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DigitalMedia™ 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing

- > 4K60 4:4:4 video over standard Gigabit Ethernet
- > No latency penalty for real-time video performance
- > HDR (High Dynamic Range) video support (HDR10)
- > Dolby® TrueHD, Dolby Atmos®, DTS-HD®, DTS:X®, and uncompressed 7.1 linear PCM audio support
- > HDCP 2.2 compliant
- > Configurable as an encoder or decoder
- > Dual onboard RJ45 LAN ports
- > Option for a fiber optic network connection via SFP port^[2]
- > Enterprise-grade security
- > Two auto-switching HDMI® inputs and one HDMI output^[1]
- > Built-in 4K60 4:4:4 scaling
- > Onboard video wall processing
- > Analog audio port configurable as a balanced stereo input or output^[5]
- > Analog audio embedding or de-embedding
- > Stereo downmixing of surround sound audio signals
- > Simultaneous distribution of stereo and surround sound signals
- > Audio breakaway capability^[6,7]
- > Dynamic text overlay capability
- > RS-232 and IR control ports^[9]
- > CEC device control gateway^[9]
- > USB and KVM signal extension and routing^[4]
- > Easy setup via built-in webpages
- > Fully-controllable via a Crestron® control system
- > Compact, surface-mountable form factor
- > Powered via local power pack or optional power injector^[8]
- > 100-240V universal power pack included

DigitalMedia™ NVX technology transports ultra high-definition 4K video with 60 Hz frame rates and 4:4:4 color sampling over standard Gigabit Ethernet. Support for HDR video (HDR10) and HDCP 2.2 ensures the ultimate in picture quality and compatibility for all of today's varied media sources. Using standards-based Ethernet wiring and switches, DM® NVX delivers a vastly scalable, high-performance solution for enterprise-wide 4K content distribution.^[1]

The Crestron® DM-NVX-351 is a compact video encoder/decoder designed to function as either a transmitter or receiver with the ability to switch between the two modes programmatically via commands from a [Crestron control system](#). Featuring simple web-based control and management, USB and KVM integration, and support for copper and fiber LAN connectivity, the DM-NVX-351 offers a one-stop solution for any-sized network AV installation.^[2]

The DM-NVX-351 includes all the features of the [DM-NVX-350](#) with the addition of surround sound to stereo downmixing. Refer to the "7.1 Surround Sound Audio with Downmixing" section below for details.



Real-Time 4K60 Video Distribution

Engineered for demanding conference room and classroom applications, DM NVX ensures real-time, full-motion 4K60 video performance for the presentation of multimedia, videoconferencing, and live camera images. DM NVX employs high-quality JPEG 2000 encoding using a patent-pending technique that overlaps scaling and encoding latencies, achieving an ultra-low end-to-end latency of 30 ms at 60 fps, so on-screen functions such as mousing and game play are fluid and natural.

Encoder and Decoder in One

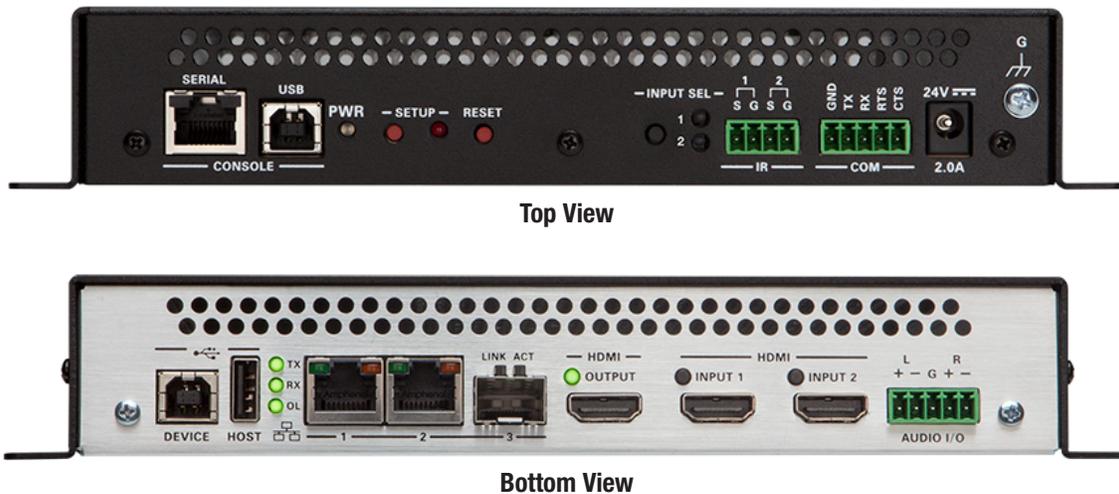
In a single compact device, the DM-NVX-351 is configurable to operate as either a network AV encoder or decoder.

- As an encoder, it allows a laptop computer, camera, or other media source to be connected via HDMI® and then transmitted over the network.^[1]
- As a decoder, it receives the signal from a DM NVX encoder and feeds it to a display device via the HDMI output. It can quickly and easily switch between multiple encoders on the network alongside locally-connected HDMI sources.^[1]
- The encoder/decoder mode can be switched on-the-fly via a control system to provide a versatile, cost-effective presentation switching solution using one integrated device.

2x1 HDMI® Auto-Switcher

The DM-NVX-351 includes two HDMI inputs. Switching between the two inputs can be performed automatically using auto-switching mode, manually using the onboard input select button, programmatically via a Crestron control system, 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.^[1]

DM-NVX-351 DM® 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing



HDMI Output

When configured as a decoder, the DM-NVX-351's HDMI output feeds the decoded signal to the local display device (or any other device with an HDMI input). Its 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 used as an encoder, the HDMI output can be used to feed a local display, confidence monitor, or audio system.^[1,3]

USB and KVM Integration

For a complete signal management solution, DM NVX supports the extension of USB signals, which may be switched and routed alongside the AV signal or separately via the control system. USB 2.0 host and device ports are provided on each DM-NVX-351 box, allowing a USB mouse, keyboard, or other device to be connected at one box and routed to a computer or other host at another box. KVM switch functionality is a natural application for this feature, but all types of USB peripherals are supported including whiteboards, touch screens, game controllers, cameras, mobile devices, headsets, and flash drives.^[4]

USB signals can also be routed to other locations where a DM NVX box does not exist using Crestron USB over Ethernet Extender Modules ([USB-EXT-DM](#)). USB signals can be freely routed between DM NVX and USB-EXT-DM units over Ethernet under the management of a Crestron control system.

7.1 Surround Sound Audio with Downmixing

DM NVX 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-351 includes the ability to 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 onboard analog output^[4], while the HDMI output can be configured to output either stereo or multichannel. 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.

Analog Audio Embedding or De-embedding

A balanced stereo analog audio port is included, which may be configured as either an input or output. As an input, it 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, it can provide 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.^[5]

Breakaway Audio

A DM NVX decoder may select and combine separate video and audio signals from two different inputs, even two different encoders. There are just two exceptions: A) signals may not be combined between the two onboard HDMI inputs, and B) combining signals from two separate encoders is limited to 2-channel stereo audio.^[6,7]

Text Overlay

The ability to display dynamic or fixed text on screen provides a means to label the video source or display special instructions, schedules, announcements, alerts, and other messaging.

Video Wall Processing

A video wall composed of up to 64 individual displays can be configured using multiple DM-NVX-351 units. Each unit provides fully-adjustable zoom capability and bezel compensation to accommodate a range of video wall configurations and display types. One DM-NVX-351 is required per display, supporting configurations of up to eight wide by up to eight high.

Copper or Fiber LAN Connectivity

The DM-NVX-351 includes two RJ45 1000Base-T LAN ports. Either port may be used as the primary LAN connection, allowing the other to be used to provide a network connection for the display, AirMedia gateway, or other local device(s). These ports may also be used to daisy-chain multiple units feeding a single-source video wall or individual displays all showing the same video image. Port 1 is also capable of receiving power from a Crestron power injector ([DM-PSU-ULTRA-MIDSPAN](#)).^[8]

DM-NVX-351 DM® 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing

Connection to a fiber optic network is facilitated by inserting an appropriate SFP transceiver module (Crestron [SFP-1G](#) series^[2]) into the SFP port on the DM-NVX-351. A selection of modules is offered to accommodate various multimode and single-mode fiber types.

Enterprise-Grade Security

A secure AV network ensures its own reliability by protecting the integrity of the content being delivered and the privacy of the personnel accessing it. Employing advanced security features and protocols like 802.1x authentication, Active Directory credential management, PKI certification, AES encryption, TLS, SSH, and HTTPS, DM NVX delivers a true enterprise-grade network AV solution engineered to fulfill the demanding IT policies of corporate, university, medical, military, and governmental clients. DM NVX runs on a dedicated AV network, with fully-managed access to, or isolation from, the customer's LAN or the Internet.

Device Controller

The DM-NVX-351 includes built-in RS-232 and IR control ports for control of the connected display, camera, and other devices under the management of a control system. Additional control capability is afforded by harnessing the CEC (Consumer Electronics Control) signal embedded in HDMI. Through its Ethernet connection to the control system, the DM-NVX-351 provides a gateway for controlling the display and source devices right through their HDMI connections, potentially eliminating the need for any dedicated serial cables or IR emitters.^[9]

Web-Based Setup

Setup of the DM-NVX-351 is accomplished using a computer web browser. Full control and monitoring of the device is enabled through integration with a Crestron control system.

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 connections and LED indicators are positioned on the top and bottom, offering optimal access and visibility for a clean, serviceable installation. Power is provided using the included 100-240V universal power pack or an optional power injector (Crestron [DM-PSU-ULTRA-MIDSPAN](#)).^[8]

Please refer to the *DigitalMedia Resources Webpage* at <http://www.crestron.com/dmresources/> for additional design tools and reference documents.

SPECIFICATIONS

Encoding/Decoding

Video Compression: JPEG 2000

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), secondary 2-channel LPCM

Bitrates: 100 to 990 Mbps

Streaming Protocols: RTP, RTSP, SDP

Container: MPEG-2 transport stream (.ts)

Session Initiation: Multicast via RTSP

Copy Protection: HDCP 2.2

Video

Input Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support^[1,10] (Dual-Mode DisplayPort and DVI compatible^[11])

Output Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support^[11] (DVI compatible^[11])

Switcher: 2x1 auto-switching, 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

Maximum Resolutions:

Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	4096x2160 DCI 4K & 3840x2160 4K UHD	24 Hz	4:4:4	36 bit
		30 Hz	4:4:4	36 bit
		60 Hz	4:2:2	36 bit
		60 Hz	4:4:4	24 bit
	2560x1600 WQXGA	60 Hz	4:4:4	36 bit
	1920x1080 HD1080p	60 Hz	4:4:4	36 bit
Interlaced (Input only)	1920x1080 HD1080i	30 Hz	4:4:4	36 bit

NOTE: Common resolutions are shown; other custom resolutions are supported at pixel clock rates up to 600 MHz

Audio

Input Signal Types: HDMI (Dual-Mode DisplayPort compatible^[11]), analog stereo^[5]

Output Signal Types: HDMI (multichannel pass-through or 2-channel downmix), analog stereo (2-channel downmix)^[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

Analog-To-Digital Conversion: 24-bit 48 kHz

Digital-To-Analog Conversion: 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 Volume Adjustment: -80 to +20 dB

DM-NVX-351 DM® 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing

Communications

Ethernet: 10/100/1000 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, HTTPS web browser setup and control, Crestron control system integration

USB: USB 2.0 host or device signal extension; 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 (0-5 Volts) up to 19.2k baud (via control system)

HDMI: HDCP 2.2, EDID, CEC

DM NVX (via Ethernet): HDCP 2.2, AES, RTP, RTSP, SDP, ONVIF, IGMPv2, IGMPv3, SMPTE 2022

NOTE: Supports management of HDCP and EDID; supports management of CEC between the connected HDMI devices and a control system

Connectors

USB DEVICE: (1) USB Type B female; USB 2.0 device port;

USB signal extender port for connection to a computer or any other USB 2.0 host^[4]

USB HOST: (1) USB Type A female; USB 2.0 host port;

USB signal extender port for connection of a mouse, keyboard, or any other USB 2.0 device^[4];

Available Power: 500 mA at 5 Volts DC

LAN 1: (1) 8-pin RJ45 female; 10Base-T/100Base-TX/1000Base-T Ethernet port; PD (powered device) port compatible with Crestron DM-PSU-ULTRA-MIDSPAN only^[8]

LAN 2: (1) 8-pin RJ45 female; 10Base-T/100Base-TX/1000Base-T Ethernet port

LAN 3: (1) SFP port; Accepts one Crestron SFP-1G series SFP transceiver module^[2]

HDMI OUTPUT: (1) 19-pin Type A HDMI female; HDMI digital video/audio output (DVI compatible^[11])^[1]

HDMI INPUT 1 – 2: (2) 19-pin Type A HDMI female; HDMI digital video/audio inputs^[1]; (DVI & Dual-Mode DisplayPort compatible^[11])

AUDIO I/O: (1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio input or output^[5]; Input Impedance: 24k Ohms balanced/unbalanced; Maximum Input Level: 4 Vrms balanced, 2 Vrms unbalanced; Output Impedance: 200 Ohms balanced, 100 Ohms unbalanced; Maximum Output Level: 4 Vrms balanced, 2 Vrms unbalanced

CONSOLE, SERIAL: (1) 8-pin RJ45 female; RS-232 computer console port (for setup)

CONSOLE, USB: (1) USB Type B 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^[9];

IR output up to 1.1 MHz;

1-way serial TTL/RS-232 (0-5 Volts) up to 19200 baud

COM: (1) 5-pin 3.5 mm detachable terminal block;

Bidirectional RS-232 port^[9];

Up to 115.2k baud, hardware and software handshaking support

24VDC 2.0A: (1) 2.1 x 5.5 mm DC power connector;

24 Volt DC power input;

PW-2420RU power pack included

G: (1) 6-32 screw;

Chassis ground lug

Controls & Indicators

TX: (1) Green LED, indicates unit is in transmitter (encoder) mode

RX: (1) Green LED, indicates unit is in receiver (decoder) mode

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

LAN 1 – 2: (4) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity

LAN 3 LNK: (1) Green LED, indicates Ethernet link status

LAN 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) Bi-color green/amber LED, indicates operating power supplied via the power pack or injector, illuminates amber while booting and green when operating

SETUP: (1) Red LED and (1) recessed pushbutton for Ethernet setup

RESET: (1) Recessed pushbutton for hardware reset

INPUT SEL: (1) Pushbutton for manual input selection and (2) bi-color green/amber LEDs to indicate the current active input and signal presence at each corresponding input

Power

Power Pack (included):

Input: 1.5 Amps maximum @ 100-240 Volts AC, 50/60 Hz

Output: 2 Amps @ 24 Volts DC

Model: PW-2420RU

Power over Ethernet: Compatible with Crestron DM-PSU-ULTRA-MIDSPAN only^[8]

Power Consumption: 35 Watts typical

Environmental

Temperature: 32° to 104° F (0° to 40° C)

Humidity: 10% to 90% RH (non-condensing)

Heat Dissipation: 85 BTU/hr

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Enclosure

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)

MODELS & ACCESSORIES

Available Models

DM-NVX-351: DigitalMedia™ 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing

Included Accessories

PW-2420RU: Desktop Power Pack, 24VDC, 2A, 2.1mm, Universal (Qty. 1 included)

Available Accessories

SFP-1G: SFP Transceiver Modules

USB-EXT-DM: USB over Ethernet Extender with Routing

DM-PSU-ULTRA-MIDSPAN: Power Injector

DM-CBL-ULTRA-PC: DigitalMedia™ Ultra Patch Cables

DM-CONN-ULTRA-RECP: DigitalMedia™ Ultra Keystone RJ45 Jack

DM-CBL-ULTRA-NP: DigitalMedia™ Ultra Cable, Non-Plenum Type CMR

DM-CBL-ULTRA-P: DigitalMedia™ Ultra Cable, Plenum Type CMP

DM-CBL-ULTRA-LSZH: DigitalMedia™ Ultra Cable, Low Smoke Zero Halogen

DM-CONN: Connector for DM-CBL-ULTRA

DM-CBL-8G-NP: DigitalMedia 8G™ Cable, non-plenum

DM-CBL-8G-P: DigitalMedia 8G™ Cable, plenum

DM-8G-CONN: Connector for DM-CBL-8G

DM-8G-CRIMP: Crimping Tool for DM-8G-CONN

DM-8G-CONN-WG: Connector with Wire Guide for DM-CBL-8G

DM-8G-CRIMP-WG: Crimping Tool for DM-8G-CONN-WG

CBL Series: Crestron® Certified Interface Cables

CNSP-XX: Custom Serial Interface Cable

IRP2: IR Emitter Probe w/Terminal Block Connector

Notes:

- 4K60 4:4:4 performance requires the use of HDMI cables with a minimum TMDS bandwidth of 18 Gbps, such as Crestron model [CBL-HD](#) (20 ft / 6.1 m max. length). If 4K60 4:2:0 or 4K30 4:4:4 performance is acceptable, cables with a minimum bandwidth of 10.2 Gbps may be used, such as Crestron models [CBL-HD-LOCK](#) or [CBL-HD](#) (any available length). Performance may also be affected if an HDMI coupler is inserted in the HDMI signal path. Crestron coupling products ([MP-WP150](#), [MP-WP152](#), [MPI-WP150](#), or [FTA-CP-HD-101](#)) and cable retractors ([CBLR2-HD](#)) all have a specified bandwidth of 10.2 Gbps, and thus do not support 4K60 4:4:4. Please be aware that bandwidth loss is cumulative, so the combination of multiple components inserted inline may reduce performance.
- To add a fiber optic LAN port requires the purchase of a Crestron [SFP-1G](#) series SFP transceiver module (sold separately). All LAN ports on the DM-NVX-351 are for connection to an Ethernet based AV network or device; they cannot be connected to the "DM" ports of other Crestron devices.
- When in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
- 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. DM NVX is compatible with Crestron [USB-EXT-DM](#) products, but is not compatible with the "USB HID only" signal extender technology found in other Crestron DM products.
- The analog audio port can function as an input or output, not both.
- Audio from one onboard HDMI input may not be combined with video from the other onboard HDMI input.
- Combining audio from one encoder with video from another encoder utilizes the secondary 2-channel audio stream. Multichannel audio from one encoder cannot be combined with video from another encoder.
- The DM-NVX-351 is powerable using the 24V power pack (included) or a [DM-PSU-ULTRA-MIDSPAN](#) (sold separately).
- Device control via RS-232, IR, CEC, or Ethernet requires integration with a [Crestron control system](#).
- 3D video input signals are automatically converted to 2D.
- 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.

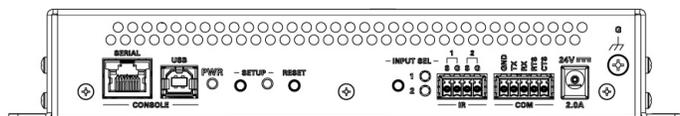
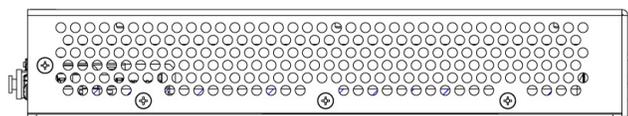
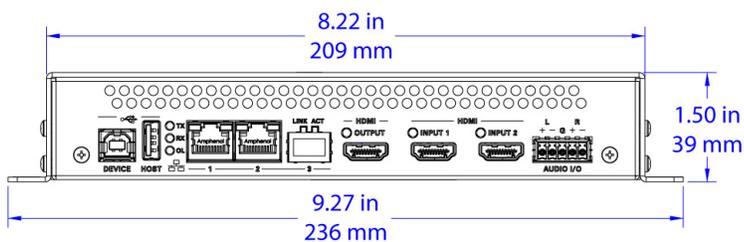
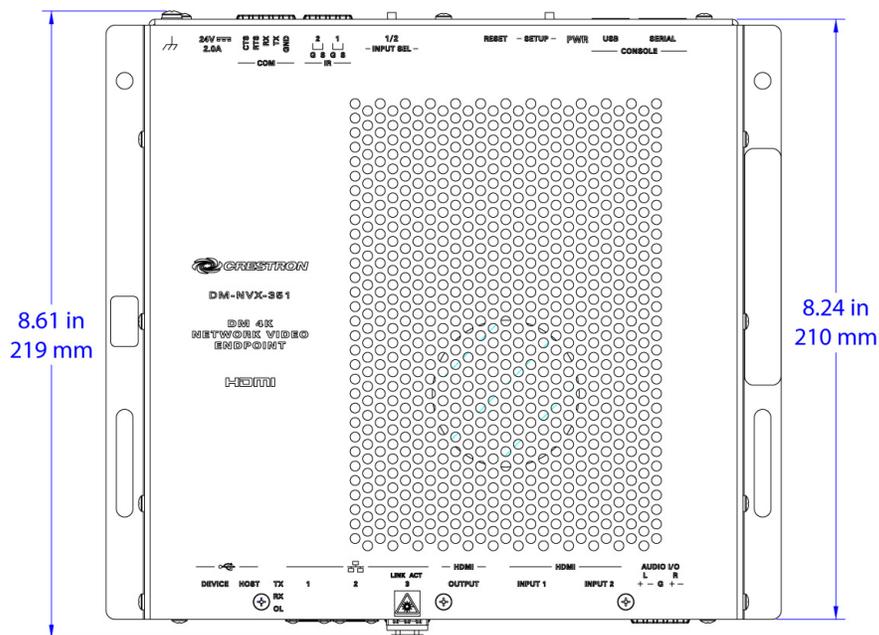
This product may be purchased from an authorized Crestron dealer. To find a dealer, please contact the Crestron sales representative for your area. A list of sales representatives is available online at www.crestron.com/salesreps or by calling 800-237-2041.

The specific patents that cover Crestron products are listed online at: patents.crestron.com.

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

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