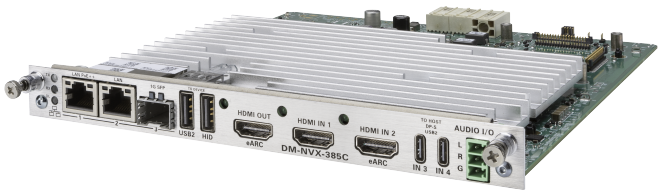
DM-NVX-385C

DM NVX® 5K 4x1 AV-over-IP Switcher Card with HDMI® and USB-C® Connectivity and Downmixing



- *Two HDMI® and two USB-C® inputs*
- *4K60 4:4:4 video over standard Gigabit Ethernet, configurable as an encoder or decoder[1]*
- *Support for 5K Ultra-Wide (21:9) and Super-Wide (32:9) resolutions*
- *HDR10, HDR10+, and Dolby Vision® video support*
- *Real-time video performance over the network with Pixel Perfect Processing technology*
- *H.264 encoding and streaming*
- *Enterprise-grade security including 802.1X, Active Directory® credential management, TLS, and AES-128*
- *One HDMI output with 5K scaler*
- *eARC support available on HDMI® connection to display and secondary HDMI input*
- *Video wall processing*
- *Dynamic text overlay capability*
- *7.1 surround sound audio with downmixing for formats up to Dolby Atmos MAT 2.0 and DTS:X*
- *AES67 and analog audio embedding and de-embedding*
- *Copper or fiber Ethernet connectivity*
- *USB 2.0 and KVM signal extension and routing*
- *Device control via CEC*
- *Automatic point-to-point connectivity*
- *Easy setup via built-in web interface*
- *Interoperability with a Crestron 3-Series® or later control system*
- *Streamlined management using DM NVX Director™ virtual switching appliances*
- *Crestron XiO Cloud™ service support*
- *Designed for installation into a DMF-CI-8 card chassis*

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.[2, 3]

Multiview Streaming

The DM-NVX-385C features a Multiview streaming mode for combining up to six DM NVX video streams into a single video output. Multiview streaming delivers the same Pixel Perfect Processing image quality and real-time performance as the rest of the DM NVX platform. Flexible layout options, customizable text overlays, selectable audio routing, window transitions, and highlight borders make Multiview ideal for command and control environments, monitoring applications, collaboration spaces, and other installations that benefit from viewing multiple content sources at once.

> **NOTE:** Multiview is only supported with other compatible DM NVX endpoints. The DM-NVX-384, DM-NVX-384C, and DM-NVX-385 also support Multiview streaming.

HDMI® and USB-C® 4x1 Input Auto-Switching

The DM-NVX-385C 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-385C 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.

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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-385C can encode or decode a video signal to achieve imperceptible end-to-end latency of less than one frame. The image quality of the source is maintained across a 1-Gigabit network at resolutions up to 5K Ultra-Wide 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 and Decoder Functionality

The DM-NVX-385C 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

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 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 or Fiber Ethernet Connectivity

The DM-NVX-385C 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.[2]

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 the DM NVX AV-over-IP System Design Guide.

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-385C, 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.[7]

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 Appliances

Use of a DM NVX Director® virtual switching appliance (DM-NVX-DIR-80, DM-NVX-DIR-160, or DM-NVX-DIR-ENT) streamlines the 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 DM-NVX-385C is compatible with the Crestron XiO Cloud® service for remote provisioning, monitoring, and managing. This service enables installers and IT managers to deploy and manage thousands of devices simultaneously. Refer to crestron.com/xiocloud for more information.

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High-Density, Card-Based Solution

The DM-NVX-385C 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.

Refer to the DM NVX feature page for additional design tools and reference documents.

Specifications

Encoding/Decoding

Video Codec	**Encoder:** Pixel Perfect Processing (default) or DM-NVX-D10/D20/D200[9], H.264 AV-over-IP streaming; **Decoder:** Pixel Perfect Processing or DM-NVX-D10/D20[9]
Video Resolutions	Up to 5120x2160 @30 Hz (5K Ultra-Wide) or 5120x1440 @60 Hz (5K Super-Wide); Up to 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	200 to 950 Mbps[8]
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 5K support[1, 10] (Dual-Mode DisplayPort™ interface and DVI compatible[11]) DisplayPort over USB-C (DisplayPort Alt Mode)[12] with HDR10, HDR10+, and 5K support
Output Signal Types	HDMI with HDR10, HDR10+, Dolby Vision, Deep Color, and 5K support[1] (DVI compatible[11])
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)	5K 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
Maximum Resolutions	Common resolutions are shown in the following table. Custom resolutions are supported at pixel clock rates up to 600 MHz.

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Scan Type	Resolution	Frame Rate	Color Sampling	Color Depth
Progressive	5120×2160 5K Ultra-Wide	30 Hz	4:4:4	8 bit
	5120x2160 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	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

*5K Ultra-Wide @60Hz 4:2:0 is supported as an unscaled pass-through resolution only.

Audio

Input Signal Types HDMI (Dual-Mode DisplayPort interface compatible[11]), DisplayPort over USB-C (DisplayPort Alt Mode),[12] eARC (via **HDMI OUT**), AES67 (2-channel), BTS (multichannel network stream), analog stereo[5]

Output Signal Types HDMI (multichannel pass-through), eARC (via **HDMI IN 2**), AES67 (2-channel), BTS (multichannel network stream), 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 or DM NAX Audio-over-IP 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, 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, ARC, eARC

USB-C (DisplayPort Alt Mode)[12] HDCP 2.3, EDID, CEC, USB 2.0

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)

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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;[7] Available Power: 500mA at 5 VDC
HID TO DEVICE	(1) USB Type-A connector, female; USB 2.0 device port; USB signal extender port for connection to a USB HID compliant mouse, keyboard, or other USB HID compliant device; Available Power: 500mA at 5VDC
Ethernet 1	(1) 8-pin 8P8C connector, female; 100BASE-TX/1000BASE-T Ethernet port[2]
Ethernet 2 (LAN)	(1) 8-pin 8P8C connector, female; 100BASE-TX/1000BASE-T Ethernet port[2]
Ethernet 3 (1G SFP)	(1) SFP port; Accepts one Crestron SFP-1G Series transceiver module[3]
HDMI OUT (eARC)	(1) HDMI Type A connector, female; HDMI digital video/audio output[1] (DVI compatible[11]); eARC audio return support
HDMI IN 1	(1) HDMI Type A connector, female; HDMI digital video/audio input;[1] (DVI and Dual-Mode DisplayPort interface compatible[11])
HDMI IN 2 (eARC)	(1) HDMI Type A connector, female; HDMI digital video/audio input;[1] (DVI and Dual-Mode DisplayPort interface compatible[11]); eARC audio output support
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[12]
AUDIO I/O	(1) 3-pin 3.5 mm detachable terminal block; Unbalanced stereo line-level audio input or output;[5] 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; Left amber indicates 1 Gbps Ethernet link; Left green indicates 100 Mbps Ethernet link; Amber indicates Ethernet activity
HDMI OUT	(1) Green LED, indicates video signal transmission at the HDMI output
HDMI IN 1-2	(2) Green LEDs, indicates sync detection at the HDMI inputs

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

ETL Listed for the United States and Canada to UL/IEC 62368-1 safety standards. CE compliant for applicable European Union requirements.

Model

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Available Accessories

For a list of available accessories, visit the DM-NVX-385C product page.

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

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Notes:

1. 5K 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. 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.
3. 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.
4. When the DM-NVX-385C is in encoder mode, the HDMI output resolution is matched to the resolution of the encoded source.
5. The analog audio port can function as either an input or output, but not both.
6. Combining audio from one encoder with video from another encoder is possible using the secondary 2-channel audio stream only. Multichannel audio from one encoder cannot be combined with video from another encoder.
7. The DM-NVX-385C can accept a USB device or a USB host device connection, not both simultaneously. 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. Consult the DM NVX AV-over-IP System Design Guide for USB bandwidth considerations.
8. The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.
9. 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 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 of the DM-NVX-385C decoder. For interoperability with DM-NVX-E10/E20 Series encoders, DM-NVX-D10/D20 Series is automatically used as the stream type of the DM-NVX-385C decoder.
10. 3D formats are not supported.
11. 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.
12. 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.

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.

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HDMI

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