THE MXNET 10G SDVoE® ECOSYSTEM

USER MANUAL

AC-MXNET-10G-TCVR
AC-MXNET-10G-TCVR-AVDM
AC-MXNET-10G-TCVR-USBX
AC-MXNET-10G-TCVR-PRO
AC-MXNET-10G-CBOX
AC-MXNET-10G-CBOX-PRO
AC-MXNET-10G-SW12C
AC-MXNET-10G-SW24C
AC-MXNET-10G-SW24Q
AC-MXNET-10G-SW48Q

Table of Contents

Important Safety Instructions

Prior to installing, configuring, and operating all MXNet devices and other vendor equipment, AVPro Edge recommends that each dealer, integrator, installer, and all other necessary personnel access and read all the required technical documentation, which can be located by visiting AVProEdge.com.

Read and understand all safety instructions, cautions, and warnings in this document and the labels on the equipment.

Safety Classifications in this Document

🔔 **NOTE:**		Provides special information for installing, configuring, and operating the devices and equipment.
💡 **TIP:**		Provides suggestions and considerations for installing, configuring, and operating the devices and equipment.
⚠ **IMPORTANT:**		Provides special information that is critical for installing, configuring, and operating the devices and equipment.
⚠ **CAUTION:**		Provides special information for avoiding situations that may cause damage to the devices and equipment.
⚠ **WARNING:**		Provides special information for avoiding situations that may cause physical danger to the installer, end user, etc.

Electrical Shock Prevention

⚡ **ELECTRICAL SHOCK:**

The source power poses an electrical shock hazard that can potentially cause serious injury to installers and end users.

⚡ **ELECTRICAL DISCONNECT:**

The source power outlet and power supply input power sockets should be easily accessible to disconnect power in the event of an electrical hazard or malfunction.

Weight Injury Prevention

⚠ **WEIGHT INJURY:**

Installing some of the MXNet devices requires two installers to ensure safe handling during installation. Failure to use two installers may result in injury.

Safety Statements

Follow all of the safety instructions listed below and apply them accordingly. Additional safety information will be included where applicable.

1   Read and keep these instructions.

2   Heed and follow all warnings.

3   Clean the devices and equipment only with a dry cloth.

4   Do not use the devices near water or expose them to rain and moisture.

5   Do not block any ventilation openings.

6   The devices and their accessories should never be exposed to open flames or excessive heat.

7   Only use attachments and accessories specified by the manufacturer.

8   Install devices in accordance with the manufacturer's instructions.

9   Do not install near any heat sources, such as radiators, heat registers, stoves or other apparatus that produce heat.

10 Do not defeat the safety purpose of the polarized/grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade, or third prong, are provided for your safety.

11 Protect all power cords from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the devices.

12 Unplug the devices during lightning storms or when unused for long periods of time.

13 To reduce the risk of electrical shock or damage to the devices and their operators, never handle or

touch the devices and power cord with damp or wet hands.

14 To reduce the risk of injury, some of the devices and equipment may require two installers to ensure safe handling during installat ion. Failure to use two installers may result in injury.

15 Refer all servicing to qualified service personnel. Servicing is required when the devices have been damaged in any way, such as the power cord or plug is damaged, liquid has been spilled, objects have fallen into the devices, the devices have been exposed to rain or moisture, do not operate normally, or have been dropped.

1 Introduction

The MXNet 10G SDVoE Ecosystem is an AV-over-IP platform of products designed and developed by AVPro Edge. This system is an ultra-low latency HDMI 2.0, 4K 60Hz 4:4:4 video, multichannel audio, and control signal distribution system over 10G Ethernet infrastructure, based on SDVoE standards and Semtech ASIC technologies. Crystal-clear 4K video is provided along with versatile AV and control signal distribution applications.

The diagram below shows the basic application with the AC-MXNET-10G-SW12C managed switch, AC-MXNET-10G-TCVR transceivers, and AC-MXNET-10G-CBOX control box. The cable connections can be category cable, optical fiber, or a combination of both, as shown below.
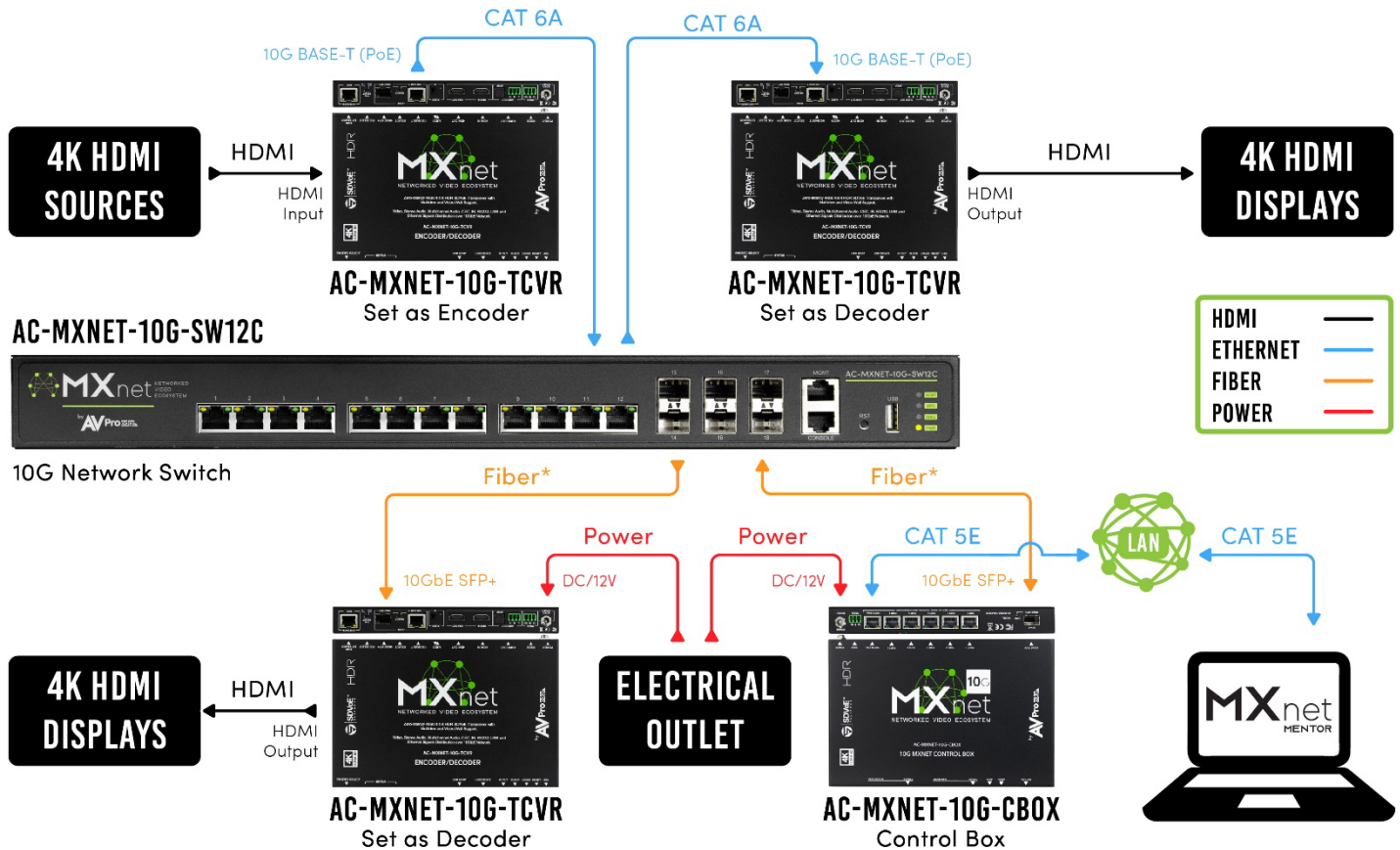
1.1 Descriptions
1.1.1 Transceivers

The AC-MXNET-10G-TCVR, AC-MXNET-10G-TCVR-AVDM, AC-MXNET-10G-TCVR-USBX, and AC-MXNET-10G-TCVR-PRO are 10GbE encoder/decoder-selectable transceivers that extend HDMI video, audio, USB 2.0, and control signals from a local source to a remote sink display or output device. The transceivers connect directly to an MXNet network switch, or other compatible switch, via Cat6 cabling, SFP fiber optic connection with 10G SFP+ modules, or 10G SFP+ AOC cables. The encoder and decoder (transmitter and receiver, respectively) are combined into one chassis with a simple toggle switch to select application functionality (factory default is decoder mode). Stand-alone point-to-point applications (encoder to decoder with direct cable connection) are also supported, along with DHCP (factory default) and static IP address settings.

1.1.1.1 Audio Downmixing

The AC-MXNET-10G-TCVR-AVDM transceiver provides the same functionality as the AC-MXNET-10G-TCVR with the addition of converting multichannel audio into 2-channel PCM through the extracted audio port.

⚠ **WARNING:**	Use caution when handling this device, as contact with hot surfaces may cause burns during normal operations. Allow the transceiver to cool before servicing. It is highly recommended to install all AVDM transceivers in a rack mount, such as the AVPro Edge HD Rack *(sold separately, SKU: AC-MXNET-10G-HDRACK)*.

1.1.1.2 USB 2.0

The AC-MXNET-10G-TCVR-USBX transceiver provides the same functionality as the AC-MXNET-10G-TCVR with the addition of USB 2.0 signal extension and routing.

1.1.1.3 Dante® and USB 2.0

The AC-MXNET-10G-TCVR-PRO transceiver provides the same functionality as the AC-MXNET-10G-TCVR with the addition of USB 2.0 signal extension and routing, and transports Dante® audio.

1.1.2 Control

The AC-MXNET-10G-CBOX is the control device that commands the transceivers and is where the system logic is stored, and commands are processed. The API utilized by the MXNet Mentor web interface and third-party control systems are centralized to the CBOX to provide multipoint AV-over-IP distribution. The CBOX enables networked signal extension, distribution, and routing with the MXNet 10G transceivers and switches.

1.1.3 Mentor

MXNet Mentor is AVPro Edge's proprietary HTML5-based setup and control web interface designed to eliminate many pain points associated with installing and configuring traditional networked AV systems. Mentor is an efficient setup solution that's easy to use and comes pre-installed on every CBOX.

1.1.4 Network Switches

The AC-MXNET-10G-SW12C, AC-MXNET-10G-SW24C, AC-MXNET-10G-SW24Q, and AC-MXNET-10G-SW48Q are 10GB Ethernet managed network switches that are pre-configured out-of-the-box for networked AV distribution and can be deployed on any industry standard IP network. The switches can be used on an existing enterprise IP network or on a physically separate parallel network (private network) to offload traffic, using the same network protocols, methods, and devices without having to combine video traffic with network data. Third party switched are accepted see third party network switch requirements.

1.1.5 PoE Power Supply

ThAC-MXNET-POE-PSU24 is an unmanaged 24-port PoE power supply that provides a power only (non-data) CAT cable connection for PoE-enabled IP devices such as the MXNet 10G transceivers.

1.2 Before You Begin

MXNet does not require the encoders and decoders to be connected in any specific order on the network switch, meaning they can be placed on adjacent ports right next to each other and the system will function without issue. However, for best results (especially when managing highly complex systems with dozens of endpoints) a certain degree of design and planning is highly recommended and can save precious time when it comes to installing, testing, and implementing features on the system.

Read through this document in its entirety and ensure that the following required items are available:

- MXNet 10G Transceivers (AC-MXNET-10G-TCVR, AC-MXNET-10G-TCVR-AVDM, AC-MXNET-10G-TCVR-PRO)

- MXNet 10G CBOX for control and Mentor web interface (AC-MXNET-10G-CBOX)

- MXNet 10G Network Switch (AC-MXNET-10G-SW12C, AC-MXNET-10G-SW24C, AC-MXNET-10G-SW24Q, AC-MXNET-10G-SW48Q) or one that meets MXNet requirements (see *Third-Party Network Switch Requirements*)

- Cables and accessories such as SFP+ (Small Form Factor Pluggable) modules

- Source devices, displays, and any other devices that will be used in the system.

1.3 Some Helpful Suggestions

- Make a list of all the devices in the system, including the sources and displays, model numbers and SKU's, MAC addresses and assigned IP addresses, along with any accessories such as rack equipment, power sources, cable types and distances.

- Created a diagram or flow chart to indicate the starting and end points of the network cable runs, as well as any schematics, diagrams, and other supporting documentation for easy future reference.

- Label the connections in the rack to their corresponding endpoints or ports on the network switch.

- For larger projects, consider grouping the encoder cables next to each other on the network switch and likewise for the decoders.

1.4 Network Cabling Tips

Everything about a successful MXNet installation revolves around the network cabling itself. Keep in mind that the quality, distance, and handling of the cable can all affect the signal speed and data stream. Generally speaking, the higher the video resolution and the longer the run, the better the cabling should be.

When terminating network cables, do not untwist the wires unnecessarily. Make sure to not untwist more than ½ inch, preferably ¼ inch. Wires are twisted for good reasons:
1.   Cancels out EMI (Electromagnetic Interference)
2.   Cancels out crosstalk from neighboring conductors
For most applications, Cat6a (or better) is recommended for MXNet 10G.

- Terminate with standard RJ-45 connectors. Avoid using push-through or "EZ" type ends, as these have exposed copper wiring at the tips that can cause signal interference.

- Cable terminations should be consistent with T568A or T568B. Avoid mixing terminations such as going from T568A to T568B, and vice versa.

- Remove as little of the sheathing as possible.

- Handle cables with care. If you need to pull, don't pull too hard as this may cause the wire pairs to untwist and degrade cable performance.

- Use zip ties to neatly, but loosely, bundle the cable runs together to reduce tangling. Avoid tight zip ties, clamps, and staples.

- Stay organized, label each cable run on both ends to indicate the location of the inputs and outputs.

- Do not overbend cables. ¼ inch cable ratio = 2" bend radius.

- Keep network cables away from power sources.

1.6 Third-Party Control Systems

MXnet supports third-party control systems with drivers readily available to download, allowing for further
customizable programming and commands to integrate with MXnet. **Be sure to successfully install and connect your MXnet system to the network first before integrating with it with a third-party control system.**

Supported drivers for third-party control system can be located at Support.AVProEdge.com

2 Third-Party Network Switch Requirements

Third-party (non-AVPro or MXNet) network switches must support the following features and functionalities and enable or disable some settings to support the AVPro MXnet AV-over-IP system.

Verify that your third-party network switch has all the following requirements for running MXNet:

- **IGMP Version 2** for snooping, queries, Immediate-Leave, and unknown multicast data dropping.
- **MTU Size** to support jumbo Ethernet frames.
- **PoE Budget** to power the MXNet endpoint devices (if using copper instead of fiber).
- **Disable EEE** functionality for system optimization.

2.1 IGMPv2 Snooping

IGMP snooping is a method that network switches use to identify multicast groups, which are groups of devices that all receive the same network traffic, such as video, audio, and control streams. It enables the switches to forward IP packets to the correct devices (decoders) in their network.

2.2 IGMPv2 Querier

The IGMP querier is responsible for sending out IGMP group membership queries at a timed interval, retrieving IGMP membership reports from active members, and allowing updates to the IGMP group tables.

2.3 IGMPv2 Immediate-Leave

When Immediate-Leave is enabled, the device immediately removes a port when it detects the IGMPv2 Leave message on that port, Immediate-Leave is only supported on IGMPv2 hosts and should be enabled for every port on the VLAN.

2.4 Unknown Multicast Dropping (Unregistered Multicast Flooding)

Unknown multicast data refers to multicast data for which no forwarding entries exist in the IGP snooping forwarding table. This feature enables the device to forward unknown multicast data to the router port only. If the device does not have a router port, unknown multicast data will then be dropped.

If this feature is not enabled, the unknown multicast data will flood the VLAN to which the data belongs and may severely interfere with normal network operations.

2.5 MTU Settings

The MTU (Maximum Transmission Unit) size needs to be changed to over 9000 bytes to support jumbo Ethernet frames on the AVPro MXNet AV-over-IP Ecosystem.

The MTU is the maximum payload length for a particular transmission media and is typically 1500 bytes. A jumbo frame is an Ethernet frame with a payload greater than the standard MTU of 1500 bytes. Jumbo frames are used on LANs that support at least 1Gbps and can be as large as 9000 bytes, or even bigger. Since jumbo frames are not defined in the IEEE 802.3 specifications for Ethernet, vendor support for jumbo frames and their maximum MTU sizes may vary.

Jumbo frames provide many benefits over the traditional IEEE 802.3 Ethernet MTU's. These include:
- The number of frames sent across the network is reduced.
- The number of Ethernet headers is reduced because of fewer frames.
- The reduction in frames results in fewer required headers.
- The CPU cycles are reduced at the sender and receiver side due to fewer headers needing to be built and read.
- Network bandwidth is reduced due to the reduction in headers.

2.6 PoE Budget

If using copper to connect your MXNet 10G endpoints instead of fiber, PoE network switches will power the
MXNet endpoint devices (transceivers), as each endpoint device consumes 6 to 9 Watts of power. Be sure to correctly identify the PoE budget of the third-party network switch before purchasing.

2.7 Disabling EEE

EEE (Energy Efficient Ethernet) is an IEEE 802.3az standard that is designed to reduce power consumption in Ethernet networks during idle periods.

If the third-party network switch supports EEE, be sure to disable the EEE function as it may cause issues with system optimization in some cases.

3 Product Overview

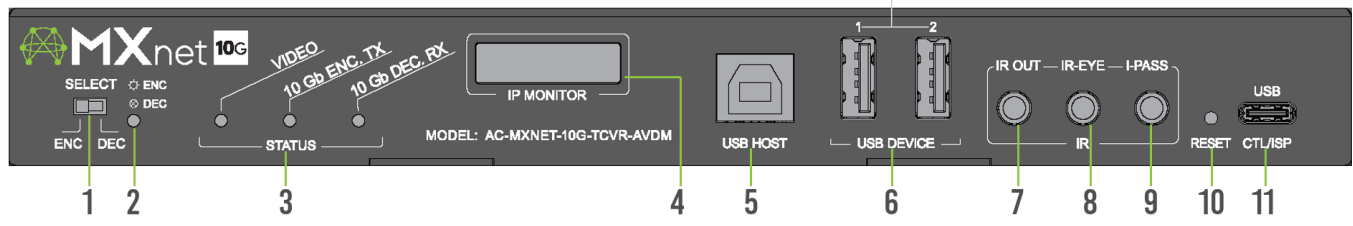## 3.1 Box Contents and Specifications

Refer to the *Specifications* page for these products located on the AVPro Edge Website for box contents
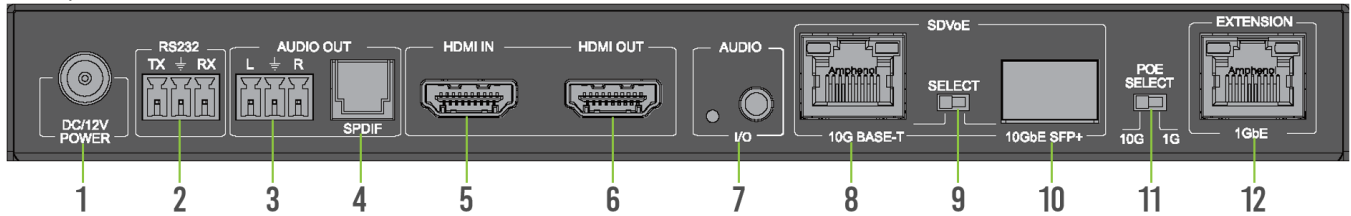
and technical specifications.

3.2 Transceivers

AC-MXNET-10G-TCVR
AC-MXNET-10G-TCVR-AVDM
AC-MXNET-10G-TCVR-USBX
AC-MXNET-10G-TCVR-PRO

⚠ **NOTE:** USB routing is only supported for basic keyboard and mouse functionality on the base TCVR and TCVR-AVDM models. For High-Speed USB capabilities, the TCVR-USBX and TCVR-PRO models must be used.

#	Name	Description
1	SELECT ENC/DEC	• Toggle switch to select transceiver operation mode as encoder or decoder
2	ENC/DEC MODE LED	• Blue LED status indicator light: LED is on = Encoder mode LED is off = Decoder mode
3	STATUS LEDs	• (3x) blue LED status indicator lights:

VIDEO	• Detects HDMI hot plug on transceiver • Solid blue indicates HDMI signal is present on transceiver • Supported on both encoder and decoder mode	
10 Gb ENC. TX	• Detects transceiver is sending data packets • Steady flickering blue indicates active connection	
10 Gb DEC. Rx	• Detects transceiver is receiving data packets • Steady flickering blue indicates active connection	

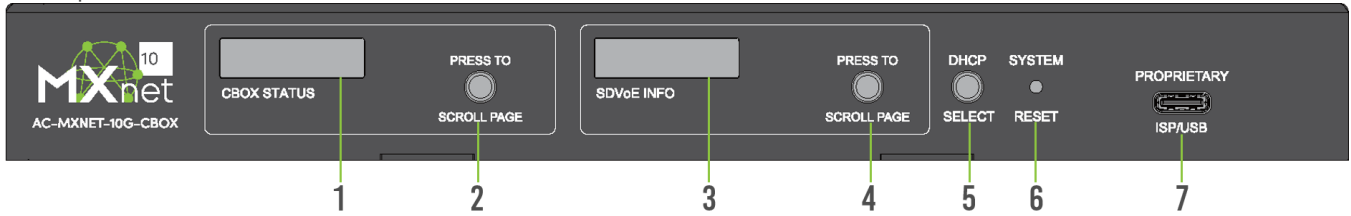| #	Name	Description
4	IP MONITOR	• Built-in front panel mini-OLED screen "data window" • Displays the transceiver's custom name (or MAC address) and IP address
5	USB HOST	• USB 2.0 Type B female connector port • USB extension for connecting to a computer or other USB 2.0 device • Supports KVM routing and hosting Note: isochronous device sync/multiple KVM pairing is only supported on TCVR-USBX and TCVR-PRO models. Base models (TCVR, TCVR-AVDM) are restricted to Keyboard + mouse support only.
6	USB DEVICE 1 & 2	• (2x) USB 2.0 Type A female connector ports • Supports routing USB 2.0 signals to the designated host transceiver (set as encoder) Note: isochronous device sync/multiple KVM pairing is only supported on TCVR-USBX and TCVR-PRO models. Base models (TCVR, TCVR-AVDM) are restricted to Keyboard + mouse support only.
7	IR OUT	• 3.5mm mono jack (TS) IR receiver port • Sends encapsulated/virtualized IR signals upstream via the MXNet API
8	IR-EYE	• 3.5mm stereo jack (TRS) IR receiver port • Supports a flashing IR emitter from an IR bridge or control system processor
9	I-PASS	• 3.5mm stereo jack (TRS) IR receiver port • Sends IR signals pass-through via an IR emitter, IR bridge, or control system processor
10	RESET	• Recessed button, use a paperclip or pen to press in and hold for 7 seconds to restore transceiver back to factory default settings
11	USB CTL/ISP	• USB Type C female connector port • Servicing port for AVPro Edge technical assistance

(rear panel)

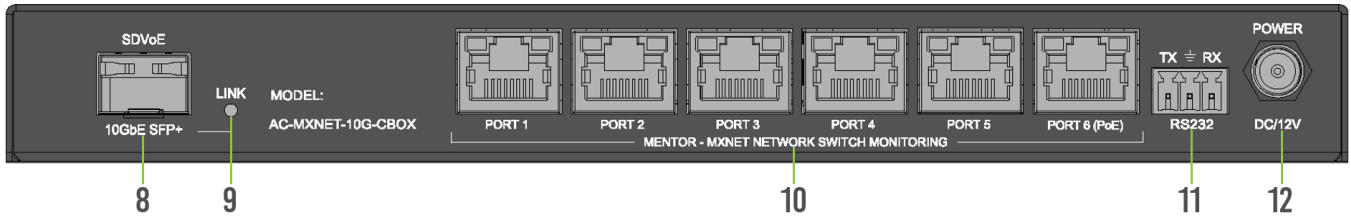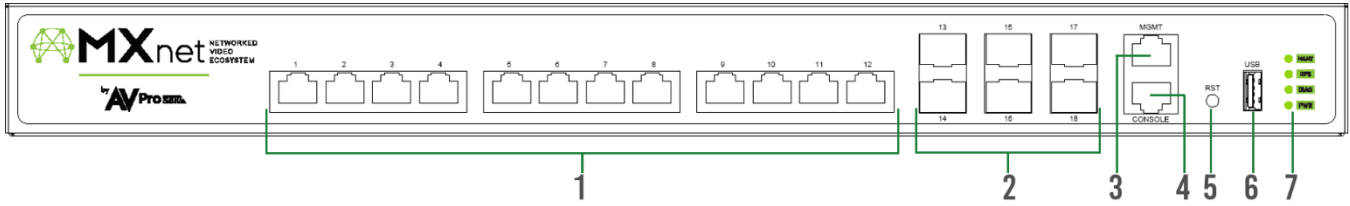|		
1	**DC/12V POWER**	• DC 12V/2A locking ring power inlet to locally power transceiver • Not required when connecting transceiver to a network switch that provides PoE
2	**RS-232**	• 3-pin terminal block connector port • Sends encapsulated/virtualized RS-232 (serial pass-through) over IP via the MXNet API • Supports serial routing with direct connection to a control system processor
3	**AUDIO OUT ANALOG**	• 3-pin terminal block connector port • De-embedded audio, extracts unbalanced 2-channel analog PCM audio (encoder mode)*(Downmixing supported only on transceiver model AC-MXNET-10G-TCVR-AVDM)*
4	**AUDIO OUT SPDIF**	• S/PDIF digital LPCM audio output • De-embedded audio, extracts uncompressed 2-channel PCM audio or 5.1 compressed surround sound (encoder mode) • (Downmixing always active; only on transceiver model AC-MXNET-10G-TCVR-AVDM) • *TOSLINK port actively outputs incoming audio conforming to TOSLINK capabilities (up to 5.1 Dolby Digital; Dolby Digital Plus and Dolby Atmos not supported)*
5	**HDMI IN**	• 19-pin HDMI Type A female connector port • Source device input for HDMI connection *(This port is not functional when transceiver is set to decoder mode)*
6	**HDMI OUT**	• 19-pin HDMI Type A female connector port • Output device port for HDMI connection *(This port functions as a Loop-out port when transceiver is set to encoder mode)*
7	**AUDIO I/O**	• 3.5mm stereo jack (TRS) for audio input (encoder mode) or output (decoder mode) • Auto-detects input or output once directly connected, indicated by adjacent blue LED • Independent analog audio port, does not extract from transceiver's HDMI audio
8	**10G BASE-T**	• 8-pin RJ-45 female connector port • 10 Gigabit Ethernet copper connection for SDVoE transmissions • Supports standard PoE power, IEEE 802.3AF (15.4W)
9	**SDVoE SELECT**	• Toggle switch to select the 10G BASE-T or the 10GbE SFP+ port
10	**10GbE SFP+**	• 10G SFP+ port for SDVoE transmissions • Modular slot for SFP+ transceiver modules *(sold separately)* • Supports fiber-optic or copper cable connections *(data only, see 5.3.1 Power with Fiber)*
11	**PoE SELECT**	• Toggle switch to select which port PoE is coming from
12	**1GbE EXTENSION**	• 8-pin RJ-45 female connector port • 1 Gigabit LAN port for powering transceiver via PoE with fiber connections

3.3 Control Box

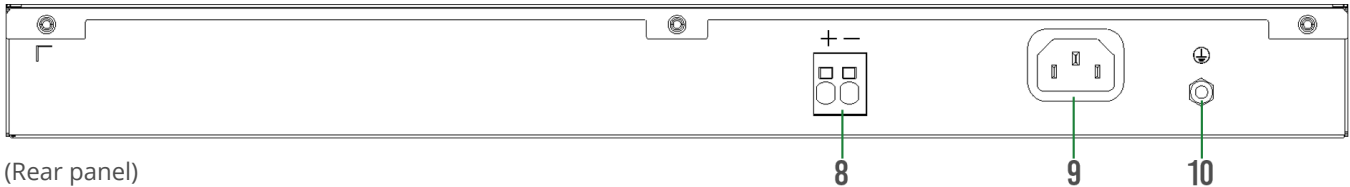AC-MXNET-10G-CBOX

(Front panel)

(Rear panel)

1	**CBOX STATUS**	• Built-in front panel mini-OLED screen "data window" • Displays the MXNet LAN and system control network information
2	**SCROLL BUTTON**	• Press to cycle through the network settings on the CBOX STATUS screen
3	**SDVOE INFO**	• Built-in front panel mini-OLED screen "data window" • Displays the MXNet SDVoE AV network information
4	**SCROLL BUTTON**	• Press to cycle through the network settings on the SDVoE INFO screen
5	**DHCP SELECT**	• Press button to toggle between DHCP (default) and STATIC IP mode 💬 **NOTE:** It is recommended to change the IP address to STATIC *after* all the MXNet devices have been successfully installed and Mentor has been accessed.
6	**SYSTEM RESET**	• Recessed button, use a paperclip or pen to press in and hold for 7 seconds to restore CBOX back to factory default settings
7	**PROPRIETARY ISP/USB**	• USB Type C female connector port, servicing port for AVPro Edge technical assistance
8	**SDVOE 10GbE SFP+**	• 10G SFP+ port for SDVoE transmissions • Modular slot for SFP+ transceiver modules *(sold separately)* • Supports fiber-optic or copper cable connections *(data only, see 5.3.1 Power with Fiber)*
9	**LINK LED**	• Detects CBOX is sending and receiving data packets • Solid blue indicates active connection
10	**MENTOR - MXNET NETWORK PORTS 1-6**	• (6x) 8-pin RJ-45 female connector ports • 10 Gigabit Ethernet copper connection for SDVoE transmissions • PoE (Power-over-Ethernet) only supported on Port 6 (PoE) port
11	**RS-232**	• 3-pin terminal block connector port • Sends encapsulated/virtualized RS-232 (serial pass-through) over IP via the MXNet API • Supports serial routing with direct connection to a control system processor • Default Baud Rate is 115200
12	**POWER** [optional]	• DC 12V/1A locking ring power charger to locally power the CBOX • Not required when connecting the CBOX to a network switch that provides PoE

3.4 AC-MXNET-10G-SW12C
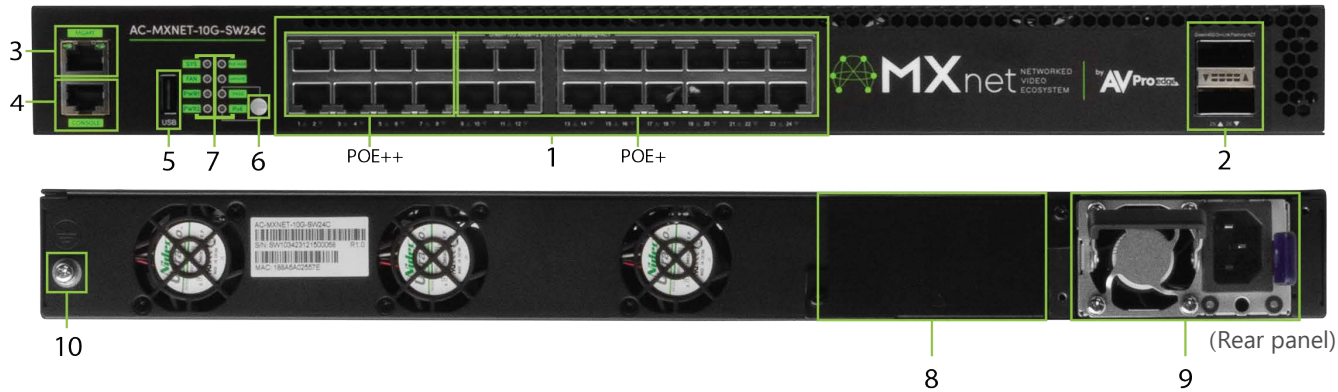
(Front panel)

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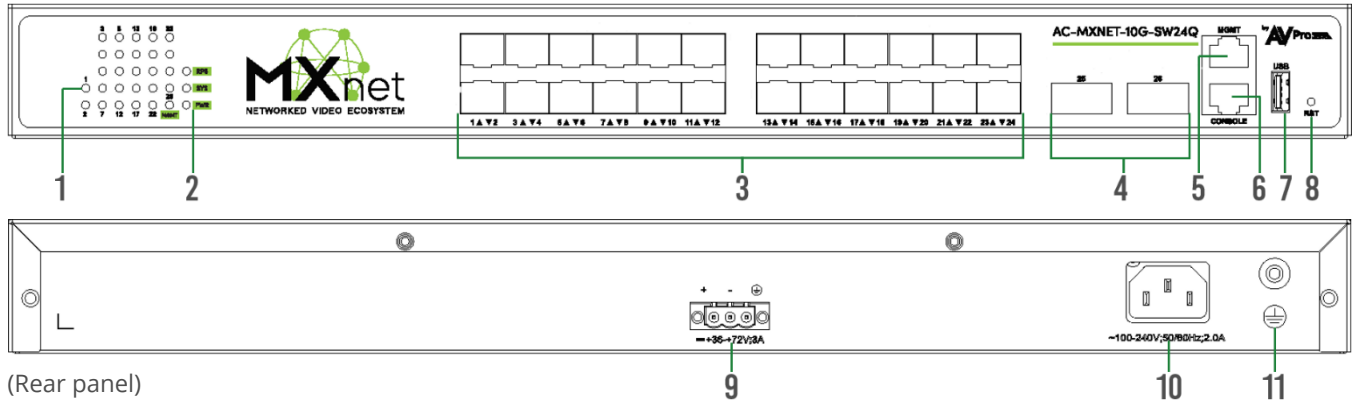| 1	10G-mGIG RJ-45 COPPER PORTS 1-12 (PoE/PoE+/PoE++)	• (12x) 8-pin RJ-45 female connector ports, 10G-mGig (multigigabit) • Supports PoE (IEEE 802.3af), PoE+(IEEE 802.3at), and PoE++ (IEEE 802.3bt) • Total PoE power budget of 370W • Supports 100Mbps, 1Gbps, 2.5Gbps, 5Gbps, and 10Gbps speeds with auto-negotiation
2	25G SFP28 PORTS 13-18	• (6x) 1G/10G/25Gbps SFP28 uplink ports • Modular slots for SFP28/SFP+ transceiver modules *(sold separately)*
3	MGMT PORT	• 8-pin RJ-45 female connector port • Used for managing the switch's network configuration settings and tracking system • data Connects to any port (1-5) on the AC-MXNET-10G-CBOX for tracking switch performance using the Mentor web UI 🗨 **NOTE:** This is a required physical connection in order to fully utilize the *Switch Management* page within the Mentor web UI, but otherwise optional.
4	CONSOLE PORT	• 8-pin RJ-45 female connector port • Used for accessing the switches' CLI (Command Line Interface)
5	RST	• Recessed button, use a paperclip or pen to press in and hold for 7 seconds to soft reboot the switch
6	USB	• USB Type A female connector port • Used for managing the switch's network configuration settings
7	SYSTEM STATUS LIGHTS	• MGMT LED steadily flashes green to indicate a stable link is present on the MGMT port • RPS LED (Redundant Power System) remains solid green to indicate the switch is powered on via back-up DC power • DIAG LED steadily flashes green to indicate a continuous diagnostic of the system is running on normal operations • PWR LED remains solid green to indicate the switch is powered on via main AC power
8	DC POWER	• 48V-57V back-up DC power supply for the network switch
9	AC POWER	• 100~240VAC, 50~60Hz main AC power supply for the network switch
10	GROUND SCREW	• Connect with a grounding cable to the conducting parts

3.5 AC-MXNET-10G-SW24C

(Front panel)

(Rear panel)

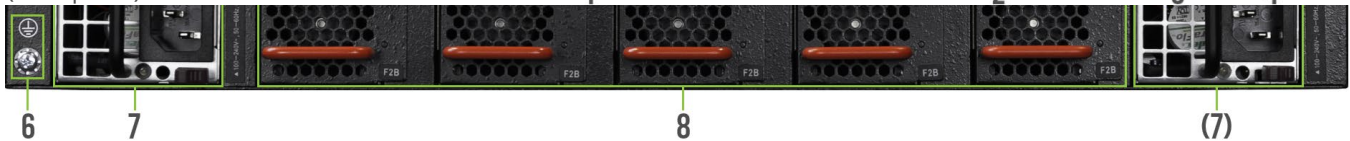|		
1	**10G-mGIG RJ-45 COPPER PORTS 1-12 (PoE/PoE+/PoE++)**	• (24x) 8-pin RJ-45 female connector ports, 10G-mGig (multigigabit) • Supports PoE (IEEE 802.3af), PoE+(IEEE 802.3at), and PoE++ (IEEE 802.3bt) • Total PoE power budget of 960W • Supports 100Mbps, 1Gbps, 2.5Gbps, 5Gbps, and 10Gbps speeds with auto-negotiation
2	**40GBE QSFP+ PORTS 25-26**	• *(2x)* 40GbE QSFP+ ports for uplinking, supports 1 QSFP+ -> 4 10G SFP+ breakout*(default configuration)* • Supports 1 QSFP+ to 4 10G SFP+ split
3	**MGMT PORT**	• 8-pin RJ-45 female connector port • Used for managing the switch's network configuration settings and tracking system data • Connects to any port (1-5) on the AC-MXNET-10G-CBOX for tracking switch performance using the Mentor web UI ⚠ **NOTE:** This is a required physical connection in order to fully utilize the *Switch Management* page within the Mentor web UI, but otherwise optional.
4	**CONSOLE PORT**	• 8-pin RJ-45 female connector port • Used for accessing the switches' CLI (Command Line Interface)
5	**USB**	• USB Type A female connector port • Used for managing the switch's network configuration settings
6	**LED SELECT BUTTON**	• When the button is pressed, each RJ45 port features a dual-color indicator light to display the RJ45 port's connection status and speed. • When the button is pressed each RJ45 Port features a dual-color indicator light to display the RJ45 port's PoE supply status
7	**SYSTEM STATUS LIGHTS**	• SYS LED - Off the device is not operational, Green blink the device is starting up, Green solid the device has completed startup and is working normally, red solid there is a operational fault in the device • FAN LED - Green solid the fan is working normally, Red solid there is a fan malfunction • PWR1 LED - Sold green when power slot 1 is working normal, red solid is abnormal • PWR2 LED - Will remain off in default from additional power supply can be perched for redundancy, when additional power supply is installed, led green indicator will remain on • PoE Max LED - Will remain off until the PoE has reached its maximum capacity • UPDATE LED - Only active when firmware updating network switch • SPEED LED - RJ45 port link and speed indicator. Off the ports connected device is not linked up, Orange Green solid the port is linked up, blinking data is being transmitted, Green indicates the port is operating at a 10Gbps speed, Orange the pots speed is below 10Gbps • PoE LED - RJ45 PoE Indicator. Off no PoE supply, Solid PoE is being Supplied, Blinking data is being transmitted, Green indicates the port is operating at a 10gps speed, Orange indicates the port's speed is below 10Gbps
8	**PSU SLOT**	• Slot for secondary power supply unit sold separately AC-SW24C-PWR
9	**AC POWER**	• 100~240VAC, 50~60Hz main AC power supply for the network switch , is replaceable with sku AC-SW24c-PWR
10	**GROUND SCREW**	• Connect with a grounding cable to the conducting parts

3.6 AC-MXNET-10G-SW24Q

(Front panel)

(Rear panel)

1	ACTIVITY LIGHTS 1-26	• Amber LED status indicator lights • Steady flickering indicates network activity is present on the numbered port
2	SYSTEM STATUS LIGHTS	• MGMT LED steadily flashes green to indicate a stable link is present on the MGMT port • RPS LED (Redundant Power System) remains solid green to indicate the switch is powered on via back-up DC power • DIAG LED steadily flashes green to indicate a continuous diagnostic of the system is running on normal operations • PWR LED remains solid green to indicate the switch is powered on via main AC power
3	10GbE SFP+ PORTS 1-24	• (24x) 10GbE/1GbE SFP+ ports for SDVoE transmissions (10GbE by default) • Modular slots for SFP+ transceiver modules *(sold separately)* • Supports fiber-optic or copper cable connections *(data only, see 5.3.1 Power with Fiber)*
4	40GbE QSFP+ PORTS 25-26	• (2x) 40GbE QSFP+ ports for uplinking, supports 1 QSFP+ -> 4 10G SFP+ breakout (default configuration) • Supports 1 QSFP+ to 4 10G SFP+ split
5	MGMT PORT	• 8-pin RJ-45 female connector port, 10/100/1000Base-T • Used for managing the switch's network configuration settings and tracking system data • Connects to any port (1-5) on the AC-MXNET-10G-CBOX for tracking switch performance using the Mentor web UI **NOTE:** This is a required physical connection in order to fully utilize the Switch Management page within the Mentor web UI, but otherwise optional.
6	CONSOLE PORT	• 8-pin RJ-45 female connector port • Used for accessing the MXNet CLI (Command Line Interface)
7	USB	• USB Type A female connector port • Used for managing the switch's network configuration settings
8	RST	• Recessed button, use a paperclip or pen to press in and hold for 7 seconds to reset the switch back to factory default settings
9	DC POWER	• Input 36V-72V back-up DC power supply for the network switch
10	AC POWER	• 100~240VAC, 50~60Hz main AC power supply for the network switch
11	GROUND SCREW	• Connect with a grounding cable to the conducting parts

3.7 AC-MXNET-10G-SW48Q

(front panel)

(Rear panel)

1	10GBE SFP+ PORTS 1-48	• (48x) 10GbE/1GbE SFP+ ports for SDVoE transmissions (10GbE by default) • Modular slots for SFP+ transceiver modules *(sold separately)* • Supports fiber-optic or copper cable connections *(data only, see 5.3.1 Power with Fiber)*
2	USB	• USB Type A female connector port • Used for managing the switch's network configuration settings
3	40G QSFP+ PORTS 49-54	• (6x) 40GbE QSFP+ ports for uplinking (default configuration) • Supports 1 QSFP+ to 4 10G SFP+ split to connect more MXNet Endpoints
4	MGMT PORT	• 8-pin RJ-45 female connector port • Used for managing the switch's network configuration settings and tracking system • data Connects to any port (1-5) on the AC-MXNET-10G-CBOX for tracking switch performance using the Mentor web UI 💬 **NOTE:** This is a required physical connection to fully utilize the Switch Management page within the Mentor web UI, but otherwise optional.
5	CONSOLE PORT	• 8-pin RJ-45 female connector port • Used for accessing the MXNet CLI (Command Line Interface)
6	GROUND SCREW	• Connect with a grounding cable to the conducting parts
7	POWER SUPPLY UNIT	• (2x) AC Power Input: 100~240V, 50-60Hz • Default with two redundant hot-swappable AC power supply
8	SYSTEM FANS	• 1+4 Redundant hot-swappable fan modules, front-to-back airflow

4 Wiring and Connections

4.1 10G Ethernet/LAN

The recommended termination for all RJ-45 ports on the MXNet devices is based on TIA/EIA T568A or T568B standards for the wiring of the twisted pair cables:
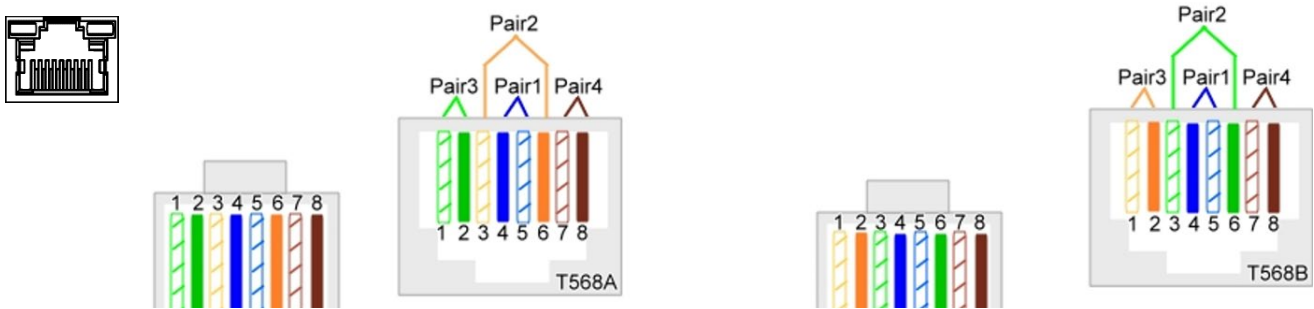
4.2 SFP+ Transceiver Modules

SFP+ (enhanced small form-factor pluggable) transceivers are compact, hot-pluggable devices that act as an interface between networking equipment (network switches, routers, network cards, etc.) and interconnecting cabling (copper or fiber).

While SFP and SFP+ transceivers are both similar in size and appearance, the main difference is SFP+ can be used in 10 Gigabit Ethernet applications, while SFP is for 100/1000BASE applications. SFP can also operate at 1000BASE/10GBASE. SFP complies with standards of IEEE 802.3 and SFF-8472, while SFP+ is based on SFF-8431.
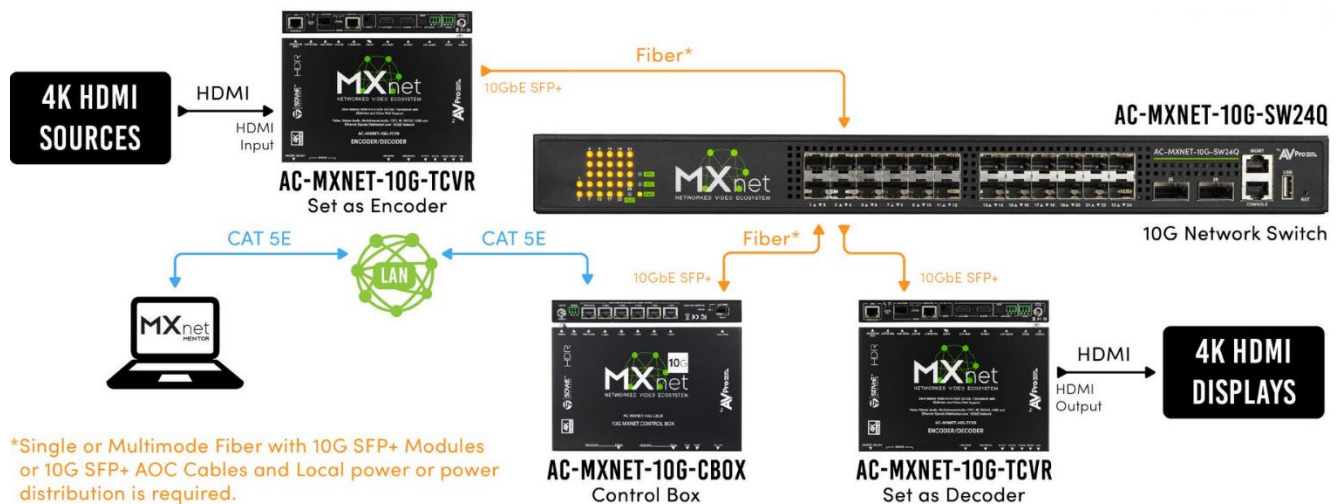
The module is inserted into the SFP+ slot on the MXNet devices and is used for network connectivity and AV transmission.
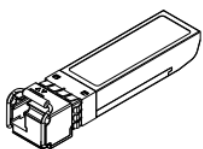
4.2.1 Installing SFP+ Transceiver Modules

The procedure for SFP+ transceiver modules is shown below:

1   Put on an ESD wrist strap (or antistatic gloves).

2   Insert the SFP+ transceiver to the guide rail inside the fiber interface line card. Do not put in the SFP+ transceiver upside down.

3   Push the SFP+ transceiver along the guide rail gently until you feel the transceiver snap into place at the bottom of the line card.

☀ TIP:	The SFP+ transceiver module is hot-swappable, meaning that it can be inserted or removed while power is still present in the system.
⚠ WARNING:	Do not stare directly at the two fiber bores inside the SFP+ transceiver module while the network switch is operating as the laser may harm the eyes.

4.3 AOC Cables

An AOC (Active Optical Cable) is a premade fiber cable with SFP+ modules connected on each end that directly connects the ports between active devices, such as network switches, routers, servers, and data storage devices within a network.
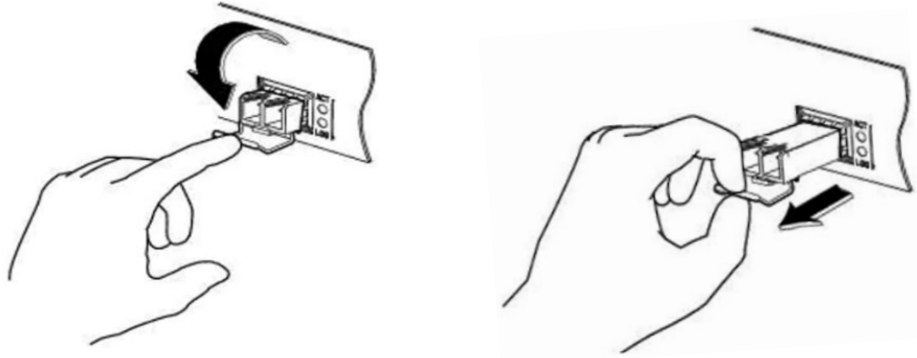
4.4 HDMI Cables

The MXNet devices use standard 19-pin HDMI female connector ports for the inputs and outputs.

Some important things to consider when planning or installing MXNet devices:

• Ensure all HDMI cables and devices can support the signal being sent. For most use cases, a High-Speed HDMI cable with Ethernet rated for 18Gbps will be more than sufficient to satisfy signal transport if every device can handle the signal.

• Ensure your HDMI cable is the correct length. The current HDMI specification calls for cables to be between 2 to 10 meters (6.6 to 33 feet). Smaller wire cables may be unable to transmit higher bandwidth signals like 4K60 over distances of even 5 meters (16 feet).

4.5 USB Ports

The USB ports allow USB 2.0 extension. The transceivers contain two USB 2.0 Type A ports, one USB 2.0 Type B port, and one USB Type C port. The USB-C port is a courtesy port and is primarily intended for AVPro Edge technical support servicing in the event of troubleshooting.
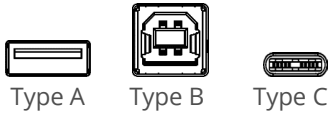
Type A   Type B   Type C

NOTE: USB routing is only supported for basic keyboard and mouse functionality on the base TCVR and TCVR-AVDM models. For High-Speed USB capabilities, the TCVR-USBX and TCVR-PRO models must be used.

4.6 Audio Ports

4.6.1 Extracted Analog Audio

All models of the MXNet 10G transceivers feature a 3-pin terminal block connector port for de-embedded audio. When the transceiver is set to Encoder or Decoder Mode, this port extracts 2-channel unbalanced PCM audio. Audio volume can be adjusted via the CBOX web UI, or API commands.

L   R

Connect a 3-pin terminal block connector into the AUDIO OUT port on the receiver.

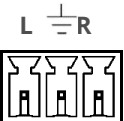**NOTE:** The source device must output PCM audio for this feature to function. This can be done by using the EDID MGMT options on the Mentor Web UI or by setting the source as such. Downmixing only supported on the transceiver model AC-MXNET-10G-TCVR-AVDM.

4.6.2 Extracted Digital Audio

All MXnet 10G transceiver models incorporate a TOSLINK port for de-embedded digital audio. When a transceiver is placed into Encoder Mode, this port extracts uncompressed 2-channel PCM or 5.1 compressed multichannel audio. When placed into Decoder Mode, the TOSLINK port actively outputs incoming audio conforming to TOSLINK capabilities (up to 5.1 Dolby Digital; Dolby Digital Plus and Dolby Atmos not supported).

4.6.3 Extracted Digital Audio

All models of the MXNet 10G transceivers feature a 3.5mm stereo jack (TRS) connector port for audio input (encoder mode) or output (decoder mode). This port auto-detects the input or output mode once directly connected, indicated by the adjacent blue LED. This is an independent audio port and does not extract from
the transceiver's HDMI audio, it is used for routing independent analog audio across the MXNet system.

Audio Input or Output
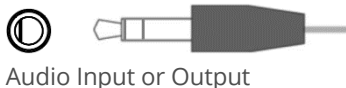
4.7 RS-232 Wiring

Serial control connections are made using the provided 3-pin terminal block connector. The wire slips into the hole and locks with a screw located at the top of the connector.
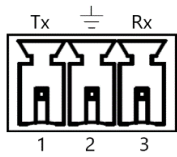
PIN 1	Transmit
PIN 2	Ground
PIN 3	Receive

4.8 IR Wiring

IR connections are made using the provided 3.5mm IR Emitter and IR Eye (receiver).

5 Installation

All the MXNet devices are preconfigured out-of-the-box for AV-over-IP applications, meaning the network settings of each individual transceiver, CBOX, and MXNet network switch do not need to be configured separately. Simply make the physical connections between the devices and MXNet will automatically discover each transceiver, receive each MAC address, auto-assign IP addresses and multicast channels, and replicate the physical system in a digital space that can be accessed by using the Mentor web interface.

5.1 Connecting the Devices

1. Select the Transceiver Mode. The encoder and decoder (transmitter/receiver) are combined into one chassis with a simple toggle switch to select application functionality. Be default, the transceiver is set to decoder mode.

Flip the **ENC/DEC SELECT toggle switch** to set the transceiver to encoder or decoder mode.

AC-MXNET-10G-TCVR (Front Panel)

To the right of the toggle switch is a blue LED that indicates the selected mode:

LED is on = Encoder mode LED is off
= Decoder mode

2. Select the Transceiver Port Type. The 10GbE copper and fiber ports on the transceiver allow flexibility to utilize the cabling that best fits the specific installation.

5.2 For Category Cable Connections

Flip the **SDVoE SELECT toggle switch** to the **10G BASE-T** setting, then flip the **POE SELECT toggle switch** to the **10G** setting.

AC-MXNET-10G-TCVR (Rear Panel)

Connect the **SDVoE 10G BASE-T port** on the transceiver to a **10G Copper PoE port** on the network switch.
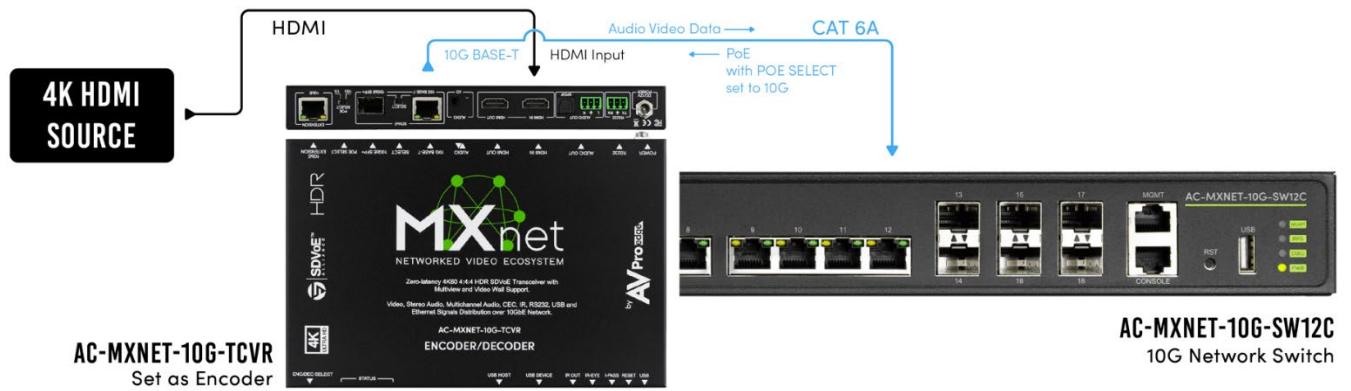
Connect the power supply to the network switch. By using this method, no additional cabling is required to power the transceiver as it will be powered by the network switch via PoE (Power-over-Ethernet).

5.3 For Optical Fiber Connections

Flip the **SDVoE SELECT toggle switch** to the **1G** setting.

Connect the **SDVoE 10GbE SFP+ port** on the transceiver to a **10G SFP+ port** on the network switch (or an **SFP28 port** on the AC-MXNET-10G-SW12C).

Connect the power supply to the network switch.

5.3.1 Power with Fiber Connections

Fiber optic cables do not carry an electrical current and cannot supply power from one device to another. There are two ways to power the transceivers when using fiber optic connections:

A. Fiber with Local Power:
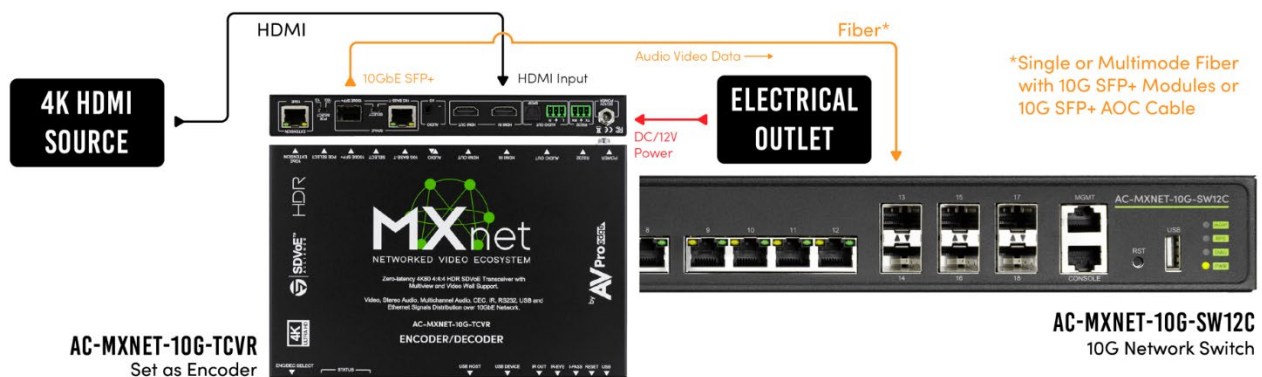
B. Fiber with PoE Power Supply:
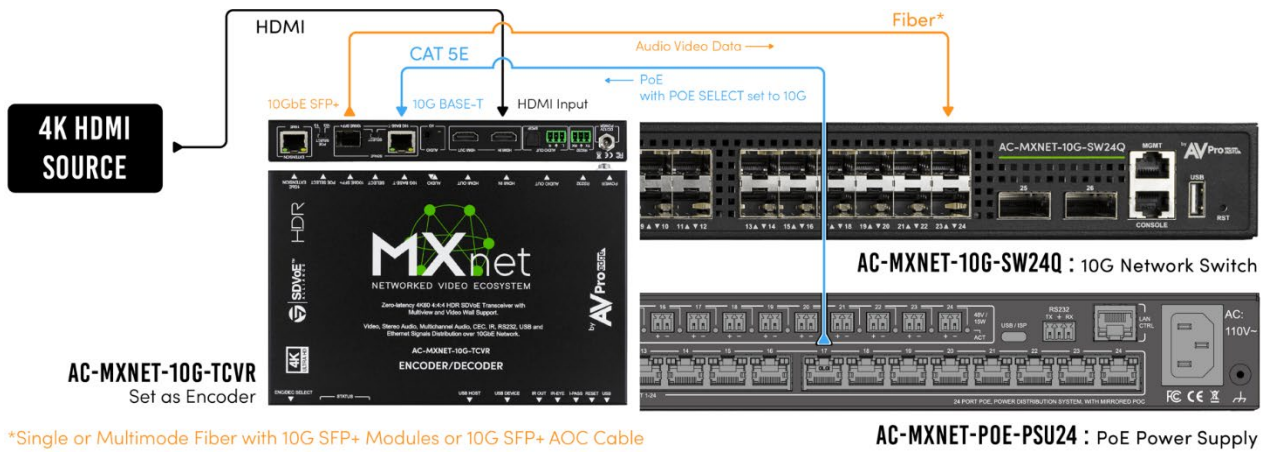
3. Connect the Transceivers to the Network Switch. Once the transceiver modes have been selected and the port types have configured for Category or fiber cabling, connect the transceivers to the network switch.
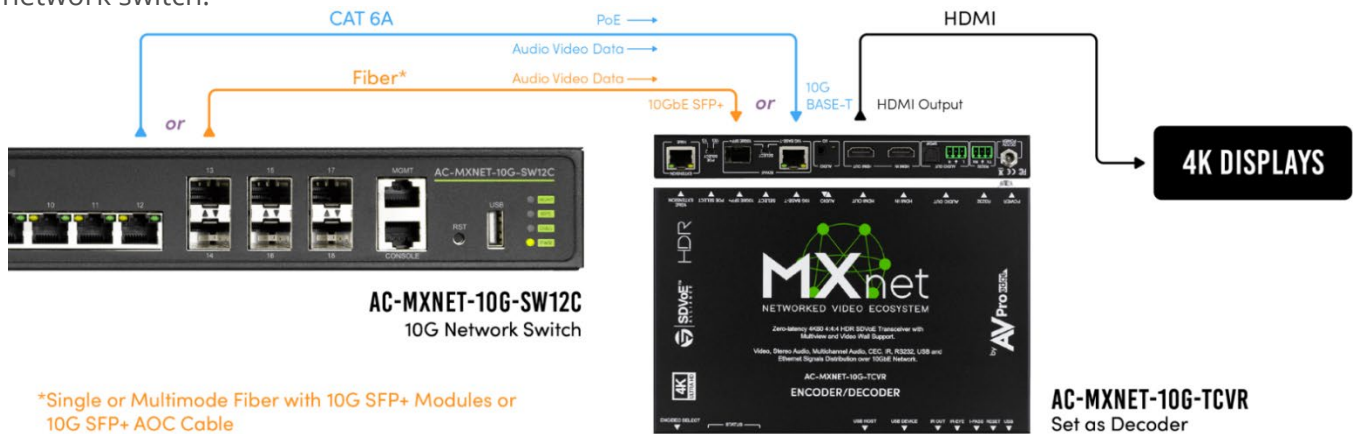
4. Connect the Transceivers to their HDMI Devices. Connect the HDMI source devices to the **HDMI IN port** on the encoders, and the HDMI output devices to the **HDMI OUT port** on the decoders.

AC-MXNET-10G-TCVR (Rear Panel)

On Encoders: Connect to the HDMI source device with an HDMI cable

On Decoders: Connect to the HDMI output device with an HDMI cable

NOTE: When the transceiver is set to encoder mode, the HDMI OUT port functions as an HDMI Loop Out port. When the transceiver is set to decoder mode, the HDMI IN port has no function.

5. Connect the CBOX to the Network Switch.

**1** Connect the **SDVoE port** on the CBOX to a **10G SFP+ port** on the network switch (or an **SFP28 port** on the AC-MXNET-10G-SW12C). An SFP+ -> RJ45 module can also be used.

2 Connect the **PORT 6 (PoE) port** to the LAN, router, or third-party control system for power and/or access to the Mentor interface.

3 *If PoE is unavailable, use the **DC/12V power inlet** to locally power the CBOX by connecting it to an electrical outlet.
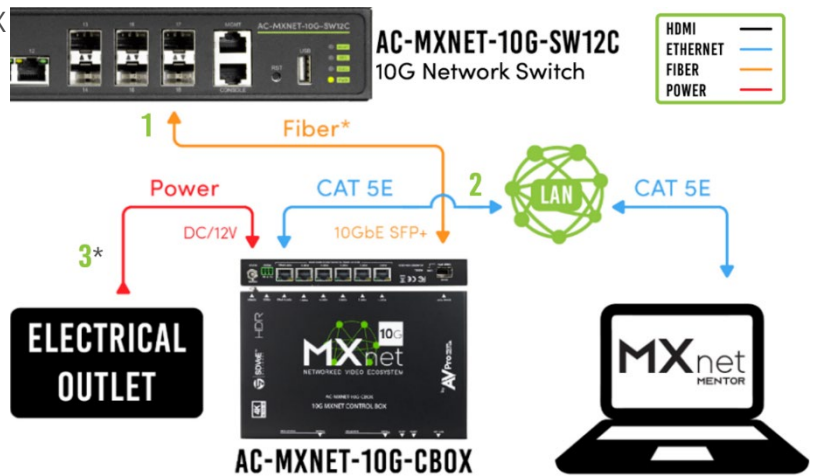
6 The Mentor Web UI

Mentor is MXNet's proprietary HTML5-based setup and control web interface that contains a variety of easy to use, yet powerful tools and settings to help streamline the installation process. It comes pre-installed on every AC-MXNET-CBOX and is purposefully designed for easy navigation and monitoring of the entire system.

Once all the devices are connected and powered on, the Mentor homepage can be accessed using the following steps below.

6.1 Accessing and Navigating Mentor

1 Locate the IP address on the CBOX by pressing the **CBOX STATUS** button to cycle through all the different network settings, including the IP address.

AC-MXNET-10G-CBOX (Front Panel)

2 Open a new tab in any web browser and type in the CBOX's IP address. This will open the Mentor web interface welcome page.
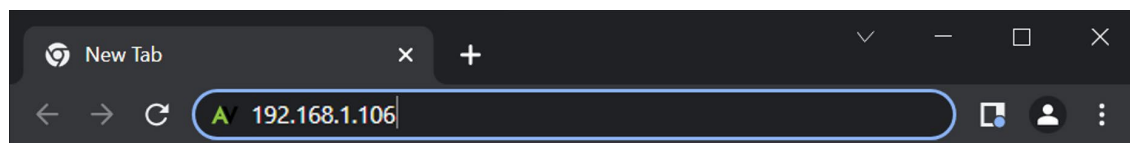
3   Enter in the default username and password below to log in.

Default Login Credentials
Username: admin
(all lowercase)
Password: admin
(all lowercase)

Both fields are case sensitive and can be changed at any time once Mentor is accessed.

6.2 System Utilities

After successfully logging in, users will be taken to the Mentor home screen with *System Utilities* as the default page. This page shows the IP address for MXNet and the current firmware version on the CBOX. From here, the MXNet devices can be updated to their latest versions of firmware, along with options to reboot the CBOX, reboot/remove the transceivers, and also factory reset them.

- To navigate through all the different pages, use the scroll bar and select the **icons** located on the left-side column of the page.
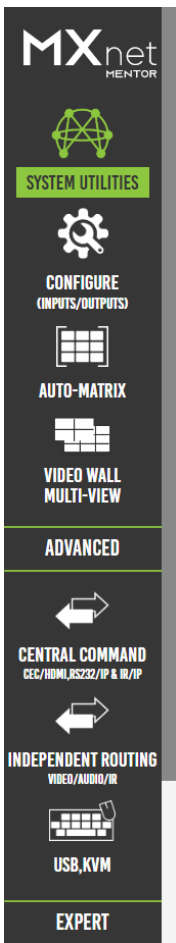
- To log out of Mentor, select the **logout** in the top-left corner of the page.

6.2.1 LAN and AV Network Configurations

1 - MXNET SYSTEM CONTROL - MENTOR PORT (USE DEFAULT TELNET PORT 24 FOR API SYSTEM CONTROL)		3 - MXNET SDVOE PORT		2 - IP MODE ENCODERS - DECODERS
IP ADDR: 192.168.1.241	**MAC ADDRESS:** 18:8A:6A:01:0B:95	**IP ADDR:** 169.254.5.114	**MAC ADDRESS:** 18:8A:6A:01:0B:94	**NOTE:** Ensure the CBOX SDVOE port,encoders,and decoders use the same IP mode.Adjust encoders and decoders IP modes before the CBOX SDVOE port.
SUBNET: 255.255.252.0	**DNS SERVER: (PRIMARY)** 192.168.1.1	**SUBNET:** 255.255.0.0		
GATEWAY: 192.168.1.1	**DNS SERVER: (SECONDARY)**	**GATEWAY:** 0.0.0.0		
DHCP (DEFAULT) ✔ STATIC ☐ APPLY CHANGES		LINK LOCAL (DEFAULT) ✔ DHCP (EXTERNAL) ☐ STATIC ☐ APPLY CHANGES		SET IP MODE

This section provides network connection settings; it is divided into two sections:

MXNET SYSTEM CONTROL – MENTOR/LAN PORT

This section is for setting an IP address for LAN and CPU connections. The default setting is DHCP IP mode but can be changed to STATIC once communication is established with the CBOX.

MXNET SDVOE PORT

This section is used for changing the IP mode for the SDVOE port (the port that communicates to the MXNet SDVOE network). Options are "Link Local (default)", "DHCP (external)" or "Static"

⚠ **IMPORTANT**:   It is highly recommended to leave the IP mode set to LINK LOCAL and not change it to DHCP or STATIC unless the system is being installed in a large corporate enterprise or commercial network setting where an IT department will manage all network nodes, as this may require additional network configurations that must be made to all transceivers prior to making this change, or the 10G CBOX will be unable to communicate to your devices.

IP MODE – ENCODERS - DECODERS

This section is used for changing the IP mode for the 10G Transceivers. After clicking "SET IP MODE", a window will populate as shown below:

MXNet 10G Transceivers are set to "DHCP" by default. If no DHCP server establishes communication to the TCVR after 10 seconds on bootup, the TCVR will self-assign a link-local address. If a DHCP server is introduced to the system while the devices are powered on, they may need to be rebooted before the transceivers will obtain a DHCP lease.

You can configure your transceivers to have a static IP address by clicking "STATIC MODE" on the top right column, then choose "SET STATIC IP" for the desired transceiver. You will now be able to modify the IP address configuration of the chosen transceiver. Once adjustments have been made, choose "Apply", then
"SAVE CONFIG" at the top, and the TCVR will save the new IP address configuration.

6.3.2 MXNet Firmware Updates

The current firmware version on the CBOX can be viewed and updated from here, along with the encoders and decoders. Firmware updates can be performed on multiple or individual encoders and decoders by selecting them once the firmware file has been added to the *Update File* field.

The latest firmware for the encoders, decoders, and CBOX can be located at Support.AVProEdge.com and can be installed once downloaded.

To update firmware, select the **paperclip** icon ✎ next to the *Update File* field of the device you wish to update, then select the firmware file for the MXNet device.

6.3.3 MXNet Events

This section provides commands for rebooting, removing, and factory resetting various MXNet devices. It also includes options for managing different user levels for limiting access and permission settings.
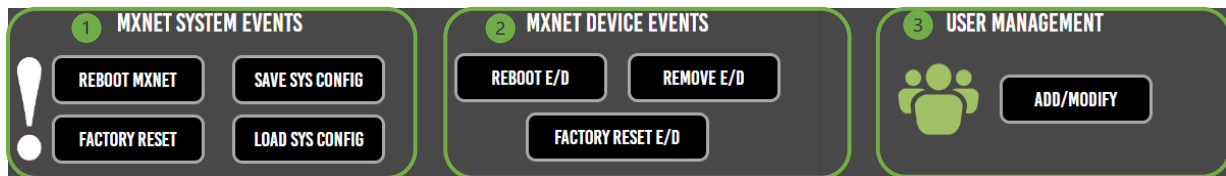
1   MXNET SYSTEM EVENTS
The following commands are related to the CBOX's functionality, and provided in this section:

- Select the **reboot MXNet** button to restart the MXNet CBOX.

- Select the **factory reset** button to restore all CBOX back to factory default settings.

- Select the **save sys config** button to download a .cfg file of the CBOX's current settings and configurations.

- Select the **load sys config** button to upload a previously saved .cfg file and apply it to all system settings and configurations.

2   MXNET DEVICE EVENTS (device specific)
The following commands are provided in this section:

- Select the **reboot E/D** button to restart one or multiple encoders and decoders.

- Select the **remove E/D** button to remove one or multiple encoders and decoders from Mentor.

- Select the **factory reset E/D** button to restore one or multiple encoders and decoders back to factory default settings.

3   USER MANAGMENT

- Select the **add/modify** button to change the admin user login credentials or to add a limited user account.

- Select the **enable limited user** toggle button to add a limited user account, including a separate username and password. The limited user account will only have access to the *Auto-Matrix* and *Video Wall* pages within Mentor.

- If the toggle button is set to **OFF** after entering a username and password for the limited user account, the limited user account's username and password will be saved within Mentor, and the limited user account cannot access Mentor until the admin account is accessed and the toggle button is set back to **ON** again.

6.4 Configure Inputs and Outputs

The *Encoder & Decoder Configurations* pages provide many useful tools and settings for configuring the encoders and decoders (transceivers). The first three tabs will be highlighted in green to indicate which page is currently selected.
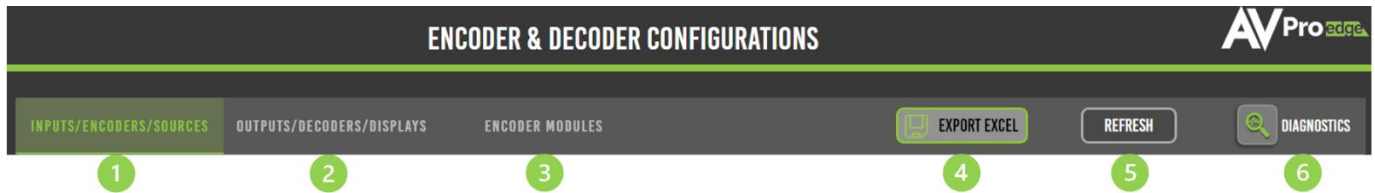
1 INPUTS/ENCODERS/SOURCES
Shows a list of all the encoders connected to MXNet along with various options for configuration.

2 OUTPUTS/DECODERS/DISPLAYS
Shows a list of all the decoders connected to MXNet along with various options for configuration.

3 ENCODER-MODULE (for AVDM Encoders only)
Shows a list of all the downmixing encoders connected to MXNet along with various options for configuration.

4 EXPORT EXCEL
Select to download a .xlsx file (Microsoft Excel Worksheet) of all the current settings and configurations of the encoders and decoders.

5 REFRESH
Select to refresh the web page.

6 DIAGNOSTICS
Select to view critical system information for the encoders and decoders.

6.4.1 Inputs/Encoders/Sources

	CUSTOM NAME ↑	DESCRIPTION	EDID MGMT	CHANNEL	IP ADDRESS(AUTO)	MAC ADDRESS(AUTO)	FIRMWARE VERSION	CHIPSET	NATIVE STREAM STATUS	SCALED STREAM STATUS	LIGHTS CONTROL-ALL
	188a6a00c1b8		User_EDID	224.1.1.6	169.254.185.193	188a6a00c1b8	1.25	AVP2000	ENABLE	ENABLE	ON
	188a6a011b3a		1080P_2D_2CH	224.1.1.22	169.254.59.27	188a6a011b3a	1.25	AVP2000	ENABLE	ENABLE	ON
	188a6a011794		User_EDID	224.1.1.2	169.254.149.23	188a6a011794	1.25	AVP2000	ENABLE	ENABLE	ON
	AppleTV		User_EDID	224.1.1.5	169.254.13.193	188a6a00c10c	1.25	AVP2000	ENABLE	DISABLE	ON
	ATV_ENCODE		COPY_FROM_OUTPUT	224.1.1.9	169.254.57.78	188a6a014e38	1.25	AVP2000	ENABLE	DISABLE	OFFLINE

‹ 1 ›

1 CUSTOM NAME (default MAC address)

Text field, limit of 12 characters. Type in a custom name and hit Enter to apply it. Custom names can be sorted by selecting the arrow button ⬆ to toggle between ascending/ descending alphanumerical order.

2 DESCRIPTION

Text field, limit of 12 characters. Type in a custom description and hit the Enter key to apply it.

3 EDID MGMT

Dropdown menu containing 21 EDID presets and one User EDID slot for a custom EDID or a copied EDID from the transceiver's HDMI output. Click on the dropdown arrow to select an EDID for the source.

4 CHANNEL

Shows the multicast channel number of the encoder. This is automatically assigned by the CBOX and contains the video, audio, IR, USB, and control signals of the encoder. Switching to a source allows the decoder to subscribe to the encoder's channel in order to receive the encoder's signals.

5 IP ADDRESS (auto)

Shows the IP address of the encoder. The network switch will automatically assign this to the encoder once a connection has been made.

6 MAC ADDRESS (auto)

Shows the MAC address of the encoder. This is a factory setting that cannot be changed.

7 FIRMWARE VERSION

Shows the version of firmware currently installed on the transceiver. This can be updated on the *System Utilities* page under the *MXNet Encoders (Tx) Updates* section.

8 CHIPSET

Shows the current chipset version of the encoder.

9 NATIVE STREAM STATUS

When enabled, indicates the native stream from the source is passthrough, untouched signal. This setting can be changed in the DIAGNOSTICS page for the encoders.

10 SCALED STREAM STATUS

Shows what's being utilized when output scaling is enabled, as well as multiview generation which uses scaled stream only. This setting can be changed in the DIAGNOSTICS page for the encoders.

	EDID SETTINGS
1	1080P 2D 2CH
2	1080P 2D 6CH
3	1080P 3D 2CH
4	1080P 3D 6CH
5	4K 30Hz 3D 2CH
6	4K 30Hz 3D 6CH
7	4K 30Hz 3D 8CH
8	4K 60Hz 3D 2CH
9	4K 60Hz 3D 6CH
10	4K 60Hz 3D 8CH
11	1080P 2D 2CH HDR
12	1080P 2D 6CH HDR
13	1080P 3D 2CH HDR
14	1080P 3D 6CH HDR
15	4K 30Hz 3D 2CH HDR
16	4K 30Hz 3D 6CH HDR
17	4K 30Hz 3D 8CH HDR
18	4K 60Hz 3D 2CH HDR
19	4K 60Hz 3D 6CH HDR
20	4K 60Hz 3D 8CH HDR
21	1920 x 1200 3D 2CH HDR
22	USER EDID
23	COPY FROM OUTPUT

⚠ **CAUTION**:   If the source resolution is set at 4K (30Hz or 60Hz) and both NATIVE and SCALED STREAMS are enabled, this can exceed the bandwidth available,
resulting in video distortion/tearing (applies to VIDEO WALL MULTI-VIEW settings as well).

6.4.2 Outputs/Decoders/Displays

① CUSTOM NAME ↑	② DESCRIPTION	③ OUTPUT RESOLUTION	④ RETAIN HDR METADATA	⑤ IP ADDRESS(AUTO)	⑥ MAC ADDRESS(AUTO)	⑦ FIRMWARE VERSION	⑧ CHIPSET	⑨ VIDEO MODES	⑩ LIGHTS CONTROL-ALL ⊙
OUT1		1080P60 ▾	⊙ NO	169.254.58.78	188a6a014e39	1.25	AVP2000	FAST SWITCH	⊙ ON
OUT2		4K60 ▾	⊙ NO	169.254.186.193	188a6a00c1b9	1.25	AVP2000	FAST SWITCH	⊙ ON
OUT3		1080P60 ▾	⊙ NO	169.254.60.27	188a6a011b3b	1.25	AVP2000	FAST SWITCH	⊙ ON
OUT4		1080P60 ▾	⊙ NO	169.254.206.23	188a6a0117cd	1.25	AVP2000	FAST SWITCH	⊙ ON

‹ 1 ›

1 CUSTOM NAME (default MAC address)
Text field, limit of 12 characters. Type in a custom name and hit the Enter key to apply it.

2 DESCRIPTION
Text field, limit of 12 characters. Type in a custom description and hit the Enter key to apply it.

3 OUTPUT RESOLUTION
Dropdown menu containing scaling resolutions and video modes.
Click on the dropdown arrow to select an output resolution for the display.

> ✎ **NOTE**: PASS-THROUGH sends an untouched video signal through the decoder to the display
> STREAM OFF disables the output stream entirely so no signal is present on the display
> When enabling output scaling, please be aware that **any** signal outputting to your display will be compressed down to an RGB 8-bit signal. This may result in some banding appearing on your video output, especially if sending HDR metadata.

OUTPUT RESOLUTION	
1	PASS-THROUGH
2	720P 50Hz
3	720P 60Hz
4	1080P 24Hz
5	1080P 50Hz
6	1080P 60Hz
7	4K 30Hz
8	4K 50Hz
	4K 60Hz
9	STREAM OFF

4 **RETAIN HDR METADATA**

If the *Output Resolution* scaling is not set to PASS-THROUGH, a toggle button will appear in this field instead of *N/A*. Selecting this will allow HDR metadata to be retained when switching between sources with *Output Resolution* scaling enabled.

5 **IP ADDRESS (auto)**

Shows the IP address of the decoder. The network switch will automatically assign this to the decoder once a connection is made.

6 **MAC ADDRESS (auto)**

Shows the MAC address of the decoder. This is a factory setting that cannot be changed.

7 **FIRMWARE VERSION**

Shows the version of firmware currently installed on the decoder. This can be updated on the *System Utilities* page under the *MXNet Decoders (Rx) Updates* section.

8 **CHIPSET**

Shows the current chipset version of the decoder.

9 **VIDEO MODES**

GENLOCK MODE: Enabled when *Output Resolution* is set to PASS-THROUGH. Latency is reduced to 0.1ms (or 1/400th of a frame) for seamless video output.

🚩 **NOTE:**   When the transceiver is set to GENLOCK MODE (Passthrough), the sink device will need to re-sync if a new video signal is introduced, which will increase switching times depending on the speed the sink device will re-sync with the new video signal.

FAST SWITCH: Enabled when *Output Resolution* is not set to PASS-THROUGH. Switching is between one to two frames (approximately 17-34 milliseconds) which is visually imperceptible. The sink device will also retain the same video signal when switching sources, meaning no re-syncing is needed, resulting in much faster video switching.

10 **LIGHTS CONTROL**

Toggle button, allows for control of the front panel LEDs on the decoder, and can be done on all or individually selected decoders. Click to toggle between FLASH, OFF, and ON.

6.4.3 Encoder Module (AVDM Encoders only)

1 **TYPE**
Shows a list of all the AVDM encoders connected to MXNet.

2 **CUSTOMERS**
Text field, limit of 12 characters. Type in a custom name and hit the Enter key to apply it.

3 **DESCRIPTION**
Text field, limit of 12 characters. Type in a custom description and hit the Enter key to apply it.

4 **ENCODER MAC ADDRESS**
Shows the MAC address of the encoder. This is a factory setting that cannot be changed.

5 **ENCODER CUSTOM NAME**
Shows the encoder's assigned custom name from the *Inputs/Encoders/Sources* page.

6 **MODULE MAC**
Shows the MAC address of the AVDM module. This is a factory setting that cannot be changed.

7 **FIRMWARE VERSION**
Shows the version of firmware currently installed on the encoder. This can be updated in the *System Utilities* page under the *MXNet Encoders (Tx) Updates* section.

8 **MODE**
Dropdown menu, allows the encoder to adjust the audio downmixing by selecting one of the following preset modes:

AVDM PRESET MODES		
1	STD FX (default)	Standard downmixing mode
2	Low Center+	Center Mix increased to 60%
3	Mid Center+	Center Mix increased to 80%
4	High Center+	Center Mix increased to 100%
5	Middle FX (recommended)	Custom AVPro Mix, including full range of sound with pronounced Center channel and small amount of LFE
6	Full FX (large 3-way systems)	Custom AVPro Mix, including full range of sound with extra Surround Mix and more LFE
7	Voice FX (voice intelligibility)	Custom AVPro Mix, including Left, Center, and Right channels 100% mixed. Surround Mix is reduced for minor effects

☼ **TIP**: AVPro Edge and MXNet provides integrators with seven downmixing preset options, allowing them to tailor the downmixing of a source's audio, similar to how most AVR's and pre-processors can adjust the level of an individual channel in their surround mix.

6.4.4 System Diagnostics

The *System Diagnostics* page can be accessed by selecting the **magnifying glass** button 🔍 located in the top-right corner of the *Configure* page. This opens a separate page that shows live information and provides critical system data for advanced network tracking and cabling performance. The encoders and decoders each feature their own separate *Diagnostics* page located on separate tabs at the top. To exit the *System Diagnostics* page, select the **close** button CLOSE X to return to the *Configure* page.

CUSTOM NAME	Switch Port Number	Real Time Bandwidth (Mbps)	POE	DESCRIPTION	NETWORK CONNECTION	CONNECTION SPEED	HDMI VIDEO	HDR	COLOR DEPTH	CHROMA	HDMI AUDIO	EXTRACTED AUDIO	NATIVE STREAM STATUS	SCALED STREAM STATUS	HOT-PLUG DETECT/RESET	HDCP VERS	RS232 MODE	ENCODERS LIGHTS-ALL
188a6a00c1b8			FAIL		NO SIGNAL							69	ENABLE	ENABLE	RESET		TYPE2	OFFLINE
188a6a011b3a			FAIL		NO SIGNAL							70	ENABLE	ENABLE	RESET		TYPE2	OFFLINE
AppleTV			GOOD		10G	1920X1080p/60Hz	NO	8Bit	RGB	LPCM		100	ENABLE	DISAB...	RESET	OFF	TYPE2	ON
ATV_ENCODE			FAIL		NO SIGNAL							100	ENABLE	DISAB...	RESET		TYPE2	OFFLINE
IN1			GOOD		10G	1920X1080p/60Hz	NO	8Bit	RGB	LPCM		100	ENABLE	ENABLE	RESET	OFF	TYPE2	ON

< 1 >

1 CUSTOM NAME
Shows the encoder/decoder's assigned custom name.

2 SWITCH PORT NUMBER
Shows which port on the network switch that the encoder/decoder is plugged into. Select the **refresh** button 🔄 to update the field.

3 REAL TIME BANDWIDTH (Mbps)
Shows the amount of bandwidth. Select the **refresh** button 🔄 to update the field.

4 POE
Toggle button, allows PoE to be enabled or disabled to the encoder/decoder. Select the **refresh** button 🔄 to update the field.

🗨 **NOTE:** Options 2, 3, and 4 are only available if the CBOX can establish active communication to your MXNet network switch via the "Switch Management" page.

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5 DESCRIPTION
Shows the encoder/decoder's assigned custom description.

6 NETWORK CONNECTION
Shows the quality of the network category cable connection, indicated by color:

|	
Green	Good, network connection is at 1G
Yellow	Marginal, MXNet will automatically throttle bandwidth to 100Mbps
Red	Failed, MXNet is unable to detect a connection to the encoder/decoder

7 CONNECTION SPEED
Shows the encoder/decoder's network connection speed.

8 HDMI VIDEO & AUDIO

HDMI VIDEO	Shows the resolution of the source's video
HDR	YES indicates the source is sending HDR metadata
	NO indicates the source is sending SDR content
COLOR DEPTH	Indicates the source is sending either 8-bit or 10-bit color depth
CHROMA	Indicates the source is sending either RGB or YUV color space
HDMI AUDIO	Indicates the source is sending either PCM or LPCM audio

9 **EXTRACTED AUDIO**

Shows the volume level of the extracted audio. Selecting this will open a separate window with a slider bar to adjust the volume. Select SAVE in the bottom right corner of the window to save changes.
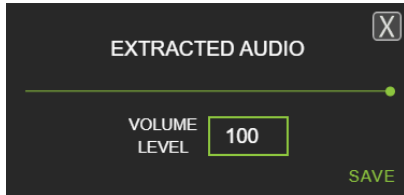
10 **NATIVE STREAM STATUS** *(INPUTS/ENCODERS/SOURCES Diagnostics Only)*

Toggle button, when enabled, indicates the native stream from the source is passthrough, untouched signal.

11 **SCALED STREAM STATUS** *(INPUTS/ENCODERS/SOURCES Diagnostics Only)*

Toggle button, shows what's being utilized when output scaling for 4K is enabled, as well as multiview generation which uses scaled stream only.

⚠ **CAUTION**: If the source resolution is set at 4K (30Hz or 60Hz) and both NATIVE and SCALED STREAMS are enabled, this can exceed the bandwidth available, resulting in image distortion/tearing. (Applies to VIDEO WALL MULTI-VIEW settings as well).

12 **HOT-PLUG DETECT/RESET**

Toggle button, green indicates a hot-plug detect has been identified by MXNet. Click on the **reset** RESET button to force a refresh of the HDMI signal between the connected devices.

13 **HDCP VERS**

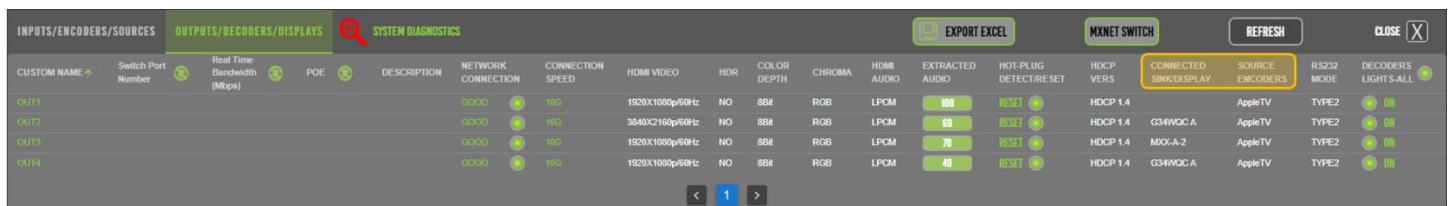Shows the version of HDCP detected from the connected device.

14 **RS232 MODE**

Shows the mode of RS-232 communication. This should remain as TYPE2.

15 **ENCODER/DECODER LIGHTS**

Toggle button, allows for control of the front panel LEDs on the transceiver, can be done to all or individually selected transceivers. Click to toggle between FLASHING, OFF, or ON.

The two columns shown below are only available on the *Outputs/Decoders/Displays* diagnostics page.

CUSTOM NAME	Switch Port Number	Real Time Bandwidth (Mbps)	POE	DESCRIPTION	NETWORK CONNECTION	CONNECTION SPEED	HDMI VIDEO	HDR	COLOR DEPTH	CHROMA	HDMI AUDIO	EXTRACTED AUDIO	HOT-PLUG DETECT/RESET	HDCP VERS	CONNECTED SINK/DISPLAY	SOURCE ENCODERS	RS232 MODE	DECODERS LIGHTS-ALL
OUT1					GOOD	10G	1920X1080p/60Hz	NO	8Bit	RGB	LPCM	100	RESET	HDCP 1.4		AppleTV	TYPE2	ON
OUT2					GOOD	10G	3840X2160p/60Hz	NO	8Bit	RGB	LPCM	69	RESET	HDCP 1.4	G34WQC A	AppleTV	TYPE2	ON
OUT3					GOOD	10G	1920X1080p/60Hz	NO	8Bit	RGB	LPCM	70	RESET	HDCP 1.4	MX-A-2	AppleTV	TYPE2	ON
OUT4					GOOD	10G	1920X1080p/60Hz	NO	8Bit	RGB	LPCM	49	RESET	HDCP 1.4	G34WQC A	AppleTV	TYPE2	ON

CONNECTED SINK/DISPLAY

Shows the manufacturer's display model or display that is connected to the decoder.

SOURCE ENCODERS

Shows the source signal routed to the decoder.

6.5 Auto-Matrix

The *Auto-Matrix* page layout consists of the *Inputs* column on the left, the *Outputs* grid in the middle, and the *Matrix Presets* section on the right. Each individual tile functions as a selectable button and will auto-populate the custom names from the *Configure* page as a label, highlighted by an orange border to indicate the selected input and output(s).

Inputs and outputs can be sorted by clicking on the **sort arrow** button ⬆ to toggle between ascending and descending alphanumerical order. Search fields can be used to locate a specific endpoint.
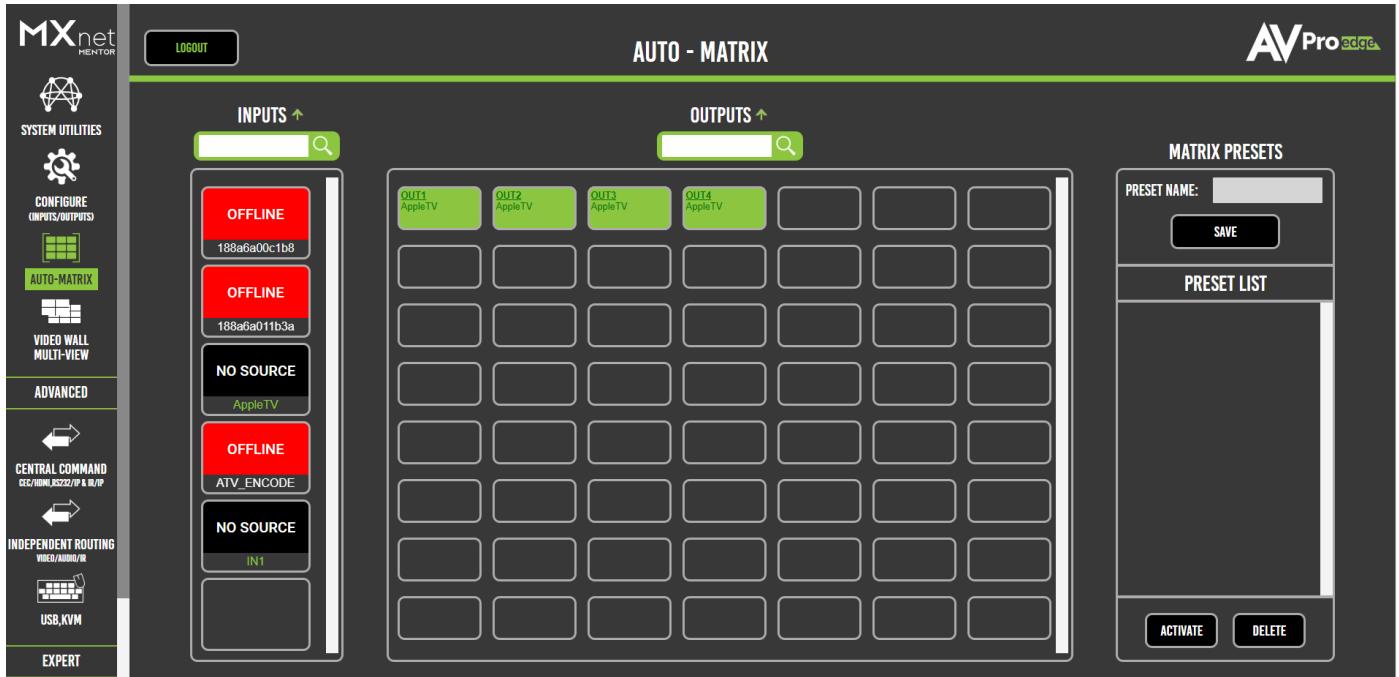
6.5.1 Inputs

This column lists all the encoders, each one is represented as a labeled thumbnail that provides a preview image of the connected source's video signal and will automatically refresh every ten seconds. Each thumbnail functions as a button that can be selected to route the connected source's signals to any one or more outputs. Inputs can be searched via their custom name by using the search bar directly below the "INPUTS" label.

6.5.2 Outputs

All the decoders are shown in this grid, each one is represented as a separate output button that is labeled with the decoder's custom name and the source that is currently routed to it. Multiple outputs can be selected at a time, indicated by an orange border, to route signals from any one of the connected source's input. Outputs can be searched via their custom name by using the search bar directly below the "OUTPUTS" label.

✏️

NOTE: The decoder's signal switching can be adjusted from this page by right-clicking on an output. This will open an additional menu where the signals can be selected for independent routing of video, HDMI and analog audio, USB, IR, and RS-232 signals.
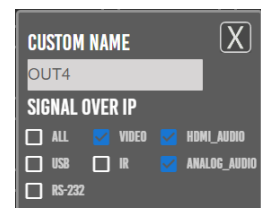
6.5.3 Matrix Switching

1   From the *Inputs* column, select the desired source's thumbnail. This will highlight the thumbnail with an orange border to indicate the selection was made.

2   From the *Outputs* grid, select the desired output(s) to route the selected source to. This will highlight the output(s) with an orange border to indicate the selection was made.

3   Switching commands will now be sent to the source's encoder and the output's decoder(s), and the selected source's signals will now be present on the selected output(s).

6.5.4 Matrix Presets

This feature provides an alternative to manually selecting and routing inputs to outputs, allowing switching commands to be saved and recalled as a preset, along with the ability to name each saved preset.

Keep in mind that when saving and activating matrix presets, settings will be applied to *all* current switching configurations on *all* the encoders and decoders.

6.5.5 Creating a Preset

1   First, select the desired inputs and switch them to the desired output(s) by using the previous steps above.

2   Under the *Matrix Presets* section, enter the name of the current switching configuration into the **preset name** field.

- ☀ **TIP**:   No spaces are allowed when entering text into this field. Individual words can be separated with a hyphen (-) or underscore (_).

3   Select the **save** button [SAVE] to save all of the current switching configurations as a matrix preset under the *Preset List*, along with its assigned name.
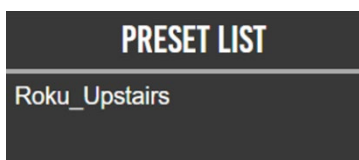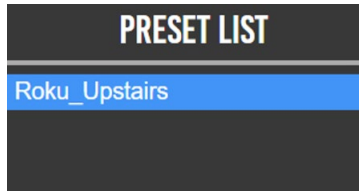
6.5.6 Activating a Preset

Once a matrix preset has been saved under the *Preset List*, it can be activated to automatically route the selected source signals to the selected output.

1   Select the preset's name from the *Preset List*, it will then be highlighted in blue to indicate the selection was made.
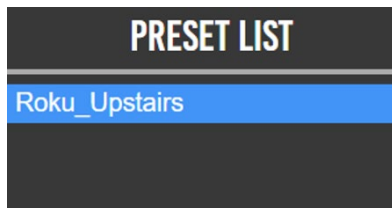
PRESET LIST

Roku_Upstairs

2   Select the **activate** button `ACTIVATE`.

3   A dialog box will prompt the selection again. Select the **yes** button `YES` to confirm.

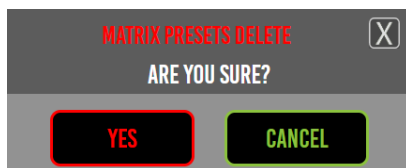**MATRIX PRESETS ACTIVATE** [X]

ARE YOU SURE?

YES   CANCEL
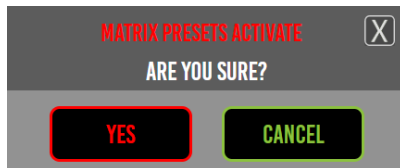
4   Switching commands will now be sent to the selected encoders and decoders, and the source's signals will be automatically routed to the outputs that were saved to the preset.

6.5.7 Deleting a Preset

1   Select the preset's name from the *Preset List*, it will then be highlighted in blue to indicate the selection was made.

PRESET LIST

Roku_Upstairs

2   Select the delete button `DELETE` .

3   A dialog box will prompt the selection again. Select the **yes** button `YES` to confirm.

MATRIX PRESETS DELETE [X]

ARE YOU SURE?

YES   CANCEL

4   The preset will now be permanently removed from the *Preset List* and is no longer able to be activated.

6.6 Video Wall

This page contains various tools and settings for creating custom video walls, including bezel adjustments, automatic cropping, aspect ratios, and more. Video wall layout options consist of two arrays: standard and mosaic, indicated by the two tabs at the top of the page labeled *Video Wall* and *Mosaic*. Both layouts retain their video resolution, including Dolby Vision, HDR, and HDR10+ metadata.
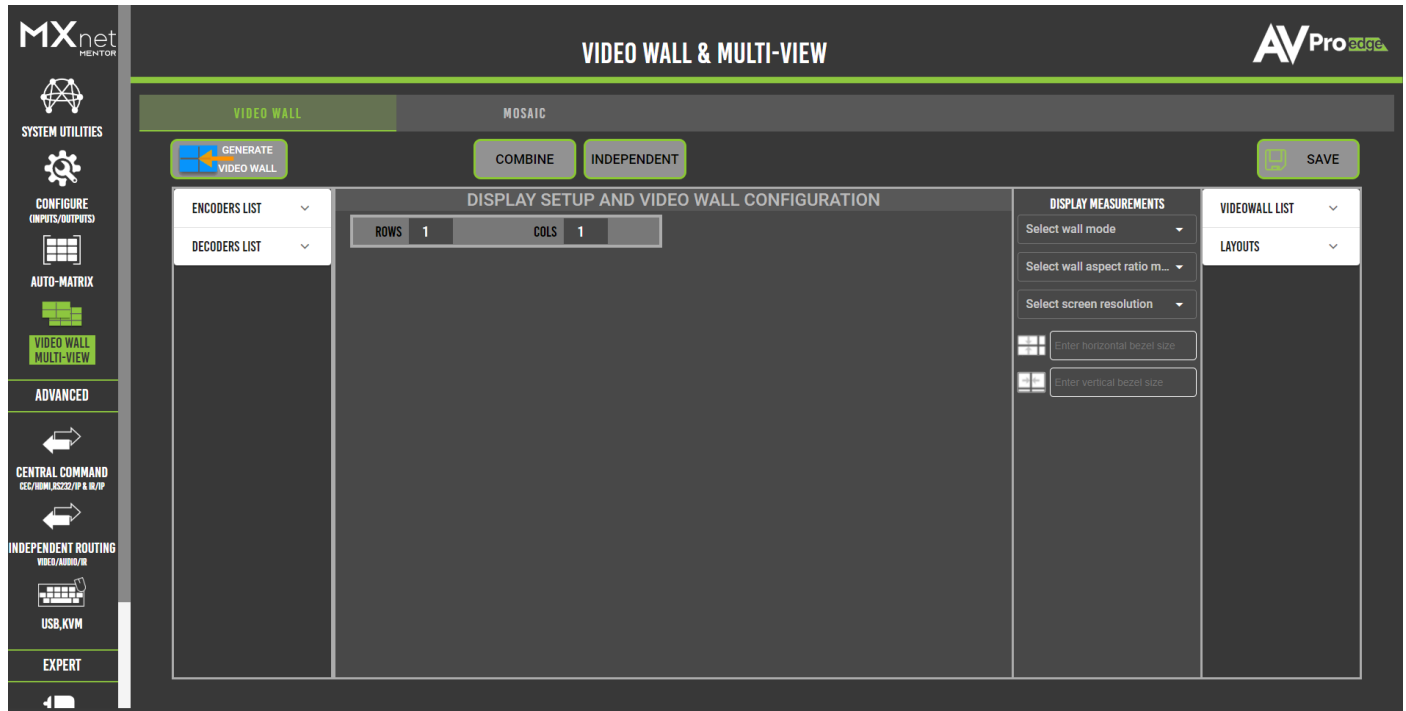
6.6.1 Standard Layout

The standard video wall layout consists of a grid array (2x2, 3x3, 4x4, etc.) with identical displays. The aspect ratio remains the same and the source's image is scaled across all the displays of the video wall. Advanced grid layouts (1x2, 2x8, etc.), where the aspect ratio of the video wall being very different from that of the individual displays, may also be configured.

6.6.2 Mosaic-Style Layout

Mosaic, or artistic, video walls do not follow the traditional standard grid-like pattern. Instead, they offer a unique and creative approach for customizing video walls, allowing the ability to mix and match displays of different sizes. Mosaic-style video walls usually play one single source across all video wall displays for an eye-catching effect.

6.6.3 Creating a Video Wall Array

The buttons at the top of the *Video Wall* page allow how the source's image will appear across the displays of the video wall.

COMBINE	INDEPENDENT

COMBINE   One image is shown on all displays as a continuous image.
INDEPENDENT   One image is shown on all displays independently.

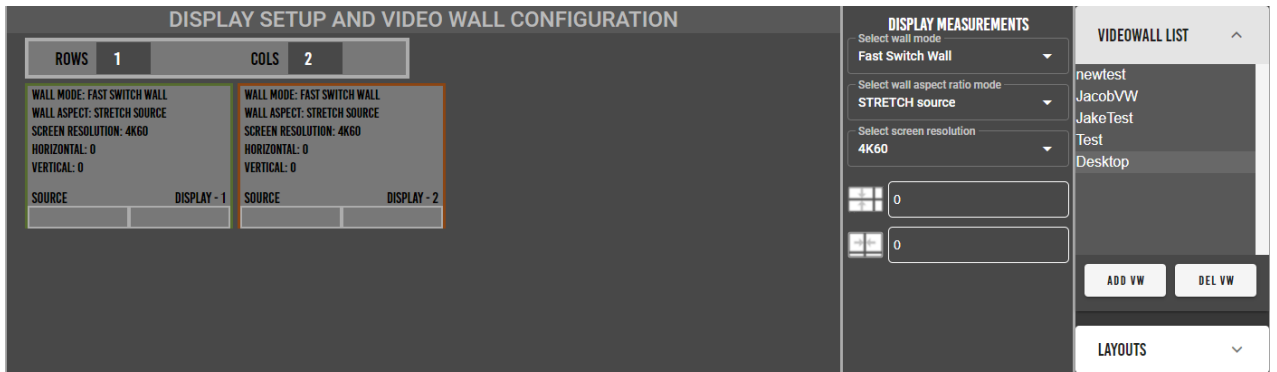**1**   In the *Video Wall* tab, select the **videowall list** dropdown menu, and select **ADD VW**.
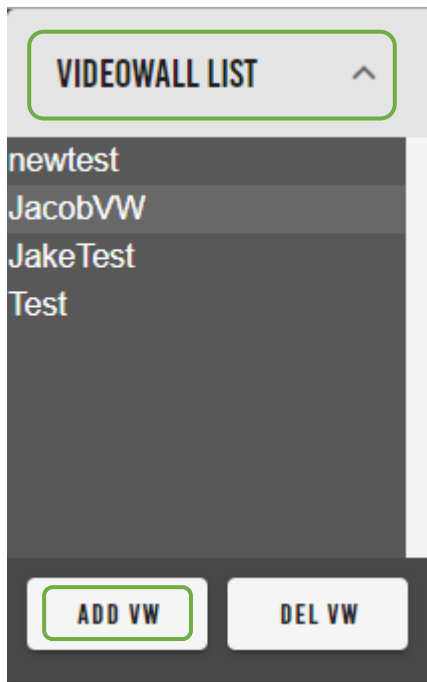
2   Enter in the **video wall name**, number of **rows** and **columns**, and the **layout name**. Then select the **save video wall array** button `SAVE VIDEOWALL ARRAY`.
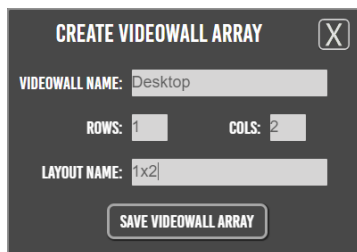
3   Mentor will then generate the "panels" of the video wall layout, with the previously saved array now appearing under the *VideoWall List*.

The panels are laid out similarly to how the actual video wall will be viewed in person. Each panel can be configured via the "DISPLAY MEASUREMENTS" column, and each panel also displays its current configurations, along with the custom names of the selected inputs and outputs, and the display number.

WALL MODE – adjust the videowall generation to be one of two options:

      GENLOCK WALL – Locks the video output with the sink device, resulting in improved videowall latency. If a source is changed, each sync device will have to re-sync with the new video wall timing.

      FAST SWITCH WALL – Clocks the signal at a specific frequency, which can result in much faster video switching times, but can introduce latency in the videowall.

ASPECT RATIO MODE – has "KEEP source aspect ratio" which retains the original aspect ratio during generation, "CROP source", or "STRETCH source" to fit the target display.

SCREEN RESOLUTION – adjust this to fit your needs, it will be the resolution/refresh rate the videowall will generate.

BEZEL MEASUREMENTS –

The first field will be your horizontal bezel measurements (in millimeters), and the second field will be your vertical bezel measurements (In millimeters)

4 Select the **decoders list** dropdown menu, this will show a list of all of the decoders as selectable buttons. Select a decoder by **clicking and dragging** the decoder, moving it over to the right, and dropping it onto a panel.
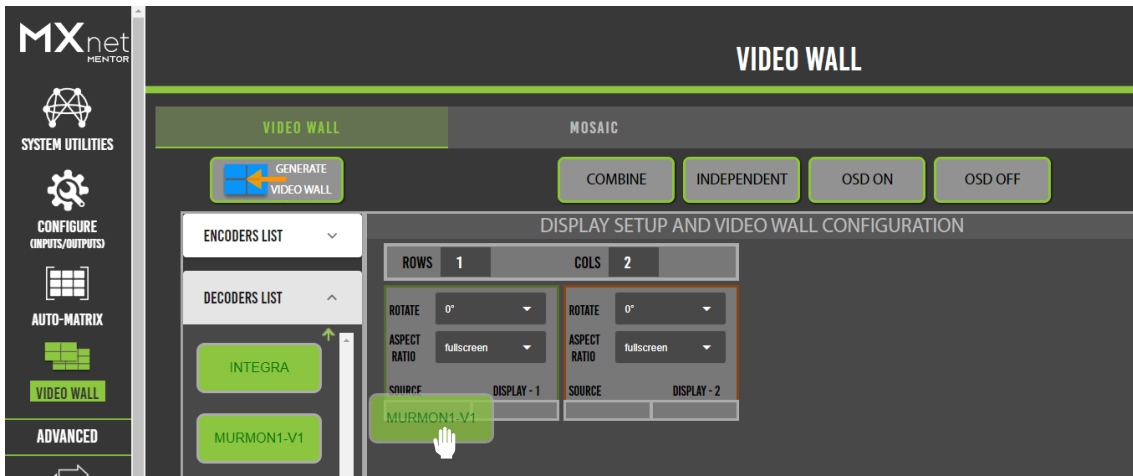
The selected display's custom name will now appear in the bottom right corner of the panel, indicating the selected display is now assigned to this panel. Repeat this step for other panels.

5   Select the **encoders list** dropdown menu. This will show a list of all the encoders with their connected source's preview image as a selectable thumbnail.

6   Select the encoder by **clicking and dragging** the source's thumbnail, moving it over to the right, and dropping it onto a panel.
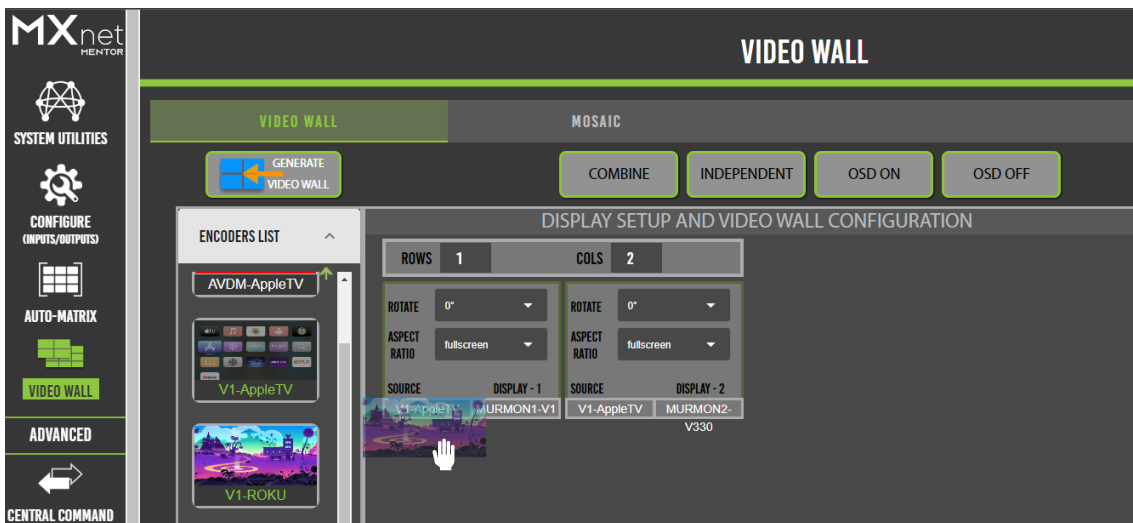

The selected source's custom name will now appear in the bottom left corner of the panel, indicating the selected source is now assigned to this display. Repeat this step for other panels.

7   Select both tiles by left clicking on them. An orange border will highlight the selected displays. Then select the **combine** button COMBINE at the top of the page.

8   Select the **save** button SAVE , this will save the selected inputs and outputs to the current video wall array. Then select the **generate video wall** button GENERATE VIDEO WALL . The video wall will now show the selected source content.

6.6.5 Creating a Multiview

1. To start the multiview creation process, first create a new videowall by following the steps above. This example will use a 1x1 videowall with the layout named "mv2by2", for a 2x2 Quad-View multiview.

2. Once the videowall has been created, select the display you'd wish to create a multiview for. Then under the "LAYOUTS" dropdown column, choose "Multi-View".
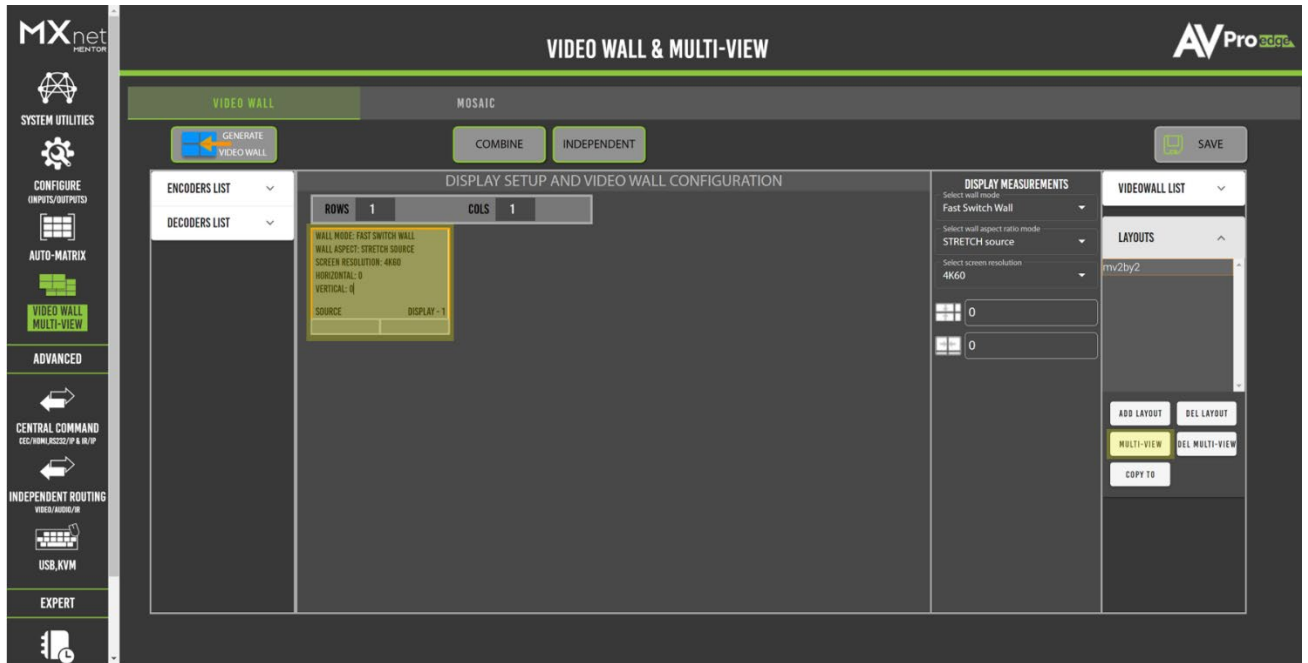
3. You will now see a page as shown in the below screenshot:
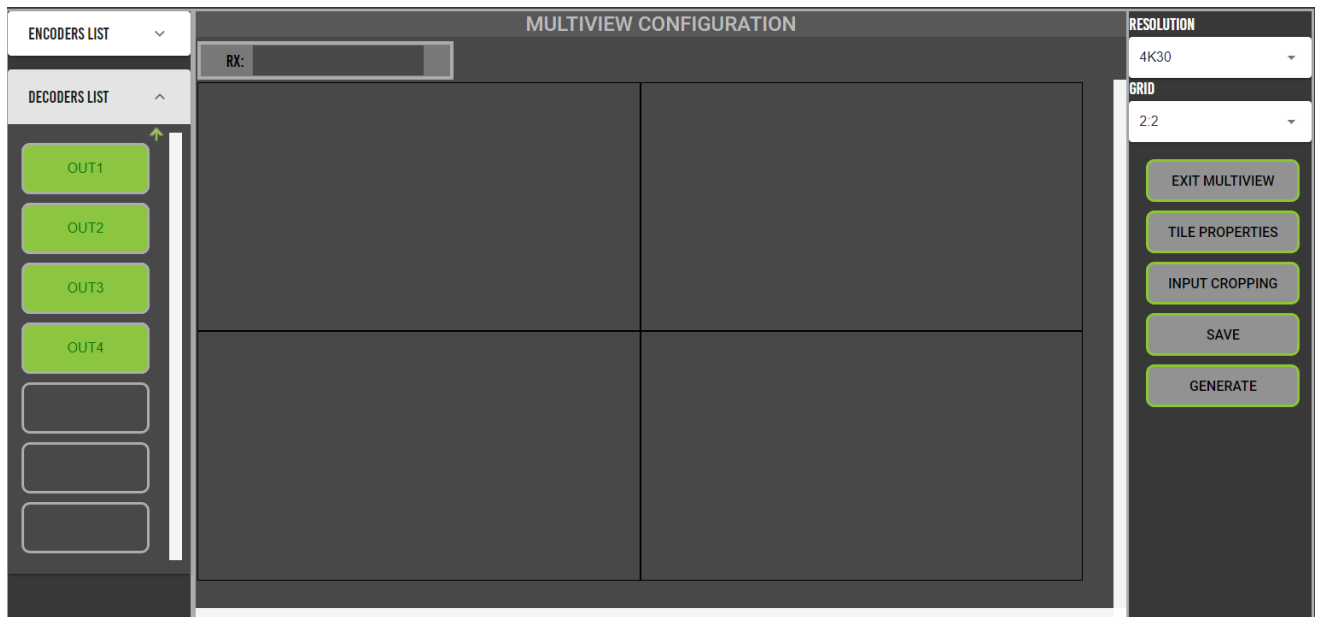
⚠ **CAUTION**:   There are some restrictions/limitations to be aware before creating a multiview:
The total number of tiles that can be generated in a single multiview is 16.
If your source is 4K, it is **extremely recommended** to either generate the multiview at 1080p, reduce the source's overall signal quality, or disable the native stream upon multiview generation. Failure to do so may result in exceeding the 10G of available bandwidth, resulting in image distortion/tearing depending on the multiview tile's size.
The multiview overall display/tiles cannot be rotated.
Each tile from a specific encoder used as the source **must** be the same size. For example, an encoder named "6G" has a window with a width and height of 1920x1080p. Each window that will use "6G" as a source also **must** be 1920x1080p, due to the multiview tile using the encoder's scaled stream for the signal source, and only one scaled stream is present on an encoder. Failure to do so will result in image distortion/undesired multiview generation.

To the right of the page is a list of available options. The "Resolution" and "Grid" fields should be configured first before placing your multiview tiles.
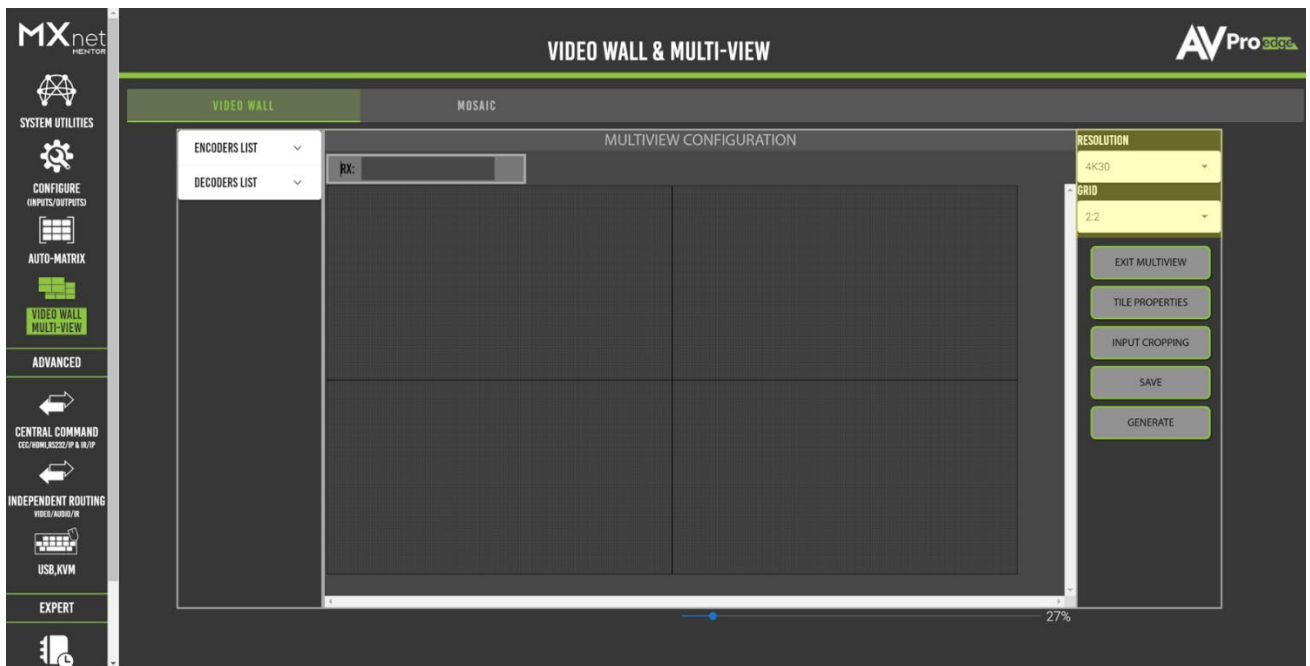

More details on the two settings can be found in the following step below.

To the left of the page are your Encoder and Decoder lists. To add an **encoder** to be a tile's source, Select the source by clicking and dragging the source's thumbnail located under the Encoders List dropdown menu and dropping it onto one of the available grid placements. The encoder will snap-to-fit onto any chosen grid tile viewable on the page. To add the **decoder** you wish this multiview display to be generated on, click and drag the chosen decoder into the "RX" field above the tile placement interface.

Once your desired multiview is in place, simply hit **"SAVE"**, then **"GENERATE"** on the right side of the page to save your multiview configuration and output the multiview layout to the chosen decoder.

4   After placing a multiview tile, you will notice information populated inside each tile, as shown in the screenshot below:
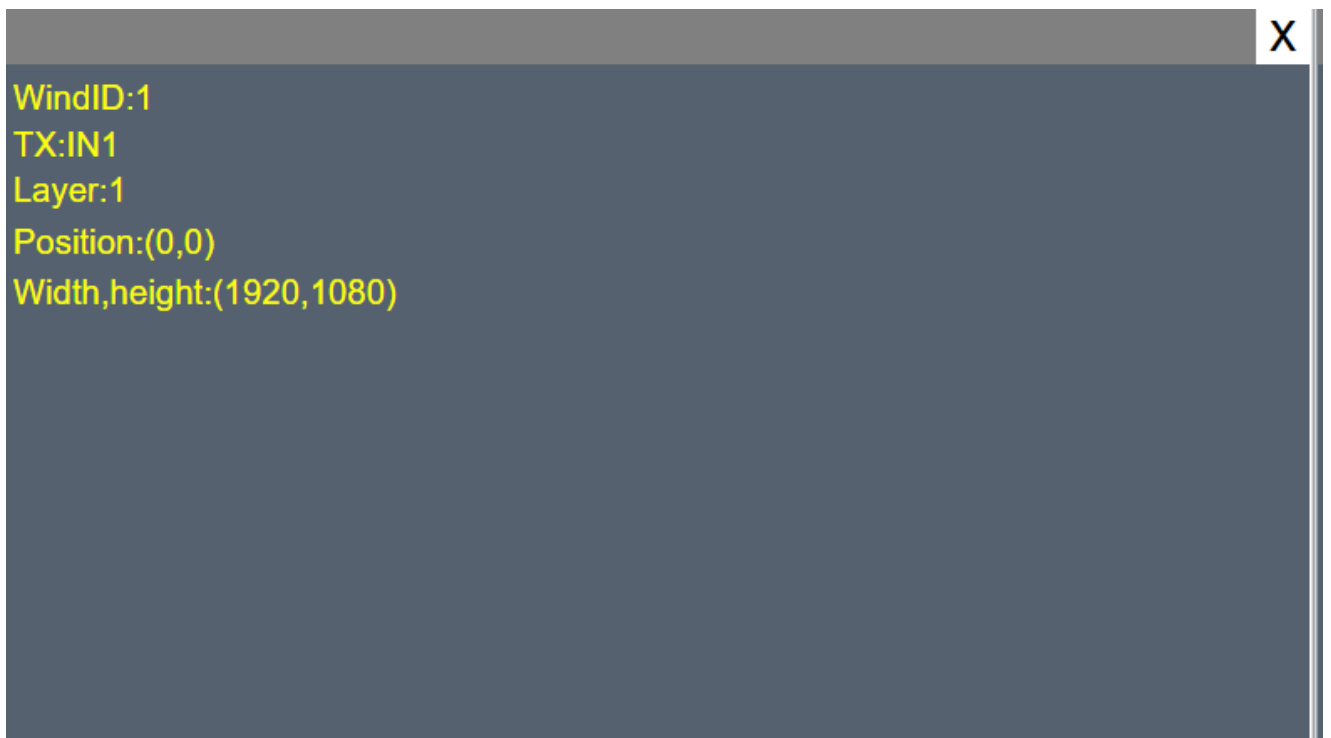
Below is a brief explanation of each field:

WindID: The window identification number assigned to each multiview tile. Your first tile placement will always start with a window ID of "1" and increases in increments of 1 for each additional tile placement.

TX: This field reports the selected encoder that will be used as the source for the specific tile.

Layer: How the multiview tile will appear when "layered" with another tile. The higher the layer number, the more "in front" said tile will appear in the multiview generation. The layer number always starts with "1" upon the placement of the first multiview window and increases in increments of 1 for each additional tile placement. Tiles cannot be on the same layer as each other, and the CBOX will adjust the layer positions accordingly if a tile's layer value is adjusted.

For example, if you wish to create a Picture-In-Picture multiview display, you will want the tile that will appear in front of the main tile (the tile that will cover the entirety of the display) to have the highest layer value available.

Position: The starting x, y coordinates the multiview tile will generate, pixel specific. Position is orientated so coordinate (0,0) starts at the **top-left** of the display as well as the multiview canvas in the middle of the webpage.

For example, in a Quad-View display generating at 3840x2160 will have the top-left tile start at coordinates (0,0). The top-right tile will be (1920x0). The bottom left tile will be (0,1080). The bottom right tile will be (1920,1080).

Width, Height: The overall size of the specific multiview tile. Starting size depends on the size of the grid the tile is placed on.

For example, a 3840x2160 Quad-View multiview display will likely have each multiview tile have a width & height of (1920,1080).

5 To the right of the page is a list of available settings for you. Each setting is described below:

RESOLUTION - "RESOLUTION" should be set first before proceeding with anything else as this will adjust your overall canvas in the middle of the page. Your options for resolution/timings are:
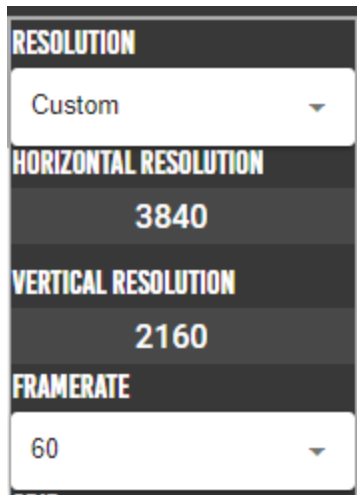
720P 50hz, 60HZ

1080P 24HZ, 50HZ, 60HZ

4K 30HZ, 50HZ, 60HZ

Custom

When the option "Custom" is chosen, additional fields will populate as shown below:

The "Custom" option allows you to specify the exact horizontal & vertical resolution desired, up to 4096x4096, as well as framerate (options are 24HZ, 30HZ, 50HZ, 60HZ), allowing you to create a multi-view that will be a perfect fit for your display.

GRID -The "GRID" field allows you to adjust the grid formation shown on the GUI. The grids are only there to assist in tile placement and have no effect on the overall multiview generation. When inserting an encoder onto the "Multiview Configuration" window, said encoder will snap-to-fit the selected grid on the page. Upon double clicking a tile, it will expand its size to fit all adjacent grid tiles.

Available grid formations to choose from the dropdown column are as follows:

1:1, 2:2, 3:3, 4:4, 6:6, 10:10, 12:12, 15:15

NOTE: While the grid formation options can go up to 15:15 grid tiles, **the total number of multiview tiles that can be generated is 16.**

EXIT MULTIVIEW – Closes the multiview configuration page and returns to the video wall configuration page.

TILE PROPERTIES – Click on a desired multiview tile that has been placed on the multiview canvas and then choose this option to pull up the properties of the chosen tile, allowing you to configure the tile's starting position as well as size, per pixel. When "Keep Aspect Ratio" is selected, the web interface will maintain the aspect ratio of the source when modifying the tile's size.
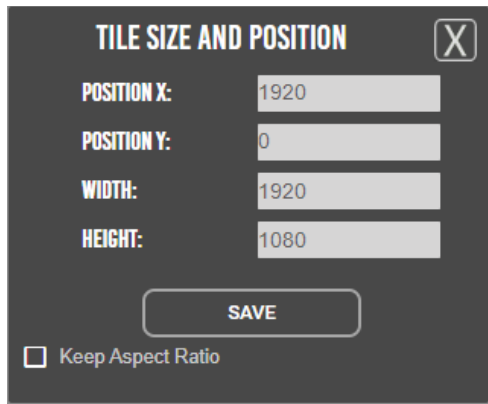
INPUT CROPPING – Clicking on the desired tile and choosing input cropping will bring up a window as shown below:
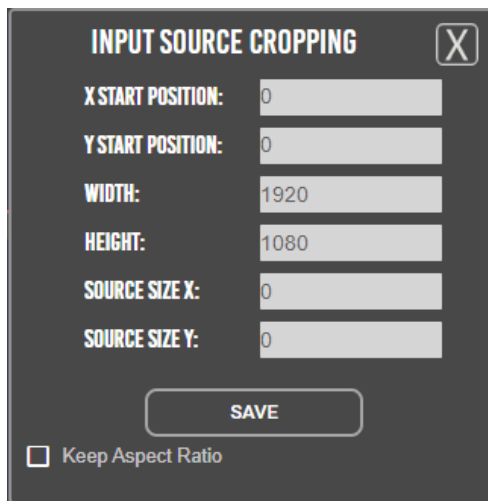
The **source size x** and **source size y** fields are for entering in the overall resolution of the source to be generated. For example, if the source signal is 3840x2160, and you wish to only display the top left portion of the source's video output, you can adjust the "source size x" and "source size y" coordinates to be 3840, 2160, then have the tile's width and height be 1920,1080. The tile will now only display the top-left section of the source's video signal.

An example screenshot of the multiview output (left) vs the original source is shown below:
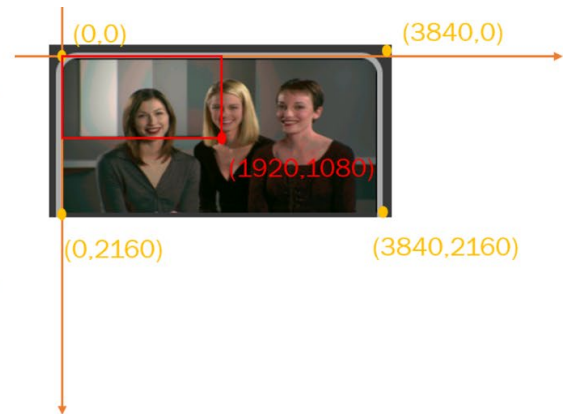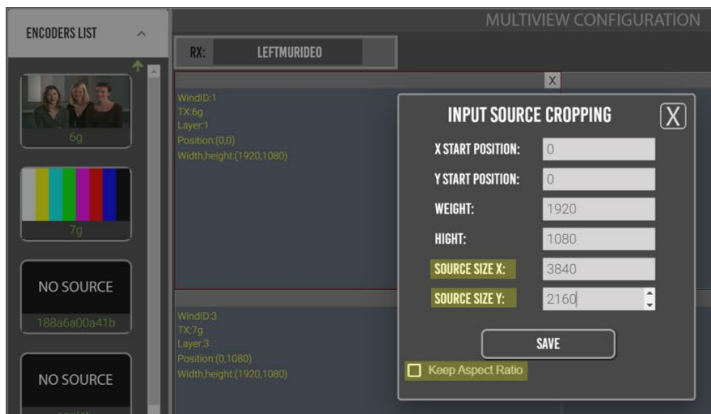
NOTE: Since the decoder receives this information from the encoder being used as the source of the tile, adjusting the source's generated size using input cropping will affect any tiles using the same encoder as a source.

You can offset the source cropping by utilizing the **x start position** and **y start position** fields in the "Input Source Cropping" menu. Simply enter in the starting coordinates of where you want the image generation to start into said fields. An example is shown below:
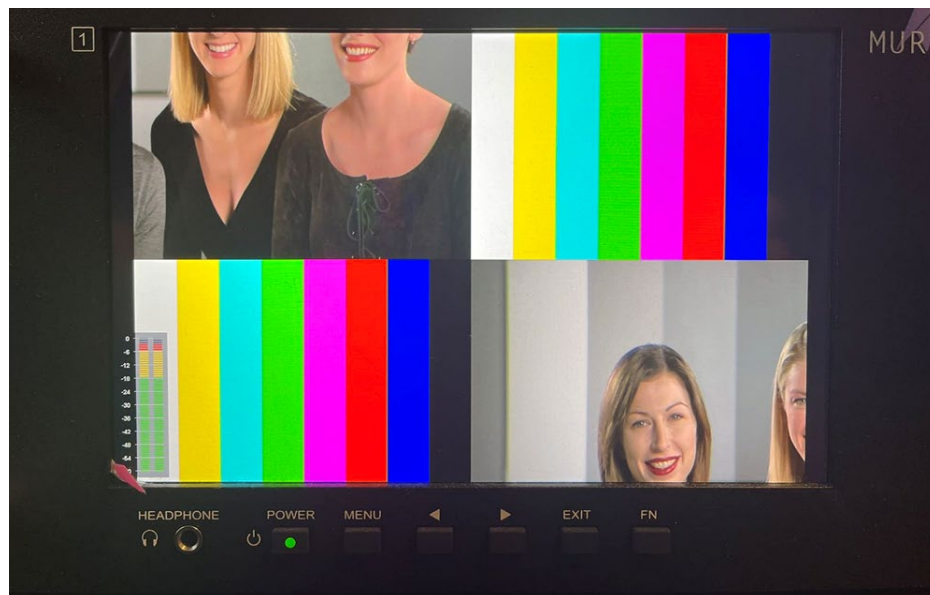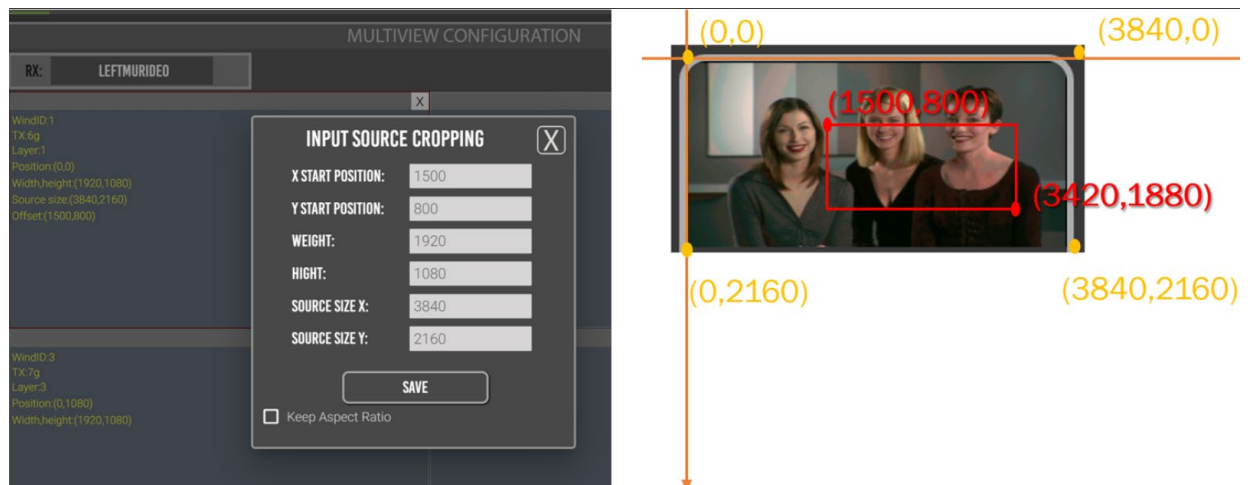
SAVE – Saves the multiview configuration into the current videowall/layout being used.

GENERATE – Outputs the saved multiview configuration to the target decoder's output.

6 Right clicking on a tile will bring up some additional options as well:
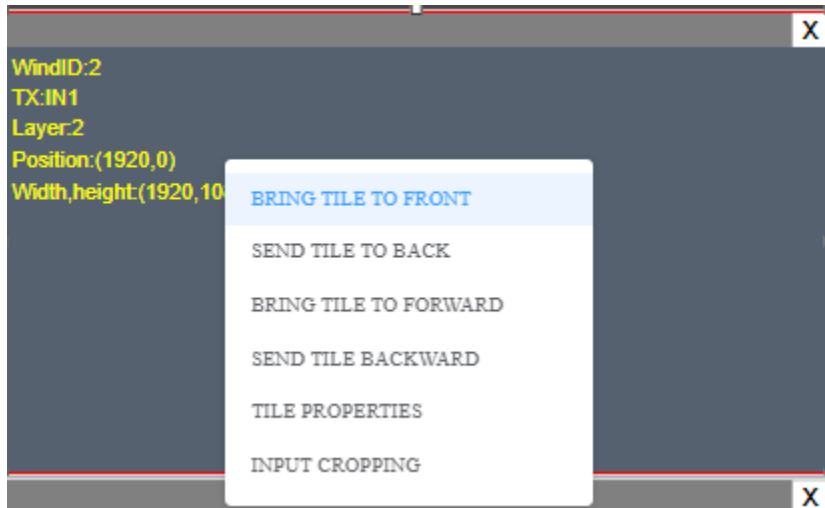
Bring Tile To Front – Clicking this option will adjust the "layer" value to be the highest available value, causing the tile to appear "in front" of all of the other tiles. Useful for Picture-In-Picture applications. Choosing this option (as well as the below layer adjustment options) will adjust the other tile's layers accordingly, as no two tiles can be on the same layer.

Send Tile To Back: Clicking this option will adjust the "layer" value to be the lowest possible value (1), causing the tile to appear "behind" all of the other tiles.

Bring Tile To Forward: Clicking this option will increase the "layer" value by 1, bringing the tile further ahead of other tiles.
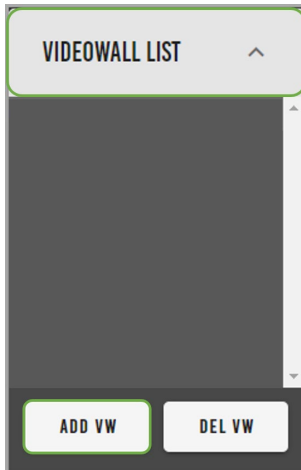
Send Tile Backward – Clicking this option will decrease the "layer" value by 1, sending the tile further behind of other tiles.

**Tile Properties –** explained in detail in the previous step

Input Cropping – explained in detail in the previous step

6.6.6 Creating a Mosaic Video Wall

1 In the *Mosaic* tab, select the **videowall list** dropdown menu and select the **add vw** button [ADD VW].
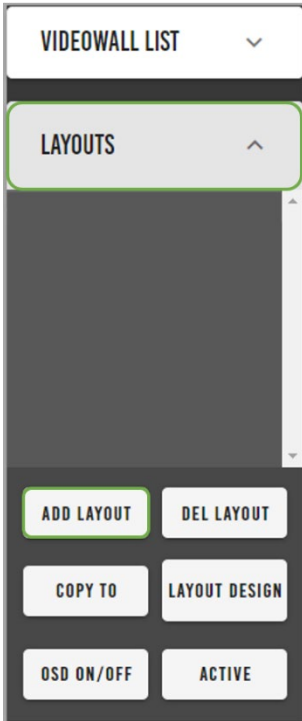

2 Enter in the **video wall name,** the number of **rows** and **columns**, and select the **save video wall array** button [SAVE VIDEOWALL ARRAY].
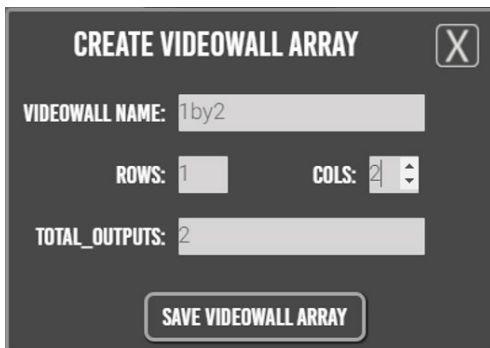
3 Mentor will then generate the "panels" of the video wall layout, with the previously saved array now appearing under the *VideoWall List*.
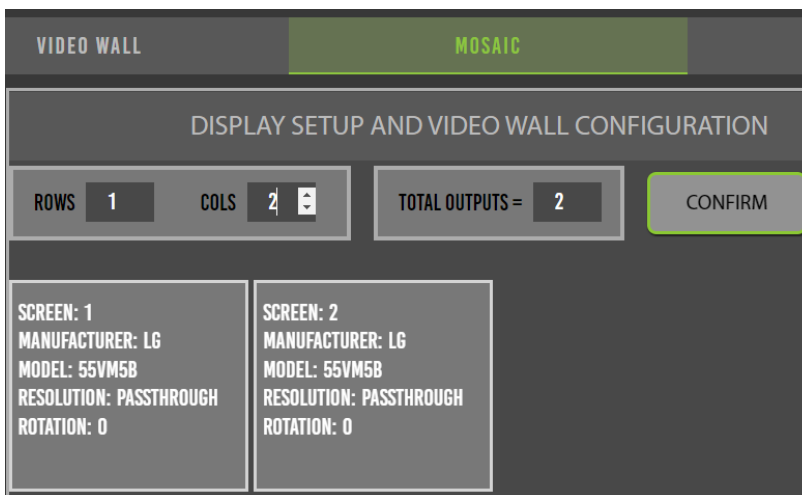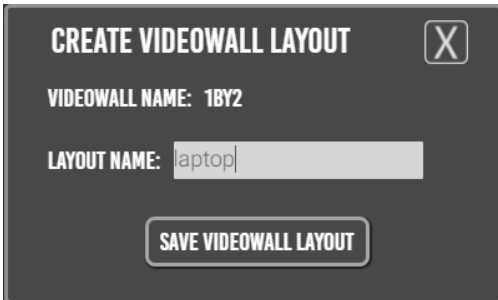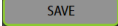

**4** Select the **layouts** dropdown menu and select the **add layout** button [ADD LAYOUT].

5 Enter in the **layout name** and select the **save videowall layout** button `SAVE VIDEOWALL LAYOUT`.


6 Select the first panel, an orange border will highlight the selected panel. Select the display's **manufacturer, model, and output resolution** from their respective dropdown menus, then select the **save** button `SAVE`. Repeat this step for the other panel.
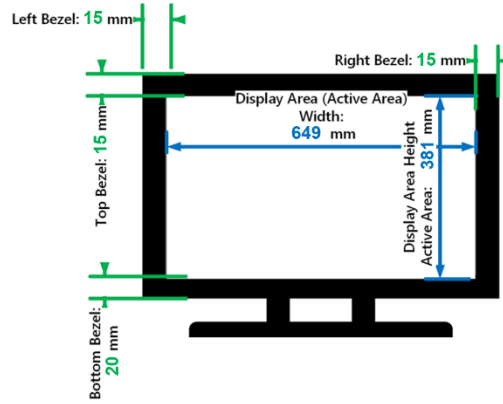

7
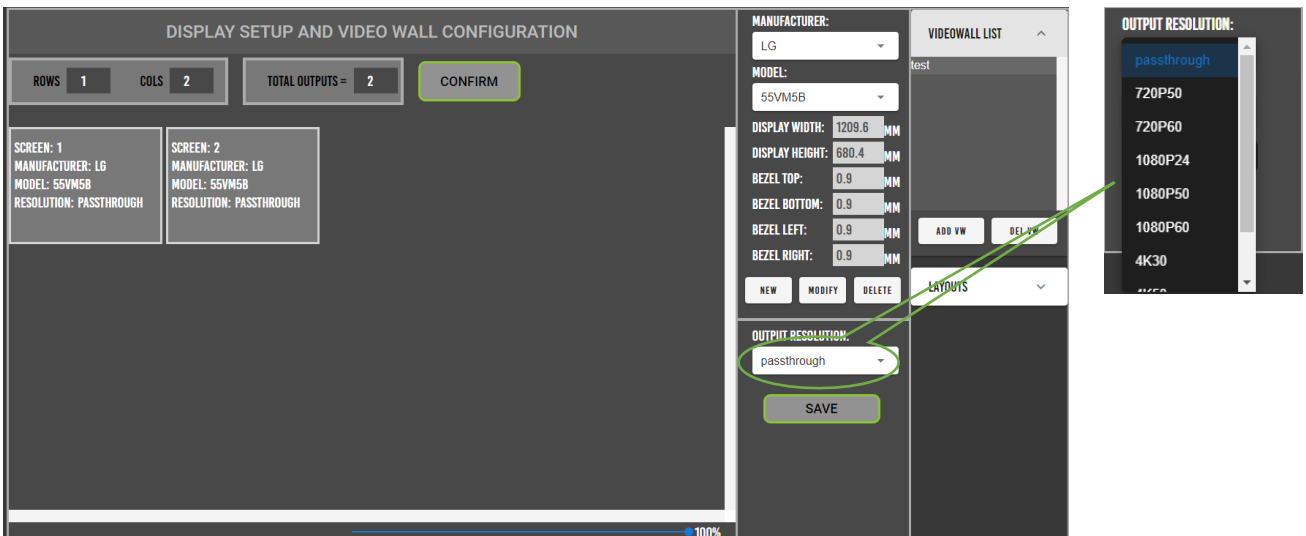
Mentor provides an internal catalog of the most commonly used displays. Selecting the manufacturer and model from these dropdown lists will auto-populate the display's dimensions into the appropriate fields.

8 If the display is not listed under the dropdown menus, select the **new** button [NEW] to open the *Display Properties* window. Enter in the display's **manufacturer**, **model**, and **dimensions**, then select the **save** button [SAVE].

DISPLAY PROPERTIES [X]

MANUFACTURER:	Acer
MODEL:	B286HK
DISPLAY WIDTH:	649 mm
DISPLAY HEIGHT:	381 mm
TOP:	15 mm	BOTTOM:	20 mm
LEFT:	15 mm	RIGHT:	15 mm

SAVE

Left Bezel: **15** mm
Right Bezel: **15** mm
Display Area (Active Area)
Width: **649** mm
Top Bezel: **15** mm
Display Area Height
Active Area: **381** mm
Bottom Bezel: **20** mm

The newly added display and saved dimensions will now be added to both the *Manufacturer* and *Model* dropdown menu lists and can now be selected for the display(s).

MANUFACTURER:
Acer ▼

MODEL:
S221HQL
V223HQ   MM
B286HK   MM
BEZEL TOP: 15   MM
BEZEL BOTTOM: 22   MM
BEZEL LEFT: 14   MM
BEZEL RIGHT: 14   MM

[NEW] [MODIFY] [DELETE]

9 Select the **layout design** button [LAYOUT DESIGN], this will open a separate window.

LAYOUTS ∧

laptop

[ADD LAYOUT] [DEL LAYOUT]

[COPY TO] [LAYOUT DESIGN]

[OSD ON/OFF] [ACTIVE]

10 Mentor will generate a "canvas" for the mosaic video wall layout with the ISF® Geometry 1.78:1 test pattern for easy visual reference regarding which part of the content will be captured.

The panels can be individually adjusted by **clicking and dragging** the desired panels on the white background, and selecting the **sync left to right** button `SYNC LEFT TO RIGHT`, followed by selecting the **save** `SAVE` and **active** `ACTIVE` buttons.
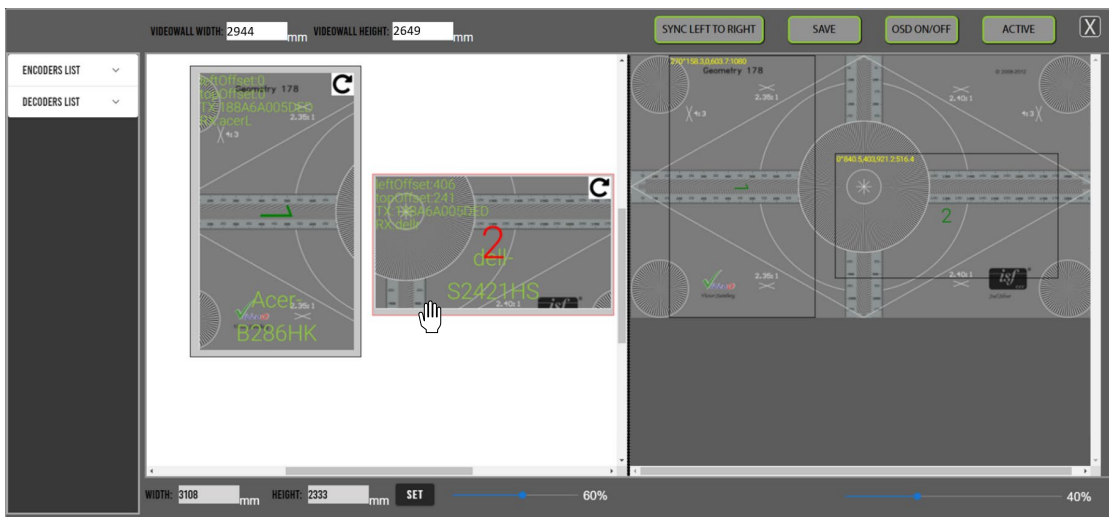
Measurement example:

236mm + 5mm *(Dell top bezel)* = 241mm

381 *(Acer height)* + 15 *(Acer top bezel)* + 5mm gap + 5mm *(Dell left bezel)* = 406mm

Red point / Coordinate origin: (0,0)
Black point / Coordinate: (406,241)

11   Select the **encoders list** dropdown menu in the left column, this will show a list of all the encoders with their connected source's preview image as a selectable thumbnail.

12   Select the encoder by **clicking and dragging** the source's thumbnail, moving it over to the right, and dropping it onto a panel.

The selected source's custom name will now appear in the top-left corner of the panel, indicating that source is now assigned to this display. Repeat this step for other panels.

13   Select the **decoders list** dropdown menu, this will show a list of all the decoders as selectable buttons. Select the decoder by **clicking and dragging** the decoder, moving it over to the right, and dropping it onto a panel.

The selected display's custom name will now appear in the top-left of the panel, indicating the selected display is now assigned to this panel. Repeat this step for the other panel with the other display's decoder.
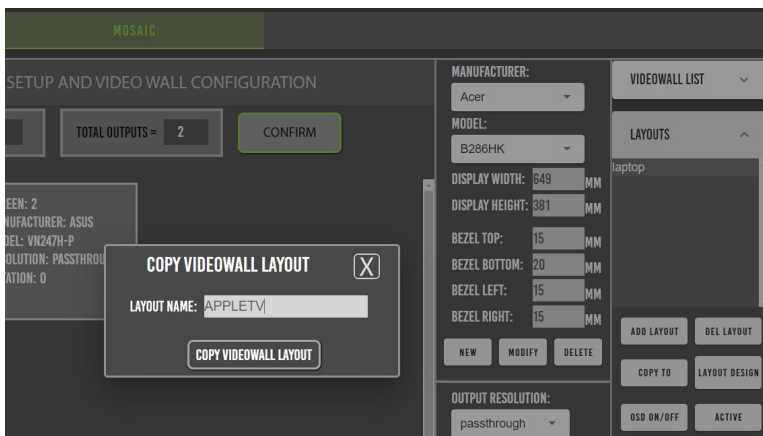
14 Select the **save** button `SAVE` followed by the **active** button `ACTIVE` located at the top of this page. The final result of the mosaic video wall is shown below:


6.6.7 Creating Another Layout

1 Select the **copy to** button `COPY TO` and type in the new layout name, then select the **copy videowall layout** button `COPY VIDEOWALL LAYOUT`.

2 Select the **layout design** button `LAYOUT DESIGN` to open the mosaic video wall design window.

3 Drag and drop the new source to the displays from the encoder list, then select the **save** `SAVE`, and **active** `ACTIVE` buttons located at the top of the page.
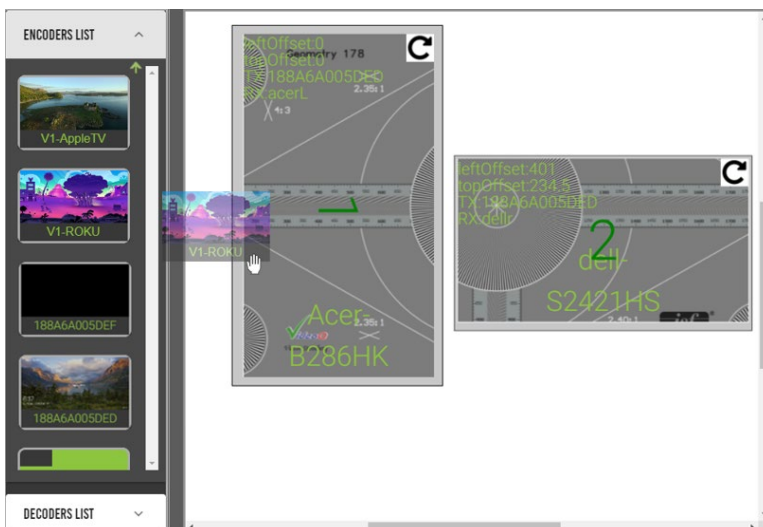
4   To switch mosaic video wall layouts, select the **layout name** from the *Layouts* list, then select the **active** button [ACTIVE].
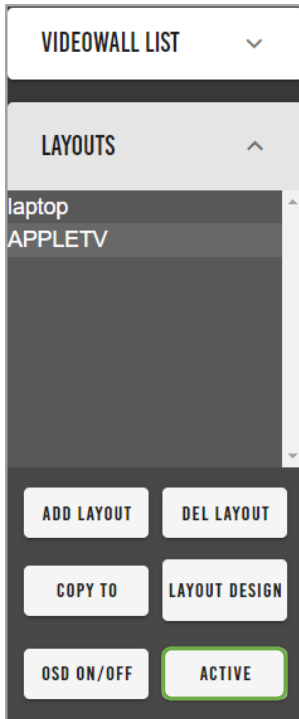
5   To delete a layout, select the **layout name** from the *Layouts* list, then select the **del layout** button [DEL LAYOUT]. The layout will now be permanently removed from the *Layouts* list and is no longer able to be activated.

6.7 Central Command

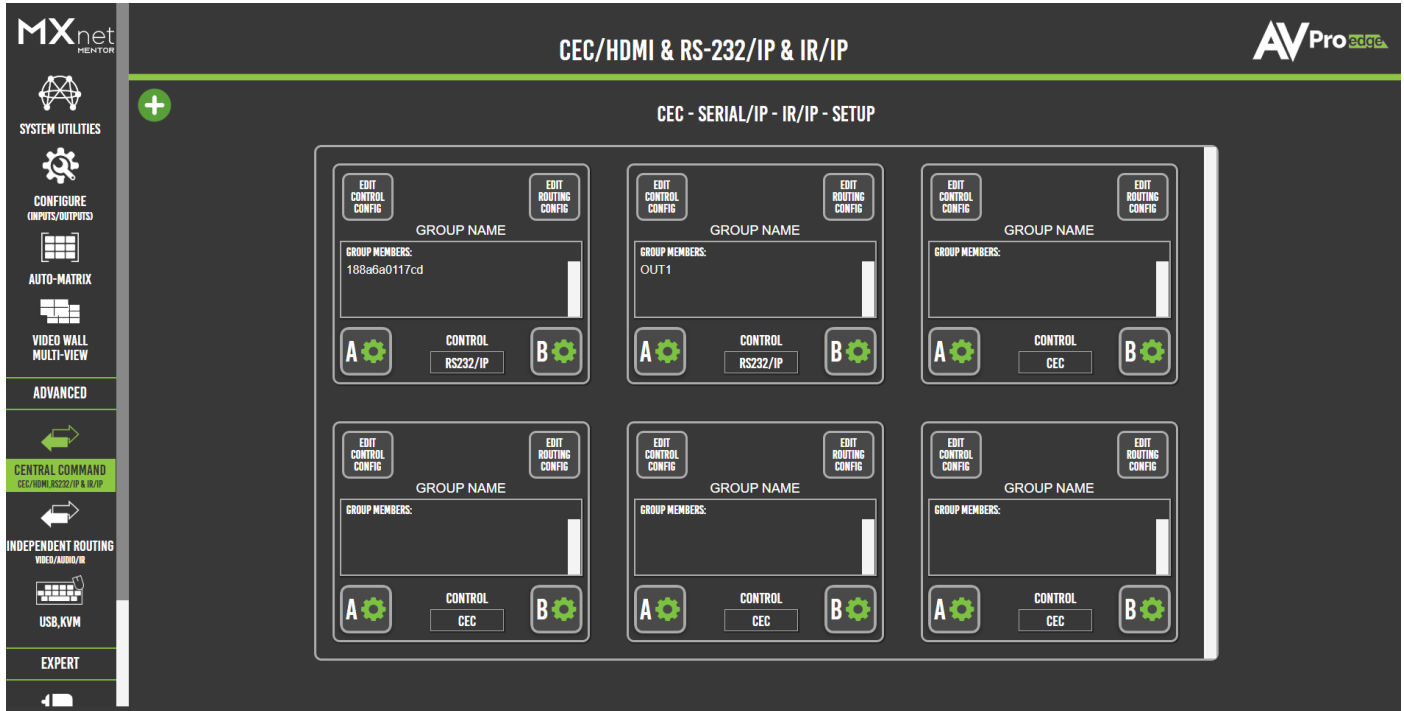The *Central Command* page provides tools for creating and building various control commands, including RS-232 over IP, IR over IP, and CEC over IP/HDMI. These commands can be sent to a single encoder or decoder, a specified group of encoders and decoders, or all encoders and decoders.

Mentor provides six routing groups for specifying six different sets of targeted display groupings. More routing groups can be added by selecting the **+ (add)** button in the top-left corner of the page.

Custom commands can be built by selecting the **edit control config** button and selecting either CEC, RS232/IP, or IR/IP. Each command option will populate the necessary fields for the selected signal type.

6.7.1 Creating a CEC Control Configuration
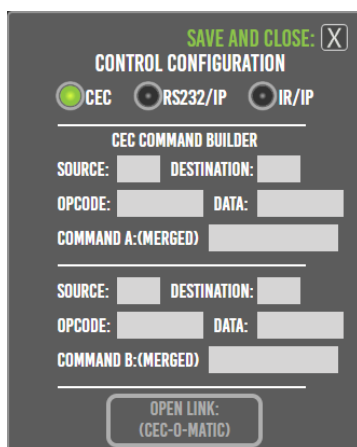
Source	1st Byte, the logical source address of the message
Destination	1st Byte, the logical destination address of the message
Opcode	2nd Byte, the CEC request message ID
Data	4th Byte, the local physical address of the HDMI port
Command	The HDMI-CEC message in its entirety
CEC-O-Matic	Opens a new web browser tab to cec-o-matic.com

6.7.2 Creating an RS-232 Control Configuration

Display	Manufacturer or brand of display
Baud Rate	Speed of bits being sent per second
Data Length	Number of bits in a data frame
Parity Bit	Error detection, includes none, odd, or even
Stop Bit	Allows the next start bit to be transmitted
Flow Control	Controls the amount of data being transmitted
Prefix	The leading character in each message
HEX	Enables HEX characters
Command A	Specified command
Command B	Specified command
Terminator	Carriage return or line feed, may be required by some display manufacturers

6.7.3 Creating an IR Control Configuration

| Display	Manufacturer or brand of display
Command A	Specified command
Command B	Specified command

6.7.4 Routing Groups for Encoders and Decoders

Select the **edit routing config** button , this will open a list of all the encoders and decoders. Select the sources and displays here to apply the selected control configurations, then select the **x** button to **save and close**.

6.8 Independent Routing

This page provides a simple way to separately route video, audio, and control signals from different encoders to different decoders, as well as any equipment connected to either the RS232 or IR EYE and I-PASS ports on the encoders and decoders.

The routing pages closely resemble the *Auto-Matrix* page with additional tabs located at the top for separating video, audio, and IR functionality. Each input can be independently configured to route video, audio, and IR signals.
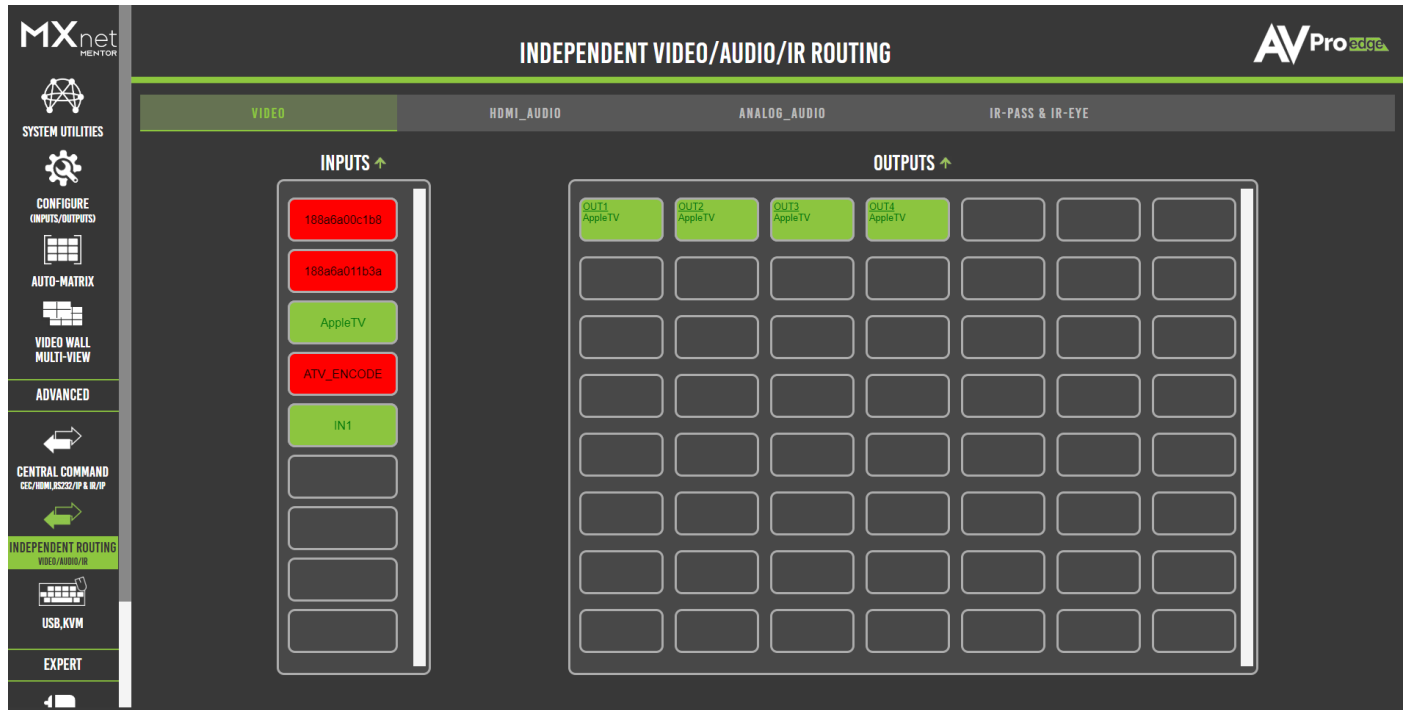
6.8.1 Creating a Routing Path   (Applies to all tabs)

1 From the *Inputs* column, select the desired source's input. This will highlight the input with an orange border to indicate the selection was made.

2 From the *Outputs* grid, select the desired output(s) to route the selected source to. This will highlight the output(s) with an orange border to indicate the selection was made.

3 Switching commands are now sent to the source's encoder and the output's decoder(s), and the selected source's signals will now be present on the selected output(s).

NOTE: The decoder's signal switching can also be adjusted from CONFIGURE (INPUTS/OUTPUTS) page by right-clicking on an output tile. This will open an additional menu where the signals can be selected for independent routing of video, HDMI and analog audio, USB, IR, and RS-232 signals.
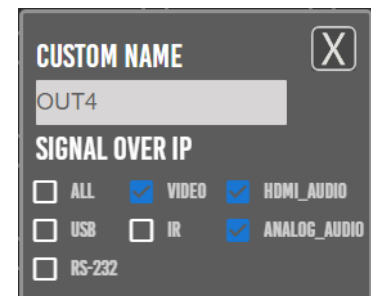
6.9 USB & KVM

The USB & KVM page provides a setup interface for routing any USB 2.0 device that uses the USB ports on the decoder which then provides the input for a keyboard and mouse. The KVM decoder input is then routed directly to the host encoder. For most applications, the host will be a PC type computer with one of its USB ports connected to the encoder's USB HOST port.
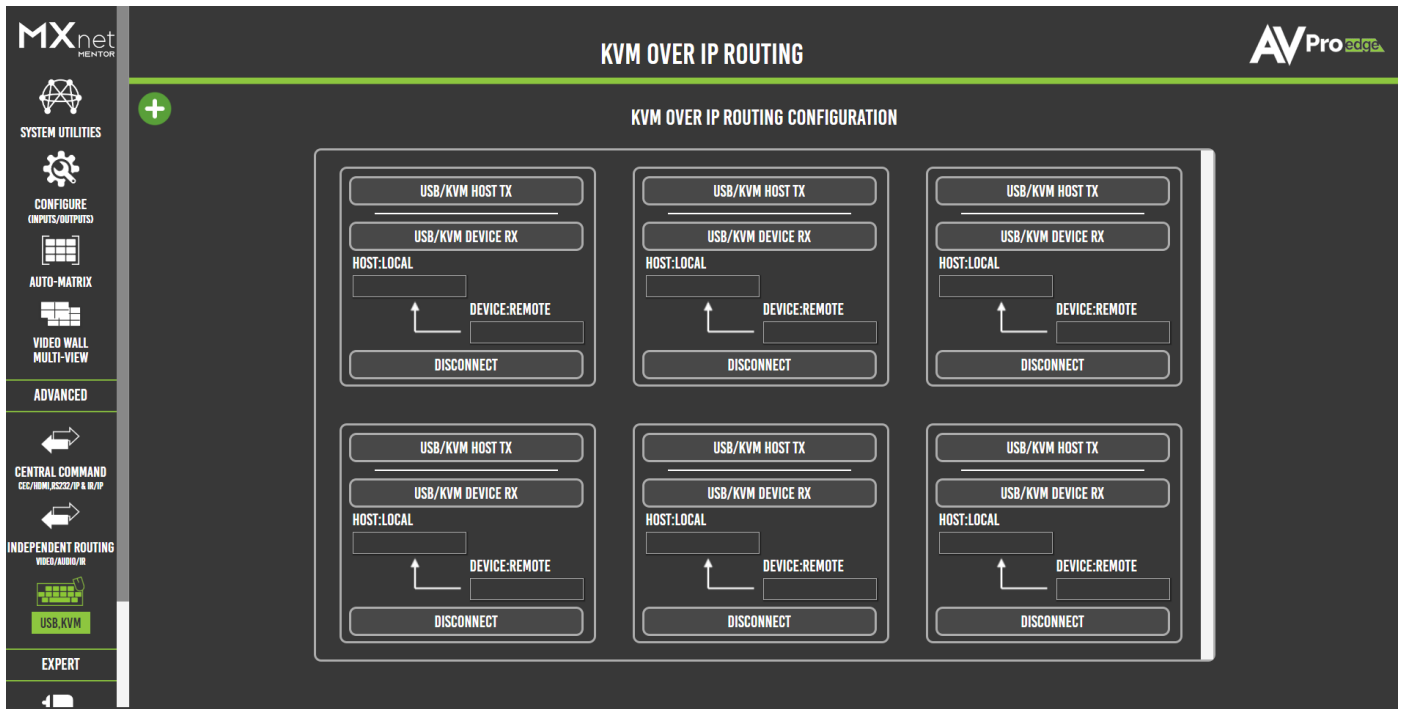
Mentor provides six routing groups for six different independent routing paths. More routing groups can be added by selecting **+ (add)** button in the top-left corner of the page.

	NOTE:	USB routing is only supported for basic keyboard and mouse functionality on the base TCVR and TCVR-AVDM models. For High-Speed USB capabilities, the TCVR-USBX and TCVR-PRO models must be used.

6.9.1 Creating a USB or KVM Routing Path

1   Plug in all the input devices into the USB ports on the decoder and connect the PC to the USB HOST port on the encoder.

2   Select the **set usb/kvm host** button `SET USB/KVM HOST` within one of the routing setup boxes. This will open a list of USB host devices for the encoders.

> ✏ **NOTE:**   If a previous KVM routing path has already been setup using a different routing setup box, any previously selected encoders will then appear in the list as grey, or unavailable.

3   Select an encoder to set it as the USB host, then select the **x** button to close the USB host list. The selected encoder will now appear in the host field.
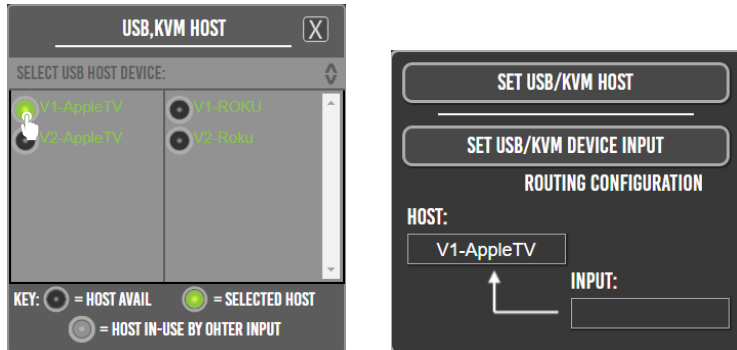
4   Select the **set usb/kvm device input** button `SET USB/KVM DEVICE INPUT` within the same routing setup box. This will open a list of USB input devices for the decoders.

5   Select a decoder to set it as the USB input device, then select the **x** button to close the USB host list. The selected decoder will now appear in the input field.
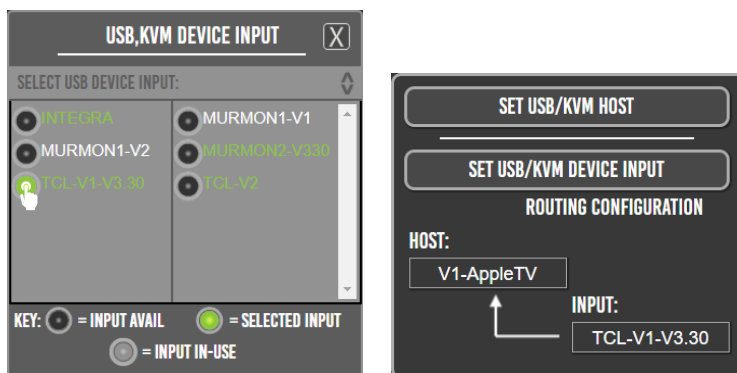
6.10 System Log

MXNet Mentor features the *System Log* page that provides current MXNet system information, time zone options for the system time and date, and setting NTP (Network Time Protocol) servers for more precise signaling and time synchronization.

1 SYSTEM LOG SCREEN

This is the MXNet log that records system events generated by the AC-MXNET-10G-CBOX in a continuous stream while the page is open within Mentor. Events recorded in the *System Log* consist of timestamped information about commands, system functions, and what actions were taken. Users cannot alter the recorded information logged by the *System Log* page.

> ✏ **NOTE:** The *System Log* only records information while Mentor is opened to the *System Log* page and does not record and store information internally.

> 💡 **TIP:** Open the *System Log* page in a separate tab on your web browser to record information while testing or troubleshooting Mentor on a different web browser tab.

2 KEYWORD SEARCH

Dropdown menu containing search options for locating specific information in the current running system log. Keywords or phrases can be searched by selecting one of the dropdown menu options, typing in the keyword or phrase into the text field, and selecting the search button on the right.

Keyword Search locates all information containing the specific keyword or phrase within the *System Log*. **Keyword Filtering** hides all information containing the specific keyword or phrase within the *System Log*.

3 SEARCH FIELD

Type in a keyword or phrase into the text field then select the **search** button ![SEARCH] to locate or hide all the information containing the keyword or phrase from the *System Log* screen.

4 VIEW SETTINGS

Selecting one of these buttons alters how the information is viewed on the *System Log* screen.

All shows all information of events currently recorded while the page is open within Mentor.
Clear hides all events recorded in the *System Log* from view.
Export Log downloads a .txt file of all *System Log* events recorded up until the page opened within Mentor.

5 SET TIME

The *System Time* is set by the default NTP server(s). If there are no NTP servers set within Mentor, the *System Time* can be manually entered in by typing into the date and time fields and selecting the **set** button SET to apply the changes.

6 AUTO SCROLL

Toggle button, when enabled the system events logged into the *System Log* will automatically scroll down.

7 TIME ZONES

Select the dropdown menu to set the UTC time zone to a positive or negative UTC offset, then select the **set** button SET to apply the changes.

8 SET NTP SERVER

By default, MXNet utilizes these four NTP servers from United States – us.pool.ntp.org:

0.us.pool.ntp.org
1.us.pool.ntp.org
2.us.pool.ntp.org
3.us.pool.ntp.org

The servers are listed by priority level, meaning that the *System Time* will always be set by the NTP server listed in the first field. Should the first NTP server fail, then the *System Time* will be set by the second listed NTP server, and so on.

Up to 5 NTP servers can be set by entering in the NTP server addresses into the fields and selecting the **set** button SET to apply the changes.

9 API COMMAND

Enter the unit's API commands into this field. System events generated by the unit will record in a continuous stream while the *System Log* page is open within the Web UI.

7 Maintenance

To ensure reliable operation of these devices as well as protecting the safety of any person using or handling these devices while powered, observe the following instructions:

- Use the provided power supplies. If an alternative power supply is required, check the voltage and polarity to ensure it has sufficient power to supply the device it is connected to.
- Do not operate these devices outside the specified temperature and humidity range given in the above specifications.
- Ensure there is adequate ventilation to allow these devices to operate efficiently.
- Repair of the equipment should only be carried out by qualified professionals as these devices contain sensitive components that may be damaged by any mistreatment.
- Only use these devices in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these devices.
- Clean this unit with a soft, dry cloth. Never use alcohol, paint thinner, or benzene to clean these devices.

8 Damage Requiring Service

The devices should be serviced by qualified personnel if:

- The DC power supply cord or AC adapter has been damaged
- Objects or liquids have breached the interior of the devices
- The devices have been exposed to rain or moisture
- The devices do not operate normally or exhibit a marked change in performance
- The devices have been dropped or the housing is damaged

9 Support

Should you experience any problems using this product, you may contact AVPro Technical Support. When calling in, the following information should be provided:

- Product name and model number
- Product serial number
- Details of the issue and any conditions under which the issue is occurring

10 Warranty

10.1 The Basics

AVPro Edge warranties its products that are purchased from all authorized AVPro Edge resellers or direct purchases. Products are guaranteed to be free from manufacturing defects and are of sound physical and electronic condition.

AVPro Edge has developed a warranty that anyone can get behind. We really wanted to take all the "red tape" out of a warranty and just make it simple. Our 10 Year No BS Warranty hinges on 3 elements:

- If you are having trouble, call us. We will attempt to troubleshoot your issue over the phone.
- If it's broken, we will replace it in advance on our dime and we'll also cover the return shipping. Repair is an option too, but it's YOUR call.
- We know you know what you are doing. We will not make you go through unnecessary steps to troubleshoot an extender.

10.2 Coverage Details

AVPro Edge will replace or repair (at customer choice) defective products. If the product is out of stock or on backorder it can be replaced with a comparable product of equal value/feature set (if available) or repaired.

Your warranty begins at receipt of product (as confirmed by shipping firm tracking). If tracking information is unavailable for any reason, the warranty will commence 30 ARO (After Receipt of Order). The coverage continues for 10 years.

10.3 Red Tape

AVPro Edge is not responsible for untraceable purchases or those that were made outside of an authorized channel.

If we conclude that a product or serial number has been tampered with as identified by the warranty seal of physical examination the warranty will be void. Additionally, excessive physical damage (beyond normal wear & tear) the warranty may be voided or prorated based on the extent of the damage as examined by an AVPro Edge representative.

Damage caused by "acts of God" are not covered. They include natural disasters, power surges, storms, earthquakes, tornados, sink holes, typhoons, tidal waves, hurricanes, or any other uncontrollable event related to nature.

Damage caused by incorrect installation will not be covered. Incorrect power supply, inadequate cooling, improper cabling, inadequate protection, static discharge are examples of this.

Products installed or sold by a third party to AVPro Edge will be serviced by the authorized AVPro Edge reseller. Accessories (IR cables, RS-232, power supplies, etc.) are not included in the warranty. We will make acceptable efforts to source and supply replacements for defective accessories at a discounted rate as needed.

10.4 Obtaining an RMA

Dealers, resellers, and installers can request an RMA from an AVPro Edge Technical Support representative or Sales Engineer. Or you may email support@avproedge.com or fill out the general contact form at www.avproedge.com/contact.

End users may not request an RMA directly from AVPro Edge and will be referred back to the dealer, reseller, or installer.

10.5 Shipping

For the USA (not including Alaska and Hawaii), shipping is covered on advanced replacements for FedEx Ground (some expressed exceptions may apply). Defective product return shipping is covered by AVPro Edge using an emailed return label. Items must be returned within 30 days of receipt of the replacement product, after 40 days the customer will be billed. Other return shipping methods will not be covered.

For international (and Alaska and Hawaii) return shipping costs will be the responsibility of the returnee. Once the unit is scanned for return shipping AVPro Edge will ship the new replacement unit.

10.6 Limitation on Liability

The maximum liability of AVPro Global Holdings LLC under this limited warranty shall not exceed the actual purchase price paid for the product. AVPro Global Holdings LLC is not responsible for direct, special, incidental, or consequential damages resulting from any breach of warranty or condition, or under any other legal theory to the maximum extent permitted by law. Taxes, Duties, VAT, and other freight forwarding service charges are not covered or paid for by this warranty.

Obsolescence or incompatibility with newly invented technologies (after manufacture of product) is not covered by this warranty. Obsolescence is defined as:

"Peripherals are rendered obsolete when current technology does not support product repair or remanufacture. O products cannot be remanufactured because advanced technologies supersede original product manufacturer capabilities. Because of performance, price and functionality issues, product re-development is not an option."

Discontinued or out-of-production items will be credited at fair market value towards a current product of equal or comparable capabilities and cost. Fair market value is determined by AVPro Edge.

10.7 Exclusive Remedy

To the maximum extent permitted by law, this limited warranty and the remedies set forth above are exclusive and in lieu of all other warranties, remedies, and conditions, whether oral or written, express or implied. To the maximum extent permitted by law, AVPro Global Holdings LLC specifically disclaims any and all implied warranties, including, without limitation, warranties of merchantability and fitness for a particular purpose. If AVPro Global Holdings LLC cannot lawfully disclaim or exclude implied warranties under applicable law, then all implied warranties covering this product, including warranties of merchantability and fitness for a particular purpose, shall apply to this product as provided under applicable law.

This warranty supersedes all other warranties, remedies, and conditions, whether oral or written, express or implied.