SECTION 27 41 16

INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

Equipment Specified in this section:

DM-NVX-350C

DM-NVX-351C

DM-NVX-350

DM-NVX-351

DMF-CI-8

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INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

Specifier: The Specifier/Design Professional is responsible for the accuracy of all project specifications, including system application and coordination with related sections. This guide specification is provided as a convenience and requires editing to match actual project requirements. CRESTRON ELECTRONICS, INC. SHALL NOT BE LIABLE FOR ANY DAMAGES ARISING OUT OF THE USE OF ANY OF ITS GUIDE SPECIFICATIONS. For Crestron design assistance and design review please contact Sales Support Services Department at 800.237.2041 or techsales@crestron.com.

1. GENERAL
   1. SUMMARY
      1. Section Includes
         1. 4K60 4:4:4 HDR Network AV Encoder/Decoder Unit
   2. REFERENCES
      1. Abbreviations and Acronyms
         1. CEC: Consumer Electronics Control
         2. EDID: Extended display identification data
         3. HDCP: High-bandwidth Digital Content Protection
         4. HDMI: High-Definition Multimedia Interface
2. PRODUCTS
   1. ENCODER/DECODER UNIT TYPE 1

Specifier Note: DM-NVX-350C - DigitalMedia 4K60 4:4:4 HDR Network AV Encoder/Decoder Card

* + 1. Real-Time 4K60 Video Distribution
       1. The Encoder/Decoder end-to-end latency for 60 frame per second content shall be less than 1 frame.
    2. Single Component Design
       1. In a single card, the Encoder/Decoder shall be configurable to operate as:
          1. Network AV encoder
          2. Network AV decoder
       2. The encoder/decoder mode shall be switchable while in use via a control system.
    3. Standard 1Gb network operation
       1. 4K60 Video distribution
       2. Web based control and management
    4. Scalable network distribution system
       1. System of encoder/decoder units shall be scalable via network switch.
    5. Auto-Switcher
       1. The Encoder/Decoder shall include two HDMI inputs. Switching between inputs shall be performed:
          1. Automatically using an auto-switching mode
          2. Programmatically via a control system
          3. Through a web browser
    6. HDMI Output
       1. When configured as a decoder, the HDMI output is scaled up or down to match the native resolution of the display device.
       2. When used as an encoder, the HDMI output shall function as a pass through output, with resolution matched to the encoded source.
    7. USB and KVM Integration
       1. The Encoder/Decoder shall support the extension of USB signals, which may be switched and routed alongside the AV signal or separately via a compatible control system.
       2. USB 2.0 host and device ports are provided on each Encoder/Decoder, allowing a USB mouse, keyboard, or other device to be connected at one DM NVX endpoint and routed to a computer or other host at any other endpoint.
       3. USB peripherals switching functionality shall support:
          1. Whiteboards
          2. Touch screens
          3. Game controllers
          4. Cameras
          5. Mobile devices
          6. Headsets
          7. Flash drives
    8. 7.1 Surround Sound Audio
       1. The Encoder/Decoder shall support lossless transport of 7.1 surround sound audio signals, including:
          1. Dolby TrueHD
          2. Dolby Atmos
          3. DTS-HD
          4. DTS:X
          5. Uncompressed linear PCM.
       2. In decoder mode, the Encoder/Decoder shall have the ability to receive both multichannel and 2-channel downmix signals from a DSP version of the Encoder/Decoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.
    9. Analog Audio Embedding or De-embedding
       1. A balanced stereo analog audio port shall be included, which may be configured as either an input or output.
          1. 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.
          2. As an output, it can provide a stereo line-level signal to feed a local sound system or analog audio switcher. The output volume is adjustable via a compatible control system or web browser.
    10. Breakaway Audio
        1. In decoder mode the Encoder/Decoder may select and combine separate video and audio signals from two different inputs, including two different encoders.
    11. Text Overlay
        1. The Encoder/Decoder shall be capable of displaying dynamic or fixed text on screen.
    12. Video Wall Processing
        1. The Encoder/Decoder shall support video wall functionality.
        2. Video walls composed of up to 64 individual displays shall be supported with configurations using multiple Encoder/Decoder units.
        3. Each Encoder/Decoder shall provide fully-adjustable zoom capability and bezel compensation.
        4. One Encoder/Decoder is required per display, supporting configurations of up to eight wide by up to eight high.
    13. Copper or Fiber LAN Connectivity
        1. The Encoder/Decoder 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 an additional device. These ports may also be used to daisy-chain multiple Encoder/Decoder units feeding a single-source video wall or individual displays all showing the same video image.
        2. Encoder/Decoder unit shall support connection to a fiber optic network by inserting an appropriate SFP transceiver module into the SFP port on the Encoder/Decoder.
        3. Encoder/Decoder manufacturer shall offer a selection of modules to accommodate various multimode and single-mode fiber types. An RJ45 module is also offered to provide a third RJ45 LAN port.
    14. Enterprise-Grade Security
        1. Encoder/Decoder shall employ advanced security features and protocols including:
           1. 802.1x authentication
           2. Active Directory credential management
           3. LDAP directory management
           4. PKI certification
           5. AES encryption
           6. TLS, SSH
           7. HTTPS
        2. Encoder/Decoder shall run on a dedicated AV network, with fully-managed access to, or isolation from, the user’s LAN or the Internet.
    15. CEC Device Control
        1. Through a compatible control processor, the Encoder/Decoder unit shall include a gateway for controlling devices through their HDMI connections using the CEC signal embedded in HDMI.
    16. Web-Based Setup
        1. Setup of the Encoder/Decoder unit shall be accomplished using a computer web browser.
        2. Full control and monitoring of the Encoder/Decoder unit is enabled through integration with a compatible control processor.
    17. High-Density Card-Based Component
        1. The Encoder/Decoder unit shall be a card type component utilizing a card chassis.
        2. The compatible card chassis shall be a scalable unit capable of housing up to eight Encoder/Decoder units.
    18. Encoding/Decoding
        1. Video Codec: Pixel Perfect Processing
        2. Video Resolutions: Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10 and Deep Color support
        3. Audio Formats: Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
        4. Bitrates: 100 to 990 Mbps
        5. Streaming Protocols: RTP, RTSP, SDP
        6. Container: MPEG-2 transport stream (.ts)
        7. Session Initiation: Multicast via RTSP
        8. Copy Protection: HDCP 2.2
    19. Video
        1. Input Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (Dual-Mode DisplayPort and DVI compatible)
        2. Output Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (DVI compatible)
        3. Switcher: 2x1 auto-switching
        4. 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
        5. Copy Protection: HDCP 2.2
    20. Maximum Resolutions
        1. Maximum Common 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 HD 1080p | 60 Hz | 4:4:4 | 36 bit |
| Interlaced (Input only) | 1920x1080 HD 1080i | 30 Hz | 4:4:4 | 36 bit |

* + - 1. Encoder/Decoder unit shall support other custom resolutions at pixel clock rates up to 600 MHz
    1. Audio
       1. Input Signal Types: HDMI (Dual-Mode DisplayPort compatible [10]), analog stereo
       2. 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
       4. Analog Formats: Stereo 2-channel
       5. Analog-To-Digital Conversion: 24-bit 48 kHz
       6. Digital-To-Analog Conversion: 24-bit 48 kHz
       7. Analog Performance:
       8. Frequency Response: 20 Hz to 20 kHz ±0.5 dB
       9. S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted
       10. THD+N: <0.005% @ 1 kHz
       11. Stereo Separation: >90 dB
       12. Analog Output Volume Adjustment: -80 to +20 dB
    2. Communications
       1. 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
       2. USB: USB 2.0 host or device signal extension
       3. HDMI: HDCP 2.2, EDID, CEC
       4. Integrated Control (via Ethernet): HDCP 2.2, AES, RTP, RTSP, SDP, ONVIF, IGMPv3, SMPTE 2022
       5. Management of HDCP and EDID
       6. Management of CEC between the connected HDMI devices and a control system
    3. Connectors
       1. USB DEVICE:
          1. (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

* + - 1. USB HOST:
         1. (1) USB Type A female
         2. USB 2.0 host port
         3. 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
      2. LAN 1 – 2:
         1. (2) 8-pin RJ45 female
         2. 10Base-T/100Base-TX/1000Base-T Ethernet ports
      3. LAN 3:
         1. (1) SFP port
         2. Accepts one SFP transceiver module
      4. HDMI OUTPUT:
         1. (1) 19-pin Type A HDMI female

HDMI digital video/audio output (DVI compatible)

* + - 1. HDMI INPUT 1 – 2:
         1. (2) 19-pin Type A HDMI female

HDMI digital video/audio inputs

(DVI & Dual-Mode DisplayPort compatible)

* + - 1. AUDIO I/O:
         1. (1) 5-pin 3.5 mm detachable terminal block

Balanced/unbalanced stereo line-level audio input or output

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

* + 1. Controls & Indicators
       1. TX: (1) Green LED, indicates unit is in transmitter (encoder) mode
       2. RX: (1) Green LED, indicates unit is in receiver (decoder) mode
       3. OL: (1) Green LED, indicates an online connection to a control system via Ethernet
       4. LAN 1 – 2: (4) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity
       5. LAN 3 LNK: (1) Green LED, indicates Ethernet link status
       6. LAN 3 ACT: (1) Green LED, indicates Ethernet activity
       7. HDMI OUTPUT: (1) Green LED, indicates video signal transmission at the HDMI output
       8. HDMI INPUT 1 – 2: (2) Green LEDs, each indicates sync detection at the corresponding HDMI input
    2. Construction
       1. Plug-in card, occupies (1) card slot in a card chassis
    3. Basis of design product: Crestron **DM-NVX-350C**
       1. Product Description: DigitalMedia 4K60 4:4:4 HDR Network AV Encoder/Decoder Card
  1. ENCODER/DECODER UNIT TYPE 2

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

* + 1. Real-Time 4K60 Video Distribution
       1. The Encoder/Decoder end-to-end latency for 60 frame per second content shall be less than 1 frame.
    2. Single Component Design
       1. In a single card, the Encoder/Decoder shall be configurable to operate as:
          1. Network AV encoder
          2. Network AV decoder
       2. The encoder/decoder mode shall be switchable while in use via a control system.
    3. Standard 1Gb network operation
       1. 4K60 Video distribution
       2. Web based control and management
    4. Scalable network distribution system
       1. System of encoder/decoder units shall be scalable via network switch.
    5. Auto-Switcher
       1. The Encoder/Decoder shall include two HDMI inputs. Switching between inputs shall be performed:
          1. Automatically using an auto-switching mode
          2. Programmatically via a control system
          3. Through a web browser
    6. HDMI Output
       1. When configured as a decoder, the HDMI output is scaled up or down to match the native resolution of the display device.
       2. When used as an encoder, the HDMI output shall function as a pass through output, with resolution matched to the encoded source.
    7. USB and KVM Integration
       1. The Encoder/Decoder shall support the extension of USB signals, which may be switched and routed alongside the AV signal or separately via a compatible control system.
       2. USB 2.0 host and device ports are provided on each Encoder/Decoder, allowing a USB mouse, keyboard, or other device to be connected at one DM NVX endpoint and routed to a computer or other host at any other endpoint.
       3. USB peripherals switching functionality shall support:
          1. Whiteboards
          2. Touch screens
          3. Game controllers
          4. Cameras
          5. Mobile devices
          6. Headsets
          7. Flash drives
    8. 7.1 Surround Sound Audio with Downmixing
       1. The Encoder/Decoder shall support lossless transport of 7.1 surround sound audio signals, including:
          1. Dolby TrueHD
          2. Dolby Atmos
          3. DTS-HD
          4. DTS:X
          5. Uncompressed linear PCM.
       2. The Encoder/Decoder shall include the ability to decode the incoming multichannel surround sound signal, 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, while the HDMI output can be configured to output either stereo or multichannel.
       3. As an encoder, the Encoder/Decoder unit distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.
    9. Analog Audio Embedding or De-embedding
       1. A balanced stereo analog audio port shall be included, which may be configured as either an input or output.
          1. 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.
          2. As an output, it can provide a stereo line-level signal to feed a local sound system or analog audio switcher. The output volume is adjustable via a compatible control system or web browser.
    10. Breakaway Audio
        1. In decoder mode the Encoder/Decoder may select and combine separate video and audio signals from two different inputs, including two different encoders.
    11. Text Overlay
        1. The Encoder/Decoder shall be capable of displaying dynamic or fixed text on screen.
    12. Video Wall Processing
        1. The Encoder/Decoder shall support video wall functionality.
        2. Video walls composed of up to 64 individual displays shall be supported with configurations using multiple Encoder/Decoder units.
        3. Each Encoder/Decoder shall provide fully-adjustable zoom capability and bezel compensation.
        4. One Encoder/Decoder is required per display, supporting configurations of up to eight wide by up to eight high.
    13. Copper or Fiber LAN Connectivity
        1. The Encoder/Decoder 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 an additional device. These ports may also be used to daisy-chain multiple Encoder/Decoder units feeding a single-source video wall or individual displays all showing the same video image.
        2. Encoder/Decoder unit shall support connection to a fiber optic network by inserting an appropriate SFP transceiver module into the SFP port on the Encoder/Decoder.
        3. Encoder/Decoder manufacturer shall offer a selection of modules to accommodate various multimode and single-mode fiber types. An RJ45 module is also offered to provide a third RJ45 LAN port.
    14. Enterprise-Grade Security
        1. Encoder/Decoder shall employ advanced security features and protocols including:
           1. 802.1x authentication
           2. Active Directory credential management
           3. LDAP directory management
           4. PKI certification
           5. AES encryption
           6. TLS, SSH
           7. HTTPS
        2. Encoder/Decoder shall run on a dedicated AV network, with fully-managed access to, or isolation from, the user’s LAN or the Internet.
    15. CEC Device Control
        1. Through a compatible control processor, the Encoder/Decoder unit shall include a gateway for controlling devices through their HDMI connections using the CEC signal embedded in HDMI.
    16. Web-Based Setup
        1. Setup of the Encoder/Decoder unit shall be accomplished using a computer web browser.
        2. Full control and monitoring of the Encoder/Decoder unit is enabled through integration with a compatible control processor.
    17. High-Density Card-Based Component
        1. The Encoder/Decoder unit shall be a card type component utilizing a card chassis.
        2. The compatible card chassis shall be a scalable unit capable of housing up to eight Encoder/Decoder units.
    18. Encoding/Decoding
        1. Video Codec: Pixel Perfect Processing
        2. Video Resolutions: Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10 and Deep Color support
        3. Audio Formats: Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
        4. Bitrates: 100 to 990 Mbps
        5. Streaming Protocols: RTP, RTSP, SDP
        6. Container: MPEG-2 transport stream (.ts)
        7. Session Initiation: Multicast via RTSP
        8. Copy Protection: HDCP 2.2
    19. Video
        1. Input Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (Dual-Mode DisplayPort and DVI compatible)
        2. Output Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (DVI compatible)
        3. Switcher: 2x1 auto-switching
        4. 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
        5. Copy Protection: HDCP 2.2
    20. Maximum Resolutions
        1. Maximum Common 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 HD 1080p | 60 Hz | 4:4:4 | 36 bit |
| Interlaced (Input only) | 1920x1080 HD 1080i | 30 Hz | 4:4:4 | 36 bit |

* + - 1. Encoder/Decoder unit shall support other custom resolutions at pixel clock rates up to 600 MHz
    1. Audio
       1. Input Signal Types: HDMI (Dual-Mode DisplayPort compatible [10]), analog stereo
       2. 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
       4. Analog Formats: Stereo 2-channel
       5. Analog-To-Digital Conversion: 24-bit 48 kHz
       6. Digital-To-Analog Conversion: 24-bit 48 kHz
       7. Analog Performance:
       8. Frequency Response: 20 Hz to 20 kHz ±0.5 dB
       9. S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted
       10. THD+N: <0.005% @ 1 kHz
       11. Stereo Separation: >90 dB
       12. Analog Output Volume Adjustment: -80 to +20 dB
    2. Communications
       1. 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
       2. USB: USB 2.0 host or device signal extension
       3. HDMI: HDCP 2.2, EDID, CEC
       4. Integrated Control (via Ethernet): HDCP 2.2, AES, RTP, RTSP, SDP, ONVIF, IGMPv3, SMPTE 2022
       5. Management of HDCP and EDID
       6. Management of CEC between the connected HDMI devices and a control system
    3. Connectors
       1. USB DEVICE:
          1. (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

* + - 1. USB HOST:
         1. (1) USB Type A female
         2. USB 2.0 host port
         3. 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
      2. LAN 1 – 2:
         1. (2) 8-pin RJ45 female
         2. 10Base-T/100Base-TX/1000Base-T Ethernet ports
      3. LAN 3:
         1. (1) SFP port
         2. Accepts one SFP transceiver module
      4. HDMI OUTPUT:
         1. (1) 19-pin Type A HDMI female

HDMI digital video/audio output (DVI compatible)

* + - 1. HDMI INPUT 1 – 2:
         1. (2) 19-pin Type A HDMI female

HDMI digital video/audio inputs

(DVI & Dual-Mode DisplayPort compatible)

* + - 1. AUDIO I/O:
         1. (1) 5-pin 3.5 mm detachable terminal block

Balanced/unbalanced stereo line-level audio input or output

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

* + 1. Controls & Indicators
       1. TX: (1) Green LED, indicates unit is in transmitter (encoder) mode
       2. RX: (1) Green LED, indicates unit is in receiver (decoder) mode
       3. OL: (1) Green LED, indicates an online connection to a control system via Ethernet
       4. LAN 1 – 2: (4) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity
       5. LAN 3 LNK: (1) Green LED, indicates Ethernet link status
       6. LAN 3 ACT: (1) Green LED, indicates Ethernet activity
       7. HDMI OUTPUT: (1) Green LED, indicates video signal transmission at the HDMI output
       8. HDMI INPUT 1 – 2: (2) Green LEDs, each indicates sync detection at the corresponding HDMI input
    2. Construction
       1. Plug-in card, occupies (1) card slot in a card chassis
    3. Basis of design product: Crestron **DM-NVX-351C**
       1. Product Description: DigitalMedia 4K60 4:4:4 HDR Network AV Encoder/Decoder Card w/Downmixing
  1. ENCODER/DECODER UNIT TYPE 3

Specifier Note: DM-NVX-350 - DigitalMedia 4K60 4:4:4 HDR Network AV Encoder/Decoder

* + 1. Real-Time 4K60 Video Distribution
       1. The Encoder/Decoder end-to-end latency for 60 frame per second content shall be less than 1 frame.
    2. Single Component Design
       1. In a single card, the Encoder/Decoder shall be configurable to operate as:
          1. Network AV encoder
          2. Network AV decoder
       2. The encoder/decoder mode shall be switchable while in use via a control system.
    3. Standard 1Gb network operation
       1. 4K60 Video distribution
       2. Web based control and management
    4. Scalable network distribution system
       1. System of encoder/decoder units shall be scalable via network switch.
    5. Auto-Switcher
       1. The Encoder/Decoder shall include two HDMI inputs. Switching between inputs shall be performed:
          1. Automatically using an auto-switching mode
          2. Manually using input select button
          3. Programmatically via a control system
          4. Through a web browser
    6. HDMI Output
       1. When configured as a decoder, the HDMI output is scaled up or down to match the native resolution of the display device.
       2. When used as an encoder, the HDMI output shall function as a pass through output, with resolution matched to the encoded source.
    7. USB and KVM Integration
       1. The Encoder/Decoder shall support the extension of USB signals, which may be switched and routed alongside the AV signal or separately via a compatible control system.
       2. USB 2.0 host and device ports are provided on each Encoder/Decoder, allowing a USB mouse, keyboard, or other device to be connected at one DM NVX endpoint and routed to a computer or other host at any other endpoint.
       3. USB peripherals switching functionality shall support:
          1. Whiteboards
          2. Touch screens
          3. Game controllers
          4. Cameras
          5. Mobile devices
          6. Headsets
          7. Flash drives
    8. 7.1 Surround Sound Audio
       1. The Encoder/Decoder shall support lossless transport of 7.1 surround sound audio signals, including:
          1. Dolby TrueHD
          2. Dolby Atmos
          3. DTS-HD
          4. DTS:X
          5. Uncompressed linear PCM.
       2. In decoder mode, the Encoder/Decoder shall have the ability to receive both multichannel and 2-channel downmix signals from a DSP version of the Encoder/Decoder, allowing either signal to be selected at the HDMI output while the 2-channel signal is automatically routed to the analog output.
    9. Analog Audio Embedding or De-embedding
       1. A balanced stereo analog audio port shall be included, which may be configured as either an input or output.
          1. 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.
          2. As an output, it can provide a stereo line-level signal to feed a local sound system or analog audio switcher. The output volume is adjustable via a compatible control system or web browser.
    10. Breakaway Audio
        1. In decoder mode the Encoder/Decoder may select and combine separate video and audio signals from two different inputs, including two different encoders.
    11. Text Overlay
        1. The Encoder/Decoder shall be capable of displaying dynamic or fixed text on screen.
    12. Video Wall Processing
        1. The Encoder/Decoder shall support video wall functionality.
        2. Video walls composed of up to 64 individual displays shall be supported with configurations using multiple Encoder/Decoder units.
        3. Each Encoder/Decoder shall provide fully-adjustable zoom capability and bezel compensation.
        4. One Encoder/Decoder is required per display, supporting configurations of up to eight wide by up to eight high.
    13. Copper or Fiber LAN Connectivity
        1. The Encoder/Decoder 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 an additional device. These ports may also be used to daisy-chain multiple Encoder/Decoder units feeding a single-source video wall or individual displays all showing the same video image.
        2. Encoder/Decoder unit shall support connection to a fiber optic network by inserting an appropriate SFP transceiver module into the SFP port on the Encoder/Decoder.
        3. Encoder/Decoder manufacturer shall offer a selection of modules to accommodate various multimode and single-mode fiber types. An RJ45 module is also offered to provide a third RJ45 LAN port.
    14. Enterprise-Grade Security
        1. Encoder/Decoder shall employ advanced security features and protocols including:
           1. 802.1x authentication
           2. Active Directory credential management
           3. LDAP directory management
           4. PKI certification
           5. AES encryption
           6. TLS, SSH
           7. HTTPS
        2. Encoder/Decoder shall run on a dedicated AV network, with fully-managed access to, or isolation from, the user’s LAN or the Internet.
    15. CEC Device Control
        1. Through a compatible control processor, the Encoder/Decoder unit shall include a gateway for controlling devices through their HDMI connections using the CEC signal embedded in HDMI.
    16. Device Control
        1. The Encoder/Decoder Unit shall include built-in RS-232 and IR control ports for control of the connected display or device.
    17. Web-Based Setup
        1. Setup of the Encoder/Decoder unit shall be accomplished using a computer web browser.
        2. Full control and monitoring of the Encoder/Decoder unit is enabled through integration with a compatible control processor.
    18. Low-Profile Installation
        1. The Encoder/Decoder Unit mounts conveniently to a flat surface or rack rail. All connections and LED indicators are positioned on the top and bottom.
        2. Power is provided using the included 100-240V universal power pack or an optional power injector.
    19. Encoding/Decoding
        1. Video Codec: Pixel Perfect Processing
        2. Video Resolutions: Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10 and Deep Color support
        3. Audio Formats: Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
        4. Bitrates: 100 to 990 Mbps
        5. Streaming Protocols: RTP, RTSP, SDP
        6. Container: MPEG-2 transport stream (.ts)
        7. Session Initiation: Multicast via RTSP
        8. Copy Protection: HDCP 2.2
    20. Video
        1. Input Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (Dual-Mode DisplayPort and DVI compatible)
        2. Output Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (DVI compatible)
        3. Switcher: 2x1 auto-switching
        4. 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
        5. Copy Protection: HDCP 2.2
    21. Maximum Resolutions
        1. Maximum Common 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 HD 1080p | 60 Hz | 4:4:4 | 36 bit |
| Interlaced (Input only) | 1920x1080 HD 1080i | 30 Hz | 4:4:4 | 36 bit |

* + - 1. Encoder/Decoder unit shall support other custom resolutions at pixel clock rates up to 600 MHz
    1. Audio
       1. Input Signal Types: HDMI (Dual-Mode DisplayPort compatible), analog stereo
       2. 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
       4. Analog Formats: Stereo 2-channel
       5. Analog-To-Digital Conversion: 24-bit 48 kHz
       6. Digital-To-Analog Conversion: 24-bit 48 kHz
       7. Analog Performance:
       8. Frequency Response: 20 Hz to 20 kHz ±0.5 dB
       9. S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted
       10. THD+N: <0.005% @ 1 kHz
       11. Stereo Separation: >90 dB
       12. Analog Output Volume Adjustment: -80 to +20 dB
    2. Communications
       1. 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
       2. USB: USB 2.0 host or device signal extension
       3. HDMI: HDCP 2.2, EDID, CEC
       4. Integrated Control (via Ethernet): HDCP 2.2, AES, RTP, RTSP, SDP, ONVIF, IGMPv3, SMPTE 2022
       5. Management of HDCP and EDID
       6. Management of CEC between the connected HDMI devices and a control system
       7. 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)
       8. 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 compatible control system)
    3. Connectors
       1. USB DEVICE:
          1. (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

* + - 1. USB HOST:
         1. (1) USB Type A female
         2. USB 2.0 host port
         3. 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
      2. LAN 1 – 2:
         1. (2) 8-pin RJ45 female
         2. 10Base-T/100Base-TX/1000Base-T Ethernet ports
      3. LAN 3:
         1. (1) SFP port
         2. Accepts one SFP transceiver module
      4. HDMI OUTPUT:
         1. (1) 19-pin Type A HDMI female

HDMI digital video/audio output (DVI compatible)

* + - 1. HDMI INPUT 1 – 2:
         1. (2) 19-pin Type A HDMI female

HDMI digital video/audio inputs

(DVI & Dual-Mode DisplayPort compatible)

* + - 1. AUDIO I/O:
         1. (1) 5-pin 3.5 mm detachable terminal block

Balanced/unbalanced stereo line-level audio input or output

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

* + - 1. CONSOLE, SERIAL:
         1. (1) 8-pin RJ45 female

RS-232 computer console port (for setup)

* + - 1. CONSOLE, USB:
         1. (1) USB Type B female

USB 2.0 computer console port (for setup)

* + - 1. IR 1 – 2: (1) 4-pin 3.5 mm detachable terminal block
         1. Comprises (2) IR/Serial ports

IR output up to 1.1 MHz

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

* + - 1. COM: (1) 5-pin 3.5 mm detachable terminal block
         1. Bidirectional RS-232 port

Up to 115.2k baud, hardware and software handshaking support

* + - 1. 24VDC 2.0A: (1) 2.1 x 5.5 mm DC power connector
         1. 24 Volt DC power input
         2. PW-2420RU power pack included
      2. Chassis ground lug
    1. Controls & Indicators
       1. TX: (1) Green LED, indicates unit is in transmitter (encoder) mode
       2. RX: (1) Green LED, indicates unit is in receiver (decoder) mode
       3. OL: (1) Green LED, indicates an online connection to a control system via Ethernet
       4. LAN 1 – 2: (4) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity
       5. LAN 3 LNK: (1) Green LED, indicates Ethernet link status
       6. LAN 3 ACT: (1) Green LED, indicates Ethernet activity
       7. HDMI OUTPUT: (1) Green LED, indicates video signal transmission at the HDMI output
       8. HDMI INPUT 1 – 2: (2) Green LEDs, each indicates sync detection at the corresponding HDMI input
       9. 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
       10. SETUP: (1) Red LED and (1) recessed pushbutton for Ethernet setup
       11. RESET: (1) Recessed pushbutton for hardware reset
       12. 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
    2. Power
       1. Power Pack (included):
          1. Input: 1.5 Amps maximum @ 100-240 Volts AC, 50/60 Hz
          2. Output: 2 Amps @ 24 Volts DC
       2. Power over Ethernet:
          1. Power Consumption: 35 Watts typical
       3. Environmental
          1. Temperature: 32° to 104° F (0° to 40° C)
          2. Humidity: 10% to 90% RH (non-condensing)
          3. Heat Dissipation: 85 BTU/hr
    3. Enclosure
       1. Chassis: Metal, black finish, integral mounting flanges, fan cooled; vented top, front, bottom, and sides
       2. Mounting: Freestanding, surface mount, or attach to a single rack rail
    4. Basis of design product: Crestron **DM-NVX-350**
       1. Product Description: DigitalMedia 4K60 4:4:4 HDR Network AV Encoder/Decoder
  1. ENCODER/DECODER UNIT TYPE 4

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

* + 1. Real-Time 4K60 Video Distribution
       1. The Encoder/Decoder end-to-end latency for 60 frame per second content shall be less than 1 frame.
    2. Single Component Design
       1. In a single card, the Encoder/Decoder shall be configurable to operate as:
          1. Network AV encoder
          2. Network AV decoder
       2. The encoder/decoder mode shall be switchable while in use via a control system.
    3. Standard 1Gb network operation
       1. 4K60 Video distribution
       2. Web based control and management
    4. Scalable network distribution system
       1. System of encoder/decoder units shall be scalable via network switch.
    5. Auto-Switcher
       1. The Encoder/Decoder shall include two HDMI inputs. Switching between inputs shall be performed:
          1. Automatically using an auto-switching mode
          2. Programmatically via a control system
          3. Through a web browser
    6. HDMI Output
       1. When configured as a decoder, the HDMI output is scaled up or down to match the native resolution of the display device.
       2. When used as an encoder, the HDMI output shall function as a pass through output, with resolution matched to the encoded source.
    7. USB and KVM Integration
       1. The Encoder/Decoder shall support the extension of USB signals, which may be switched and routed alongside the AV signal or separately via a compatible control system.
       2. USB 2.0 host and device ports are provided on each Encoder/Decoder, allowing a USB mouse, keyboard, or other device to be connected at one DM NVX endpoint and routed to a computer or other host at any other endpoint.
       3. USB peripherals switching functionality shall support:
          1. Whiteboards
          2. Touch screens
          3. Game controllers
          4. Cameras
          5. Mobile devices
          6. Headsets
          7. Flash drives
    8. 7.1 Surround Sound Audio with Downmixing
       1. The Encoder/Decoder shall support lossless transport of 7.1 surround sound audio signals, including:
          1. Dolby TrueHD
          2. Dolby Atmos
          3. DTS-HD
          4. DTS:X
          5. Uncompressed linear PCM.
       2. The Encoder/Decoder shall include the ability to decode the incoming multichannel surround sound signal, 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, while the HDMI output can be configured to output either stereo or multichannel.
       3. As an encoder, the Encoder/Decoder unit distributes both stereo and multichannel signals simultaneously over the network, allowing either signal to be selected at any decoder on the network.
    9. Analog Audio Embedding or De-embedding
       1. A balanced stereo analog audio port shall be included, which may be configured as either an input or output.
          1. 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.
          2. As an output, it can provide a stereo line-level signal to feed a local sound system or analog audio switcher. The output volume is adjustable via a compatible control system or web browser.
    10. Breakaway Audio
        1. In decoder mode the Encoder/Decoder may select and combine separate video and audio signals from two different inputs, including two different encoders.
    11. Text Overlay
        1. The Encoder/Decoder shall be capable of displaying dynamic or fixed text on screen.
    12. Video Wall Processing
        1. The Encoder/Decoder shall support video wall functionality.
        2. Video walls composed of up to 64 individual displays shall be supported with configurations using multiple Encoder/Decoder units.
        3. Each Encoder/Decoder shall provide fully-adjustable zoom capability and bezel compensation.
        4. One Encoder/Decoder is required per display, supporting configurations of up to eight wide by up to eight high.
    13. Copper or Fiber LAN Connectivity
        1. The Encoder/Decoder 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 an additional device. These ports may also be used to daisy-chain multiple Encoder/Decoder units feeding a single-source video wall or individual displays all showing the same video image.
        2. Encoder/Decoder unit shall support connection to a fiber optic network by inserting an appropriate SFP transceiver module into the SFP port on the Encoder/Decoder.
        3. Encoder/Decoder manufacturer shall offer a selection of modules to accommodate various multimode and single-mode fiber types. An RJ45 module is also offered to provide a third RJ45 LAN port.
    14. Enterprise-Grade Security
        1. Encoder/Decoder shall employ advanced security features and protocols including:
           1. 802.1x authentication
           2. Active Directory credential management
           3. LDAP directory management
           4. PKI certification
           5. AES encryption
           6. TLS, SSH
           7. HTTPS
        2. Encoder/Decoder shall run on a dedicated AV network, with fully-managed access to, or isolation from, the user’s LAN or the Internet.
    15. CEC Device Control
        1. Through a compatible control processor, the Encoder/Decoder unit shall include a gateway for controlling devices through their HDMI connections using the CEC signal embedded in HDMI.
    16. Device Control
        1. The Encoder/Decoder Unit shall include built-in RS-232 and IR control ports for control of the connected display or device.
    17. Web-Based Setup
        1. Setup of the Encoder/Decoder unit shall be accomplished using a computer web browser.
        2. Full control and monitoring of the Encoder/Decoder unit is enabled through integration with a compatible control processor.
    18. Low-Profile Installation
        1. The Encoder/Decoder Unit mounts conveniently to a flat surface or rack rail. All connections and LED indicators are positioned on the top and bottom.
        2. Power is provided using the included 100-240V universal power pack or an optional power injector.
    19. Encoding/Decoding
        1. Video Codec: Pixel Perfect Processing
        2. Video Resolutions: Up to 4096x2160@60Hz (DCI 4K60), 4:4:4 color sampling, HDR10 and Deep Color support
        3. Audio Formats: Primary multichannel (up to 8-channel LPCM or encoded HBR 7.1 surround sound), secondary 2-channel LPCM
        4. Bitrates: 100 to 990 Mbps
        5. Streaming Protocols: RTP, RTSP, SDP
        6. Container: MPEG-2 transport stream (.ts)
        7. Session Initiation: Multicast via RTSP
        8. Copy Protection: HDCP 2.2
    20. Video
        1. Input Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (Dual-Mode DisplayPort and DVI compatible)
        2. Output Signal Types: HDMI w/HDR10, Deep Color, and 4K60 4:4:4 support (DVI compatible)
        3. Switcher: 2x1 auto-switching
        4. 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
        5. Copy Protection: HDCP 2.2
    21. Maximum Resolutions
        1. Maximum Common 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 HD 1080p | 60 Hz | 4:4:4 | 36 bit |
| Interlaced (Input only) | 1920x1080 HD 1080i | 30 Hz | 4:4:4 | 36 bit |

* + - 1. Encoder/Decoder unit shall support other custom resolutions at pixel clock rates up to 600 MHz
    1. Audio
       1. Input Signal Types: HDMI (Dual-Mode DisplayPort compatible [10]), analog stereo
       2. 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
       4. Analog Formats: Stereo 2-channel
       5. Analog-To-Digital Conversion: 24-bit 48 kHz
       6. Digital-To-Analog Conversion: 24-bit 48 kHz
       7. Analog Performance:
       8. Frequency Response: 20 Hz to 20 kHz ±0.5 dB
       9. S/N Ratio: >95 dB 20 Hz to 20 kHz A-weighted
       10. THD+N: <0.005% @ 1 kHz
       11. Stereo Separation: >90 dB
       12. Analog Output Volume Adjustment: -80 to +20 dB
    2. Communications
       1. 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
       2. USB: USB 2.0 host or device signal extension
       3. HDMI: HDCP 2.2, EDID, CEC
       4. Integrated Control (via Ethernet): HDCP 2.2, AES, RTP, RTSP, SDP, ONVIF, IGMPv3, SMPTE 2022
       5. Management of HDCP and EDID
       6. Management of CEC between the connected HDMI devices and a control system
       7. 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)
       8. 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 compatible control system)
    3. Connectors
       1. USB DEVICE:
          1. (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

* + - 1. USB HOST:
         1. (1) USB Type A female
         2. USB 2.0 host port
         3. 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
      2. LAN 1 – 2:
         1. (2) 8-pin RJ45 female
         2. 10Base-T/100Base-TX/1000Base-T Ethernet ports
      3. LAN 3:
         1. (1) SFP port
         2. Accepts one SFP transceiver module
      4. HDMI OUTPUT:
         1. (1) 19-pin Type A HDMI female

HDMI digital video/audio output (DVI compatible)

* + - 1. HDMI INPUT 1 – 2:
         1. (2) 19-pin Type A HDMI female

HDMI digital video/audio inputs

(DVI & Dual-Mode DisplayPort compatible)

* + - 1. AUDIO I/O:
         1. (1) 5-pin 3.5 mm detachable terminal block

Balanced/unbalanced stereo line-level audio input or output

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

* + - 1. CONSOLE, SERIAL:
         1. (1) 8-pin RJ45 female

RS-232 computer console port (for setup)

* + - 1. CONSOLE, USB:
         1. (1) USB Type B female

USB 2.0 computer console port (for setup)

* + - 1. IR 1 – 2: (1) 4-pin 3.5 mm detachable terminal block
         1. Comprises (2) IR/Serial ports

IR output up to 1.1 MHz

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

* + - 1. COM: (1) 5-pin 3.5 mm detachable terminal block
         1. Bidirectional RS-232 port

Up to 115.2k baud, hardware and software handshaking support

* + - 1. 24VDC 2.0A: (1) 2.1 x 5.5 mm DC power connector
         1. 24 Volt DC power input
         2. PW-2420RU power pack included
      2. Chassis ground lug
    1. Controls & Indicators
       1. TX: (1) Green LED, indicates unit is in transmitter (encoder) mode
       2. RX: (1) Green LED, indicates unit is in receiver (decoder) mode
       3. OL: (1) Green LED, indicates an online connection to a control system via Ethernet
       4. LAN 1 – 2: (4) LEDs, green indicates Ethernet link status, amber indicates Ethernet activity
       5. LAN 3 LNK: (1) Green LED, indicates Ethernet link status
       6. LAN 3 ACT: (1) Green LED, indicates Ethernet activity
       7. HDMI OUTPUT: (1) Green LED, indicates video signal transmission at the HDMI output
       8. HDMI INPUT 1 – 2: (2) Green LEDs, each indicates sync detection at the corresponding HDMI input
       9. 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
       10. SETUP: (1) Red LED and (1) recessed pushbutton for Ethernet setup
       11. RESET: (1) Recessed pushbutton for hardware reset
       12. 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
    2. Power
       1. Power Pack (included):
          1. Input: 1.5 Amps maximum @ 100-240 Volts AC, 50/60 Hz
          2. Output: 2 Amps @ 24 Volts DC
       2. Power over Ethernet:
          1. Power Consumption: 35 Watts typical
       3. Environmental
          1. Temperature: 32° to 104° F (0° to 40° C)
          2. Humidity: 10% to 90% RH (non-condensing)
          3. Heat Dissipation: 85 BTU/hr
    3. Enclosure
       1. Chassis: Metal, black finish, integral mounting flanges, fan cooled; vented top, front, bottom, and sides
    4. Mounting: Freestanding, surface mount, or attach to a single rack rail
    5. Basis of design product: Crestron **DM-NVX-351**
       1. Product Description: DigitalMedia 4K60 4:4:4 HDR Network AV Encoder/Decoder w/Downmixing
  1. CARD CHASSIS

Specifier Note: DMF-CI-8 DigitalMedia™ Card Chassis for DM-NVX-C & DMCF, 8 Slots

* + 1. Card Chassis Design
       1. The Card Chassis shall be a 2-space rack-mountable chassis designed to house up to eight Encoder/Decoder cards. Any of these cards may be installed in any slot.
    2. Communications
       1. USB Host: For loading of firmware via a USB mass storage device
       2. USB Device: Computer console for setup
       3. RS-232: Computer console for setup
    3. Card Slots
       1. Card Slots: eight Card slots per chassis
       2. Each slot accepts one encoder/decoder card
    4. Connectors
       1. Chassis ground lug
       2. 100-240V~4.3-1.8A 50/60Hz: (1) IEC 60320 C14 main power inlet mates with removable power cord, included
       3. CONSOLE, SERIAL (front): (1) 8-pin RJ45 female
       4. RS-232 computer console port
       5. CONSOLE, USB (front): (1) USB Type-B female
       6. USB computer console port
       7. USB (front): (1) USB Type A female
       8. Supports USB mass storage devices for firmware update
    5. Controls & Indicators
       1. PWR: (1) Bi-color green/amber LED, indicates operating power supplied from AC line, turns amber while booting and green when operating
       2. STATUS: (1) Bi-color green/red LED, indicates a normal (green) or critical error (red) condition
       3. Display: (1) 2 inch (52 mm) diagonal, 220 x 176 pixels, 16-bit TFT active matrix color LCD, displays IP address settings for each installed card
       4. Navigation Pad: (1) 5-way navigation pad for menu navigation and adjustment of settings
       5. HOME: (1) Pushbutton, enters or returns to the home menu
       6. BACK: (1) Pushbutton, steps menu back one level
       7. CARD SLOT STATUS, TX 1 – 8: (8) Green LEDs, each indicates the corresponding card is in transmitter mode
       8. CARD SLOT STATUS, RX 1 – 8: (8) Green LEDs, each indicates the corresponding card is in receiver mode
       9. CARD SLOT STATUS, OL 1 – 8: (8) Green LEDs, each indicates the corresponding card is online
    6. Power
       1. Main Power: 4.3-1.8 Amps @ 100-240 Volts AC, 50/60 Hz
       2. Power Consumption: 350 Watts fully loaded
    7. Environmental
       1. Temperature: 32° to 104° F (0° to 40° C)
       2. Humidity: 10% to 90% RH (non-condensing)
       3. Heat Dissipation: 1195 BTU/hr fully loaded
    8. Enclosure
       1. Chassis: Metal with black finish, vented sides, fan-cooled
       2. Front Panel: Metal, black finish with polycarbonate label overlay
       3. Mounting: Freestanding or 2 RU 19-inch rack-mountable (rack ears included)
    9. Basis of design product: **DMF-CI-8**
       1. DigitalMedia Card Chassis for DM-NVX-C & DMCF, 8 Slots

1. NOT USED

END OF SECTION 27 41 16