SECTION 27 41 16

INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

GUIDE SPECIFICATION

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Specifier: Please see PART 4 for a listing of products specified in this Guide Specification.

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# GENERAL

NOT USED in this Guide Specification. Specifier shall Specify PART 1 administrative and procedural requirements as needed.

# PRODUCTS

## AVoIP Encoder / Decoder

Specifier Note:

*The Crestron DM-NVX-384 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, 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.*

### Basis of Design

#### Crestron DM-NVX-384

### Device Definition

#### AVoIP encoder/decoder that transmits proprietary multicast streaming signals and AES67 over a network that at a minimum, partially consists of other endpoints by same manufacturer

##### Transmits 4K60 4:4:4 over standard gigabit Ethernet

##### Support for 5K Wide (16:9), Ultra-wide (21:9), and Super-Wide (32:9) resolutions

#### Uses security protocols such as 802.1X authentication, Active Directory® credential management, TLS, and AES-128

#### Two HDMI and two USB-C inputs

#### One HDMI output with 4K60 4:4:4 scaler

#### Video wall processing and dynamic text overlay capabilities

#### Analog audio embedding and de-embedding via unbalanced stereo analog audio port

#### Lossless transport of 7.1 surround sound audio signals

#### 2-channel AES67 Audio Embedding and De-embedding

#### Breakaway audio support

#### Copper or fiber Ethernet connectivity

#### USB 2.0 and KVM signal extension and routing

#### Device control via RS-232, IR, and CEC

#### Automatic point-to-point connectivity

#### Web browser-based setup

#### Compatible with control system from same manufacturer

#### Compatible with endpoint virtual switching appliance from same manufacturer

#### Compatible with endpoint management software by same manufacturer

#### Surface or rack mountable

#### Powered via POE++ or optional power pack

### Device Architecture

#### Physical Form factor

##### Chassis

###### Metal, black finish, integral mounting flanges

###### Fan cooled; vented top, front, rear, and sides

###### Mounting: Freestanding, surface mount, or attachment to a single rack rail

##### Dimensions

###### Height: 8.21 in. (209 mm)

###### Width: 8.21 in. (209 mm)

###### Depth: 1.22 in. (31 mm)

##### Weight: 2.0 lb. (0.91 kg)

##### Environmental Operating Conditions

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

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

### Functions

#### Encoding / Decoding

##### Video Codec: Proprietary to device manufacturer

##### Video Resolutions: Up to 5120x2880@60Hz (5K 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

Specifier Note: 3D formats are not supported.

##### Bit Rates: 200 to 950 Mbps

Specifier Note: The minimum bit rate for 4K60 video is 350 Mbps. A bit rate below 350 Mbps may display a black screen.

##### 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 HDR10, HDR10+, Dolby Vision, Deep Color, and 4K60 4:4:4 support (Dual-Mode DisplayPort™ interface and DVI compatible)

Specifier Note:

*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.*

###### 3D formats not supported

###### HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort™ signal.

###### 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 (DVI compatible)

Specifier Note:

*HDMI connections require an appropriate adapter or interface cable to accommodate a DVI or Dual-Mode DisplayPort signal.*

##### Switcher: 4x1 in encoder mode (Two HDMI, Two USB-C), manual or auto-switching, breakaway audio, utilizing proprietary switching technology by same manufacturer

Specifier Note:

*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.*

##### 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

Specifier Note:

*The device specified shall provide support for a variety of commonly used resolutions up to 5120x2880 at 30 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 when paired with an appropriate adapter or interface cable), DisplayPort over USB-C (DisplayPort Alt Mode) analog stereo

##### Output Signal Types: HDMI (multichannel pass-through), analog stereo (2-channel)

Specifier Note:

*The analog audio port can function as an input or output, not both.*

##### 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 proprietary AoIP system by same manufacturer: 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

###### 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, Active Directory authentication, variable Multicast TTL, HTTPS web browser setup and control, support for integration with control system from same manufacturer

##### 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 by same manufacturer)

##### IR/Serial: 1-way device control via infrared up to 1.1 MHz or serial TTL (0-5 V) up to 19.2k baud (via control system by same manufacturer)

##### HDMI: HDCP 2.3, EDID, CEC

##### USB-C (DisplayPort Alt Mode): HDCP 2.3, EDID, CEC, USB 2.0

##### Proprietary AVoIP (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

Specifier Note:

*This device can be configured to accept the connection of a USB device or a USB host, not both.*

##### Available Power: 500 mA at 5 VDC

Specifier Note:

*When PoE++ is used to power this device, a maximum of 500 mA is available to power both the USB TO DEVICE and USB HID ports. To prevent possible instability issues, it is recommended that a power pack by the same manufacturer be used.*

#### 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: 500 mA at 5 VDC

#### Ethernet 1 (LAN PoE++)

##### (1) 8-pin 8P8C connector, female; 100BASE-TX/1000BASE-T Ethernet port

Specifier Note:

*The minimum cable required for this AVoIP device 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 proprietary HDBaseT ports by same manufacturer.*

##### PoE++ PD (powered device) port, IEEE 802.3bt Type 3 Class 5 (60 W) compliant

Specifier Note:

*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.*

#### Ethernet 2 (LAN)

##### (1) 8-pin 8P8C connector, female; 100BASE-TX/1000BASE-T Ethernet port

#### Ethernet 3 (1G SFP)

##### (1) SFP port; accepts one transceiver module by same manufacturer

Specifier Note:

*Use of the SFP port requires the purchase of an SFP transceiver module by same manufacturer (sold separately). All Ethernet ports on this device are for connection to an Ethernet network or device. The Ethernet ports cannot be connected to the proprietary HDBaseT ports by same manufacturer.*

#### HDMI OUT (eARC)

##### (1) HDMI Type A connector, female; HDMI digital video / audio output (DVI compatible)

##### eARC audio return support in future firmware update

#### HDMI IN 1

##### (1) HDMI Type A connector, female; HDMI digital video / audio input

##### DVI and Dual-Mode DisplayPort interface compatible

#### HDMI IN 2 (eARC)

##### (1) HDMI Type A connector, female; HDMI digital video / audio input

##### DVI and Dual-Mode DisplayPort interface compatible

##### eARC audio return support in 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

#### AUDIO I/O

##### (1) 3-pin 3.5 mm detachable terminal block

##### Unbalanced stereo line-level audio input or output

##### Input Impedance: 24 kΩ

##### Maximum Input Level: 2 Vrms

##### Output Impedance: 100 Ω

##### Maximum Output Level: 2 Vrms

#### 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 (0-5 V) up to 19200 baud

##### IR emitter by same manufacturer not included with device

#### 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 1.7A

##### (1) 2.1 x 5.5 mm DC power connector; 24 VDC power input

##### Power pack by same manufacturer 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 for onscreen IP address display and changing operating modes (TX or RX)

#### RESET: (1) Recessed push-button for hardware reset

#### 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 link 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, indicates sync detection at the HDMI inputs

### Power

#### PoE++

##### IEEE 802.bt Type 3 Class 5 (60 W) compliant

##### Compatible with proprietary HDBaseT-based midspan power injector by same manufacturer, PoE++ compliant Ethernet switch, or third-party IEEE 802.3bt compliant PSE

#### Power Pack (Optional)

##### Input: 1.7 A maximum @ 100-240 VAC, 50/60 Hz

##### Output: 1.25 A @ 24 VDC

### Compliance

#### Regulatory Model M202234002

#### FCC Part 15 Class B, IC Class B, CE, Intertek® Listed for US and Canada

# EXECUTION

NOT USED in this Guide Specification. Specifier shall Specify PART 3 On-Site work as needed.

# APPENDICES

## SPECIFIED PRODUCTS

Specifier Note: This Article includes Crestron products specified in this Guide Specification document. This Article is for reference only and should not be required in actual project manual unless included in an overall system equipment list.

### Crestron DM-NVX-384