

DISPLAYNET[®]

CUTTING EDGE

AV Distribution



 **DVIGEAR[®]**

 **SDVoE[™]**
ALLIANCE



ZERO COMPROMISE

DisplayNet® is an award-winning system for AV distribution that leverages proven SDVoE technology to switch, extend and distribute uncompressed AV signals in real time with resolutions up to 4K /60p. DisplayNet provides unmatched image quality with **zero frame latency and zero artifacts.**

INFINITE POSSIBILITIES

DisplayNet delivers **unprecedented levels of scalability, versatility and reliability** and supports a wide range of applications including point-to-point Extension, limitless Matrix Switching, Video Wall Display and MultiViewer. DisplayNet isn't just new technology, it's a new paradigm for AV system integration.



DisplayNet DN-200 Series

Signal Distribution Using SDVoE

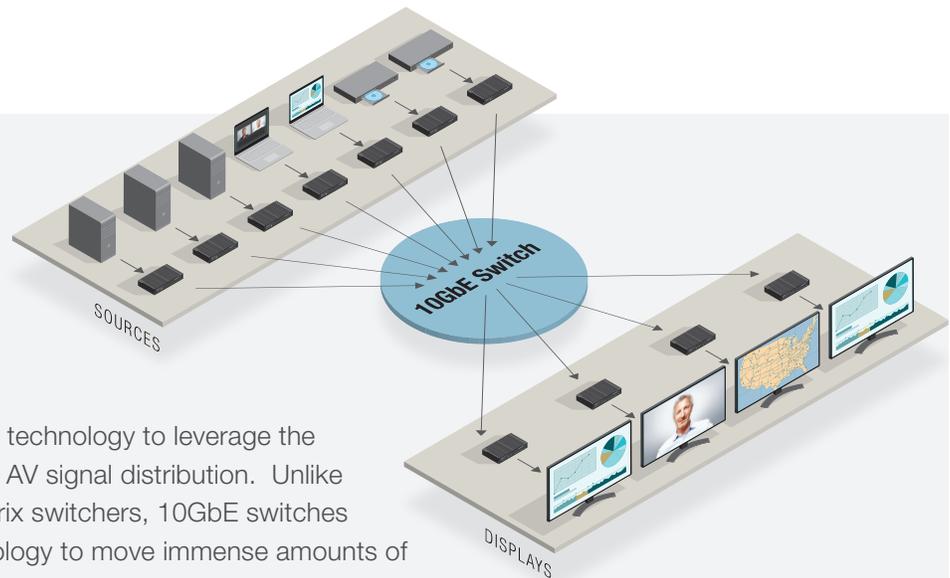
The DN-200 Series is the flagship model of the DisplayNet product line. It leverages the latest SDVoE technology to distribute uncompressed AV signals with resolutions up to 4K /60p over a 10GbE Ethernet network. The DN-200 Series supports HDMI 2.0 with up to 12-bit color, HDCP 2.2, DisplayPort 1.2, and High Speed USB 2.0. A high-performance scaler in both the Transmitter (TX) and Receiver (RX) units enables Fast Switching, MultiViewer, and enhanced Video Wall processing.

Each TX unit accepts multiple source signals, including HDMI (with embedded audio and HDCP), DisplayPort, analog stereo audio, bidirectional IR, RS-232, and 1GbE Ethernet. These input signals are packetized and are distributed to destinations over 10GbE with an off-the-shelf network switch. The DN-200 Series supports twisted pair (CAT6a or CAT7) media up to 328 ft. (100 meters), or Fiber Optic media using industry standard SFP+ modules, supporting extension distances of up to 18 miles (30 km). The 10GbE switch provides a highly efficient and reliable means of distributing AV signals from many sources to an array of RX units, which convert the packetized data to AV output signals at the destination in real time with zero frame latency and artifact-free image quality.

Zero Compromise, Infinite Possibilities

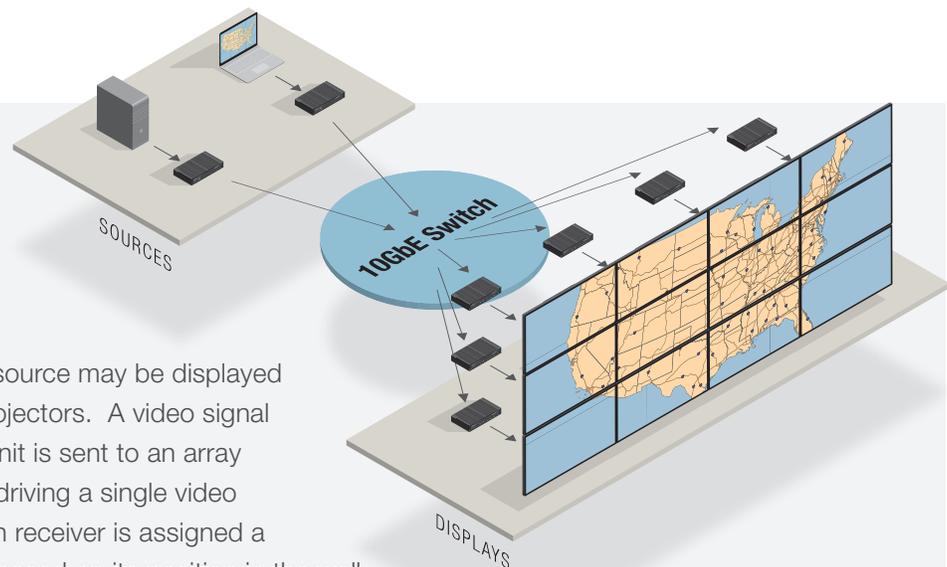
The DN-200 Series distributes video with resolutions up to 4K /60p with 8-bit color (4:4:4), and 4K /60p with 10-bit or 12-bit color (4:2:2 or 4:2:0), without image artifacts and without frame latency. When the video signal exceeds the bandwidth limits of 10GbE, very light compression (maximum ratio of about 1.4:1) is used. Point-to-Point extension, Matrix Switching, Video Wall, and MultiViewer modes all are available in the same system. For optimal flexibility, each signal layer (Video, Embedded Audio, Downmixed Audio, Analog Audio, IR, RS-232, and 1GbE) can each be routed completely independently from one another. Advanced audio features are supported, including audio embedding, de-embedding, and PCM down-mixing.

DN-200 Series transmitter and receiver units are controlled by a DisplayNet Server™ (DNS-200), which includes powerful DisplayNet Manager™ web-based software that enables the system to be managed using any third-party controller using simple Telnet commands.



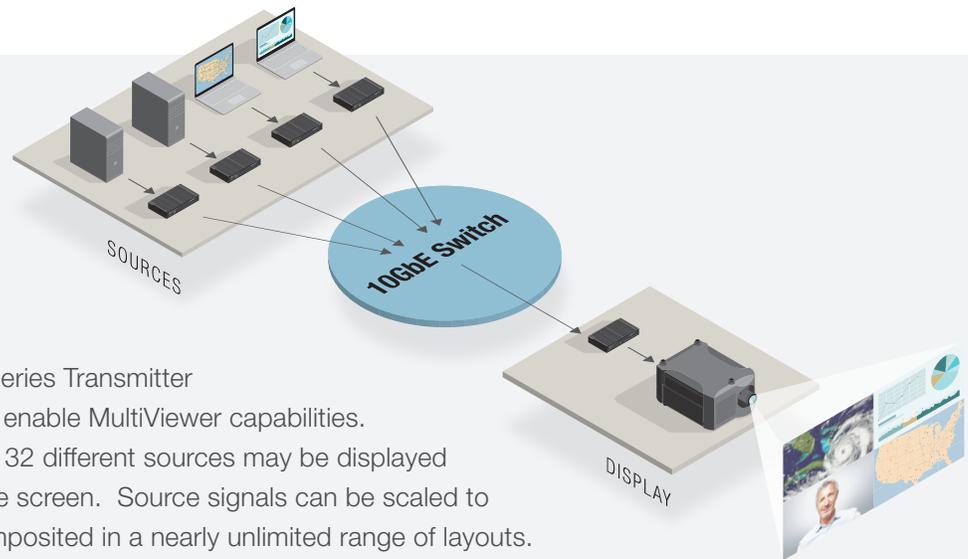
Matrix Switcher

DisplayNet harnesses SDVoE technology to leverage the power of 10GbE switches for AV signal distribution. Unlike traditional proprietary AV matrix switchers, 10GbE switches utilize proven Ethernet technology to move immense amounts of data in real time. The combined innovation, cost, efficiency, scalability and 24/7/365 reliability make 10GbE switches a vastly superior solution for AV signal distribution. The number of endpoints in a DisplayNet system is only limited by the number of available 10GbE switch ports, and any switch port can be assigned to a TX or RX unit. DisplayNet renders traditional AV matrix switchers obsolete, and is the ideal solution for small, medium, large and massive AV signal distribution systems.



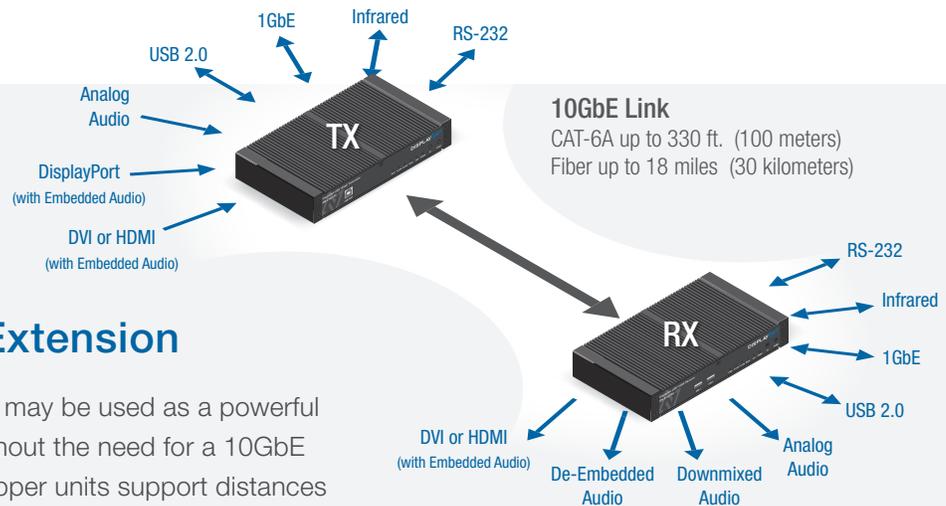
Video Wall

In Video Wall mode, a single source may be displayed across multiple screens or projectors. A video signal from a single DisplayNet TX unit is sent to an array of DisplayNet RX units, each driving a single video wall screen or projector. Each receiver is assigned a segment of the video source based on its position in the wall configuration. The result is that multiple screens are effectively combined to achieve a single large-scale display. DisplayNet Manager™ software includes a video wall configuration tool that can be used to create, save, and use a virtually unlimited number of wall configurations. Advanced Video Wall functionality allows for asymmetric video walls, with options to fit, stretch, or crop the source video.



MultiViewer

Each DisplayNet DN-200 Series Transmitter includes a built-in scaler to enable MultiViewer capabilities. In MultiViewer mode, up to 32 different sources may be displayed simultaneously on the same screen. Source signals can be scaled to certain resolutions and composited in a nearly unlimited range of layouts. Common layouts include Picture-in-Picture (PiP), Picture-and-Picture (PaP), Grid, L-Shape, I-Shape. Custom layouts may also be created in DisplayNet Manager. DN-200 Series TX units can provide both the scaled output stream and the native source stream at the same time, provided the aggregate bandwidth does not exceed 10GbE limits.



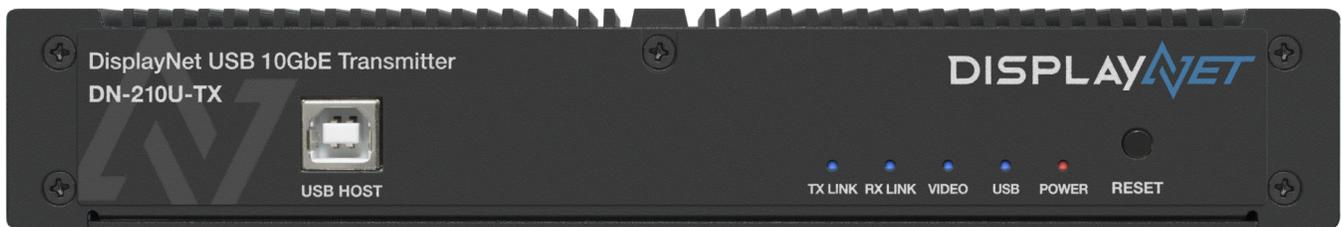
Point-to-Point Extension

DisplayNet TX and RX units may be used as a powerful point-to-point extender, without the need for a 10GbE switch. As an extender, copper units support distances of up to 330 ft. (100 meters), while fiber optic units support distances of up to 18 miles (30 km). These units provide a wide range of connectivity over 10GbE, including HDMI 2.0, DisplayPort 1.2, Embedded Audio, Downmixed Audio, Analog Audio, High Speed USB 2.0 (480 Mbps.), 1GbE LAN, Bidirectional IR, and RS-232.

Models

The DN-200 Series consists of four (4) different device models: DN-210, DN-210U, DN-220, and DN-220U. DN-210 units include a copper 10GbE network port, whereas DN-220 units employ an optical SFP+ port. DN-210U and DN-220U units include High Speed USB 2.0 connectivity. All DN-200 receivers and transmitters support 4K/60p video signals, as well as advanced video processing that enables features such as scaling, fast switching, video wall, and multiview.

DN-210U-TX Transmitter



Front View



Rear View

DN-210U-RX Receiver



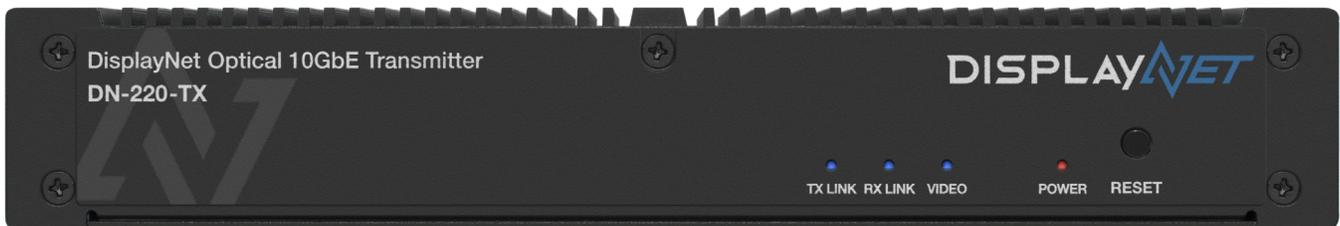
Front View



Rear View

Model	Copper 10GbE Link	Fiber 10GbE Link	Max Range to Switch	USB 2.0	Fast Switching	Video Wall	Multiview
DN-210	X	-	330 ft. / 100m	-	X	X	X
DN-210U	X	-	330 ft. / 100m	X	X	X	X
DN-220	-	X	18 miles / 30km	-	X	X	X
DN-220U	-	X	18 miles / 30km	X	X	X	X

DN-220-TX Transmitter



Front View



Rear View

DN-220-RX Receiver



Front View



Rear View

Features

HDMI 2.0

The DN-200 Series supports distribution of HDMI 2.0 signals with resolutions up to 4K /60p with 8-bit color (4:4:4) and 4K /60p with 10-bit or 12-bit color (4:2:2 or 4:2:0). Light compression is only used if the bandwidth exceeds the limits of 10GbE. The maximum compression ratio employed is about 1.4:1.



DisplayPort 1.2

The TX units each include a DisplayPort 1.2 input, which supports resolutions up to 4K /60p (4:4:4). Input selection between the HDMI or the DisplayPort input is provided, with HDMI auto-switching available as an option.



HDCP 2.2

DisplayNet DN-200 Series systems support HDCP 2.2 content encryption for maximum protection and compatibility with the latest source devices and displays.



High Speed USB 2.0 (480 Mbps.)

The DN-210U and DN-220U can distribute High Speed USB 2.0 (480 Mbps.) as an independent switching layer. Each USB-equipped TX unit includes a single USB Type-B host connector, and each USB-equipped RX unit includes two (2) USB Type-A device connectors. These USB connections can support KVM applications, as well as a myriad of other USB 2.0 devices.



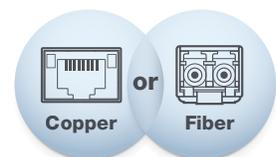
Scaling in Both TX and RX

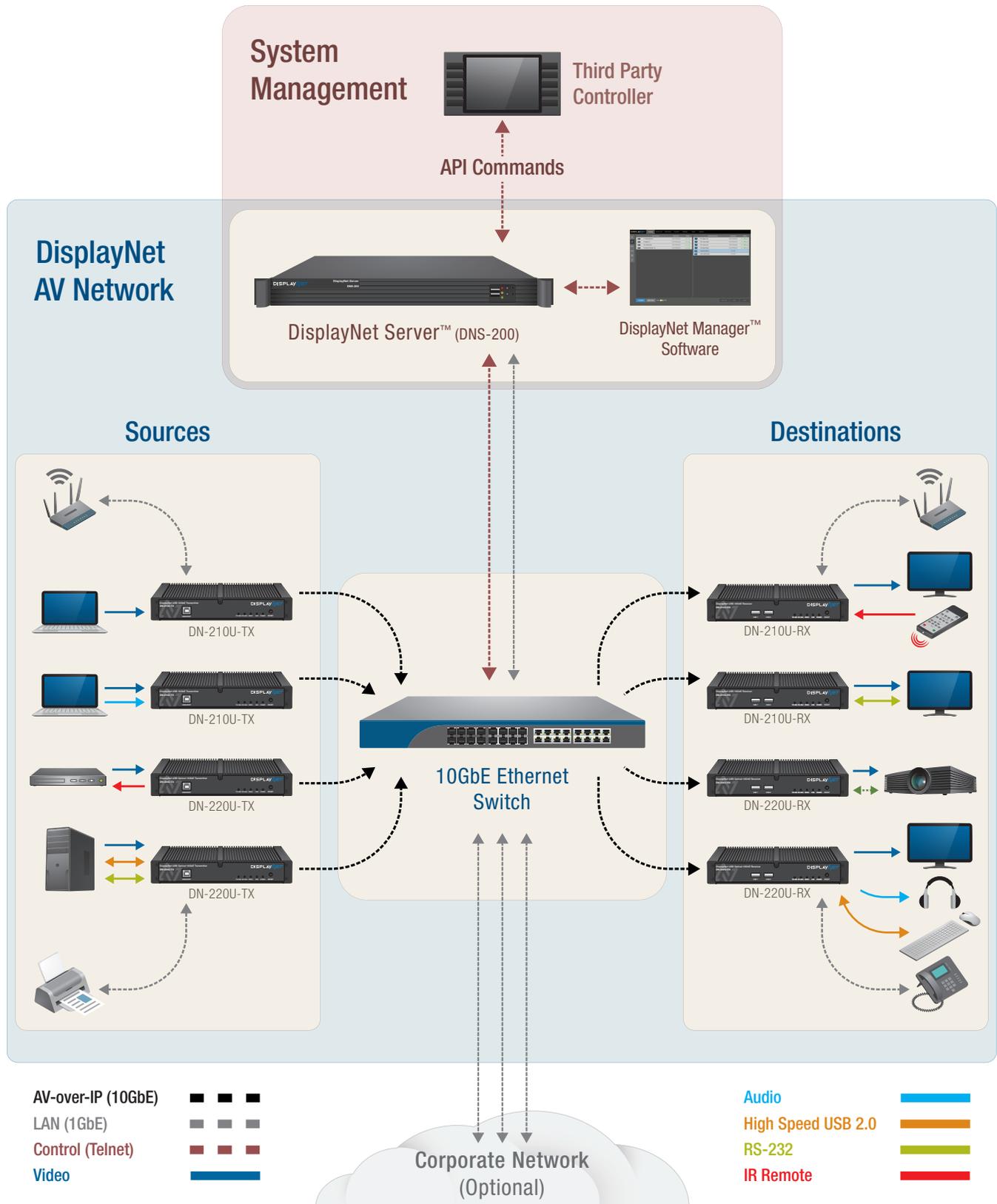
A built-in scaler in the TX unit enables powerful MultiViewer functionality that supports simultaneous viewing of up to 32x different sources on a single display. A scaler in the Rx enables very fast switching as well as enhanced Video Wall capabilities.



10GbE Link on Copper or Fiber Media

DN-210 and DN-210U models include a copper 10GbE network port that supports twisted pair (CAT6a or CAT7) media up to 328 ft. (100 meters). DN-220 and DN-220U models include an optical SFP+ port that can accommodate a variety of direct connection copper cables, AOC and SFP+ modules to achieve transmission distances over 18 miles (30 km).





System Management and Control

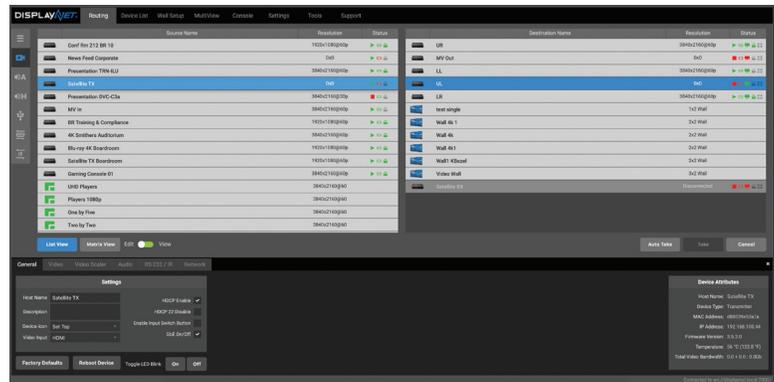


DisplayNet Server™

DisplayNet systems consist of multiple transmitter and receiver endpoints, a 10GbE network switch, and a DisplayNet Server™, which provides the interface layer required to control and manage the entire system. The server is a rack-mountable PC running the DisplayNet API Engine, allowing network-enabled third-party control interfaces to control the system. With DisplayNet Server™ (model no. DNS-200), systems can be managed using a number of control methods, which enables the technology to be seamlessly integrated into a variety of workflows. DisplayNet Server™ provides a central interface between the control equipment/software and the DisplayNet endpoint devices; therefore, it should be included with every DisplayNet system.

DisplayNet Manager™ Software

DisplayNet Manager is a web-based software application that controls and configures DisplayNet endpoint devices, Video Walls, MultiViewer Displays, and the system as a whole. It provides a host of powerful control features, as well as tools to facilitate the use of third party controllers that enable DisplayNet to be easily integrated into a wide range of professional AV applications. DisplayNet Manager makes the system integration process easier, faster and more efficient.



DisplayNet API Command Set

While DisplayNet Manager™ provides a graphically intuitive method of controlling DisplayNet systems, it is possible to use the DisplayNet API Command Set to interface directly with third-party controllers. For instance, DisplayNet API commands may be loaded into a third-party controller device and issued via Telnet to the DisplayNet Server™, which then distributes the commands to the overall DisplayNet system and endpoints. This approach allows DisplayNet systems to easily be integrated into existing control systems and workflows.

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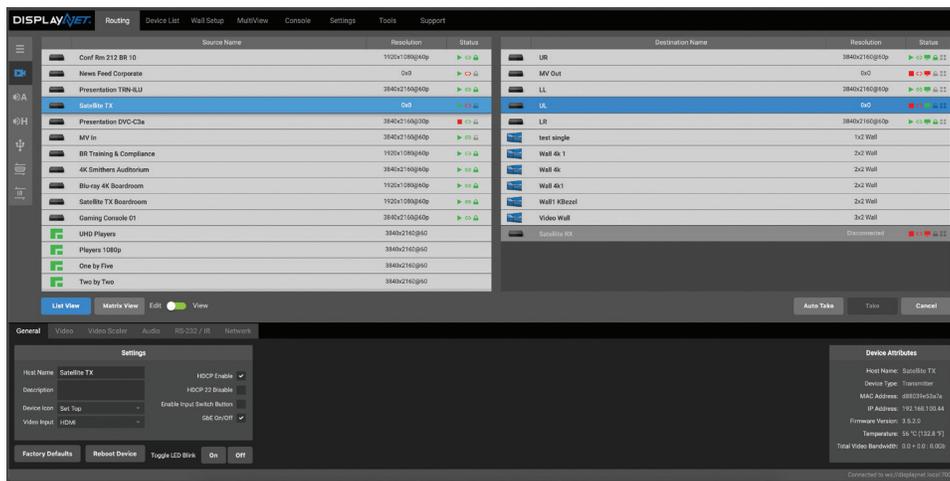
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join 002af5603643:HDMI:0 001ec0f04d9c:0
join 002a3e03632a:HDMI:0 001a20694d9c:0
join 002a5c03228a:AudioIO:0 001a20fd2d9c:0
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DisplayNet Manager

DisplayNet Manager offers powerful system management tools, enabling integrators to quickly and easily design and deploy applications.

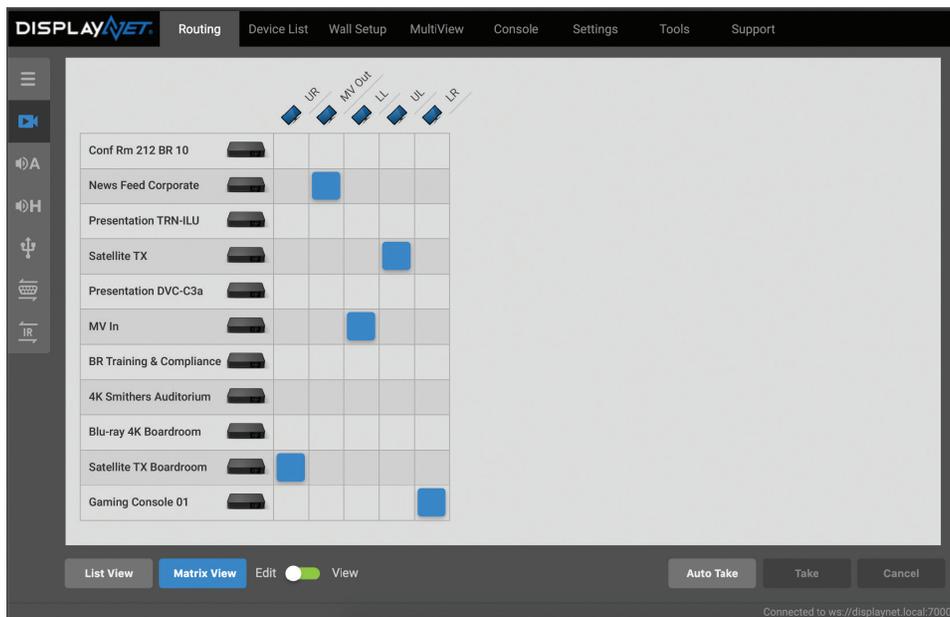
Routing

The routing screen enables integrators to quickly and easily view and edit device settings and signal routings. Each signal type is presented in a dedicated switching layer, allowing for independent management of all signal routing. Settings for any device can be changed in the Device Settings panel at the bottom of the screen.



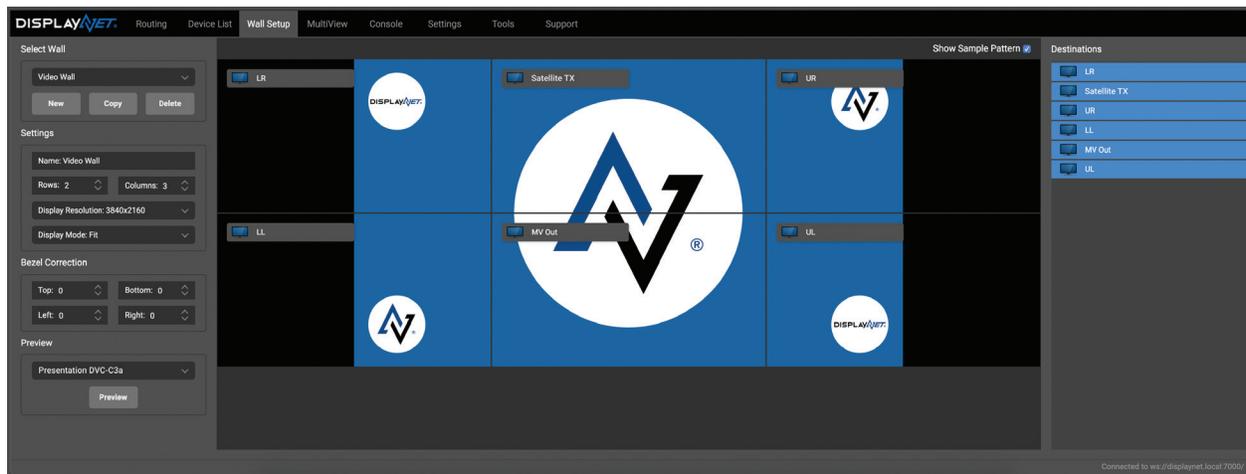
Matrix View

Matrix switcher style routing is also available in the routing tab by enabling Matrix View. Like a traditional matrix switcher, selecting the cross points on the matrix immediately routes the source signal to the destination. Matrix View offers a simple way of displaying all existing routings, and is available for all signal types.



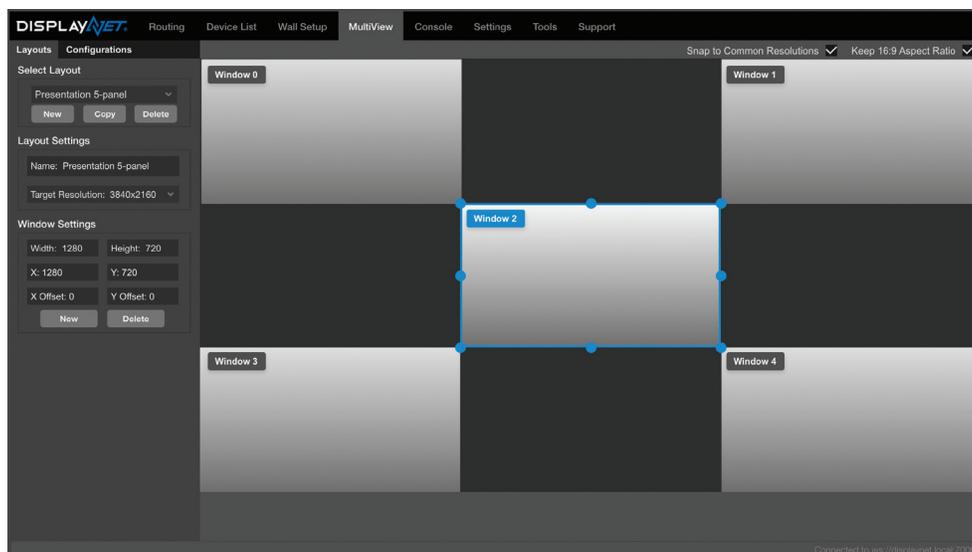
Wall Setup

DisplayNet Manager makes the creation and setup of Video Walls fast and easy. Walls are designed by selecting the desired number of rows and columns, and then dragging displays to their position in the wall. Options for bezel correction, asymmetric wall display mode (Crop, Stretch, and Fit), and panel resolution are also available. Video Wall configurations appear as virtual destination devices in the Routing Tab. Sources can be routed to a Video Wall in the same manner as any other display.



Multiview

DisplayNet Manager offers a powerful suite of multiview editing tools. Multiview Layouts support up to 32 windows on a single screen. Layouts are created by resizing and dragging windows to their desired locations. Multiview Configurations are created by selecting a Layout and then dragging source devices to their on-screen windows. Multiview configurations are then shown as virtual source devices in the Routing tab, and can be easily routed to any destination.



Console

The Console screen shows all of the DisplayNet API commands sent and received by DisplayNet Manager during the current session. Commands may be copied and pasted from this screen into any suitable third-party control interface used by the integrator. This allows for easy automation of complex routing and configuration tasks. Additionally, individual DisplayNet API commands may be sent using the Command Terminal.

Device List

The Device List shows all of the connected DisplayNet devices in a system, along with detailed information about each device and its current state. This list may be exported for simplified troubleshooting and device inventory management.

Type	HostName	MAC Address	IP Address	Mode	Video Status	Ext. Audio Status	Resolution	Bandwidth	HDCP	HDMI	Bits Per Pixel	Color Space	Firmware
Transmitter	Conf Rm 212 BR 10	d88039e596dc	192.168.100.22		Streaming	Stopped	1920x1080@60p	3.1 + 0.0 : 3.1Gb	Yes	Yes	8	RGB	3.5.2.0
Transmitter	News Feed Corporate	d88039e55019	192.168.100.42		Streaming	Stopped	0x0	0.0 + 0.0 : 0.0Gb	No	No	8	RGB	3.5.2.0
Transmitter	Presentation TRN-ILU	d88039e5e581	192.168.100.51		Streaming	Streaming	3840x2160@60p	4.4 + 0.0 : 4.4Gb	Yes	Yes	10	YCBCR 4:2:0	3.5.2.0
Receiver	UR	d88039a4df60	192.168.100.50	Genlock Scaling	Streaming	Streaming	3840x2160@60p	3.14Gb	Yes	Yes	8	RGB	3.5.2.0
Receiver	MV Out	d88039a4fe16	192.168.100.71	Genlocked	Stopped	Streaming	0x0	0.00Gb	No	No	8	RGB	3.5.2.0
Receiver	LL	d88039a5361d	192.168.100.45	Genlocked	Streaming	Stopped	3840x2160@60p	4.35Gb	No	Yes	10	YCBCR 4:2:0	3.5.2.0
Receiver	UL	d88039a4c431	192.168.100.47	Genlocked	Stopped	Streaming	0x0	0.00Gb	No	Yes	8	RGB	3.5.2.0
Receiver	LR	d88039a4ab33	192.168.100.43	Genlocked	Streaming	Streaming	3840x2160@60p	7.84Gb	Yes	Yes	12	YCBCR 4:2:2	3.5.2.0
Transmitter	Satellite TX	d88039e53a7a	192.168.100.44		Streaming	Streaming	0x0	0.0 + 0.0 : 0.0Gb	No	No	8	RGB	3.5.2.0
Transmitter	Presentation DVC-C3a	d88039a5a2ea	192.168.100.25		Stopped	Stopped	3840x2160@30p	0.0 + 0.3 : 0.3Gb	No	Yes	8	RGB	3.4.0.0
Transmitter	MV In	d88039e540f4	192.168.100.30		Streaming	Stopped	3840x2160@60p	4.4 + 0.0 : 4.4Gb	No	Yes	10	YCBCR 4:2:0	3.5.2.0
Transmitter	BR Training & Compliance	d88039e5c58f	192.168.100.37		Streaming	Stopped	1920x1080@60p	3.1 + 0.0 : 3.1Gb	Yes	Yes	8	YCBCR 4:4:4	3.5.2.0
Transmitter	4K Smithers Auditorium	d88039e54008	192.168.100.26		Streaming	Streaming	3840x2160@60p	4.4 + 0.0 : 4.4Gb	Yes	Yes	10	YCBCR 4:2:0	3.5.2.0
Transmitter	Blu-ray 4K Boardroom	d88039e5d9d2	192.168.100.62		Streaming	Stopped	1920x1080@60p	3.1 + 0.0 : 3.1Gb	Yes	Yes	8	YCBCR 4:4:4	3.5.2.0
Transmitter	Satellite TX Boardroom	d88039e5b3fc	192.168.100.49		Streaming	Stopped	1920x1080@60p	3.1 + 0.0 : 3.1Gb	Yes	Yes	8	RGB	3.5.2.0
Transmitter	Gaming Console 01	d88039e579d8	192.168.100.40		Streaming	Stopped	3840x2160@60p	7.8 + 0.0 : 7.8Gb	Yes	Yes	12	YCBCR 4:2:2	3.5.2.0

Specifications

Supported AV Signals	
Video	HDMI v2.0, DisplayPort v1.2, DVI 1.0 and HDCP 2.2
HDCP	Compliant with HDCP 2.2
Embedded Audio	Supports pass-through of embedded HDMI audio including up to 8 channels of LPCM or HBR audio formats such as: Dolby Digital TrueHD, and DTS-HD Master Audio
De-Embedded Audio	Supports independent routing of de-embedded HDMI audio: Up to 8 channels of LPCM digital audio with up to 24-bit depth and 192 kHz sampling rate
Downmixed Audio	Supports independent routing of 2-channel de-embedded / down-mixed HDMI audio.
External Audio	Supports independent routing of analog stereo audio stream with up to 24-bit depth and a fixed 48 kHz sampling rate.
Audio-over-IP	Supports networked audio pass-through using 1GbE port
Ethernet	Built-in 1GbE Ethernet switch on all Tx and Rx units supporting 10 Mbps. up to 1 Gbps.
USB Control	Supports bidirectional High Speed USB 2.0 (480 Mbps.) pass-through
IR Control	Supports bidirectional IR pass-through
RS-232 Control	Supports bidirectional RS-232 pass-through UART interface with to 115,200 baud
Connections / Indicators	
10GbE Port ⁽¹⁾⁽²⁾	1ea. shielded RJ45 connector with LED indicators, OR 1ea. Fiber Optic SFP+ slot (populated with SFP+ module sold separately)
HDMI Input / HDMI Output	1ea. 19-pin Female HDMI connector
DisplayPort Input	1ea. 20-pin Female DP connector (Input on TX)
Analog Stereo Audio	1ea. 3.5mm Stereo-Mini Jack (Input / Output on TX and Output on RX)
1GbE Port	1ea. shielded RJ45 connector with LED indicators
USB 2.0 ⁽²⁾	TX Units: 1ea. USB 2.0 Type B connector (Configured as host by default. May be re-configured in software.) RX Units: 2ea. USB 2.0 Type A connector (Configured as destinations by default. May be re-configured in software.)
RS-232	1ea. 4-pin, 3.5mm pitch, Phoenix connector
IR Control	1ea. IR IN: 3.5mm Stereo Mini-Jack; 1ea. IR OUT: 3.5mm Mini-Jack
DC Power	1ea. 5.5 mm / 2.0 mm female screw locking connector
Diagnostic LEDs	TX Link, RX Link, Video, USB, Power
Hardware Reset	1ea. Push-button to restore factory default values
Performance	
Supported Resolutions ⁽³⁾	Up to 4K /60p with 8-bit color (4:4:4) Up to 4K /60p with 10-bit or 12-bit color (4:2:2 or 4:2:0)
Maximum Pixel Clock Freq.	Supports pixel clock rates up to 600 MHz
Maximum Video Bit Rate	Supports digital signal bit rates up to 6.0 Gbps./color, 18.0 Gbps. total
Switching Layers	Independent switching layers for all connected Video, Embedded Audio, Analog Audio, Downmixed Audio, RS-232 and IR
Video Signal Latency ⁽⁴⁾	Genlock Mode: ≤ 30 μsec. (uncompressed), ≤ 120 μsec. (compressed) ⁽⁴⁾ Genlock Scaler Mode: 3.0 msec. Fast Switch Mode: 1-2 Frames Video Wall Mode: 1-2 Frames MultiViewer Mode: 1-2 Frames
Supported I/O Switching Array	Size of I/O array is only limited by the size (number of ports) of the 10GbE network switch
Recommended CAT Cable	CAT-6A S/FTP (500 MHz) AWG 23, or CAT-7 (Europe); Compliant with TIA/EIA-568B termination standard
Maximum Cable Distance	Up to 328 ft. (100 meters) using CAT-6A S/FTP (500 MHz) AWG 23 cable
HDMI Input Cable Equalization	Supports DVIgear's SHR™ Series HDMI with cable lengths up to 15 meters at 4K /60p resolution

Note 1: The 10GbE port is designed to connect to compatible DVIgear products and 10GbE network switches only. Do not connect any device to the 10GbE port of this product unless you are sure it is compatible.

Note 2: Connectivity varies by model. USB connectivity is only available on the DN-210U and DN-220U. Copper 10GbE link is only available on DN-210 and DN-210U. Optical 10GbE link is only available on DN-220 and DN-220U.

Note 3: Video signals will be transported uncompressed unless the bandwidth exceeds the limits of 10GbE. For video signals that exceed 10Gbps. of raw data, light compression is employed. For the maximum resolutions shown above, the DN-200 Series employs a compression ratio of about 1.4:1.

Specifications (Continued)

Operational Modes ⁽⁵⁾	
Matrix Switching Mode	Fully non-blocking cross-point routing of nearly any size I/O array – only limited by size of 10GbE switch
Video Wall Mode	Supports Video Wall displays using integrated scaling engine in the RX
MultiViewer Mode	Supports MultiViewer displays with up to 32x sources using integrated scaling engine in the TX
Point-to-Point Mode	Supports Point-to-Point Extension up to 328 ft. / 100 meters (DN-210) or 18 miles / 30 km (DN-220) using recommended cables and SFP+ modules
Power	
Typical Power Consumption	DN-210-TX: 15.24 watts / DN-210-RX: 16.24 watts DN-220-TX: 9.72 watts / DN-220-RX: 11.64 watts
External AC Power Adapter	Input: 100-240VAC, 50-60Hz / Output: +12VDC @ 2.5A
Mechanical	
Construction	Heavy-duty steel enclosure with jet black finish
Dimensions (H x W x D)	Each Unit: 1.4" x 8.3" x 5.7" (35.0 mm x 210.0 mm x 145.4 mm)
Weight	Each Unit: 3.3 lbs. (1.5 kg)
Environmental	
Operating Temp. (Environment)	+32° to +104° F (0° to +40° C)
Typical Case Temperature	Tx Unit: 98.6° F (37° C) Rx Unit: 105.8° F (41° C)
Storage Temp. (Environment)	-4° to +158° F (-20° to +70° C)
Operating / Storage Humidity	10% to 90% (non-condensing)
Regulatory Approvals	
TX / RX Units	FCC, CE, RoHS
External AC Power Adapter	FCC, CE, UL, C-UL, CEC, GS, PSE, CCC, RoHS, WEEE
Warranty	
Limited Warranty	3 Years Parts and Labor
Model Numbers	
DN-210-TX / DN-210-RX	DisplayNet HDMI 10GbE Transmitter / DisplayNet HDMI 10GbE Receiver
DN-210U-TX / DN-210U-RX	DisplayNet USB 10GbE Transmitter / DisplayNet USB 10GbE Receiver
DN-220-TX / DN-220-RX	DisplayNet Optical 10GbE Transmitter / DisplayNet Optical 10GbE Receiver
DN-220U-TX / DN-220U-RX	DisplayNet USB Optical 10GbE Transmitter / DisplayNet USB Optical 10GbE Receiver
DNS-200	DisplayNet Server™: Rack-mountable Windows 10 PC with DisplayNet API and DisplayNet Manager™ Software pre-installed
Accessories Included	Optional Accessories
1x External AC Power Adapter (per unit)	DisplayNet Server™ (Model No. DNS-200) ⁽⁶⁾
2x Mounting Brackets with Screws (per unit)	External AC Power Adapter with USA, Euro, UK, or Australia Plugs
1x HDMI Gold-Plated Jack Screw (per unit)	Power Distribution Unit, 8x 12VDC (Model No. DVI-7520-PDU)
1x 4-pin RS-232 Phoenix Connector (per unit)	IR Transmitter (Model No. DVI-7360-IR-TX)
1x IR Transmitter (per TX unit)	IR Receiver (Model No. DVI-7360-IR-RX)
1x IR Receiver (per RX unit)	19" Rack Mount Kit (Model No. DN-100-RMK)
1x USB Flash Drive Loaded with: Hardware Manual, Software Manual	DVI-I Female to HDMI Male Adapter Cable (Model No. DVI-8511c)

Note 4: DN-200 Series uses lightweight compression for some high bit rate formats (e.g. 4K /60p), which adds few extra lines of latency. For Fast Switch, Video Wall, and MultiViewer modes, a maximum of 2 frames of latency translates to not more than 33.3 msec. at 60Hz and not more than 67.7 msec at 30Hz.

Note 5: A system may operate concurrently in Matrix Switching, Video Wall, and MultiViewer modes.

Note 6: The DisplayNet Server™ is recommended for optimal system configuration. Please see the DisplayNet DN-200 Series Hardware Manual for details on the DisplayNet Server™ specifications, installation, and use.

All specifications are subject to change without notice.



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