

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



- 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
- 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 Crestron® 3-Series® or later control systems
- 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 of the DM-NVX-E30
- Compact, surface-mountable design
- Powered via PoE+ or optional power pack (sold separately)

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}

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.²

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.

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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.¹ 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

Image preview provides still images (thumbnails) that show the current video being received by an input of a DM NVX encoder. 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.

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 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@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.
- 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

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 Audio Embedding and De-Embedding

AES67 support enables the HDMI source to be transmitted as a 2-channel AES67 audio stream while another 2-channel AES67 audio stream is received from a Crestron DSP or other third-party device. 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 Ethernet Connectivity

The DM-NVX-E30 includes one RJ-45 1000BASE-T Ethernet port.² The port is PoE+ compliant, allowing the device to be powered via a PoE+ Ethernet switch.⁵ For information about network requirements and guidelines, refer to the [DM NVX AV-over-IP System Design Guide](#), Doc. 7977.

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 source devices under the management of a control system. Additional control capability is provided by CEC over the HDMI connection. Under the management of a control system, the DM-NVX-E30 can control a source device via CEC, 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.

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Streamlined Management Using DM NVX Director Virtual Switching Appliances

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

For additional design tools and reference documents, refer to the DM NVX web page at www.crestron.com/nvx.

Specifications**Encoding**

Stream Type: Pixel Perfect Processing (default) or DM-NVX-D10/D20 Series⁶

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)³
Adaptive: Dependent on input resolution of the stream
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^{1,7} (Dual-Mode DisplayPort™ interface and DVI compatible⁸)

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.

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Audio

Input Signal Types: HDMI (Dual-Mode DisplayPort interface compatible⁸)

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/RS-232 (0-5 V) up to 19.2k baud (via control system)

HDMI: HDCP 2.3, EDID, CEC

DM NVX (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;² PoE+ PD (powered device) port, IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant; Compatible with Crestron [DM-PSU-ULTRA-MIDSPAN](#), PoE+ compliant Ethernet switch, or approved third-party PSE⁵

HDMI INPUT: (1) HDMI Type A connector, female; HDMI digital video/audio input (DVI and Dual-Mode DisplayPort interface compatible⁸)

AUDIO: (1) 5-pin 3.5 mm detachable terminal block; Balanced/unbalanced stereo line-level audio output;⁴ Output Impedance: 200 Ohms balanced, 100 Ohms unbalanced; Maximum Output Level: 4 Vrms balanced, 2 Vrms 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 (0-5 V) 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; 24 VDC 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) 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

PWR: (1) Bi-color green/amber LED, indicates operating power supplied via PoE+ or optional power pack (sold separately), lights amber while booting and green when operating

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 Crestron [DM-PSU-ULTRA-MIDSPAN](#), PoE+ compliant Ethernet switch, or approved third-party PSE

Power Pack (Optional):

Input: 0.8 A maximum @ 100-240 VAC, 50/60 Hz
Output: 1.25 A @ 24 VDC
Model: [PW-2412WU](#) (sold separately)

Power Consumption: 15 W typical

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Environmental

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

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

Heat Dissipation: 48 BTU/hr

Acoustic Noise: 33 dBA typical

Enclosure

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: 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

Regulatory Model: M202013001

Bureau Veritas Listed for US & Canada, IC, CE, FCC Part 15 Class B digital device

Model

DM-NVX-E30: DM NVX 4K60 4:4:4 HDR Network AV Encoder

Management Tools

DM-NVX-DIR-80: DM NVX Director Virtual Switching Appliance for 80 Endpoints

DM-NVX-DIR-160: DM NVX Director Virtual Switching Appliance for 160 Endpoints

DM-NVX-DIR-ENT: DM NVX Director Virtual Switching Appliance for 1000 Endpoints

Accessories

For a list of accessories, visit the [DM-NVX-E30](#) product page.

Notes:

- 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.

- 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 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.

- The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
- The analog audio output is functional only when the DM-NVX-E30 is receiving a 2-channel stereo input signal.
- 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.
- 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 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.
- 3D formats are not supported.
- 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 select authorized Crestron dealers and distributors. To find a dealer or distributor, please contact the Crestron sales representative for your area. A list of sales representatives is available online at www.crestron.com/How-To-Buy/Find-a-Representative or contact us for additional information by visiting www.crestron.com/contact/our-locations for your local contact.

This product is covered under the Crestron standard limited warranty. Refer to www.crestron.com/warranty for full details.

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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HDMI

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