display** settings:

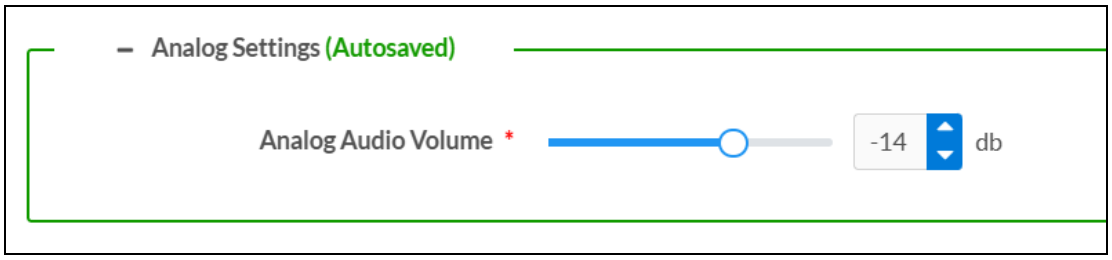
1. Set the **Background Image** toggle to the right to display a background image on the connected display, and to make all the other settings in the accordion available for configuration.
2. Enter a value in the **Time to wait after no video is detected** field from 5 seconds to 65,535 seconds to determine how long the device will wait after input signal is no longer detected before displaying the background image.
3. Use the **Aspect Ratio Mode** drop-down to select one of the following:
    - **Maintain Aspect Ratio:** The aspect ratio of the background image is preserved at the output. This may result in letterboxing or pillarboxing black bars at the edges of the display area.
    - **Stretch:** The aspect ratio of the background image is stretched to fit the aspect ratio of the display. This may distort the background image.
    - **1:1:** The background image is mapped 1:1 at the display without any aspect ratio scaling. This will preserve the aspect ratio of the image, but may not fill the entire display area, resulting in black borders around the image.

4. Select an option for **Image Retrieval**:
    - **From Local Device:** Select this option if an image stored locally on the DM NVX device will be used as the background image. Select the desired image from the **Image File** drop-down. To load custom images to the DM NVX device, select **Manage Images** from the **Edit Output** window or from the **Action** menu. Refer to Action on page 671 for more information.
    - **From Remote Server:** Select this option if an image hosted on a network server will be used as the background image. Enter the network file path to the image in the **Remote Path** field.
        - This option also allows the DM NVX device to refresh the image at a given interval. To have the DM NVX refresh the image, select the **Refresh** checkbox below the **Image Preview**, then enter a refresh rate in minutes from 1 to 65,535 minutes. The default refresh rate is 60 minutes.

To disable the background image, set the **Background Image** toggle to the left.

Outputs (E Models)

In the interface of an E30 or E760 model, the **Outputs** accordion only contains the **Analog Audio Volume** setting for the local **AUDIO I/O** connector of the device.



To adjust the **Analog Audio Volume**, do one of the following:

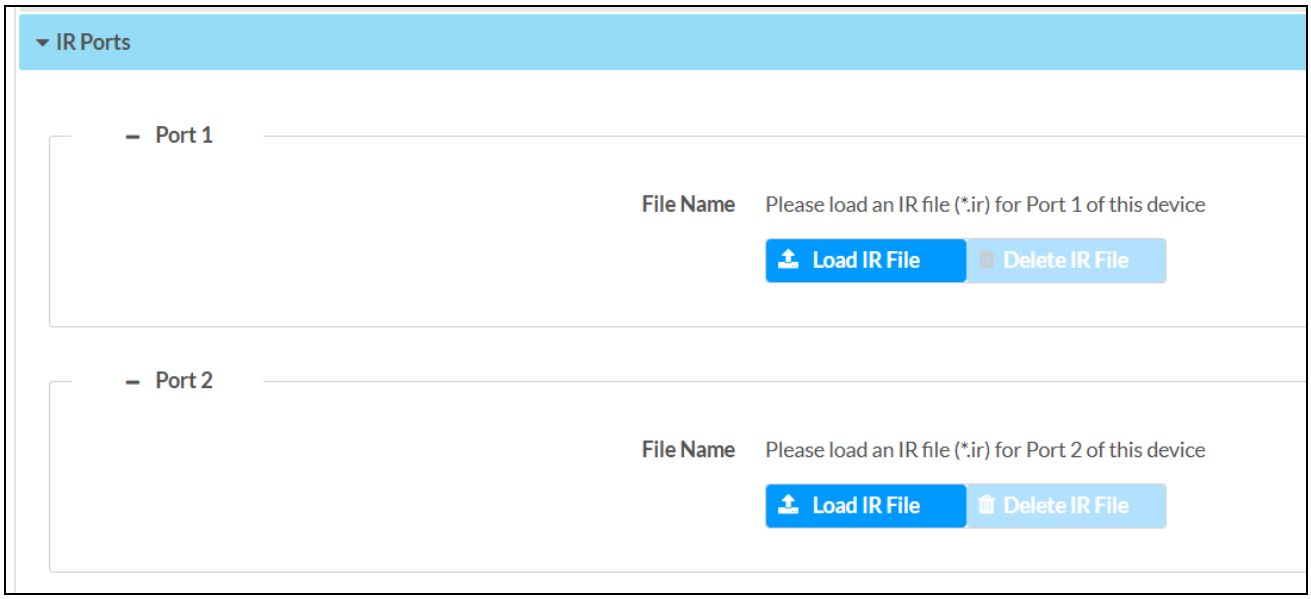
- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

IR Ports

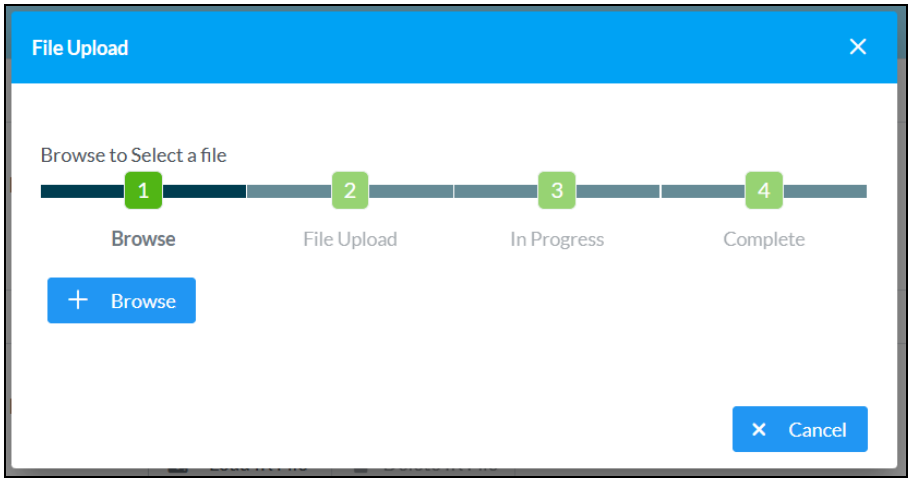
> **NOTE:** This accordion is not available on card-based models.

The **IR Ports** accordion allows custom IR files containing device commands to be uploaded to the DM NVX device for each IR connector. Custom IR files can be generated via the Device Learner utility within Crestron Toolbox software. Each IR port can hold only one IR file at a time. IR files must be loaded to each port individually.



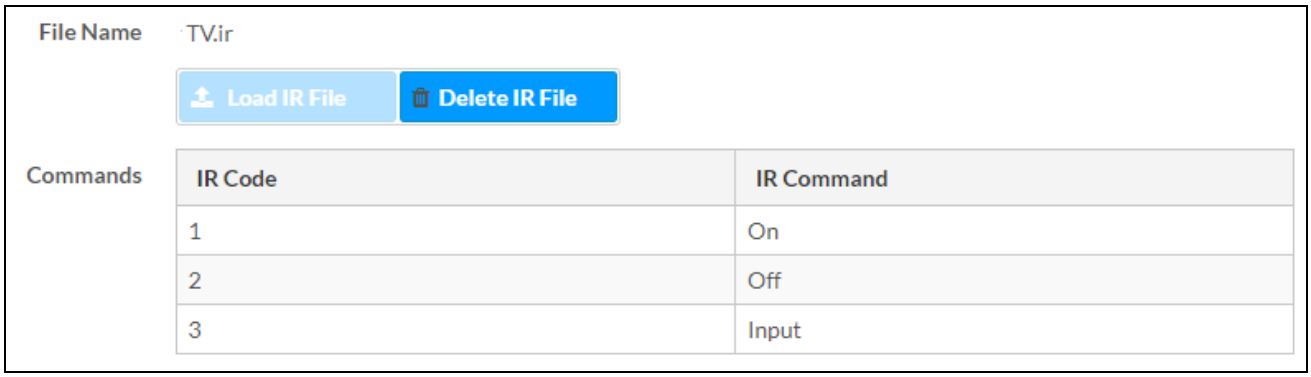
To upload an IR file to a given IR port:

1. Select **Load IR File**.
2. In the **File Upload** window that appears, select **+ Browse**.



3. Locate and select the desired IR file, then select **Open**. The selected file name is displayed.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The IR file is now loaded to the IR port.

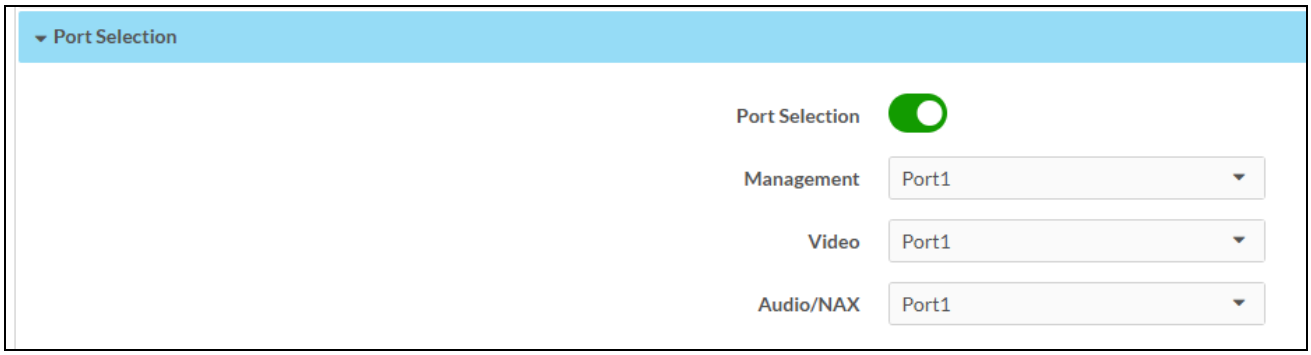
Once the IR file is uploaded, its filename will appear next to the IR port it was uploaded to. A read-only table showing all included commands will also appear and populate.



To delete an IR file from a given IR port, select **Delete IR File**.

Port Selection (E760 Models Only)

The **Port Selection** feature allows the device's internal network traffic to be managed and segregated based on traffic type. Internal VLANs are used to segment device management, video, AES67, and USB traffic to discrete Ethernet ports. With **Port Selection** disabled, the additional Ethernet ports of the DM NVX device can be used as courtesy ports to extend the connected LAN to a local network device. With **Port Selection** enabled on all DM NVX devices on a network, traffic types can be physically separated from the control network onto dedicated networks.



To configure **Port Selection**:

1. Set the **Port Selection** toggle to the right to enable **Port Selection**. Set the toggle to the left to disable **Port Selection**. By default, **Port Selection** is disabled.
2. With **Port Selection** enabled:
    a. Select an Ethernet port from the **Management** drop-down to designate it to handle network traffic relating to device configuration and connection to a control system.
    b. Select an Ethernet port from the **Video** drop-down to designate it to handle the DM NVX AV-over-IP streaming network traffic.
    c. Select an Ethernet port from the **Audio/NAX** drop-down to designate it to handle audio-over-IP streaming network traffic.

> **NOTE:** The audio signal in the primary DM NVX AV-over-IP stream will still traverse the port designated by the **Video** drop-down. The **Audio/NAX** drop-down only designates the port for the secondary audio stream.

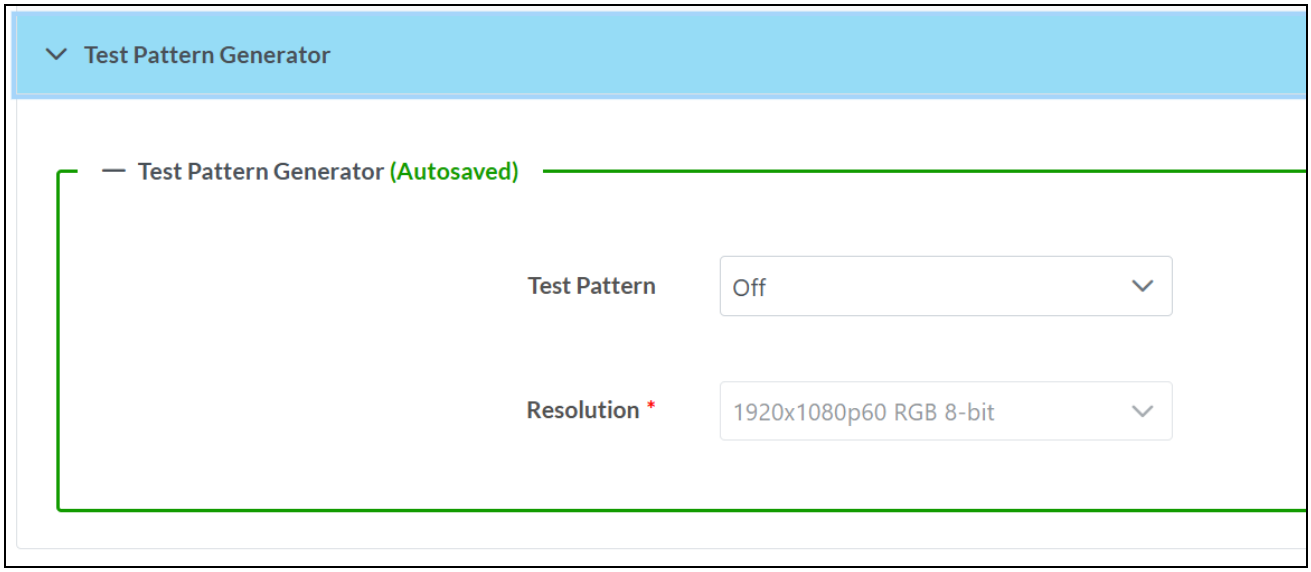
3. Select **Save** to apply the new settings.

> **NOTE:** Changes to **Port Selection** will require a device reboot.

Test Pattern Generator (E Models Only)

The **Test Pattern Generator** accordion contains settings for enabling various video test patterns to replace the DM NVX AV-over-IP video output signal.

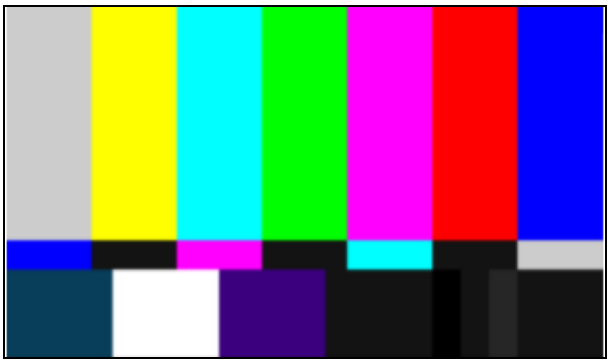
> **NOTE:** The **Test Pattern Generator** accordion is only available when the device is set to **Transmitter** mode.

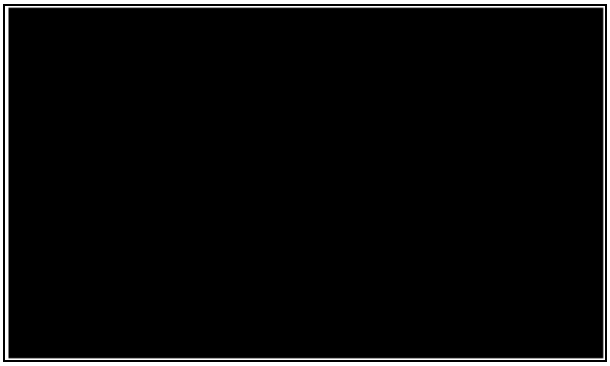
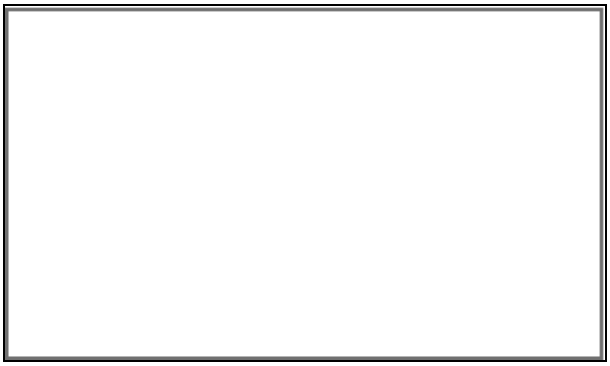
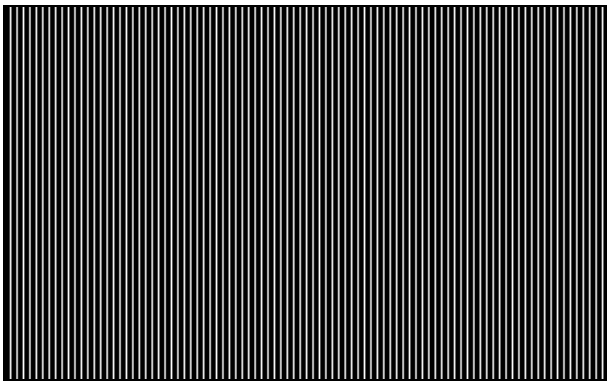
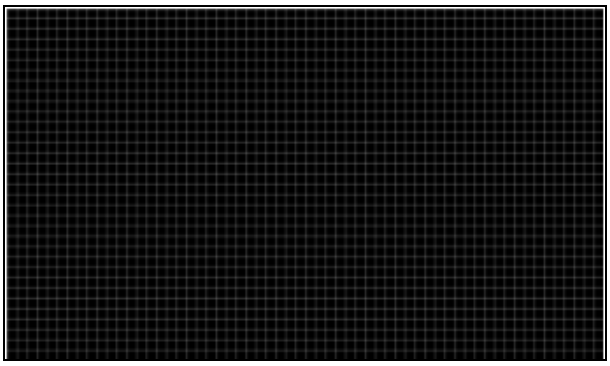


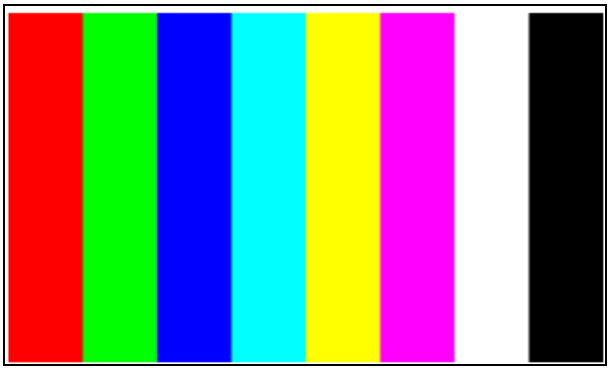
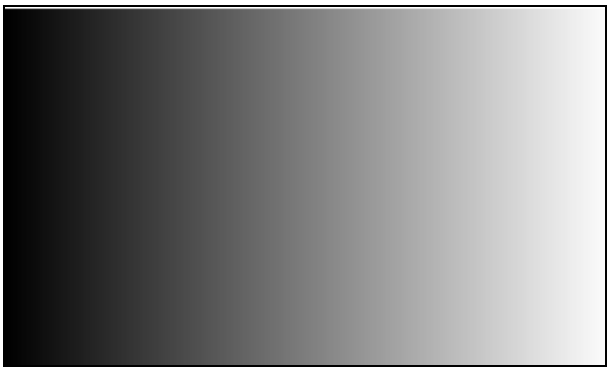
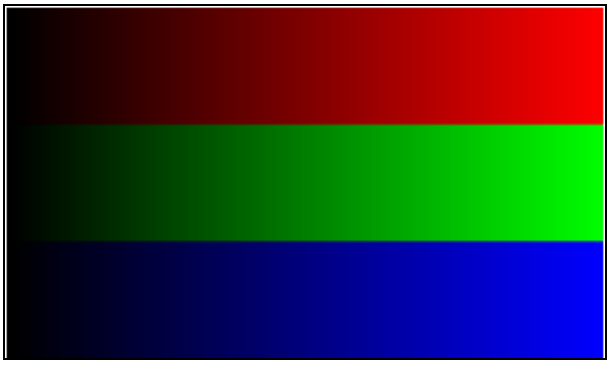
To set a test pattern:

1. Use the **Test Pattern** drop-down to select an available pattern from among **Off**, **SMPTE ColorBars**, **Black**, **White**, **Vertical Lines**, **Grid**, **Color Bars**, **Gray Gradient**, **RGB Gradient**, and **Frequency Adjust**. Refer to the table below for a reference of each pattern.
2. Use the Resolution drop-down to select a resolution for the selected test patten.

Available Test Patterns

SMPTE ColorBars	

Black	
White	
Vertical Lines	
Grid	

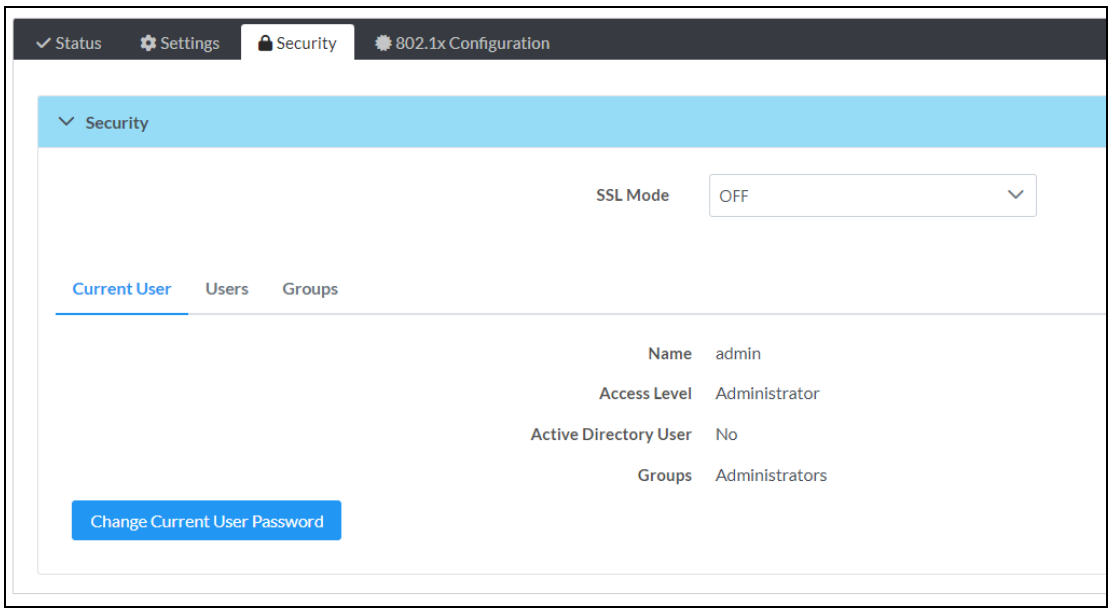
Color Bars	
Gray Gradient	
RGB Gradient	
Frequency Adjust	

Security

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-D30
- DM-NVX-D30C
- DM-NVX-E30
- DM-NVX-E30C
- DM-NVX-E760
- DM-NVX-E760C

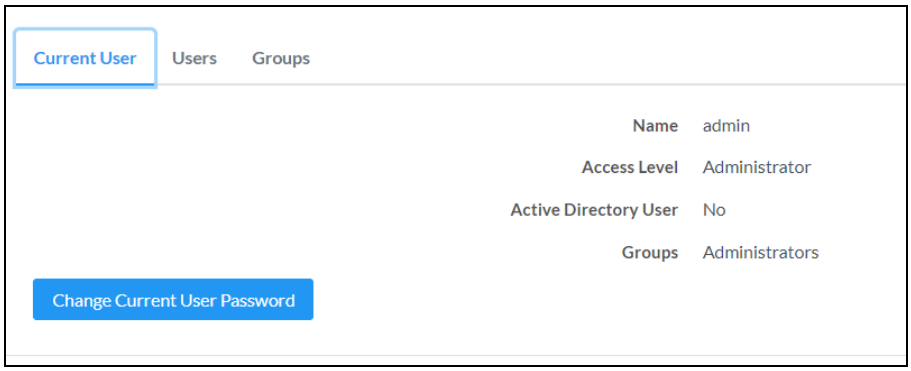
Select the **Security** tab to configure security for users and groups and to allow different levels of access to the DM NVX device functions. By default, security is disabled.



Select **Encrypt and Validate**, **Encrypt**, or **OFF** from the **SSL Mode** drop-down menu to specify whether to use encryption. By default, **SSL Mode** is set to **OFF**.

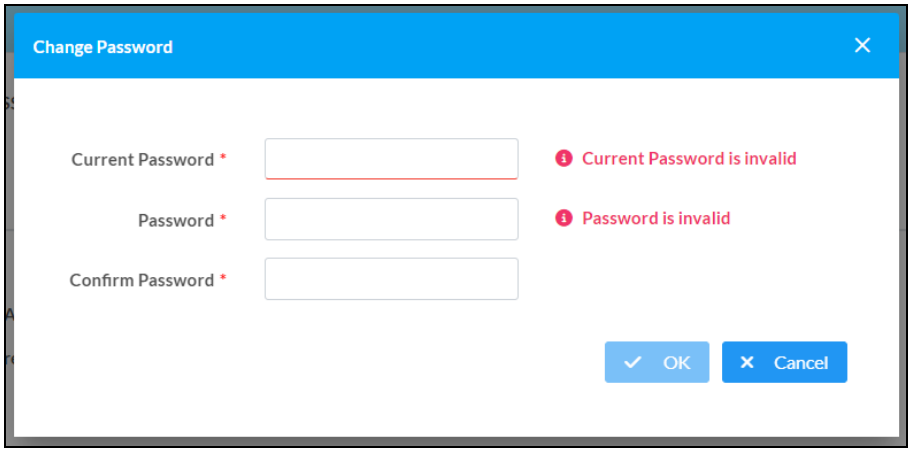
Current User

Select the **Current User** tab to view read-only information or to change the password for the current user.



To change the password for the current user account:

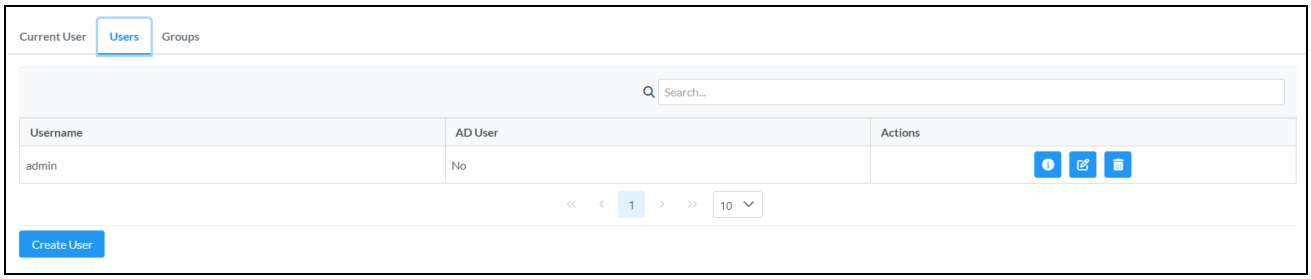
1. Select **Change Current User Password**.
2. In the **Change Password** dialog, enter the current password in the **Current Password** field, the new password in the **Password** field, and then re-enter the same new password in the **Confirm Password** field.



3. Select **OK** to save or select **Cancel** to cancel the changes.

Users

Select the **Users** tab to view and edit user settings. The **Users** tab can be used to add or remove local and Active Directory users and preview information about them.



Use the **Search Users** field to enter search term(s) and display users that match the search criteria.

If users listed in the **Users** table span across multiple pages, navigate through the list by selecting a page number or by using the left or right arrows at the bottom of the **Users** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 users by using the drop-down to the right of the navigation arrows.

Information about existing users is displayed in table format and the following details are provided for each user.

- **Username:** Displays the name of the user.
- **AD User:** Displays whether the user requires authentication using Active Directory.

Select the information icon in the **Actions** column to view detailed user information, or select the delete icon to delete a user.

To create a new user, select **Create User**.

Create a New Local User

To create a new local user:

1. Select **Create User** in the **Users** tab.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field. A valid user name can consist of alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
   c. Assign the access level by selecting one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the left (disabled).

3. Select **OK** to save or select **Cancel** to cancel the changes.

Grant Access to an Active Directory User

Users cannot be created or removed from the Active Directory server, but access can be granted to an existing user in the Active Directory server.

To grant access to an Active Directory user, you can either add the user to a local group on the DM NVX device, or add the Active Directory group(s) that they are a member of to the DM NVX device. Refer to Grant Access to an Active Directory Group on page 730 for steps on granting access to a group.

To grant access to an Active Directory user directly:

1. Select **Create User**.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field in the format "Domain\UserName", for example "crestronlabs.com\JohnSmith". Valid user names can contain alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Select one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the right (enabled).

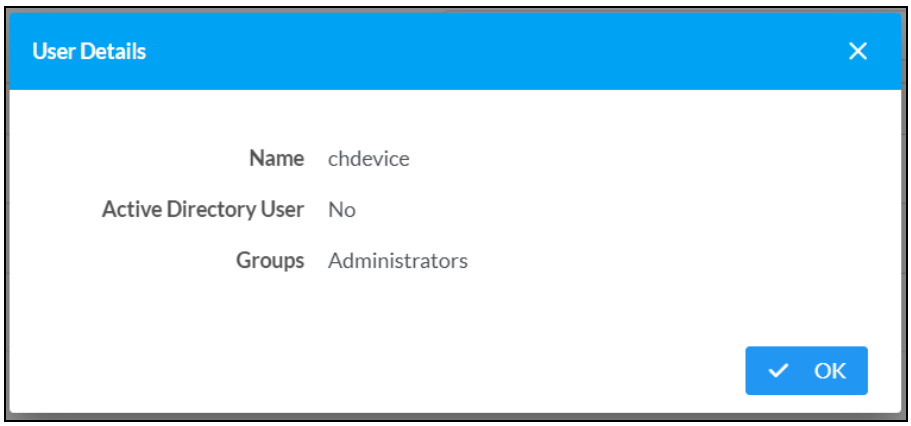
3. Select **OK** to save or select **Cancel** to cancel the changes.

Delete a User

To delete a user, select the trashcan icon in the **Actions** column. Select **Yes** when prompted to delete the user or **No** to cancel the deletion.

View User Details

Select the information icon in the **Actions** column to view information for the selected user. The **User Details** dialog displays the following information for the selected user.



The fields displayed in the **User Details** window are:

- **Name:** Displays the name of the selected user.
- **Active Directory User:** Displays whether the user is an Active Directory user.
- **Group:** Displays group(s) the selected user is part of.

Select **OK** to close the **User Details** window and return to the **Users** tab.

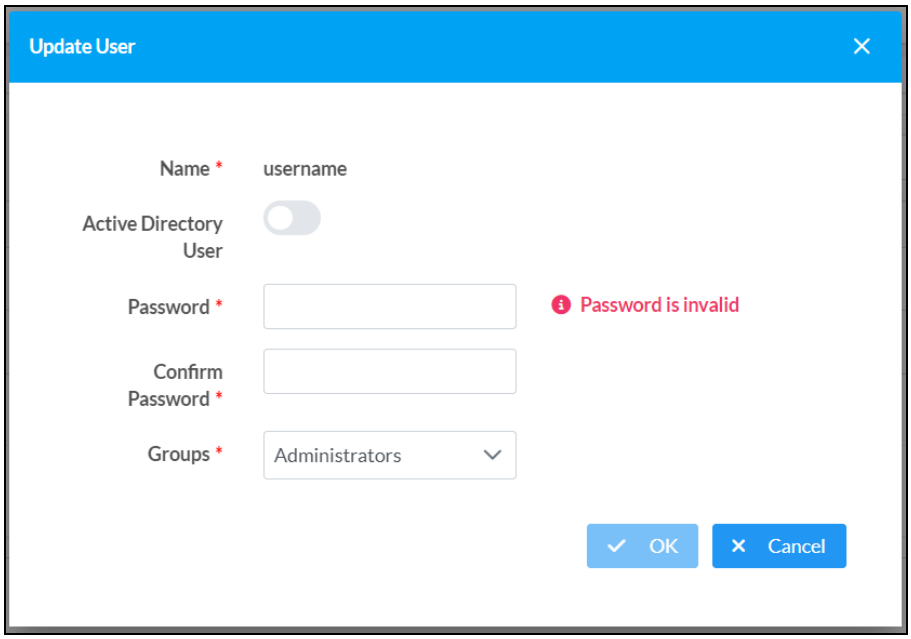
Update User Details

To update the details for an existing user:

1. Select the edit icon in the **Actions** column to update information for the selected user.
2. Set the **Active Directory User** toggle to the right if the user is an Active Directory user, or to the left if the user is not.
3. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
4. Select one or more groups to assign the user to from the **Groups** drop-down list. Deselect any groups to remove the user from those groups.

   > **NOTE:** After a user is removed from a group, they lose any access rights associated with that group.

5. Select **OK** to save or select **Cancel** to cancel the changes.

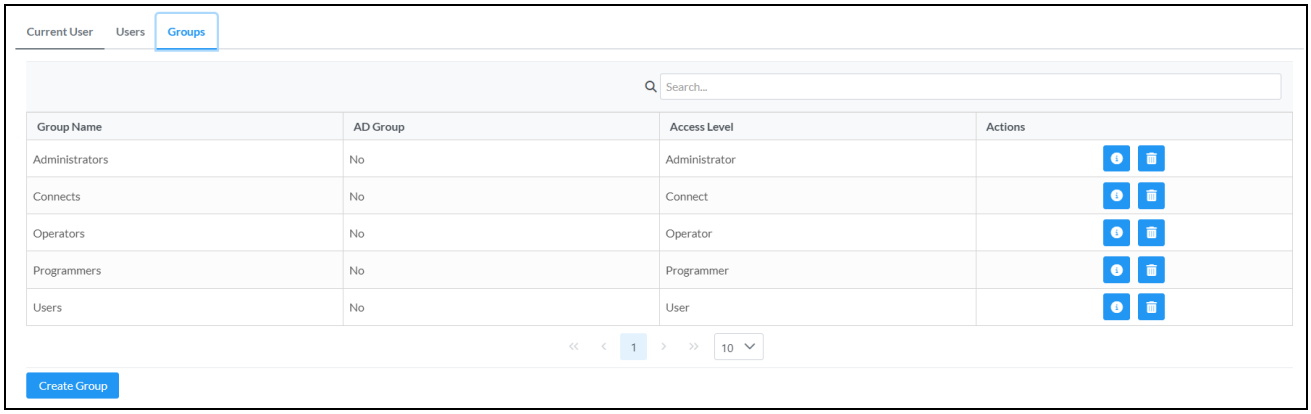


NOTE: The **Name** field is a read-only field that displays the username for the selected user. To change a username, the user must be deleted and a new user must be added.

Groups

Select the **Groups** tab to view and edit group settings. The **Groups** tab can be used to add local and Active Directory groups, remove local and Active Directory groups, and preview information about a group.

Use the **Search Groups** field to enter search term(s) and display groups that match the search criteria.



If groups listed in the **Groups** table span across multiple pages, navigate through the groups by selecting a page number or by using the left or right arrows at the bottom of the **Groups** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 groups by using the drop-down to the right of the navigation arrows.

Existing groups are displayed in a table and the following information is provided for each group:

- **Group Name:** Displays the name of the group.
- **AD Group:** Displays whether the group requires authentication using Active Directory.
- **Access Level:** Displays the predefined access level assigned to the group (Administrator, Programmer, Operator, User, or Connect).

Select the information icon in the **Actions** column to view detailed group information, or select the delete icon to delete a group.

Select **Create Group** in the **Groups** tab to create new group.

Create a Local Group

To create a local group:

1. Select **Create Group**.
2. In the **Create Group** dialog, enter the following:
   a. Enter the group name in the **Name** field.
   b. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the left (disabled).
3. Select **OK** to save. Select **Cancel** to cancel the changes.

Grant Access to an Active Directory Group

A group cannot be created or removed from the Active Directory server, but access can be granted to an existing Active Directory group.

Once the group is added, all members of that group will have access to the DM NVX device.

To grant access to an Active Directory group:

1. Select **Create Group**.
2. In the **Create Group** dialog enter the following:
   a. Enter the group name in the **Name** field (for example, "Engineering Group").

   > **NOTE:** Group names are case sensitive, and a space is a valid character that can be used in group names.
3. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the right (enabled).
4. Select **OK** to save. Select **Cancel** to cancel the changes.

Delete a Group

Select the trashcan icon in the **Actions** column to delete a group. Select **Yes** when prompted to delete the group or **No** to cancel the deletion.

When a group is deleted, users in the group are not removed from the device or Active Directory server. However, because a user's access level is inherited from a group(s), users within the deleted group will lose access rights associated with the group.

View Group Details

Select the information icon in the **Actions** column to view information for the selected group. The **Group Details** dialog lists the following information for the selected group:

- **Name:** Displays the name of the group.
- **Access Level:** Displays the access level of the group and its users.
- **Active Directory Group:** Displays whether the group is an Active Directory group.

Select **OK** to close the **Group Details** dialog and return to the **Groups** tab.

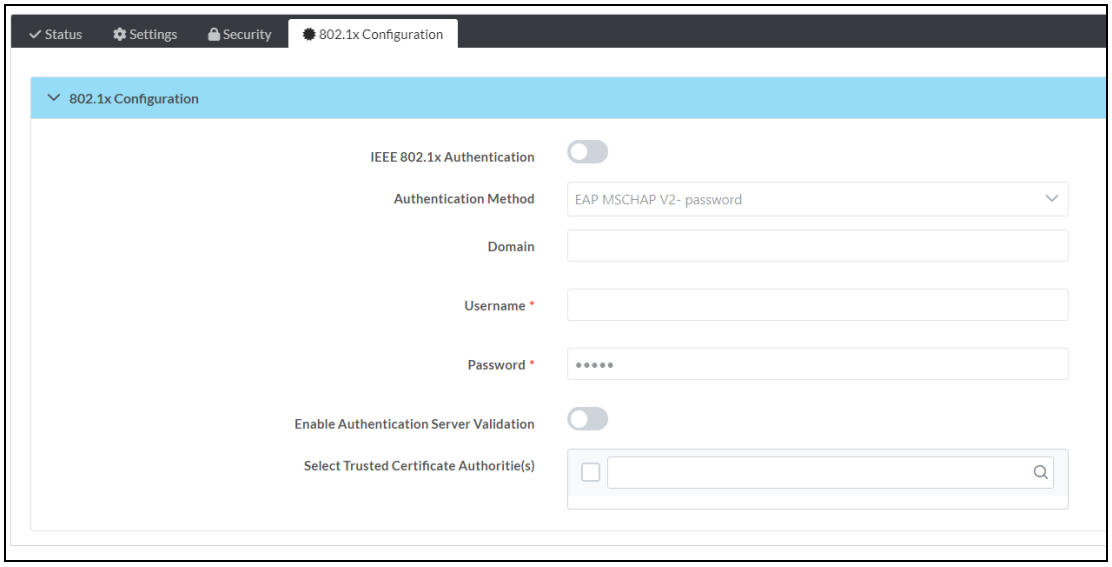
802.1X Configuration

NOTE: This section applies to the following models:

- DM-NVX-D30
- DM-NVX-D30C
- DM-NVX-E30
- DM-NVX-E30C
- DM-NVX-E760
- DM-NVX-E760C

DM NVX devices have built-in support for the 802.1X standard (an IEEE network standard designed to enhance the security of wireless and Ethernet LANs, relying on the exchange of messages between the device and the network's host, or authentication server), allowing communication with the authentication server and access to protected corporate networks.

The **802.1X Configuration** page can be accessed at any time by selecting the **802.1X Configuration** tab of the interface.



Configure the Device for 802.1X Authentication

To configure the DM NVX device for 802.1X Authentication:

1. Set the **IEEE 802.1X Authentication** toggle to the right. This will enable all options on the 802.1X dialog.
2. Select an **Authentication Method**: Choose between **EAP-TLS Certificate** or **EAP-MSCHAP V2 Password** according to the network administrator's requirement.

3. Do one of the following:
    a. If **EAP-TLS Certificate** was selected: Select **Action/Manage Certificates** to upload the required machine certificate. The machine certificate is an encrypted file that will be supplied by the network administrator, along with the certificate password.
    b. If EAP-MSCHAP V2 Password was selected: Enter the username and password supplied by the network administrator into the **Username** and **Password** fields, respectively. This method does not require the use of a machine certificate, only the user name and password credentials.
4. If you enabled the **Enable Authentication Server Validation** option, this will enable the **Select Trusted Certificate Authoritie(s)** list box which contains signed Trusted Certificate Authorities (CAs) preloaded onto the DM NVX device.

    Select the check box next to each CA whose certificate can be used for server validation, as specified by the network administrator.

    If the network does not use any of the listed certificates, the network administrator must provide a certificate, which must be uploaded manually via the **Manage Certificates** function in the **Action** menu. Refer to Action on page 671 for more information on the **Manage Certificates** function.
5. If required, type the domain name of the network in the **Domain** field.
6. When the 802.1X settings are configured as desired, select **Save Changes** to save the changes to the device and reboot it. Select **Revert** to cancel any changes.

Configuration (DM-NVX-D10, D20, D200, E10, and E20 Models)

NOTE: This section applies to the following models:

- DM-NVX-D10
- DM-NVX-D20
- DM-NVX-D200
- DM-NVX-E10
- DM-NVX-E20
- DM-NVX-E20-2G-B-T
- DM-NVX-E20-2G-W-T

Web Interface Configuration

The web interface of a DM NVX AV-over-IP device allows for the viewing of status information as well as the configuration of local device settings.

Access the Web Interface

To access the web interface, refer to either of the following:

- Access the Web Interface with a Web Browser on page 735
- Access the Web Interface with the Crestron Toolbox™ Application on page 736

The web interface runs in a web browser. The following web browser versions are supported:

Operating System and Supported Web Browsers

OPERATING SYSTEM	SUPPORTED WEB BROWSERS
Windows® operating system	Chrome™ web browser, version 31 and later
	Firefox® web browser, version 31 and later
	Internet Explorer web browser, version 11 and later
	Microsoft Edge web browser
macOS® operating system	Safari® web browser, version 6 and later
	Chrome web browser, version 31 and later
	Firefox web browser, version 31 and later

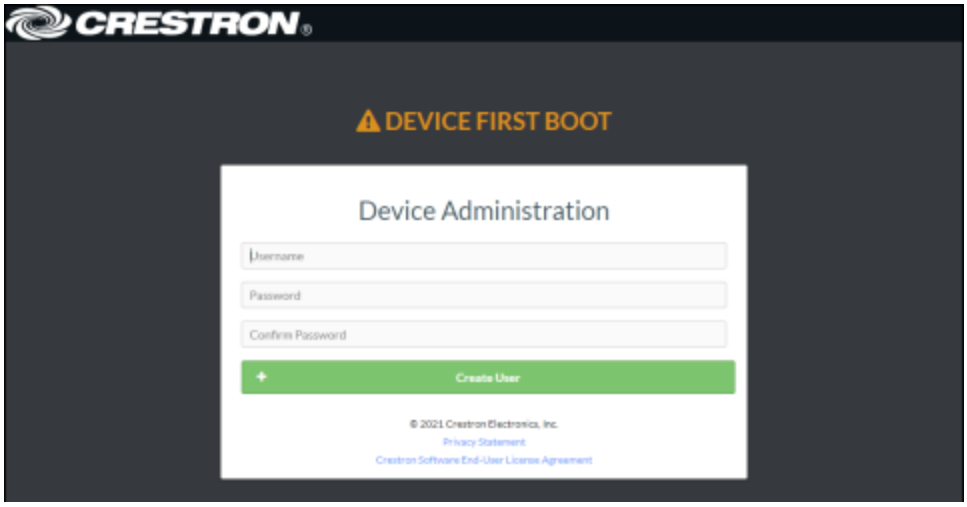
Access the Web Interface with a Web Browser

To access the web interface:

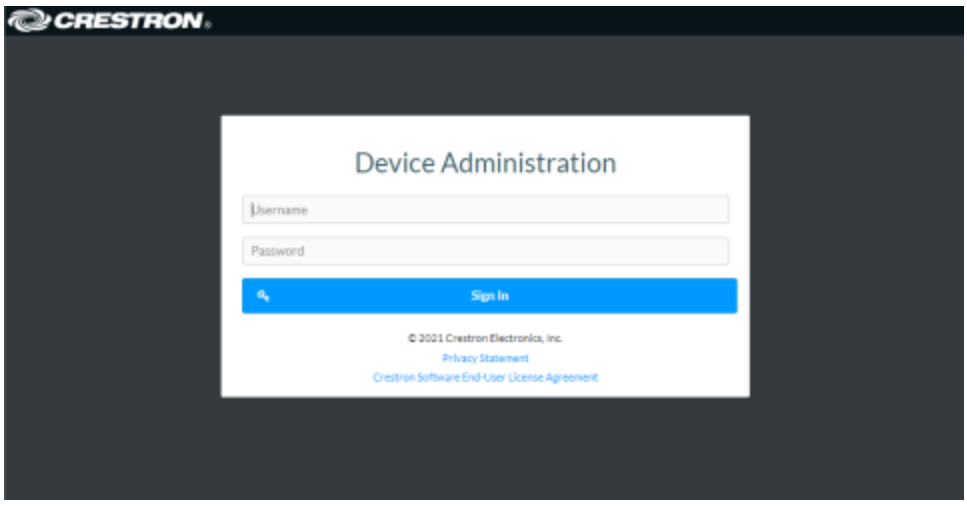
1. Enter the IP address of the DM NVX device into a web browser.

   > **NOTE:** To obtain the IP address, use the Device Discovery Tool utility in Crestron Toolbox™ software or an IP scanner application.

2. If accessing the device for the first time, a prompt to create an administrator account will be displayed along with a **DEVICE FIRST BOOT** message. To create the first admin account:
   a. Enter a username in the **Username** field.
   b. Enter a password in the **Password** field.
   c. Re-enter the same password in the **Confirm Password** field.



   d. Select **Create User**. A new **Device Administration** page appears with an option to **Sign In** instead of **Create User**.



3. Enter the username in the **Username** field.

4. Enter the password in the **Password** field.
5. Select **Sign In**.

Access the Web Interface with the Crestron Toolbox™ Application

To access the web interface by opening a web browser from the Crestron Toolbox™ application:

1. Open the Crestron Toolbox application.
2. Select **Device Discovery Tool** from the **Tools** menu or select the Device Discovery Tool icon in the toolbar. Once the utility loads, the DM NVX device will be discovered on the network and listed in the device list on the left side of the screen. The device's host name, IP address, and firmware version are displayed.

   > **NOTE:** If there is security software running on the computer, a security alert might be displayed when the Crestron Toolbox application attempts to connect to the network. Make sure to allow the connection, so that the Device Discovery Tool can be used.

3. Select the device from the discovered devices list.
4. Enter the device credentials in the **Authentication Required** dialog that opens, then select **Log In**.
5. Select **Web Configuration**.

Action

NOTE: Unless otherwise noted, this section applies to the following models:

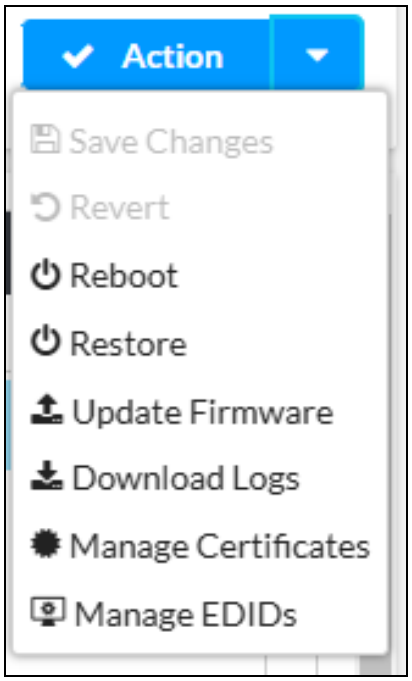
- DM-NVX-D10
- DM-NVX-D20
- DM-NVX-D200
- DM-NVX-E10
- DM-NVX-E20
- DM-NVX-E20-2G-B-T
- DM-NVX-E20-2G-W-T

For brevity, the DM-NVX-D10, DM-NVX-D20, and DM-NVX-D200 are referred to as the D models, and the remainder are referred to as the E models in this section.

The **Action** drop-down menu is displayed at the top right side of the web interface and provides quick access to these common device functions:

- Save Changes on page 738
- Revert on page 738
- Reboot on page 738
- Restore on page 738
- Update Firmware on page 739
- Download Logs on page 740
- Manage Certificates on page 740
- Manage EDIDs (E Models Only) on page 742

Action Menu (DM-NVX-E20 Shown)



Save Changes

Select **Save Changes** to save any changes made to the configuration settings.

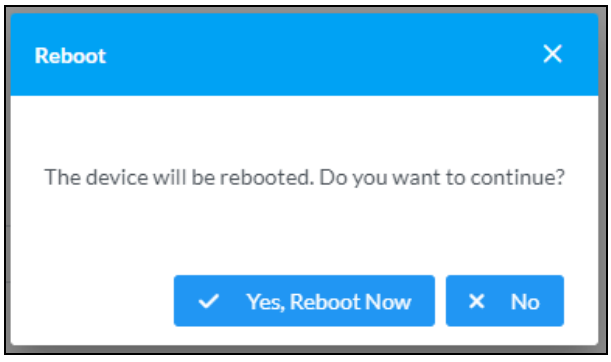
Revert

Select **Revert** to revert the device back to the last saved configuration.

Reboot

Certain changes to the settings may require a reboot to take effect. To reboot the device:

1. Select **Reboot** in the **Action** menu. The **Reboot** confirmation message box appears.



2. Select **Yes, Reboot Now** to reboot the device. The **Reboot** status message box appears. Wait for the device reboot to complete before attempting to reconnect to the web interface. Alternatively, select **No** to cancel the reboot operation.

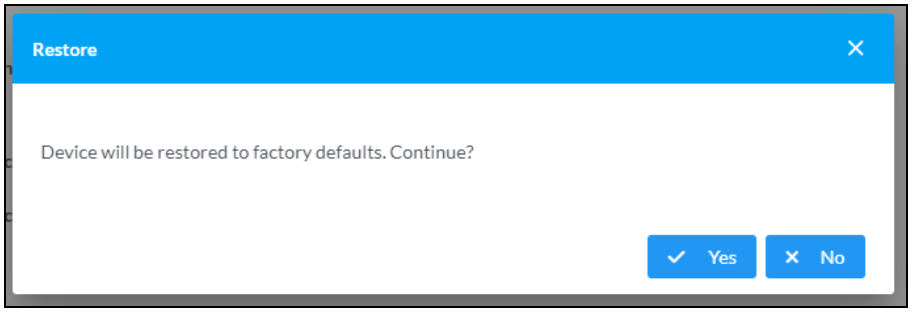
Restore

The DM NVX device can be restored to factory default settings from the **Action** menu.

NOTE: The **Restore** procedure will wipe all settings from the device, including network settings. If a static IP address is set, restoring the device to factory default settings will clear this address and DHCP will be enabled instead.

To restore the device to factory defaults:

1. Select **Restore** in the **Action** menu. The **Restore** confirmation message box appears.



2. Select **Yes** to restore the device to factory default settings. Select **No** to cancel the restore operation. When **Yes** is selected, the **Restore** status message box appears. Wait for the device restore to complete before attempting to reconnect to the web interface.

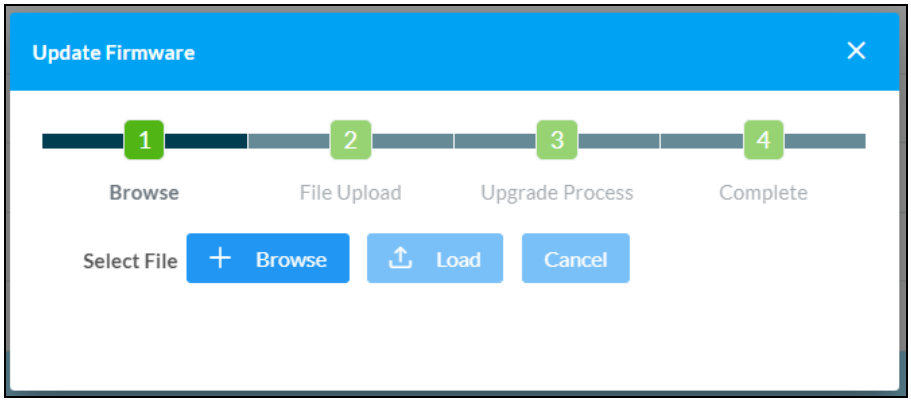
   NOTE: Once the device is restored, it may have a new IP address. If reconnecting to the original address does not work, use the Device Discovery Tool in Crestron Toolbox software or an IP scanner application to find the device's new IP address.

If the web interface is not accessible, the device can also be restored to factory default settings via a hardware-based procedure (refer to DM-NVX-D10, DM-NVX-D20, DM-NVX-E10, and DM-NVX-E20 Installation on page 389, DM-NVX-D200 Installation on page 395, or Wall Plate Installation on page 416).

Update Firmware

To update the firmware of the device:

1. Select **Update Firmware** in the **Action** menu.
2. In the **Update Firmware** window that appears, select **+ Browse**.



3. Locate and select the desired firmware file, then select **Open**. The selected firmware file name is displayed in the **Update Firmware** window.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The firmware update is now complete, and the web interface will return to the main log-in page.

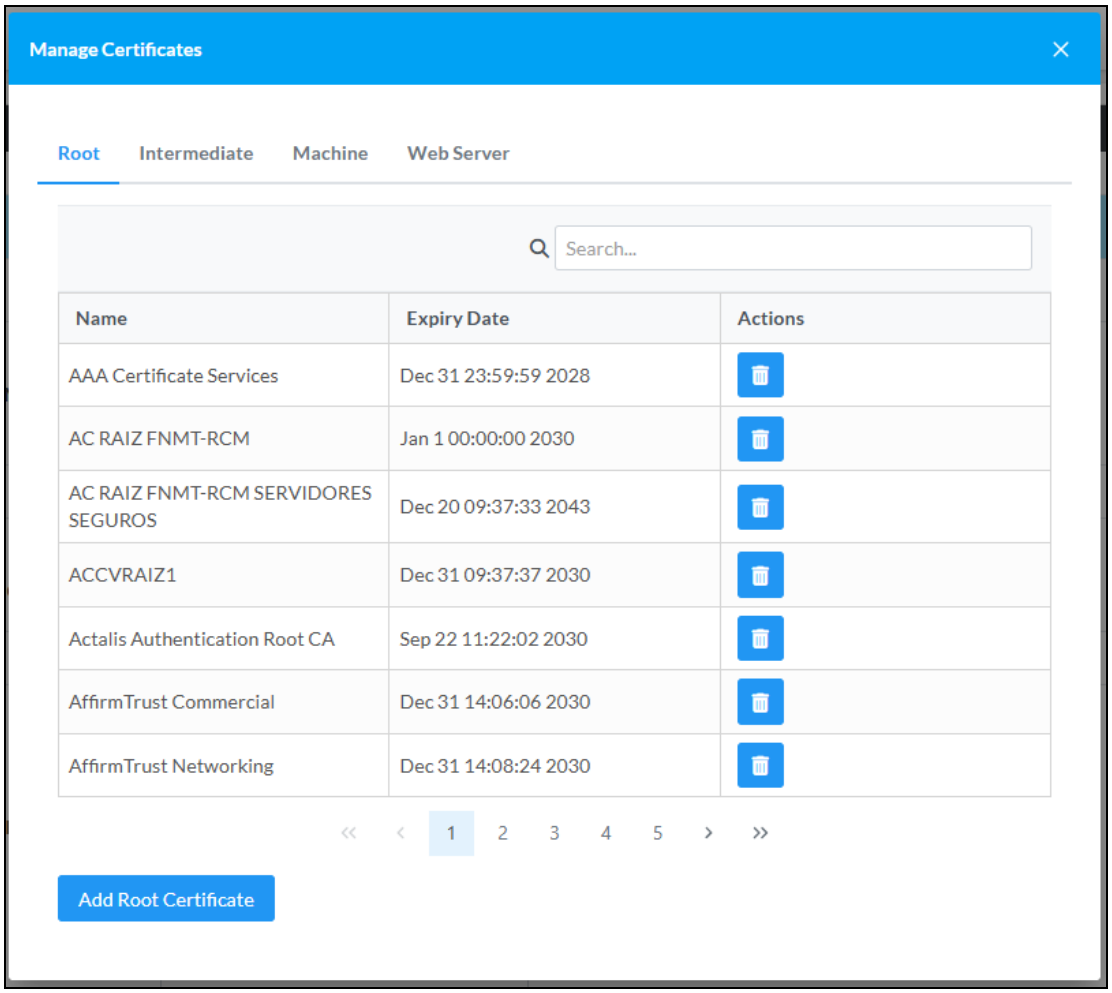
Download Logs

Select **Download Logs** in the **Action** menu to download the device message logs for diagnostic purposes.

The log file is downloaded to the Downloads folder of the PC.

Manage Certificates

Select **Manage Certificates** in the **Action** menu to open the **Manage Certificates** window. Use this window to add or remove certificates used in 802.1x authentication and other protected network functions.



The following certificate tabs are available in the **Manage Certificates** window:

- **Root:** The Root certificate is used by the DM NVX device to validate the network's authentication server. The device has a variety of Root certificates, self-signed by trusted CAs (Certificate Authorities) preloaded into the device. Root certificates must be self-signed.
- **Intermediate:** The Intermediate store holds non self-signed certificates that are used to validate the authentication server. These certificates will be provided by the network administrator if the network does not use self-signed Root certificates.
- **Machine:** The Machine certificate is an encrypted PFX file that is used by the authentication server to validate the identity of the DM NVX device. The machine certificate will be provided by the network administrator, along with the certificate password. For 802.1x, only one machine certificate can reside on the device.
- **Web Server:** The Web Server certificate is a digital file that contains information about the identity of the web server.

Add Certificates

To add a certificate:

1. Select the corresponding certificate tab.
2. Select **Add [Type] Certificate**.
3. Select **+ Browse**.
4. Locate and select the file, then select **Open**.

   > **NOTE:** If the selected certificate is a machine certificate, enter the password provided by the network administrator.

5. Select **OK**. This will add the certificate to the list in the **Manage Certificates** window, displaying the file name and expiration date. The certificate is now available for selection and can be loaded to the device.

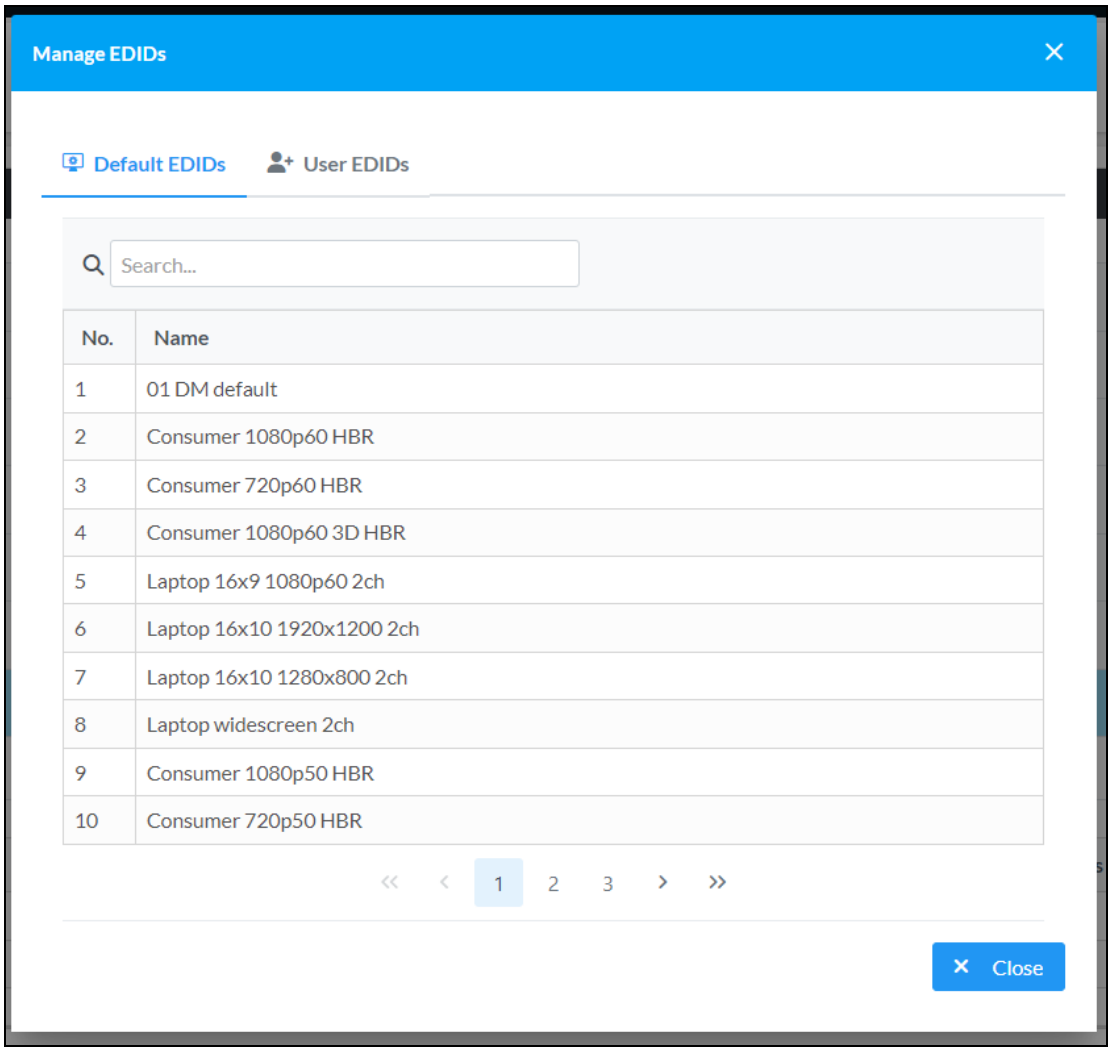
Delete Certificates

To delete a certificate:

1. Select the corresponding certificate tab.
2. Select the trashcan icon in the **Actions** column and the row of the certificate to be deleted.
3. Select **Yes** when prompted to delete the certificate or **No** to cancel the deletion.

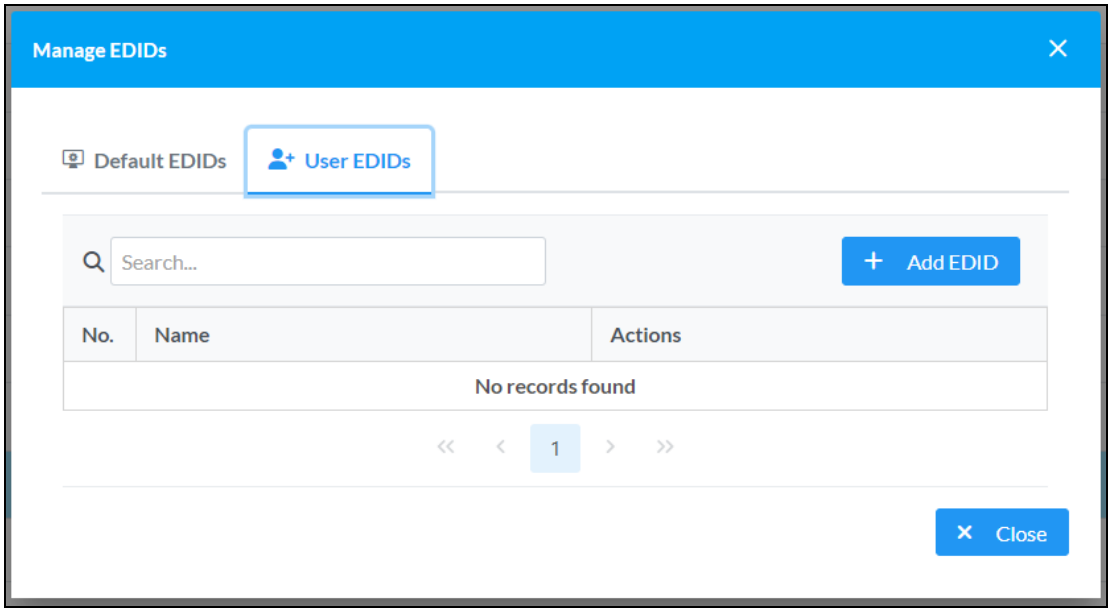
Manage EDIDs (E Models Only)

Select **Manage EDIDs** in the **Action** menu to open the **Manage EDIDs** window. Use this window to add, remove, or browse which EDIDs are available for the AV inputs of the DM NVX device.



The default tab that will open in this window is the **Default EDIDs** tab. This tab is read only, and provides a list of all default EDIDs available on the DM NVX device as part of the firmware. Use the **Search...** text entry field to filter the list of EDIDs by name. Default EDIDs cannot be removed from the device.

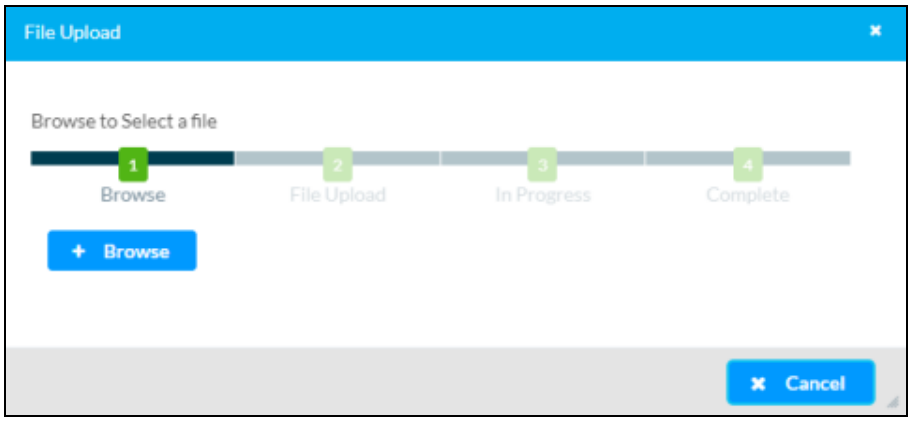
The second tab available in this window is the **User EDIDs** tab. By default, the table will populate with **No records found**.



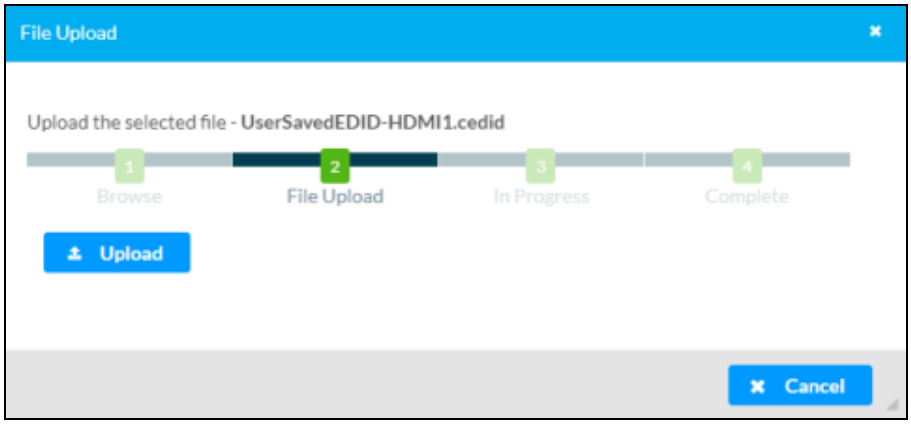
To add a **User EDID** file:

1. Select **+ Add EDID** at the top right of the table. The **File Upload** screen will appear.
2. Select **+ Browse**. Locate the desired .cedid file, then select **Upload** to upload it to the DM NVX device.

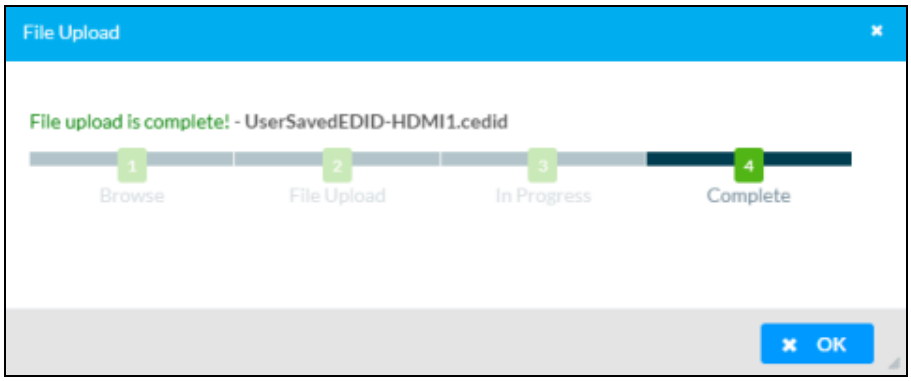
   Browse for and select a .cedid file

   Upload the selected file

   Wait for the upload to complete, then select OK

3. Select **OK** to return to the **Manage EDIDs** window. The uploaded User EDID is now displayed in the table.

To remove a **User EDID** file, select **Delete** in its table row.

Status

NOTE: Unless otherwise noted, this section applies to the following models:

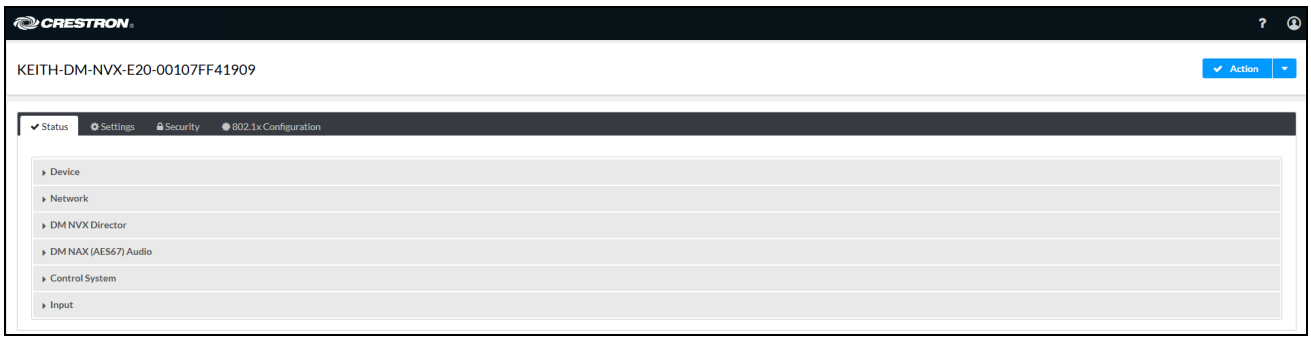
- DM-NVX-D10
- DM-NVX-D20
- DM-NVX-D200
- DM-NVX-E10
- DM-NVX-E20
- DM-NVX-E20-2G-B-T
- DM-NVX-E20-2G-W-T

For brevity, the DM-NVX-D10, DM-NVX-D20, and DM-NVX-D200 are referred to as the D models, and the remainder are referred to as the E models in this section.

The **Status** page is the first page displayed when opening the interface of the DM NVX device. It displays general information about the device (such as **Model Name**, **Firmware Version**, and **Serial Number**), current network settings (such as **Host Name** and **IP Address**), and the current status of the connectors on the device.

The **Status** page can be accessed at any time by selecting the **Status** tab of the interface.

Status Page (DM-NVX-E20 Shown)

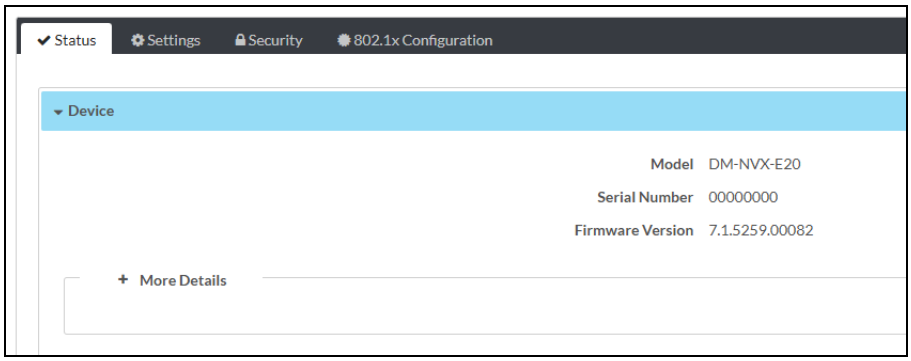


Information displayed on the **Status** page is organized into different sections:

- Device on page 746
- Network on page 746
- DM NVX Director on page 747
- DM NAX (AES67) Audio on page 747
- Control System on page 749
- Output (D Models Only) on page 749
- Input (E Models Only) on page 750

Device

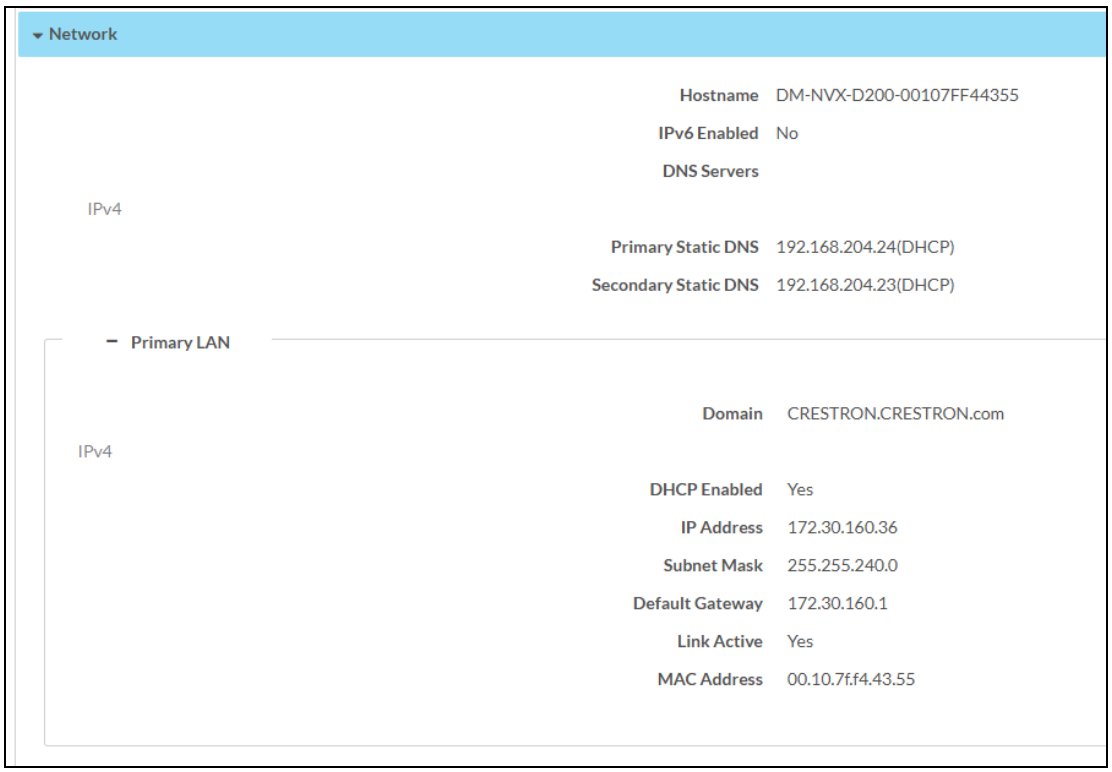
The **Device** accordion displays the **Model**, **Firmware Version**, and **Serial Number** of the DM NVX device.



Select **+ More Details** to review additional information about the device.

Network

The **Network** accordion displays network-related information about the device, including the **Hostname**, **Domain Name**, and **DNS Servers**.



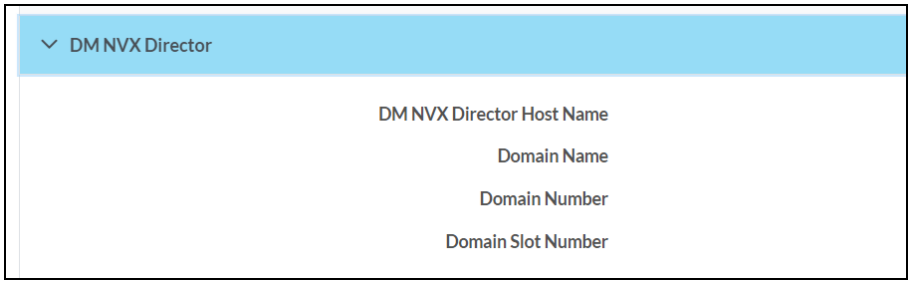
By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-D200-00107FF44355.

Select **+ Primary LAN** to display additional network information. If **+ Primary LAN** is selected, select **- Primary LAN** to collapse the section.

DM NVX Director

The **DM NVX Director** accordion displays the details of the DM NVX Director switching appliance to which the DM NVX device is claimed.

> **NOTE:** If the DM NVX device has not been claimed by a DM NVX Director switching appliance, all fields in this section will be empty.

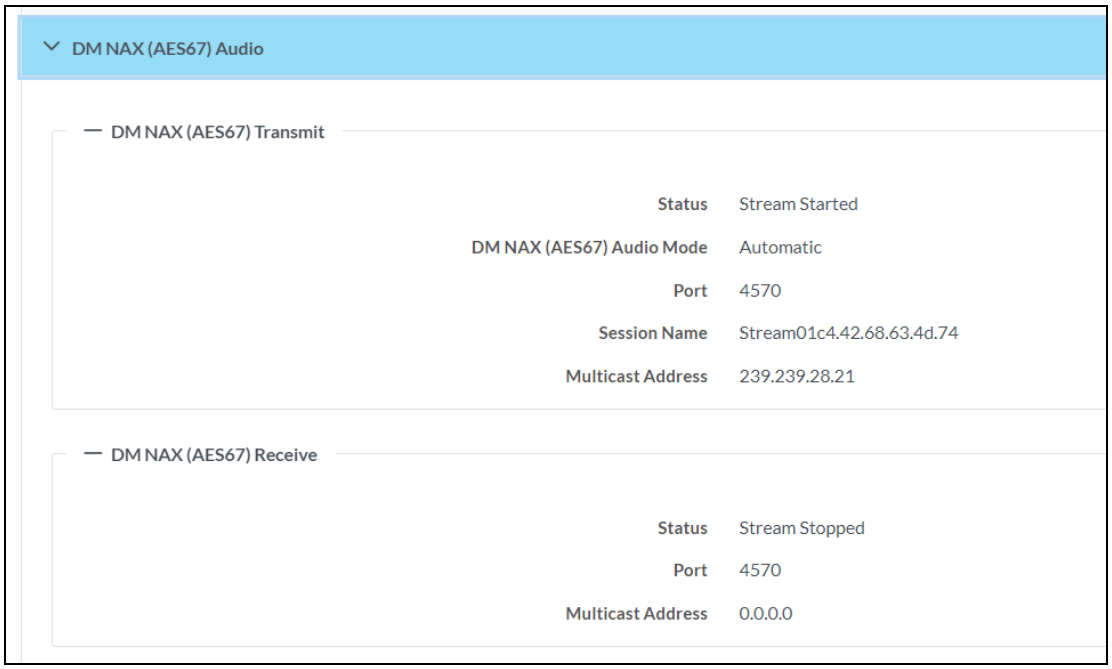


- **DM NVX Director Host Name:** Displays the host name of the claiming DM NVX Director switching appliance.
- **Domain Name:** Displays the name of the DM NVX Director domain to which the encoder or decoder device belongs.
- **Domain Number:** Displays the number of the DM NVX Director domain to which the encoder or decoder device belongs.
- **Domain Slot Number:** Displays the slot number within the DM NVX Director that refers to this specific encoder or decoder device.

DM NAX (AES67) Audio

The **DM NAX (AES67) Audio** accordion displays information regarding the **DM NAX (AES67) Transmit** and **DM NAX (AES67) Receive** audio-over-IP (AoIP) signals. This accordion varies slightly between D models and E models.

DM NAX (AES67) Audio (DM-NVX-E20 Shown)



The **DM NAX (AES67) Audio Mode** field will be under the **DM NAX (AES67) Receive** heading if the device is a decoder (D model) or under the **DM NAX (AES67) Transmit** heading if the device is an encoder (E model). This field displays whether the transmitting AoIP stream is set to **Automatic** (the AoIP multicast address is automatically set as the next available multicast address after the video stream's address), **Manual** (the AoIP multicast address is manually set), or **Disabled** (AoIP transmit is disabled).

The details displayed for **DM NAX (AES67) Transmit** are:

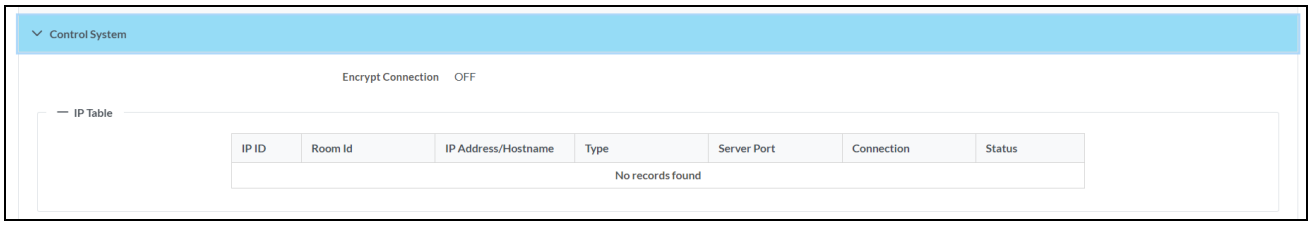
- **Status:** Displays a status message for the transmitting AoIP stream, such as **Stream Stopped**, **Stream Starting**, or **Stream Started**.
- **Port:** Displays the port of the AoIP transmit stream.
- **Session Name:** Displays the session name of the AoIP transmit stream.
- **Multicast Address:** Displays the multicast address of the AoIP transmit stream.

The details displayed for **DM NAX (AES67) Receive** are:

- **Status:** Displays a status message for the AoIP stream receiver, such as **Connecting**, **Stream Stopped**, or **Stream Started**.
- **Port:** Displays the port of the received AoIP stream.
- **Multicast Address:** Displays the multicast address of the received AoIP stream.

Control System

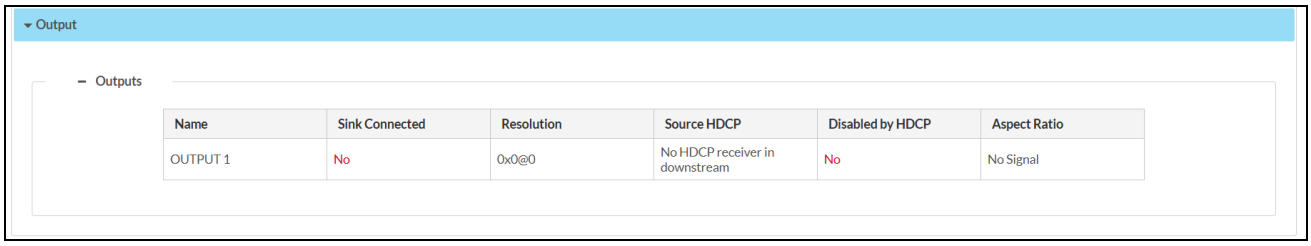
The **Control System** accordion displays information regarding the connection between the DM NVX device and a control system.



The displayed fields are:

- **Encrypt Connection:** Displays **ON** if the connection is encrypted or **OFF** if it is not.
- **IP ID:** Displays the IP ID of the DM NVX device in its IP table entry of the control system's IP table.
- **Room ID:** Displays the room ID of the DM NVX device in its IP table entry of the control system's IP table.
- **IP Address/Hostname:** Displays the IP address and host name of the control system.
- **Type:** Always displays **Peer** (this is the only relationship the DM NVX device can have to a control system).
- **Server Port:** Displays the port for the connection between the DM NVX device and the control system.
- **Connection:** Always displays **Gway** (this is the only connection type supported between a DM NVX device and a control system).
- **Status:** Displays either **ONLINE** or **OFFLINE** depending on if the DM NVX device is able to communicate with the control system.

Output (D Models Only)

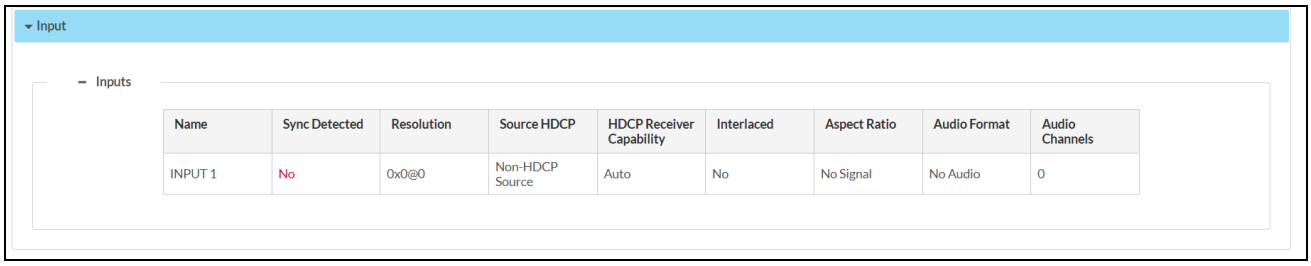


The displayed fields are:

- **Name:** Displays the name of the output.
- **Sink Connected:** Displays whether a sink (such as a display or projector) is connected to the output (**Yes**) or not (**No**).
- **Resolution:** Displays the current resolution of the video output signal.
- **Source HDCP:** Displays the HDCP level supported by the connected display or projector.
- **Disabled by HDCP:** Displays whether the output is disabled by HDCP (**Yes**) or not (**No**).
- **Aspect Ratio:** Displays the aspect ratio of the video output signal.

Input (E Models Only)

The **Input** accordion displays status information regarding the HDMI input connector.



The displayed fields are:

- **Name:** Displays the name of the input.
- **Sync Detected:** Displays whether sync is detected at the input (**Yes**) or not (**No**).
- **Resolution:** Displays the resolution and refresh rate of the input video signal.
- **Source HDCP:** Displays the HDCP level of the input video signal.
- **HDCP Receiver Capability:** Displays the HDCP capabilities of the DM NVX device.
- **Interlaced:** Displays **Yes** or **No** depending if the input video signal is interlaced or not.
- **Aspect Ratio:** Displays the aspect ratio of the input video signal.
- **Audio Format:** Displays the audio format of the input signal.
- **Audio Channels:** Displays the number of audio channels in the input signal.

Settings

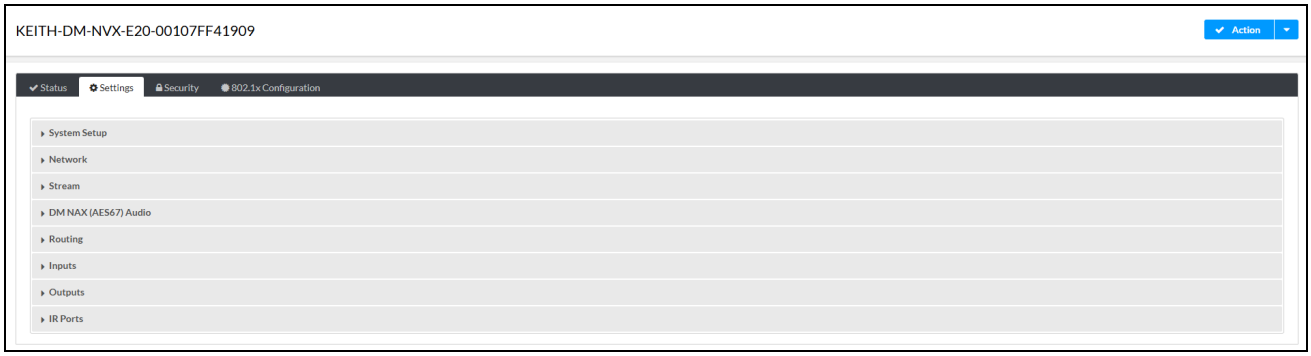
NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-D10
- DM-NVX-D20
- DM-NVX-D200
- DM-NVX-E10
- DM-NVX-E20
- DM-NVX-E20-2G-B-T
- DM-NVX-E20-2G-W-T

For brevity, the DM-NVX-D10, DM-NVX-D20, and DM-NVX-D200 are referred to as the D models, and the remainder are referred to as the E models in this section.

The **Settings** page enables configuration of the DM NVX device's settings. The **Settings** page can be accessed at any time by selecting the **Settings** tab of the interface.

Settings Page (DM-NVX-E20 Shown)



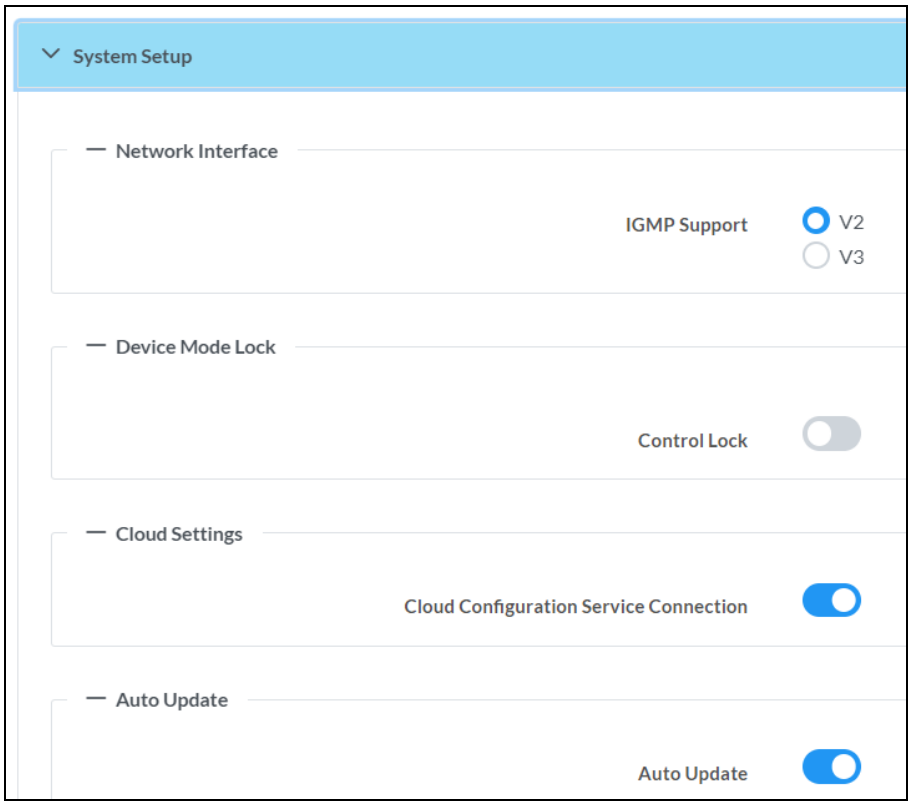
NOTE: Some settings are specific to the decoder (D models) or encoder (E models) interface. Model requirements are noted in headings below where appropriate.

Settings available on the **Settings** page are organized into different sections:

- System Setup on page 752
- Network on page 758
- Stream on page 759
- DM NAX (AES67) Audio on page 764
- Routing on page 766
- Subscriptions (D Models Only) on page 769
- Inputs (E Models Only) on page 771
- Outputs on page 773
- IR Ports on page 778

System Setup

The **System Setup** accordion contains settings for configuration of the following system functions.



Network Interface

The **Network Interface** section provides a choice between IGMPv2 and IGMPv3 operation. Choose the settings that matches the capabilities of the network hardware.

NOTES:

- This setting must match on all DM NVX devices in a system to ensure compatibility.
- DM NVX devices are set to IGMPv2 operation by default.
- Crestron recommends leaving DM NVX systems set to IGMPv2 operation unless the network specifically requires IGMPv3.



To change the **Network Interface** mode:

1. Select **V2** to set the DM NVX device to IGMPv2 operation, or select **V3** to set the device to IGMPv3 operation.
2. Select **Save Changes**. A prompt will appear to reboot the device.
3. Select **Yes, Reboot Now** to reboot the device into the new **Network Interface** mode.

Device Mode Lock

The **Device Mode Lock** section provides a toggle for the **Control Lock** feature.

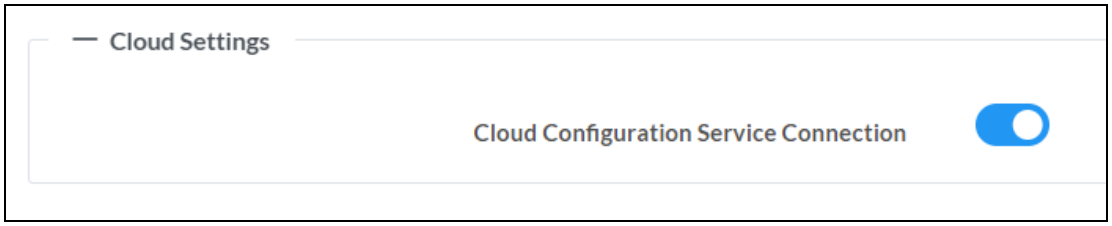


Set the **Control Lock** toggle to the right to lock out the push buttons built in to the DM NVX device.

Set the **Control Lock** toggle to the left to disable the lock, allowing the push buttons to control source routing and device modes.

Cloud Settings

The Cloud Settings section provides a toggle to enable or disable communication with the Crestron XiO Cloud® platform.

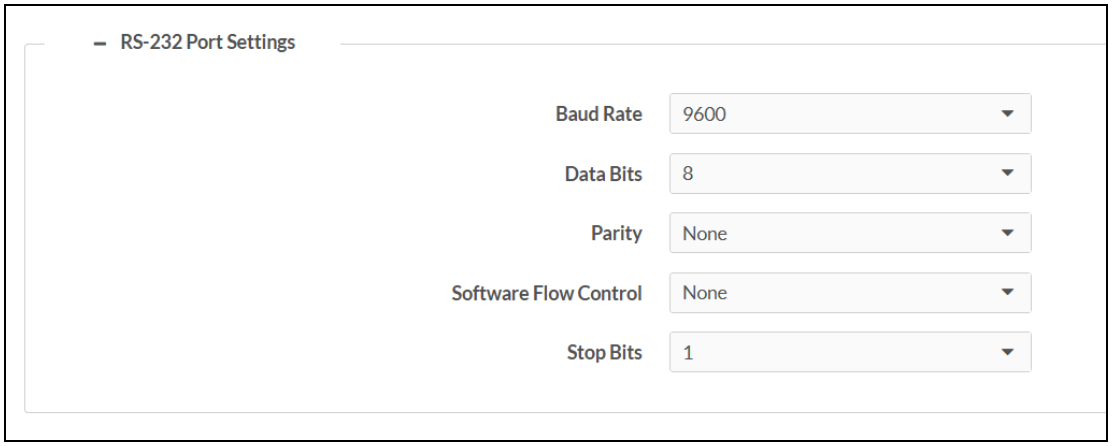


Set the **Cloud Configuration Service Connection** toggle to the right to allow the DM NVX device to communicate with the XiO Cloud platform. Set the toggle to the left to prevent the device from communicating with the XiO Cloud platform.

RS-232 Port Settings

> **NOTE:** This accordion is not available on DM-NVX-E20-2G models.

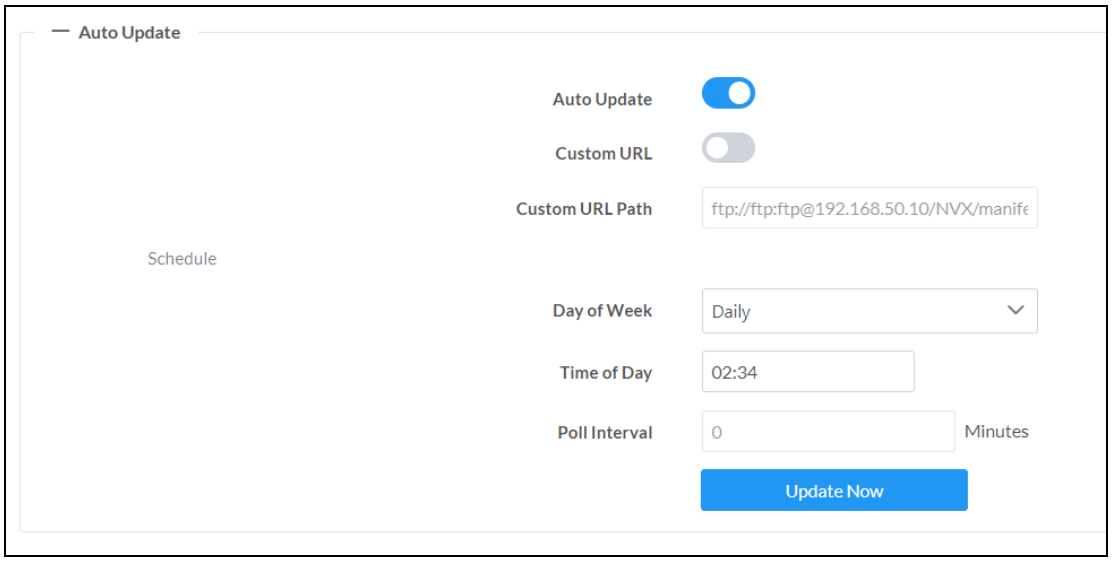
Configure the settings for the built-in RS-232 port of the device in the **RS-232 Port Settings** section.



- **Baud Rate:** Select the baud rate from the drop-down.
- **Data Bits:** Select the number of data bits from the drop-down.
- **Parity:** Select the parity from the drop-down.
- **Software Flow Control:** Select the software flow control from the drop-down.
- **Stop Bits:** Select the number of stop bits from the drop-down.

Auto Update

The DM NVX device can automatically check for and install firmware updates at scheduled intervals via the **Auto Update** feature.



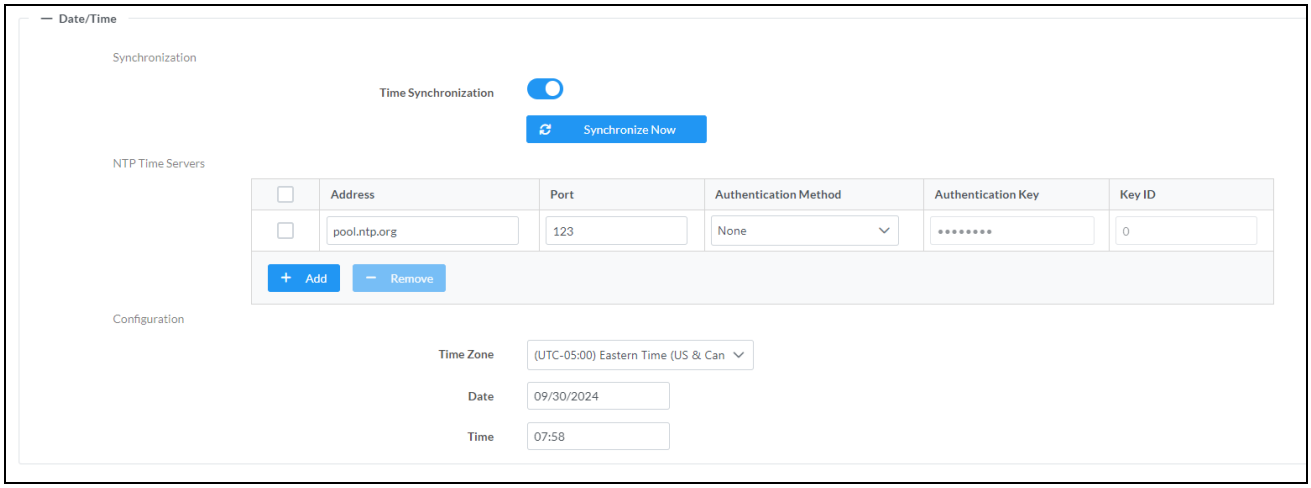
To configure the **Auto Update** feature settings:

1. Set the **Auto Update** toggle to the right to enable the **Auto Update** feature.
2. Define the URL to download the updates by doing either of the following:
    a. Use the default URL to download the updates from the Crestron server.
    b. Use a custom URL. Set the **Custom URL** toggle to the right to enable a custom URL. In the **Custom URL Path** text box, enter the path to a custom manifest file in the FTP or SFTP URL format. Use the Crestron Auto Update Tool to generate a custom manifest file, then store the file on an FTP (File Transfer Protocol) or SFTP (Secure File Transfer Protocol) server.
3. Set a schedule for the automatic firmware update by doing either of the following:
    a. Select the desired **Day of Week** and **Time of Day** (24-hour format) values.
    b. Set the **Poll Interval** by entering a value from 60 to 65535 minutes. A value of 0 disables the **Poll Interval**.
4. Select **Save Changes**.

Selecting **Update Now** causes the device to check for a firmware update immediately. If a schedule was set in step 3 above, that schedule still remains in effect.

Date/Time

Use the **Date/Time** section to configure the date and time settings of the DM NVX device.



Synchronization

1. Set the **Time Synchronization** toggle to the right to enable or left to disable time synchronization. By default, time synchronization is enabled.
2. In the **NTP Time Servers** table, enter the URL of a NTP (Network Time Protocol) or SNTP (Simple Network Time Protocol) server. Up to three time servers can be added on a device.
3. Select **Synchronize Now** to perform time synchronization between the device's internal clock and the time server.

Configuration

1. Open the **Time Zone** drop-down menu to select the applicable time zone.
2. In the **Date** field, enter the current date.

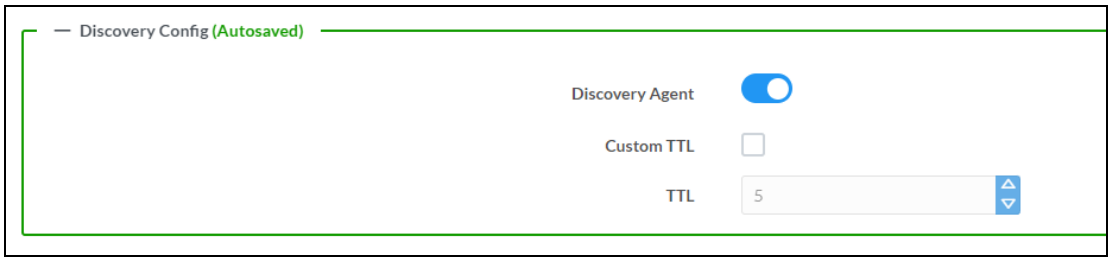
3. In the **Time (24hr Format)** field, enter the current time in 24-hour format.

Select **Save Changes** to save the settings.

Select **Revert** from the **Action** drop-down menu to revert to the previous settings without saving.

Discovery Config

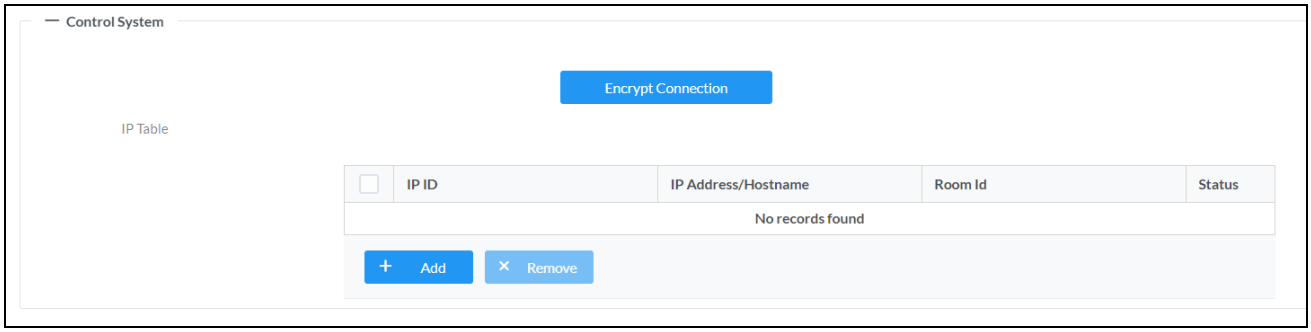
The **Discovery Config** section provides settings to customize how the DM NVX device and its streams can be discovered on the LAN.



Set the **Discovery Agent** toggle to the right to allow streams from the device to be discoverable on the network or to the left to prevent network discovery. When **Discovery Agent** is enabled, the streams from the DM NVX device are displayed in the **Available Streams** list of other receivers.

Select the **Custom TTL** option and enter a value in the **TTL** field if a custom Time-to-live (TTL) value is required on the network. The default **TTL** value is 5.

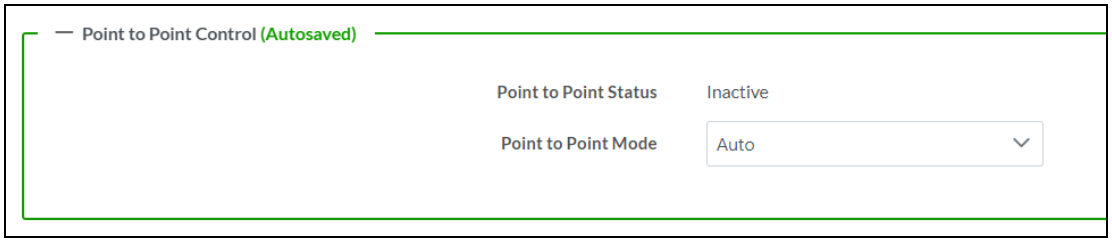
Control System



1. Select **Encrypt Connection** to navigate to the **Security** tab to configure encryption settings.
   a. Enter a username in the **Control System Username** field.
   b. Enter a password in the **Control System Password** field.
2. Select **+ Add** to add an IP table entry to the **IP Table**.
   a. Enter the Room ID in the **Room ID** field.
   b. Enter the IP ID of the DM NVX device in the **IP ID** field.
   c. Enter the IP address or hostname of the control system in the **IP Address/Hostname** field.
3. Select **Save Changes** to save the new entries. The **Control System Save** message box appears, indicating that the control system settings were saved successfully. Select **Revert** to revert to the previous settings without saving.

Point to Point Control

The **Point to Point Control** section allows enabling or disabling point-to-point streaming of AV-over-IP between this device and another directly-connected DM NVX device without the need for a control system.

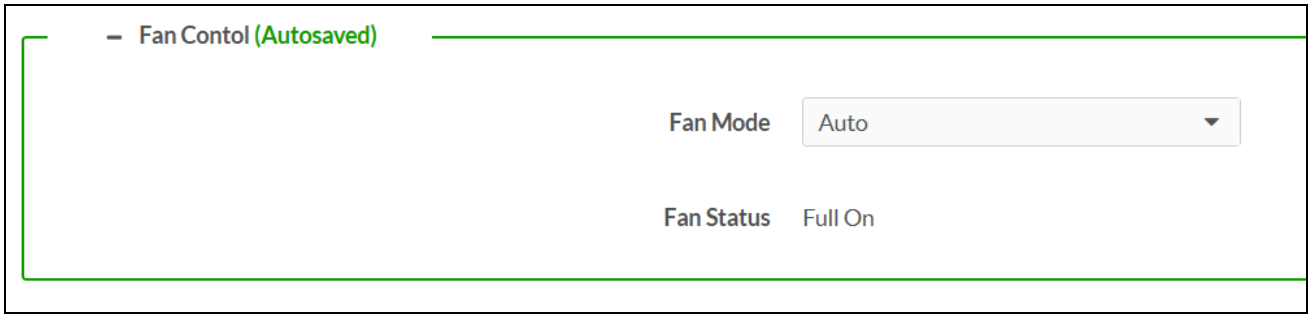


Point to Point Status is a read-only field that indicates whether point-to-point mode is **Active** or **Inactive**.

Select an option from the **Point to Point Mode** drop-down:

- **Auto:** (Default setting) Each 1000BASE-T port of the device detects whether it is connected directly to another DM NVX device or to a 1000BASE-T switch. If a direct connection between a DM NVX encoder and decoder is detected, point-to-point streaming is automatically initiated.
- **Disable:** Disables point-to-point streaming.

Fan Control (DM-NVX-D200 Only)



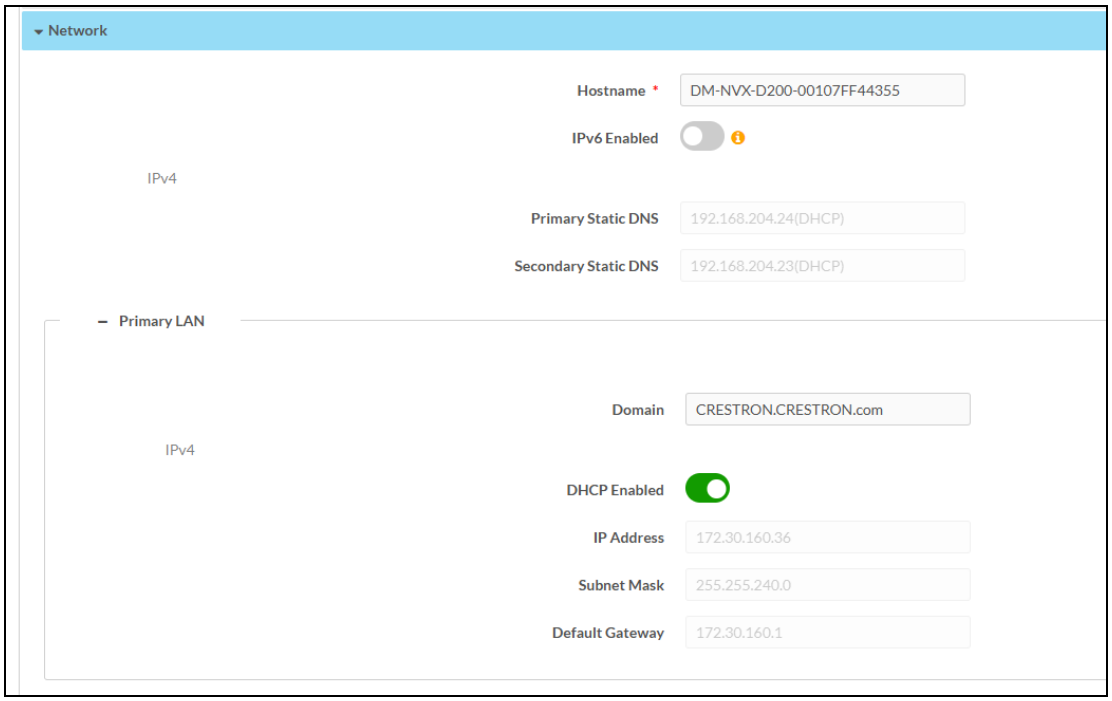
Select an option from the **Fan Mode** drop-down:

- **Auto:** The fan automatically turns on when either of these conditions are met:
  - A video stream is present.
  - The internal temperature of the device exceeds the normal operating range.
- **Always On:** The fan runs continuously regardless of video stream status and internal temperature.

Fan Status is a read-only field that will either read **Full On** to indicate that the fan is running or **Off** to indicate that the fan is not running.

Network

The **Network** accordion contains network-related settings for the DM NVX device, including the **Hostname**, **Domain**, **Primary Static DNS**, and **Secondary Static DNS**.



NOTE: By default, the host name of the device consists of the model name followed by the MAC address of the device. For example, DM-NVX-D200-00107FF44355.

Primary LAN

The **Primary LAN** subheading contains settings for **DHCP**, **IP Address**, **Subnet Mask**, and **Default Gateway** of the Ethernet adapter.

Set the **DHCP** toggle to the right to enable **DHCP** or left to disable **DHCP**. This determines whether the IP address of the **Primary LAN** port is to be assigned by a DHCP (Dynamic Host Configuration Protocol) server.

- **Enabled:** When DHCP is enabled (default setting), the IP address of the Primary LAN port is automatically assigned by a DHCP server on the local area network (LAN).
- **Disabled:** When DHCP is disabled, manually enter information in the following fields:
  - **Primary Static DNS:** Enter a primary DNS IP address.
  - **Secondary Static DNS:** Enter a secondary DNS IP address.
  - **IP Address:** Enter a unique IP address for the Primary LAN port.
  - **Subnet Mask:** Enter the subnet mask that is set on the network connected to the Primary LAN port.
  - **Default Gateway:** Enter the IP address that is to be used as the Primary LAN network's gateway.

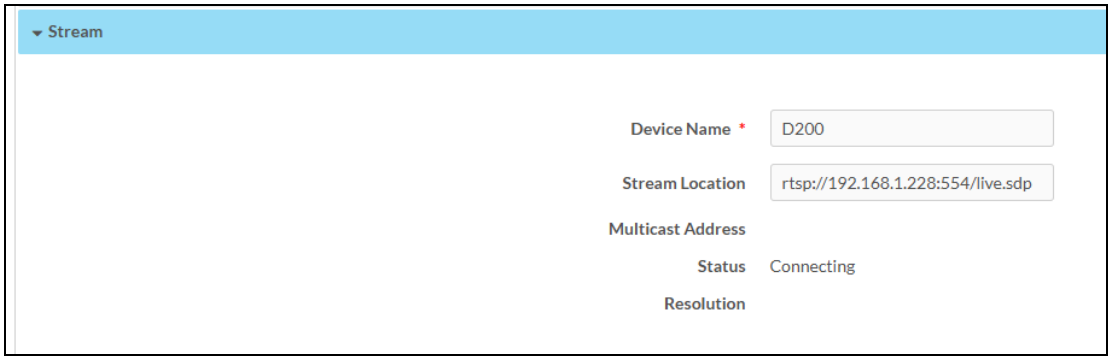
To save any new network entries, select **Save Changes**.

Stream

The settings available under the **Stream** accordion vary depending on whether the device is a decoder (D model) or encoder (E model).

Stream Settings (D Models)

Sample Stream Settings (DM-NVX-D200 Shown)

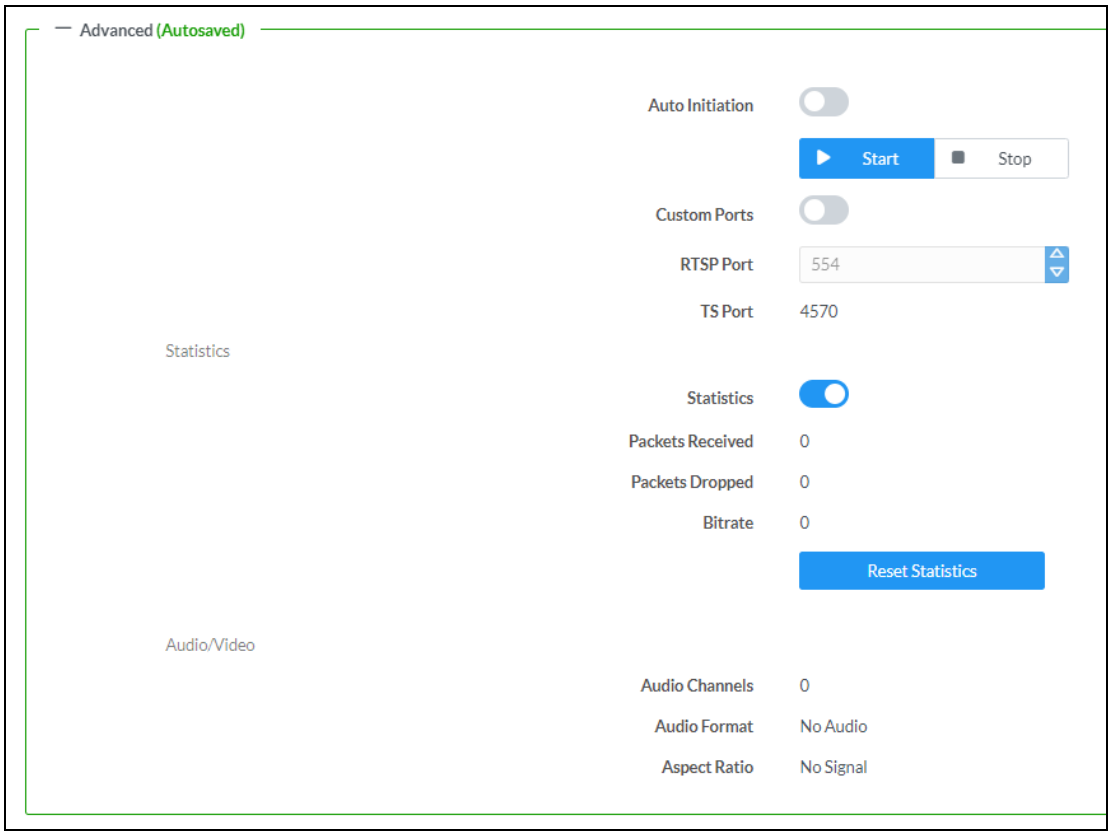


Configure the basic stream settings:

- **Device Name:** Displays the name of the upstream DM NVX device. By default, this will match the hostname.
- **Multicast Address:** Displays the multicast address of the incoming stream.
- **Stream Location:** Displays the network location of the incoming stream.
- **Status:** Displays the status of the network stream (for example, **Connecting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the incoming stream.
- **Preview:** Displays a preview thumbnail of the stream; the thumbnail refreshes once per second.

Advanced

The **Advanced** section provides further configuration of the incoming AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to set a custom RTSP port to connect to an incoming DM NVX stream. Set the toggle to the left to use the default port values (the default RTSP port value is 554).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.

  > **NOTE:** Valid values for the custom port field range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

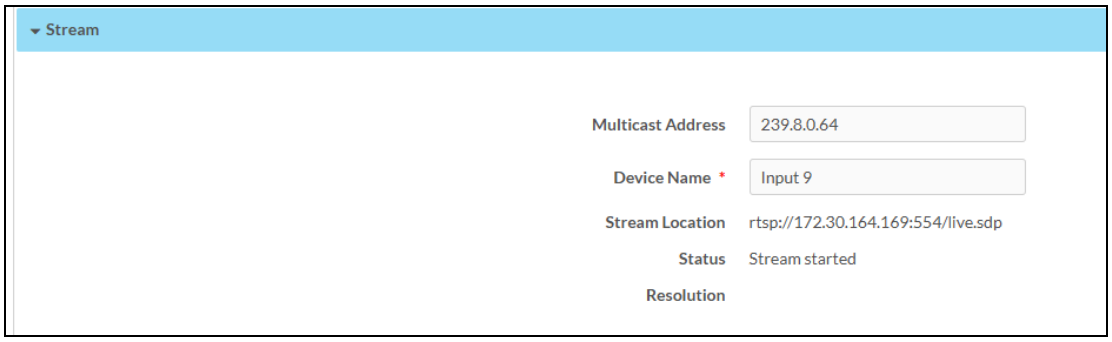
- **TS Port:** Displays the default TS port value (4570).

The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the incoming DM NVX stream:
  - **Packets Received** will display the total number of packets received by the DM NVX device as part of the incoming DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - **Bitrate** will display the current bitrate of the incoming DM NVX stream.
  - Select **Reset Statistics** to set both **Packets Received** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the incoming DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the incoming DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the incoming DM NVX stream.

Stream Settings (E Models)

Sample Stream Settings (DM-NVX-E20 Shown)



Configure the basic stream settings:

- **Multicast Address:** Sets the multicast address of the outgoing stream.
  - The secondary audio stream from the DM NVX device will consume the next multicast address above the value entered here. For example, a **Multicast Address** of 239.10.0.1 will result in a secondary audio stream address of 239.10.0.2.

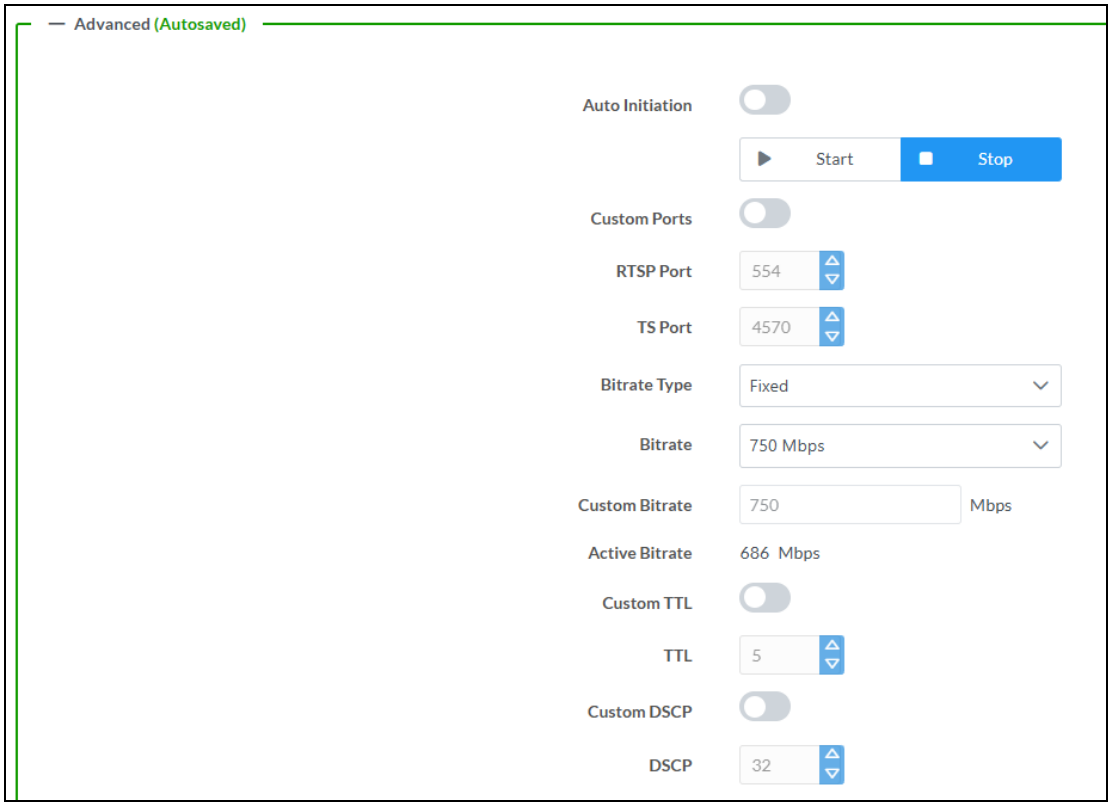
> **CAUTION:** Ensure the value entered for **Multicast Address** is unique on the network. Duplicate multicast addresses will result in traffic collision and downstream receivers will fail to receive content.

> **NOTES:**
>
> - DM NVX devices can have a multicast transmit address anywhere in the range from 239.0.0.0 to 239.127.255.255. Starting at 239.1.0.0 is recommended to avoid common multicast MAC address conflicts.
> - DM NAX audio-over-IP devices use a multicast range from 239.8.0.1 to 239.127.255.255.

- **Device Name:** Displays the name of the DM NVX device. A custom name can also be entered in this text box. By default, this will match the hostname.
- **Stream Location:** Displays the network location of the stream.
- **Status:** Displays the status of the network stream (for example, **Stream starting**, **Stream started**, or **Stream stopped**).
- **Resolution:** Displays the resolution of the outgoing stream.

Advanced

The **Advanced** section provides further configuration of the transmitting AVoIP stream along with stream statistics.



The following advanced settings are available for the transmitting DM NVX AVoIP stream:

- **Auto Initiation:** Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of DM NVX streams. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

  Press the **Start** or **Stop** button to start or stop a stream if **Auto Initiation** is disabled.

  > **NOTE:** When **Automatic Initiation** is disabled, the device will not attempt to start a stream until the **Start** button is pressed or a control system sends a signal to the corresponding programmatic join.

- **Custom Ports:** Set the **Custom Ports** toggle to the right to configure a custom RTSP port for the transmitting DM NVX stream. Set the toggle to the left to use the default port values for both ports (the default RTSP port value is 554 and the default TS port value is 4570).

  With **Custom Ports** enabled:

  - Enter a custom RTSP port in the **RTSP Port** field.
  - Enter a custom TS port in the **TS Port** field.

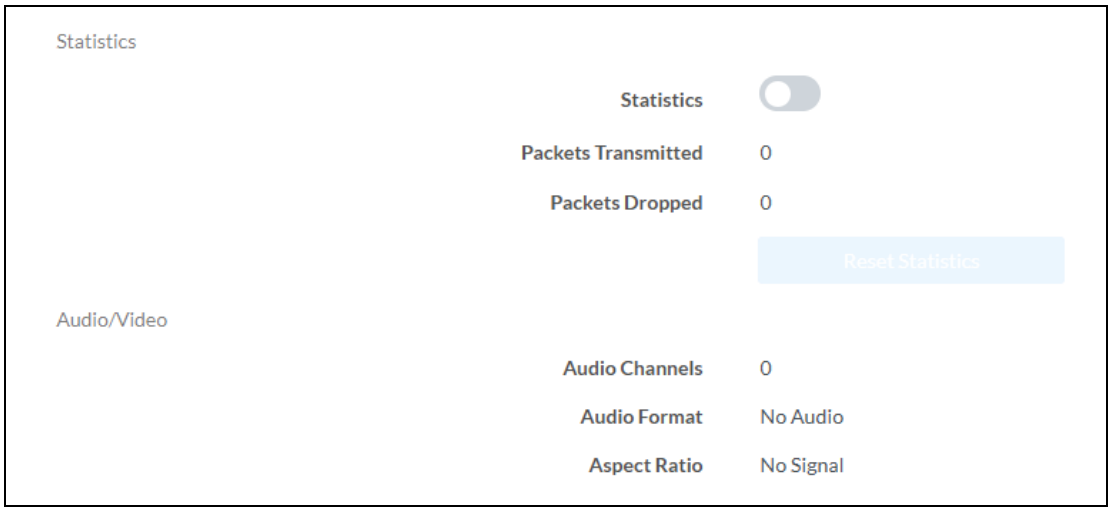
  > **NOTE:** Valid values for both custom port fields range from 1 to 65535. Crestron recommends using a custom port value greater than 10000.

- **Bitrate Type:** Select **Fixed**, **Variable**, or **Custom** from the drop-down.
  - **Fixed:** The transmitting DM NVX stream always meets the bitrate specified by the **Bitrate** drop-down. The default and recommended bitrate value is 750 Mbps.
  - **Variable:** The bitrate of the transmitting DM NVX stream is dynamic based on the resolution of the stream content. Selecting **Variable** will disable the **Bitrate** drop-down and **Custom Bitrate** text entry field.
  - **Custom:** The transmitting DM NVX stream always meets the bitrate specified by the **Custom Bitrate** text entry field. The default and recommended bitrate value is 750 Mbps.
- **Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Fixed**.
- **Custom Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Custom**.
- **Active Bitrate:** Displays the current bitrate of the transmitting DM NVX stream.
- **Custom TTL:** Multicast Time-to-live (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.

  Select the **Custom TTL** checkbox to enter a custom TTL value for the DM NVX stream in the **TTL** field.
- **TTL:** Enter a value from 1 to 255. The default TTL value is 5.
- **Custom DSCP:** To implement Quality of Service (QoS), IP networks use Differentiated Services Code Point (DSCP) values. Within an IP packet header, the DSCP is a value from 0 to 63 that maps to a certain traffic classification. Based on IT department policies and network switch configurations, DSCP values are used to determine the treatment of specific packets in router queues, the routes of traffic flows, and per-hop behavior. By default, DSCP for DM NVX AV-over-IP is set to 32.

  Select the **Custom DSCP** checkbox to enter a custom DSCP value for the DM NVX stream's AV-over-IP packets in the **DSCP** field

  > **NOTE:** Only change the DSCP value if required by IT department policies or if necessitated by poor network performance. Refer to AV-over-IP Network Design on page 871 for network performance troubleshooting tips.



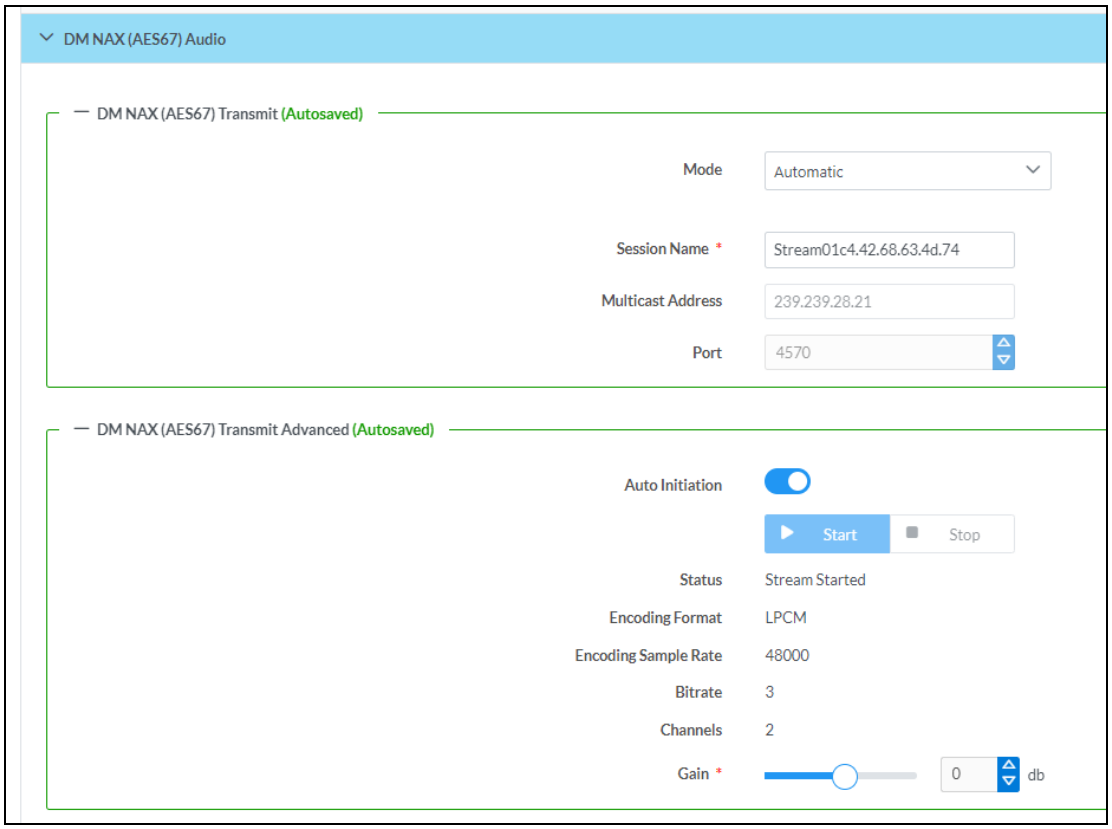
The bottom portion of the **Advanced** section includes a **Statistics** field and an **Audio/Video** field:

- Set the **Statistics** toggle to the right to begin collecting statistics on the transmitting DM NVX stream:
  - **Packets Transmitted** will display the total number of packets transmitting by the DM NVX device as part of the outgoing DM NVX stream.
  - **Packets Dropped** will display the total number of dropped packets.
  - Select **Reset Statistics** to set both **Packets Transmitted** and **Packets Dropped** back to 0.
- **Audio Channels** displays the number of audio channels embedded in the transmitting DM NVX stream.
- **Audio Format** displays the format of the digital audio embedded in the transmitting DM NVX stream.
- **Aspect Ratio** displays the aspect ratio of the video signal embedded in the transmitting DM NVX stream.

DM NAX (AES67) Audio

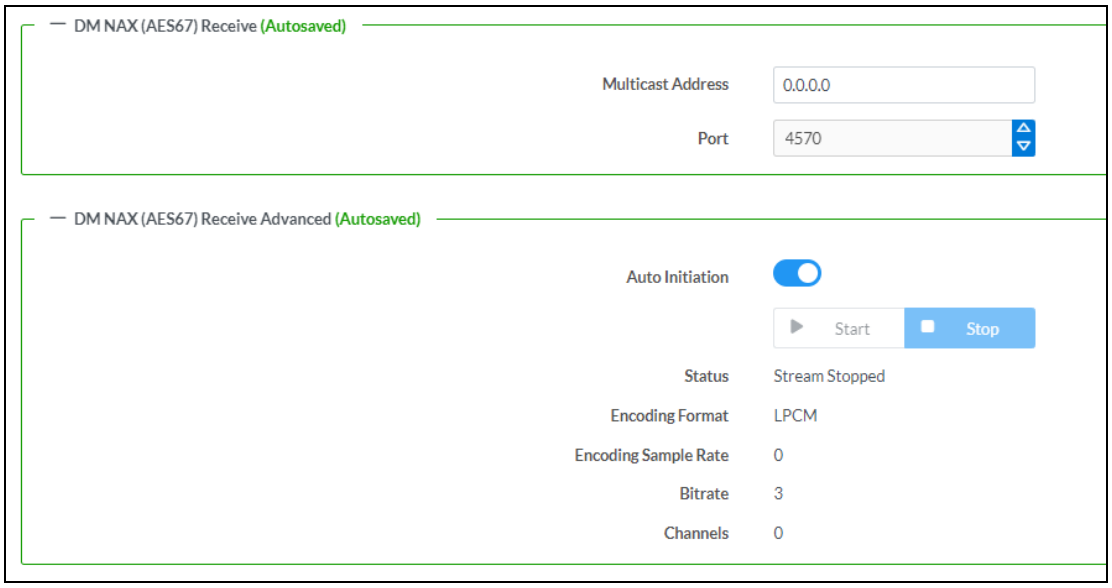
DM NVX devices natively support DM NAX® audio-over-IP technology, which is built off the standards of AES67. AES67 support allows a selected audio source to be transmitted as a 2-channel AES67 stream while another 2-channel AES67 audio stream is received from another AES67-capable device or Crestron DM NAX device.

Use the **DM NAX (AES67) Audio** accordion to configure the DM NAX audio-over-IP transmit and receive streams of the DM NVX device.



To configure the **DM NAX (AES67) Transmit** stream:

1. Select a stream addressing mode from the **Mode** drop-down:
   - **Automatic** adds 1 to the outgoing video stream multicast address to generate the DM NAX transmit 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.
   - **Manual** requires the multicast address of the transmitting DM NAX stream to be set manually. Selecting **Manual** enables the **Multicast Address** and **Port** text entry fields.
   - **Disabled** turns off DM NAX transmission from the DM NVX device.
2. Set a custom session name in the **Session Name** text entry field. This is similar to setting a hostname for an IP address on the LAN. The session name will appear in addition to the multicast address when the DM NAX audio-over-IP stream is discovered on the network.
3. If the **Mode** is set to **Manual**, enter custom values in the **Multicast Address** and **Port** text entry fields.
4. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the DM NAX transmit stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.
5. Adjust the **Gain** slider to configure the audio level compensation on the transmitting DM NAX stream from -10 to +10 dB.

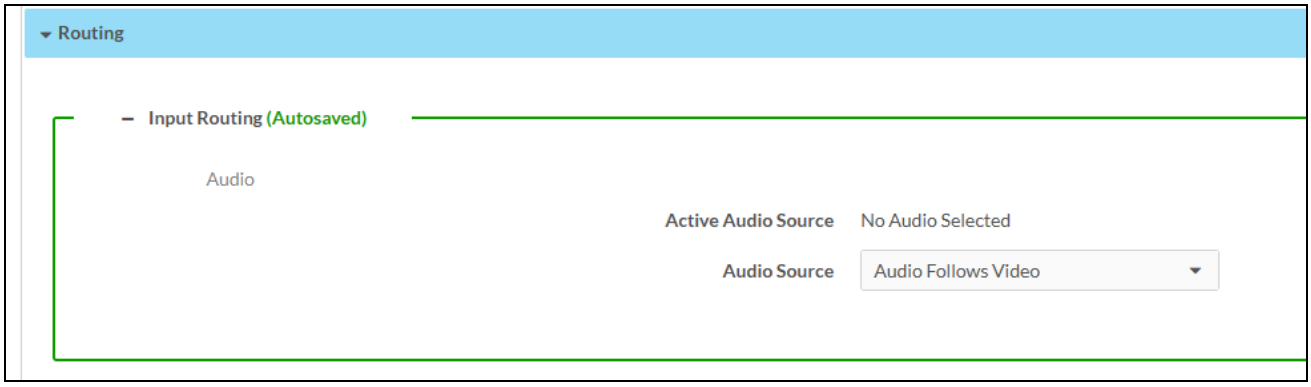


To configure the **DM NAX (AES67) Receive** stream:

1. Enter a valid multicast IP address in the **Multicast Address** field.
2. Enter the port value of the stream in the **Port** field.
3. Set the **Auto Initiation** toggle to the right to enable or left to disable automatic initiation of the incoming DM NAX stream. With **Auto Initiation** enabled, the stream will automatically start when valid stream parameters are set. By default, **Auto Initiation** is enabled.

Routing

Use the **Routing** accordion to configure the audio and video routing behavior of the DM NVX device's internal switcher and secondary audio stream.



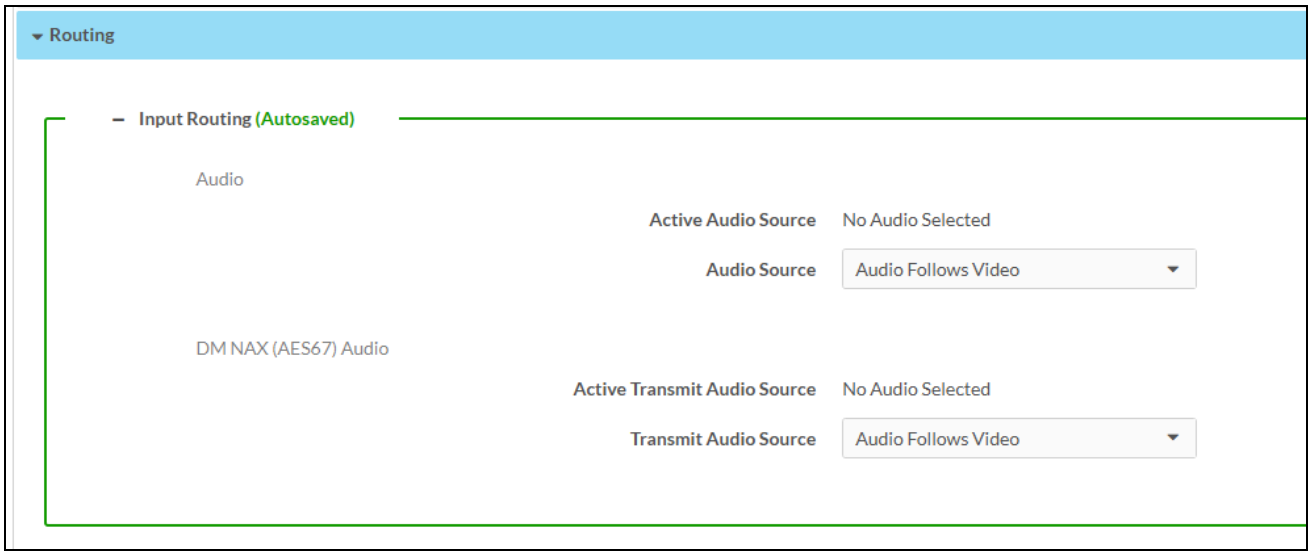
Input Routing

The fields under the **Input Routing** subheading refer specifically to audio signal routing, which can be handled separately from video routing.

- The **Active Audio Source** read-only field displays the name of the currently active audio source. This reflects the audio that is embedded in the HDMI output (for D models) or DM NVX AV-over-IP stream (for E models).

- The options available for the **Audio Source** drop-down depend on the model:
  - For D models, the options are **Audio Follows Video**, **Primary Stream Audio**, and **DM NAX (AES67) Audio**.
  - For E models, the options are **Audio Follows Video**, **Input 1**, **DM NAX (AES67) Audio**, and **Analog Audio**.

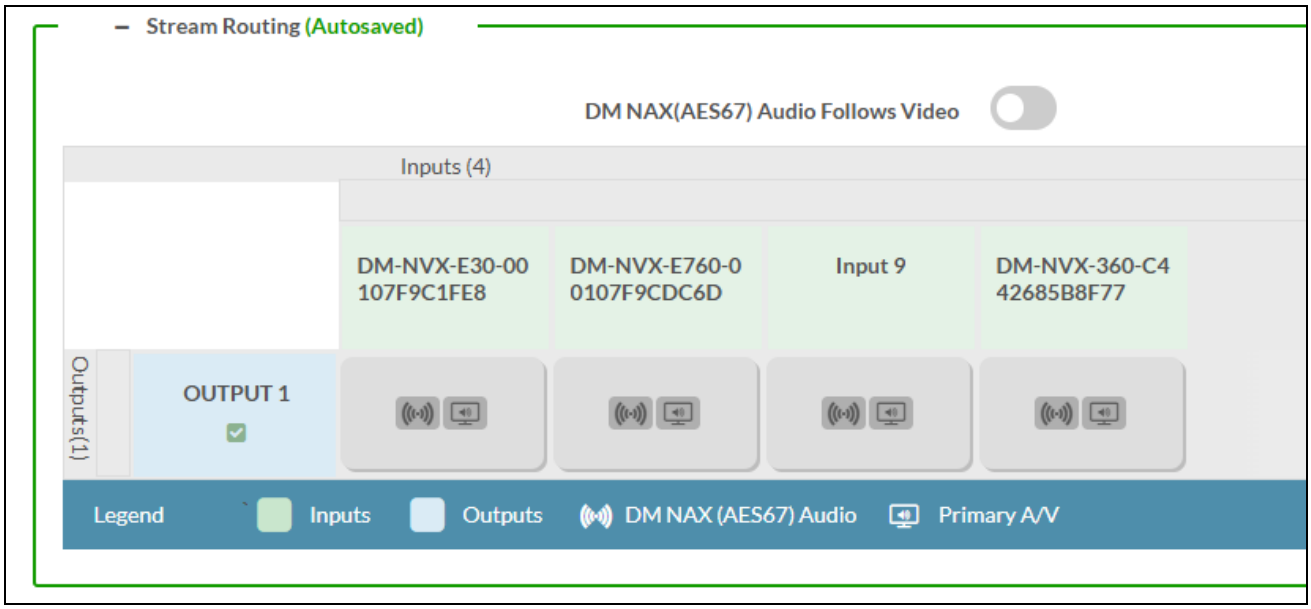
E models also have a subheading for DM NAX (AES67) Audio to handle routing for the secondary audio stream.



- The **Active Transmit Audio Source** read-only field displays the name of the currently transmitting audio source on the secondary audio stream.
- The options available for the **Transmit Audio Source** drop-down are **Audio Follows Video**, **Input 1**, and **Analog Audio**.

Stream Routing (D Models Only)

The **Stream Routing** section houses the routing matrix for audio and video signals that can be received over the network.



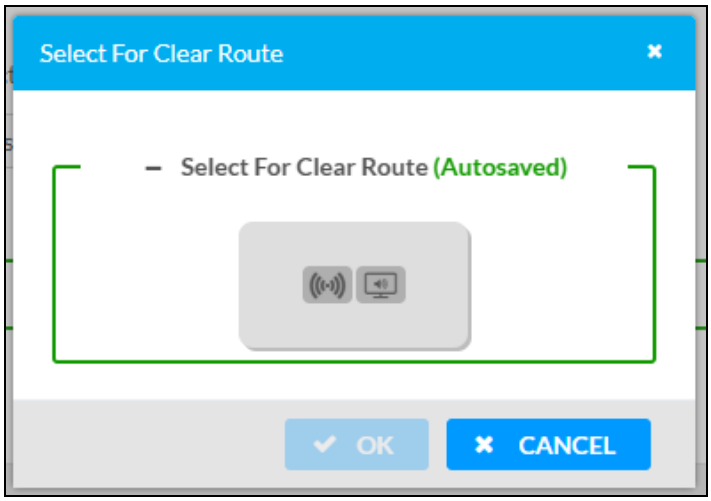
NOTE: In order for the routing matrix to appear, at least one subscription must be added from the **Subscriptions** accordion. Refer to Subscriptions (D Models Only) on page 769 for information on adding subscriptions.

Set the **DM NAX (AES67) Audio Follows Video** toggle to the right to have the secondary audio stream match the same routes as the primary AV stream. Set the toggle to the left to manage the secondary audio stream routing independently of the primary AV stream.

Use the routing matrix to establish or break signal routes:

- To route an AV-over-IP stream to the DM NVX device, select the **Primary A/V** icon in that stream's matrix column. If the **DM NAX (AES67) Audio Follows Video** toggle is set to the right, the **DM NAX (AES67) Audio** icon will also be selected automatically for that stream.
- To route a DM NAX (AES67) stream to the DM NVX device, select the **DM NAX (AES67) Audio** icon in that stream's matrix column. To manage this independently of the AV-over-IP stream, the **DM NAX (AES67) Audio Follows Video** toggle must be set to the left.

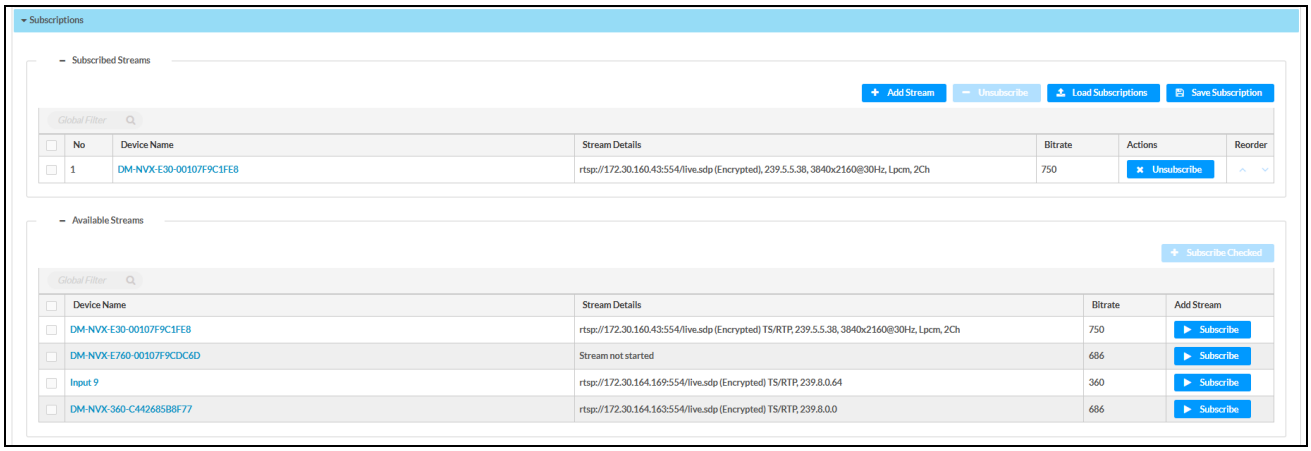
- To clear a route, do one of the following:
  - Select the ✖ icon for a given input to clear all routes from that input.
  - Select the ✔ icon for a given output to clear routes from that input. A **Select For Clear Route** window appears.



Select either or both of the signal types to clear all routes of those types from the output, then select **OK** to clear those routes or **Cancel** to cancel the operation.

Subscriptions (D Models Only)

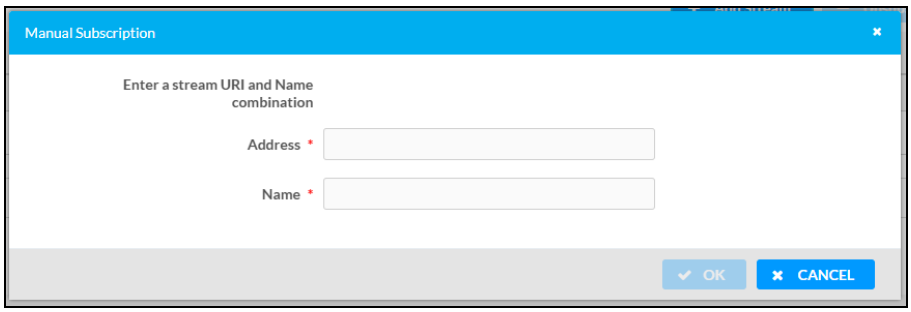
The **Subscriptions** accordion allows the DM NVX receiver to subscribe to discovered network AV-over-IP streams for quick routing and switching without having to manually enter multicast addresses or session names.



The **Subscribed Streams** table displays all network streams that the device is subscribed to. These streams are also available in the routing matrix in the **Routing** accordion. Refer to Stream Routing (D Models Only) on page 767 for information on routing a subscribed stream.

To add a stream to the table, do either of the following:

- Select **+ Add Stream**. A **Manual Subscription** window appears.



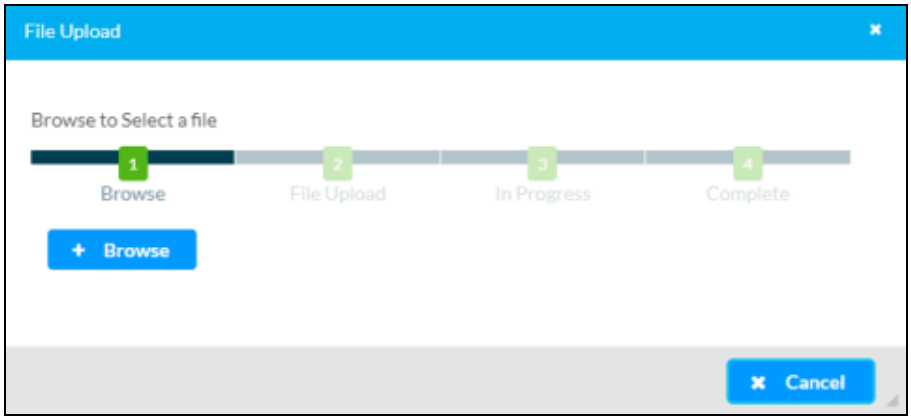
  - Enter the multicast address of the stream in the **Address** field.
  - Enter the device name of the transmitting device in the **Name** field.
  - Select **√ OK** to add the stream to the **Subscribed Streams** list or select **X Cancel** to cancel the operation.
- Select the **Subscribe** button for a stream listed in the **Available Streams** table.

To add multiple streams to the table at once, select the checkbox for each desired stream in the **Available Streams** table, then select **+ Subscribe Checked**.

To remove a stream from the table, select **x Unsubscribe** in its table row. To remove multiple streams at once, select the checkbox for each stream in the **Subscribed Streams** table, then select **- Unsubscribe** at the top of the table.

The **Subscribed Streams** table can also be exported as a .xml file to other DM NVX receivers. This allows the subscription process to be performed even more efficiently on other receivers. To export the table and upload it to another receiver:

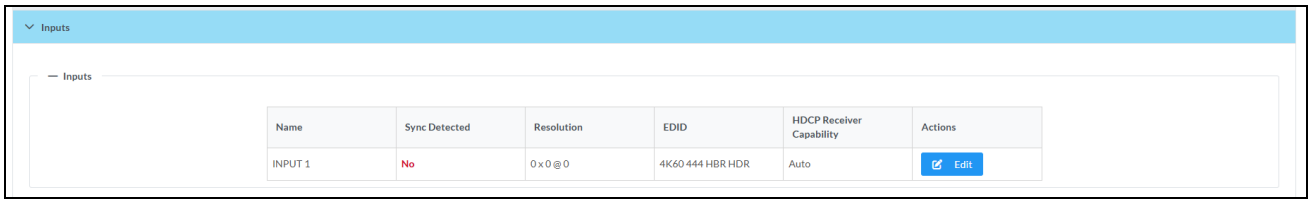
1. Subscribe to all of the desired network streams.
2. Select **Save Subscription** at the top of the **Subscribed Streams** table. A .xml file will be downloaded to the connected PC.
3. Log in to the next DM NVX receiver's web interface and navigate to its **Subscriptions** accordion.
4. Select **Load Subscriptions** at the top of the **Subscribed Streams** table. A **File Upload** window appears.



5. Select **+ Browse**. Locate the .xml file, then select **Upload** to upload it to the DM NVX device. When the upload completes, the window will close and the interface will return to the **Subscriptions** accordion with the **Subscribed Streams** table filled out.

Inputs (E Models Only)

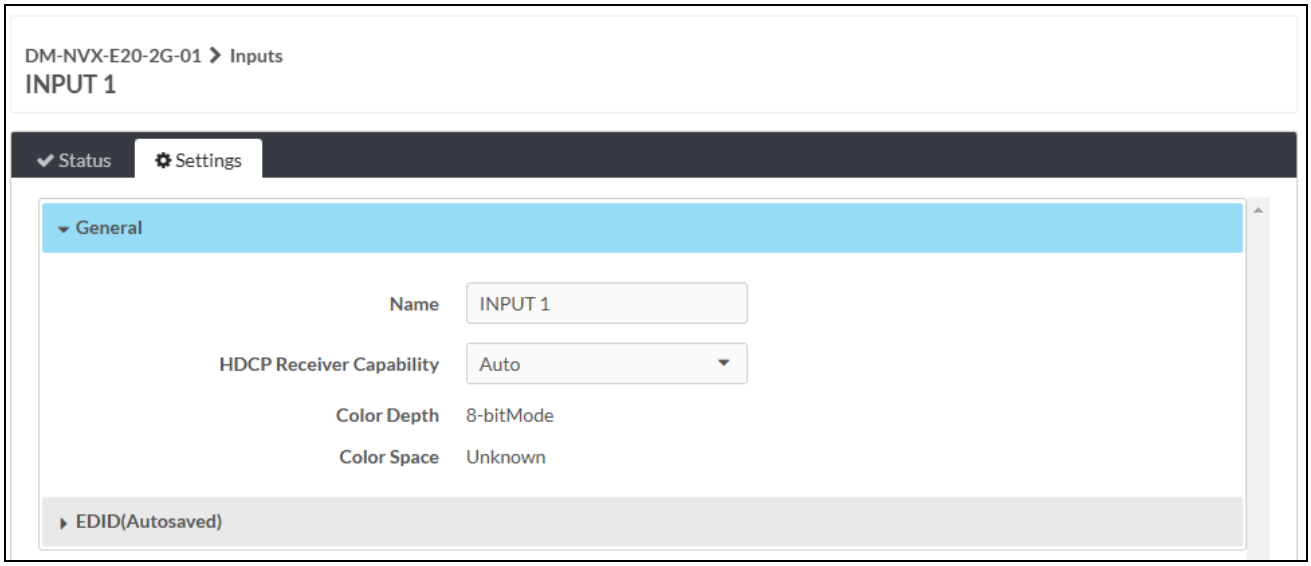
The **Inputs** accordion contains source resolution and EDID information as well as input configuration options for the local input connector on the DM NVX device.



To configure the input, select the **Edit** button. An **Edit Input** window appears.

Edit Input

The **Edit Input** window will open to the **Settings** tab by default. This tab enables configuration of the available input settings for the HDMI input.



The **General** accordion is open by default.

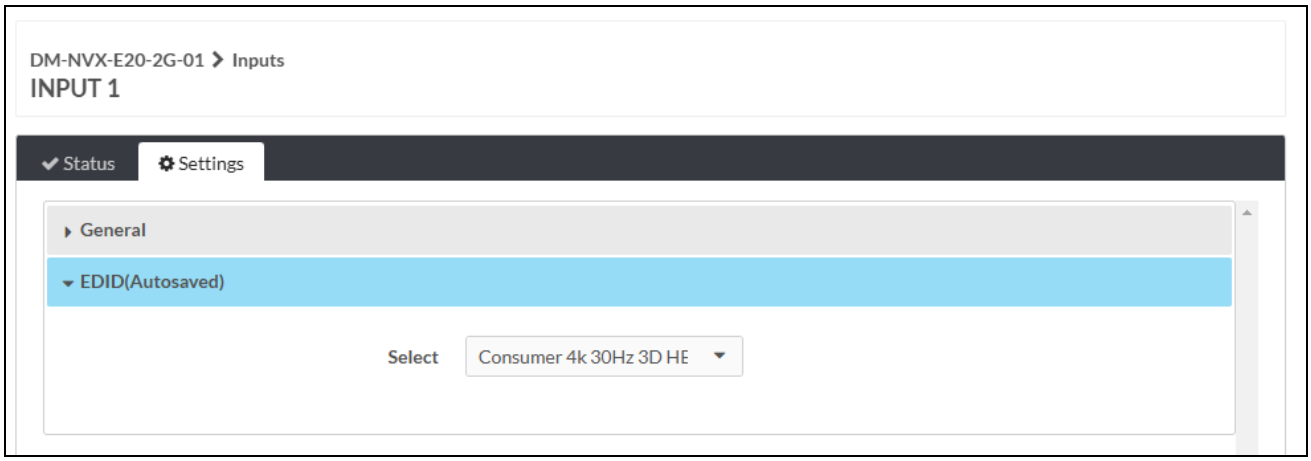
Enter a friendly name for the input in the **Name** text entry field.

Use the **HDCP Receiver Capability** drop-down to select **Auto** or a specific HDCP version. The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display.

> **NOTE:** Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

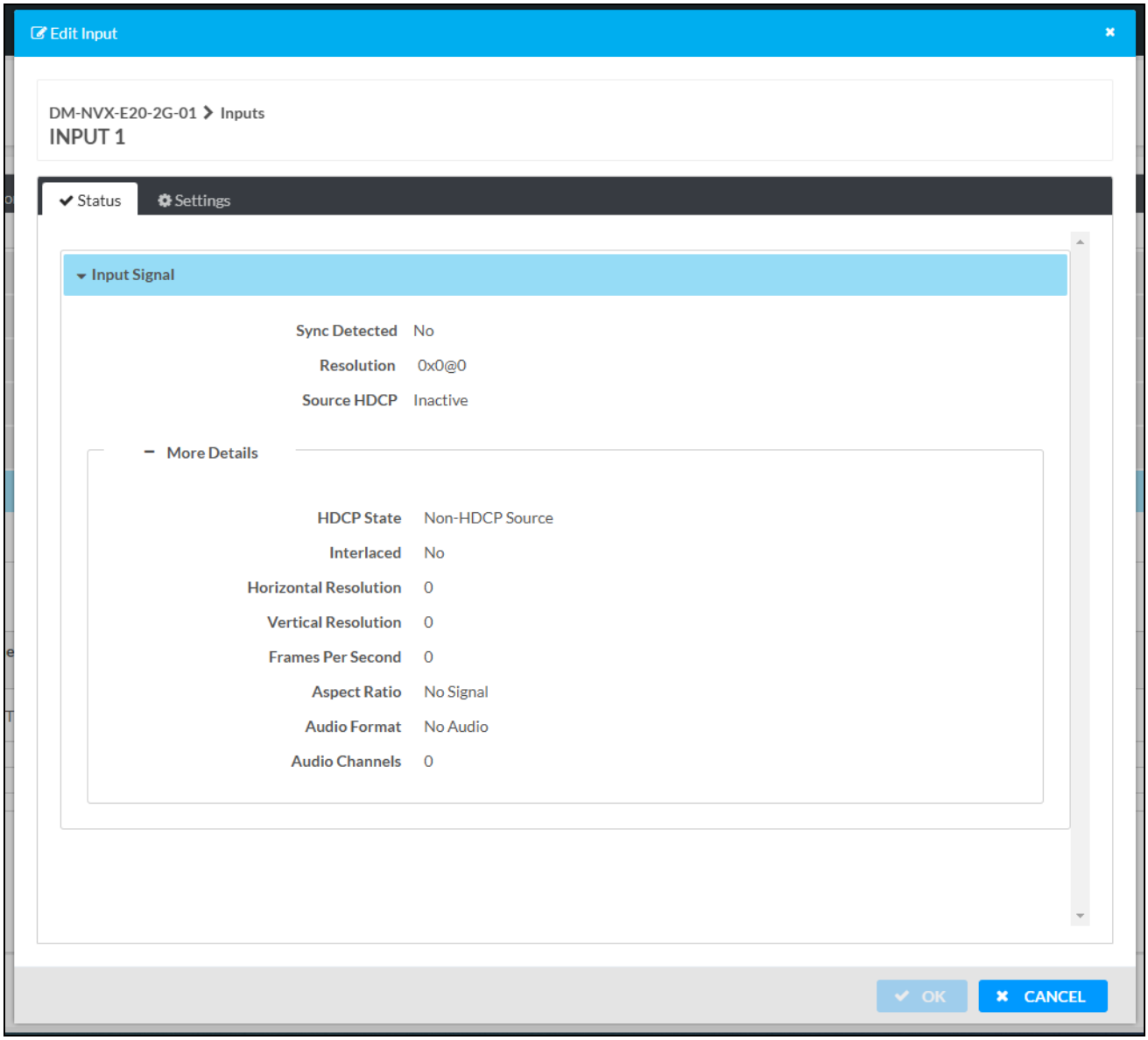
The **Color Depth** and **Color Space** fields are read-only and depend on the incoming video signal.

Select the **EDID** accordion to access EDID settings specific to the selected input.



Use the **Select** drop-down to apply a specific EDID file to the selected input. All built-in and custom EDIDs are available in this list. Refer to Action on page 737 for more information on loading custom EDIDs to this list.

Select the **Status** tab to reference sync, resolution, HDCP, and audio information for the connector and input source.



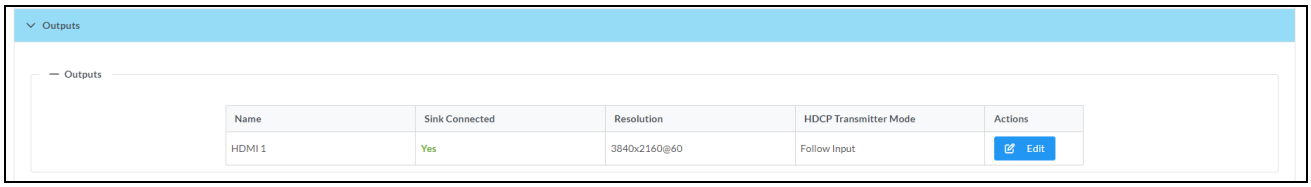
Use **OK** or **Cancel** to return to the **Settings** page. Select **OK** to apply any changes made in the **Edit Input** window or select **Cancel** to discard the changes.

Outputs

The **Outputs** accordion contents depend on whether the device is a decoder (D model) or encoder (E model).

Outputs (D Models)

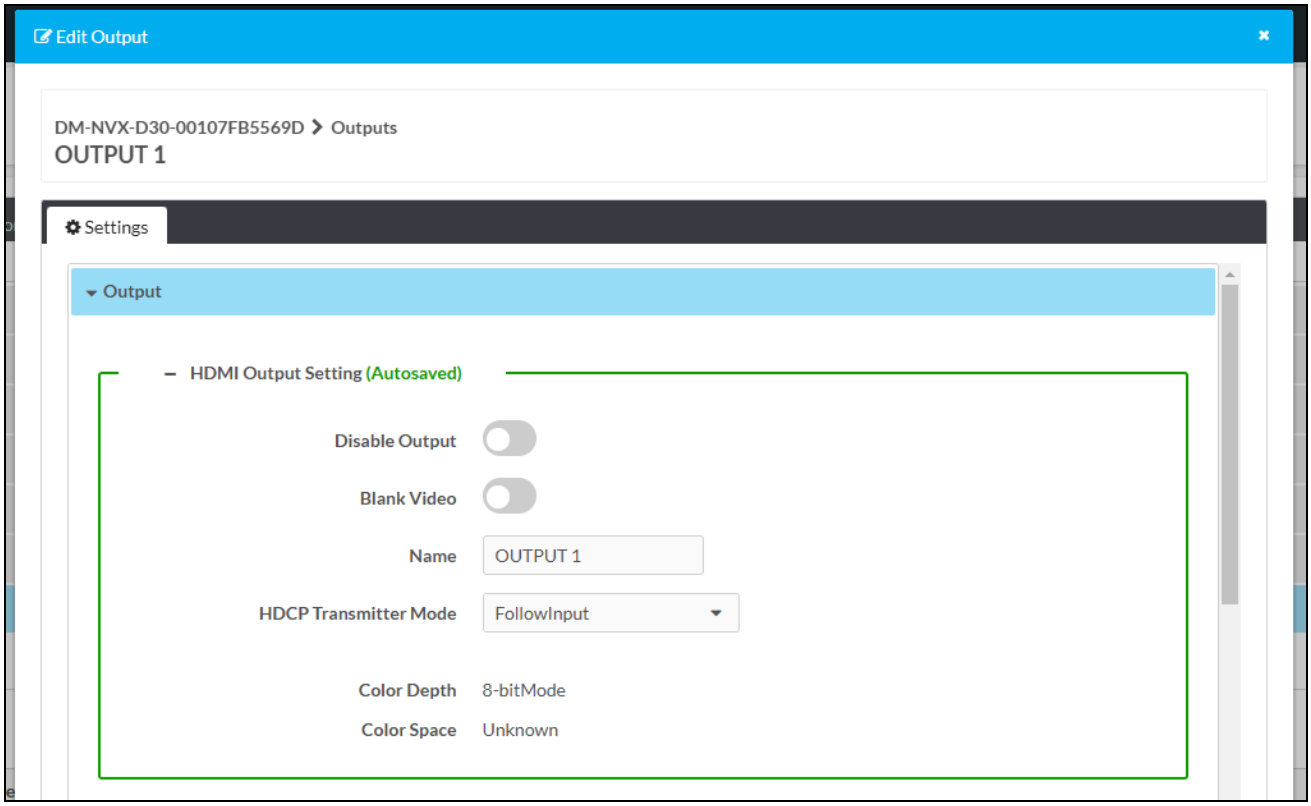
In the interface of D10, D20, and D200 models, the **Outputs** accordion contains status information and an **Edit** option for the local HDMI output connector on the DM NVX device.



To configure the output, select the **Edit** button. An **Edit Output** window appears. The settings available in the **Edit Output** window depend on which mode the DM NVX device is in.

Edit Output - Output Accordion

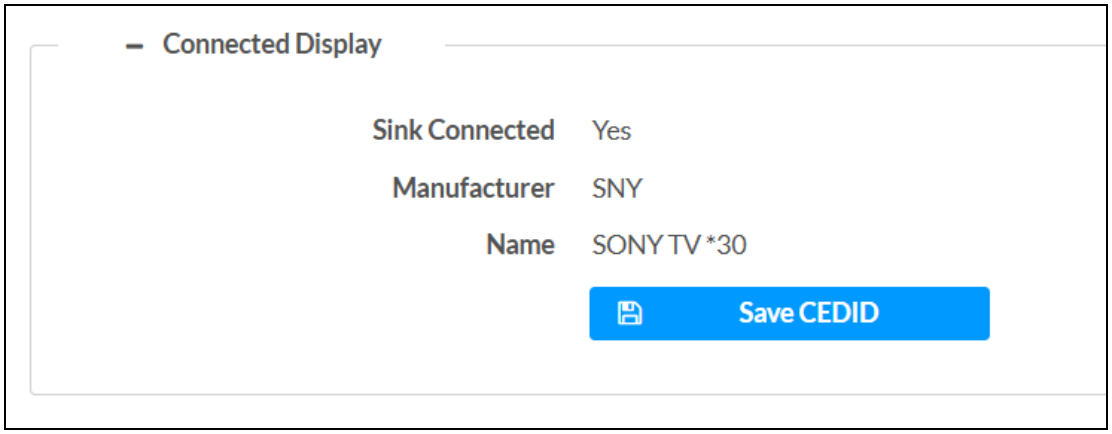
The **Output** accordion is open by default.



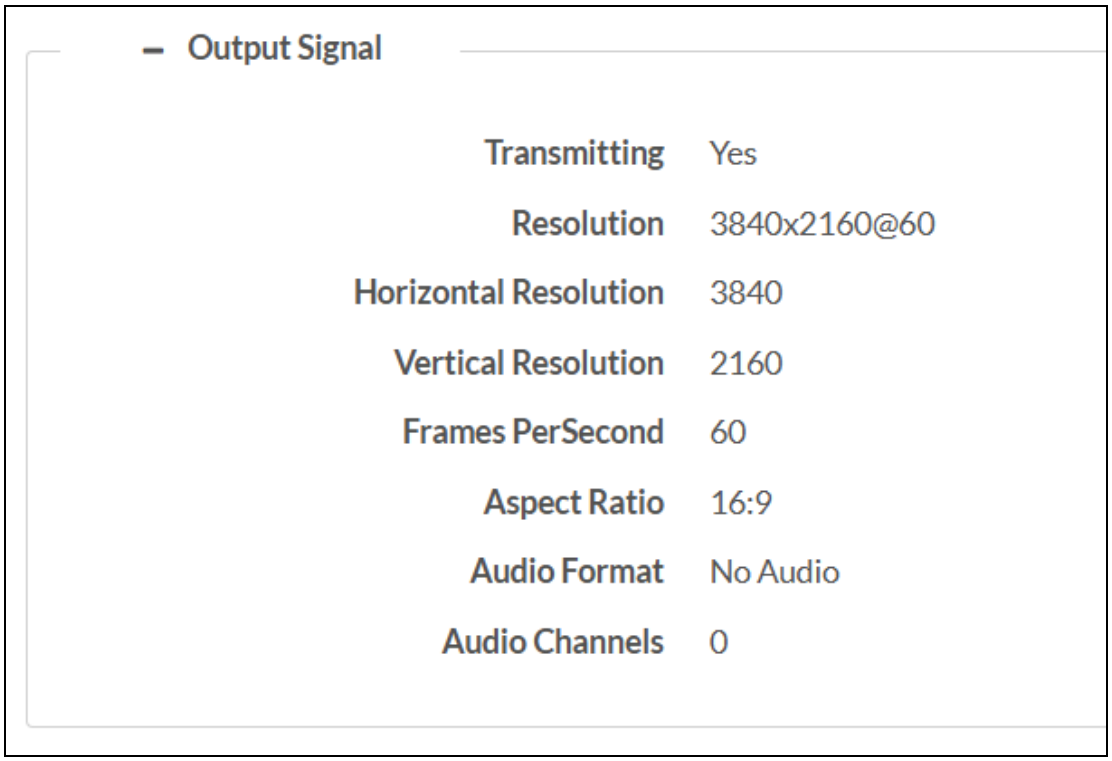
Configure basic settings under the **HDMI Output Setting** subheading:

- Set the **Disable Output** toggle to the right to turn off the HDMI output. Set the toggle to the left to turn the HDMI output back on.
- Set the **Blank Video** toggle to the right to transmit a full-screen black video signal. Set the toggle to the left to transmit the video signal of the selected input.
- Enter a friendly name for the output in the **Name** text entry field.

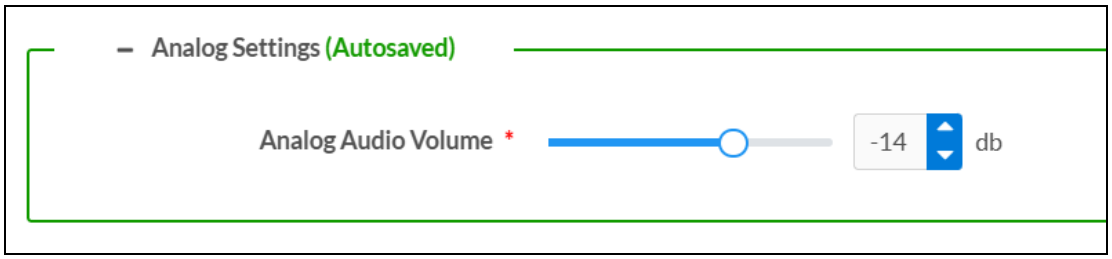
- Use the **HDCP Transmitter Mode** drop-down to select between:
  - **Auto:** The HDCP level of the output will automatically match the HDCP level of the video signal.
  - **Follow Input:** The HDCP level of the output will be forced to the supported HDCP level of the local input.
  - **Force Highest:** The HDCP level of the output will force compatibility with the highest HDCP level supported by the entire signal chain.
  - **Never Authenticate:** The output will never authenticate at any HDCP level. This will blank video when any content-protected video signal is routed to the output.
- The **Color Depth** and **Color Space** fields are read-only values that display the current depth and space of the video output signal, respectively.



The **Connected Display** subheading contains read-only fields with the **Sink Connected** status, **Manufacturer**, and **Name** of the connected display. Select **Save CEDID** to download a .cedid file that can be loaded to this or other DM NVX devices. Refer to Action on page 737 for more information on loading custom EDID files.



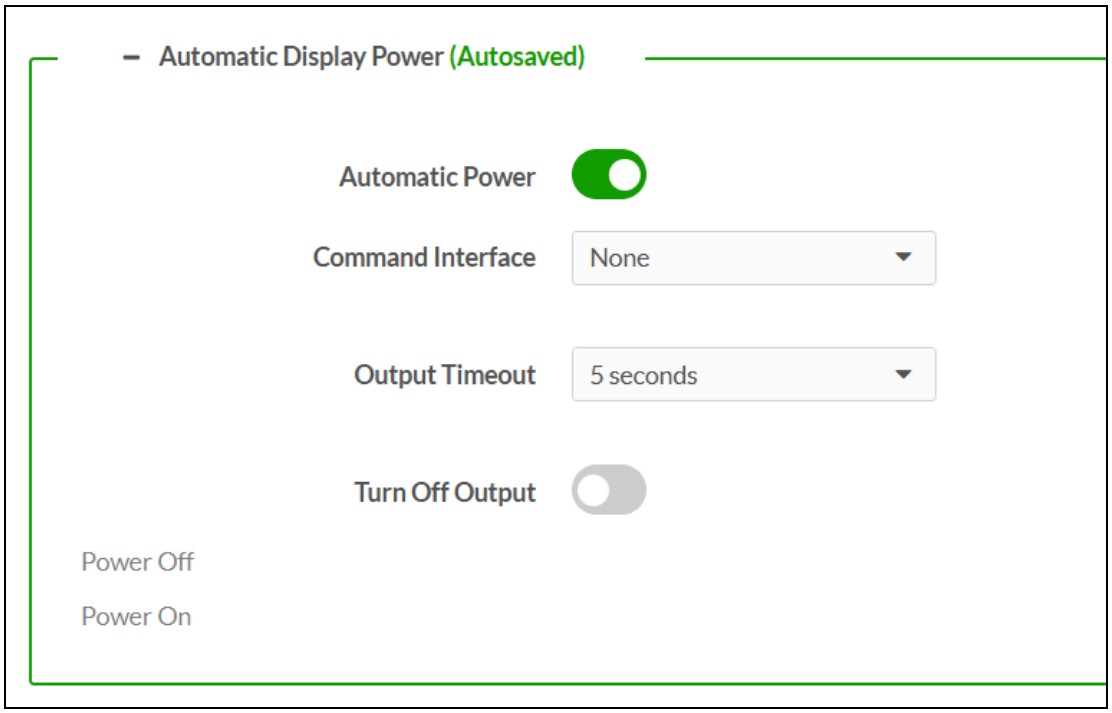
The **Output Signal** subheading contains read-only fields with information on the transmission status and resolution of the video output signal.



To adjust the **Analog Audio Volume**, do one of the following:

- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.



The **Automatic Display Power** subheading enables configuration of display power on and power off commands that are issued to the connected display when a video signal is detected or stops.

Set the **Automatic Power** toggle to the right to enable display power commands. Select a **Command Interface** from the drop-down from among **None**, **CEC**, **IR**, and **RS-232**.

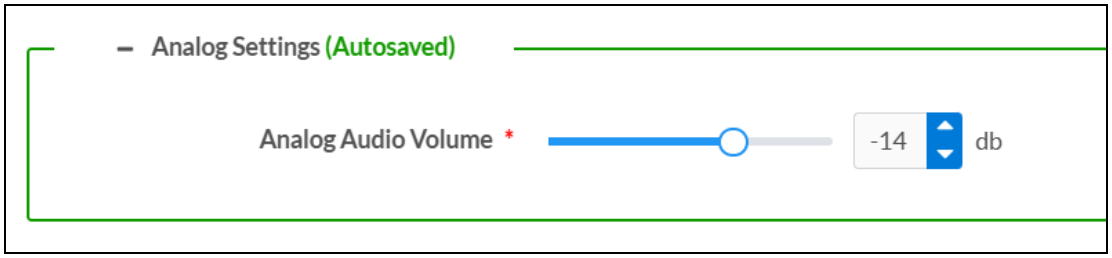
> **NOTE: IR** and **RS-232** are not available on card-based models.

Once the **Command Interface** is selected, set the appropriate **Power On** and **Power Off** commands under their respective subheadings. RS-232 command strings may be available from the display manufacturer's documentation.

Outputs (E Models)

> **NOTE:** This accordion is not available on DM-NVX-E20-2G models.

In the interface of an E10 or E20 model, the **Outputs** accordion only contains the **Analog Audio Volume** setting for the local **AUDIO I/O** connector of the device.



To adjust the **Analog Audio Volume**, do one of the following:

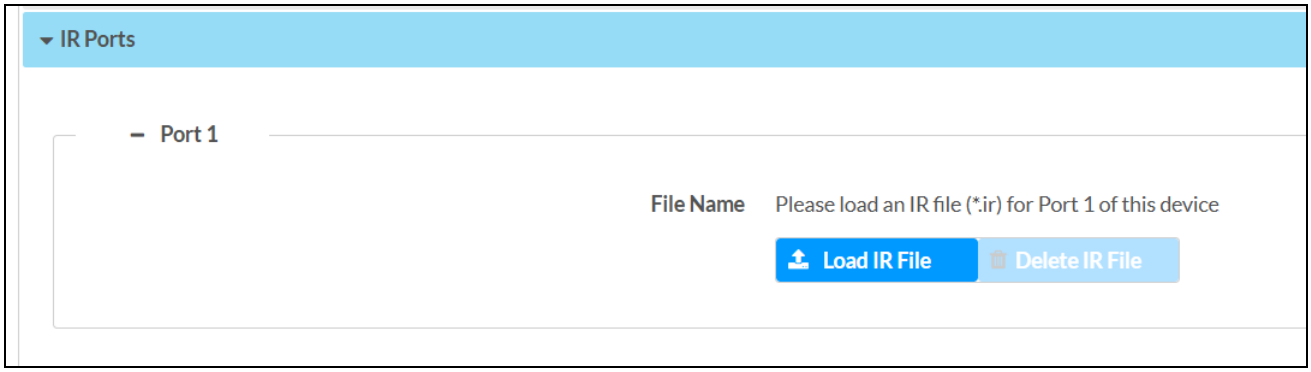
- Move the slider to the right to increase or left to decrease the volume.
- Use the arrows to increase or decrease the volume.
- Manually enter a volume value in the text entry field.

The **Analog Audio Volume** is set to 0 dB by default. Values range from -80 dB to 20 dB.

IR Ports

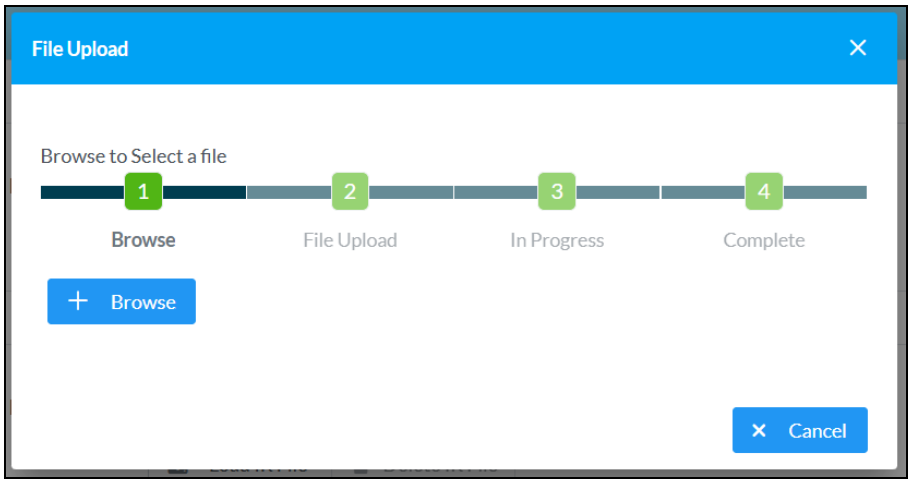
> **NOTE:** This accordion is not available on DM-NVX-E20-2G models.

The **IR Ports** accordion allows custom IR files containing device commands to be uploaded to the DM NVX device IR connector. Custom IR files can be generated via the Device Learner utility within Crestron Toolbox software. The IR port can hold only one IR file at a time. IR files must be loaded to each port individually.



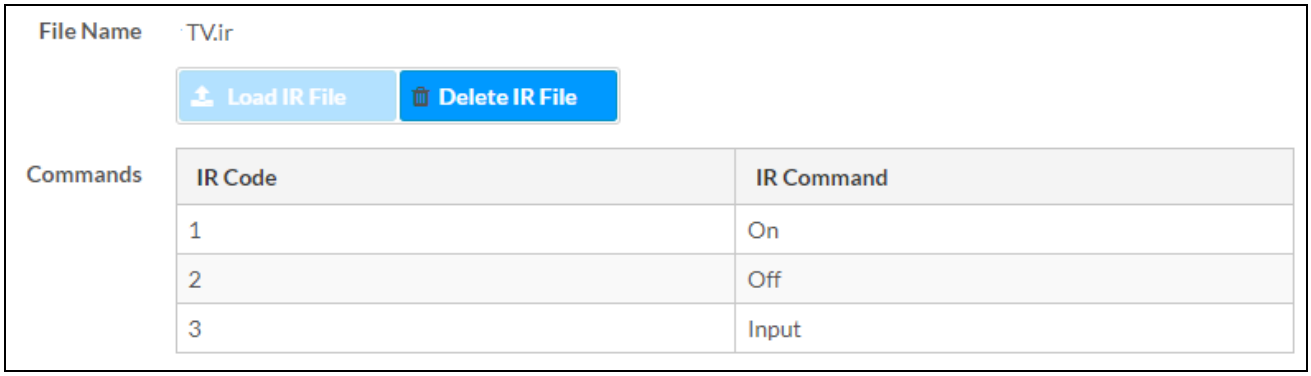
To upload an IR file to the IR port:

1. Select **Load IR File**.
2. In the **File Upload** window that appears, select **+ Browse**.



3. Locate and select the desired IR file, then select **Open**. The selected file name is displayed.
4. Select **Load**, then wait for the progress bar to complete and for **OK** to become selectable.
5. Select **OK**. The IR file is now loaded to the IR port.

Once the IR file is uploaded, its filename will appear next to the IR port. A read-only table showing all included commands will also appear and populate.



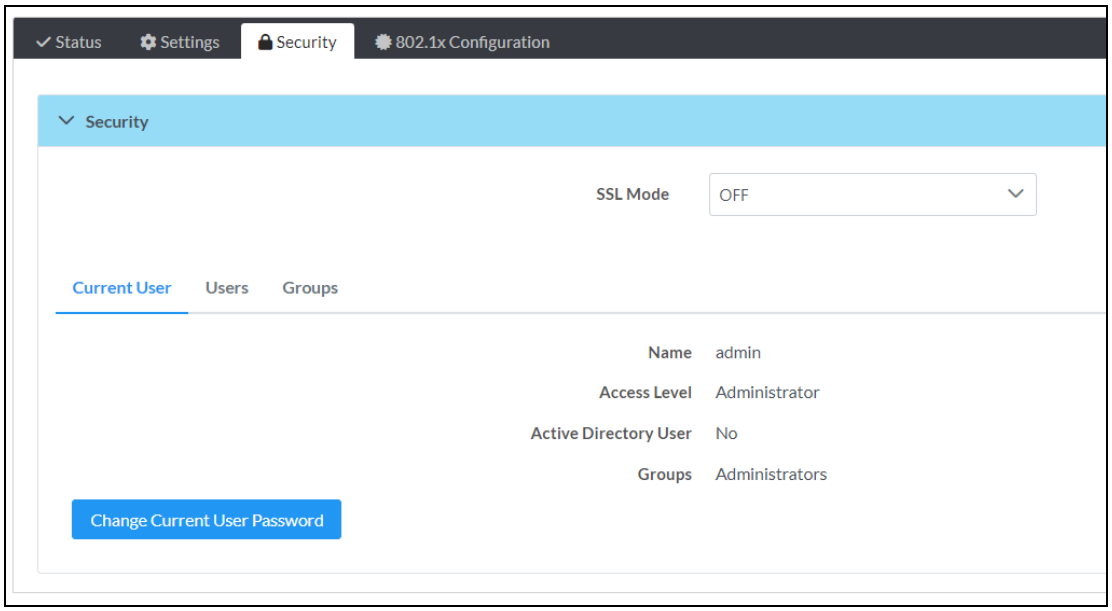
To delete an IR file, select **Delete IR File**.

Security

NOTE: This section applies to the following models:

- DM-NVX-D10
- DM-NVX-D20
- DM-NVX-D200
- DM-NVX-E10
- DM-NVX-E20
- DM-NVX-E20-2G-B-T
- DM-NVX-E20-2G-W-T

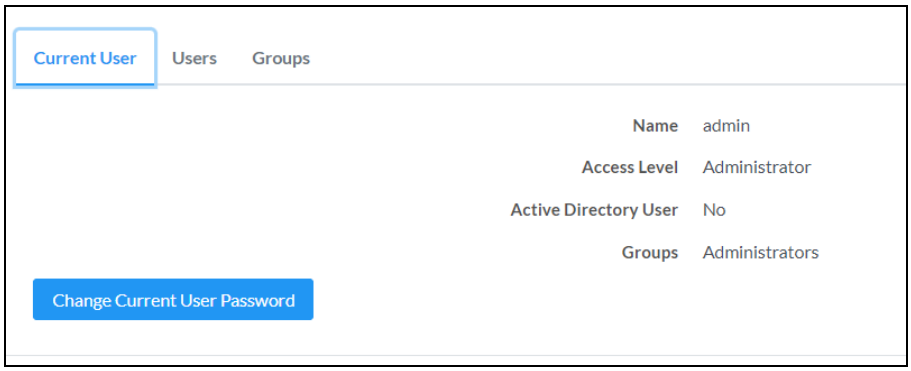
Select the **Security** tab to configure security for users and groups and to allow different levels of access to the DM NVX device functions. By default, security is disabled.



Select **Encrypt and Validate**, **Encrypt**, or **OFF** from the **SSL Mode** drop-down menu to specify whether to use encryption. By default, **SSL Mode** is set to **OFF**.

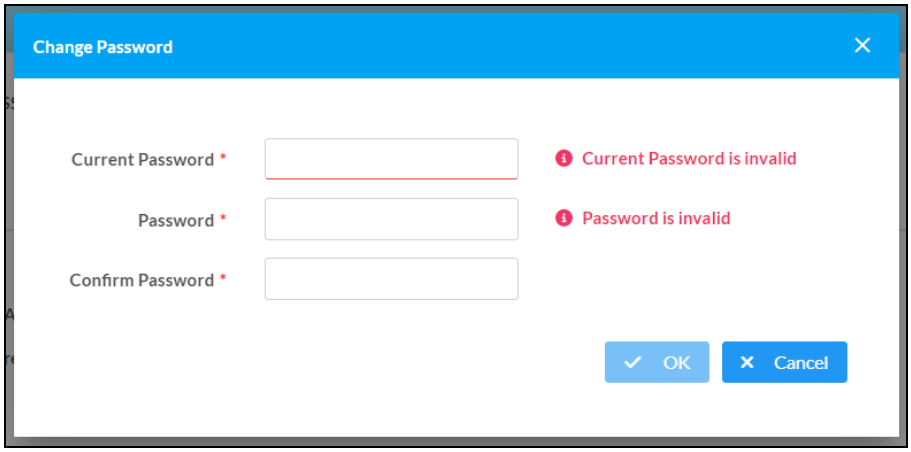
Current User

Select the **Current User** tab to view read-only information or to change the password for the current user.



To change the password for the current user account:

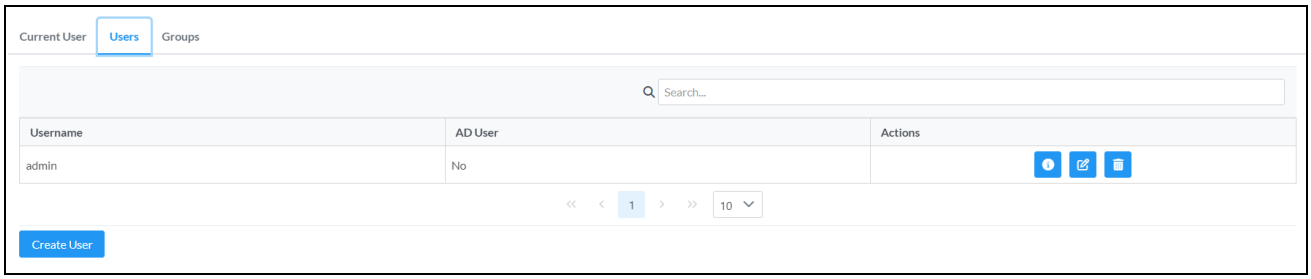
1. Select **Change Current User Password**.
2. In the **Change Password** dialog, enter the current password in the **Current Password** field, the new password in the **Password** field, and then re-enter the same new password in the **Confirm Password** field.



3. Select **OK** to save or select **Cancel** to cancel the changes.

Users

Select the **Users** tab to view and edit user settings. The **Users** tab can be used to add or remove local and Active Directory users and preview information about them.



Use the **Search Users** field to enter search term(s) and display users that match the search criteria.

If users listed in the **Users** table span across multiple pages, navigate through the list by selecting a page number or by using the left or right arrows at the bottom of the **Users** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 users by using the drop-down to the right of the navigation arrows.

Information about existing users is displayed in table format and the following details are provided for each user.

- **Username:** Displays the name of the user.
- **AD User:** Displays whether the user requires authentication using Active Directory.

Select the information icon in the **Actions** column to view detailed user information, or select the delete icon to delete a user.

To create a new user, select **Create User**.

Create a New Local User

To create a new local user:

1. Select **Create User** in the **Users** tab.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field. A valid user name can consist of alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
   c. Assign the access level by selecting one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the left (disabled).

3. Select **OK** to save or select **Cancel** to cancel the changes.

Grant Access to an Active Directory User

Users cannot be created or removed from the Active Directory server, but access can be granted to an existing user in the Active Directory server.

To grant access to an Active Directory user, you can either add the user to a local group on the DM NVX device, or add the Active Directory group(s) that they are a member of to the DM NVX device. Refer to Grant Access to an Active Directory Group on page 785 for steps on granting access to a group.

To grant access to an Active Directory user directly:

1. Select **Create User**.
2. In the **Create User** dialog, enter the following:
   a. Enter a user name in the **Name** field in the format "Domain\UserName", for example "crestronlabs.com\JohnSmith". Valid user names can contain alphanumeric characters (letters a-z, A-Z, numbers 0-9) and the underscore "_" character.
   b. Select one or more groups from the **Groups** drop-down list.

   > **NOTE:** Make sure that the **Active Directory User** toggle is set to the right (enabled).

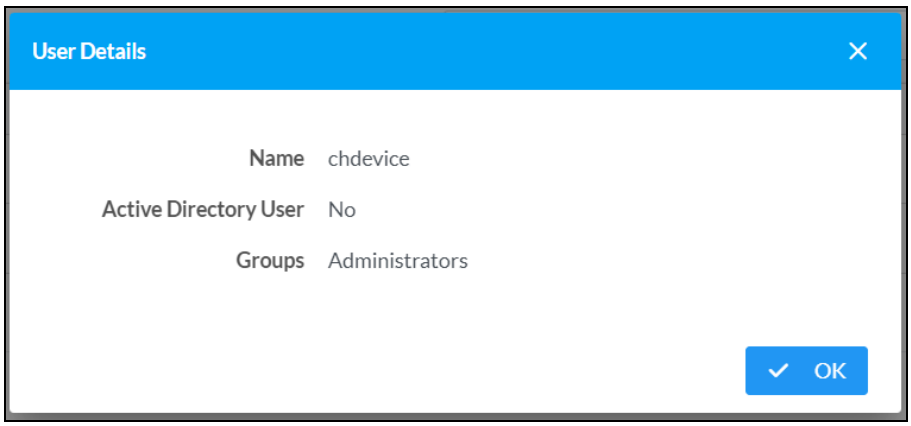
3. Select **OK** to save or select **Cancel** to cancel the changes.

Delete a User

To delete a user, select the trashcan icon in the **Actions** column. Select **Yes** when prompted to delete the user or **No** to cancel the deletion.

View User Details

Select the information icon in the **Actions** column to view information for the selected user. The **User Details** dialog displays the following information for the selected user.



The fields displayed in the **User Details** window are:

- **Name:** Displays the name of the selected user.
- **Active Directory User:** Displays whether the user is an Active Directory user.
- **Group:** Displays group(s) the selected user is part of.

Select **OK** to close the **User Details** window and return to the **Users** tab.

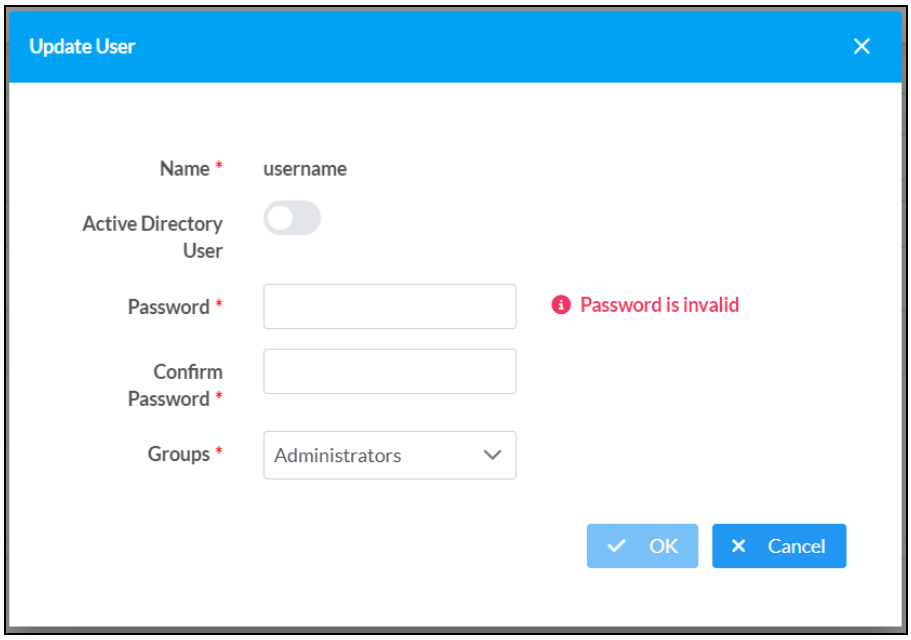
Update User Details

To update the details for an existing user:

1. Select the edit icon in the **Actions** column to update information for the selected user.
2. Set the **Active Directory User** toggle to the right if the user is an Active Directory user, or to the left if the user is not.
3. Enter a password in the **Password** field; re-enter the same password in the **Confirm Password** field.
4. Select one or more groups to assign the user to from the **Groups** drop-down list. Deselect any groups to remove the user from those groups.

   > **NOTE:** After a user is removed from a group, they lose any access rights associated with that group.

5. Select **OK** to save or select **Cancel** to cancel the changes.

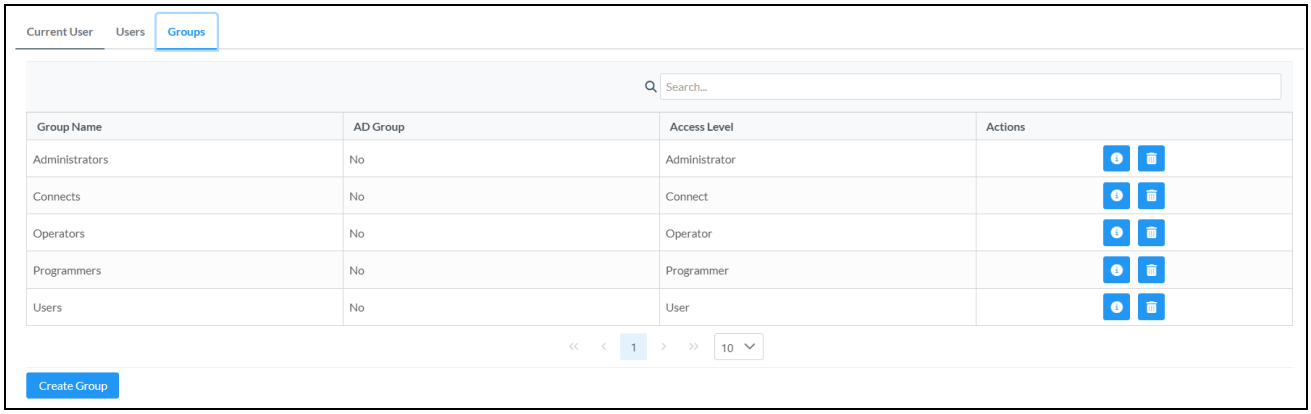


NOTE: The **Name** field is a read-only field that displays the username for the selected user. To change a username, the user must be deleted and a new user must be added.

Groups

Select the **Groups** tab to view and edit group settings. The **Groups** tab can be used to add local and Active Directory groups, remove local and Active Directory groups, and preview information about a group.

Use the **Search Groups** field to enter search term(s) and display groups that match the search criteria.



If groups listed in the **Groups** table span across multiple pages, navigate through the groups by selecting a page number or by using the left or right arrows at the bottom of the **Groups** pane to move forward or backward through the pages.

Each page can be set to display 5, 10, or 20 groups by using the drop-down to the right of the navigation arrows.

Existing groups are displayed in a table and the following information is provided for each group:

- **Group Name:** Displays the name of the group.
- **AD Group:** Displays whether the group requires authentication using Active Directory.
- **Access Level:** Displays the predefined access level assigned to the group (Administrator, Programmer, Operator, User, or Connect).

Select the information icon in the **Actions** column to view detailed group information, or select the delete icon to delete a group.

Select **Create Group** in the **Groups** tab to create new group.

Create a Local Group

To create a local group:

1. Select **Create Group**.
2. In the **Create Group** dialog, enter the following:
   a. Enter the group name in the **Name** field.
   b. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the left (disabled).
3. Select **OK** to save. Select **Cancel** to cancel the changes.

Grant Access to an Active Directory Group

A group cannot be created or removed from the Active Directory server, but access can be granted to an existing Active Directory group.

Once the group is added, all members of that group will have access to the DM NVX device.

To grant access to an Active Directory group:

1. Select **Create Group**.
2. In the **Create Group** dialog enter the following:
   a. Enter the group name in the **Name** field (for example, "Engineering Group").

   > **NOTE:** Group names are case sensitive, and a space is a valid character that can be used in group names.
3. Assign the group access level by selecting a predefined access level (Administrator, Connect, Operator, Programmer, User) from the **Access Level** drop-down.

   > **NOTE:** Make sure that the Active Directory Group toggle is set to the right (enabled).
4. Select **OK** to save. Select **Cancel** to cancel the changes.

Delete a Group

Select the trashcan icon in the **Actions** column to delete a group. Select **Yes** when prompted to delete the group or **No** to cancel the deletion.

When a group is deleted, users in the group are not removed from the device or Active Directory server. However, because a user's access level is inherited from a group(s), users within the deleted group will lose access rights associated with the group.

View Group Details

Select the information icon in the **Actions** column to view information for the selected group. The **Group Details** dialog lists the following information for the selected group:

- **Name:** Displays the name of the group.
- **Access Level:** Displays the access level of the group and its users.
- **Active Directory Group:** Displays whether the group is an Active Directory group.

Select **OK** to close the **Group Details** dialog and return to the **Groups** tab.

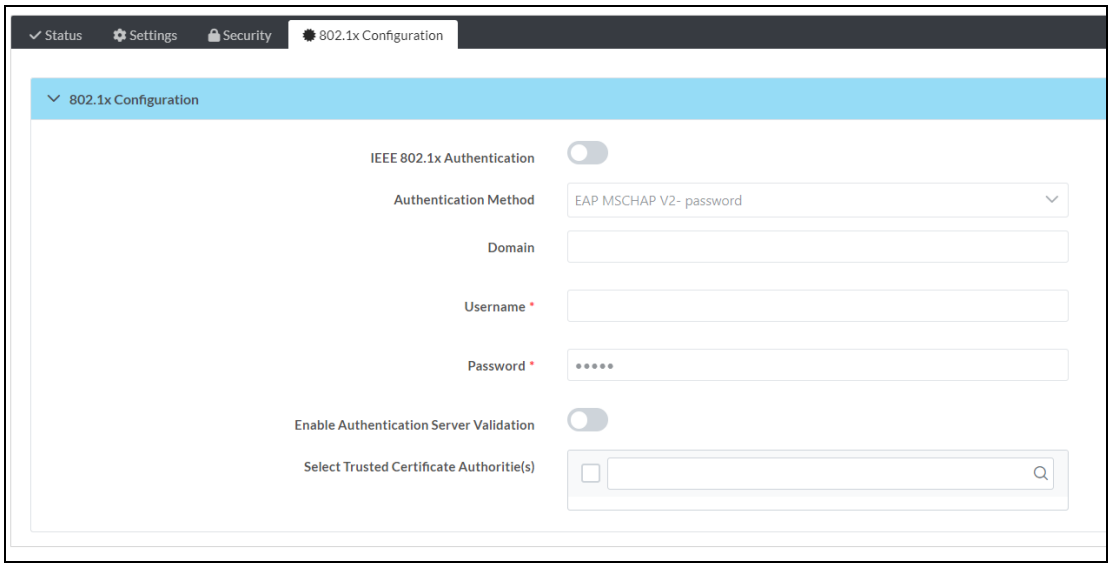
802.1X Configuration

NOTE: This section applies to the following models:

- DM-NVX-D10
- DM-NVX-D20
- DM-NVX-D200
- DM-NVX-E10
- DM-NVX-E20
- DM-NVX-E20-2G-B-T
- DM-NVX-E20-2G-W-T

DM NVX devices have built-in support for the 802.1X standard (an IEEE network standard designed to enhance the security of wireless and Ethernet LANs, relying on the exchange of messages between the device and the network's host, or authentication server), allowing communication with the authentication server and access to protected corporate networks.

The **802.1X Configuration** page can be accessed at any time by selecting the **802.1X Configuration** tab of the interface.



Configure the Device for 802.1X Authentication

To configure the DM NVX device for 802.1X Authentication:

1. Set the **IEEE 802.1X Authentication** toggle to the right. This will enable all options on the 802.1X dialog.
2. Select an **Authentication Method**: Choose between **EAP-TLS Certificate** or **EAP-MSCHAP V2 Password** according to the network administrator's requirement.

3. Do one of the following:
    a. If **EAP-TLS Certificate** was selected: Select **Action/Manage Certificates** to upload the required machine certificate. The machine certificate is an encrypted file that will be supplied by the network administrator, along with the certificate password.
    b. If EAP-MSCHAP V2 Password was selected: Enter the username and password supplied by the network administrator into the **Username** and **Password** fields, respectively. This method does not require the use of a machine certificate, only the user name and password credentials.
4. If you enabled the **Enable Authentication Server Validation** option, this will enable the **Select Trusted Certificate Authoritie(s)** list box which contains signed Trusted Certificate Authorities (CAs) preloaded onto the DM NVX device.

    Select the check box next to each CA whose certificate can be used for server validation, as specified by the network administrator.

    If the network does not use any of the listed certificates, the network administrator must provide a certificate, which must be uploaded manually via the **Manage Certificates** function in the **Action** menu. Refer to Action on page 737 for more information on the **Manage Certificates** function.
5. If required, type the domain name of the network in the **Domain** field.
6. When the 802.1X settings are configured as desired, select **Save Changes** to save the changes to the device and reboot it. Select **Revert** to cancel any changes.

Configuration (DM NVX Director Switching Appliances)

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

Web Interface Configuration

DM NVX Director switching appliances include an integrated web server that provides a web interface for viewing device status and managing DM NVX encoders/decoders in an AV network.

Access the Web Interface

To access the web interface, refer to either of the following:

- Access the Web Interface with a Web Browser on page 790
- Access the Web Interface with the Crestron Toolbox™ Application on page 792

The web interface runs in a web browser. The following web browser versions are supported:

Operating System and Supported Web Browsers

OPERATING SYSTEM	SUPPORTED WEB BROWSERS
Windows® operating system	Chrome™ web browser, version 114.0.5735.199 or later
	Firefox® web browser, version 115.0.2 or later
	Microsoft Edge® web browser, version 114.0.1823.82 or later
macOS® operating system	Safari® web browser, version 16.6 or later

Access the Web Interface with a Web Browser

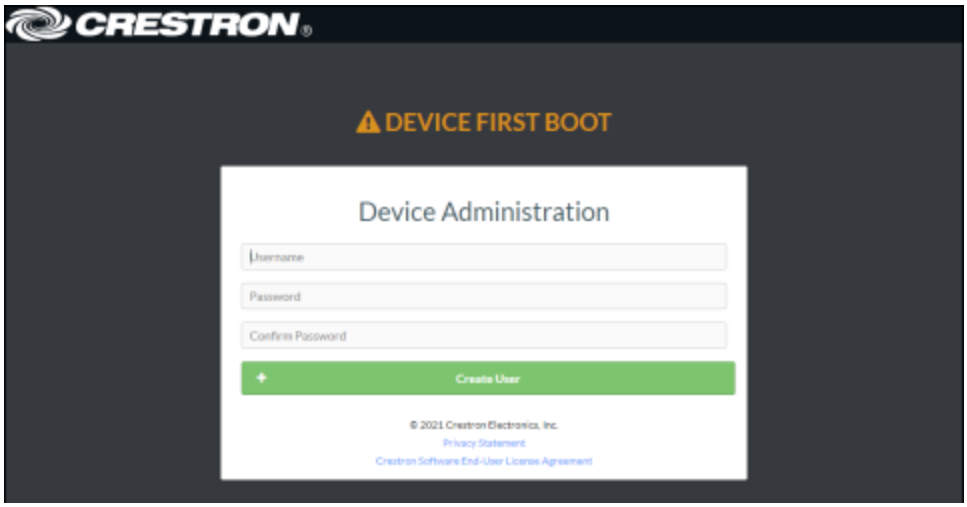
To access the web interface:

1. Enter the IP address of any of the switching appliance's Ethernet ports into a web browser.

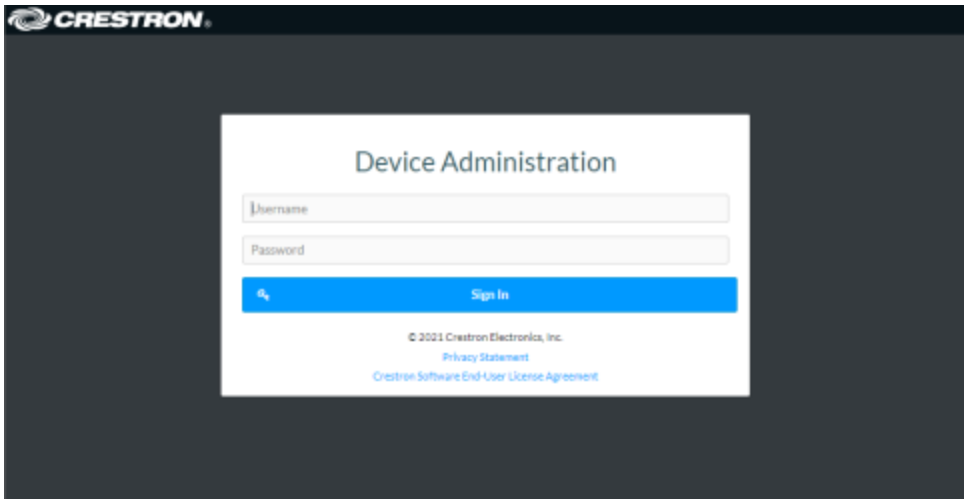
   NOTES:

   - To obtain the IP address, use the Device Discovery Tool utility in Crestron Toolbox™ software or an IP scanner application.
   - By default, DHCP is enabled on ports 1-3 of the DM-NVX-DIR-80 and DM-NVX-DIR-160, and on all ports except port 6 of the DM-NVX-DIR-ENT. Port 4 of the DM-NVX-DIR-80 and DM-NVX-DIR-160, and port 6 of the DM-NVX-DIR-ENT will default to a link-local address in the 169.254.*xxx.xxx* range.

2. If accessing the device for the first time, a prompt to create an administrator account will be displayed along with a **DEVICE FIRST BOOT** message. To create the first admin account:
    a. Enter a username in the **Username** field.
    b. Enter a password in the **Password** field.
    c. Re-enter the same password in the **Confirm Password** field.



    d. Select **Create User**. A new **Device Administration** page appears with an option to **Sign In** instead of **Create User**.



3. Enter the username in the **Username** field.
4. Enter the password in the **Password** field.
5. Select **Sign In**.

Access the Web Interface with the Crestron Toolbox™ Application

To access the web interface by opening a web browser from the Crestron Toolbox™ application:

1. Open the Crestron Toolbox application.
2. Select **Device Discovery Tool** from the **Tools** menu or select the Device Discovery Tool icon in the toolbar. Once the utility loads, the DM NVX device will be discovered on the network and listed in the device list on the left side of the screen. The device's host name, IP address, and firmware version are displayed.

   > **NOTE:** If there is security software running on the computer, a security alert might be displayed when the Crestron Toolbox application attempts to connect to the network. Make sure to allow the connection, so that the Device Discovery Tool can be used.

3. Select the device from the discovered devices list.
4. Enter the device credentials in the **Authentication Required** dialog that opens, then select **Log In**.
5. Select **Web Configuration**.

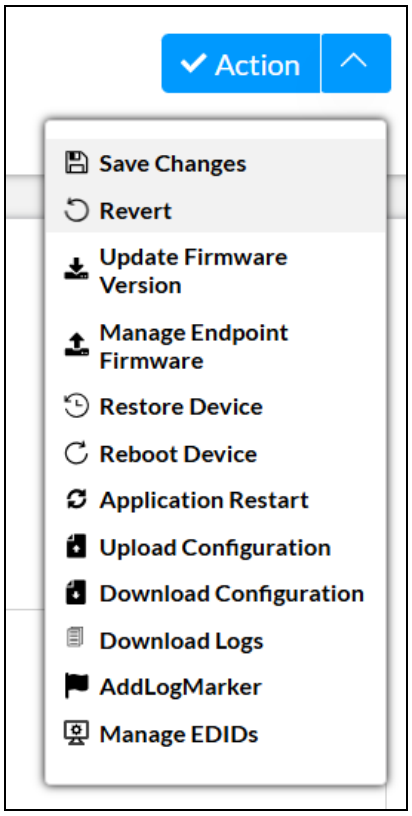
Action

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

The **Action** drop-down menu is displayed at the top right side of the web interface and provides quick access to these common device functions:

- Save Changes on page 794
- Revert on page 794
- Update Firmware Version on page 794
- Manage Endpoint Firmware on page 795
- Restore Device on page 796
- Reboot Device on page 796
- Application Restart on page 797
- Upload Configuration on page 797
- Download Configuration on page 798
- Download Logs on page 798
- Add Log Marker on page 798
- Manage EDIDs on page 800



Save Changes

Select **Save Changes** to save any changes made to the configuration settings.

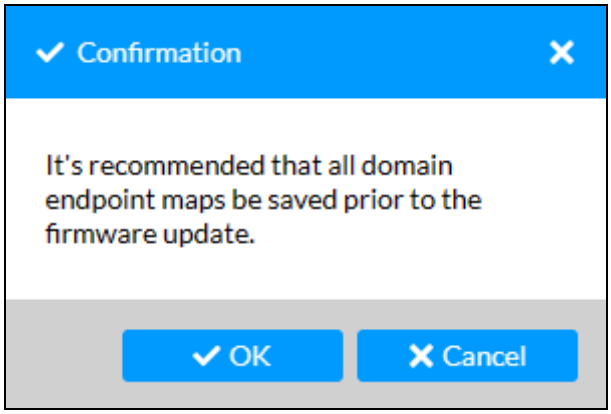
Revert

Select **Revert** to revert the device back to the last saved configuration.

Update Firmware Version

To update the firmware of the DM NVX Director switching appliance:

1. Select **Update Firmware Version** in the **Action** menu. A **Confirmation** message box appears.



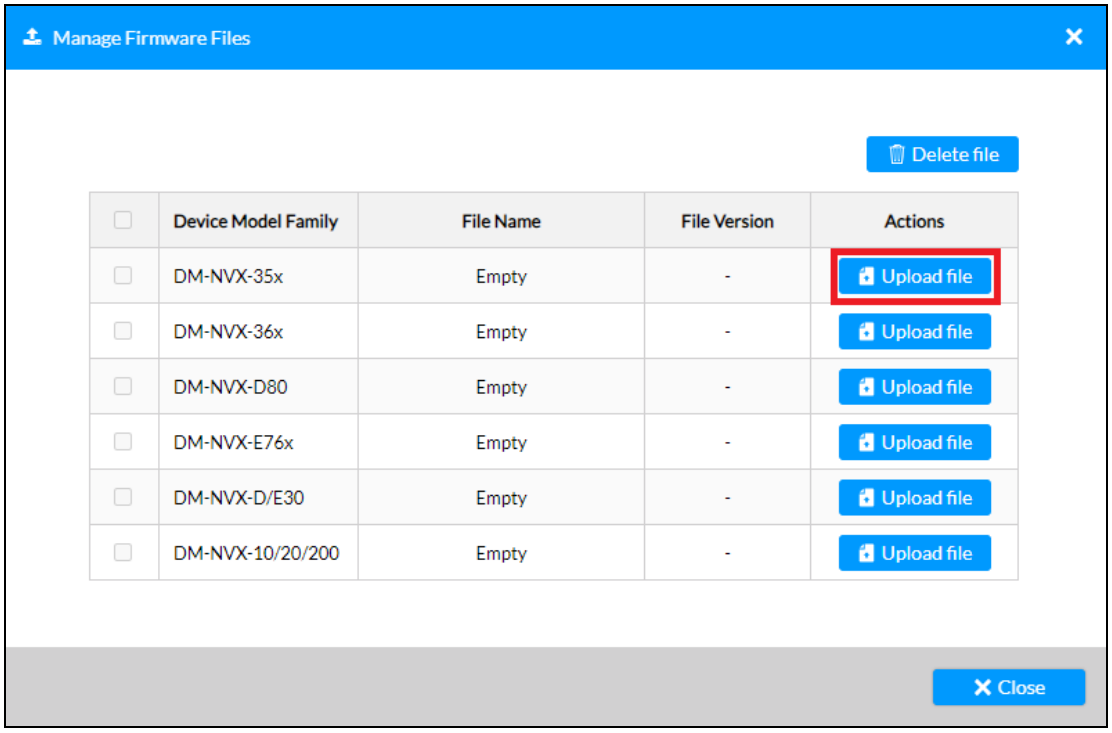
2. Do one of the following:
    - If the endpoint maps are already saved, select **✓ OK**. A file browser window opens.
    - If the endpoint maps need to be saved, select **X Cancel**. Save the endpoint maps, then return to step 1.
3. Select the firmware file in the file browser window, then select **Open**. A **Firmware Upgrade** message box appears, indicating the progress of the file upload and upgrade process. The message box will indicate when the upgrade is complete and the interface can once again be accessed.

Manage Endpoint Firmware

Firmware files for all supported DM NVX device model families can be loaded directly to the DM NVX Director appliance. Uploaded firmware can be pushed to endpoints of that device model family from the **Dashboard** page, under the **Firmware** column of the table.

To upload a firmware file:

1. Select **Manage Endpoint Firmware** in the **Action** menu. The **Manage Firmware Files** window appears.
2. Select **Upload File** for a given DM NVX **Device Model Family**, then upload a compatible firmware file. If the file does not match the selected model family, it will be rejected. The **File Name** and **File Version** columns will populate once a firmware file has been uploaded for a given model family.



To delete firmware files from the appliance, select the checkboxes to the left of the table for each **Device Model Family** firmware file to be deleted, then select **Delete**.

Select **Close** to close the **Manage Firmware Files** window.

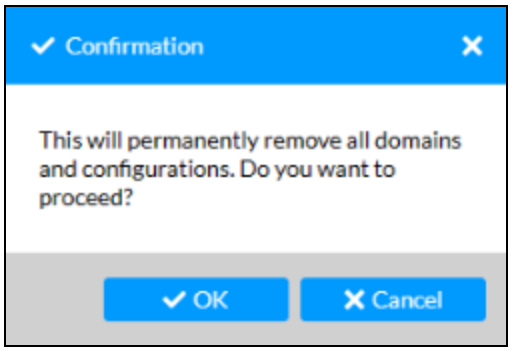
Restore Device

The DM NVX Director appliance can be restored to factory default settings from the **Action** menu. This will clear all custom configuration to prepare the appliance for a new installation or as a troubleshooting step to correct configuration errors.

CAUTION: The **Restore** procedure will wipe all settings from the device, including network settings. If a static IP address is set, restoring the device to factory default settings will clear this address and DHCP will be enabled instead. All domains and device configurations will be lost.

To restore the device to factory defaults:

1. Select **Restore** in the **Action** menu. The **Confirmation** message box appears.



2. Select **OK** to restore the device to factory default settings. Select **Cancel** to cancel the restore operation. When **OK** is selected, the **Restore** status message box appears. Wait for the device restore to complete before attempting to reconnect to the web interface.

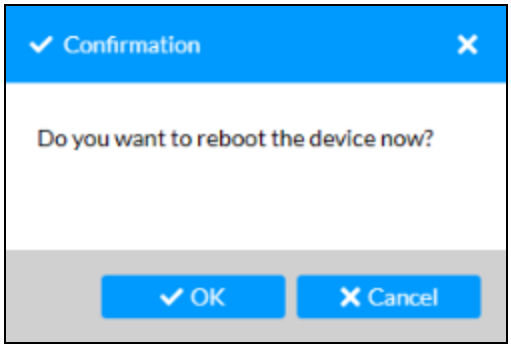
   NOTE: Once the device is restored, it may have a new IP address. If reconnecting to the original address does not work, use the Device Discovery Tool in Crestron Toolbox software or an IP scanner application to find the device's new IP address.

Reboot Device

The DM NVX Director appliance can be rebooted from the **Action** menu.

To reboot the device:

1. Select **Reboot Device** in the **Action** menu. The **Confirmation** message box appears.



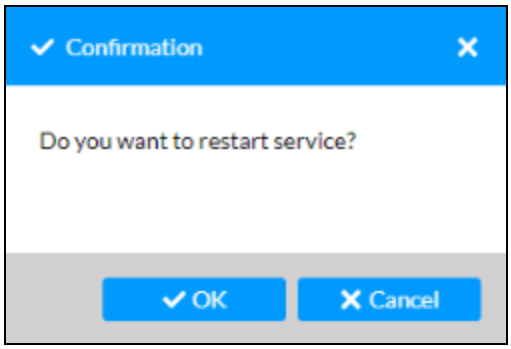
2. Select **OK** to reboot the device or **Cancel** to cancel the reboot operation. When **OK** is selected, the **Reboot** status message box appears. Wait for the device to reboot before attempting to reconnect to the web interface.

Application Restart

The DM NVX Director application running on the network appliance can be restarted from the **Action** menu.

To restart the application:

1. Select **Application Restart** in the **Action** menu. The **Confirmation** message box appears.



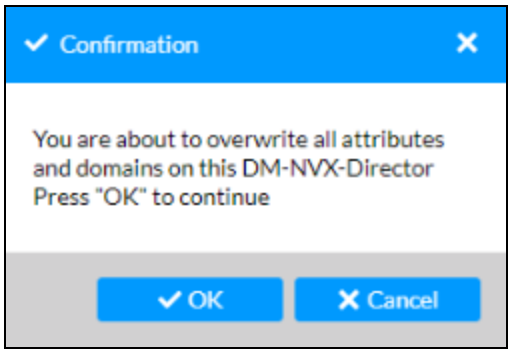
2. Select **OK** to restart the application or **Cancel** to cancel the operation. When **OK** is selected, the **Application Restart** status message box appears. Wait for the application restart to fully complete before attempting to reconnect to the web interface.

Upload Configuration

A configuration file (in a *.tgz format) consisting of device and domain configurations can be uploaded to the DM NVX Director appliance from the Action menu.

To upload a configuration file to a DM NVX Director appliance:

1. Select **Upload Configuration** from the **Action** menu. The connected computer's file browser opens.
2. Navigate to the desired .tgz file and select **Open**. The **Confirmation** message box appears.

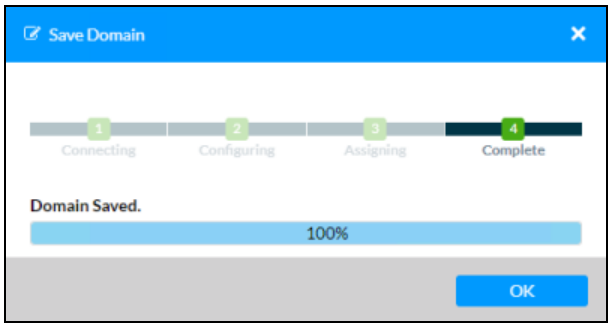


> **NOTE:** The configuration file can only be uploaded to the same model device from which it was originally downloaded.

3. Select **OK** to confirm that the configuration of the device can be overwritten by the uploaded file. Select **Cancel** to cancel the operation. When **OK** is selected, the **Uploading File** status box appears.



4. When the upload is complete, select **OK**. The **Save Domain** status box appears. When the domain saving process reaches 100%, select **OK** again to complete the process.



Download Configuration

A configuration file (in a *.tgz format) can be downloaded to a computer for use as a backup configuration file or for uploading to a replacement DM NVX Director network appliance.

Select **Download Configuration** in the **Action** menu to download the configuration file to the connected PC. The file is downloaded to the Downloads folder of the PC using the following naming convention:

[model]_config_**[yyyy-mm-dd]**_**[hh-mm-ss]**.tgz

- **[model]** is the model name of the DM NVX Director network appliance.
- **[yyyy-mm-dd]** is the 4-digit year, 2-digit month, and 2-digit day separated by hyphens.
- **[hh-mm-ss]** is the 2-digit hour, 2-digit minutes, and 2-digit seconds separated by hyphens in a 24-hour format.

For example, DM-NVX-DIR2_config_2025-05-12_14-53-49.tgz

To upload the configuration file to another DM NVX Director appliance, refer to Upload Configuration on page 797.

Download Logs

Select **Download Logs** in the **Action** menu to download the device message logs for diagnostic purposes.

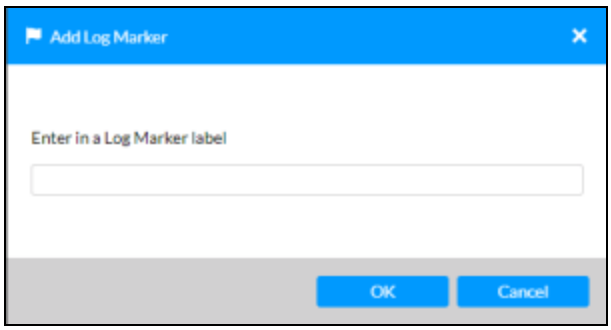
The log file is downloaded to the Downloads folder of the PC.

Add Log Marker

A note can be added to the message log from the **Action** menu.

To add a note to the log:

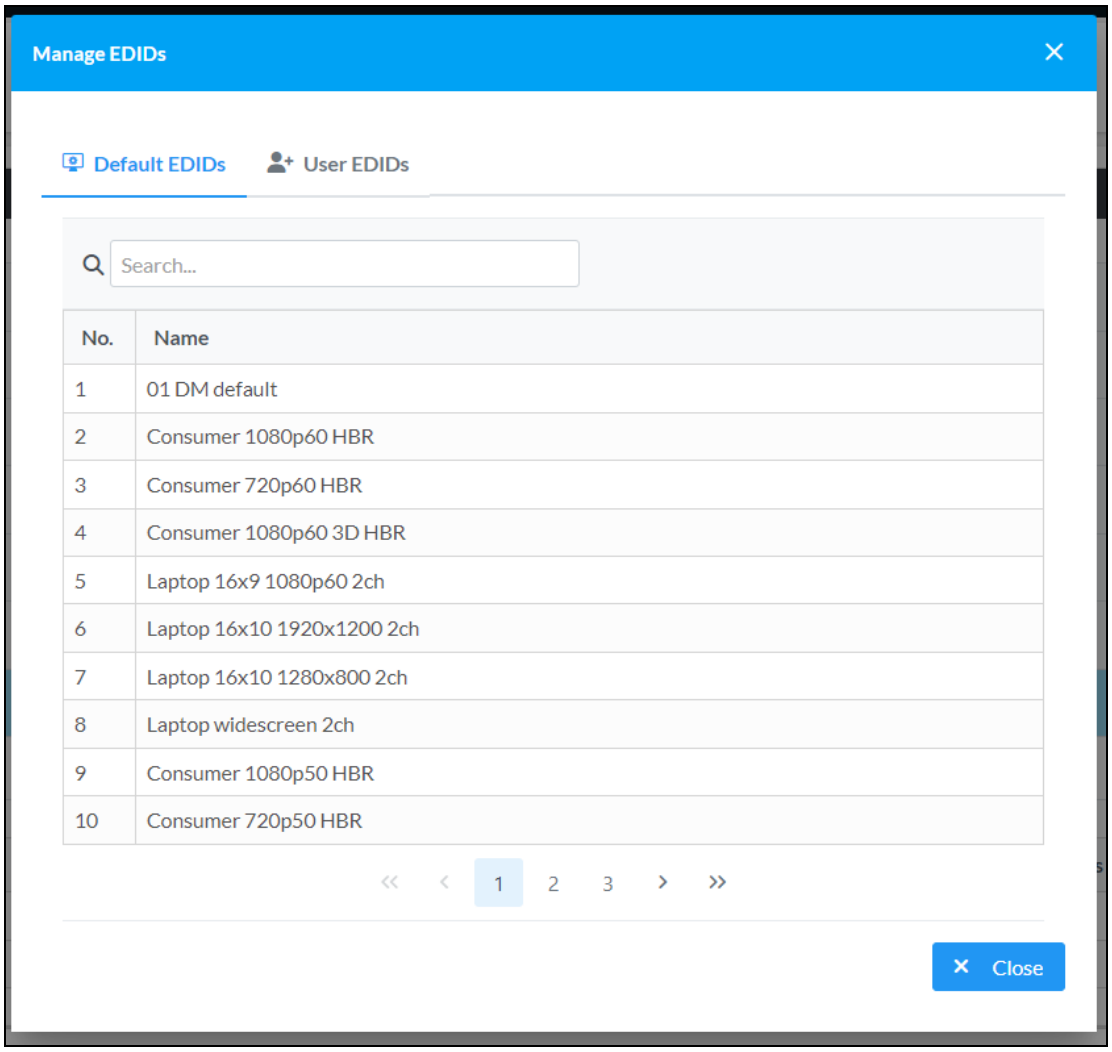
1. Select **Add Log Marker** from the **Action** menu. The **Add Log Marker** window appears.



2. Enter a note in the **Enter in a Log Marker label** field.
3. Select **OK** to add the note to the log or select **Cancel** to cancel the operation. When **OK** is selected, the entered note is added to the log.

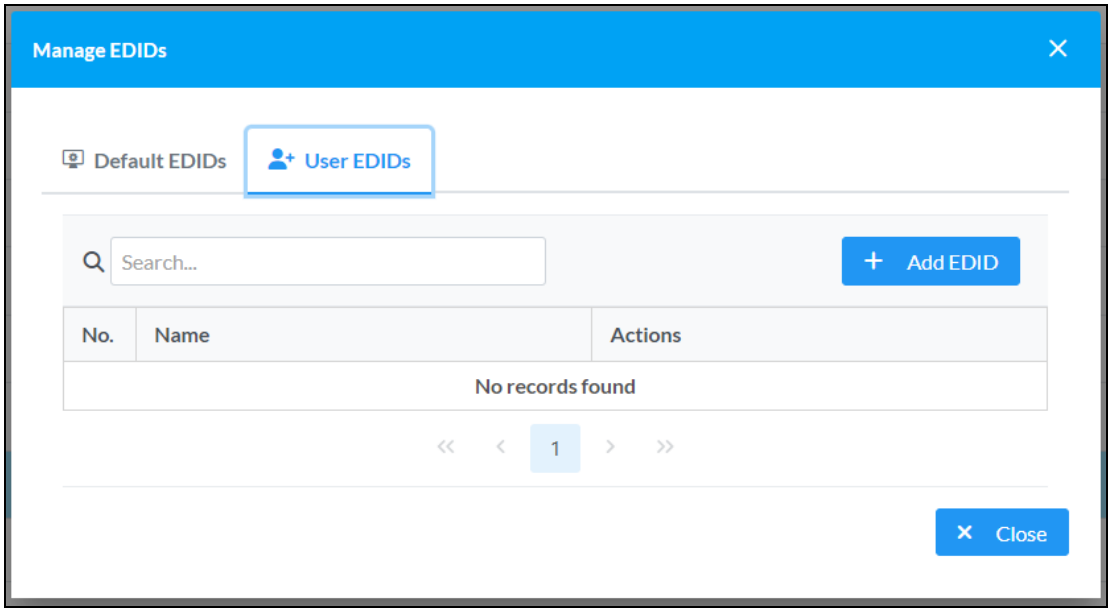
Manage EDIDs

Select **Manage EDIDs** in the **Action** menu to open the **Manage EDIDs** window. Use this window to add, remove, or browse which EDIDs are available for the DM NVX devices managed by the DM NVX Director appliance.



The default tab that will open in this window is the **Default EDIDs** tab. This tab is read only, and provides a list of all default EDIDs available on DM NVX devices via firmware. Use the **Search...** text entry field to filter the list of EDIDs by name. Default EDIDs cannot be removed from the device.

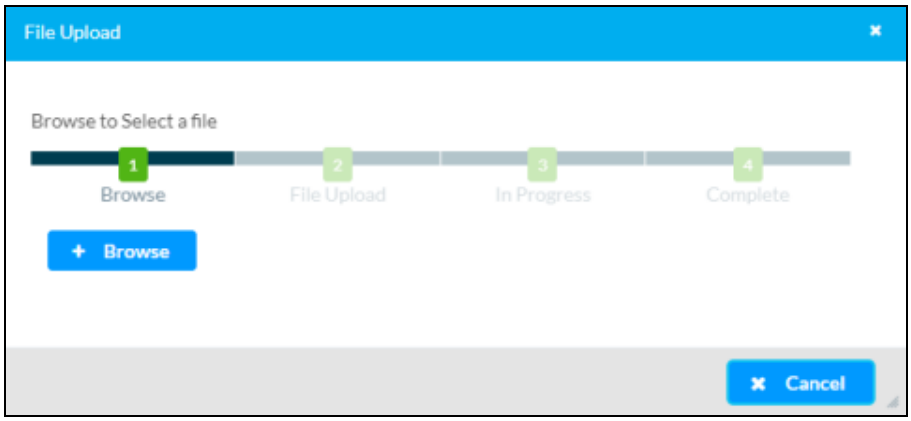
The second tab available in this window is the **User EDIDs** tab. By default, the table will populate with **No records found**.



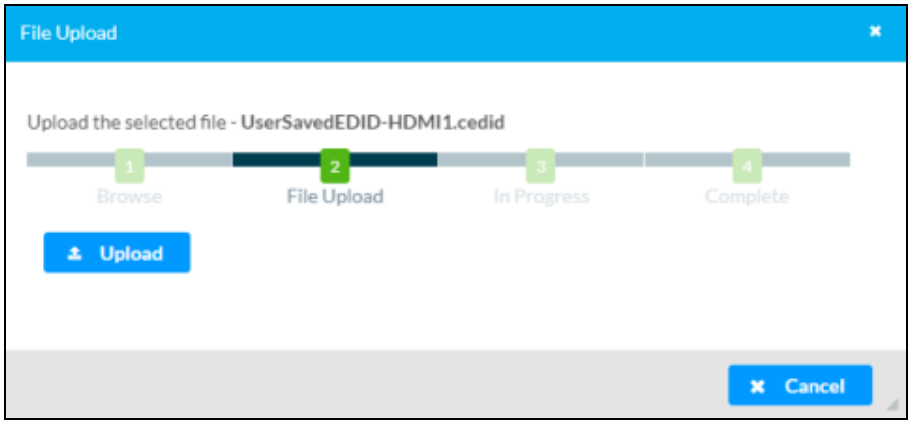
To add a **User EDID** file:

1. Select **+ Add EDID** at the top right of the table. The **File Upload** screen will appear.
2. Select **+ Browse**. Locate the desired .cedid file, then select **Upload** to upload it to the DM NVX Director appliance.

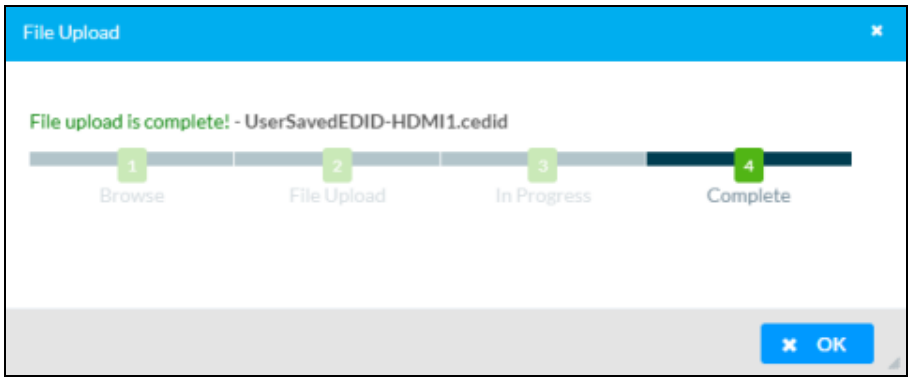
   Browse for and select a .cedid file

   Upload the selected file

   Wait for the upload to complete, then select OK

3. Select **OK** to return to the **Manage EDIDs** window. The uploaded User EDID is now displayed in the table.

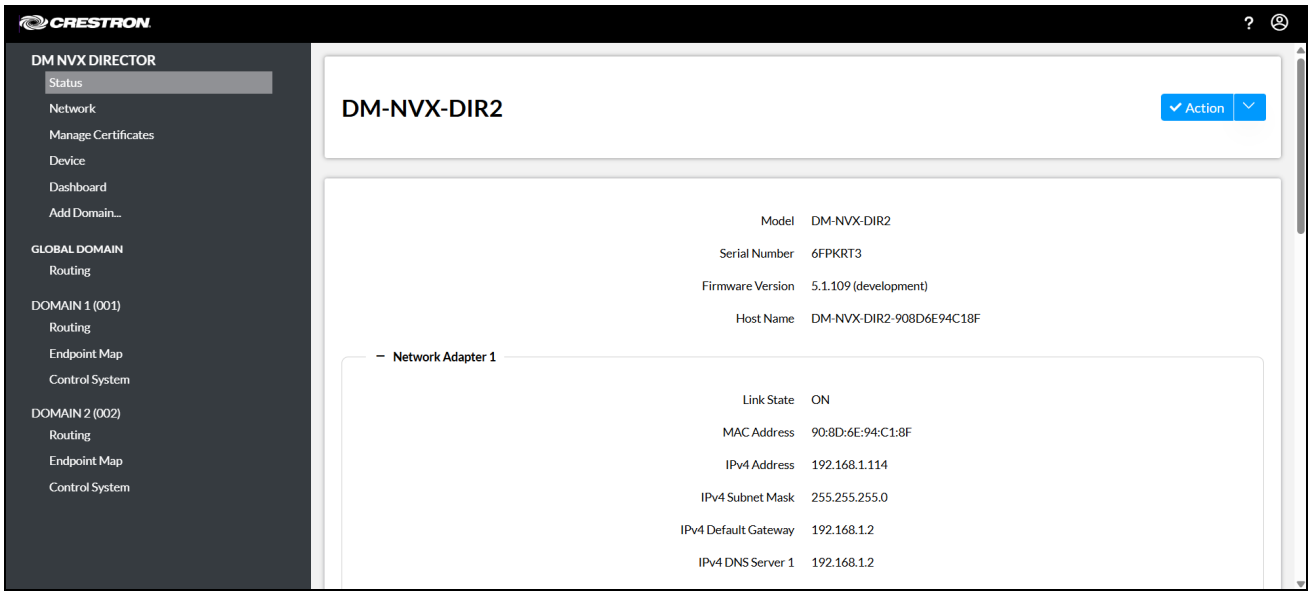
To remove a **User EDID** file, select **Delete** in its table row.

Status

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

The **Status** page is the first page displayed when opening the interface of the DM NVX Director switching appliance. To access the **Status** page from other pages of the interface, select **Status** in the navigation bar.



The **Status** page displays the **Model**, **Serial Number**, **Firmware Version**, and **Host Name** of the DM NVX Director switching appliance.

Information about each of the Ethernet ports on the device is also displayed:

- For the DM-NVX-DIR-80, DM-NVX-DIR-160, and DM-NVX-DIR2, the **Status** page displays information about Ethernet ports 1-4 in the **Network Adapter 1-4** sections.

  NOTE: The DM-NVX-DIR2 only supports additional Ethernet ports via USB to Ethernet adapters (not included). Up to three additional Ethernet ports can be connected. Connected adapters must support at least a 1 Gbps uplink. The ADPT-USB3.0-GBENET (sold separately) is compatible with the USB ports on the rear of the DM-NVX-DIR2.

- For the DM-NVX-DIR-ENT, the **Status** page displays information about Ethernet ports 1-12 in the **Network Adapter 1-12** sections.

The **Status** page also displays information about the control system connection(s) to the DM NVX Director switching appliance. The control system's **IP Address/Hostname**, **Room ID**, **IP ID**, **Port**, and **Status** are all available under the **Control System Connection** heading.

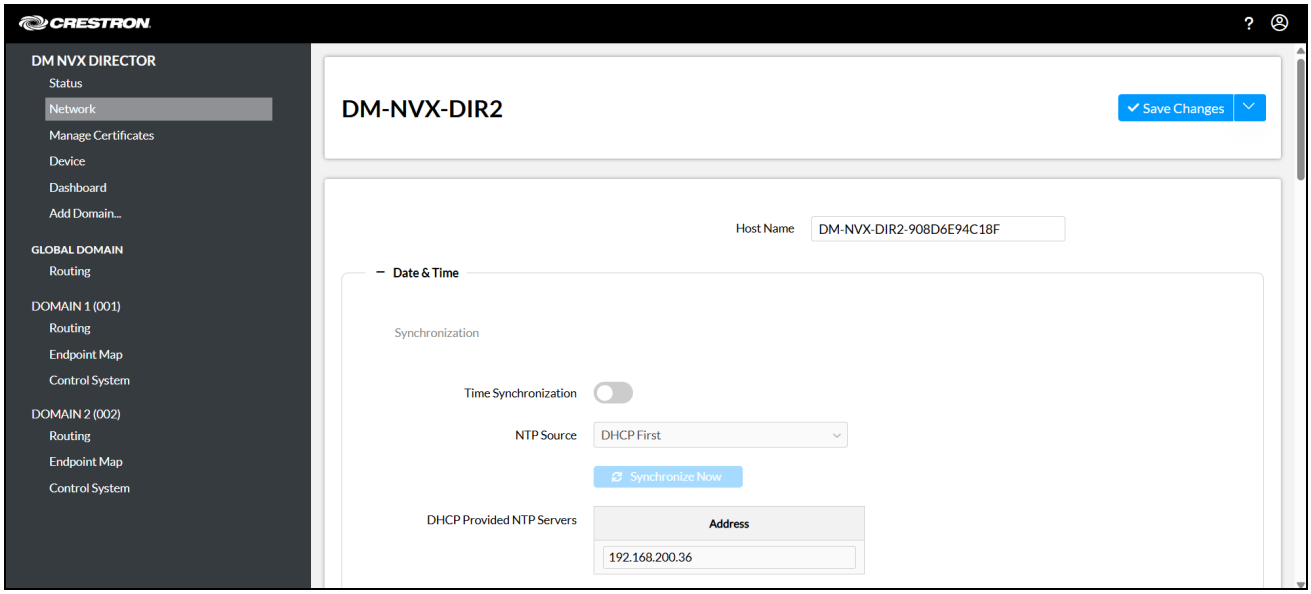
Network

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

The **Network** page enables configuration of the DM NVX Director appliance's network settings. The **Network** page can be accessed at any time by selecting the **Network** tab of the interface.

Network Page



Configure the available network settings as needed:

- **Host Name:** In the text box, enter the desired host name to identify the device on the network. Host name characters are restricted to letters a to z (not case sensitive), digits 0 to 9, and hyphens.

  The default host name consists of the device model name followed by a hyphen and the MAC address of the device. For example, a DM-NVX-DIR2 with a MAC address of 90:8D:6E:94:C1:8F, the default host name is DM-NVX-DIR2-908D6E94C18F.

- **Date & Time:** The following settings are available:
  - **Time Synchronization:** Set the toggle to the right to enable or to the left to disable time synchronization via Network Time Protocol (NTP).
  - **NTP Source:** Select an NTP synchronization source type from among **Static Only**, **DHCP Only**, **Static First**, **DHCP First**, or **None**.
  - **Synchronize Now:** With **Time Synchronization** enabled, select **Synchronize Now** to synchronize the device with the DHCP time server or the primary NTP server entered in the **NTP Time Servers** table.
  - **DHCP Provided NTP Servers:** Populates with NTP servers discovered by the device from the network DHCP server. This field is read-only. Copy the server address and paste it as an entry in the **NTP Time Servers** table below if desired.
  - **NTP Time Servers:** Use this table to enter information regarding the NTP server(s) used for time synchronization:
    - Select **+Add** to add a new NTP server row to the table.
    - Enter the following information for each row:
      - Enter the NTP server address into the **Address** text field.
      - Enter the NTP server port into the **Port** text field.
      - Use the **Authentication Method** drop-down to select the authentication method used to access the NTP server (if one exists).
      - If an authentication method is selected, enter the key used to authenticate against the NTP server into the **Authentication Key** text field.
      - If an authentication method is selected, enter the ID for the key used to authenticate against the NTP server into the **Key ID** text field.
    - To remove an entry, select the checkbox to the left of the table entry, then select **-Remove**.

    > **NOTE:** NTP servers are configured in discrete rows of the table. The server configured in the top table row will be the primary server used for time synchronization. The servers configured in the lower rows will be used as secondary servers.

  - **Time Zone:** Select a time zone from the drop-down.
  - **Date Format:** Select a date format from the drop-down.
  - **Time Format:** Select whether the time is displayed in a 12-hour or 24-hour format.
  - **Date:** Select the date for the device using the pop-up calendar that is displayed.
  - **Time:** Select the time for the device using the pop-up menu that is displayed.

- **Network Adapters:** Configure network settings for Ethernet ports:
    - For the DM-NVX-DIR-80, DM-NVX-DIR-160, and DM-NVX-DIR2, configure network settings for Ethernet ports 1-4 in the **Network Adapter 1-4** sections.

      > **NOTE:** Adapters 2-4 for the DM-NVX-DIR2 can only be configured if additional USB-to-Ethernet adapters (not included) are connected to the device's rear panel USB ports. Connected adapters must support at least a 1 Gbps uplink. The ADPT-USB3.0-GBENET (sold separately) is compatible with the USB ports on the rear of the DM-NVX-DIR2.

    - For the DM-NVX-DIR-ENT, configure network settings for Ethernet ports 1-12 in the **Network Adapter 1-12** sections.

  In each **Network Adapter** section, configure the following as required for each Ethernet port:

- **Domain Name Suffix:** In the text box, enter the appropriate domain name suffix.
- **Arrangement:** Select the appropriate radio button to specify how the device's IP address should be assigned:
  - **Obtain an IP address automatically:** An IP address is assigned by a DHCP server on the network for a predetermined period of time.

    NOTES:
    - For the DM-NVX-DIR-ENT, DHCP is enabled by default for Ethernet ports 1-5 and 7-12, enabling each of the ports to be automatically assigned a different IP address.
    - For the DM-NVX-DIR-80, DM-NVX-DIR-160, and DM-NVX-DIR2, DHCP is enabled by default for Ethernet ports 1-3, enabling each of the ports to be automatically assigned a different IP address.
  - **Obtain a Link-Local IP address automatically:** The IPv4 address uses a link-local address in the 169.254.xxx.xxx range (refer to RFC 3927 for detailed information about link-local addressing).

    NOTES:
    - For the DM-NVX-DIR-ENT, the IP address of Ethernet port 6 defaults to a link-local address in the 169.254.xxx.xxx range.
    - For the DM-NVX-DIR-80, DM-NVX-DIR-160, and DM-NVX-DIR2, the IP address of Ethernet port 4 defaults to a link-local address in the 169.254.xxx.xxx range.
  - **Use the following IP address:** If a static IP address is desired, enter the IP address and related network information in the corresponding text boxes:
    - **IPv4 Address:** Enter a unique static IPv4 address for the DM NVX Director network appliance.
    - **IPv4 Subnet Mask:** Enter the IPv4 subnet mask that is set on the network.
    - **IPv4 Default Gateway:** Enter the IPv4 IP address that is to be used as the default gateway.
    - **IPv4 DNS Server 1:** Enter an IPv4 IP address for the primary static DNS server.
    - **IPv4 DNS Server 2:** Enter an IPv4 IP address for the secondary static DNS server.

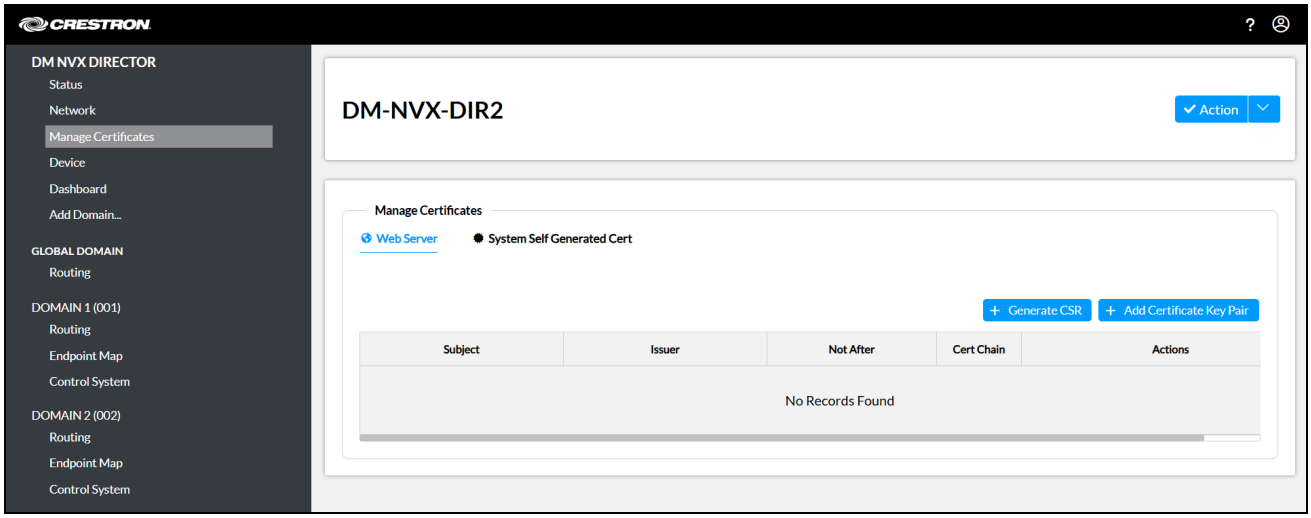
Manage Certificates

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

The **Manage Certificates** page enables management of device certificates loaded to the DM NVX Director appliance.

Manage Certificates Page



NOTE: The **Manage Certificates** page only applies to certificates loaded on the DM NVX Director appliance itself. The certificates for other DM NVX endpoints on the network are not managed on this page.

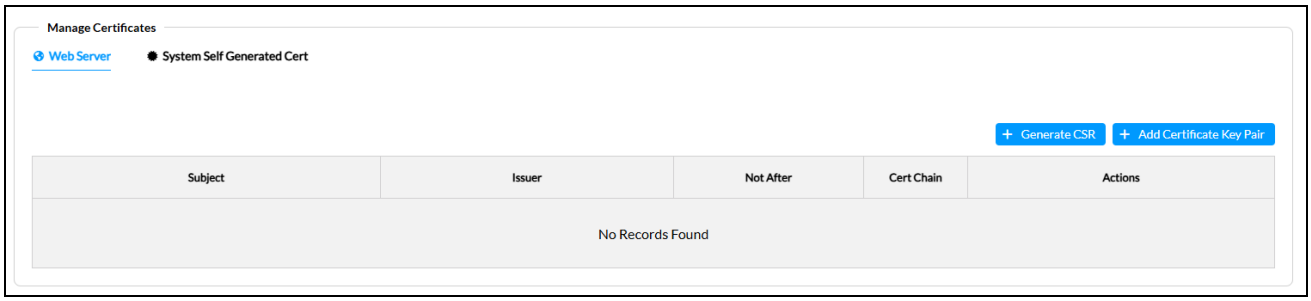
The **Manage Certificates** table displays all currently-loaded certificates present on the DM NVX Director appliance. The table includes two tabs:

- Web Server on page 809
- System Self-Generated Cert on page 812

Web Server

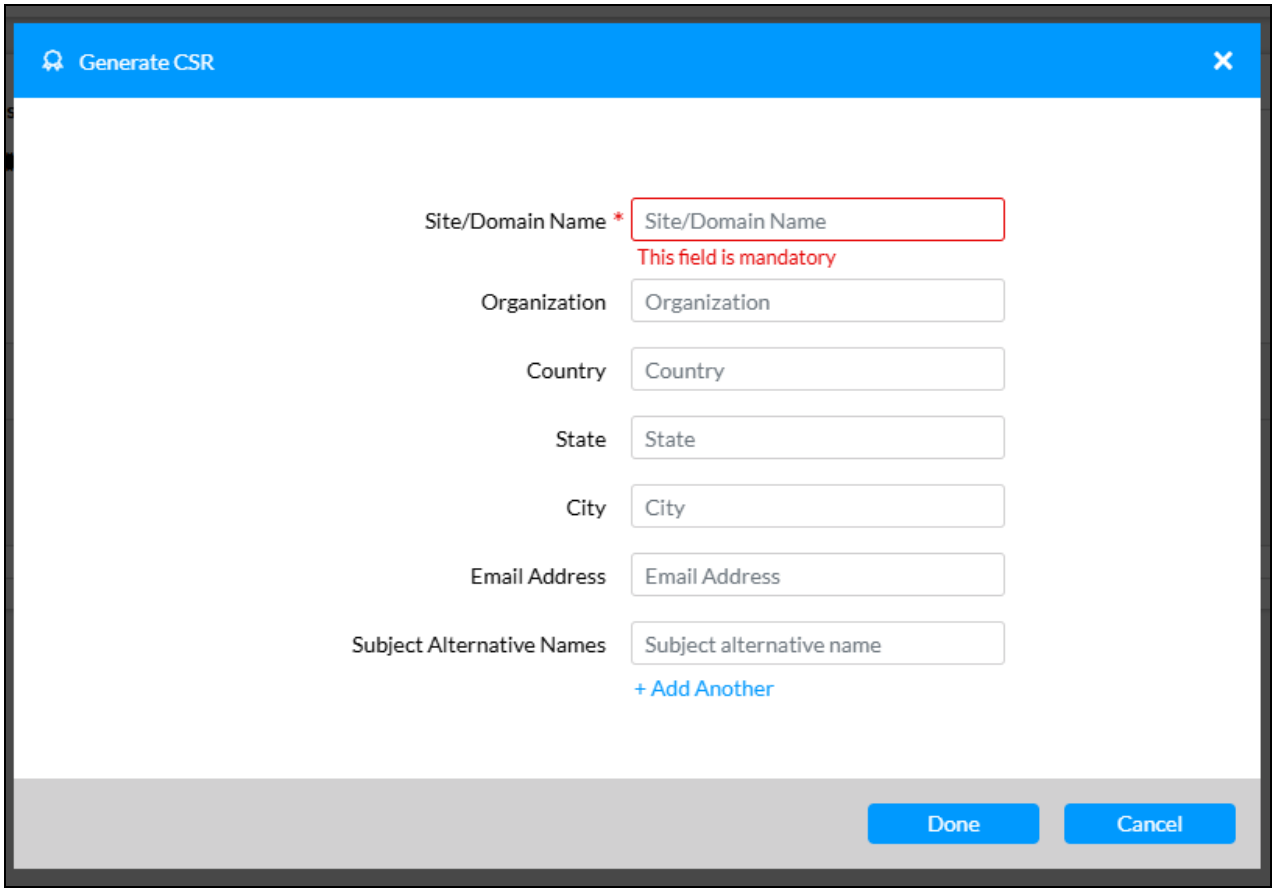
The **Web Server** tab is open by default, and provides functions for generating a certificate signing request (CSR) or adding a certificate key pair. The **Web Server** tab also houses the **Web Server** certificate table.

Manage Certificates Page - Web Server Tab



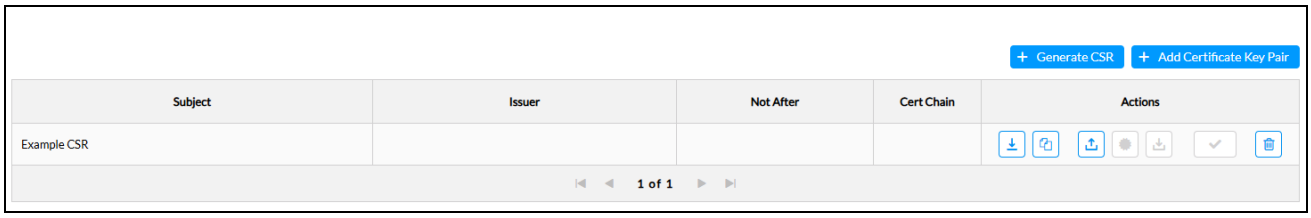
To generate a CSR:

1. Select **+ Generate CSR**. The **Generate CSR** window appears.



2. Enter all available information into the fields as required by the Certificate Authority (CA). Only the **Site/Domain Name** field is mandatory.
3. Select **Done** to finish generating the CSR or **Cancel** to cancel the operation.

The CSR now appears in the **Web Server** certificate table on its own table row.

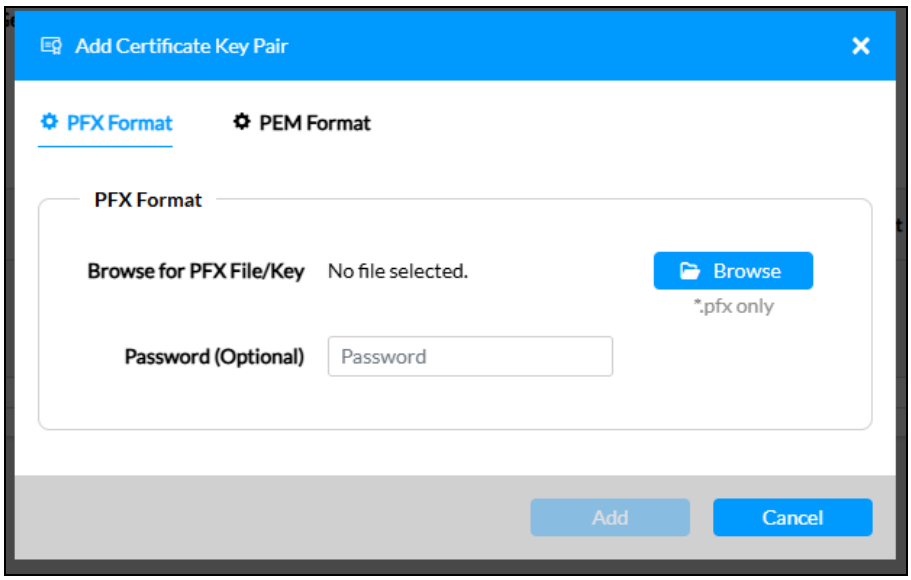


Perform the following functions for a CSR in the **Actions** column:

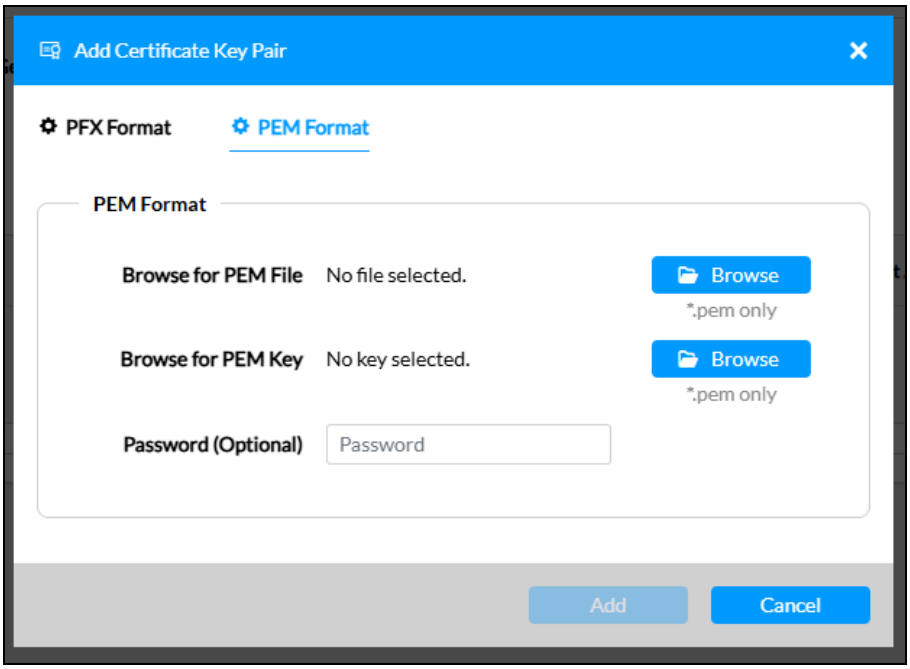
- Select the **Download CSR** icon to download the CSR as a .csr file. Use this function to send the CSR to a CA.
- Select the **Duplicate CSR** icon to duplicate the CSR as a new table row.
- Select the **Upload Cert** icon to upload the certificate returned by the CA.
- Select the **Delete Cert** icon to delete the CSR from the DM NVX Director device and its row in the Web Server table.

To add a certificate key pair:

1. Select **+ Add Certificate Key Pair** from above the **Web Server** table or the **Upload Cert** icon in the table. The **Add Certificate Key Pair** window appears.



2. Select either the **PFX Format** (default selection) or **PEM Format** tab depending on the format of the key file being added:
    a. If the **PFX Format** tab is selected:
        i. Select **Browse** to locate a .pfx file and upload it to the DM NVX Director appliance. Select the .pfx file from the file browser, then select **Open**.
        ii. Enter a password in the **Password (Optional)** field if one is available.
        iii. Select **Add** to add the key pair or **Cancel** to cancel the operation.
    b. If the **PEM Format** tab is selected:

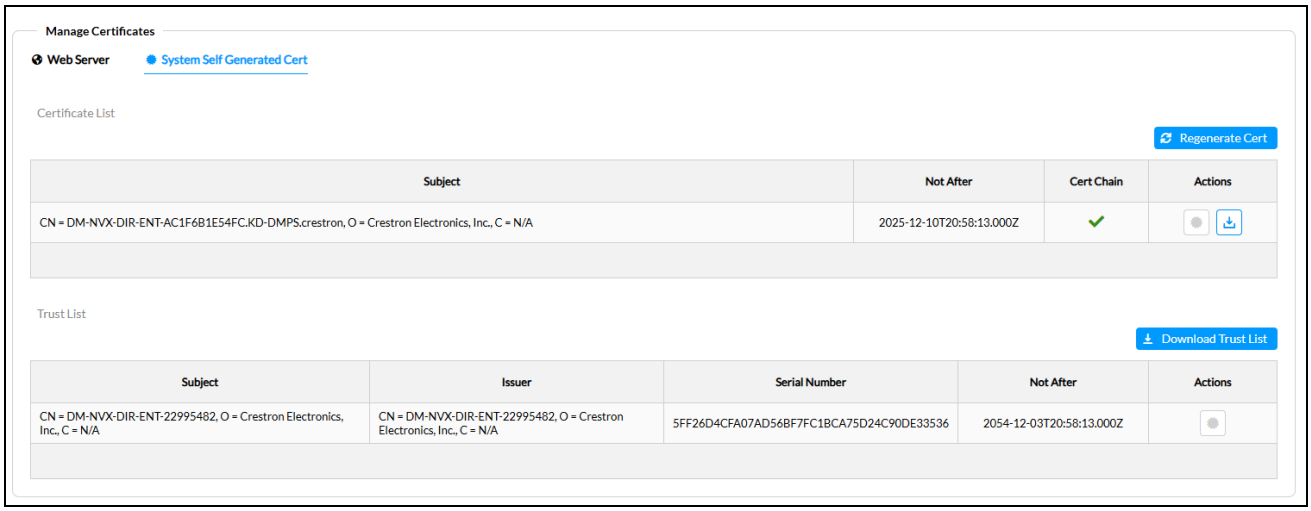


        i. Select **Browse** in line with **Browse for PEM File** to locate the certificate .pem file and upload it to the DM NVX Director appliance. Select the .pem file from the file browser, then select **Open**.
        ii. Select **Browse** in line with **Browse for PEM Key** to locate the key .pem file and upload it to the DM NVX Director appliance. Select the .pem file from the file browser, then select **Open**.
        iii. Enter a password in the **Password (Optional)** field if one is available.
        iv. Select **Add** to add the key pair or select **Cancel** to cancel the operation.

System Self-Generated Cert

The **System Self-Generated Cert** tab provides the **Certificate List** and **Trust List** for the self-generated certificate of the DM NVX Director device.

Manage Certificates Page - System Self-Generated Cert Tab



The self-generated certificate can be either regenerated or downloaded:

- To regenerate the certificate, select **Regenerate Cert**.
- To download the certificate to local storage as a .cert.pem file, select the download icon from the **Certificate List** table.

The **Trust List** can be downloaded to local storage as a .tl.pem file. To download the **Trust List**, select **Download Trust List**.

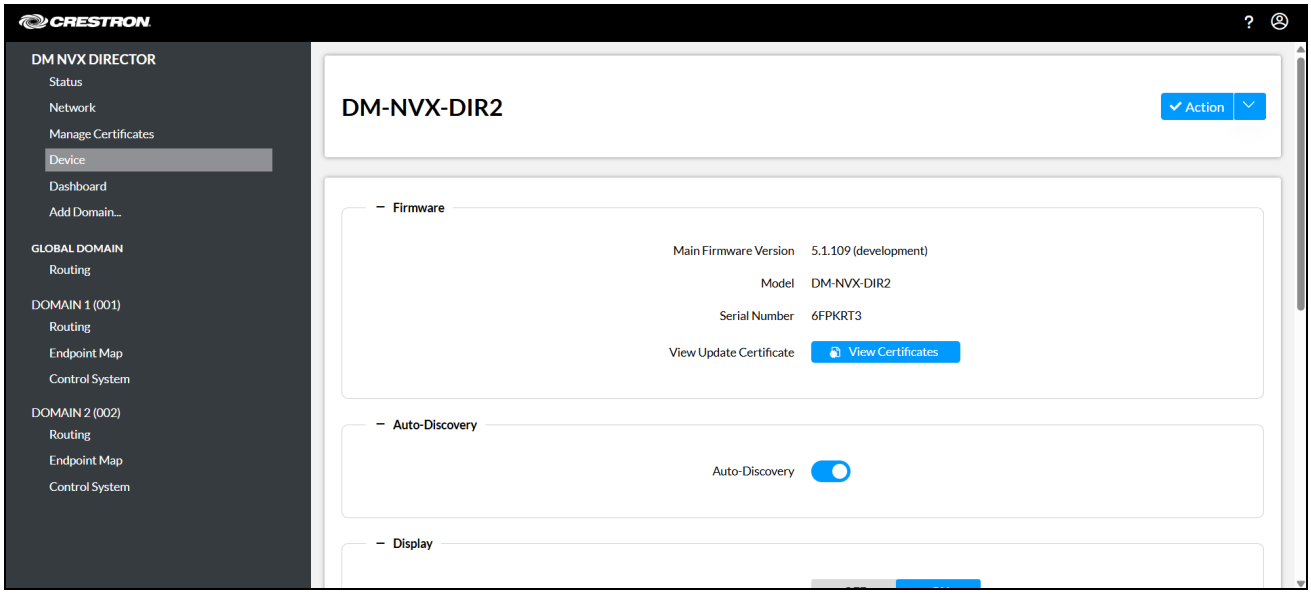
Device

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

The **Device** page enables configuration of settings specific to the DM NVX Director network appliance. Select **Device** from the left-hand navigation menu to open the **Device** page.

Device Page



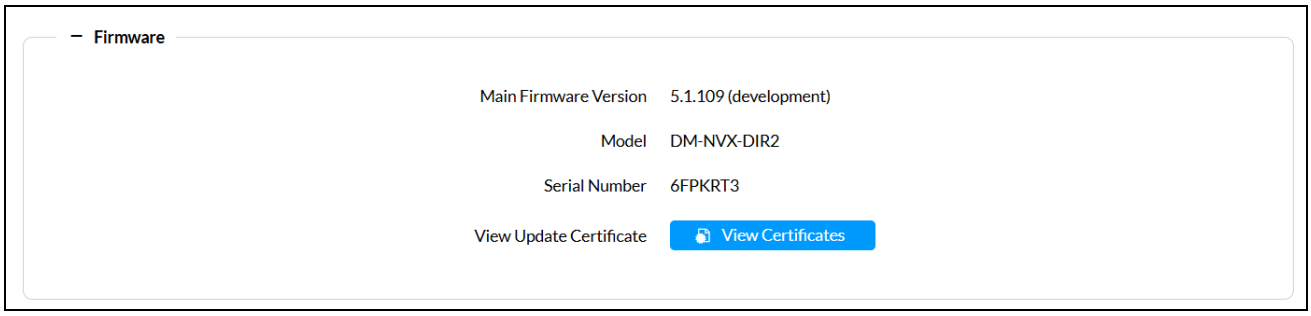
The **Device** page consists of the following sections:

- Firmware on page 814
- Auto-Discovery on page 816
- Display on page 816
- Control System on page 816
- Application Management on page 817

Firmware

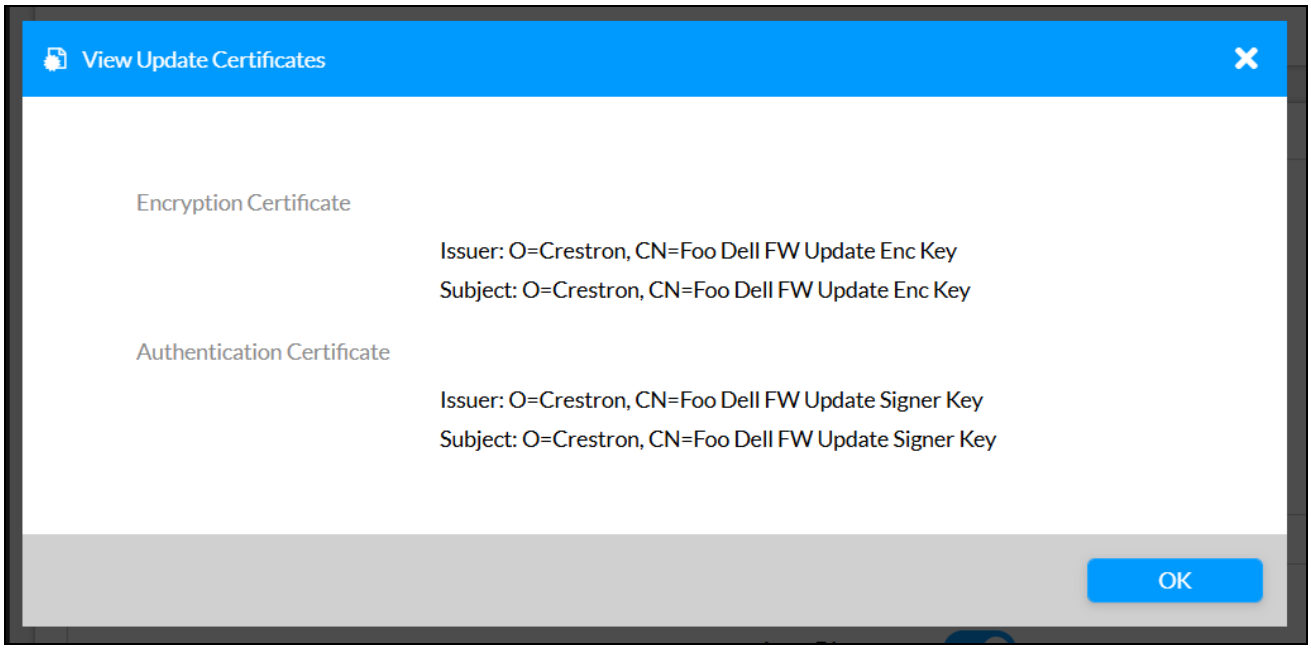
The **Firmware** section displays the firmware version, model name, and serial number of the DM NVX Director switching appliance. The **Firmware** section can also display encryption and authentication certificate information.

Device Page - Firmware



To view certificate information related to firmware security, select **View Certificates**. The **View Update Certificates** window opens, displaying encryption and authentication certificate information.

View Update Certificates Window



The **View Update Certificates** window displays the following information:

- The **Encryption Certificate** section displays the following:
  - Issuer's Organization (O), which is **Crestron**, and Common Name (CN), which may vary depending on the model of the appliance.
  - Subject's Organization (O), which is **Crestron**, and Common Name (CN), which may vary depending on the model of the appliance.
- The **Authentication Certificate** section displays the following:
  - Issuer's Organization (O), which is **Crestron**, and Common Name (CN), which may vary depending on the model of the appliance.
  - Subject's Organization (O), which is **Crestron**, and Common Name (CN), which may vary depending on the model of the appliance.

Select **OK** to dismiss the window.

Auto-Discovery

The **Auto-Discovery** section controls whether DM NVX endpoints on the network can automatically be discovered by the DM NVX Director network appliance.

Device Page - Auto-Discovery



To control automatic discovery of DM NVX endpoints, do either of the following:

- Set the **Auto-Discovery** toggle to the right to enable automatic discovery of the endpoints (default setting).
- Set the **Auto-Discovery** toggle to the left to disable automatic discovery of the endpoints.

Display

The Display section is used to identify the DM NVX Director appliance in a rack.

Device Page - Display



The **MSG** LED on the DM NVX Director network appliance is used to identify the location of the device in a rack.

To control the behavior of the **MSG** LED:

- Select **ON** for **Unit Identification** to have the LED illuminate blue.
- Select **OFF** for **Unit Identification** to turn the LED off (default setting).

Control System

The **Control System** section is used to pair the DM NVX Director appliance with a Global Control System.

> **NOTE:** The Global Control System will be used as the default control system for all domains unless a different control system is assigned at the domain level. For additional information, refer to Modifying a Domain on page 857.

Device Page - Control System



To assign a Global Control System configure the available fields:

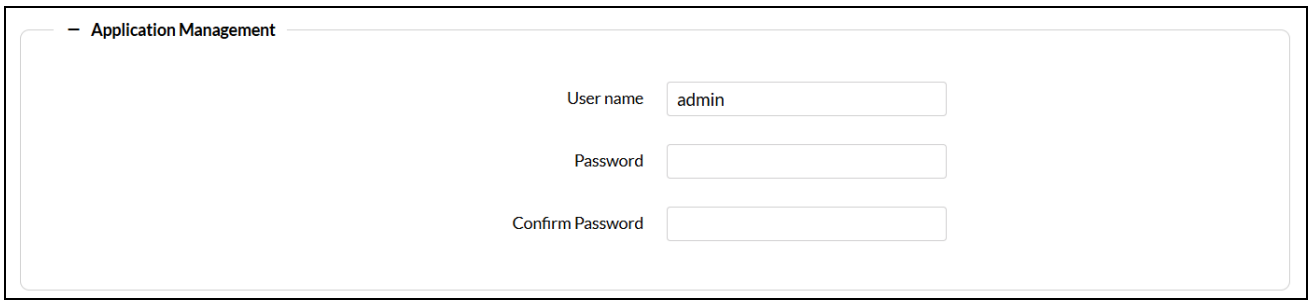
- **IP ID:** Select the desired IP ID for all domains from the drop-down. This must match the IP ID assigned to the DM NVX Director appliance in the control system's program.
- **IP Address/Hostname:** Enter the IP address or hostname of the control system.
- **Room ID:** If using Crestron Virtual Control, enter a room ID.

The **Status** field indicates whether the connection to the control system is **ONLINE** or **OFFLINE**.

Application Management

The Application Management field allows the login credentials of the DM NVX Director appliance to be changed.

Device Page - Application Management



To change the login credentials:

- Enter the desired username in the **Username** text entry field. The maximum number of characters is 128. The username is not case-sensitive.
- Enter the desired password in the **Password** text entry field. The minimum number of characters is eight, and the maximum number of characters is 128. The password is case-sensitive.
- Reenter the new password in the **Confirm Password** text entry field.

Once all three fields are populated and the **Password** and **Confirm Password** field match, the login credentials will be updated.

Dashboard

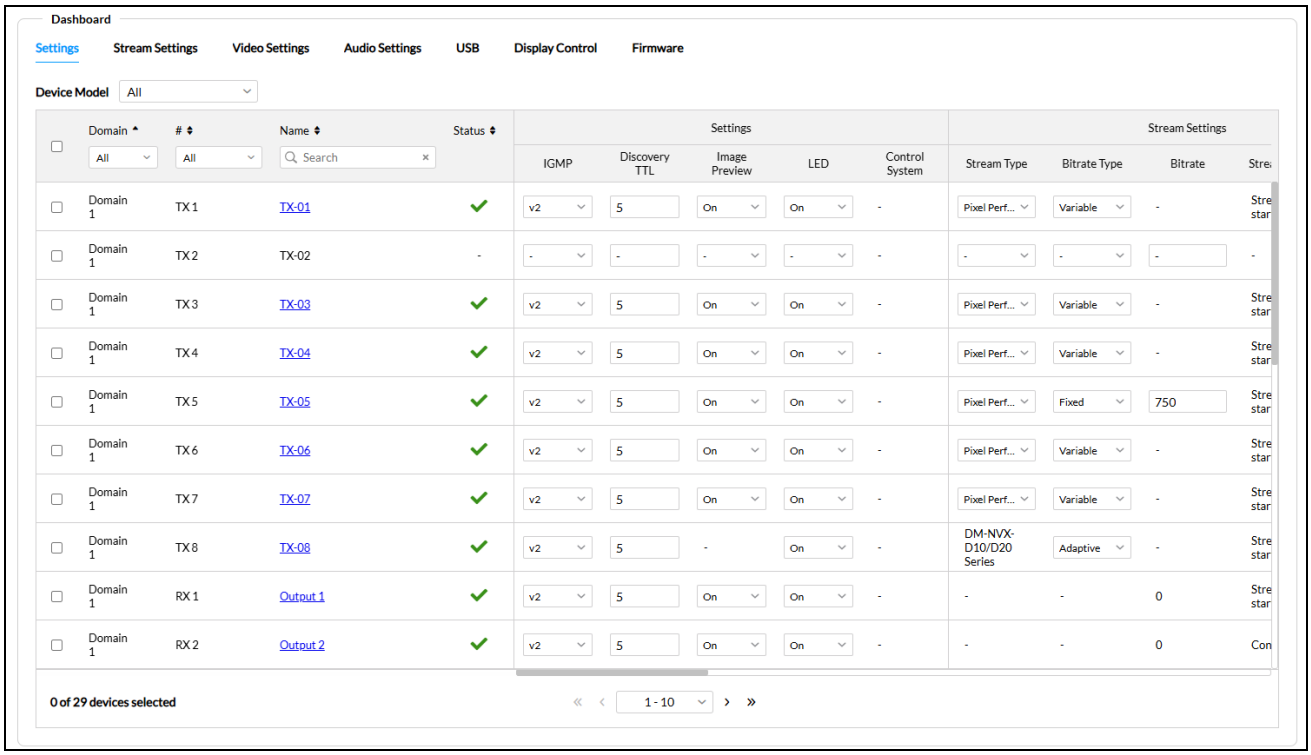
NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

The **Dashboard** page enables settings management and firmware upgrades for DM NVX endpoints assigned to domains using the DM NVX Director network appliance.

NOTE: The available settings and options for each endpoint will depend on the endpoint's capabilities.

Dashboard Page



Receivers and receiver placeholders are denoted by **RX**. Transmitter and transmitter placeholders are denoted by **TX**. Both are numbered consecutively based on the order in which the receivers, placeholders, and transmitters are added to the domain.

Note the following information about each endpoint listed in the table:

- **Name:** Indicates the name assigned to the endpoint.
- **Device Status:** Displays one of the following symbols to indicate the status of a DM NVX endpoint's connection to the DM NVX Director network appliance:
  - ✓: A network connection exists between the endpoint and the DM NVX Director network appliance.
  - ⇄: The device mode (transmitter or receiver) configured on the endpoint is being reconfigured to match the device mode selected when the endpoint was added to the domain.
  - ✗: No network connection exists between the endpoint and the DM NVX Director network appliance due to reasons such as the following:
    - The DM NVX Director network appliance cannot access the endpoint with the provided credentials.
    - The endpoint is not connected to the network.
  - **-**: The endpoint is a placeholder.

Sorting the Dashboard Table

There are a number of ways to sort the table of connected DM NVX endpoints:

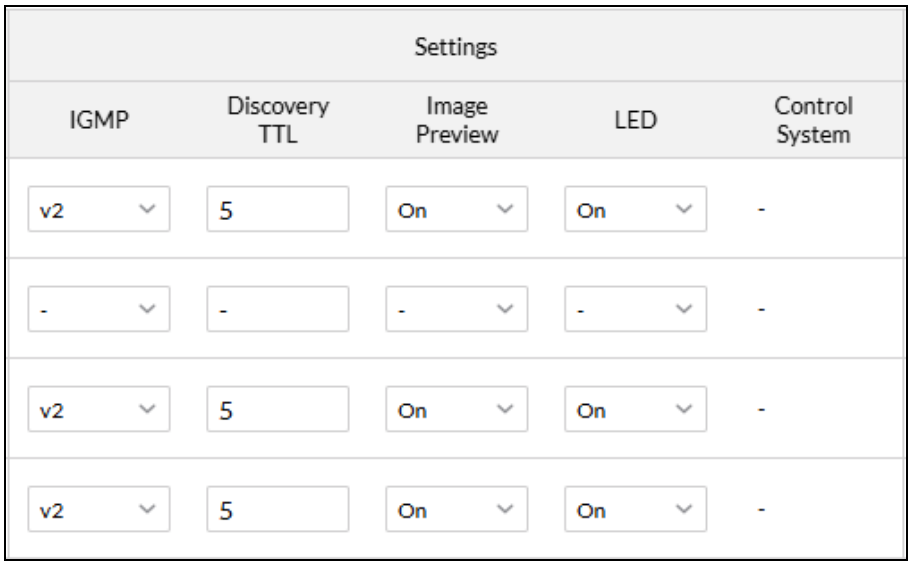
- In the drop-down below the **Domain** heading, select **ALL** to view the endpoints in all domains (default setting) or select a domain number to view only the endpoints within that domain.
- Use the arrows to the right of the **Domain** heading to sort the endpoints based on ascending or descending domain number.
- Use the **Search** box or the **Device Model** drop-down to find specific endpoints. By default, all endpoints appear in the table.
- Select one of the following from the **#** drop-down:
  - **ALL:** (Default setting) Display transmitters, receivers, transmitter placeholders, and receiver placeholders.
  - **Receiver:** Display receivers and receiver placeholders only.
  - **Transmitter:** Display transmitters and transmitter placeholders only.
- Use the arrows to the right of the **#** heading to sort the endpoints based on ascending or descending device number. A device's number is determined by when it was added to the domain relative to the other devices in that domain.
- Use the arrows to the right of the **Device Status** heading to sort the endpoints based on their status.
- Use the arrows to the right of the **Name** heading to sort the endpoints alphabetically or reverse-alphabetically by their name.

Table Column Groups

The **Dashboard** table is divided into several groups of columns. Supported functions vary based on endpoint model. Refer to the headings below for information on the settings or readouts contained in each group:

- Settings Columns on page 820
- Stream Settings Columns on page 821
- Video Settings Columns on page 822
- Audio Settings Columns on page 822
- USB Columns on page 824
- Display Control Columns on page 825
- Firmware Columns on page 827

Settings Columns



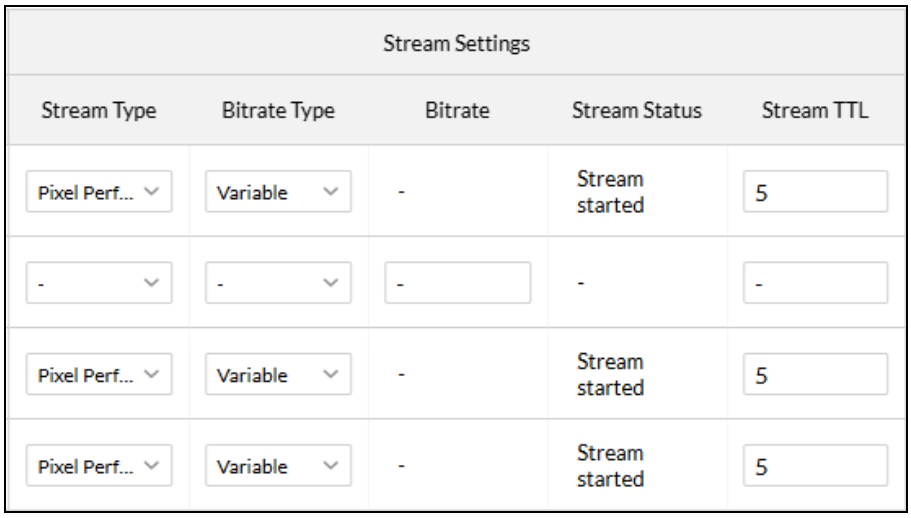
The following options can be configured in the **Settings** columns of the **Dashboard** table:

- **IGMP:** Select **V2** to set the DM NVX device to IGMPv2 operation, or select **V3** to set the device to IGMPv3 operation.
- **Discovery TTL:** Enter a value in the **Discovery TTL** field if a custom Time-to-live (TTL) value is required on the network. The default **Discovery TTL** value is 5.
- **Image Preview:** Set **Image Preview** to **On** to enable the image preview feature of the device, or **Off** to disable the image preview feature.

  Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX transmitter or displayed by an output of a DM NVX receiver. 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.

- **LED:** Set **LED** to **On** to enable the LEDs on the device, or **Off** to disable the LEDs on the device. Turning off the LEDs can reduce the visual intrusion of ambient light from a device in a bedroom or other space where the room lights may be turned off at night.
- **Control System:** Displays the status of the control system connected to the device.

Stream Settings Columns



The following options can be configured in the **Stream Settings** columns of the **Dashboard** table:

- **Stream Type:** Select either **Pixel Perfect Processing** (if transmitting to other DM NVX 4K60 4:4:4 capable endpoints) or **DM-NVX-D10/D20** (if transmitting to a decoder in the D10/D20/D200 family of DM NVX decoders).
- **Bitrate Type:** Select **Fixed**, **Variable**, or **Custom** from the drop-down:
  - **Fixed:** The transmitting DM NVX stream always meets the bitrate specified by the **Bitrate** drop-down. The default and recommended bitrate value is 750 Mbps.
  - **Variable:** The bitrate of the transmitting DM NVX stream is dynamic based on the resolution of the stream content. Selecting **Variable** will disable the **Bitrate** drop-down and **Custom Bitrate** text entry field.
  - **Custom:** The transmitting DM NVX stream always meets the bitrate specified by the **Custom Bitrate** text entry field. The default and recommended bitrate value is 750 Mbps.
- **Bitrate:** Sets the bitrate of the DM NVX stream. This field is only applicable if **Bitrate Type** is set to **Fixed**.
- **Stream Status:** Displays the status of the DM NVX stream.
- **Stream TTL:** Multicast Time-to-live (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.

  Enter a value from 1 to 255. The default TTL value is 5.

Video Settings Columns

Video Settings								
Video Source	Active Video Source	Video Resolution	Scaler Resolution	EDID Input 1	EDID Input 2	EDID Input 3	EDID Input 4	HDCP I
None	None	0x0 @0	-	DM Def...	-	-	-	Auto
-	-	-	-	-	-	-	-	-
Input 1	Input 1	0x0 @0	-	DM Def...	-	-	-	Auto
Input 1	Input 1	1920x1080 @60	-	DM Def...	-	-	-	Auto

The following options can be configured in the **Video Settings** columns of the **Dashboard** table:

- **Video Source:** Select a video source from the drop-down to route that source.
- **Active Video Source:** Displays the video source that is currently routed.
- **Video Resolution:** Displays the resolution of the active video source.
- **Scaler Resolution:** If the device is scaling at the output, this displays the new resolution the output is scaling to.
- **EDID Input [1-4]:** Select an EDID from the drop-down for the input from among any default and custom EDIDs loaded to the device. Refer to Action on page 793 for information on loading custom EDIDs to devices via the DM NVX Director appliance.
- **HDCP Input [1-4]:** Select **Auto** or a specific HDCP version. The **Auto** setting will set the HDCP level of the input to match the detected HDCP level of the source. Use a specific HDCP setting to force the input signal to match the capabilities of a downstream display.

> **NOTE:** Setting a specific HDCP level may blank the input signal if the source is not capable of meeting the specified HDCP level.

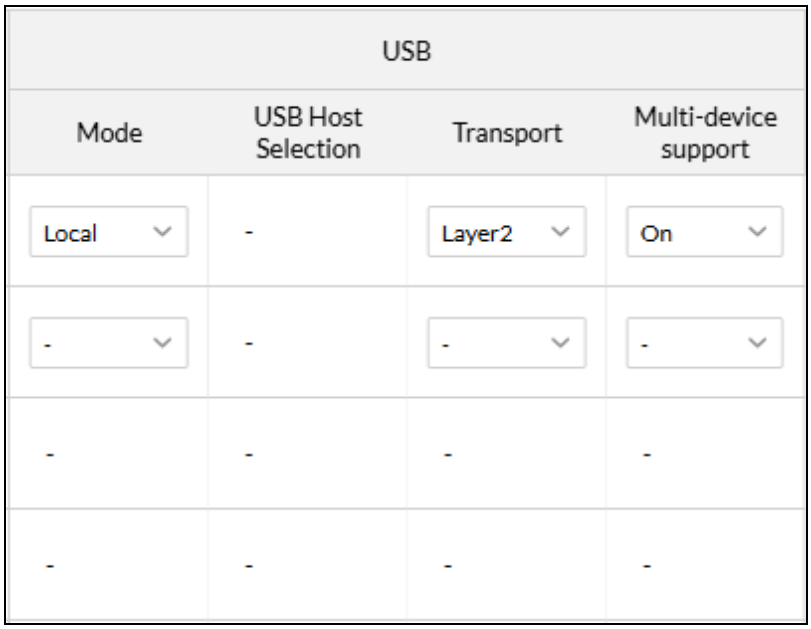
Audio Settings Columns

Audio Settings								
Audio Source	Active Audio Source	Audio Status	NAX TX Source	NAX TX Active Source	NAX Mode	Gain (db)	Dante TX Source	Dante T Active Sou
Audio F...	No Audio	No Audio	Audio F...	No Audio	Automa...	0	Audio F...	No Audio
-	-	-	-	-	-	-	-	-
Audio F...	No Audio	-	Input 1	NRP	Automa...	0	-	-
Audio F...	Input 1	LPCM 2ch	Input 1	NRP	Automa...	0	-	-

The following options can be configured in the **Video Settings** columns of the **Dashboard** table:

- **Audio Source:** Select an active audio source from among **Audio Follows Video**, **HDMI 1**, **HDMI 2**, **USB C1**, **USB C2**, **Analog Audio**, and **DM NAX (AES67) Audio**.
- **Active Audio Source:** Displays the currently selected audio source.
- **Audio Status:** Displays the detected audio format.
- **NAX TX Source:** Select an audio source to transmit via the DM NAX audio-over-IP stream from among **Audio Follows Video**, **HDMI 1**, **HDMI 2**, **USB C1**, **USB C2**, and **Analog Audio**.
- **NAX TX Active Source:** Displays the currently selected audio source for the DM NAX audio-over-IP stream.
- **NAX Mode:** Select a stream addressing mode from the drop-down:
    - **Automatic** adds 1 to the outgoing video stream multicast address to generate the DM NAX transmit multicast address. For example, if the video multicast address is 239.8.0.1, the DM NAX (AES67) multicast address is automatically set to 239.8.0.2.
    - **Manual** requires the multicast address of the transmitting DM NAX stream to be set manually. Selecting **Manual** enables the **Multicast Address** and **Port** text entry fields.
    - **Disabled** turns off DM NAX transmission from the DM NVX device.
- **Gain (db):** Set a gain level for the analog audio output.
- **Dante TX Source:** Select an audio source to transmit via the Dante audio-over-IP stream from among **Audio Follows Video**, **HDMI 1**, **HDMI 2**, **USB C1**, **USB C2**, and **Analog Audio**.
- **Dante TX Active Source:** Displays the currently selected audio source for the Dante audio-over-IP stream.
- **Analog Audio:** Select between **Insert** or **Extract**.
    - In **Insert** mode, the analog audio connector will function as an input and the incoming audio signal can be selected as the **Audio Source**.
    - In **Extract** mode, the analog audio connector will function as an output and will transmit the audio signal selected for **Audio Source**.

USB Columns



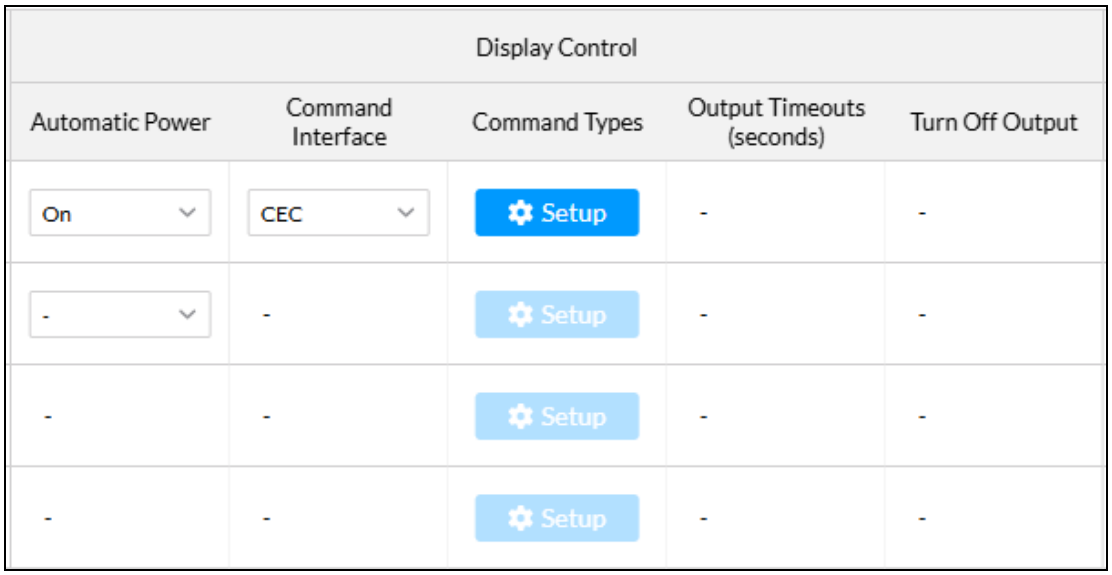
The following options can be configured in the **USB Settings** columns of the **Dashboard** table:

- **Mode:** Select either **Local** or **Remote** from the drop-down:
  - In **Local** mode, USB signals from another **Remote** device on the network are extended to the **TO HOST** connectors of the DM NVX device.
  - In **Remote** mode, USB devices connected to the **TO DEVICE** ports are extended over the network to a **Local** device.
- **USB Host Selection:** Displays whether host selection is occurring automatically.
- **Transport:** Select a either **Layer 2** or **Layer 3** from the drop-down:
  - **Layer 2**: Enables Layer 2 transport of USB 2.0 data. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), DM-NVX-38X(C), and DM NUX USB-over-Ethernet devices (DM-NUX-L2 and DM-NUX-R2). Devices will pair via MAC address.
  - **Layer 3**: Enables Layer 3 transport of USB 2.0 data across VLANs. This mode is compatible with DM-NVX-35x(C), DM-NVX-36x(C), and DM-NVX-38X(C) devices. Devices will pair via IP address.

    > **NOTE:** This mode is not compatible with DM NUX USB-over-Ethernet devices.

- **Multi-device support:** Enable or disable multi-device support. If the device is set to **Local** mode and **Layer 2** transport, **Multiple Device Support** allows it to receive USB data from up to seven **Remote** extenders. A hub must be used to connect devices to the **TO DEVICE** port of each DM NVX **Remote** extender.

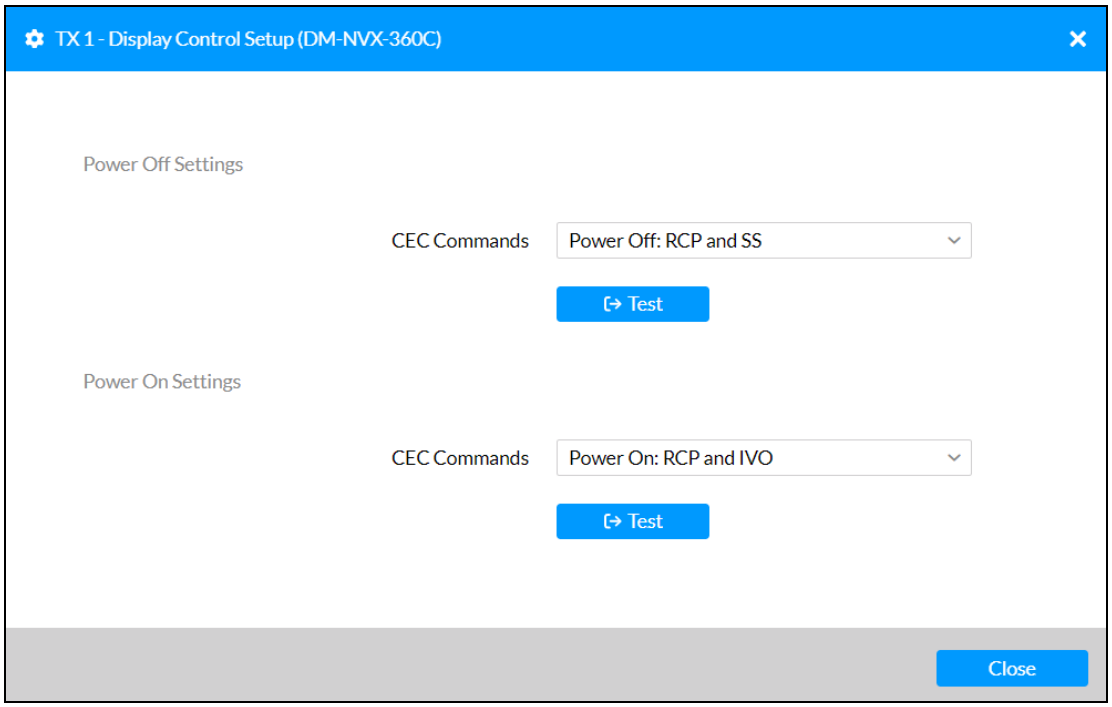
Display Control Columns



The following options can be configured in the **Display Control** columns of the **Dashboard** table:

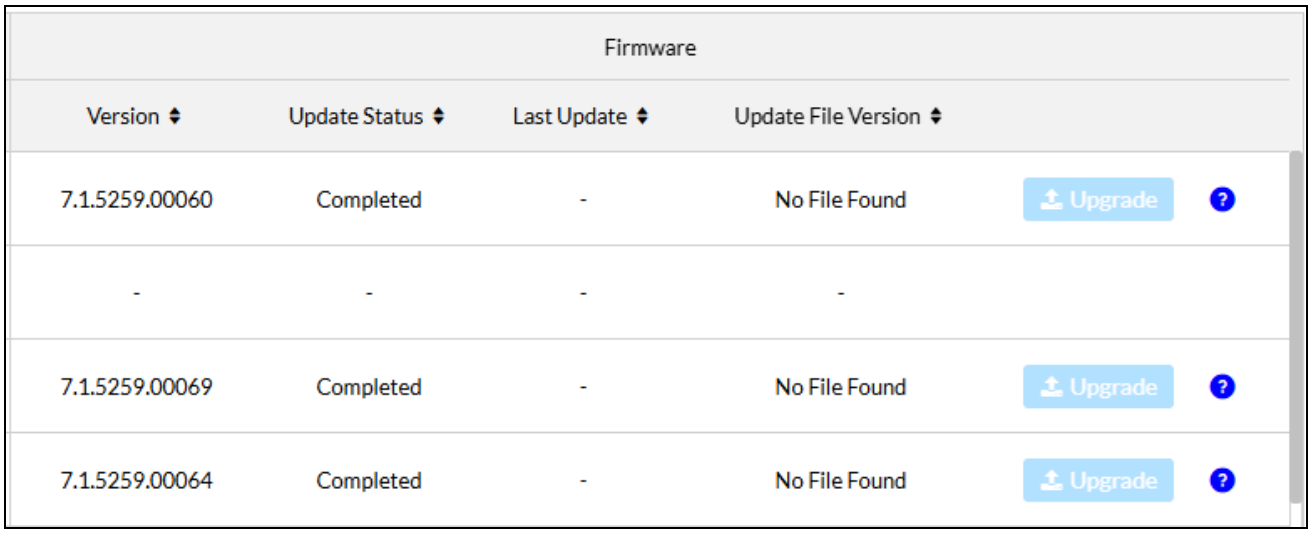
- **Automatic Power:** Select **On** to send automatic power commands to the connected display when a video signal is detected or absent, or select **Off** to disable automatic power commands.
- **Command Interface:** Select which type of command interface to use to issue power commands to the connected display from **None**, **CEC**, **IR**, or **RS-232**.

- **Command Types:** With **Automatic Power** enabled and a **Command Interface** selected, select **Setup** to open a **Display Control Setup** window.



  - The **Power Off Settings** and Power On Settings sections will vary depending on the selected Commander Interface. Consult the display manufacturer's documentation to determine which CEC commands should be selected, or which RS-232 or IR commands should be entered.
  - Select **Test** to test the corresponding power command.
  - Select **Close** to close the **Display Control Setup** window.
- **Output Timeouts (seconds):** Select a time from the drop-down. Options are available from 5 to 90 seconds. This setting determines how long the endpoint will wait to send a power off command after video signal to the display is stopped.
- **Turn Off Output:** Select **On** from the drop-down to send a power off command to the connected display when the **Output Timeout** elapses.

Firmware Columns



The **Firmware** columns display information about the current firmware version of each endpoint. The firmware can be updated on individual or multiple DM NVX endpoints. The following information is displayed:

- **Version:** Indicates the current firmware version of the endpoint. A **-** (hyphen) is displayed for placeholder endpoints.

  To view the endpoints based on the ascending or descending numerical order of the firmware version, use the scroll arrows to the right of the **Version** heading.
- **Update Status:** Indicates the current status of the firmware upgrade process when using the **Dashboard** page to upgrade the firmware: **Uploading**, **Upgrading**, **Rebooting**, **Connecting**, and **Completed**. A **-** (hyphen) is displayed for placeholder endpoints.

  To view the endpoints based on the ascending or descending alphabetical order of the firmware upgrade status, use the scroll arrows to the right of the **Update Status** heading.
- **Last Update:** Indicates the date when the firmware was last upgraded using the **Dashboard** page. A **-** (hyphen) is displayed if the firmware has not been upgraded using the **Dashboard** page or if the endpoint is a placeholder.

  To view the endpoints based on the ascending or descending numerical order of the firmware update date, use the scroll arrows to the right of the **Last Update** heading.
- **Update File Version:** Indicates the firmware version the endpoint will use if the firmware is updated.

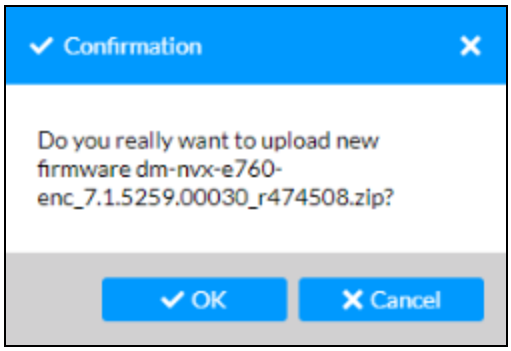
To update an endpoint's firmware:

1. Download the latest firmware file of the DM NVX endpoint. Firmware files can be found on the device's product page or on the Firmware page of the Crestron website.
2. If updating a single endpoint, select **Upgrade**. If updating multiple endpoints, select the checkboxes for their rows to the left of the table, then select **Upgrade Selected** from above the table. A file browser window appears.

3. Navigate to the downloaded firmware file, then select **Open**.

   > **NOTE:** If multiple devices were selected, they all must be compatible with the selected firmware file.

   A **Confirmation** message box appears.



4. Select **OK** to continue with the firmware update, or select **Cancel** to cancel the operation.

   The **Uploading file** status box opens, indicating the progress of the upload of the firmware file. When the file upload process has completed, the **Uploading file** dialog box indicates that the file has been uploaded.

5. Select **OK** to dismiss the **Uploading file** status box. The loaded firmware appears in the **Select Firmware File** field above the dashboard table.

6. Select **Load** to upload the firmware file to the selected devices.

   The **Update Status** column for the selected endpoints indicates the progression of the firmware upgrade process as applicable to each DM NVX device.

   > **NOTE:** The firmware file is uploaded to 10 DM NVX endpoints at a time. Starting with the eleventh device, the **Update Status** column in the dashboard table indicates **Waiting**. When one of the 10 devices completes the upload process, the eleventh device will start uploading the firmware file and the **Update Status** column for the corresponding device will change from **Waiting** to **Uploading**.

Alternatively, use the **Manage Endpoint Firmware** function in the **Action** menu to load firmware files directly to the DM NVX Director appliance, then push loaded firmware files to devices by selecting **Upgrade**. Refer to Action on page 793 for more detailed information.

Add Domain

NOTE: Unless otherwise noted, this section applies to the following models:

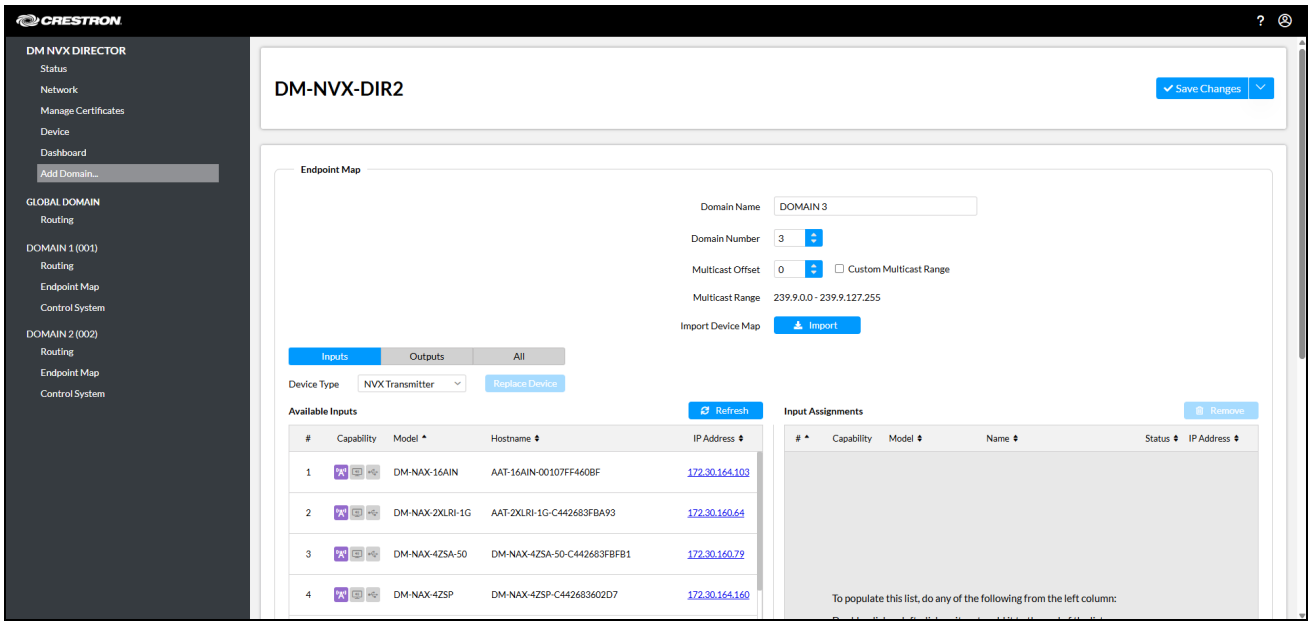
- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

A domain is a logical grouping of DM NVX endpoints that operate as a single switching entity, enabling individual subsystems to be arranged and controlled independently on the AV network. A DM NVX Director network appliance automatically discovers each DM NVX endpoint on the network.

NOTE: In order for the DM NVX Director network appliance to be able to automatically discover DM NVX endpoints, Auto-Discovery must be enabled via the Auto-Discovery setting on the Device page of the web interface. Refer to Device on page 814 for more detailed information. In addition, one of the Ethernet ports (excluding the **MGMT** port) must be connected to the VLAN associated with the endpoints.

The **Add Domain...** page of the web interface enables adding a new domain. Created domains will then have their own management page in the web UI. Refer to Modifying a Domain on page 857 for more information on managing created domains.

Add Domain Page



A DM NVX Director network appliance enables each endpoint to be assigned as a logical input or output within a domain:

- The DM-NVX-DIR-80 supports a maximum of 80 DM NVX endpoints and 1 domain.
- The DM-NVX-DIR-160 supports a maximum of 160 DM NVX endpoints and 20 domains.
- The DM-NVX-DIR-ENT supports a maximum of 1000 DM NVX endpoints and 240 domains.
- The DM-NVX-DIR2 supports a maximum of 100 DM NVX endpoints and 20 domains.

> **NOTE:** To simplify programming, it is recommended that domains be added via the DM NVX Director web interface before being added to the SIMPL program running on the control system. The domain configuration in the web interface can then be referenced when adding domains to the program.

To add a domain using the DM NVX Director appliance web interface, the Endpoint Map must first be configured, then the domain must be saved.

Refer to the headings below for more information on configuring the Endpoint Map and saving a domain:

- Enter Domain Identification and Multicast Information on page 830
- Assign Endpoints to the Domain on page 833
    - Use the Endpoint Map on page 833
    - Use the SETUP Button on page 841
    - Import a Device Map on page 842
- Remove an Endpoint on page 842
- Replace an Endpoint on page 844
- View Input and Output Assignments Simultaneously on page 845
- View Endpoint Statistics on page 846
- Save the Domain on page 847

Enter Domain Identification and Multicast Information

Enter the following domain identification and multicast information for the new domain:

- **Display Name:** Enter a friendly name to identify the domain on the network. The default domain names are numbered consecutively starting from **DOMAIN 1**.

- **Domain Number:** Enter or select a number in the scrollable text entry field.
  - For the DM-NVX-DIR-80, the **Domain Number** must be set to **1**.
  - For the DM-NVX-DIR-160, the **Domain Number** can be set from **1** to **20**.
  - For the DM-NVX-DIR-ENT, the **Domain Number** can be set from **1** to **240**.
  - For the DM-NVX-DIR2, the **Domain Number** can be set from **1** to **20**.

  NOTES:
  - The **Domain Number** must correspond to the **XIO Domain** slot number used in the SIMPL program. For example, if the **Domain Number** is set to **1** via the web interface, the corresponding **XIO Domain** slot number in the SIMPL program must be **Slot-01 : XIO-Domain : XIO Domain**. Refer to the DM NVX Director symbol help file for more information.
  - Domain numbers cannot be used on multiple domains.

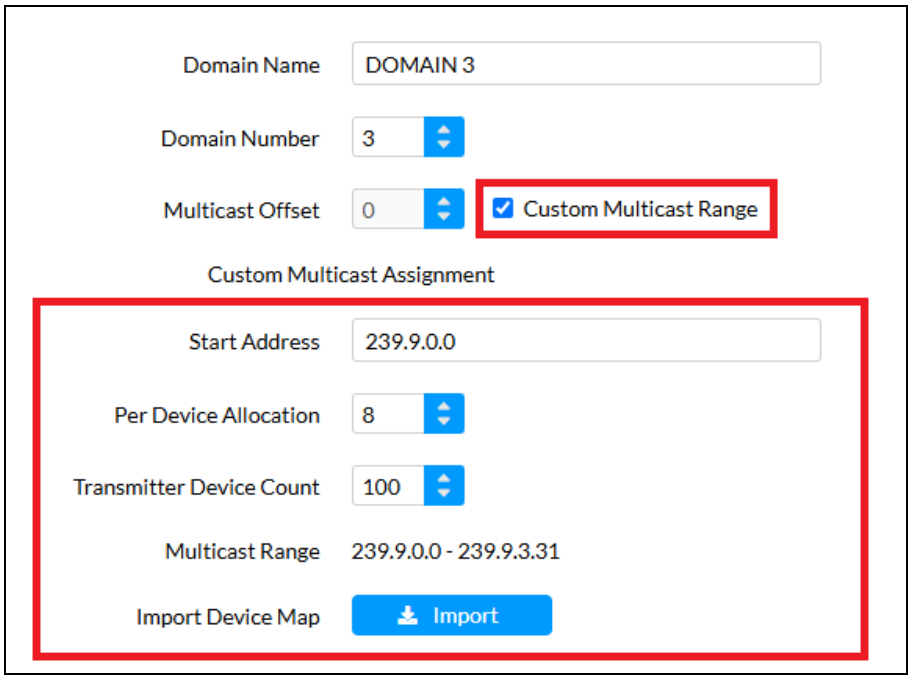
- **Multicast Offset:** Enter or select a **Multicast Offset** only when multiple DM NVX Director network appliances exist on the same network and a **Custom Multicast Range** (discussed below) is not set. The **Multicast Offset** is required to prevent multicast collisions between DM NVX endpoints managed by different DM NVX Director appliances on the same network.

  NOTES:
  - The total of the Domain Number and the Multicast Offset must be less than or equal to 240.

    For example:
    - If the **Domain Number** is **1**, valid **Multicast Offset** values range from **0** to **239**.
    - If the **Domain Number** is **2**, valid **Multicast Offset** values range from **0** to **238**.
    - If the **Domain Number** is **20**, valid **Multicast Offset** values range from **0** to **220**.
  - The combination of **Domain Number** and **Multicast Offset** determines the **Multicast Range**, which must be unique for each domain.

- **Custom Multicast Range:** (Optional) Specifies a custom multicast range for assigning to endpoints when the checkbox is selected, and **Start Address**, **Per Device Allocation**, and **Transmitter Device Count** are all set under **Custom Multicast Assignment**.

  Custom Multicast Assignment Example



  Refer to the following guidelines to configure the **Custom Multicast Assignment** fields:

  - **Start Address:** Enter the starting multicast address of the **Custom Multicast Range**. The starting address must end with an even number (including **0**).

    > **NOTE:** Multicast addresses can start at 224.0.2.0 and end at 239.255.255.254, excluding 239.255.255.250 and 239.255.255.253.

    The first DM NVX endpoint in the domain will be assigned the **Start Address**.

  - **Per Device Allocation:** Enter or select the number of multicast addresses to be assigned to each DM NVX endpoint. Values range from **2** to **256** and must be an even number.

    > **NOTE:** If a value of **2** is entered, a message appears indicating that DM NVX endpoints may use 3 or more multicast addresses depending on the device configuration.

- **Transmitter Device Count:** Enter or select the number of DM NVX endpoints to be assigned to the domain:
  - For the DM-NVX-DIR-80, values range from **2** to **80**.
  - For the DM-NVX-DIR-160, values range from **2** to **160**.
  - For the DM-NVX-DIR-ENT, values range from **2** to **1000**.
  - For the DM-NVX-DIR2, values range from **2** to **100**.

  The **Multicast Range** is calculated and displayed once these fields are configured. For example, if **Start Address** is set to **239.100.100.0**, **Per Device Allocation** is set to **4**, and **Transmitter Device Count** is set to **16**, the custom multicast range will result in 64 multicast addresses (4 times 16) ranging from **239.100.100.0** to **239.100.100.63**.

Assign Endpoints to the Domain

To assign endpoints to the domain, do any of the following:

- Use the Endpoint Map on page 833
- Use the SETUP Button on page 841
- Import a Device Map on page 842

Use the Endpoint Map

In the **Endpoint Map**, assign desired discovered endpoints as transmitters (inputs) or receivers (outputs). Endpoint placeholders can also be assigned as transmitter placeholders (inputs) or receiver placeholders (outputs).

> **NOTE:** Transmitter placeholders and receiver placeholders are available for addition to a domain and can later be replaced by actual transmitters and receivers, respectively, when appropriate.

To assign discovered endpoints, refer to Assigning Discovered Endpoints to a Domain on page 833.

To assign placeholders, refer to Assigning Endpoint Placeholders to a Domain on page 838.

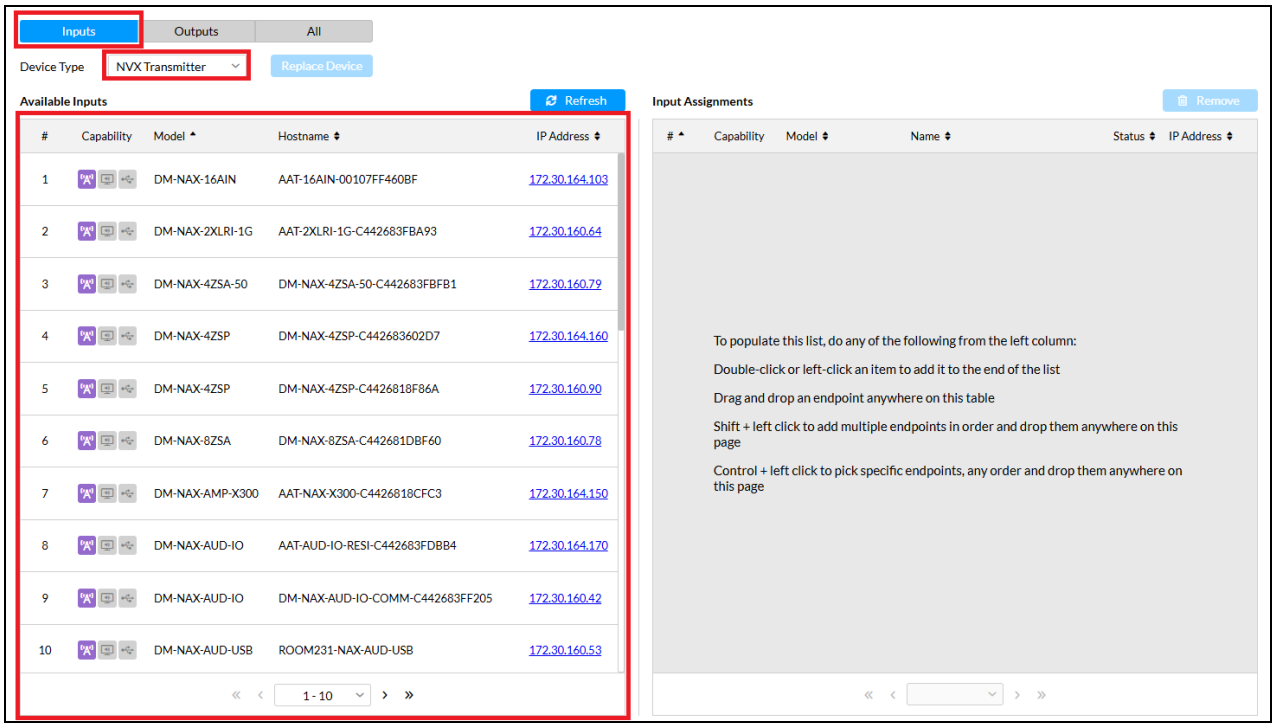
Assigning Discovered Endpoints to a Domain

Assign discovered endpoints to a domain based on their desired operating mode (as transmitter or receiver).

To obtain a list of inputs (transmitters) available for addition to the domain:

1. Select **Inputs** at the top of the **Endpoint Map** (selected by default).
2. Select **NVX Transmitter** from the **Device Type** drop-down (selected by default). Discovered DM NVX devices that can function as transmitters are listed in the **Available Inputs** portion of the table.

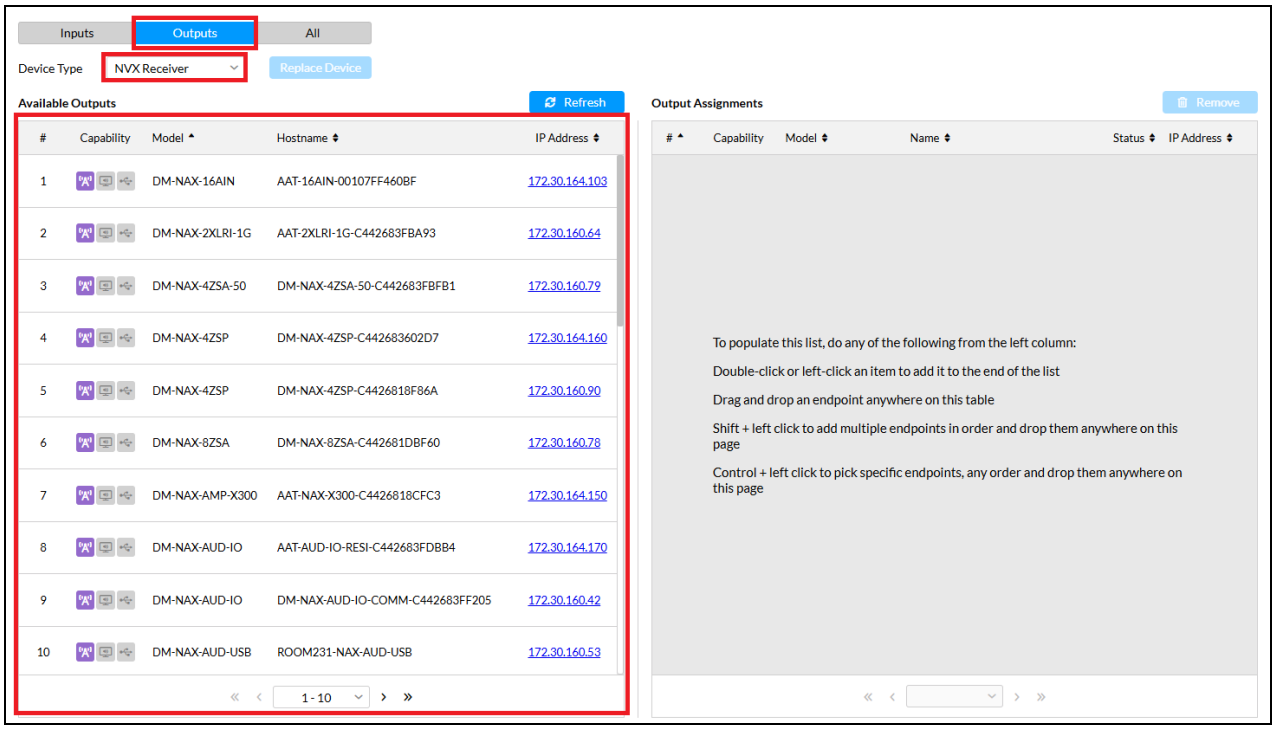
Add Domain Page - Available Inputs for Discovered Transmitters



To obtain a list of outputs (receivers) available for addition to the domain:

1. Select **Outputs** at the top of the **Endpoint Map**.
2. Select **NVX Receiver** from the **Device Type** drop-down. Discovered DM NVX devices that can function as receivers are listed in the **Available Outputs** portion of the table.

Add Domain Page - Available Outputs for Discovered Receivers

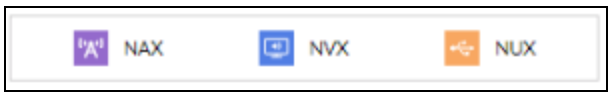


The corresponding **Available Inputs** or **Available Outputs** table provides the following information:

- **#:** Indicates the number of the device based on the order in which the device was added to the **Available Inputs** or **Available Outputs** list. This is determined during the discovery process.
- **Capability:** Provides icons representing the capabilities of the device:
  - The purple icon represents DM NAX audio-over-IP.
  - The blue icon represents DM NVX AV-over-IP.
  - The yellow icon represents DM NUX USB-over-Ethernet data from the DEVICE or HOST port on a DM NVX endpoint. If the DM NUX icon is shaded gray, DM NUX capability is not supported by the endpoint.

  A capability legend is provided below the **Input Assignments** or **Output Assignments** table indicating the meaning of the icons.

  Capability Legend



- **Model:** Indicates the model name of the DM NVX endpoint.

  To sort the table by model name, select the arrows to the right of the **Model** heading.

- **Hostname:** Indicates the hostname of the DM NVX endpoint. The default hostname is the model name followed by a hyphen and the MAC address of the device.

  To sort the table by hostname, select the arrows to the right of the **Hostname** heading.
- **IP Address:** Indicates the IP address of the DM NVX endpoint. Selecting the IP address of an endpoint links directly to its web interface.

  To sort the table by IP address, select the arrows to the right of the **IP Address** heading.

Up to 10 endpoints can be displayed in the table simultaneously. If more than 10 endpoints are discovered and available on the network, use the scroll arrows at the bottom of the table to navigate through the list of endpoints.

> **NOTE:** For a DM NVX endpoint that functions as either a transmitter or receiver, the endpoint is available for addition to the domain as a transmitter or receiver. If the endpoint is added to the **Input Assignments** table but its operating mode is set to receiver, the operating mode will automatically be reconfigured as a transmitter when the domain is saved. If the endpoint was added to the **Output Assignments** table, but was set to operate as a transmitter, it will be reconfigured to receiver mode when the domain is saved.

To assign endpoints to the domain on an individual basis, do either of the following:

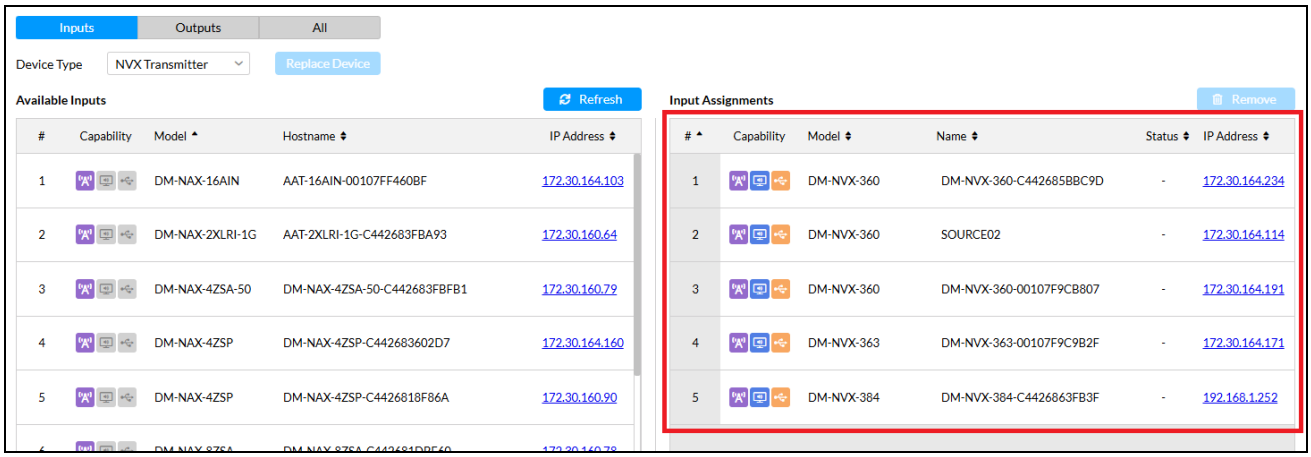
- Drag and drop the desired endpoint into any location (including an existing row) of the corresponding **Input Assignments** or **Output Assignments** table.

  If the assignments table was originally empty, the desired endpoint is added to the beginning of the table. If the endpoint was dragged into an existing row within the table, the endpoint is added to the desired row and all remaining rows are automatically renumbered. If the endpoint was not dragged into an existing row, the endpoint is added to the end of the table.
- Double-click the desired endpoint. The endpoint is added to the end of the corresponding **Input Assignments** or **Output Assignments** table.

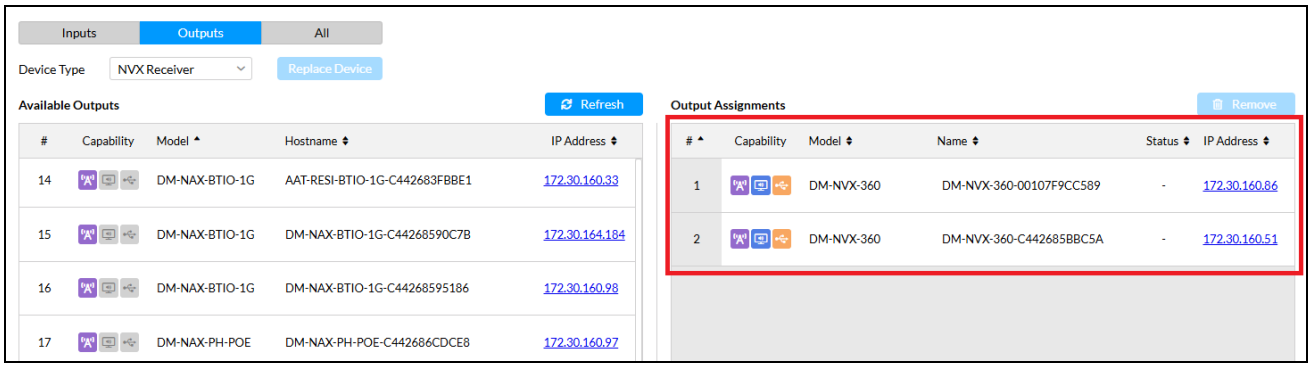
To assign multiple endpoints simultaneously:

- Select one endpoint, then **Shift** + **Click** on another endpoint to select it and all endpoints in the list between them. Drag and drop the selected endpoints into the corresponding **Input Assignments** or **Output Assignments** table.
- **Ctrl** + **Click** on any number of endpoints to select multiple at once without including any entries in between them. Drag and drop the selected endpoints into the corresponding **Input Assignments** or **Output Assignments** table.

Add Domain Page - Input Assignments for Transmitters



Add Domain Page - Output Assignments for Receivers



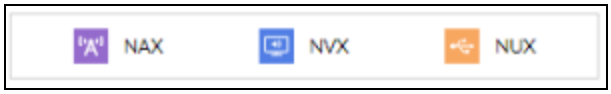
The **Input Assignments** and **Output Assignments** tables provide the following information:

- **#:** Indicates the number of the device based on the order in which the device was added to the **Input Assignments** or **Output Assignments** table.

  To sort the table by device number, select the arrows to the right of the **#** heading.
- **Capability:** Provides icons representing the capabilities of the device:
  - The purple icon represents DM NAX audio-over-IP.
  - The blue icon represents DM NVX AV-over-IP.
  - The yellow icon represents DM NUX USB-over-Ethernet data from the DEVICE or HOST port on a DM NVX endpoint. If the DM NUX icon is shaded gray, DM NUX capability is not supported by the endpoint.

  A capability legend is provided below the **Input Assignments** or **Output Assignments** table indicating the meaning of the icons.

  Capability Legend

- **Model:** Indicates the model name of the DM NVX endpoint.

  To sort the table by model name, select the arrows to the right of the **Model** heading.

- **Name:** Indicates the device name assigned to the endpoint. Selecting the name enables the endpoint name to be changed.

  To sort the table by device name, select the arrows to the right of the **Name** heading.
- **IP Address:** Indicates the IP address of the DM NVX endpoint. Selecting the IP address of an endpoint links directly to its web interface.

  To sort the table by IP address, select the arrows to the right of the **IP Address** heading.

Assigning Endpoint Placeholders to a Domain

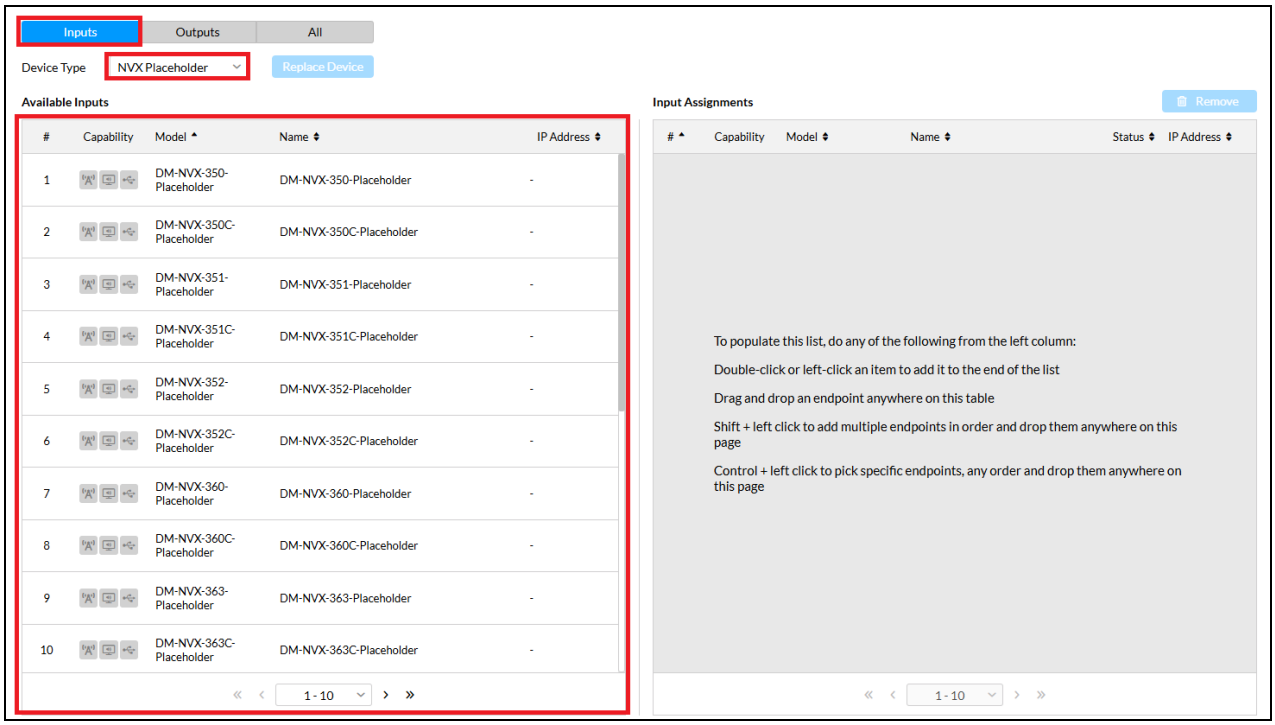
Assign endpoint placeholders to a domain based on their desired operating mode (transmitter or receiver).

> **NOTE:** Placeholders can be added to a domain that also contains discovered endpoints. A domain consisting only of placeholders can be created.

To obtain a list of transmitter placeholders available for addition to the domain:

1. Select **Inputs** at the top of the **Endpoint Map** (selected by default).
2. Select **NVX Placeholder** from the **Device Type** drop-down. A placeholder for every DM NVX model that can function as a transmitter is listed in the **Available Inputs** table.

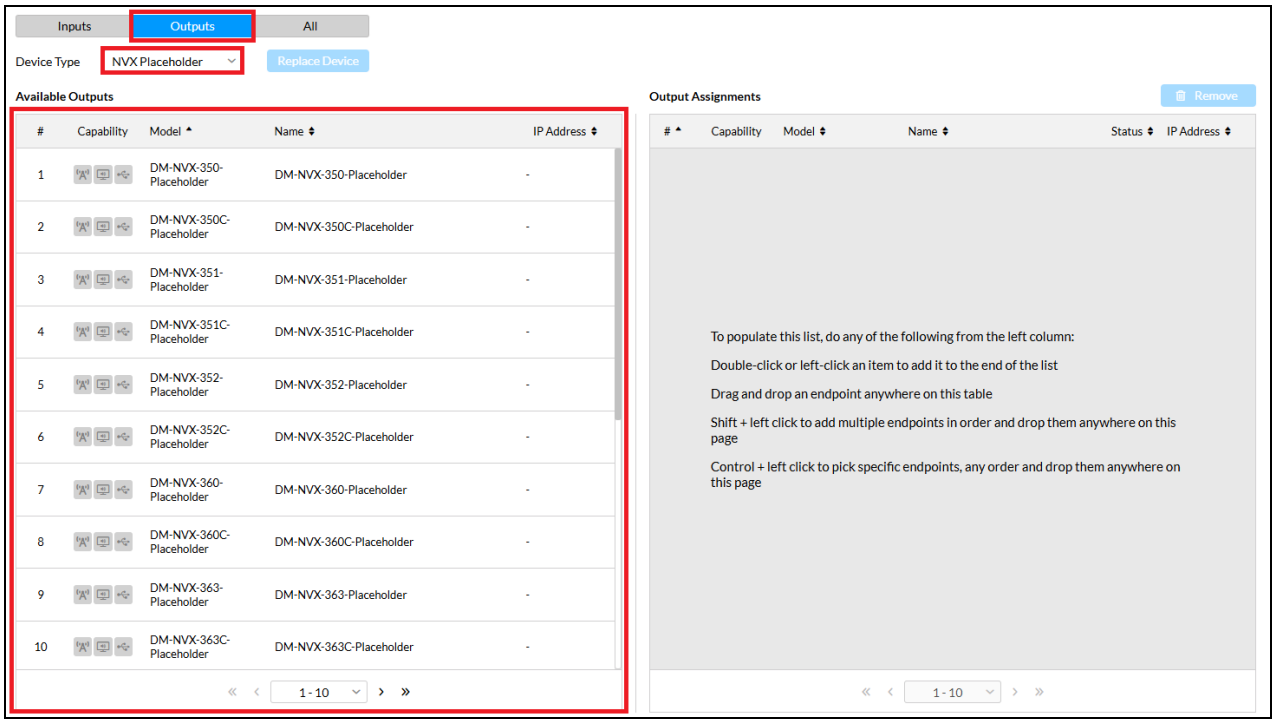
   Add Domain Page - Input Placeholders



To obtain a list of receiver placeholders available for addition to the domain:

1. Select **Outputs** at the top of the **Endpoint Map**.
2. Select **NVX Placeholder** from the **Device Type** drop-down. A placeholder for every DM NVX model that can function as a receiver is listed in the **Available Outputs** table.

Add Domain Page - Output Placeholders



The corresponding **Available Inputs** or **Available Outputs** table provides the following information:

- **#:** Indicates the number of the placeholder based on the alphanumeric order of the placeholder name.
- **Capability:** Each icon is shaded gray to indicate that the placeholder provides no capabilities.
- **Model:** For transmitter placeholders, indicates the model name of all DM NVX endpoints that can function as a transmitter. For receiver placeholders, indicates the model name of all DM NVX endpoints that can function as a receiver. The model name is appended with a hyphen and the word **Placeholder**. For example, **DM-NVX-384-Placeholder**. A **Generic-Transmitter-Placeholder** and **Generic-Receiver-Placeholder** are also provided. By default, the generic placeholders are provided at the end of the lists.

  To sort the table by model name, select the arrows to the right of the **Model** heading.
- **Name:** Indicates the same name listed as the model name.

  To sort the table by hostname, select the arrows to the right of the **Hostname** heading.
- **IP Address:** Displays a hyphen to indicate that the placeholder does not have an IP address.

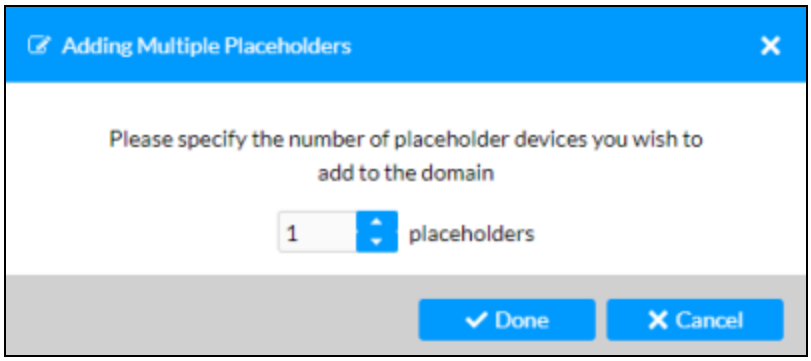
Up to 10 placeholders can be displayed in the table simultaneously. Use the scroll arrows at the bottom of the table to navigate through more than 10 placeholders.

To assign a specific endpoint placeholder to a domain:

1. Do one of the following:
   - Drag and drop the desired placeholder into any location (including an existing row) of the corresponding assignments table.
   - Double-click the desired placeholder.

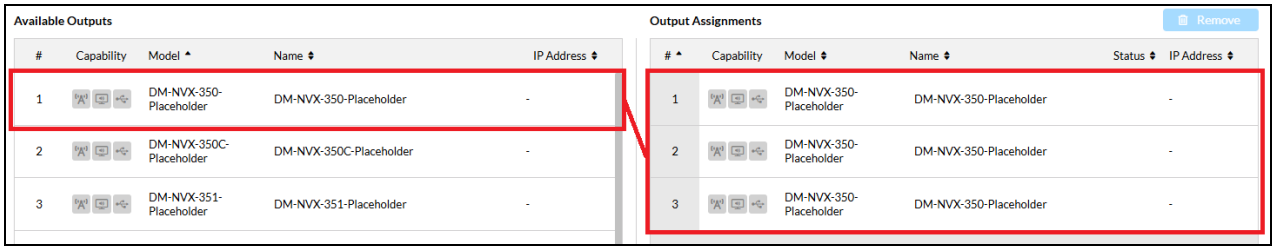
   The **Adding Multiple Placeholders** window opens, prompting for the number of placeholders of the selected endpoint type to be added to the domain.

   Adding Multiple Placeholders Window



2. In the scrollable text box, enter or select the desired number of placeholders (the default setting is **1**), then select **Done**. Depending on the number of placeholders selected, one or more placeholders are added to the corresponding **Input Assignments** or **Output Assignments** table

   Example of Three DM-NVX-350 Placeholders Simultaneously Added to Input Assignments Table



   If the assignments table was originally empty, the desired number of placeholders are added to the beginning of the table. If the placeholder was dragged to an existing row within the table, the desired number of placeholders are added starting at the desired row location and all remaining rows are automatically renumbered. If the placeholder was dragged to the end of the table, the desired number of placeholders are added to the end of the table.

The corresponding **Input Assignemtns** or **Output Assignments** table provides the following information:

- **#:** Indicates the number of the placeholder based on the alphanumeric order of the placeholder name.
- **Capability:** Each icon is shaded gray to indicate that the placeholder provides no capabilities.
- **Model:** Indicates the DM NVX endpoint model that the placeholder represents.

  To sort the table by model name, select the arrows to the right of the **Model** heading.

- **Name:** Indicates the same name listed as the model name. Selecting the name enables the endpoint name to be changed.

  To sort the table by hostname, select the arrows to the right of the **Hostname** heading.
- **IP Address:** Displays a hyphen to indicate that the placeholder does not have an IP address.

To assign multiple different DM NVX endpoint model placeholders simultaneously, do one of the following:

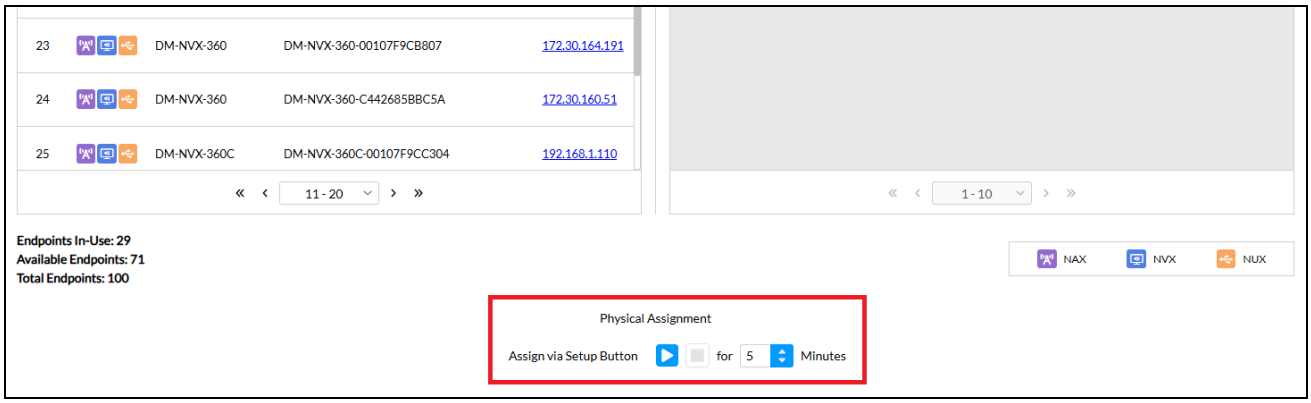
- Select one placeholder, then **Shift** + **Click** on another placeholder to select it and all placeholders in the list between them. Drag and drop the selected placeholders into the corresponding **Input Assignments** or **Output Assignments** table.
- **Ctrl** + **Click** on any number of placeholders to select multiple at once without including any entries in between them. Drag and drop the selected placeholders into the corresponding **Input Assignments** or **Output Assignments** table.

If the assignments table was originally empty, the desired placeholders are added to the beginning of the table. If the placeholders were dragged to an existing row within the table, the placeholders are added starting at the desired row location and all remaining rows are automatically renumbered. If the placeholders were dragged to the end of the table, the placeholders are added to the end of the table.

Use the SETUP Button

The **Physical Assignment** section at the bottom of the **Add Domain...** page allows the physical SETUP button on the available DM NVX endpoints to be used to assign the endpoints to a domain.

Add Domain Page - Physical Assignment



Selecting the **Start** ( ) icon will begin the physical assignment process for the amount of time determined by the **Minutes** text box. During this process, the physical **SETUP** button on each available DM NVX endpoint on the network can be pressed to add that endpoint to the domain.

The **Minutes** range can be adjusted from **1** to **30** minutes, with a default setting of **5** minutes.

The physical assignment process will stop either when it times out (determined by the **Minutes** setting) or when the **Stop** ( ) icon is manually selected.

Once the physical assignment process has stopped, pressing the physical **SETUP** button on DM NVX endpoints will no longer add them to the domain until the process has been restarted.

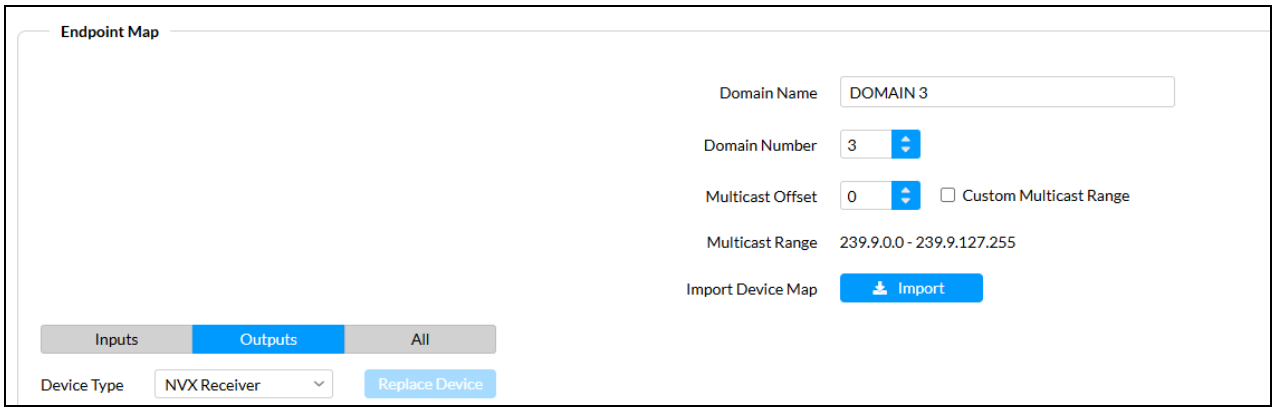
Import a Device Map

A device map consists of a DM NVX Director appliance's domain configuration that can be imported or exported as a .xml file. A device map that was exported from a DM NVX Director appliance being replaced can be imported into the replacement DM NVX Director appliance. For information about exporting a device map, refer to Modifying a Domain on page 857.

To import a device map:

1. Select **Import** at the top of the **Endpoint Map**.

   Add Domain Page - Import Device Map

   A file browser window opens.

2. Navigate to the location of the device map file to be imported, select it, then select **Open**. The device map will be imported into the domain. DM NVX transmitter endpoints are automatically added to the Input Assignments table, and DM NVX receiver endpoints are automatically added to the Output Assignments table.

   NOTE: If the device map file is formatted incorrectly, it will not be accepted by the DM NVX Director appliance.

For information about saving the device map to the domain, refer to Save the Domain on page 847.

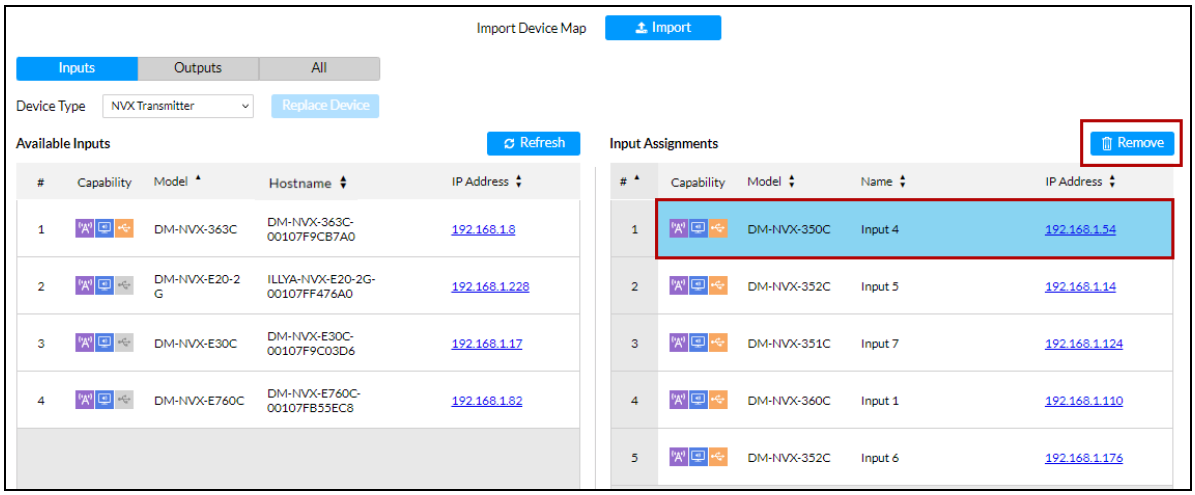
Remove an Endpoint

Endpoints can be removed from the **Input Assignments** or **Output Assignments** table of a domain.

To remove a single endpoint:

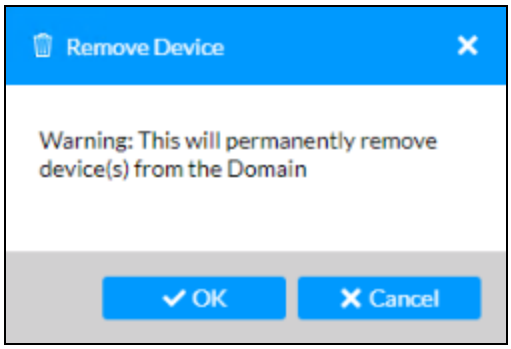
1. Do one of the following:
   - Select the endpoint to be removed. Once the endpoint is shaded blue, select **Remove**.

     Removing an Endpoint Using the Remove Button



   - Double-click the endpoint.

   The **Remove Device** confirmation message box appears.

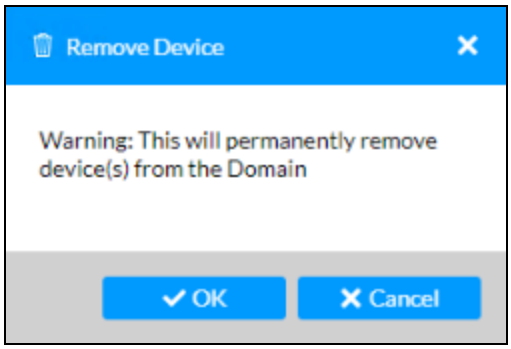


2. Select **OK** to remove the device from the domain, or select **Cancel** to cancel the operation.

To remove multiple endpoints simultaneously:

1. Do one of the following:
   - Select one device, then **Shift** + **Click** on another device to select it and all devices in the list between them, then select **Remove**.
   - **Ctrl** + **Click** on any number of devices to select multiple at once without including any entries in between them, then select **Remove**.

   The **Remove Device** confirmation message box appears.



2. Select **OK** to remove the devices from the domain or select **Cancel** to cancel the operation.

Once removed from a domain, devices become available endpoints listed in the **Available Inputs** and/or **Available Outputs** tables as appropriate.

Replace an Endpoint

Endpoints assigned to a domain can be replaced with available endpoints if required. An endpoint in the **Input Assignments** table can be replaced with an endpoint from the **Available Inputs** table. Similarly, an endpoint in the **Output Assignments** table can be replaced with an endpoint from the **Available Outputs** table.

Some examples of reasons for replacing endpoints are:

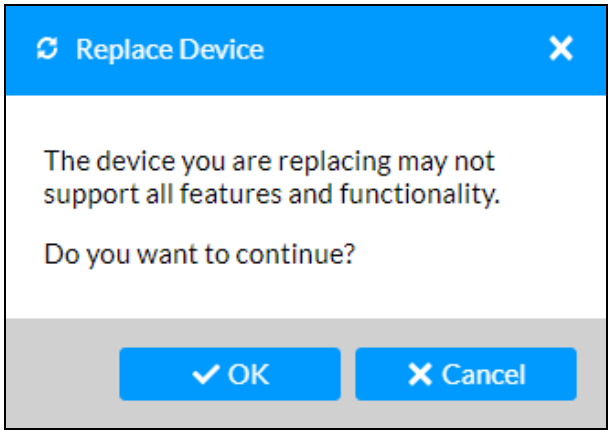
- Replacing an assigned endpoint with a newer available model.
- Replacing an assigned placeholder endpoint with an available discovered endpoint
- Replacing an assigned endpoint with a placeholder endpoint.

To replace an assigned endpoint with another available endpoint:

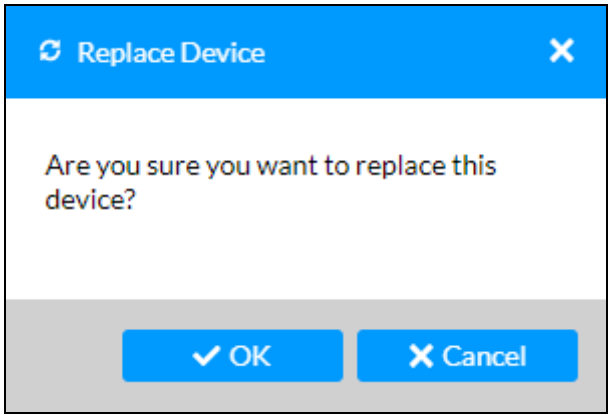
1. Select the endpoint that will be used to replace an assigned endpoint from the **Available Inputs** or **Available Outputs** table. The endpoint is shaded blue.
2. In the corresponding **Input Assignments** or **Output Assignments** table, select the endpoint that is to be replaced. That endpoint will also be shaded blue.

3. Select **Replace Device**. The Replace Device confirmation message box appears.

   If the replacement device is a different DM NVX model than the original, a dialog box will appear warning that the new device may not support all the features and functionality of the one being replaced. The dialog box also prompts for confirmation to proceed with the replacement.



   If the replacement device is the same DM NVX model as the device being replaced, the dialog box prompts for confirmation that the device be replaced.



4. Select **OK** to replace the device or select **Cancel** to cancel the operation.

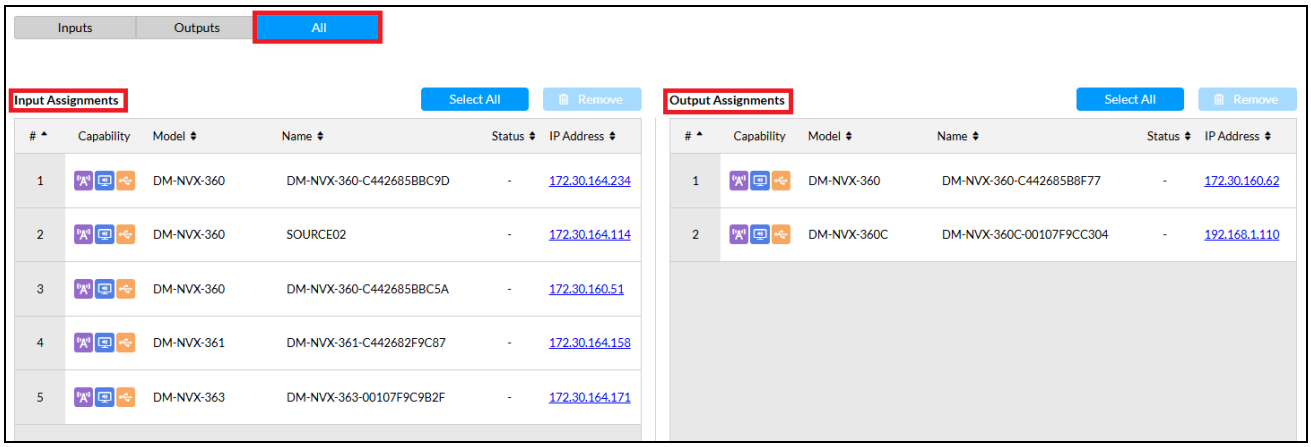
   If **OK** was selected, the endpoint selected in step 1 replaces the endpoint selected in step 2. The endpoint selected in step 2 is removed from the domain and becomes an available endpoint listed in the **Available Inputs** and/or **Available Outputs** tables.

View Input and Output Assignments Simultaneously

The **Input Assignments** and **Output Assignments** tables of the **Endpoint Map** can be displayed simultaneously, enabling both input and output assignments to be viewed. In addition, an input can be reassigned as an output or an output can be reassigned as an input for endpoints that can function as either a transmitter or a receiver.

To view input and output assignments simultaneously, select **All** at the top of the **Endpoint Map**.

Add Domain Page - Simultaneous Display of Input and Output Assignments



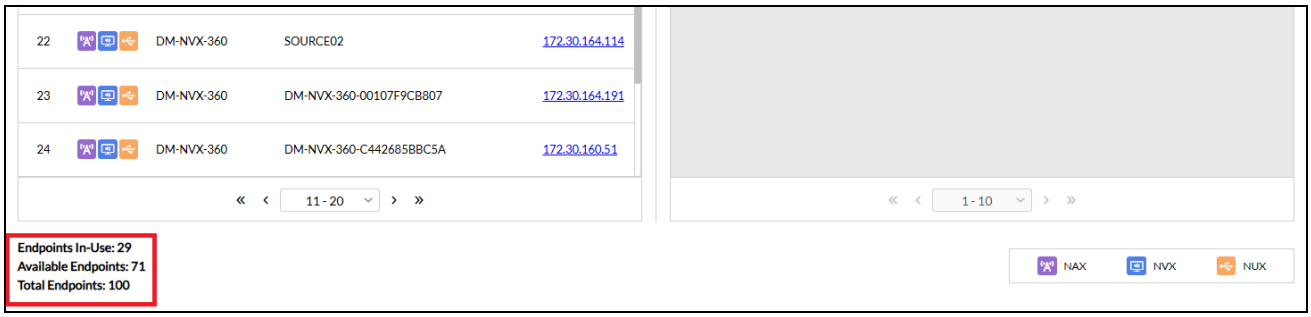
Reassign inputs as outputs or outputs as inputs by doing the following:

- Drag and drop the desired endpoint into any location (including an existing row) of the opposing table (**Input Assignments** or **Output Assignments**).
- Select one endpoint, then **Shift** + **Click** on another endpoint to select it and all endpoints in the list between them. Drag and drop the selected endpoints into the opposing table.
- **Ctrl** + **Click** on any number of endpoints to select multiple at once without including any entries in between them. Drag and drop the selected endpoints into the opposing table.

View Endpoint Statistics

Endpoint statistics are provided at the bottom of the **Endpoint Map**.

Add Domain Page - Endpoint Statistics



The statistics indicate the following information:

- **Endpoints in Use:** Indicates the total number of transmitters, transmitter placeholders, receivers, and receiver placeholders that have been assigned among existing domains.
- **Available Endpoints:** Indicates the total number of transmitters, transmitter placeholders, receivers, and receiver placeholders that are available for assignment among all domains supported by the DM NVX Director appliance.

- **Total Endpoints:** Indicates the total number of endpoints that supported by the DM NVX Director appliance.
    - The DM-NVX-DIR-80 will display **80**.
    - The DM-NVX-DIR-160 will display **160**.
    - The DM-NVX-DIR-ENT will display **1000**.
    - The DM-NVX-DIR2 will display **100**.

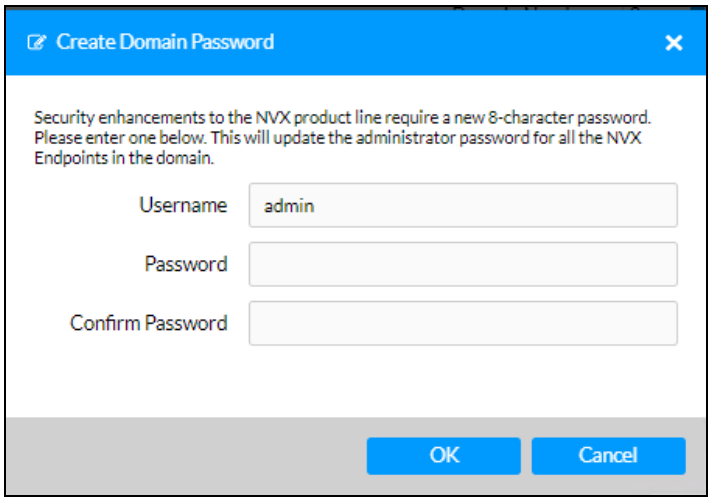
Save the Domain

To save the new domain:

1. Select **Save Changes** at the top-right of the interface (usually labeled **Action**). The **Create Domain Password** dialog box appears.

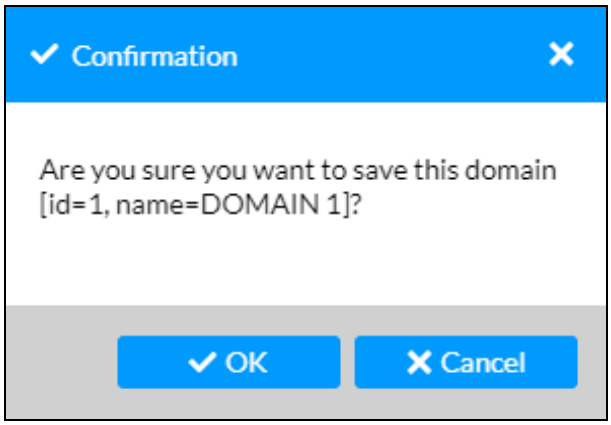
    > **NOTE:** If a domain is added by importing a device map, the Create Domain Password dialog box will not appear. Instead, the **Confirmation** dialog box for saving the domain appears as shown at the end of step 2 below. When the **Confirmation** dialog box appears, proceed to step 3 to save the device map.

    Create Domain Password Dialog Box



2. Assign domain credentials as follows:
    a. If desired, change the current username that is displayed in the Username text box.
    b. In the **Password** text box, enter a password with a minimum of 8 characters. The password is case sensitive.
    c. In the **Confirm Password** text box, reenter the password for confirmation.
    d. Select **OK** to confirm the password or select **Cancel** to cancel the operation.

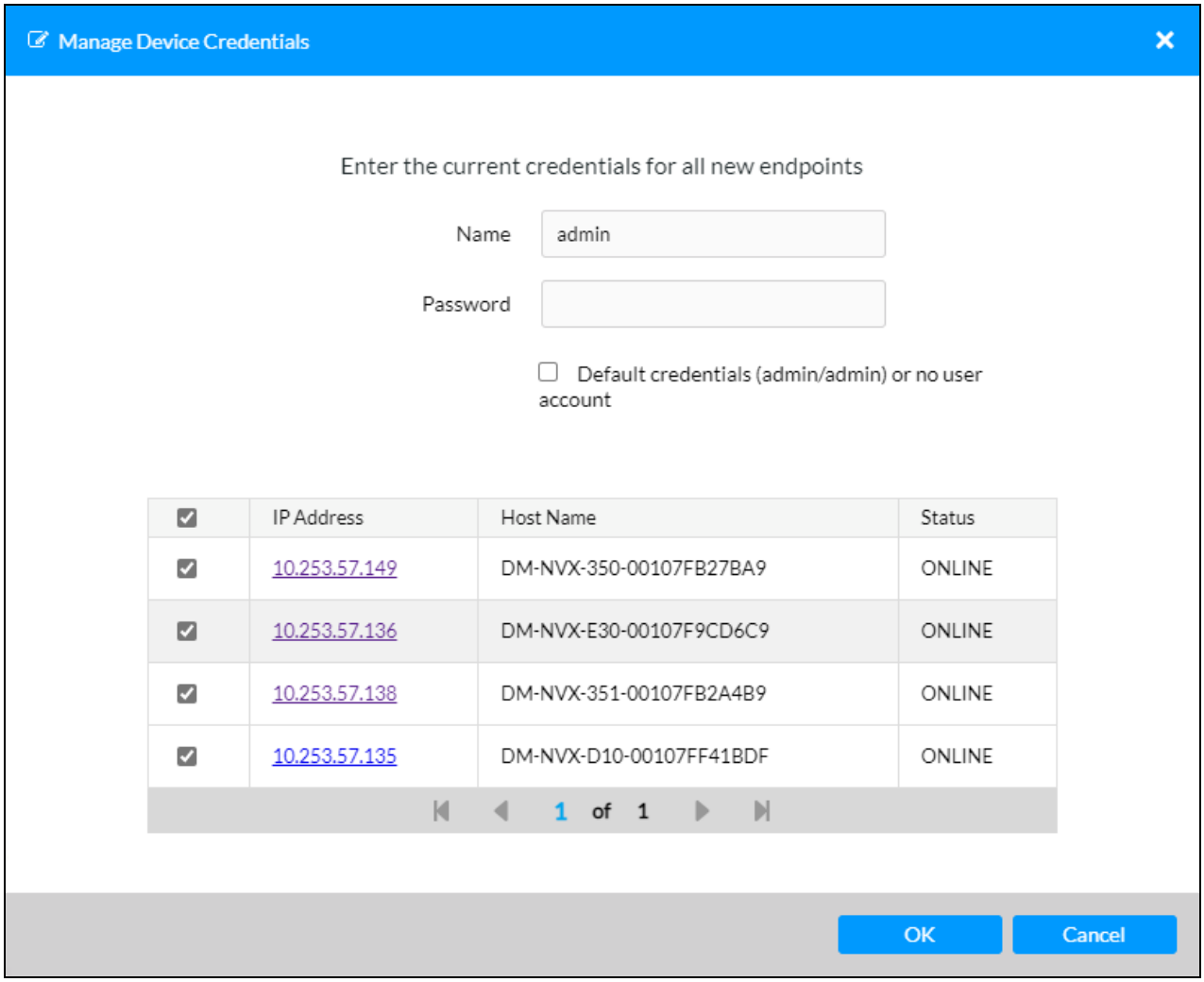
A Confirmation dialog box appears.



3. Select **OK** to save the domain or select **Cancel** to cancel the operation.

   When **OK** is selected, the new domain is saved and added to the navigation menu on the left-hand side of the interface.

   If DM NVX endpoints have been assigned to the domain, the **Manage Device Credentials** dialog box opens.



   By default, the **Default credentials (admin/admin) or no user account** checkbox is selected. The checkboxes of all DM NVX endpoints in the domain are also selected.

   Four DM NVX endpoints are listed at a time. All endpoints in the table can be viewed by using the scroll arrows at the bottom of the table. The IP address, host name, and status (**ONLINE** or **OFFLINE**) of each DM NVX endpoint is displayed. Selecting the IP address of an endpoint links directly to the endpoint's web interface.

   > **NOTE:** Do not deselect the checkbox of any of the DM NVX endpoints listed in the table. The same credentials must be used for all DM NVX endpoints in the domain.

4. To be able to use the current credentials for all DM NVX endpoints listed in the table, do one of the following:
    - For DM NVX endpoints either using **admin/admin** as the default credentials or with no user account, ensure that the **Default credentials (admin/admin) or no user account** checkbox is selected (default setting).
    - For DM NVX endpoints with an existing user account, deselect the **Default credentials (admin/admin) or no user account** checkbox, then enter the endpoint username and password.
5. Select **OK** to assign the credentials to the DM NVX endpoints or select **Cancel** to cancel the operation

    > **NOTE:** If a credential-related error occurs for a DM NVX endpoint, locate its IP address and use its web interface to update the username and password. The DM NVX Director appliance may be temporarily blocked from accessing the endpoint for 24 hours. To remove this restriction and restore communication, connect to the endpoint using the Text Console utility within Crestron Toolbox™ software and issue the following command:
    >
    > `remblockedip all`

    The **Save Domain** status box appears, indicating that the devices are being configured and assigned. A progress indicator bar is also provided. When the process is complete, the dialog box indicates that the configuration is complete.
6. Select OK to dismiss the status box.

    In the navigation menu, the added domain is indicated by the domain name followed by the domain number in parentheses. In addition, the endpoint map of the domain is displayed.

Global Domain Routing

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

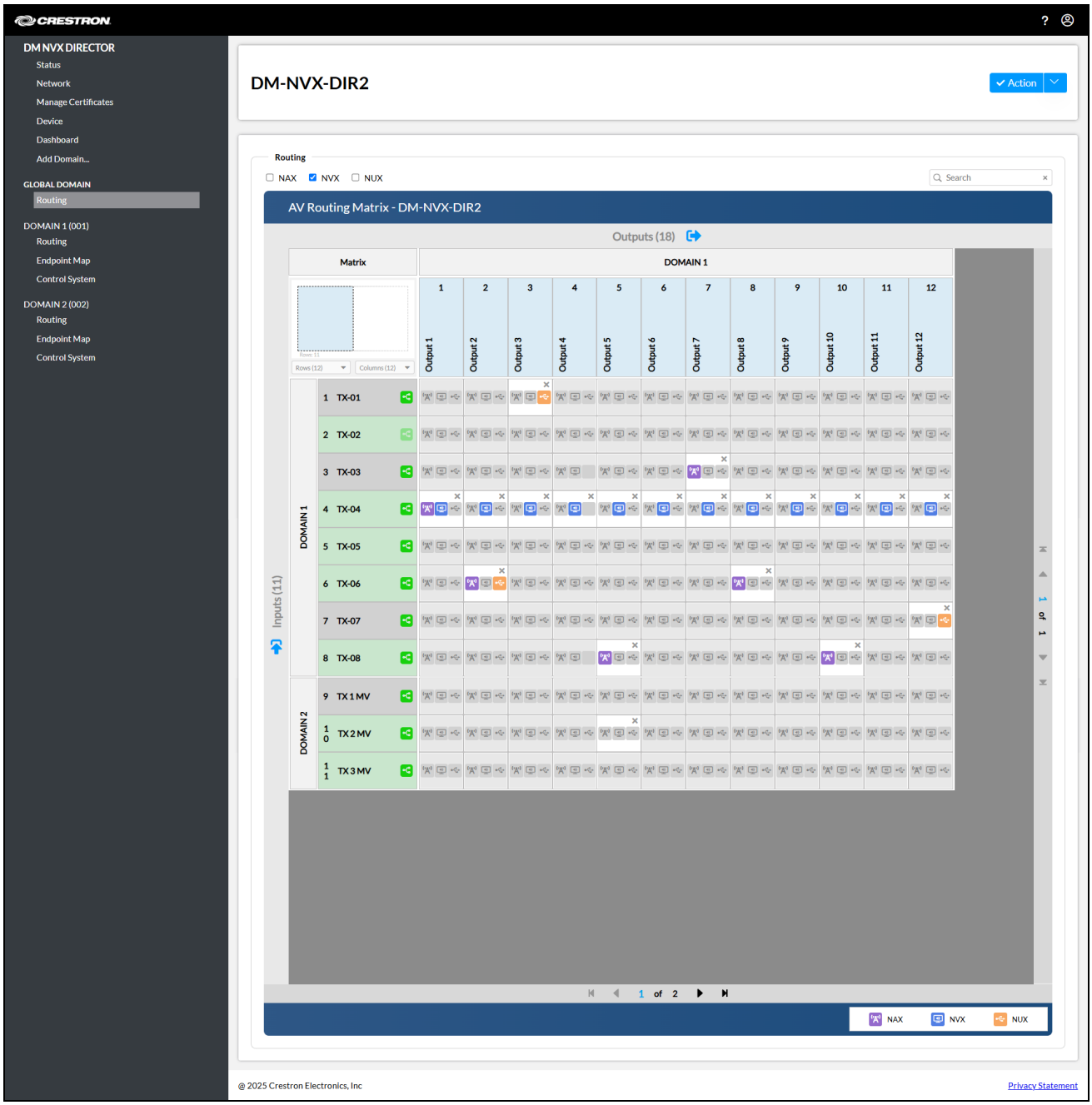
The **GLOBAL DOMAIN** for a DM NVX Director appliance is a superset of all other devices and domains available to the appliance.

The **Routing** page for the **GLOBAL DOMAIN** provides a routing matrix for all endpoints present within the **GLOBAL DOMAIN**. Global domain routing supports interdomain routing, which enables inputs (transmitters) within a single domain to be routed to outputs (receivers) of one or more other domains. Inputs within a single domain can also be routed to outputs within the same domain.

NOTES:

- If interdomain routing is not desired, routing inputs to outputs within a single domain can also be accomplished by navigating to the desired domain in the navigation menu and selecting its **Routing** page. For additional information, refer to Modifying a Domain on page 857.
- The DM-NVX-DIR-160, DM-NVX-DIR-ENT, and DM-NVX-DIR2 support interdomain routing. Because the DM-NVX-DIR-80 supports only a single domain, interdomain routing is not applicable to that model.

GLOBAL DOMAIN - Routing Page



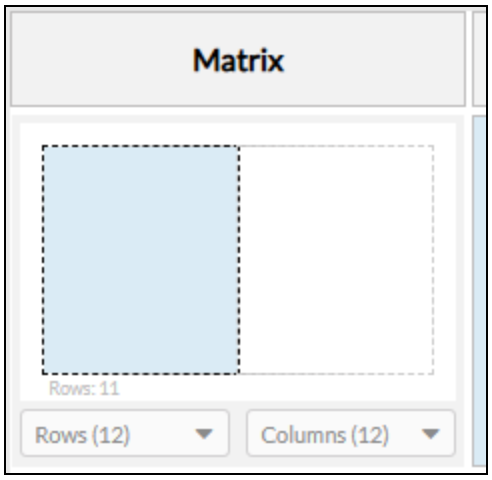
GLOBAL DOMAIN Routing provides an AV routing matrix consisting of inputs and outputs for one or more domains. The inputs are shaded green and are listed vertically on the left-hand side of the matrix. Inputs are identified by their domain number and assigned name. The total number of inputs is labeled on the left side of the routing matrix. If more inputs are present on the matrix than can be listed on a single page, use the navigation arrows on the right-hand side of the matrix to switch pages.

The outputs are shaded blue and are listed horizontally at the top of the matrix. The outputs are identified by their domain number and assigned name. The total number of outputs is labeled at the top of the AV routing matrix. If more outputs are present on the matrix than can be listed on a single page, use the navigation arrows at the top of the matrix to switch pages.

A **Search** box is provided in the upper-right corner above the AV routing matrix. Inputs and outputs can be filtered by searching for names.

The **Routing** matrix provides the following routing controls:

- **Matrix:** A navigation matrix located in the upper-left corner of the **Routing** matrix. Enables quick navigation to a group of inputs and outputs within the global domain.



Below the navigation matrix are **Rows** and **Columns** drop-downs that determine the number of rows (inputs) and number of columns (outputs) to be displayed simultaneously on the **Routing** page.

By default, the **Rows** and **Columns** drop-downss are set to **12**. To change the number of rows and columns that can be displayed on the **Routing** page simultaneously, select the corresponding drop-down list, then select one of the options between **12** (default setting), **16**, **24**, **36**, **48**, or **Custom**. If Custom is selected, enter the desired number of rows or columns.

A black dashed box in the navigation matrix represents the number of rows and columns currently displayed in the **Routing** matrix. Selecting one of the gray dashed boxes navigates to another group of rows and columns (if available) within the global domain.

- **Signal type icons:** Icons at each crosspoint of the **Routing** matrix representing the three signal types to be routed: DM NAX audio-over-IP, DM NVX AV-over-IP, and DM NUX USB-over-Ethernet. By default, the icons are shaded gray, indicating that the signal types are not routed at that cell.

  When the signal types are routed, their respective icons appear as follows:

  -  The purple icon indicates that DM NAX audio-over-IP is routed between the endpoints represented by a cell.

    > **NOTE:** If the DM NAX icon continuously flashes purple, a routing problem exists (for example, one of the endpoints is offline). The route cannot be made until the problem is resolved.

  -  The blue icon indicates that DM NVX AV-over-IP is routed between the endpoints represented by a cell.

    > **NOTE:** If the DM NVX icon continuously flashes blue, a routing problem exists (for example, one of the endpoints is offline). The route cannot be made until the problem is resolved.

  -  The yellow icon indicates that DM NUX USB-over-Ethernet is routed between the endpoints represented by a cell.

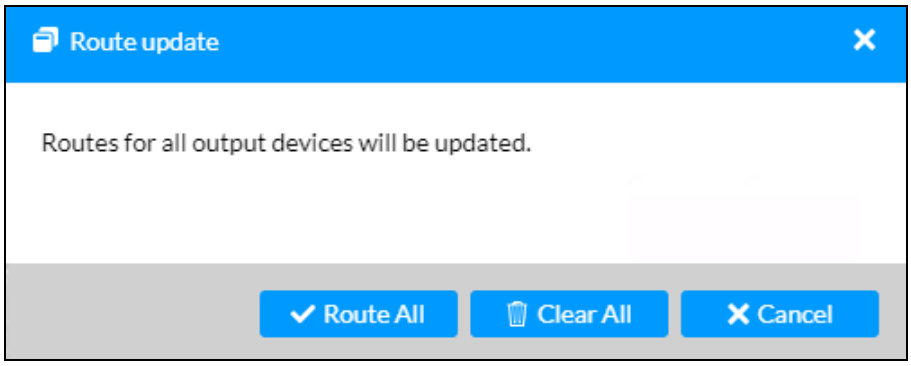
    > **NOTES:**
    >
    > - If the DM NUX icon continuously flashes yellow, a routing problem exists (for example, one of the endpoints is offline). The route cannot be made until the problem is resolved.
    > - If a DM NVX endpoint does not provide USB data capability, the DM NUX icon is shaded gray and is empty (it does not include the USB symbol). Although the **NUX** checkbox may be selected at the top of the **Routing** matrix, USB data cannot be routed for that DM NVX endpoint.

  For each input and associated output, the three icon buttons are arranged horizontally in a single cell. Each cell represents a specific crosspoint between one transmitter endpoint and one receiver endpoint. Selecting a cell will route whichever signal types are selected using the checkboxes at the top of the **Routing** matrix (**NAX**, **NVX**, and **NUX**). Selecting a cell again when those signal types are already routed will unroute those signals for that cell.

- **Route Update icon ( )**: Green icon that is located to the right of each input name, which is shaded green.

  > **NOTE:** The **Route Update** icon does not apply to the DM NUX USB-over-Ethernet signal type. Even if the **NUX** signal type checkbox is selected, DM NUX routing is ignored when the **Route Update** dialog box is used to route or clear signals for all outputs.

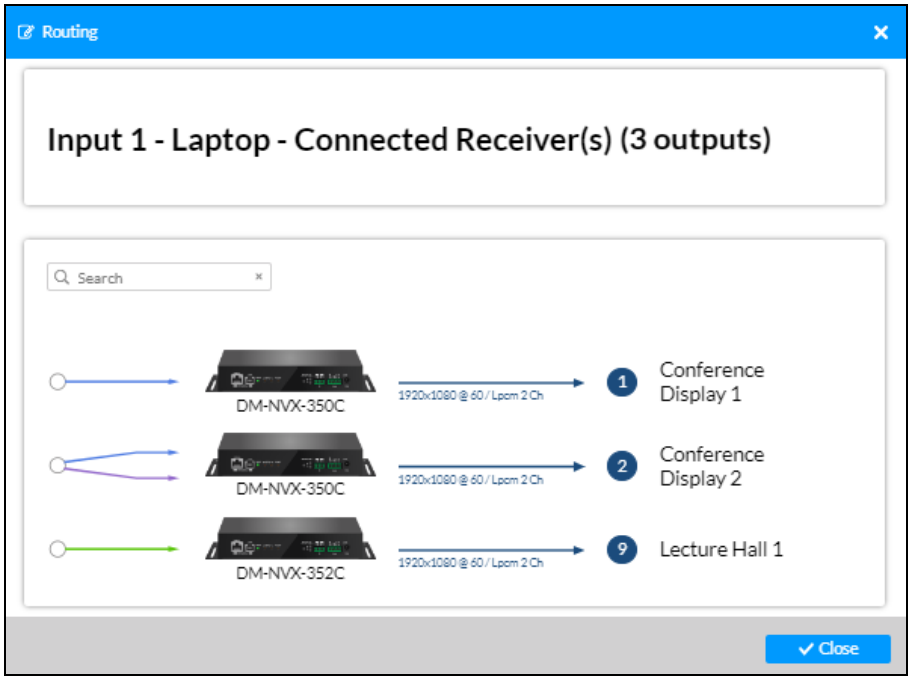
  When the **Route Update** icon is selected, the **Route update** dialog box appears.



  To route signals based on the selected signal types, selecting **Route All** routes the associated signal types from the input to all outputs. To clear the signal types for all outputs, select **Clear All**. Alternatively, select **Cancel** to cancel the route update operation.

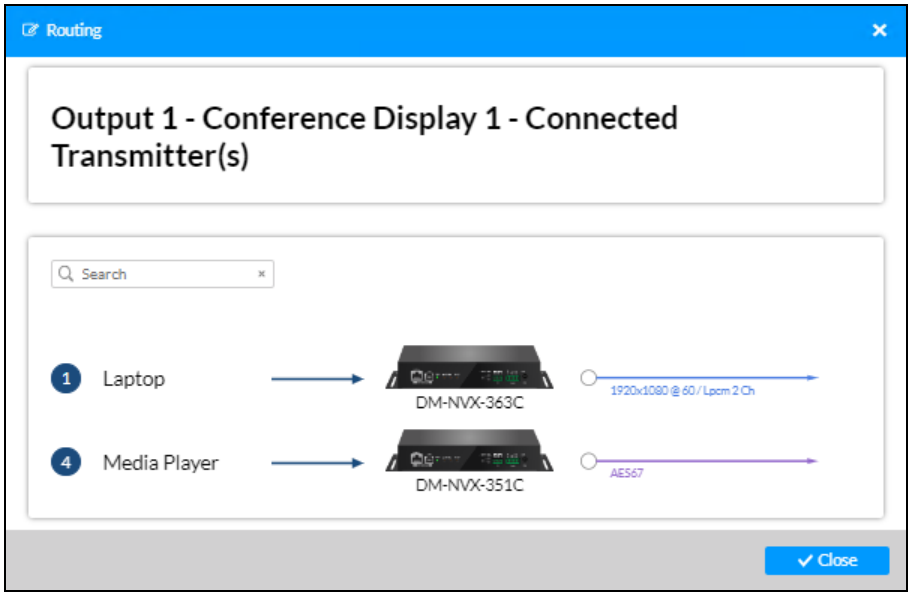
The **Routing** matrix also enables a signal routing map to be viewed for each input and output.

To view the signal routing map for an input, select its name. The signal routing map for the input is displayed:



Select **Close** to dismiss the signal routing map.

To view the signal routing map for an output, select its name. The signal routing map for the output is displayed.



Select **Close** to dismiss the signal routing map.

Modifying a Domain

NOTE: Unless otherwise noted, this section applies to the following models:

- DM-NVX-DIR-80
- DM-NVX-DIR-160
- DM-NVX-DIR-ENT
- DM-NVX-DIR2

After a domain is added to the DM NVX Director appliance, the following links are provided for each domain in the navigation menu:

- Routing on page 857
- Endpoint Map on page 862
- Control System on page 869

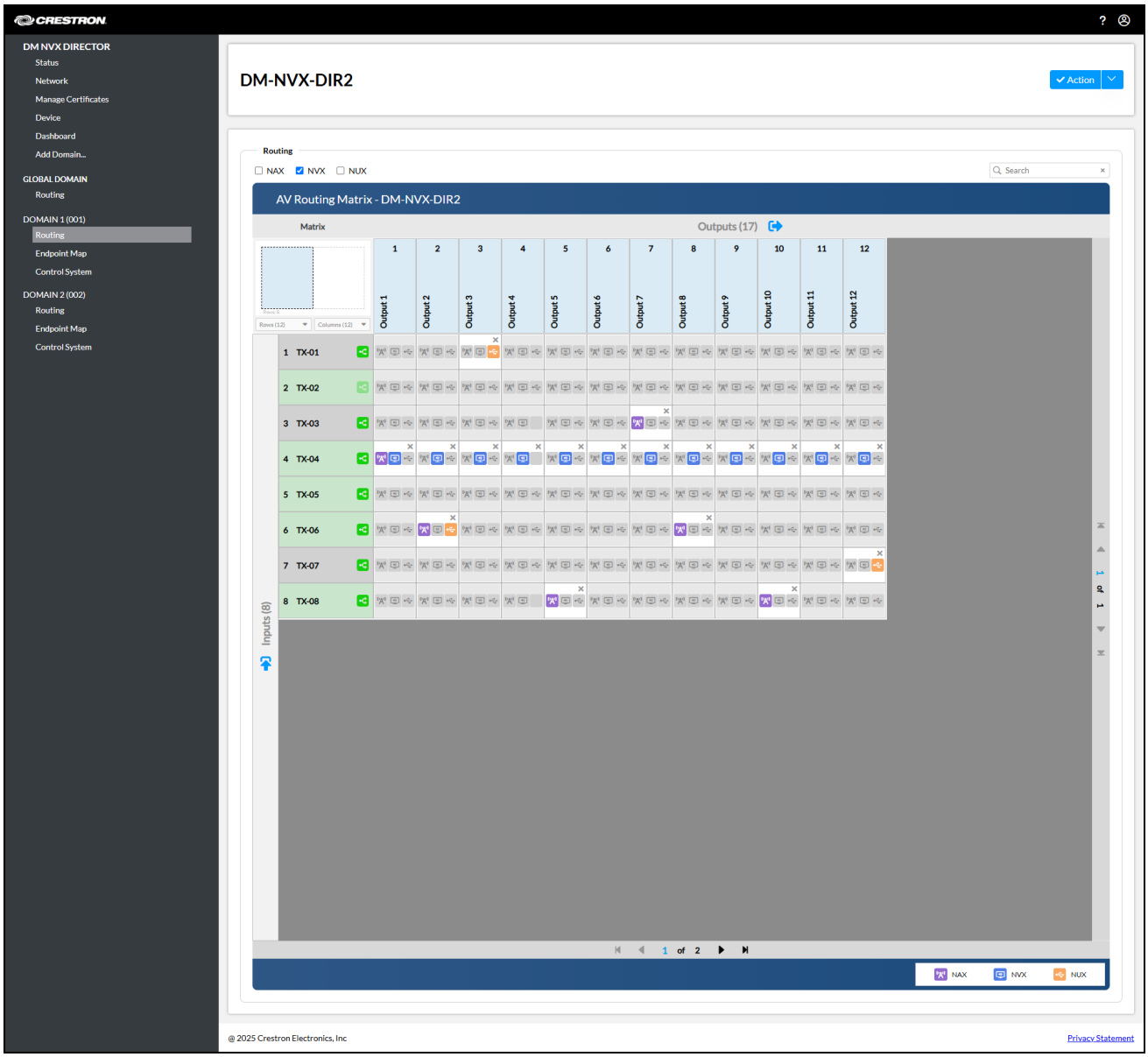
Routing

Domain routing enables inputs within a domain to be routed to outputs within the same domain only. Routing is accomplished for each domain on an individual basis.

NOTE: For information about interdomain routing, which enables inputs within a single domain to be routed to the outputs of one or more other domains, refer to Global Domain Routing on page 851.

The **Routing** page for a domain provides a routing matrix for all endpoints present within that domain.

Domain Routing Page



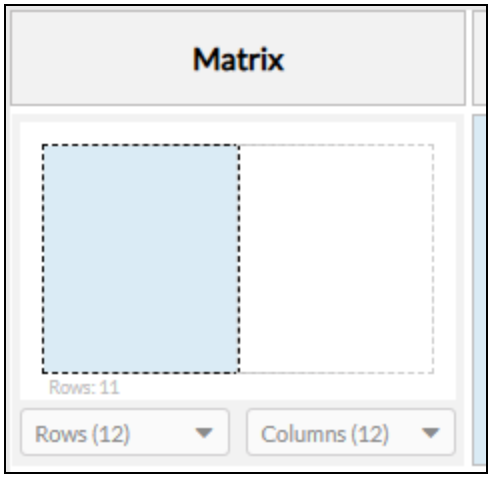
The inputs are shaded green and are listed vertically on the left-hand side of the matrix. Inputs are identified by their domain number and assigned name. The total number of inputs is labeled on the left side of the routing matrix. If more inputs are present on the matrix than can be listed on a single page, use the navigation arrows on the right-hand side of the matrix to switch pages.

The outputs are shaded blue and are listed horizontally at the top of the matrix. The outputs are identified by their domain number and assigned name. The total number of outputs is labeled at the top of the AV routing matrix. If more outputs are present on the matrix than can be listed on a single page, use the navigation arrows at the top of the matrix to switch pages.

A **Search** box is provided in the upper-right corner above the AV routing matrix. Inputs and outputs can be filtered by searching for names.

The **Routing** matrix provides the following routing controls:

- **Matrix:** A navigation matrix located in the upper-left corner of the **Routing** matrix. Enables quick navigation to a group of inputs and outputs within the global domain.



  Below the navigation matrix are **Rows** and **Columns** drop-downs that determine the number of rows (inputs) and number of columns (outputs) to be displayed simultaneously on the **Routing** page.

  By default, the **Rows** and **Columns** drop-downs are set to **12**. To change the number of rows and columns that can be displayed on the **Routing** page simultaneously, select the corresponding drop-down list, then select one of the options between **12** (default setting), **16**, **24**, **36**, **48**, or **Custom**. If Custom is selected, enter the desired number of rows or columns.

  A black dashed box in the navigation matrix represents the number of rows and columns currently displayed in the **Routing** matrix. Selecting one of the gray dashed boxes navigates to another group of rows and columns (if available) within the global domain.

- **Signal type icons:** Icons at each crosspoint of the **Routing** matrix representing the three signal types to be routed: DM NAX audio-over-IP, DM NVX AV-over-IP, and DM NUX USB-over-Ethernet. By default, the icons are shaded gray, indicating that the signal types are not routed at that cell.

  When the signal types are routed, their respective icons appear as follows:

  -  The purple icon indicates that DM NAX audio-over-IP is routed between the endpoints represented by a cell.

    > **NOTE:** If the DM NAX icon continuously flashes purple, a routing problem exists (for example, one of the endpoints is offline). The route cannot be made until the problem is resolved.

  -  The blue icon indicates that DM NVX AV-over-IP is routed between the endpoints represented by a cell.

    > **NOTE:** If the DM NVX icon continuously flashes blue, a routing problem exists (for example, one of the endpoints is offline). The route cannot be made until the problem is resolved.

  -  The yellow icon indicates that DM NUX USB-over-Ethernet is routed between the endpoints represented by a cell.

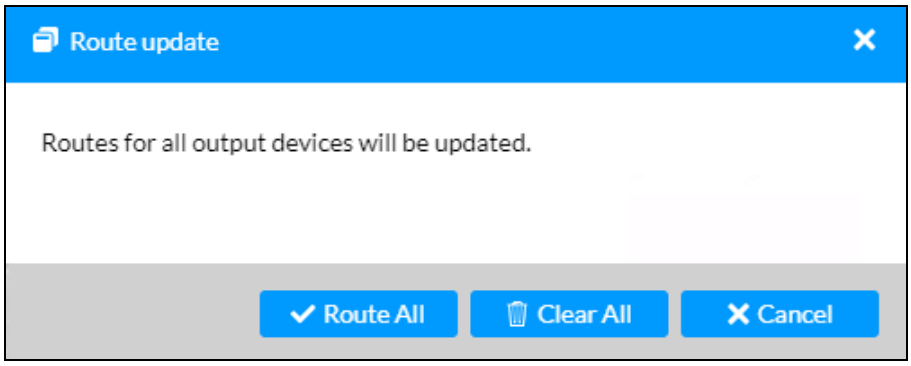
    > **NOTES:**
    >
    > - If the DM NUX icon continuously flashes yellow, a routing problem exists (for example, one of the endpoints is offline). The route cannot be made until the problem is resolved.
    > - If a DM NVX endpoint does not provide USB data capability, the DM NUX icon is shaded gray and is empty (it does not include the USB symbol). Although the **NUX** checkbox may be selected at the top of the **Routing** matrix, USB data cannot be routed for that DM NVX endpoint.

  For each input and associated output, the three icon buttons are arranged horizontally in a single cell. Each cell represents a specific crosspoint between one transmitter endpoint and one receiver endpoint. Selecting a cell will route whichever signal types are selected using the checkboxes at the top of the **Routing** matrix (**NAX**, **NVX**, and **NUX**). Selecting a cell again when those signal types are already routed will unroute those signals for that cell.

- **Route Update icon ( )**: Green icon that is located to the right of each input name, which is shaded green.

  > **NOTE:** The **Route Update** icon does not apply to the DM NUX USB-over-Ethernet signal type. Even if the **NUX** signal type checkbox is selected, DM NUX routing is ignored when the **Route Update** dialog box is used to route or clear signals for all outputs.

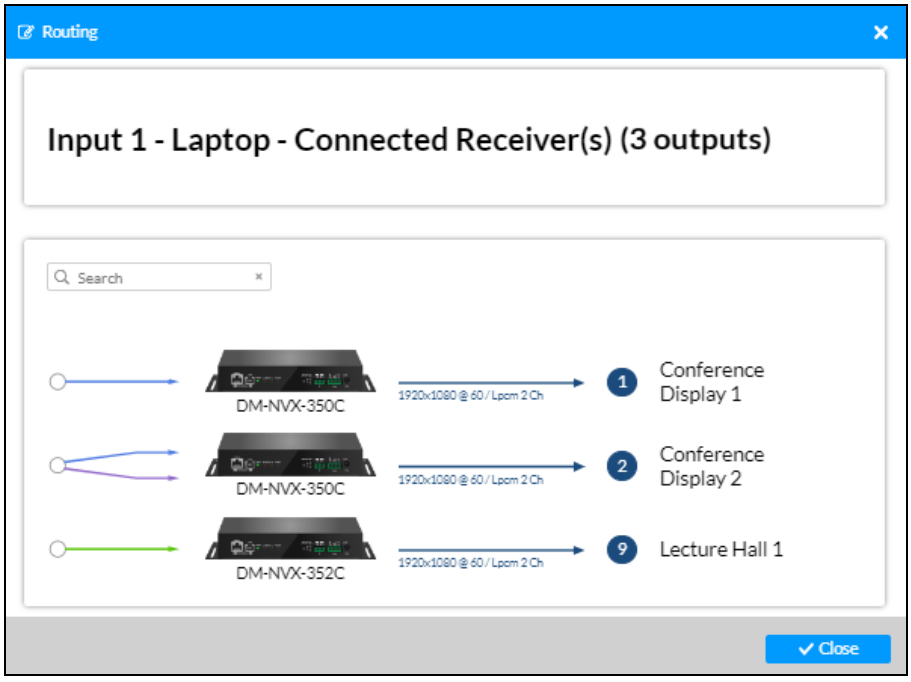
  When the **Route Update** icon is selected, the **Route update** dialog box appears.



  To route signals based on the selected signal types, selecting **Route All** routes the associated signal types from the input to all outputs. To clear the signal types for all outputs, select **Clear All**. Alternatively, select **Cancel** to cancel the route update operation.

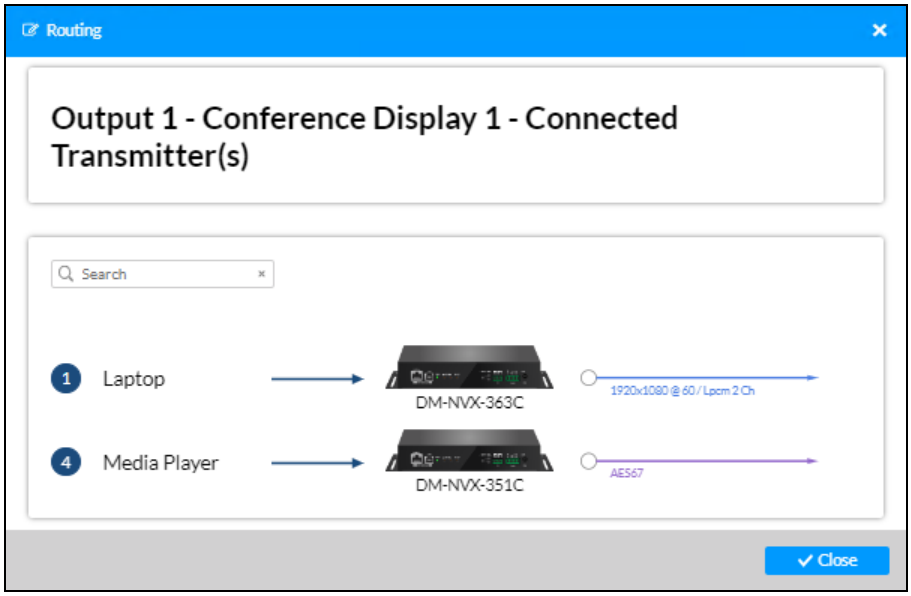
The **Routing** matrix also enables a signal routing map to be viewed for each input and output.

To view the signal routing map for an input, select its name. The signal routing map for the input is displayed:



Select **Close** to dismiss the signal routing map.

To view the signal routing map for an output, select its name. The signal routing map for the output is displayed.



Select **Close** to dismiss the signal routing map.

Endpoint Map

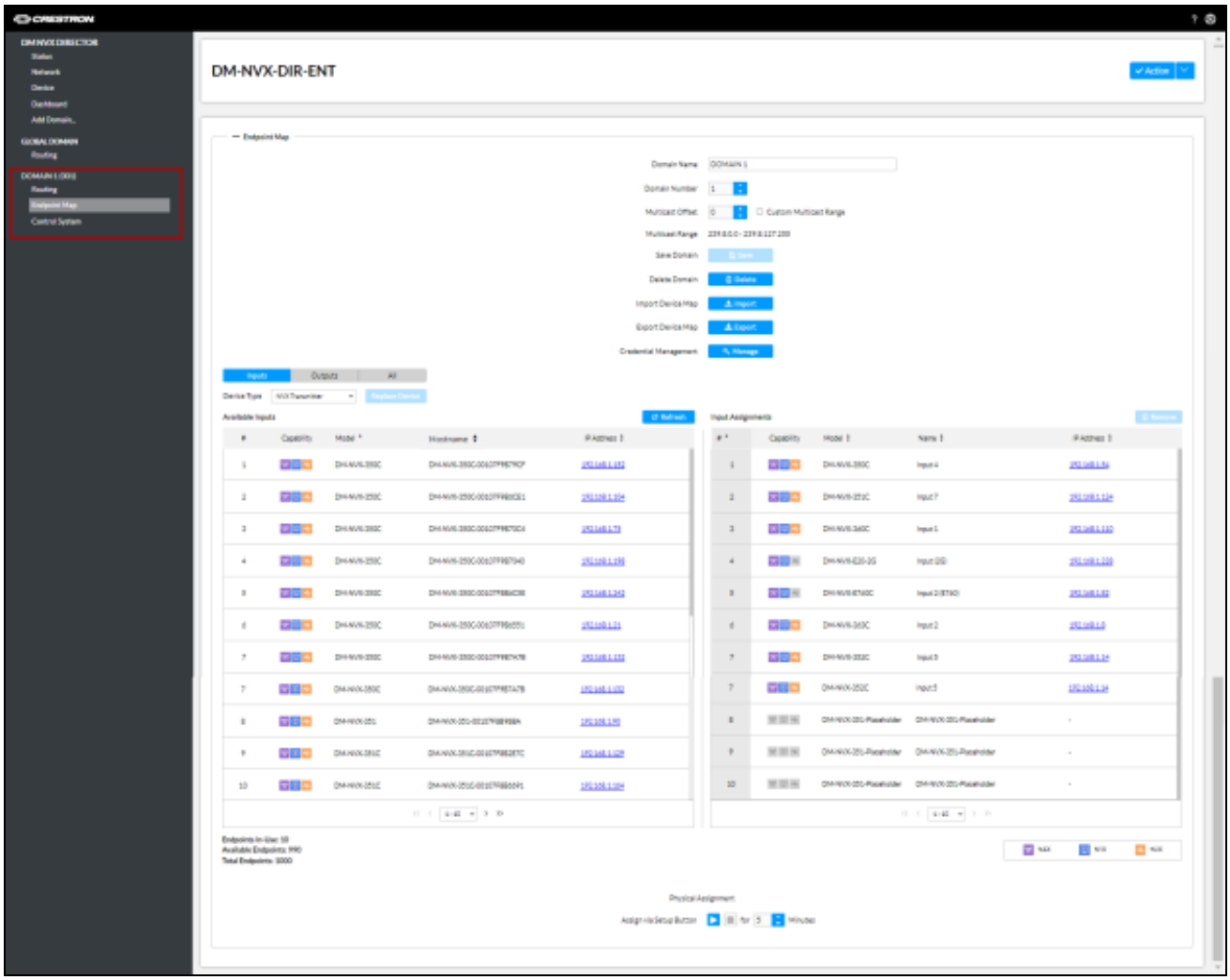
After a domain is added and saved, the domain endpoint map can be modified as necessary for each domain on an individual basis. The domain can also be deleted.

> **NOTE:** To simplify programming of domains, it is recommended that domains be modified via the DM NVX Director appliance's web interface before being modified in the SIMPL program. The domain configuration in the web interface can then be referenced when modifying domains in the program.

To modify a domain endpoint map using the DM NVX Director web interface:

In the navigation menu, navigate to the desired domain, then select **Endpoint Map**. The **Domain Endpoint Map** page opens, providing the current configuration of the domain endpoint map.

Domain Endpoint Map Page



NOTE: To save certain changes on the **Endpoint Map** page, a **Save** button is provided. Depending on the change that is being made, a message appears in red below the **Save** button, indicating that the change must be saved. To save one or more changes, select this **Save** button or select **Save Changes** in the **Action** menu.

Using the **Domain Endpoint Map** page, perform any of the following tasks:

- Modify Domain Identification and Multicast Information on page 864
- Delete the Domain on page 866
- Import a Device Map on page 866
- Export a Device Map on page 867
- Manage Credentials on page 867
- Assign Endpoints on page 869

Modify Domain Identification and Multicast Information

If required, modify any of the current domain identification and multicast information settings using the following fields at the top of the **Endpoint Map**:

- **Domain Name:** Enter a friendly name to identify the domain on the network. The default domain names are numbered consecutively starting from **DOMAIN 1**.
- **Domain Number:** Enter or select a number in the scrollable text entry field.
  - For the DM-NVX-DIR-80, the **Domain Number** must be set to **1**.
  - For the DM-NVX-DIR-160, the **Domain Number** can be set from **1** to **20**.
  - For the DM-NVX-DIR-ENT, the **Domain Number** can be set from **1** to **240**.
  - For the DM-NVX-DIR2, the **Domain Number** can be set from **1** to **20**.

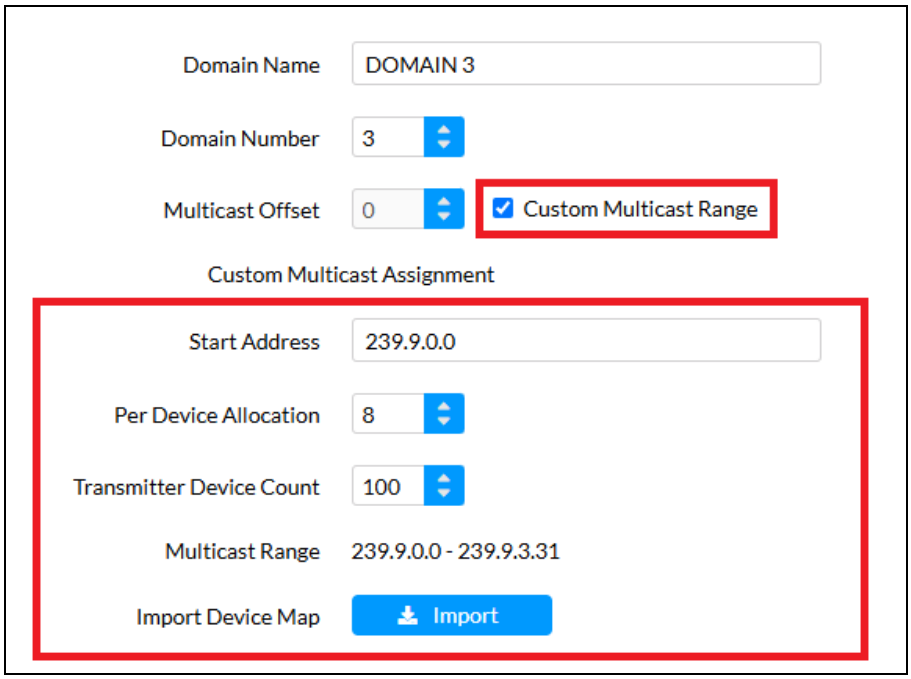
  NOTES:
  - The **Domain Number** must correspond to the **XIO Domain** slot number used in the SIMPL program. For example, if the **Domain Number** is set to **1** via the web interface, the corresponding **XIO Domain** slot number in the SIMPL program must be **Slot-01 : XIO-Domain : XIO Domain**. Refer to the DM NVX Director symbol help file for more information.
  - Domain numbers cannot be used on multiple domains.
- **Multicast Offset:** Enter or select a **Multicast Offset** only when multiple DM NVX Director network appliances exist on the same network and a **Custom Multicast Range** (discussed below) is not set. The **Multicast Offset** is required to prevent multicast collisions between DM NVX endpoints managed by different DM NVX Director appliances on the same network.

  NOTES:
  - The total of the Domain Number and the Multicast Offset must be less than or equal to 240.

    For example:
    - If the **Domain Number** is **1**, valid **Multicast Offset** values range from **0** to **239**.
    - If the **Domain Number** is **2**, valid **Multicast Offset** values range from **0** to **238**.
    - If the **Domain Number** is **20**, valid **Multicast Offset** values range from **0** to **220**.
  - The combination of **Domain Number** and **Multicast Offset** determines the **Multicast Range**, which must be unique for each domain.

- **Custom Multicast Range:** (Optional) Specifies a custom multicast range for assigning to endpoints when the checkbox is selected, and **Start Address**, **Per Device Allocation**, and **Transmitter Device Count** are all set under **Custom Multicast Assignment**.

  Custom Multicast Assignment Example



  Refer to the following guidelines to configure the **Custom Multicast Assignment** fields:

  - **Start Address:** Enter the starting multicast address of the **Custom Multicast Range**. The starting address must end with an even number (including **0**).

    > **NOTE:** Multicast addresses can start at 224.0.2.0 and end at 239.255.255.254, excluding 239.255.255.250 and 239.255.255.253.

    The first DM NVX endpoint in the domain will be assigned the **Start Address**.

  - **Per Device Allocation:** Enter or select the number of multicast addresses to be assigned to each DM NVX endpoint. Values range from **2** to **256** and must be an even number.

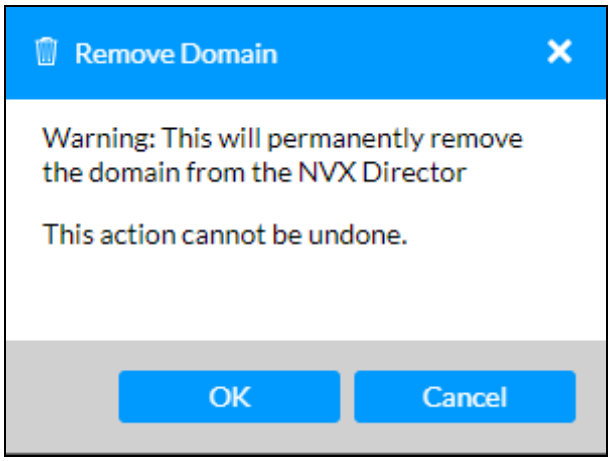
    > **NOTE:** If a value of **2** is entered, a message appears indicating that DM NVX endpoints may use 3 or more multicast addresses depending on the device configuration.

- **Transmitter Device Count:** Enter or select the number of DM NVX endpoints to be assigned to the domain:
  - For the DM-NVX-DIR-80, values range from **2** to **80**.
  - For the DM-NVX-DIR-160, values range from **2** to **160**.
  - For the DM-NVX-DIR-ENT, values range from **2** to **1000**.
  - For the DM-NVX-DIR2, values range from **2** to **100**.

  The **Multicast Range** is calculated and displayed once these fields are configured. For example, if **Start Address** is set to **239.100.100.0**, **Per Device Allocation** is set to **4**, and **Transmitter Device Count** is set to **16**, the custom multicast range will result in 64 multicast addresses (4 times 16) ranging from **239.100.100.0** to **239.100.100.63**.

Delete the Domain

To delete the domain, select **Delete** above the **Endpoint Map**. A **Remove Domain** dialog box appears, warning that the domain will be permanently removed.



Select **OK** to delete the domain or select **Cancel** to cancel the operation.

Import a Device Map

A device map can be imported on an existing **Domain Endpoint Map** page that does not include a domain configuration of input and output assignments.

CAUTION: If the **Domain Endpoint Map** page already includes a domain configuration of input and output assignments, importing a device map will replace the existing configuration.

To import a device map:

1. Select **Import** above the **Endpoint Map**. A file browser window appears.
2. Navigate to the location of the desired device map file, select it, then select Open.

   The device map is imported into the domain. DM NVX transmitter endpoints are automatically added to the **Input Assignments** table, and DM NVX receiver endpoints are automatically added to the **Output Assignments** table.

   > **NOTE:** If the device map file is formatted incorrectly, it will not be accepted by the DM NVX Director network appliance.

Export a Device Map

A device map consists of a DM NVX Director domain configuration that can be imported or exported as a .xml file. A device map can be exported to your computer to provide a backup of a current domain configuration or for use by a replacement DM NVX Director appliance if necessary.

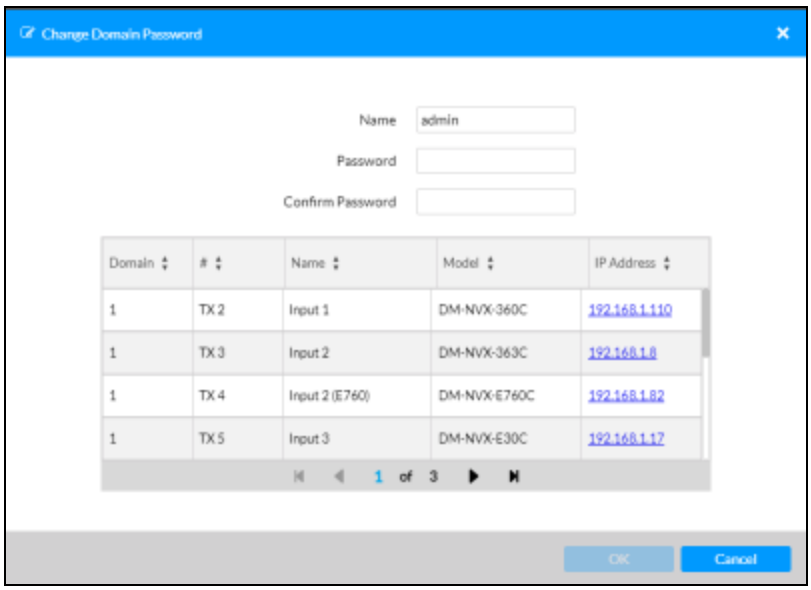
To export a device map, select **Export** above the **Endpoint Map**. The device map .xml file will be downloaded to the downloads folder of the PC accessing the appliance's web interface.

Manage Credentials

For security purposes, the password of all endpoints in a domain can be changed. Alternatively, a new user account can be created.

To change the password or to create a new user account:

1. Select **Manage** above the **Endpoint Map**. The Change Domain Password dialog box appears.



The **Change Domain Password** dialog box provides a table listing all DM NVX endpoints in the domain. For each endpoint, the following information is provided:

- **Domain:** Displays the domain number to which the endpoints are assigned
- **#:** For a transmitter, indicates **TX** followed by a number indicating the order in which the transmitter was added to the domain. For a receiver, indicates **RX** followed by a number indicating the order in which the receiver was added to the domain.

  To sort the table by device number, select the arrows to the right of the **#** heading.
- **Name:** Indicates the device name assigned to the endpoint.

  To sort the table by name, select the arrows to the right of the **Name** heading.
- **Model:** Indicates the model name of the endpoint.

  To sort the table model name, select the arrows to the right of the **Model** heading.
- **IP Address:** Indicates the IP address of the endpoint. Clicking the IP address provides access to the web interface of the endpoint.

  To sort the table by IP address, select the arrows to the right of the **IP Address** heading.

Four DM NVX endpoints are listed at a time. All DM NVX endpoints in the table can be viewed by using the scroll arrows at the bottom of the table to navigate through the list of endpoints.

2. Change the username and password of all DM NVX endpoints in the domain as required:
    a. In the **Name** text box, modify the current username if required. The username is not case sensitive.
    b. In the **Password** text box, enter a new password using a minimum of 8 characters. The password is case sensitive.
    c. In the **Confirm Password** text box, reenter the password for confirmation.
    d. Select **OK** to modify the credentials or select **Cancel** to cancel the operation.

> **NOTE:** If a credential-related error occurs for a DM NVX endpoint, locate its IP address and use its web interface to update the username and password. The DM NVX Director appliance may be temporarily blocked from accessing the endpoint for 24 hours. To remove this restriction and restore communication, connect to the endpoint using the Text Console utility within Crestron Toolbox™ software and issue the following command:
>
> ```
> remblockedip all
> ```

Assign Endpoints

After a domain has been added and saved, additional endpoints can be assigned to the **Endpoint Map** as required.

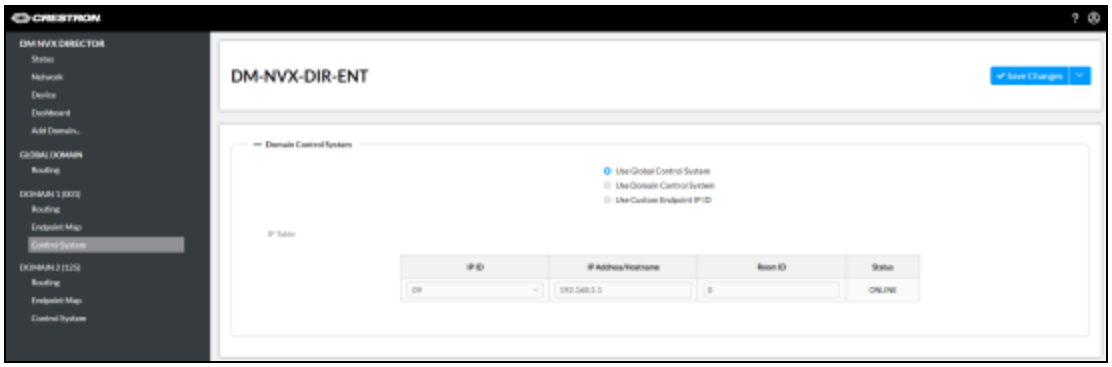
Refer to the **Assign Endpoints to the Domain** heading under Add Domain on page 829 for detailed instructions on adding endpoints to a domain.

Control System

A single control system, referred to as the **Global Control System**, can be assigned to all domains simultaneously in the **Control System** section of the **Device** page (refer to Device on page 814 for more information). Support for multiple control systems by the DM NVX Director appliance additionally enables the **Global Control System** or another control system, referred to as a **Domain Control System**, to be assigned to each domain on an individual basis.

To assign a control system to a domain on an individual basis:

1. In the navigation menu, navigate to the desired domain and select **Control System**.



2. Select one of the available radio buttons:
    - **Use Global Control System:** Enables the **Global Control System** specified in the **Control System** section of the **Device** page to control this domain. When assigning control systems on an individual basis, the **Global Control System** can be used for one or more domains.
    - **Use Domain Control System:** Enables a control system other than the **Global Control System** to be control this domain. If **Use Domain Control System** is selected, configure the following in the **IP Table** below:
        - **IP ID:** Select the desired IP ID from the drop-down. This must match the IP ID assigned to the domain in the control system's program.
        - **IP Address/Hostname:** Enter the IP address or hostname of the control system. The IP address must be different from the IP address of the **Global Control System** and must be unique for each domain.
        - **Room ID:** If using Crestron Virtual Control, enter a room ID.
    - **Use Custom Endpoint IP ID:** Forces all connected DM NVX endpoint IP IDs to be configured locally. The IP ID of the DM NVX Director appliance will not be applied to any of the connected endpoints, and all endpoints will have to be configured manually.

      CAUTION: Use this mode only if specifically required. Either **Use Global Control System** or **Use Domain Control System** will allow the DM NVX Director device to assign IP IDs more efficiently, and will save those IP IDs as part of the device configuration file. Losing communications to the DM NVX Director in either of these modes does not lead to losing communications with the connected endpoints. In **Use Custom Endpoint IP ID** mode:
        - The IP IDs of the individual devices are not saved in the DM NVX Director's configuration file.
        - Changing the device control mode back to one of the other modes will overwrite the locally set IP IDs of the endpoints.
3. Select **Save Changes** in the **Action** menu to save the control system settings for the domain.

Status indicates whether the control system is **ONLINE** or **OFFLINE**.

AV-over-IP Network Design

A Crestron DM NVX AV-over-IP (AVoIP) distribution system routes and manages digital AV and USB signals over standard gigabit Ethernet infrastructure. The DM NVX AVoIP platform also includes DM NAX Audio-over-IP technology for distribution of digital audio signals based on AES67 standards. DM NVX AVoIP traffic is multicast by design, so careful and thorough network design is critical to a successful deployment. For a proper installation of a DM NVX AVoIP distribution system, refer to the best practices that follow.

> **NOTE:** Additional content pertaining to systems utilizing DM NAX Audio-over-IP technology is available in the DM NAX Audio-over-IP Network Design topic in the DM NAX Audio-over-IP Platform Product Manual.

Minimum Network Requirements

Several network switch hardware and firmware features are required in order for an install to successfully support DM NVX AVoIP.

- Required network switch features and settings:
  - 1 Gbps port for each connected DM NVX endpoint
  - Nonblocking backplane
  - Layer 3 switching
  - IGMPv2 Snooping
  - IGMPv2 Querier
  - Fast-leave (also known as immediate leave)
- Interswitch uplink requirements (if needed):
  - Must have sufficient bandwidth for all encoder and decoder traffic to be passed along the uplink (allocate 1 Gbps of traffic per device)

Network Design Overview

DM NVX networks must be designed to isolate traffic on network segments specifically configured to handle DM NVX AV-over-IP (AVoIP) and DM NAX Audio-over-IP (AoIP) traffic. This can be accomplished by using separate infrastructure, Virtual Local Area Networks (VLANs), or Multi-Protocol Label Switching (MPLS). DM NVX network segments carry DM NVX multicast streams, DM NVX control, and ancillary traffic.

The location of other Crestron network devices relative to network infrastructure must be determined. A decision must be made as to whether the devices are to coexist on the same network segment as the DM NVX segment or on another segment that has traversal capabilities to the DM NVX segment, but is not multicast enabled. Networked AV devices other than DM NVX devices can be placed on the DM NVX

network segment if their bandwidth requirements are relative to the DM NVX endpoint bandwidth requirements.

A DM NVX device can have several addresses:

- An IP address is required for control of the device and access to the web configuration interface and console. For the DM-NVX-352, DM-NVX-352C, DM-NVX-363, and DM-NVX-363C, an IP address for the Dante® module is also required.
- Multicast addresses are required for multicast streams:
    - One multicast address is required for the primary multicast stream of audio and video.
    - Another multicast address is required for the DM NAX (AES67) audio multicast stream.
    - (DM-NVX-352, DM-NVX-352C, DM-NVX-363, and DM-NVX-363C only) A Dante multicast address is also required if a Dante multicast stream is used.

  During endpoint configuration, the primary multicast address must be set manually to an address ending with an even number in the last octet. The DM NAX (AES67) audio multicast stream address can be automatically assigned to take the next odd-numbered multicast stream address (for example, a primary address of 239.8.0.10 will automatically assign a DM NAX address of 239.8.0.11). Alternatively, the DM NAX (AES67) audio multicast stream can be manually set.

  A Dante multicast address is automatically assigned. The address must be unique and must not match a DM NVX multicast address. If the Dante multicast address does match a DM NVX multicast address, the DM NVX multicast address must be changed. Refer to the Audinate website for further information regarding Dante networking.

The DM NVX network segment must receive network services, including DNS, DHCP, Active Directory, and RADIUS services. Coordinate with IT staff to provide access to these services and to create the proper traversal rules to the DM NVX network segment.

Network Segmentation Along Logical Boundaries

Consideration must be given to blocking at both the switch level and the network design level. DM NVX network switches must have enough switch fabric bandwidth to support full nonblocking bidirectional gigabit bandwidth on all ports simultaneously. This is a common feature in enterprise-grade gigabit network switches, but it should not be assumed that a switch is nonblocking or is configured as nonblocking.

Due to system size or physical layout, most DM NVX installations require multiple network switches. The network switches must connect to each other via a high-bandwidth uplink port. For network design purposes, assume that each DM NVX link consumes the full gigabit of link bandwidth.

Consider the example of a standard 48-port Gigabit Ethernet switch with one 40-gigabit uplink (or four 10-gigabit uplinks). Since each DM NVX endpoint consumes 1 Gbps of bandwidth, this switch can support up to 40 DM NVX devices in a nonblocking way. If more devices are connected, the uplink becomes a bottleneck, introducing the potential for difficult-to-diagnose blocking problems.

Network Topologies

Connect devices such as control processors, touch screens, servers, personal computing devices, and DM NVX endpoints directly to network switches. In a large network with multiple layers of switch hierarchy, situate these devices at the network's edge. The network edge switches are often connected via uplinks

to other switches and routers. This aggregates traffic from the network edge and forms the network's core. The relationships between network switches and their interconnection to each other define the network's topology.

The following general rules apply for sizing network switches in terms of switch fabric nonblocking bandwidth:

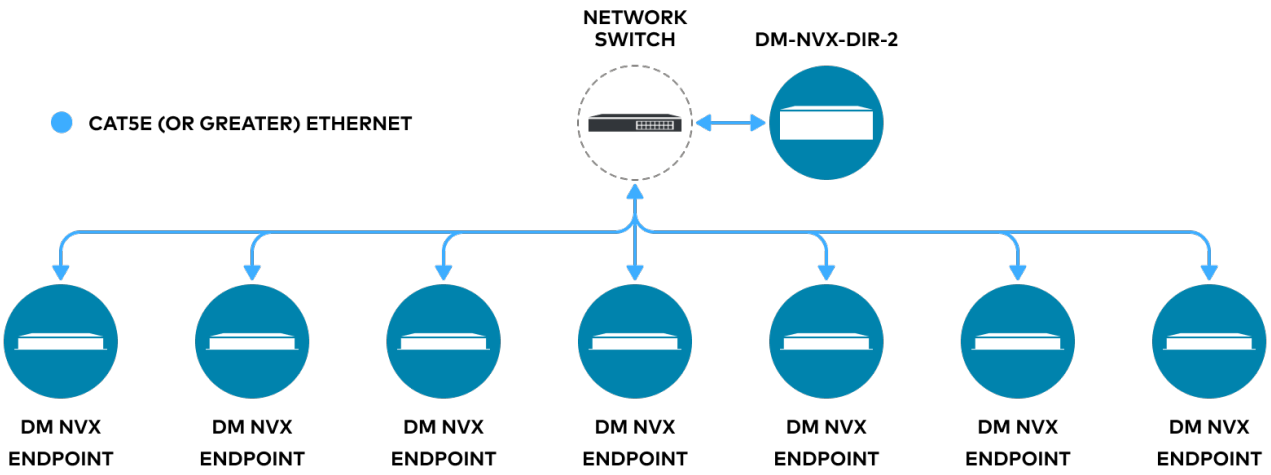
- The network core must support a nonblocking bandwidth and port speed. Nonblocking core bandwidth is calculated as 1 Gbps multiplied by the total number of either encoder endpoints or decoder endpoints (whichever is lesser), plus the number of USB extenders.
- Network edge switches must support a nonblocking bandwidth and uplink speed. Nonblocking edge bandwidth is calculated as 1 Gbps multiplied by the total number of either encoder endpoints or decoder endpoints (whichever is greater), plus the number of USB extenders.

Star

The default recommended network topology is a star. Using a fully nonblocking switch, the star topology allows any combination of one or more endpoints to connect to any other combination of endpoints. It also easily allows the network to grow beyond a single switch if the uplink in the switch supports the maximum specified bandwidth.

For small DM NVX systems that employ only one network switch, use a nonblocking switch to prevent a bottleneck. Star topologies can accommodate very large DM NVX installations by using large modular switch frames.

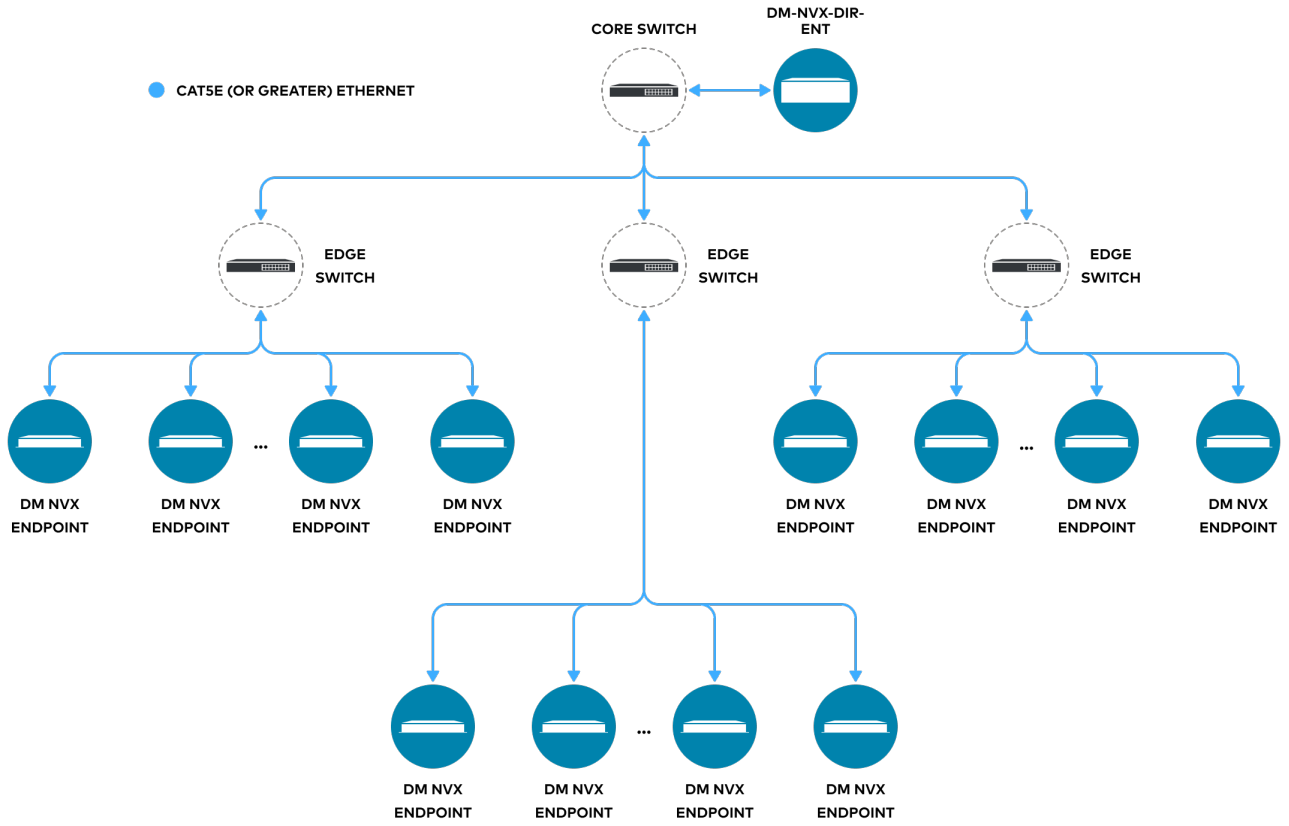
Star Network Using a Nonblocking Switch



Tree

A tree network is a combination of more than one star network existing on a core-switching infrastructure. The tree network allows failure in one part of the attached star networks without widely affecting the other star networks. Configure the core network, which is the larger network switch, for redundancy and scalability.

Tree Topology Using Nonblocking Switches on a Core Network



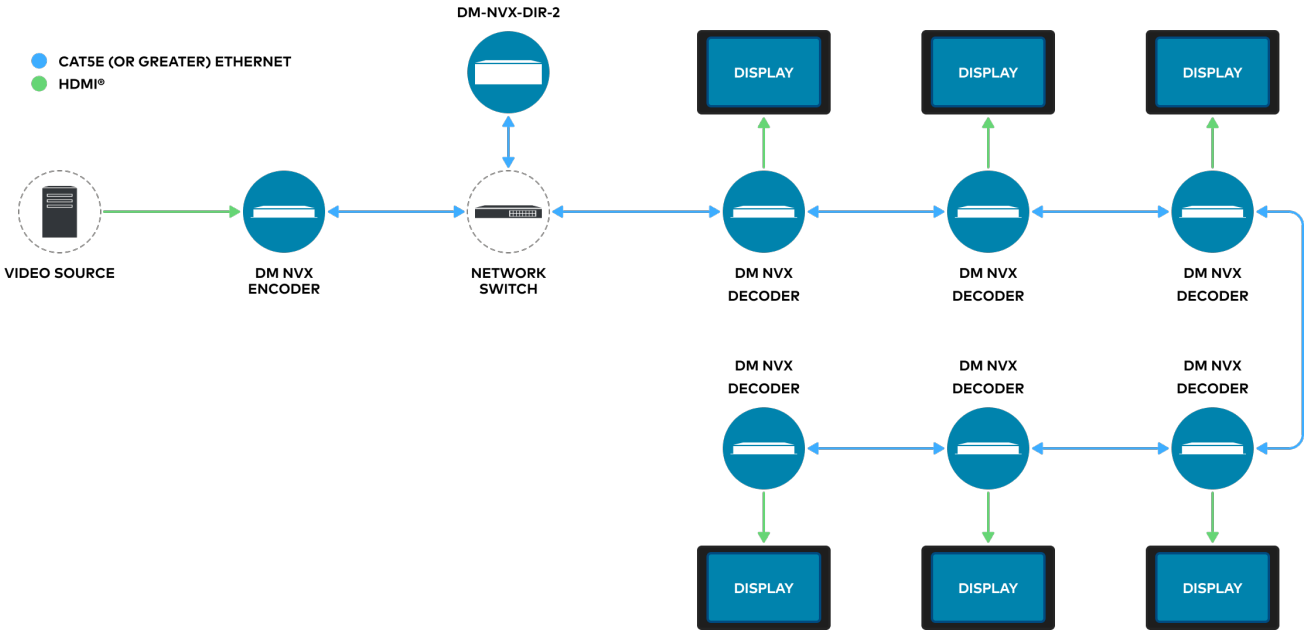
Daisy Chain

Daisy chaining is appropriate for specific deployment applications such as video walls or jury boxes in which all displays receive the same video source as the first DM NVX endpoint in the chain.

For video wall applications and any other application in which displays are near each other and share the same source, up to 16 endpoints can be daisy chained together. Larger video walls can be divided into individual daisy chains that each contain up to 16 endpoints.

For applications such as information signage in which more than one display is viewable concurrently without being dependent on the viewing of another display in the daisy chain, up to 64 endpoints can be daisy chained together.

Daisy Chain Network Configuration for Jury Box



Due to limited bandwidth for audio and video, a USB host or device on a daisy chained endpoint is not recommended. For maximum flexibility and the ability to reconfigure video walls with multiple sources, connect DM NVX endpoints directly to switches rather than daisy chain the endpoints.

Other Topologies and Network Functionality

Other valid deployment topologies for DM NVX networks are ring and mesh. These deployments require project-specific discovery and configuration of the network switch. For projects using advanced topologies for deployments, a networking professional must be involved early in the network design process.

Multicast Network Traffic

DM NVX networks rely on multicast functionality to send and receive video, even in the simplest case of a single encoder endpoint and a single decoder endpoint. Internet Group Management Protocol (IGMP) multicast in the Ethernet context replaces a fixed switching architecture in AV distribution.

Segregation of DM NVX traffic by using a VLAN or MPLS is usually the first step in enabling multicast. A VLAN or MPLS ensures that DM NVX traffic stays on the DM NVX network and does not route to other network segments and interfere with their operation. A VLAN or MPLS also ensures that traffic from other network segments does not interfere with DM NVX operation. Within that segment, all ports can be flooded by IGMP traffic regardless of whether that traffic was intended to be sent or received by a network device at any time. This will result in interference with network operation and can be a means of implementing a denial-of-service attack on a network if done maliciously.

To ensure that only traffic between intended multicast senders and multicast receivers appears at a given port, IGMP snooping must be enabled. IGMP snooping refers to the ability of the network switch to limit multicast traffic only to ports between intended senders and receivers. DM NVX devices support both versions of IGMP snooping: IGMPv2 and IGMPv3.

In order for the network switch to know where route limiting is implemented in the network for multicast traffic, an IGMP querier must be enabled. In most instances, a single network switch is selected by address to act as the IGMP querier; however, if multiple switches are configured as queriers, the switch with the lowest numerical IP address on the network is typically the default. The default leave time for the querier (typically 125 seconds) is sufficient for a DM NVX network.

Protocol Independent Multicast (PIM)

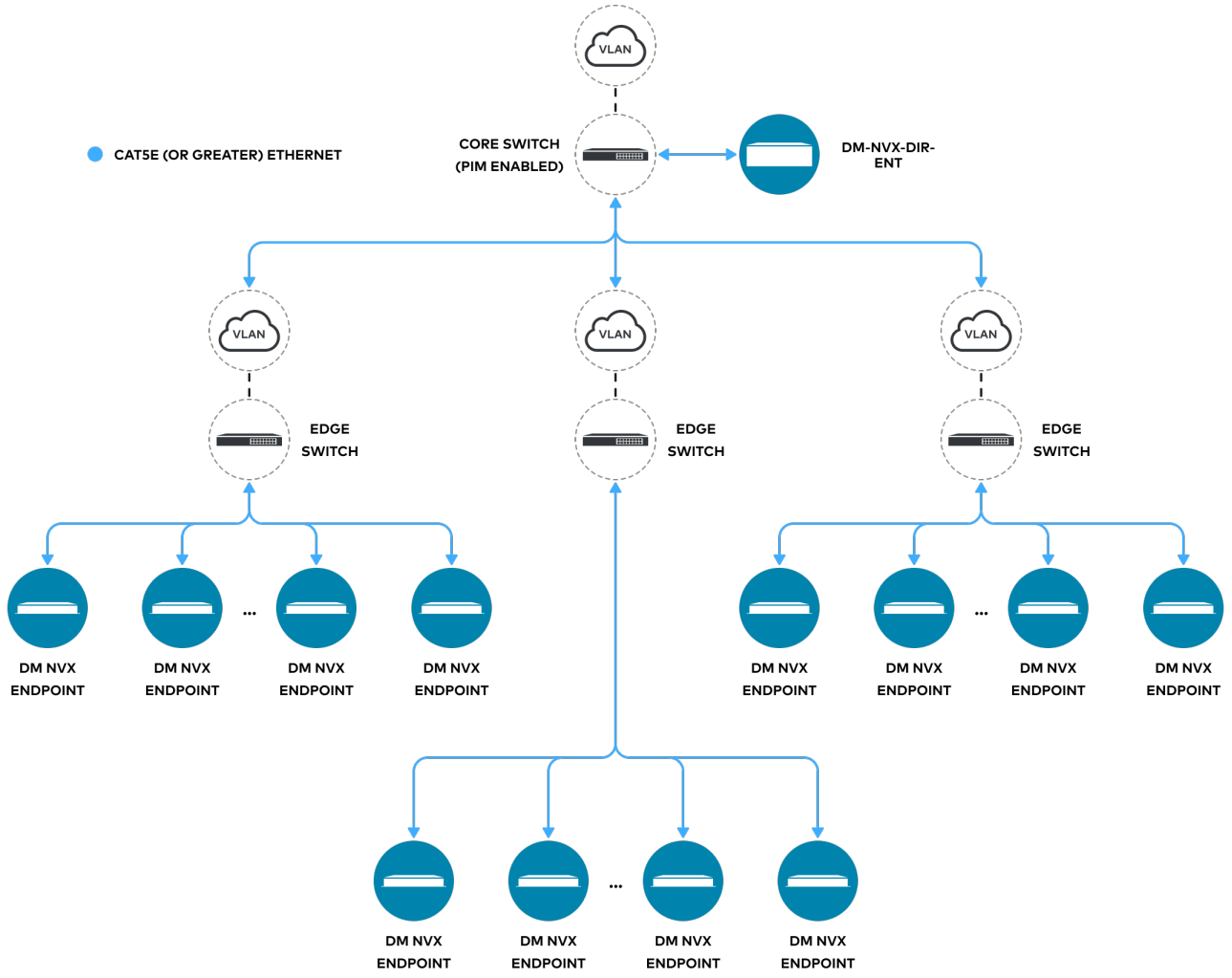
Protocol Independent Multicast (PIM) is a family of multicast routing protocols for IP networks. PIM offers one-to-many and many-to-many distribution of data. PIM modes include PIM Sparse Mode (PIM-SM), PIM Dense Mode (PIM-DM), and PM Source-Specific Multicast Mode (PIM-SSM). PIM-SM must be used for large DM NVX networks. PIM-SM finds the shortest trees per path from a multicast source to multicast receivers on a network and is more scalable than PIM-DM or PIM-SSM. PIM-SM also prevents edge-to-switch link saturation and network loops in multicast traffic routing.

Enabling network Quality of Service (QoS) helps prioritize DM NVX traffic over other traffic at both the source and the destination. The highest priority on IGMP multicast traffic must be enabled. An example of enabling network QoS is as follows:

- Enable 802.1Q VLAN tagging support in the network switch.
- Enable and assign an 802.1P priority (for example, 5, 6, or 7) to DM NVX addresses and ports or IGMP protocol traffic.
- For other traffic, such as HTTP for web services or SSH for console access, assign lower priority numbers (for example, 0 to 4) based on their addresses, ports, or protocols.
- For successful QoS operation, ensure that all traffic types are included in the QoS setup.

> **NOTE:** In addition to 802.1Q and 802.1P mentioned on the preceding page, other QoS protocols exist and are dependent on the switch vendor. The protocols are configured similar to the 802.1Q and 802.1P examples on the preceding page.

PIM Multicast Routing Protocol for an IP Network



Network Security

Security requires the support of particular capabilities within all devices on the network. DM NVX networks employ the following security features:

- 802.1X authentication is used to ensure that devices on the network have been authorized by the network administration team. Unauthorized devices are prevented from being added to the network and from having access to sensitive content.
- Active Directory services for endpoint administration can be used to ensure that administrative privileges for DM NVX devices can be centrally managed, granted, and revoked when necessary.
- DM NVX endpoints use Advanced Encryption Standard (AES) block cipher with Public Key Infrastructure (PKI) for stream encryption to protect content from unauthorized access as it crosses the network.
- SSL-based Secure Cresnet over IP (SCIP) for DM NVX control ensures that control processors and DM NVX devices communicate with the intended party device and that any unauthorized device on the network cannot monitor commands and status.

- SSH-based command line console access for device configuration and status protects the device console from access by unauthorized users.

SSL-based Cresnet over IP and SSH-based command line console access are automatically configured within DM NVX devices and support software. The designer should focus on 802.1X and Active Directory services within the design.

For additional information about deploying security with Crestron products, refer to the IP Considerations Guidelines for the IT Professional Design Guide and Knowlegde Base Article 5571.

Network Design Considerations

Consider and apply the following network design best practices:

- Use nonblocking Layer 3 switches with port-based QoS such as 802.1P with 802.1Q at all stages of the design. Use sufficient switch bandwidth and port speeds. Less expensive switches cause loss of capability in the network.
- Choose switches with sufficient bandwidth at each segment (from edge to core) to accommodate a nonblocking architecture for DM NVX endpoints and any additional needs.
- Choose an appropriate network topology. Consider the network, including basic functionality and redundancy, and whether video walls or repetitive display signage is necessary. When planning a topology for the network, ensure that network IT staff and network architects are involved in the decisions.
- Enable an IGMP Querier on at least one switch in the DM NVX network. The IGMP Querier ensures that all switches know which multicast transmitters and receivers are connected to which switches in the network. Enabling an IGMP Querier on multiple switches causes the switch with the lowest value of IP source address to take priority and act as the Querier.
- Consult the network switch manufacturer's documentation to ensure that the uplinks are properly configured to support multicast traffic.
- Use switches that support 802.1X for endpoint authentication by implementing 802.1X endpoint authentication through TLS or MS-CHAP v2. Only authorized endpoints can communicate with the network.
- Ensure that VLANs or MPLS are implemented correctly. Leveraging existing switch infrastructure with VLANs or MPLS can cause conflicts with network provisioning needs. If a dedicated DM NVX network is not going to be used, VLANs must be implemented correctly with their own IP subnet, and MPLS networks must be configured correctly.
- Account for even-numbered DM NVX primary stream multicast address assignments since both primary and secondary multicast streams are possible. The assignment of multicast IP addresses for primary streams should be even numbered to allow the secondary stream to be assigned to the odd-numbered IP address, which is one higher than the primary stream's IP address. For multicast IP address assignment, refer to the guidelines in IETF RFC 3171.

- Use the Active Directory service for administration security:
  - Create an Active Directory group responsible for device administration.
  - Add device administrators to the group.
  - Add the group to the DM NVX device on the Device page of the web interface.

  Use of the Active Directory service with DM NVX endpoint logins allows for easy, seamless, and better controlled access from a central directory authority with fewer risks.
- Use a DHCP server with link-layer filtering, and configure the IP addresses of endpoints using DHCP rather than static IP addresses. Using a DHCP server with short lease times, MAC address filtering, and sufficient address space for future needs makes network management easier.
- Enable IGMPv2 (DM NVX default) or IGMPv3 multicast snooping on all switches in the DM NVX network. This is a requirement for all designs in order to enable multicast delivery to multiple endpoints. Without IGMP Snooping enabled, switches that receive a multicast stream will transmit that stream to all ports simultaneously and saturate all network links.
- Use the Rapid Spanning Tree Protocol (RSTP) on the network to ensure that network loops are discoverable and to prevent deployment issues. Network management should account for RSTP discovery downtime when the network changes.
- Use and plan for DM NVX Director management of endpoints.
- Use daisy chaining to connect video wall endpoints or repeated displays. For video walls or endpoints that receive the same source from a single transmitter to feed multiple identical displays or in a video wall using a single source, it is simpler and less expensive to daisy chain the network.
- Disable IGMP Proxy functionality on Crestron control processors with routers to ensure that DM NVX multicast traffic does not interfere with the control processor. The CP3N, PRO3, and AV3 control processors, as well as DMPS3 presentation systems, should have IGMP Proxy functionality disabled when connected to the DM NVX network.
- Account for high-bandwidth external USB devices that are to be connected to DM NVX devices. Ensure that the bandwidth is accounted for as a separate 1 Gbps link since USB 2.0 bandwidth can consume 480 Mbps of the 1 Gbps link.
- Ensure that multicast IP addresses do not share multicast MAC addresses. Duplicate multicast MAC addresses can cause network conflicts and prevent normal operation of the DM NVX network. Starting DM NVX multicast transmit addresses at 239.1.0.0 instead of 239.0.0.0 can help prevent conflicts with well-known multicast MAC addresses that may already be present on the network.
- For Dante audio networking with DM-NVX-352, DM-NVX-352C, DM-NVX-363, and DM-NVX-363C devices, additional network considerations may need to be addressed. For Ethernet switch guidelines, refer to the information provided on the Audinate website.

System Installation

The installation phase should ensure that the interaction among designer, installer, programmer, and end user is considered in all installation decisions.

Endpoint Installation

Each DM NVX endpoint has unique installation requirements that depend on the following:

- Copper or fiber network connectivity of the endpoint
- Surface-mountable or card-based form factor
- Configuration of a combined encoder/decoder endpoint as a transmitter or a receiver or whether the endpoint is to switch dynamically between modes
- Additional local HDMI inputs that require configuration
- Use of source autoswitching or external switching control
- Additional audio sources that require encoding
- USB device or host functionality
- Whether the endpoint is part of a video wall or goes to multiple identical displays
- Requirement for Serial or IR control, or both

A Crestron touch panel can be linked through a spare LAN port on an endpoint. An audio input/output port can be repurposed to be a balanced line input for external analog audio input or for line output to a speaker system at the endpoint. The endpoint features and attached devices can be configured through programming or through the web interface.

Depending on the location of the control processor, serial and IR control of endpoint devices may be routed directly from that control processor. Access to HDMI and USB inputs and outputs can be provided through Crestron HDMI breakout devices for tabletops and walls.

Surface-mountable endpoints can be mounted in any orientation as required. Typical locations for surface-mountable endpoints include inside closets and drop ceilings, underneath tables, and in podiums. The specific location is determined by the following factors:

- Length of HDMI and USB cable runs
- Location of display and audio devices, network connectivity, power for the device, and physical security requirements

Serial and IR connectivity can be run at longer lengths and are typically not drivers of the endpoint mounting location.

For card-based endpoints, the DMF-CI-8 card chassis is placed in a closet or locked rack near the source and display devices. (To ensure that the environmental conditions in the rack meet the specifications outlined, refer to the DMF-CI-8 product page on the Crestron website).

Serial and IR interfaces are not provided by card-based endpoints. The functionality must be provided by other means, such as through a local Crestron control processor on the DM NVX network.

For a maintenance-free installation, follow these guidelines:

- While considering cable distances, plan the optimum location for the surface-mountable or card-based endpoint, especially when distance-limited HDMI cables are involved.
- Avoid direct access to the endpoint by the end users. End users can induce failures or create a security risk due to unauthorized network access. Ensure that HDMI cables and wall plates are routed away from the endpoint appropriately.

- Use Category 2 certified HDMI cables to meet the minimum HDMI specifications at 4K or 1080p and to prevent problems such as degradation or loss of video or audio.
- Use properly terminated network cables. Network cabling must be either of the following:
  - Fiber that is terminated with a clean LC connector
  - Shielded or unshielded Cat 5e or higher copper cable that is terminated with an RJ-45 connector
- Observe the minimum bend radiuses and pull forces of cables to maintain cable integrity and prevent failures.
- Use plenum-rated cables in plenum spaces. Cables such as Crestron DigitalMedia™ plenum-rated cables are suitable. Fire-rated conduit for any fiber or copper cabling used in plenum spaces is also suitable.
- Practice good cable dressing, especially for card-based endpoints in racks.
- Manage EDID and HDCP proactively. For additional information, refer to the Crestron DigitalMedia System Design Guide.
- HDR and deep color sources may not display correctly on endpoints with non-HDR or non-deep color displays. Ensure that the capabilities of the sources are matched to the capabilities of the displays.
- Use descriptive names for endpoints either through the DM NVX web interface or by replacing the default name in the Crestron Toolbox™ software. Do not rely on the default name or the Crestron IP ID.
- Physically secure the endpoint to a fixed point or rack to prevent movement over time. Secure all mounting points and mounting hardware for surface-mountable endpoints, card chassis, and card-based endpoints.
- Leverage use of the DM NVX Director server for endpoint configuration. The presence of a DM NVX Director server makes it easy to configure and control multiple DM NVX endpoints on the network.
- Thoroughly document the installation of endpoints, including drawings, lists, and descriptions, in order to provide detailed information for those who are to maintain or upgrade the DM NVX network.

Network Installation

The installation of a DM NVX network varies greatly depending on a number of factors, including the following:

- Whether existing network infrastructure such as switches and cabling are to be reused
- Location of closets, racks, Intermediate Distribution Frames (IDFs), and Main Distribution Frame/Combined Distribution Frame (MDF/CDF) relative to the endpoints

For optimal installation and maintenance of the DM NVX network, follow these best practices:

- Use or repurpose existing infrastructure in DM NVX network installation cases.
- Use physical security for the network. Secure all network locations (MDF/CDF and IDF down to individual closets) from unauthorized access.
- Disable any unused ports on the network switches.

- Use a structured cabling approach such as those described in the TIA/EIA-568 standard. Include keystones in jacks and patch panels, shielded or unshielded solid copper conductor cable not exceeding 295 ft (90 m), and patch cables not exceeding 33 ft (10 m) to connect between patch panels. Use cable testers to verify the integrity of the installation and capacity for future expansion and backup.
- Use Crestron-verified switch configuration files when possible. Refer to Knowledge Base Article 1000314 for information on verified configurations.
- Configure the routing of external servers. If nondedicated DHCP, RADIUS, Active Directory, or other servers are used, ensure that the servers access the DM NVX network.
- Thoroughly document all DM NVX network hardware and configurations.

Crestron Service Provider Handoff

Consult the Crestron Service Providers (CSPs) once the DM NVX network and endpoints are installed and interconnected. Typical activities of a CSP in a DM NVX installation may include the following:

- Writing appropriate control programs for controllers on the network
- Programming appropriate serial and IR control for endpoint devices
- Configuring external analog and digital audio source input and output
- Configuring video walls
- Designing button and UI features for control surfaces such as touch screens and switches
- Managing EDID for endpoint devices

As CSPs implement and deploy the program, installers and designers should test and review the functionality. The programmer must document the program functionality to avoid future issues.

Resources

The following resources are provided for the DM NVX® AV-over-IP.

> **NOTE:** You may need to provide your Crestron.com web account credentials when prompted to access some of the following resources.

Crestron Support and Training

- Crestron True Blue Support
- Crestron Resource Library
- Crestron True Blue Community
- Crestron Technical Institute (CTI) Portal

Programmer and Developer Resources

- help.crestron.com: Provides help files for Crestron programming tools such as SIMPL, SIMPL#, and Crestron Toolbox™ software
- developer.crestron.com: Provides developer documentation for Crestron APIs, SDKs, and other development tools

Product Certificates

To search for product certificates, refer to the Product Certificates section of the Crestron Resource Library.

Related Documentation

- DM NAX® Audio-over-IP Network Design Guide
- Crestron Design Database

Crestron Electronics, Inc.
15 Volvo Drive, Rockleigh, NJ 07647
Tel: 888.CRESTRON
Fax: 201.767.7656
www.crestron.com

Product Manual — Doc. 9496E
09/23/25
Specifications subject to
change without notice.