

# VPX Series

VPX-TC1-PRO • VPX-TC1-LT • VPX-TC1-WP2-PRO

*4K60 4:4:4 1GbE Visually Lossless  
Low Latency AV over IP*



**VPX-TC1-PRO**



**VPX-TC1-LT**



**VPX-TC1-WP2**

## SAFETY INSTRUCTIONS

Please review the following safety precautions. If this is the first time using this model, then read this manual before installing or using the product. If the product is not functioning properly, please contact your local dealer or Aurora for further instructions.



The lightning symbol in the triangle is used to alert you to the presence of dangerous voltage inside the product that may be sufficient to constitute a risk of electric shock to anyone opening the case. It is also used to indicate improper installation or handling of the product that could damage the electrical system in the product or in other equipment attached to the product.



The exclamation point in the triangle is used to alert you to important operating and maintenance instructions. Failure to follow these instructions could result in injury to you or damage to the product.



Be careful with electricity:

- **Power Outlet:** To prevent electric shock, be sure the electrical plug used on the product power cord matches the electrical outlet used to supply power to the Aurora product. Use the power adapter and power connection cables designed for this unit.
- **Power Cord:** Be sure the power cord is routed so that it will not be stepped on or pinched by heavy items.
- **Lightning:** For protection from lightning or when the product is left unattended for an extended period, disconnect it from the power source.



Also follow these precautions:

- **Ventilation:** Do not block ventilation slots, if applicable, on the product, or place any heavy object on top of it. Blocking airflow could cause damage. Arrange components so that air can flow freely. Ensure that there is adequate ventilation if the product is placed in a stand or cabinet. Put the product in a properly ventilated area, away from direct sunlight or any source of heat.
- **Overheating:** Avoid stacking the Aurora product on top of a hot component, such as a power amplifier.
- **Risk of Fire:** Do not place the unit on top of any easily combustible material, such as carpet or fabric.
- **Proper Connections:** Be sure all cables and equipment are connected to the unit as described in this manual.
- **Object Entry:** To avoid electric shock, never stick anything in the slots on the case, or remove the cover.
- **Water Exposure:** To reduce the risk of fire or electric shock, do not expose the product to rain or moisture.
- **Cleaning:** Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- **ESD:** Handle this unit with proper ESD care. Failure to do so can result in failure.

### FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two (2) conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.



### Trademarks

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## PACKAGE CONTENTS

Please make sure the following items are included within your package.

### Box Versions

#### VPX-TC1-PRO

- 1 QTY VPX-TC1-Pro 4K60 4:4:4 1G RJ-45/SFP Copper/Fiber Transceiver Unit
- 2 QTY Mounting Ears and screws.

#### VPX-TC1-LT

- 1 QTY VPX-TC1-LT 4K30 4:4:4 1G RJ-45/SFP Copper/Fiber Transceiver Unit
- 2 QTY Mounting Ears and screws.

### Wall Plate 2 Gang Versions

#### VPX-TC1-WP2-PRO

- 1 QTY VPX-TC1-WP2-PRO (-W for White or -B for Black) 1G RJ-45 Copper Transmitter Unit with 1 HDMI & USB-C Inputs, HDMI Output & USB 2.0 Type A

*Power supplies are sold separately.*

*\*Note: Go to [www.auroramm.com](http://www.auroramm.com) for the latest manual and firmware.*

### License Options

#### Dante

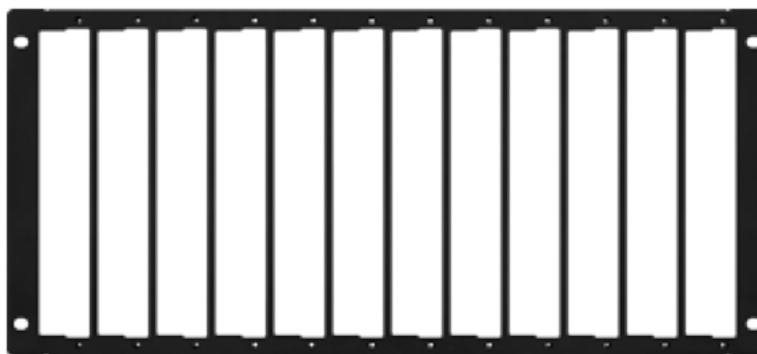
- LCN-DTE-2 2x2 Channel Dante License

## OPTIONAL ACCESSORIES

- **RK2-1-K**  
(1RU Rack Mount Holds 2 Units)  
Includes 4 rails and 1 blank



- **RK2-5-K**  
(5RU Rack Mount Holds 12 Units)  
Includes 24 rails and 4 blanks



- **RK2-BP-K**  
(Blank Plate for Rack Mounts)  
**RK2-RL-K**  
(For VPX-TC1 Use in Rack Mounts)

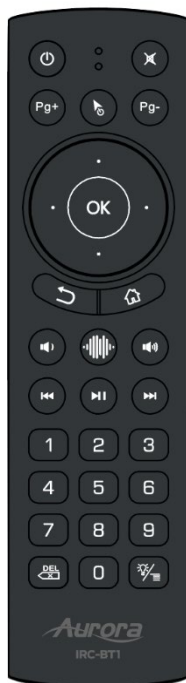


- **BT-AC1 Bluetooth 5.3 Auracast**  
(USB Dongle to be inserted in Top Device USB port)



- **IRC-BT1 RF/IR Remote Control**

(Backlit remote for Changing Channels, EPG Guide, remote control system triggering and more.  
Comes with 2.4GHz RF dongle)



- **IPA-SFP-RJ45-1**

(1G RJ-45 LAN SFP Module)



- **IPA-SFP-1GMM-1**

(1G Multi-Mode Fiber SFP Module)



- **IPA-SFP-1G20**  
(1G Single-Mode Duplex Fiber SFP Module)



- **PS0081-1**  
(48V 24-Watt PoE Injector)  
Available in -US, -AU, -EU, and -UK worldwide models



- **PS0094-3**  
(48V 25-Watt Wall Supply)  
Comes with US, AU, EU, and UK interchangeable blades



- **IR Receiver CA0062-1**



- **IR Emitter CA0061-2**



- **RS-232 Adaptor CA0052-F2T3R**  
(3.5mm TRS to FEMALE DB89 2-TX 3-RX)
- **RS-232 Adaptor CA0052-F3T2R**  
(3.5mm TRS to FEMALE DB89 3-TX 2-RX)
- **RS-232 Adaptor CA0052-M2T3R**  
(3.5mm TRS to MALE DB9 2-TX 3-RX)
- **RS-232 Adaptor CA0052-M3T2R**  
(3.5mm TRS to MALE DB9 3-TX 2-RX)



- **LVR-2G Gang Electrical Ring**



## INTRODUCTION

### About

The VPX-TC1 Series provides one of the most advanced 1G IP Streaming solutions on the market utilizing Aurora's new Mimix™ CODEC technology. Mimix™ compression allows for near perfect reproduction of video and graphic images at resolutions up to 4K60 4:4:4 over 1G networks. It has zero frame (1.78ms) of latency and seamless switching for fast lag-free content. Power consumption is important as the VPX-TC1 uses as little as 8 watts. It does this with no fan (box versions) and a small form factor, saving a lot of money on utility bills as it uses 1/3 the power of comparable systems.

Audio, video, data, and control can be sent securely to one or many units using an off-the-shelf Managed 1G Ethernet and/or Fiber switch. When the VPX-TC1 is set up to be a transmitter, the HDMI or USB-C (VPX-TC1-WP2-Pro only) inputs become a source switch, and the HDMI output becomes a potential loop out. When set up as a receiver, a user can select the local HDMI inputs or an IP source. Seamless switching of the sources further enhances the presentation. Regardless of how the VPX-TC1 is set up, the audio can be de-embedded at any location, and/or be sent to or received from a Dante® enabled device. The USB extension is also flexible, working as a KVM and/or a high-speed data transfer for memory sticks & another port just for cameras. To keep the system friendly, an OSD and integrated web server are available for easy navigation and setup of features.

Digital signage, education, corporate, and residential are just a few markets which benefit from the flexibility and low cost of the VPX-TC1.

### Documentation

Aurora provides many documents to support the VPX Series and accessories. Below is a list of the available documents that can be found on the download tab of the VPX products or the customer portal.

- VPX Series Control API (Available only on Customer Portal)
- VPX Series Control API Quick Start Guide (Available only on Customer Portal)

## Features

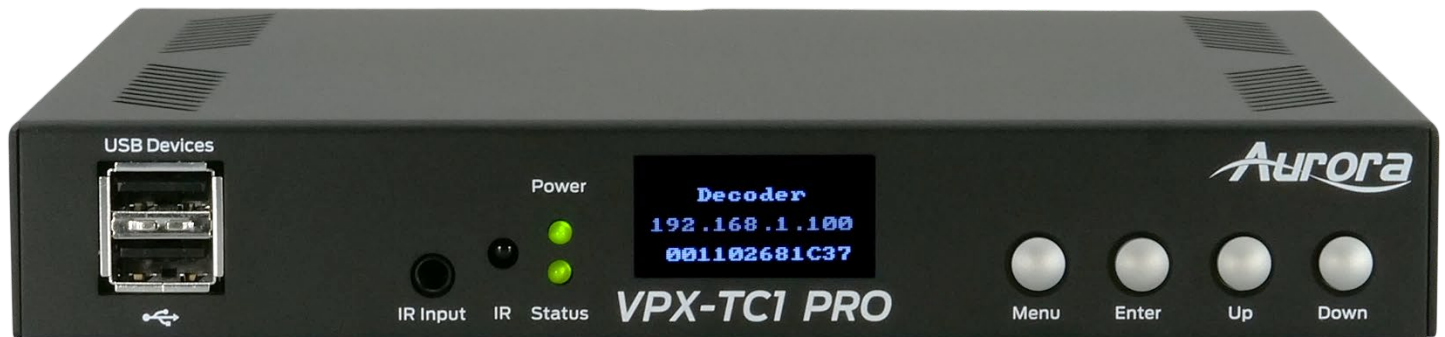
- Configure as Encoder or Decoder
- 4K60 4:4:4 (Pro) 4K30 4:4:4 (LT) UHD 120m over 1G CAT 5e
- HDMI 2.0b, HDCP 2.2
- HDR10, HDR10+, Dolby Vision
- LPCM up to 12-channels with 2-channel embedding and de-embedding
- Dolby Digital Plus, Dolby TrueHD DTS HD Master Audio & ATMOS passthrough
- 12-bit color depth processing
- Enterprise Security (AES 256, 802.1x, HTTPS, & SSH)
- Zero Frame Latency (as low as 1.78ms)
- Low Power Design
- Seamless Switching
- MJPEG Preview at 720p30 (Pro) & 480p15 (LT)
- Video Wall with Image Rotation
- 1G LAN PoE and SFP for Fiber or 2<sup>nd</sup> RJ-45
- 2 HDMI Inputs (Pro), 1 HDMI Input (LT), 1 HDMI Output
- Line In/Out Stereo
- RS-232 Serial Port and IR (In/Out)
- Channel Mapping with EPG & On-Screen Preview
- Picture in Picture (Pro)
- Integrated Web Server for Configuration
- 2 USB 2.0 Type-A for Cameras, HID Devices, Mass Storage, etc. (Devices)
- 1 USB 2.0 Type-C for Computer (Host)
- Roaming Mouse & Hotkeys (Pro)
- AES67 Included
- Dante<sup>®</sup> 2x2 Ch Audio License Options
- Bluetooth Auracast Option
- Wireless Remote Option
- Wall Plate Available in White or Black
- Rack and Under Table Mounting (box version)

*\*Note: Wall plate versions require full 2 gang electrical box space. Some electrical boxes and mud rings do not accommodate the full size. Read specifications for dimensions.*

## VPX Model Comparison Table

	VPX-TC1 Pro	VPX-TC1 LT	VPX-TC1-WP2
<b>Enclosure Type</b>	Box	Box	Wall Plate
<b>Unit Type</b>	Transceiver	Transceiver	Transceiver
<b>Network Type</b>	(Encode or Decode)	(Encode or Decode)	(Encode or Decode)
<b>Max Video Resolution</b>	1Gbps	1Gbps	1Gbps
<b>Compression Type</b>	4K60 4:4:4	4K30 4:4:4	4K60 4:4:4
<b>Compression Ratio</b>	Mimix CODEC	Mimix CODEC	Mimix CODEC
<b>Latency (end to end)</b>	13:1	13:1	13:1
<b>HDMI/HDCP Version</b>	0 Frame (1.78ms)	0 Frame (1.78ms)	0 Frame (1.78ms)
<b>Content Encryption</b>	2.0/2.2	2.0/2.2	2.0/2.2
<b>HDMI In</b>	Yes	Yes	Yes
<b>HDMI Out</b>	2	1	1
<b>USB DP In</b>	1	1	1
<b>Seamless Switching</b>	0	0	1
<b>Scaling</b>	Seamless (300ms)	Seamless (300ms)	Seamless (300ms)
<b>Fiber</b>	Yes	Yes	Yes
<b>Copper</b>	Yes	Yes	No
<b>PoE Type</b>	PoE (802.3af)	PoE (802.3af)	PoE (802.3af)
<b>USB Ports</b>	3 x USB 2.0	3 x USB 2.0	2 x USB 2.0
<b>RS-232</b>	Yes	Yes	Yes
<b>IR In</b>	1	1	No
<b>IR Out</b>	1	1	No
<b>CEC</b>	Yes	Yes	Yes
<b>Videowall</b>	8x8	8x8	8x8
<b>Image Rotation</b>	Yes	Yes	Yes
<b>Windowing</b>	Yes up to 1	No	Yes up to 1
<b>Dante</b>	Software License	Software License	Software License
<b>Roaming Mouse/Hotkeys</b>	Yes	No	Yes
<b>Audio Downmixing</b>	Yes	Yes	Yes
<b>Analog Audio In/Out</b>	Yes	Yes	Yes
<b>Channel Mapping</b>	Yes (EPG)	Yes (EPG)	Yes (EPG)
<b>Auto Sense Switching</b>	Yes	Yes	Yes
<b>Video Preview</b>	Yes (720p30)	Yes (480p15)	Yes (720p30)
<b>Front OLED Display</b>	Yes	Yes	No
<b>Management Software</b>	Yes (Free)	Yes (Free)	Yes (Free)
<b>Power Consumption</b>	8 Watts	8 Watts	8 Watts
<b>Enclosure Size</b>	174.8 x 150.7 x 26.7mm [6.88" x 5.93" x 1.05"]	174.8 x 150.7 x 26.7mm [6.88" x 5.93" x 1.05"]	2 Gang Decora
<b>Warranty</b>	5 Years	5 Years	5 Years

## VPX-TC1-PRO & LT Front



### LEDs

- **Power:** Power will light green when unit is on or in standby.
- **Status:** Status will blink at a normal pace during regular operation and slower pace when in standby.

### OLED Display

Using the buttons as described below, the OLED display will show firmware version, mode (encoder/decoder), IP address, serial number, MAC address, subnet mask, USB mode, active source information, and more.

### Buttons

- **Menu Button:** Cycle through info screens. Press and hold for 6 seconds switch between encode and decode mode.
- **Up Button:** Select next input source.
- **Down Button:** Select previous input.
- **Enter Button:** Confirms selection.

### Miscellaneous

- **IR Window:** IR remote and IR pass through.
- **IR Input:** For use with external IR Receiver. If utilized, front IR window will become disabled.

***\*Note: It is important to use 5V only photo receiver which is with carrier and inverted. Use a stereo 3.5mm TRS connector.***

- **USB 2.0:** Dual Type A USB 2.0 Connectors for peripherals (Camera, Bluetooth, Memory, etc.) & keyboard/mouse for HID functionality. This port has up to 200Mbps throughput.

## Special Functions

- **Factory Default:** Press and hold MENU and ENTER for 6 seconds. The OLED display will show “FACTORY RESET” while the device is resetting, followed by an automatic reboot. This will not change the current set device mode.
- **Secondary Firmware Image Mode:** Press and hold UP and DOWN while applying power. The OLED display will show “Secondary” mode alongside the device IP.

## Default Settings

- **Baud Rate:** 9600
- **IP Mode:** DHCP
- **Fallback IP Mode (no DHCP Present):** Auto-IP 169.254.xxx.xxx range
- **Autosense:** Off

## VPX-TC1-PRO & LT Rear



### Rear

From left to right:

- **48VDC:** 48 Volt isolated power input
- **LAN Connector LED's:**
  - Left LED Green = 1G Link Speed (1G Link speed is required for operation)
  - Left LED Orange = 10/100 Mbps Link Speed (Device will NOT operate at 10/100 speeds)
  - Right LED is Orange, for general LAN Activity

LAN is PoE and PoE+ capable based on needs. The VPX-TC1-Pro uses 8 watts of power. Standard PoE is 12.9 watts. When USB is utilized, some peripherals may require extra power. If more than 5 watts is required for USB, PoE+ can be used to extend the power range to 20 watts for 7 additional watts of power.

- **SFP:** SFP Cage for Multi-mode or Single-mode Fiber and RJ-45 LAN with optional modules available from Aurora. This can be used for daisy chaining or to control nearby LAN product.
- **Audio In:** Analog stereo audio input.
- **Audio Out:** Analog stereo audio output. De-embedded audio output from HDMI stream or Dante/AES67. HDMI multichannel audio (up to 7.1) is down mixed (PCM) to stereo (2 channel).
- **HDMI In 1/ In 2:** Two HDMI inputs up to 4K60 4:4:4 for PRO model. LT has 1 Input up to 4K30 4:4:4.
- **HDMI Out:** HDMI Output to Display up to 4K60 4:4:4 (PRO)/4K30 4:4:4 (LT). Output can be native or scaled (Ex. from 1080p to 4K60/4:4:4). When in encoder mode the HDMI output is a loop out of the HDMI input(s). When in decoder mode the HDMI output will show the remote stream as well as loop out the local HDMI input(s). Remote stream is the only source that can be scaled or seamlessly switched. Local inputs are not scaled nor can they seamless switch.
- **Control RS-232:** Serial port pass-through and control up to 115Kbps.
- **Control IR Out:** Infrared control output 30kHz-60kHz. IR emitter must be mono 3.5mm TS.
- **USB 2.0:** 200Mbps USB 2.0 Type C to be connected to a host (PC) for peripherals from routed decoder.

## VPX-TC1-WP2 Front



### Buttons

- **Video In 1:** Selects HDMI Input 1 (Illuminates when selected or autosensed from last plugged).
- **Video In 2:** Selects USB-C Input 2 (Illuminates when selected or autosensed from last plugged).
- **Stream:** When in decoder mode this selects remote encoder stream to Video Out. If held for 6 seconds, it will switch between encoder and decoder mode. When in encoder mode the stream button will be lit solid blue all the time in addition to the Video In 1/2 being selected.

### Connectors

- **HDMI Video In 1:** HDMI inputs up to 4K60 4:4:4 (Auto sense feature available)
- **USB-C Video In 2:** USB Type C to be connected to a host (PC) for Video and USB 2.0 Data
- **USB Type A:** To be connected to a device (i.e., Mouse, keyboard, etc.).
- **HDMI Video Out:** HDMI Output to Display up to 4K60 4:4:4. Output can be native or scaled (Ex. from 1080p to 4K60/4:4:4). When in encoder mode the HDMI output is a loop out of the HDMI input(s). When in decoder mode the HDMI output will also loop out the local HDMI input(s) or show the remote stream. Remote stream is the only source that can be scaled or seamlessly switched. Local inputs are not scaled nor can they seamless switch.

### Special Functions

- **Factory Default:** Press [IN1] and [IN2] button till white LED turns on for a second. Release the switches once the white LED turns on, on both the buttons. The unit will reboot automatically after factory default.
- **Reboot:** Press [In1] button for 5 seconds. All lit LEDs will be off now and the board reboots.
- **Secondary Firmware Image Mode:** Press [In1] and [In2] button while powering up for 5 seconds. The LED in buttons In1 and In2 will light Red once the board has finished booting to indicate secondary mode. This may be necessary if for some reason the firmware becomes corrupted during a firmware update.

## LED Indications

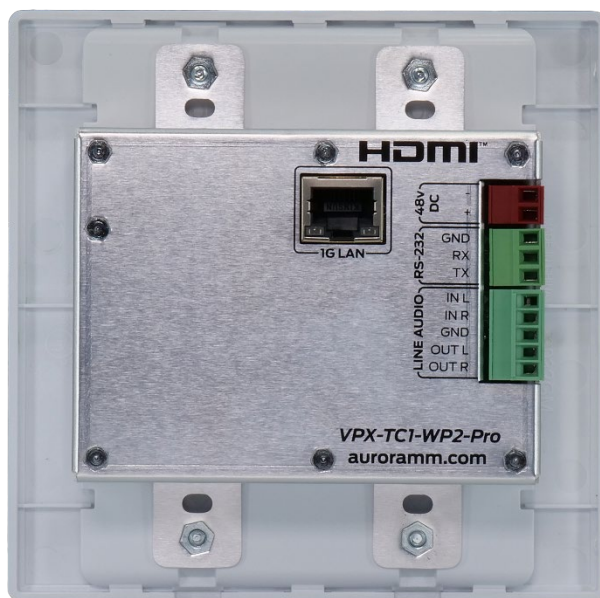
- **Source Indication:** Red LED to be lit on the button corresponding to the source.
- When power is first applied, all front LEDs will light white for a second.
- All LEDs will be lit white to indicate that the firmware update is in progress.
- Selected input source LED will light red.
- Both In1 and In2 LEDs will light Red to indicate secondary mode.

## Default Settings

- **Baud Rate:** 9600
- **IP Mode:** DHCP
- **Fallback IP Mode (no DHCP Present):** Auto-IP 169.254.xxx.xxx range
- **Autosense:** Off

**Note: When using the USB-C port make certain it is a properly rated cable for video and data. Although most USB-C cables look similar, many are not rated for the video capability.**

## VPX-TC1-WP2 Rear



### Rear

- **48VDC:** 48 Volt DC isolated power input
- **LAN:** 10/100/1000Mbps LAN. Can power the unit with PoE from injector or switch.
- **RS-232:** Serial port pass-through and control up to 115Kbps.
- **Audio In:** Analog stereo audio input.
- **Audio Out:** Analog stereo audio output. De-embedded audio output from HDMI stream or Dante/AES67. HDMI LPCM multichannel audio (up to 7.1) is down mixed to stereo (2 channel). Can be used to connect to another 1 Gang Audio Input/Output connector plate for enhanced usability.

***\*Note: Wall plate versions require full 2 gang electrical box space. Some electrical boxes and mud rings do not accommodate the full size. VPX-TCW2 wall box dimensions are 3.728" x 2.83" x 1.404".***

## UNDERSTANDING THE BASICS

### Direct Connection with No Ethernet Switch

The VPX Series is designed to automatically tunnel the video, audio, USB, RS-232, and IR if they are connected without an Ethernet switch once they have been connected for the first time with an Ethernet switch or through the secondary SFP port. Point to point will require a power supply at both ends or a PoE injector on one end in addition to the local power supply.

### 1GbE Ethernet Switch

It is important to use a non-blocking IGMP capable 1GbE switch that supports IGMP Snooping and Querier. Consider uplink ports of adequate bandwidth if extra port capacity is required for future expansion. The VPX, when set to encoder (TX), determines the bandwidth that will be multicast across the network. 24bit 4k@60Hz can peak at about 800Mbps (Data Rate in bits per second = Color Depth x Horizontal Resolution x Vertical Resolution x Frame Rate) but typically varies with content as it is dynamic compression for full motion 4K video. This does not include the 10/100 LAN passthrough, up to 200Mbps USB, RS-232, IR over the same transmission if required. If 10 units are set as encoders, and 4K@60Hz is the desired video resolution, then 8Gbps of bandwidth will be needed if uplinked to another switch. If the available bandwidth between the two 1GbE switches is less than 8Gbps, then packets will drop, and information will be lost. It is also good to consider overhead and assume 15% bandwidth loss to play it safe. Since each port is bi-directional at 1Gbps, it enables any port to be used as an encoder or decoder. The AV industry is used to standard distribution topology limitations of 4x4, 8x8, 16x16, etc. With networked based video distribution, a 48 port 1GbE switch as an example can be 24x24, 1x47, 47x1, 12x36, etc. (see [Ethernet Bandwidth Usage](#) section for more detailed information).

### VPX Network Switch Requirements

It is ideal to use a non-blocking 1G PoE Ethernet switch with enough power for a standard 15 watts per port if the infrastructure is RJ-45. PoE+ can be used as well but it is not necessary. If multiple switches are used there should be only 1 IGMP Querier per VLAN for the network.

- **IGMPv2 Snooping:** Enabled
- **IGMP Fast Leave:** Enabled
- **Unregistered Multicast Flooding:** Disabled
- **IGMP Querier:** Enabled (Note: There can only be 1 querier per VLAN for the network.)
- **QOS:** Disabled (Note: If using separate VLAN for the VPX Dante, QOS can be used on Dante VLAN only.)
- DHCP if utilized, can only be on the VPX video VLAN. Do NOT use DHCP on the video VLAN and Dante VLAN as there is only one MAC address for both IP address and VLANs. When separate VLAN is used for Dante, the IP address must be static.

Note: More detailed network switch requirements can be found in [Appendix 5](#).

### Network Infrastructure

The raw network cabling as well as the patch cables are as important as the switch. When using copper, CAT5e, 6, or 6a cable is preferred for optimal performance and is important to follow the standard rules for running Ethernet cables. No sharp bends, coiling, putting near power lines, grouping unshielded cables tightly together with other LAN cables, etc. Shielding is not necessary but can be used for noisy environments.

### Isolated Network or Users Network

When discussing a networked based video solution, many times it is assumed it must be on the client's network. This is not true. The application determines the type of network to be used. For example, if it is simply being used as a typical AV matrix switch with no distribution throughout the facility, then a 1GbE switch can be used just for that room. Just because it is Ethernet based does not mean it has to be used on the main network. The Ethernet switch is simply used as the end

point for all the cables and the glue that holds everything together. In other words, it takes the place of the standard AV matrix switch topology. If only remote control is required from the main network, then connect the 1GbE switch to the main network and allow the control data between the 1GbE switch VLAN and the main network. Even if the VLAN is part of the main network it does not mean you will use all the bandwidth. The purpose of IGMP is to only send the multicast data to the ports specified, which would be where the VPX units are connected to. A non-blocking switch assures full bandwidth is available for all ports as required.

Overall, Aurora recommends allowing the integrator to supply and configure the switch as this will allow for a smooth installation. This does not mean it cannot be connected to the client network or even use the same brand switch as the client's. It does allow the integrator and Aurora better access for making changes as needed for the AV over IP system on site while maintaining job sites security protocols.

## Network Switch Support

While Aurora will do its best to assist in the network setup, the service and support of the switch will be borne by the Manufacturer of the switch. It is also highly recommended to have personnel, or a consultant certified in the brand being deployed for the facility. Typical single switch typology is straightforward, however, once there is more than one switch, VLANs, and other specifications required for the solution require a certain level of expertise in the brand chosen. Aurora will work with most brands, and they do have a wealth of documentation and support services.

### Netgear Resources

Support

<https://www.netgear.com/av/services/proav-designsupport/>

Documentation

<https://www.netgear.com/hub/business/av/av-tech-guides/>

## Controlling the VPX

To simplify control of the VPX, each unit can be controlled via the Aurora IPBaseT Manager server, either running on a PC or on a dedicated control appliance (Aurora RXS-2). It can also be controlled from other Aurora control products or third-party control systems with the available VPX Control API. To obtain the VPX Control API commands you must have dealer status otherwise an NDA is required and is at the discretion of Aurora. The VPX can also work without the server as a third-party control can communicate directly to each unit to change settings or make routes. This makes the VPX extremely flexible and for low-cost smaller systems very cost effective.

## Controlling the VPX for Redundancy

Multiple control systems can run on the same network for redundancy. It is important only one communicates at any given time or incomplete commands may occur between units communicating simultaneously.

## EDID and its Importance

One of the most forgotten setup procedures in AV systems is EDID management. The EDID comes from the destination (display, VTC, recorder, etc.) and must be saved into the encoder and decoder HDMI input ports. This allows the source (Blu-ray, computers, etc.) to know the capabilities of the destination. This includes the audio type if any, video resolution and timing, color space, color depth, and more. If no EDID is present an HDMI device will revert to its lowest resolution in DVI mode which also means no audio. If the wrong EDID is used, the image may look pink, green, or have no image at all. To make matters more complex, if different destinations/displays are in use in a matrix configuration, then it is important to use an EDID with a common denominator or only one or the other destination may work. In an ideal installation, all the destinations should have the same capabilities for optimal performance. If this is not possible a scaler may have to be implemented to assist in compatibility.

For example, there are 2 displays, one is 1080p and the other is 4k UHD. If the EDID of the 4K display is used, the 1080p display will not see an image if it receives a 4K signal. If the EDID of the 1080p display is used, then both will see the image. However, signals will be limited to 1080p causing the 4K display to need to upscale the content. In a situation where this is unacceptable, a scaler can be implemented to down-scale the 4K signal to 1080p. This will allow the 4K display to receive an optimal signal, however it can potentially degrade image quality on the 1080P display. Therefore, it is always ideal to use destinations with similar capabilities for optimal performance.

Audio can be impacted just as easily. The most common mismatch is an audio format mismatch. For example, if a destination is 5.1-channel Dolby/DTS surround sound capable and the other destination is only LPCM, then the EDID from the 5.1 Dolby/DTS destination cannot be used, or there will be no audio on the other destination. Also, channel count can also cause issues. For example, if you have a 5.1-channel capable destination and the other destination can only support 2-channel audio, then there may be limited or incorrect audio at the 2-channel destination. In most commercial installations, it should not be an issue to choose the lowest common denominator, which is 2-channel LPCM audio, but in cases where you must have surround sound then a down-mixer for the 2-channel destination must be used.

In some cases, a custom EDID could be created, as the audio and video are mismatched between the destinations. This can occur for example, when one destination has 4K 2-channel LPCM audio and the other 1080p with multichannel Dolby/DTS surround sound. If the EDID of the 1080p destination is used, audio will not be present on the 4K destination. If the 4K EDID is used, there will be no video present on the 1080p destination. The only way to solve this issue is a new EDID combining the common features. In this case an EDID which is set at 1080p with 2-channel LPCM audio is the solution.

## Video Wall Capabilities

The VPX video wall mode can take in up to a 4K UHD signal and create a low latency high quality video wall up to 8x8 in size. The way the mode works is by dividing the input resolution by the number of displays. For example, a 2x2 video wall will become four 1080p signals from a 4K UHD signal. The VPX also has bezel compensation to create a seamless windowpane effect.

## Ethernet Bandwidth Usage

The VPX streaming bandwidth is dynamic with compression at 14:1 compression for 4K60 4:4:4. With no USB activity and a still image fed into a decoder the VPX will use as little as 92Mbps of network bandwidth. Maximum throughput is 800Mbps without USB data. With USB data the VPX will consume up to a full 1Gbps of bandwidth.

### USB Network Bandwidth Requirements

- When USB devices are attached but there is no activity, the network bandwidth requirement is almost 0. For non-isochronous USB devices, network performance only impacts the performance of the USB device. It will not impact USB devices' functionality.
- For isochronous USB devices (for example, USB audio), the network latency may impact the functionality of this kind of device. If the network latency is too high, ISO packets may be discarded and cause audio glitches. It is important to use fast-leave high quality switches for this application.
- For most USB devices, the network bandwidth requirement will be the same as a local USB bus.

### Typical Video Network Bandwidth

- **Still Frame:** < 100Mbps
- **Web Browsing:** 200~600Mbps (3840x2160) 60fps
- **YouTube Full Screen:** 600~800Mbps (3840x2160) 60fps

### Bandwidth Table

The following table is the network bandwidth requirement matrix which measured from playing a video clip. The average network bandwidth is measured by profiling Ethernet MAC layer traffic. The value in () is the performance variation.

Video Resolution	Quality Level	Maximum Frame Rate	Average Network Bandwidth (Mbps)
3840x2160 (2160p60)	Auto	60	442 (93~800)
3840x2160 (2160p30)	Auto	30	261 (92~423)
1920x1080 (1080p)	Auto	60	187 (99~525)
1280x720 (720p)	Auto	60	119 (78~330)

## HARDWARE INSTALLATION

### Network Setup

1. It is ideal to use a non-blocking 1G PoE Ethernet switch with enough power for a standard 15 watts per port if the infrastructure is RJ-45. PoE+ can be used as well but it is not necessary. If multiple switches are used there should be only 1 IGMP Querier per VLAN for the network.

- **IGMPv2 Snooping:** Enabled
- **IGMP Fast Leave:** Enabled
- **Unregistered Multicast Flooding:** Disabled
- **IGMP Querier:** Enabled (Note: There can only be 1 querier per VLAN for the network.)
- **QOS:** Disabled (Note: If using separate VLAN for the VPX Dante, QOS can be used on Dante VLAN only.)
- DHCP if utilized, can only be on the VPX video VLAN. Do NOT use DHCP on the video VLAN and Dante VLAN as there is only one MAC address for both IP address and VLANs. When separate VLAN is used for Dante, the IP address must be static.

Note: More detailed network switch requirements can be found in [Appendix 5](#).

2. Connect CAT cable RJ-45 accordingly to the network switch and to the VPX unit main RJ-45 port or SFP port accordingly.

### Encoder Setup

1. Plug HDMI source(s) into the inputs. Local display should be connected to the HDMI output. Connect any other RS-232, IR, USB, or audio accordingly.
2. Connect power via 48v red terminal connector or PoE via LAN connection. Unit will take about 40 seconds to initialize.
3. Make certain the unit's OLED states Encoder. If not, press the MENU button for 6 seconds to switch modes. The VPX-TC1-WP2 requires the stream button to be pressed for 6 seconds to switch modes.
4. For the box version use the UP and DOWN buttons to cycle between HDMI 1 and HDMI 2. The OLED display will show the current active input. For the VPX-TC1-WP2, press the respective input button. The LED on the button will illuminate to show the active input.
5. Every VPX unit has a unique MAC and IP addresses. The IP address can be changed using the built-in setup web pages. It is important to make certain each unit has its own unique IP and Host Name.

### Decoder Setup

1. Plug the display into the HDMI output. If local sources are also connected to the decoder, use the HDMI inputs 1 and/or 2. Connect any RS-232, IR, USB, or audio accordingly.
2. Connect power via 48v red terminal connector or PoE via LAN connection. Unit will take about 30 seconds to initialize.
3. Make certain the unit's OLED states Decoder. If not, press the MENU button for 6 seconds to switch modes. The VPX-TC1-WP2 requires the stream button to be pressed for 6 seconds to switch modes.
4. For the box version use the UP and DOWN buttons to cycle between HDMI 1, HDMI 2, and STREAM inputs. The OLED display will show the current active input.
5. Every VPX unit has a unique MAC and IP addresses. The IP address can be changed using the built-in web setup pages. It is important to make certain each unit has its own unique IP and Host Name.

## Control Setup

1. If the network has a DHCP server, make sure the PC is set to DHCP. If not, make sure the PC is set to a 169.254.xxx.xxx IP address. If the VPX units have previously been set to a static IP address, make sure the PC is set to an IP address in the same subnet.
2. Launch the windows application IPBaseT Manager available on the Aurora customer portal.
3. The units on the network will populate into the encoder and decoder fields accordingly.
4. This will allow you to initially identify and communicate with the built-in web pages to set up each unit or to communicate directly with the VPX protocol.

## Dante® License Option

This is done with licensing which can be obtained by an authorized Aurora dealer. Once the license is enabled, Dante will be operational.

### Encoder Mode

Line in audio can be routed either to Dante® or HDMI (to replace HDMI audio). Selection of this can be done from web page or API.

### Decoder Mode

Line out audio can be from Dante® or HDMI.

### **Important:**

- *For optimal switching speed, make sure the decoder scaler is turned on as well as genlock.*
- *When updating to version 0.18.1 or higher from any version prior to 0.18.1, only update from the device web page. Updating through IPBaseT manager or TFTP can cause firmware corruption due to a bug fixed in 0.18.1. Any update method can be used for firmware versions higher than 0.18.1 if the unit is running at least version 0.18.1.*
- *Make certain all units are using the latest firmware 3.2.6 or higher.*
- *Remember to set up EDID for proper operation.*

### **Audio Setup:**

- **When Dante is enabled:**
  - **Source -> Destination**
  - Dante -> Dongle
  - Mute -> Dongle
  - Example: Dante audio can be routed to Dongle, or it will be mute
- **When Dante is disabled:**
  - **Source -> Destination**
  - HDMI -> Dongle
  - Mute -> Dongle
  - Example: HDMI audio can be routed to Dongle, or it will be mute

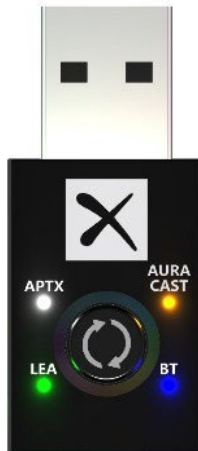
Playback audio can only be captured from the network or Dante. As a result, the audio for the Auracast broadcast will be either remote audio or Dante audio. Audio from the local HDMI input or locally inserted line in audio in the decoder will not work.

## Auracast Bluetooth Option (BT-AC1)

This feature requires the Aurora BT-AC1 USB Dongle to enable this feature. The BT-AC1 will transmit up to 200m (660ft) under ideal conditions but the distance is ultimately limited by the headset it is connected to and the placement of the VPX/BT-AC1. Try not to block the dongle as it will weaken the range. You can use a USB extension cable to move it away from the VPX to make it more exposed depending on the install. It is always recommended to test the range with the expected use case in the final environment.

Auracast can broadcast audio over Bluetooth 5.2 and above to many devices as it behaves as a wireless multicast. Perfect for sports bars, airports, conference rooms, etc. where audio can be privately heard with a person’s personal audio headset and even hearing aids. For this feature to work a user must have a Bluetooth LE Auracast compliant product.

The BT-AC1 plugs into a VPX Series box set to decoder and must be plugged into the front top USB Type-A port. The feature must also be turned on in the VPX under device settings. Only the HDMI streaming feed or the Line In can be sent over the Auracast at this time. If Dante/AES to Auracast is required, it is recommended to enable on an encoder and break-away route to the decoder with the Auracast.



**Note: At this time only Auracast mode is available and guaranteed. Solid Orange is the only selection to be set on the charts below.**

Function	Button Action	LED Indicator
Bluetooth Pairing	Double Press Quickly	● Blue LED rapidly flashing
Auracast On/Off	Triple Press Quickly	● Orange LED On/Off
Factory Default	Press & Hold for 6 Seconds	● Blue LED constantly on for 1 Second

Status	Description
○ White - aptX	Lit Solid – Connected in aptX Mode Connected Bluetooth devices must be using Qualcomm semiconductor
● Orange - Auracast	Lit Solid – Auracast mode activated Active under LEA function
● Green - LEA	Lit Solid – Connected in LE, LC3 mode Connected Bluetooth devices must be LE audio capable
● Blue - BT	Rapid Flashing (50ms) – Attempting to reconnect to a device in the pairing list Rapid Flashing (100ms) – Bluetooth Pairing Slow Flashing (2secs) – Waiting to reconnect to a device in the pairing list  Constantly On for 1 Sec – Factory Reset Completed Constantly On – Bluetooth Connected Off – Pairing Failed, entering idle mode

## WEB SETUP PAGES

Web Setup pages can be accessed by typing in the IP address of the unit (example: 192.168.100.1). You will then be prompted for a username and password. The default username and password are “admin.” It is highly advisable to change the units to a unique username and password for security reasons. Make certain if all the VPX units are already connected to the 1GbE network that each VPX web server has a unique IP Address or there will be communication issues. The images below may change with firmware revisions as we are always enhancing the capabilities.

*\*Note: All setup and configuration options available in the web setup pages can also be accessed through IPBaseT Manager using a unified, intuitive interface. IPBaseT Manager also allows for mass actions, such as updating firmware to all units at once.*

While all units have redundant Web Page settings, the free tools IPBaseT manager and the soon to be released DASH AV are designed to make installation quick and easy especially with the rapid deployment tool. This feature will allow you to set up just a few or hundreds of units in minutes using a spreadsheet. Even updating firmware is a breeze as many units can be targeted at once instead of one by one.

[IPBaseT Manager \(auroramultimedia.com\)](http://auroramultimedia.com)

Dash AV – Coming Soon!

## Encoder Mode Web Pages

The Encoder pages are comprised of 2 tabs, Settings, and Preview. Settings has 9 sub selections as described below.

### Device Info

**Hardware** Information shows the units MAC Address, Serial Number and Mode.

**Version** Information reports back the current firmware version. This will help to not only make choices for updating firmware if necessary but by knowing the firmware the user will know the current capabilities that can be expected of the unit.

**Network Information** shows the units IP Address and Hostname.

**Statistics** is especially useful when diagnosing the unit as it reveals valuable information about the unit itself. Everything from MAC, IP, EDID detail, Video Timing and more is all available to help see the state of the unit.

**VPX Series**

**Settings**

Settings Preview

- Device Info
- Firmware
- Network
- Security
- Device
- Video
- Audio
- Backup
- IR & Channel
- Diagnostics

**Hardware Information**

MAC 001102680BA7  
Mode encoder  
Serial # VPX0000-2984

**Version Information**

CR\_3.14.6

**Network Information**

IP 10.1.1.190  
Hostname vpx-series-enc-2984

Statistics :

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**VPX Series**

**Settings**

---

**Statistics**

**State Machine**  
State: s\_attaching

**Network**

Host Name: vpx-series-enc-2984  
IP Address: 10.1.1.190  
Subnet Mask: 255.255.255.0  
Default Gateway: 10.1.1.1  
MAC Address: 001102680BA7  
Link Status: on  
Link Mode: 1G

**Video**

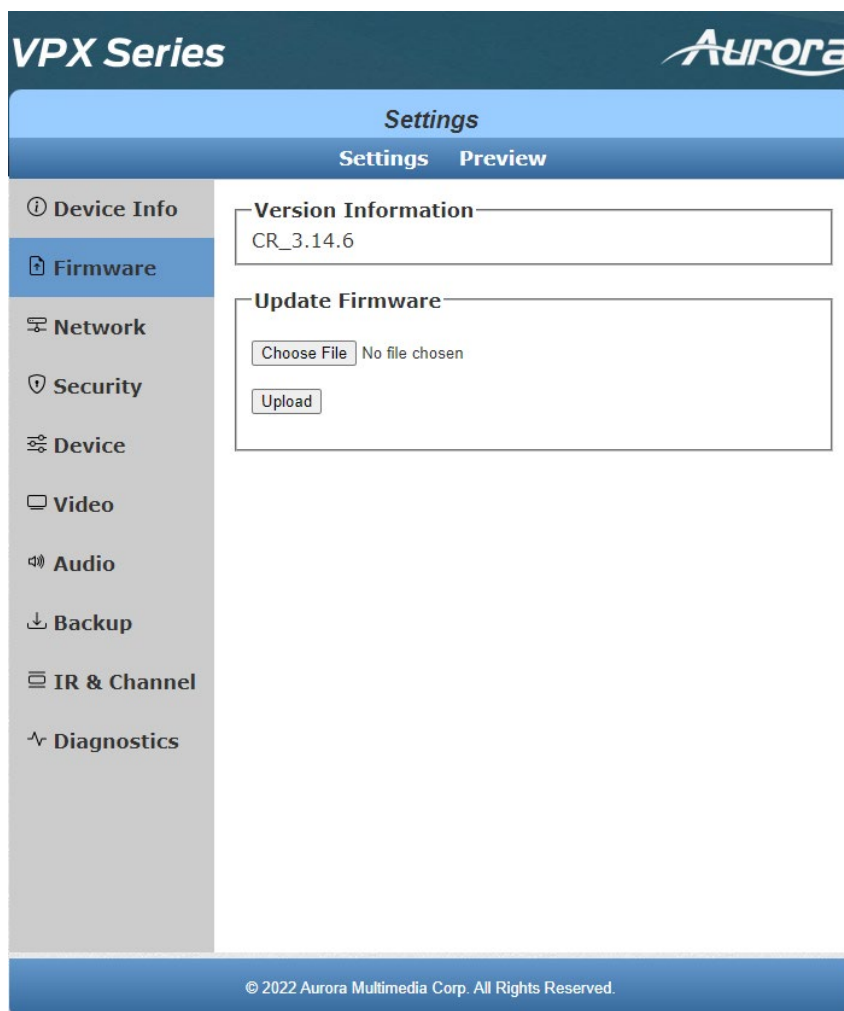
EDID Used:

```
00 ff ff ff | ff ff ff 00 | 06 74 03 00 | 01 00 00 00 |
05 19 01 03 | 80 3d 23 78 | 2a 5f b1 a2 | 57 4f a2 28 |
0f 50 54 21 | 08 00 71 40 | 81 00 81 c0 | 81 80 95 00 |
a9 c0 b3 00 | d1 00 08 e8 | 00 30 f2 70 | 5a 80 b0 58 |
8a 00 ba 88 | 21 00 00 1e | 02 3a 80 18 | 71 38 2d 40 |
58 2c 45 00 | ba 88 21 00 | 00 1e 00 00 | 00 fd 00 18 |
4b 1e 5a 3c | 00 0a 20 20 | 20 20 20 20 | 00 00 00 fc |
00 47 65 6e | 65 72 69 63 | 5f 34 4b 0a | 20 20 01 8d |
02 03 43 f0 | 47 61 10 04 | 1f 13 03 01 | 35 09 7f 04 |
0f 7f 04 15 | 07 50 3d 1f | c0 5f 54 01 | 57 06 00 67 |
54 00 83 4f | 00 00 6e 03 | 0c 00 10 00 | 80 3c 20 10 |
80 01 02 03 | 04 67 d8 5d | c4 01 78 80 | 00 e2 00 4b |
e2 0f 01 08 | e8 00 30 f2 | 70 5a 80 b0 | 58 8a 00 60 |
88 21 00 00 | 1e 01 1d 00 | 72 51 d0 1e | 20 6e 28 55 |
00 60 59 21 | 00 00 1e 02 | 3a 80 18 71 | 38 2d 40 58 |
2c 45 00 60 | 59 21 00 00 | 1e 00 00 00 | 00 00 00 50 |
```

Local Video Output:  
Attached: n

## Firmware

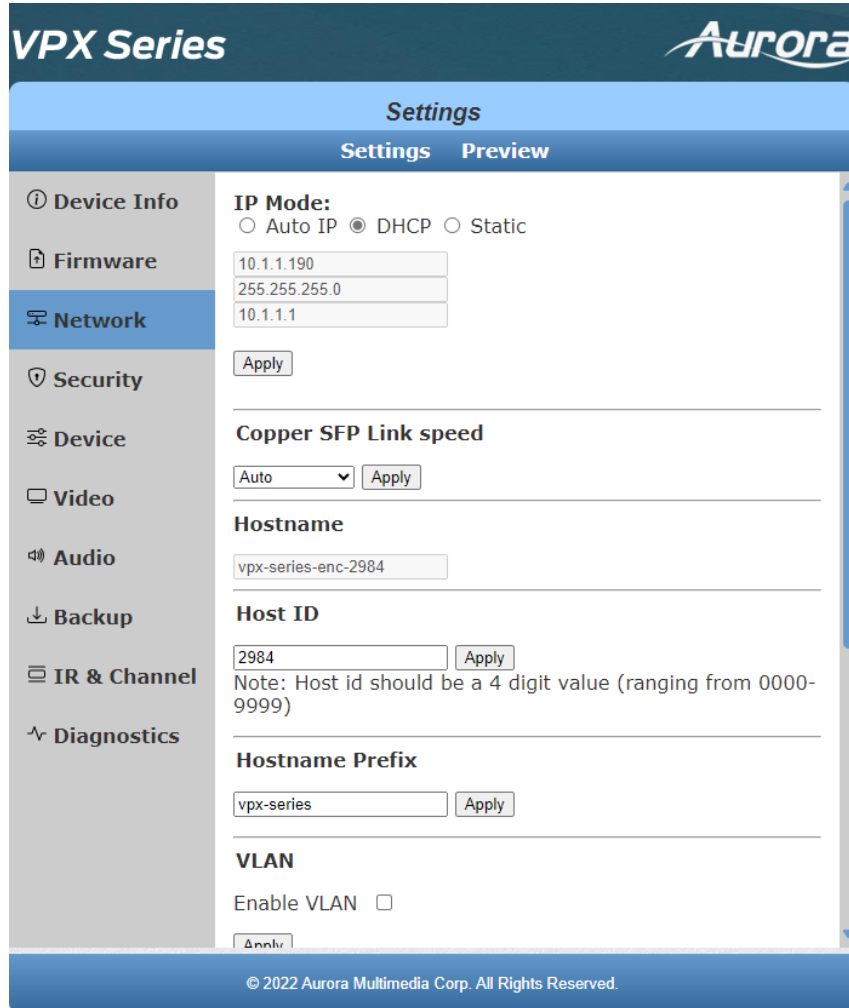
If updating firmware is necessary, this selection allows a user to select the firmware file and upload it to the unit. When the process is done, a notification will appear.

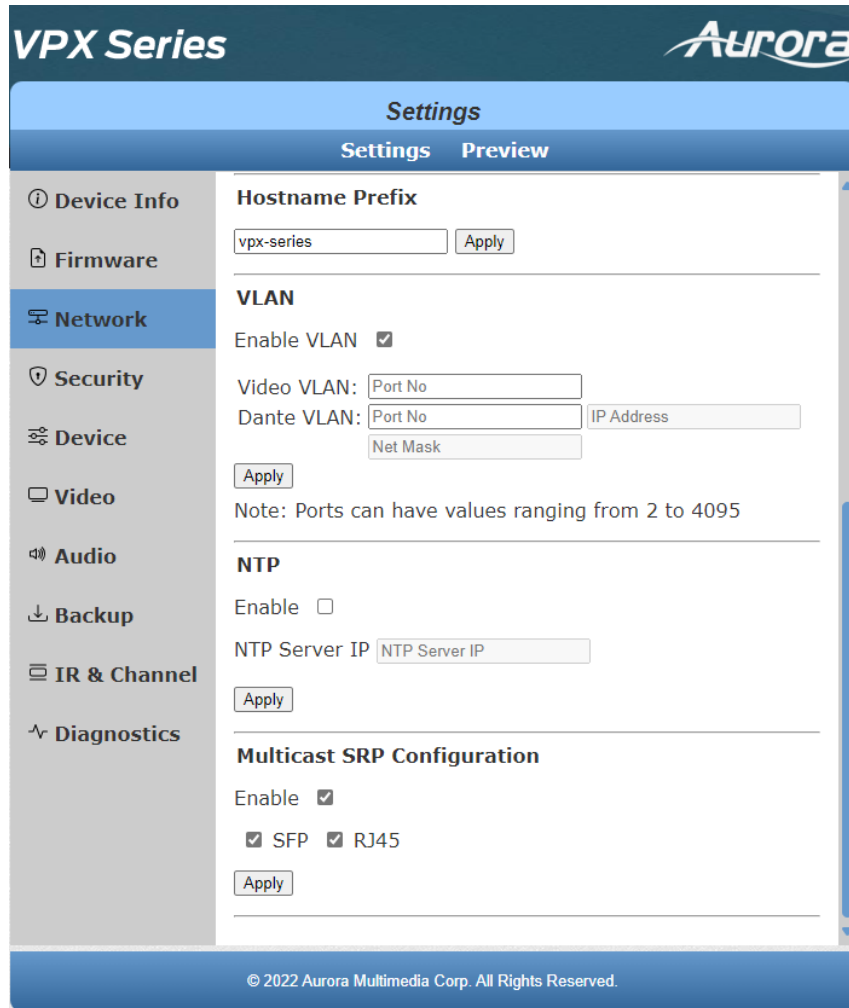


The screenshot shows the Aurora VPX Series Settings interface. The top header includes "VPX Series" and the Aurora logo. Below this is a "Settings" section with tabs for "Settings" and "Preview". A left-hand navigation menu lists various settings categories: Device Info, Firmware (highlighted), Network, Security, Device, Video, Audio, Backup, IR & Channel, and Diagnostics. The main content area is divided into two sections: "Version Information" and "Update Firmware". The "Version Information" section contains a text box displaying "CR\_3.14.6". The "Update Firmware" section features a "Choose File" button, the text "No file chosen", and an "Upload" button. At the bottom of the interface, a footer displays the copyright notice: "© 2022 Aurora Multimedia Corp. All Rights Reserved."

## Network

The Network tab allows the setup of the IP address, subnet mask, and gateway. The Host ID and Hostname Prefix must be unique for every unit, as the multicast IPs are generated based on the Host ID. The VPX has an internal network switch, and another excellent feature is the ability to set VLAN for the Video and the Dante Audio.





Multicast SRP controls the IGMP passthrough traffic. This allows the IGMP for the video to pass-through from one ethernet port to the other or to keep the traffic on that port only to the VPX unit while letting other control traffic through. When using this unit to pass-through LAN control of a display for example, removing the IGMP traffic on its port may be required if it can't handle the traffic. On the other hand, VPX units can be daisy chained and this is where you would want to leave the traffic passing through.

## Security

Change the password settings for the VPX from this web page. Super security mode adds an additional 256-bit encryption to the stream. To use super security mode, all devices must have it enabled as well as jumbo frames configured on the switch. You can also enable and configure 802.1X authentication from this page.

The screenshot shows the 'Settings' page for the 'VPX Series' in the 'Security' tab. The page has a dark blue header with 'VPX Series' and the 'Aurora' logo. Below the header is a 'Settings' section with 'Settings' and 'Preview' tabs. A left sidebar contains navigation links: Device Info, Firmware, Network, Security (highlighted), Device, Video, Audio, Backup, IR & Channel, and Diagnostics. The main content area is titled 'Page Auth settings:' and includes radio buttons for 'Off' and 'On' (selected). Below are input fields for 'New UserName:', 'New User Password:', and 'Confirm Password:', followed by an 'Apply' button. The next section is 'Super security mode:' with radio buttons for 'Off' (selected) and 'On'. A yellow warning box states: 'Warning: If using this mode, all units in system must have this enabled for proper operation. Jumbo packets must be enabled on switch as well.' The 'Configuration:' section includes checkboxes for 'Enable 802.1X Authentication' and 'Validate Server Certificate'. Below is a 'CA certificate:' field with a 'Choose File' button, 'No file chosen' text, and an 'Upload' button. An 'Authentication Method:' dropdown menu is set to '- Select -'. The 'Server Certificate Start Time:' field is empty, with '(YYYY.MM.DD-hh:mm:ss)' as a placeholder. The footer contains the copyright notice: '© 2022 Aurora Multimedia Corp. All Rights Reserved.'

## Device

Device type can be set between encoder and decoder. Note the unit will need to be rebooted for the change to take effect.

Auto Sense is for the rear HDMI connectors to automatically switch between the 2 inputs based on the last active.

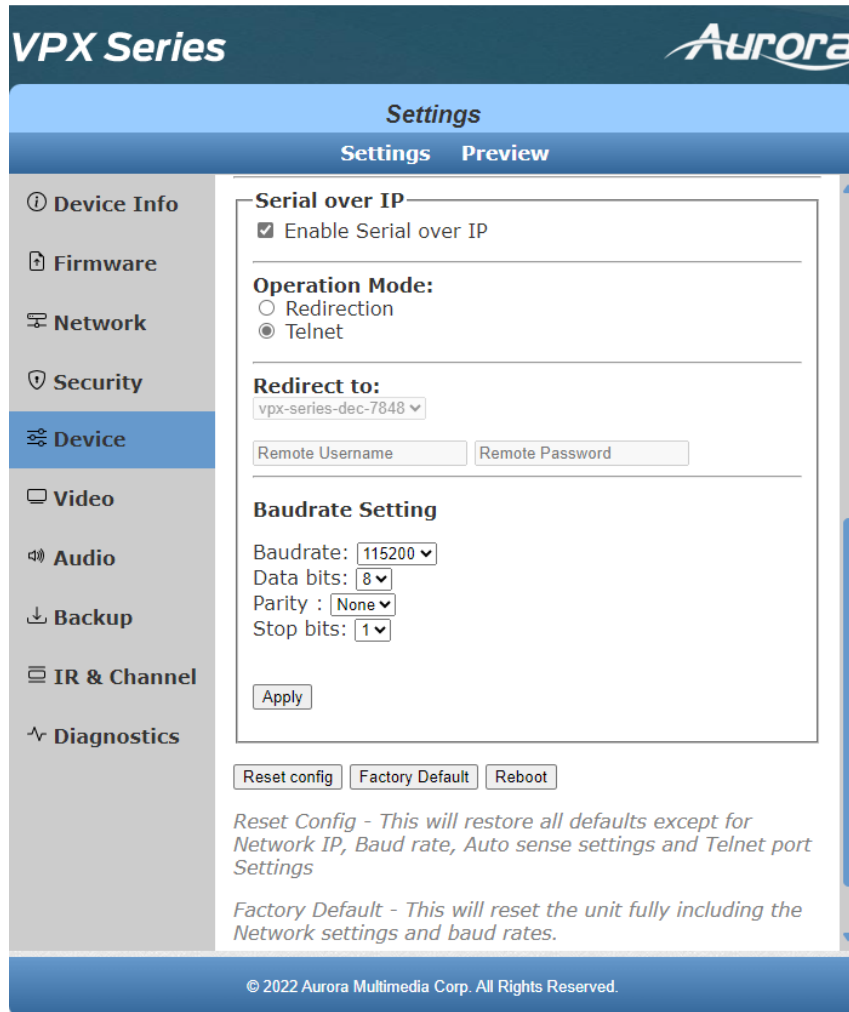
Front Panel Lock will disable the front buttons to eliminate access to people who may have physical access to the box in a more public location.

Serial over IP allows you to enable and configure Serial over IP. It also allows you to set the operation mode, baud rate, data bits, parity, and stop bits of the serial port.

The screenshot shows the Aurora VPX Series Settings interface. The left sidebar contains navigation options: Device Info, Firmware, Network, Security, Device (selected), Video, Audio, Backup, IR & Channel, and Diagnostics. The main content area is titled 'Settings' and has tabs for 'Settings' and 'Preview'. The 'Device' section is active, showing the following options:

- Device Type:** (Unit will reboot after change)  
 ENCODER  DECODER  
[Apply]
- Auto Sense:**  Enable  Disable  
**Priorities:**  
IN Port 1: [1] [v]  
IN Port 2: [1] [v]  
[Apply]
- CEC Commands:**  
TV OFF [v] [Send]
- Front Panel Lock:**  Enable  Disable  
[Apply]
- USB PORTS:**  On  Off  
[Apply]
- Serial over IP:**  
 Enable Serial over IP
- Operation Mode:**

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Factory default will restore all settings in the unit same as it is sent out from the factory

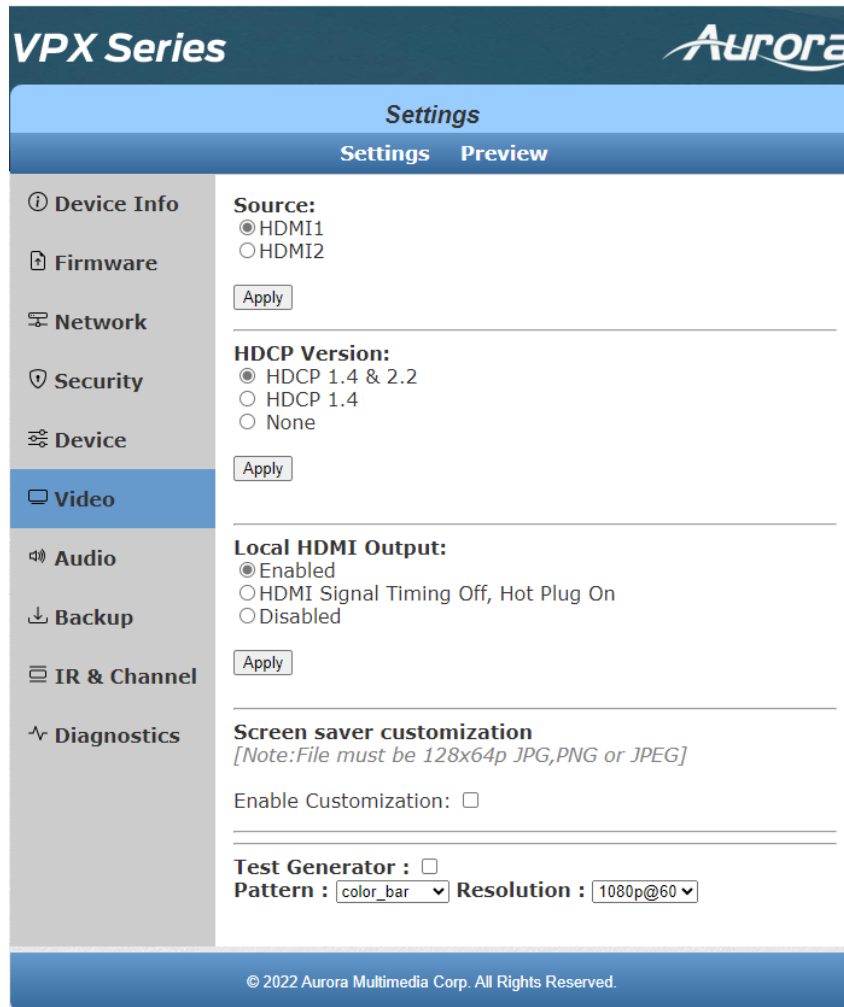
Reset Config is like factory default except it keeps the IP Address and Subnet, Baud Rate, & Mode (Encoder/Decoder).

Reboot is a soft reboot.

## Video

From this page you can select the output source. On an Encoder HDMI1 or HDMI2 can be sent to both the local output as well as the stream. On a Decoder, HDMI1, HDMI2, or Stream can be sent to the local output. In addition, the HDCP for the encoder can be set for compatibility or to turn it off so it forces a device to no HDCP which is useful for Video Conferencing devices.

The HDCP Version comes in handy for interoperability with older devices or a CODEC (Ex. Cisco or Polycom) that cannot accept HDCP inputs. This can also be controlled by API when used in a mixed system with a control system.



### **OLED Screen Saver**

Screen saver customization is for the Front OLED Panel to label or put a custom graphic.

### **Test Pattern Generator**

Test Generator is one of the handier features as it will allow a selection of 12 different test patterns at 4 different resolutions. This feature allows you to inject a pattern into the system without any sources to prove the integrity of the network and the overall stability. It can also help prove if the issue is the source or the something else. The VPX will remember the test pattern able during reboot so don't forget to turn it off when done as it overrides the input source.

**VPX Series** **Aurora**

**Settings**

Settings   Preview

- Device Info
- Firmware
- Network
- Security
- Device
- Video**
- Audio
- Backup
- IR & Channel
- Diagnostics

**Source:**

- HDMI1
- HDMI2

Apply

---

**HDCP Version:**

- HDCP 1.4 & 2.2
- HDCP 1.4
- None

Apply

---

**Local HDMI Output:**

- Enabled
- HDMI Signal Timing Off, Hot Plug On
- Disabled

Apply

---

**Screen saver customization**  
*[Note: File must be 128x64p JPG, PNG or JPEG]*

Enable Customization:

---

Test Generator :

Pattern : color\_bar Resolution : 1080p@60

- color\_bar
- checkboard
- strip
- red
- green
- blue
- white
- ramp
- red\_ramp
- green\_ramp
- blue\_ramp
- prbs

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## Audio

Audio allows the routing of the various audio combinations including volume levels. It is also where Dante/AES67 is enabled and routed as well. Note, if using separate VLANs for Dante vs the video stream, the Dante IP must be set static as there is only one MAC address shared between the two VLANs. The Video VLAN has priority for DHCP addressing.

**VPX Series** **Aurora**

**Settings**  
Settings Preview

Device Info  
Firmware  
Network  
Security  
Device  
Video  
**Audio**  
Backup  
IR & Channel  
Diagnostics

Dante CODEC : **DISABLED**  
IPE-DTE-1 : **NOT INSTALLED**

Enable Dante CODEC  
 Enable AES67 CODEC

Note: Navigate to Network tab to configure VLAN

**Audio routing:**

	Destination			
	HDMI IN1	HDMI IN2	Lineout	
Source	HDMI Audio	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	Linein	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Mute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

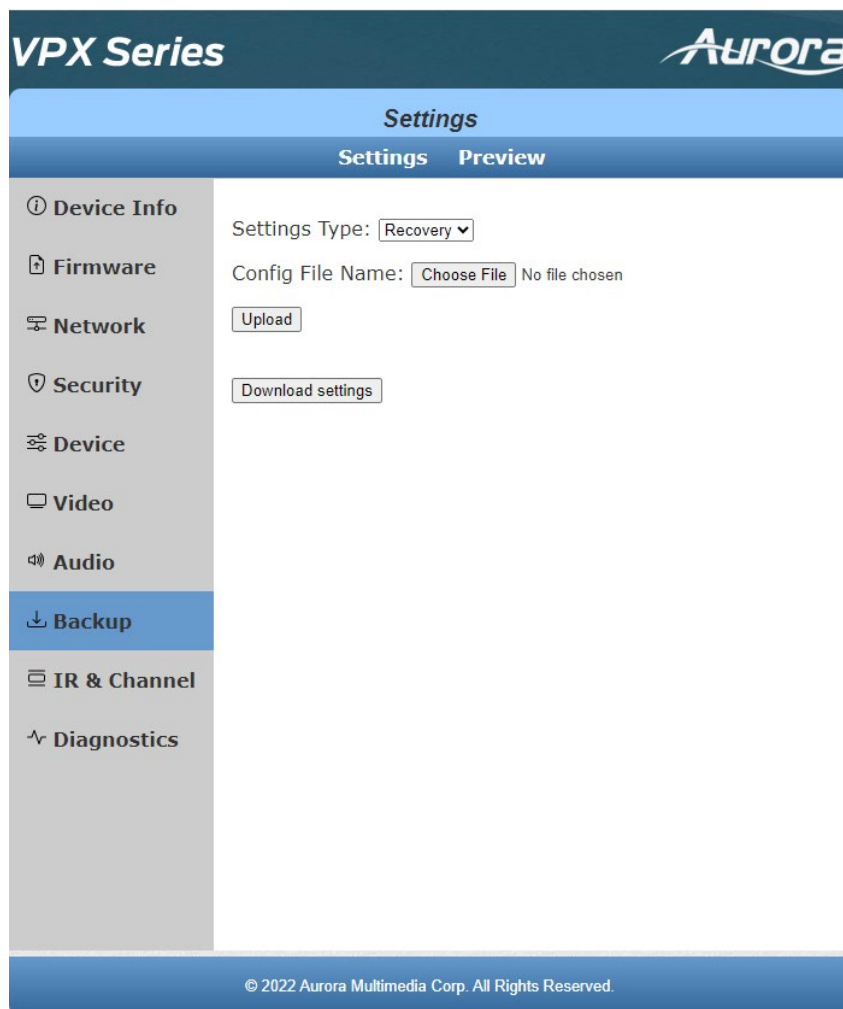
**Volume Control**  
Linein:90      Lineout:90

Mute       Mute  
 Mono

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## Backup

The Backup page is to save the configuration of the VPX unit in the event it needs to be replaced and cloned.



## IR & Channel

This page is uploading and creating IR files to be triggered by the command port 6970 with the VPX Series API. The files that are created are in Aurora ReAX file format. This means it can be used with the ReAX control system and ReAX control system IR files can be used with VPX Series. In addition, the file format is based on Pronto code standards, so it is easy to create and import thousands of available IR commands for a variety of Manufacturers and their models.

The screenshot shows the Aurora VPX Series Settings interface. The top navigation bar includes 'Settings' and 'Preview'. A left sidebar lists various settings categories: Device Info, Firmware, Network, Security, Device, Video, Audio, Backup, IR & Channel (highlighted), and Diagnostics. The main content area is titled 'Settings' and contains the following sections:

- Filebased IR settings:**
  - Select File To upload:  No file chosen
  - 
  - Select Existing File:
- IR Learning:**
  - Create IR File**
    - File Name \***
    - Version \***
    - Make \***
    - Model \***
    - Remote \***
    - 
    - Comments**
    -

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## Diagnostics

This page is for advanced troubleshooting of the VPX. It also has a handy feature called Locate Device which puts an indicator on the units display to help find which physical unit it is. It is particularly useful when there are many units in a rack to quickly identify the location.

You can also enable the debug console for advanced logging out the RS-232 port as well as the LAN port using the Live Log function. To test the VPX IP commands, there is a VPX API command to test right from the web page.

The screenshot shows the Aurora VPX Series Settings page. The left sidebar contains a menu with the following items: Device Info, Firmware, Network, Security, Device, Video, Audio, Backup, IR & Channel, and Diagnostics (which is currently selected). The main content area is titled 'Settings' and has a sub-tab 'Settings' (selected) and 'Preview'. The 'Diagnostics' section is expanded, showing the following options:

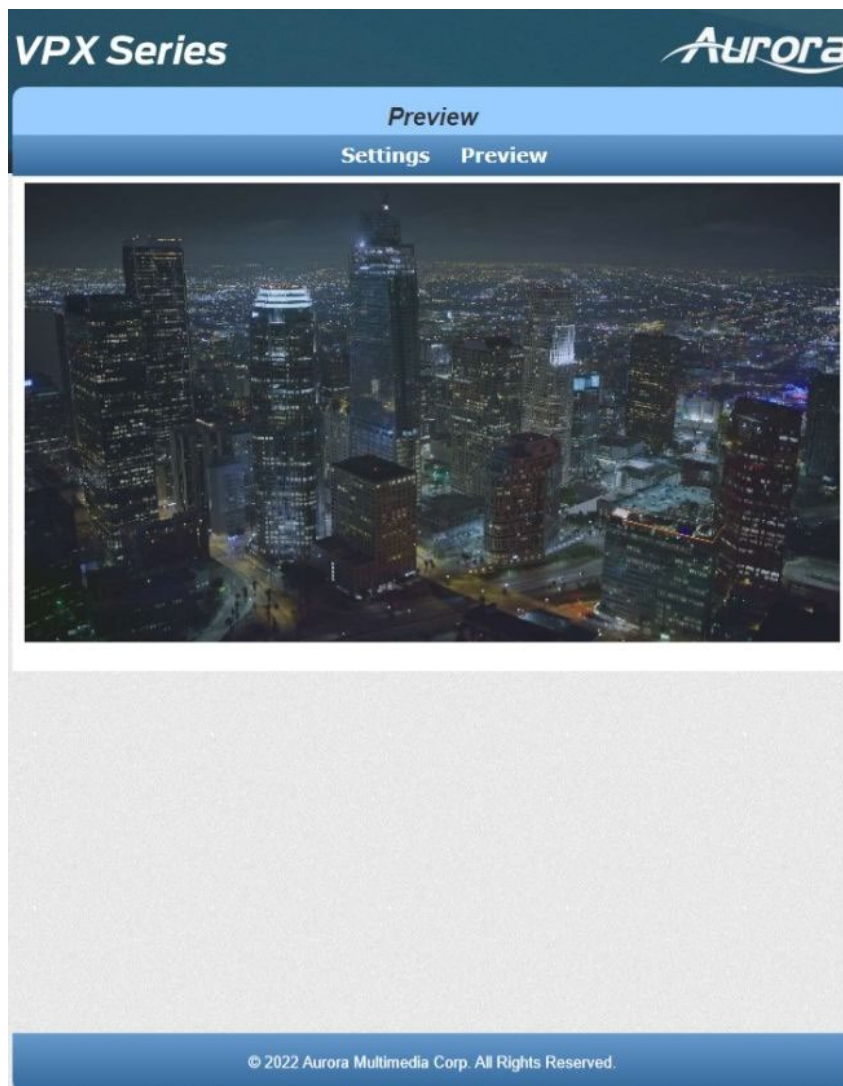
- Version Information:** A text box containing: Fri, 02 Aug 2024 05:48:20 +0000, CR\_3.14.6, Hardware ID 4, Model VPX-TC1-PRO.
- Device locator:** A checkbox labeled 'Locate Device' which is currently unchecked.
- Console:** Radio buttons for 'Enable' and 'Disable', with 'Disable' selected. An 'Apply' button is below.
- Persistent log:** Radio buttons for 'Enable' and 'Disable', with 'Disable' selected. An 'Apply' button is below.
- Debug Log:** Two buttons: 'Live Log' and 'Download Log'.
- Statistics:** A 'show' button.
- VPX API Command:** A text input field.

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## Preview Tab

The Preview tab allows you to look at the active video source. No preview will be displayed if there is no active signal.



## Decoder Mode Web Pages

### Device Info

**Hardware** Information shows the units MAC Address, Serial Number and Mode.

**Version** Information reports back the current firmware version. This will help to not only make choices for updating firmware if necessary but by knowing the firmware the user will know the current capabilities that can be expected of the unit.

**Network Information** shows the units IP Address and Hostname.

**Statistics** is extremely useful when diagnosing the unit as it reveals valuable information about the unit itself. Everything from MAC, IP, EDID detail, Video Timing and more is all available to help see the state of the unit.

**VPX Series**

**Settings**

Settings Preview VideoWall

- ① Device Info
- 📁 Firmware
- 🌐 Network
- ⚙️ Routing
- 🛡️ Security
- ⚙️ Device
- 📺 Video
- 🔊 Audio
- ⬇️ Backup
- 📺 IR & Channel
- 📺 PIP
- 📺 KMOIP
- ⤴️ Diagnostics

**Hardware Information**

MAC 001102681EA7  
Mode decoder  
Serial # VPX0000-7848

**Version Information**


CR\_3.14.6

**Network Information**

IP 10.1.1.189  
Hostname vpx-series-dec-7848

Statistics :

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**VPX Series** 

**Settings**

Settings Preview VideoWall

**Statistics**

**State Machine**  
State: s\_srv\_on

**Network**  
Host Name: vpx-series-dec-7848  
IP Address: 10.1.1.189  
Subnet Mask: 255.255.255.0  
Default Gateway: 10.1.1.1  
MAC Address: 001102681EA7  
Link Status: on  
Link Mode: 1G

**Video**  
Local Video Output:  
Attached: n

Video Timing Information:  
Not Available

## Firmware

If updating firmware is necessary, this selection allows a user to select the firmware file and upload it to the unit. When the process is done, a notification will appear.

The screenshot shows the Aurora VPX Series Settings interface. The top header includes 'VPX Series' and the Aurora logo. Below this is a 'Settings' tab with sub-tabs for 'Settings', 'Preview', and 'VideoWall'. A left-hand navigation menu lists various settings categories: Device Info, Firmware (highlighted), Network, Routing, Security, Device, Video, Audio, Backup, IR & Channel, PIP, KMOIP, and Diagnostics. The main content area is divided into two sections: 'Version Information' and 'Update Firmware'. The 'Version Information' section contains a text box with the value 'CR\_3.14.6'. The 'Update Firmware' section features a 'Choose File' button, the text 'No file chosen', and an 'Upload' button. The footer of the interface contains the copyright notice: '© 2022 Aurora Multimedia Corp. All Rights Reserved.'

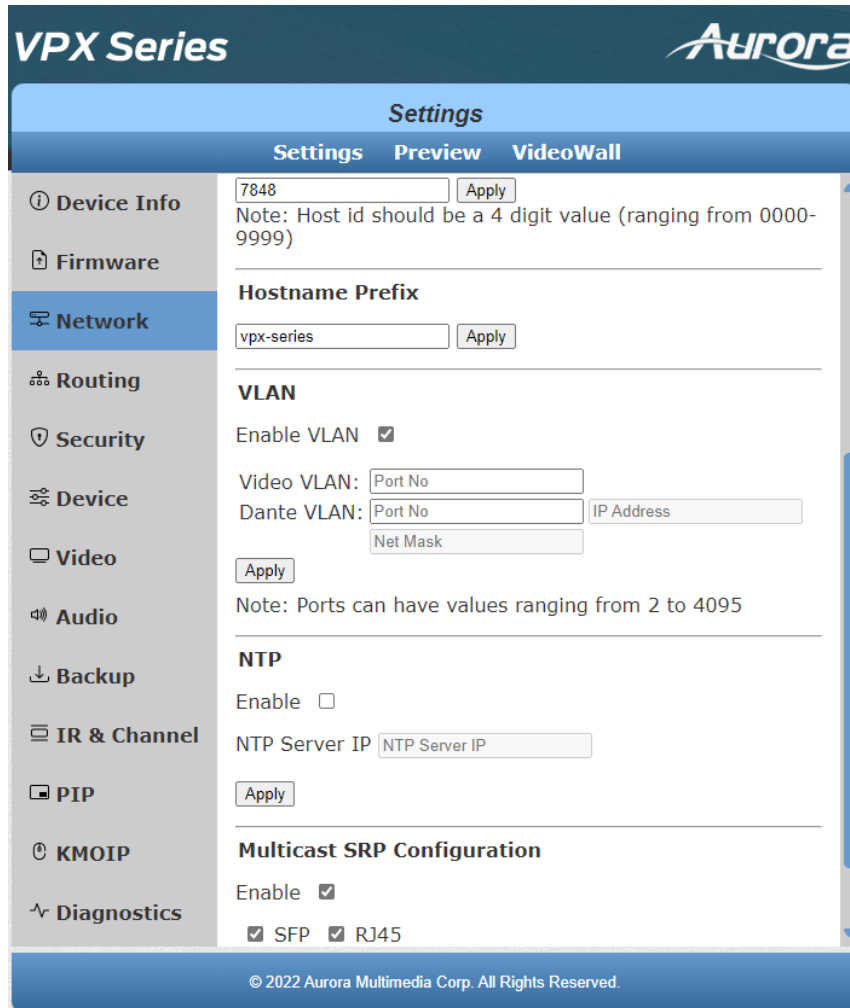
## Network

The Network tab allows the setup of the IP address, subnet mask, and gateway. The Host ID and Hostname Prefix must be unique for every unit, as the multicast IPs are generated based on the Host ID. The VPX has an internal network switch, and another excellent feature is the ability to set VLAN for the Video and the Dante Audio.

The screenshot shows the 'Settings' page for the 'VPX Series' device, with the 'Network' tab selected. The page has a dark blue header with the 'Aurora' logo and 'VPX Series' text. Below the header is a navigation bar with 'Settings', 'Preview', and 'VideoWall' tabs. A left sidebar contains a list of settings categories: Device Info, Firmware, Network (highlighted), Routing, Security, Device, Video, Audio, Backup, IR & Channel, PIP, KMOIP, and Diagnostics. The main content area is titled 'Settings' and contains the following configuration options:

- IP Mode:** Radio buttons for Auto IP, DHCP (selected), and Static.
- IP Address:** Text input field containing 10.1.1.189.
- Subnet Mask:** Text input field containing 255.255.255.0.
- Gateway:** Text input field containing 10.1.1.1.
- Apply:** Button.
- Copper SFP Link speed:** Dropdown menu set to 'Auto' and an 'Apply' button.
- Hostname:** Text input field containing 'vpx-series-dec-7848'.
- Host ID:** Text input field containing '7848' and an 'Apply' button.
- Note:** Host id should be a 4 digit value (ranging from 0000-9999).
- Hostname Prefix:** Text input field containing 'vpx-series' and an 'Apply' button.
- VLAN:** Section with 'Enable VLAN' checkbox (unchecked) and an 'Apply' button.

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Multicast SRP controls the IGMP passthrough traffic. This allows the IGMP for the video to pass-through from one ethernet port to the other or to keep the traffic on that port only to the VPX unit while letting other control traffic through. When using this unit to pass-through LAN control of a display for example, removing the IGMP traffic on its port may be required if it can't handle the traffic. On the other hand, VPX units can be daisy chained and this is where you would want to leave the traffic passing through.

## Routing

This page allows routing to any encoder on the network and will do breakaway routing as well.

The screenshot shows the Aurora VPX Series Settings interface. The top navigation bar includes 'Settings', 'Preview', and 'VideoWall'. A left sidebar lists various settings categories: Device Info, Firmware, Network, Routing (highlighted), Security, Device, Video, Audio, Backup, IR & Channel, PIP, KMOIP, and Diagnostics. The main content area is titled 'Settings' and contains several sections for configuring breakaway routing:

- Remote connection**: 'Apply To:' dropdown set to '2984.vpx-series-enc-2984', with 'Apply', 'Send EDID', and 'Disconnect' buttons.
- Video Breakaway**: 'Apply To:' dropdown set to '2984.vpx-series-enc-2984', with 'Apply' and 'Disconnect' buttons.
- Audio Breakaway**: 'Apply To:' dropdown set to '2984.vpx-series-enc-2984', with 'Apply' and 'Disconnect' buttons.
- USB Breakaway**: 'Apply To:' dropdown set to '2984.vpx-series-enc-2984', with 'Apply' and 'Disconnect' buttons.
- IR Breakaway**: This section is currently empty.

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## Security

Change the password settings for the VPX from this web page. Super security mode adds an additional 256-bit encryption to the stream. To use super security mode, all devices must have it enabled as well as jumbo frames configured on the switch. You can also enable and configure 802.1X authentication from this page.

The screenshot shows the 'VPX Series' web interface with the 'Settings' tab selected. The 'Security' section is active in the left sidebar. The main content area shows the following configuration options:

- Page Auth settings:**  Off  On
- New UserName:
- New User Password:
- Confirm Password:
- 
- Super security mode:**  Off  On
- Warning:** If using this mode, all units in system must have this enabled for proper operation. Jumbo packets must be enabled on switch as well.
- Configuration:**
  - Enable 802.1X Authentication
  - Validate Server Certificate
  - CA certificate:  No file chosen
  - Authentication Method:
  - Server Certificate Start Time:

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## Device

Device type can be set between encoder and decoder. Note the unit will need to be rebooted for the change to take effect.

Auto Sense is for the rear HDMI connectors to automatically switch between the 2 inputs and stream based on the last active input as well as the priority settings.

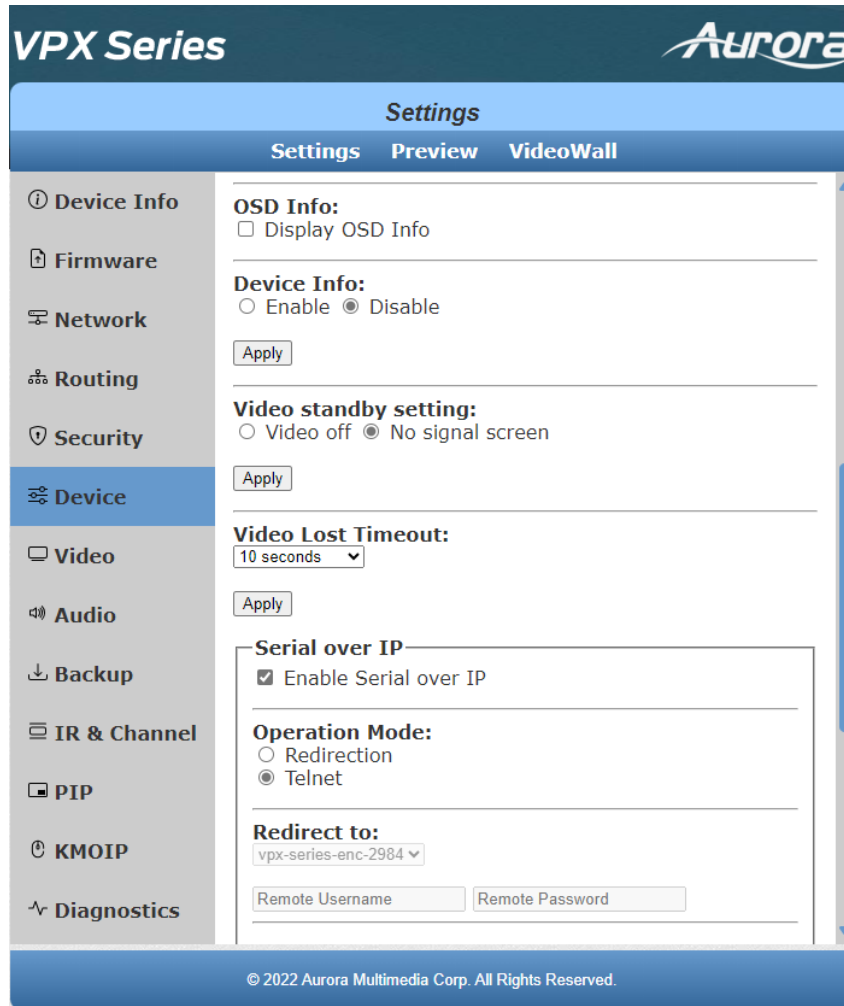
CEC allows the testing of CEC commands (On, Off, and Source).

Front Panel Lock will disable the front buttons to eliminate access to people who may have physical access to the box in a more public location.

The screenshot shows the Aurora VPX Series Settings interface. The 'Settings' tab is active, with sub-tabs for 'Settings', 'Preview', and 'VideoWall'. A left-hand navigation menu lists various settings categories: Device Info, Firmware, Network, Routing, Security, Device (highlighted), Video, Audio, Backup, IR & Channel, PIP, KMOIP, and Diagnostics. The main content area is titled 'Settings' and contains the following configuration options:

- Device Type:** (Unit will reboot after change)  
 ENCODER  DECODER  
[Apply]
- Auto Sense:**  Enable  Disable  
**Priorities:**  
IN Port 1: 1  
IN Port 2: 1  
Stream: 1  
[Apply]
- CEC Commands:**  
TV OFF [v] [Send]
- Front Panel Lock:**  Enable  Disable  
[Apply]
- USB PORTS:**  On  Off  
[Apply]
- Bluetooth Remote:**  On  Off  
[Apply]

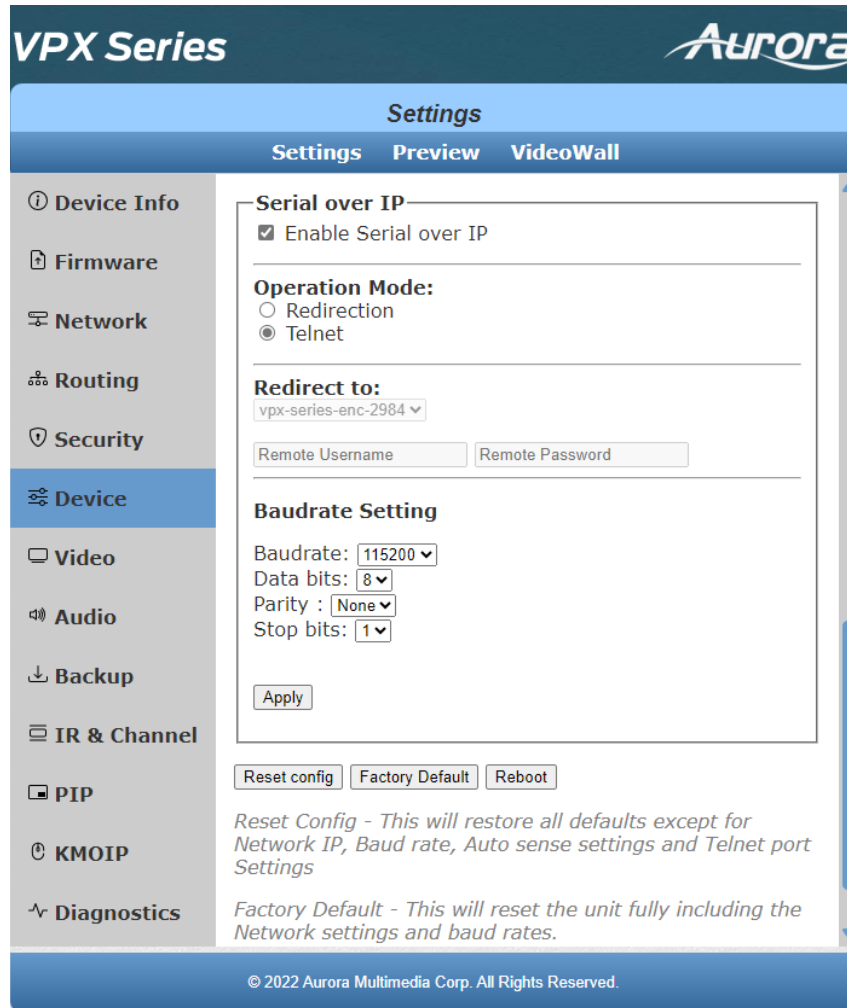
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Device Info enables or disables displaying debug information such as the hostname and IP address shown on the no signal screen.

Video Standby Setting sets the behavior when the stream signal is lost, either displaying the no signal screen or disabling all video output.

Serial over IP allows you to enable and configure Serial over IP. It also allows you to set the operation mode, baud rate, data bits, parity, and stop bits of the serial port.



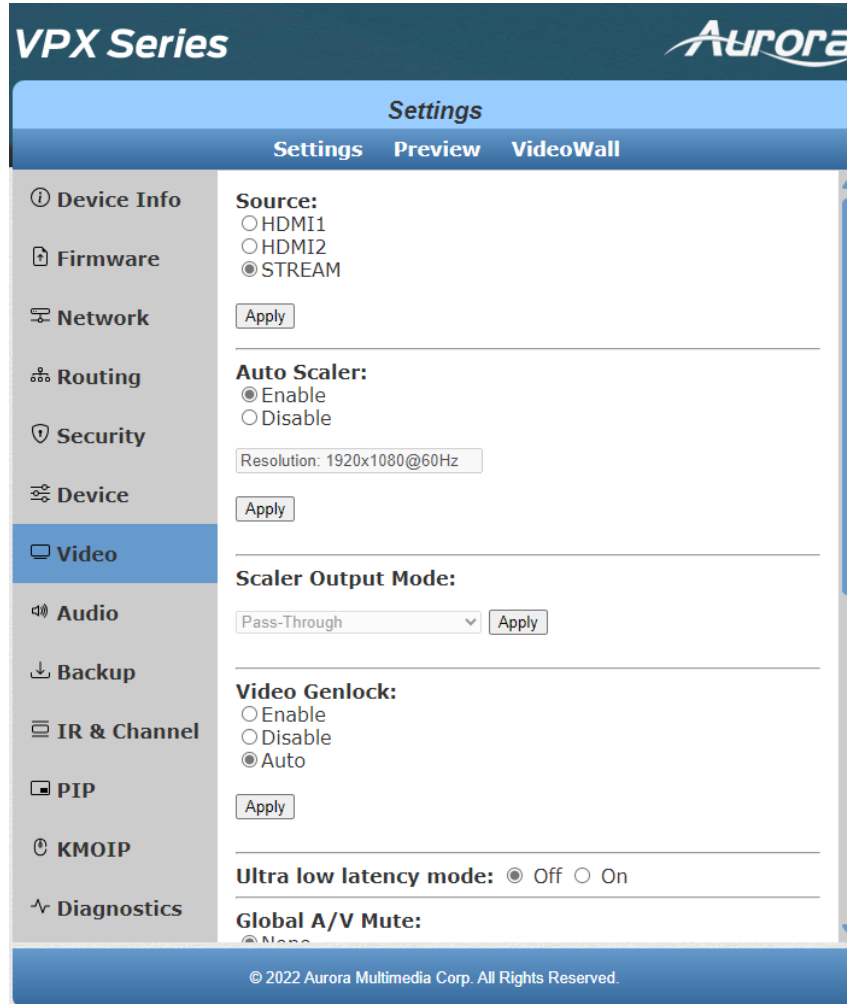
Factory default will restore all settings in the unit same as it is sent out from the factory

Reset Config is like factory default except it keeps the IP Address and Subnet, Baud Rate, & Mode (Encoder/Decoder).

Reboot is a soft reboot.

## Video

From this page you can select the source and set scaler resolutions. Setting the scaler to the display's native resolution will improve switching speed by removing the need for the display to re-sync when switching to a source with differing resolution/frame rate/color space.



### **Auto Scaler**

The decoder will read the EDID of the device connected to the HDMI Output and automatically select the best resolution based on the EDID's native resolution.

### **Scaler Output Mode**

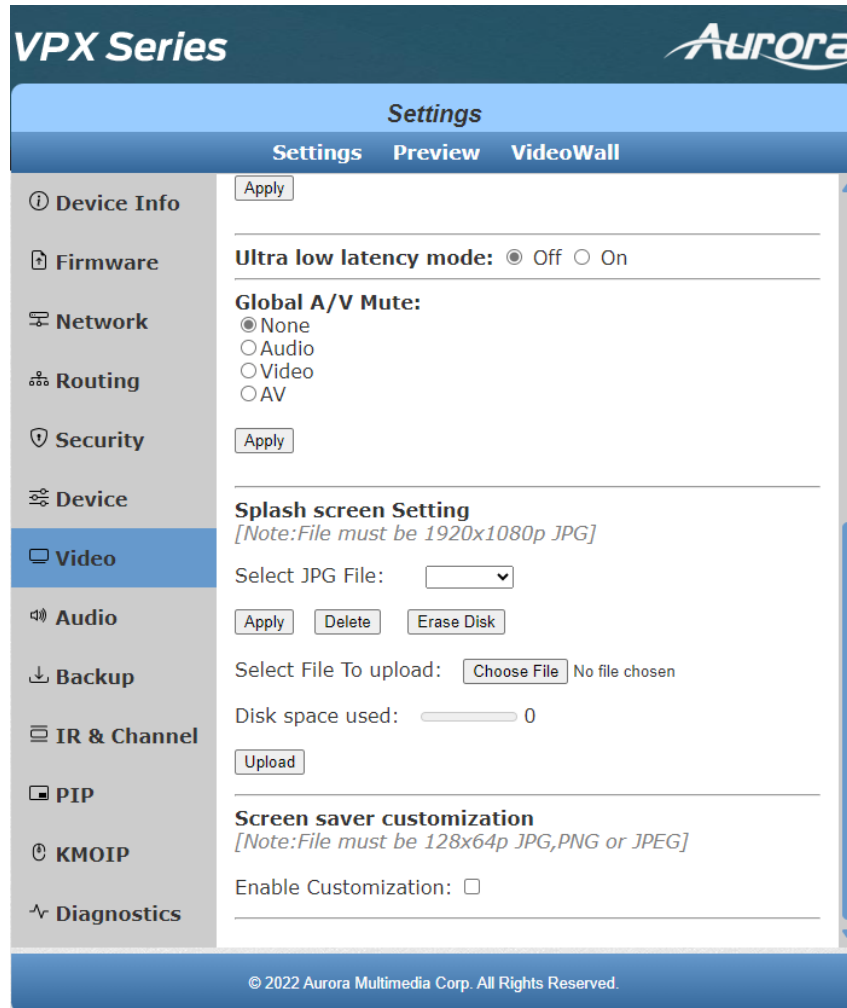
Pass-Through will take the resolution from the encoder and pass it directly to the output of the decoder with no scaling. Otherwise, you can select from a list of various resolutions and color spaces to match the display. If the scaler is not turned on the seamless switch will not work.

## Video Genlock

This allows the VPX to slightly adjust output timings to closer match the input signal's timings. Normally it should be left enabled as it will ensure proper videowall sync and faster switching time between encoders. Sometimes you may need to disable it, as certain devices are too sensitive to the signal. We have seen some CODECs and projectors with this issue.

## HDCP Handling

Allows the choice of adhering to the HDCP of the display at the decoder or the forced settings of the encoder. Sometimes with CODECs you will need to disable the HDCP at the encoder, so the source does not send HDCP allowing the image to pass. If the source must be encrypted, then it will not work with non-HDCP devices as per the HDCP guidelines.



## Ultra Low Latency Mode

This mode will reduce the latency from 1 frame (16.6ms to 1.78ms). Note that seamless switch will not work unless it is same resolution and frame rate to same resolution and frame rate. This mode is intended for broadcast situations or other latency critical applications. The network must also be stable as this mode is less tolerant of dropped packets.



## Splash Screen Custom 'No Signal' Graphics

The VPX contains a 'No Signal' image, which will display when the input signal is lost. This graphic can be replaced with a custom graphic. This feature is often used to include the client and/or integrator logo on the VPX when no signal is present.

To create a custom graphic, use a graphic editing tool to create a JPEG image. The image resolutions must be 1920x1080px (1080p).

Once saved in JPEG format, navigate to the *Video* tab on the web setup page of the VPX decoder. Under *Splash Screen Setting*, press the *Choose file* button, then select and upload your custom graphic. Once uploaded, select the new file from the *Select JPEG File* dropdown menu, and press apply. On this page, you can also delete files, view the disk space used, and erase the JPEG/channel map storage disk.

*NOTE: When the No Signal screen is showing on the screen, there is some small information text in the lower corners which can be helpful for diagnostics. This text is white and will be overlaid over any graphic. Using a light or white background in this region may make the debug text unreadable.*

## OLED Screen Saver

Screen saver customization is for the Front OLED Panel to label or put a custom graphic.

## Audio

Audio allows the routing of the various audio combinations including volume levels. It is also where Dante/AES67 is enabled and routed as well. Note, if using separate VLANs for Dante vs the video stream, the Dante IP must be set static as there is only one MAC address shared between the two VLANs. The Video VLAN has priority for DHCP addressing.

**VPX Series** **Aurora**

**Settings**

Settings   Preview   VideoWall

- Device Info
- Firmware
- Network
- Routing
- Security
- Device
- Video
- Audio**
- Backup
- IR & Channel
- PIP
- KMOIP
- Diagnostics

**Info**

Dante CODEC : **DISABLED**

Enable Dante CODEC

Note: Navigate to Network tab to configure VLAN

**Audio routing:**

Source	Destination		
	HDMI	Lineout	Auracast
HDMI	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Linein	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

**Volume Control**

Linein:90

Mute

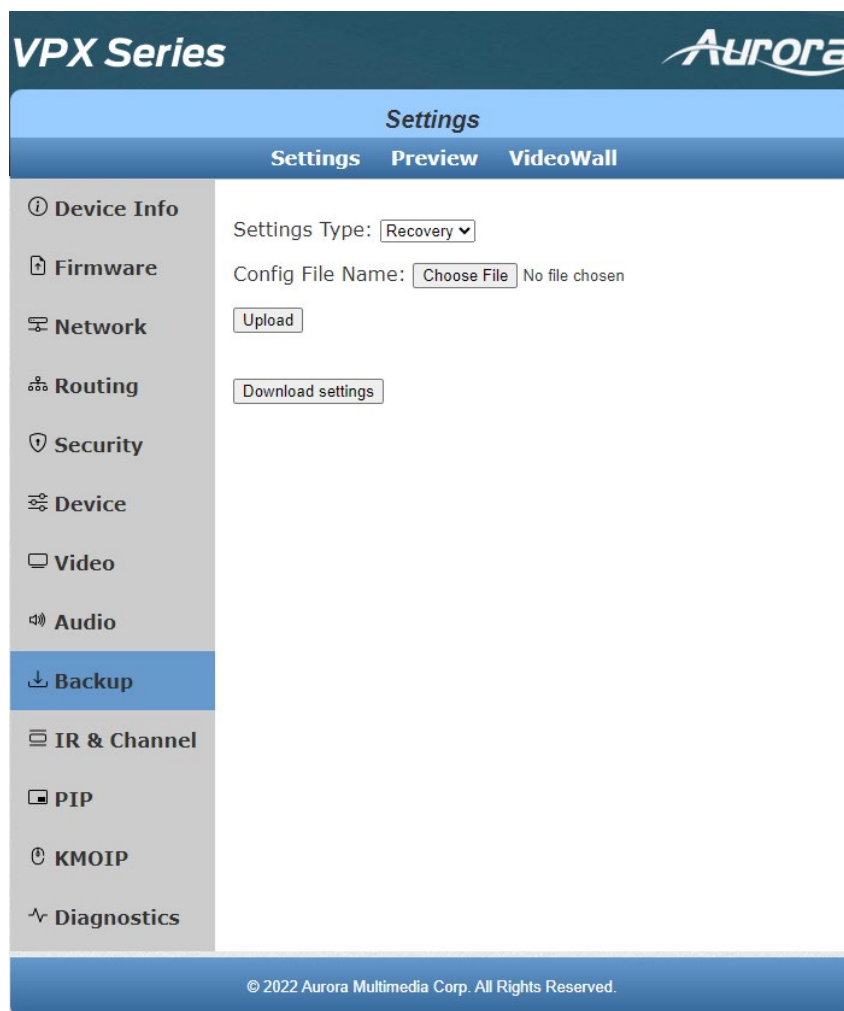
Lineout:90

Mute  
 Mono

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## Backup

The Backup page is to save the configuration of the VPX unit in the event it needs to be replaced and cloned.



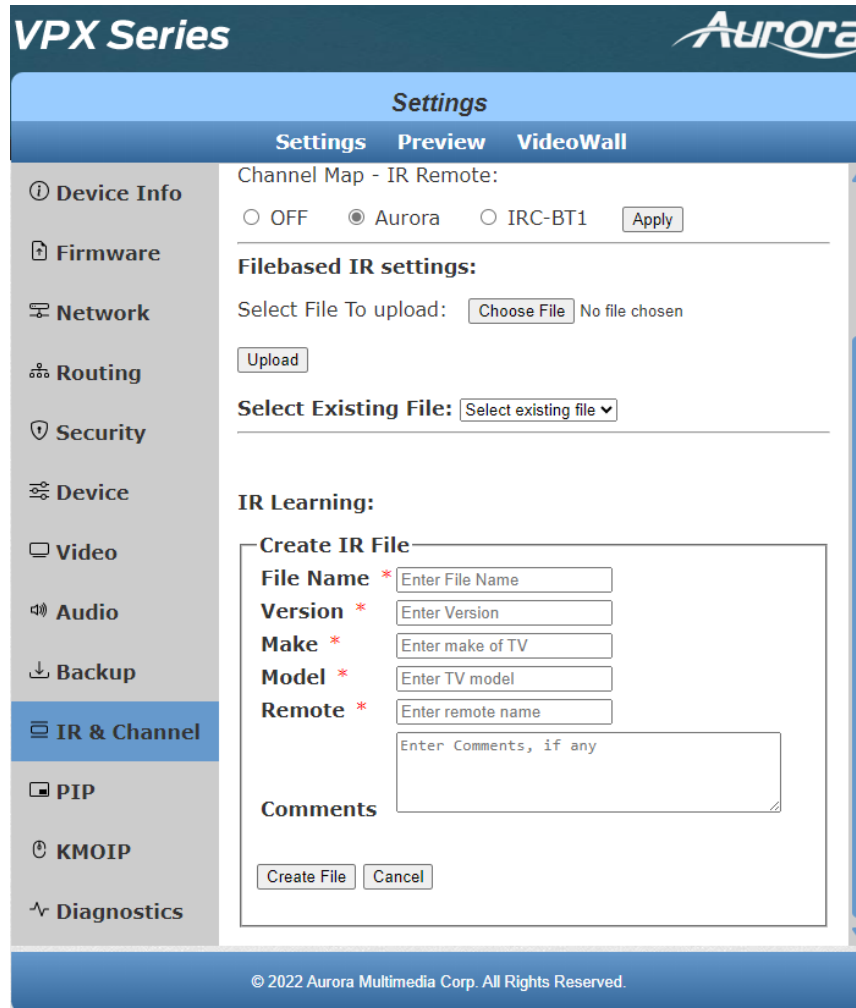
## Channel Map

Channel mapping is a feature that allows you to assign VPX streams to a virtual channel, much like a TV tuner. Once enabled, you can use the channel up/down buttons on the Aurora IRC-BT1 remote control to change streams. You can also optionally enable the up/down front panel buttons of the VPX-TC1 to use this feature. This provides a simple and familiar alternative method of control for certain applications.

The screenshot shows the Aurora VPX Series Settings interface. The top navigation bar includes 'Settings', 'Preview', and 'VideoWall'. The left sidebar lists various settings categories: Device Info, Firmware, Network, Routing, Security, Device, Video, Audio, Backup, IR & Channel (highlighted), PIP, KMOIP, and Diagnostics. The main content area is titled 'Settings' and contains the following sections:

- Channel map settings:** Includes a 'Select File To upload:' field with a 'Choose File' button and 'No file chosen' text, and an 'Upload' button.
- Channel Map - IR Remote:** Features three radio buttons: 'OFF', 'Aurora' (selected), and 'IRC-BT1', followed by an 'Apply' button.
- Filebased IR settings:** Includes a 'Select File To upload:' field with a 'Choose File' button and 'No file chosen' text, and an 'Upload' button.
- Select Existing File:** A dropdown menu with the text 'Select existing file'.
- IR Learning:** A section titled 'Create IR File' containing several input fields:
  - File Name \***: Enter File Name
  - Version \***: Enter Version
  - Make \***: Enter make of TV
  - Model \***: Enter TV model
  - Remote \***: Enter remote name
  - Enter Comments, if any

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To use channel mapping, you will need to create a simple CSV file to define the mapping. This can be done using a text editor like Notepad, or a spreadsheet editor like Excel. The file starts with the header row:

**ChNo,ChName,HostName,HostID,Description**

The second, and subsequent lines will contain the actual definitions of the channels.

- **ChNo**<sup>5</sup> (channel number) - The virtual channel number of the stream, like a TV tuner
- **ChName** (channel name) - The virtual name of the stream, as displayed on the OSD
- **HostName**<sup>6</sup> - The host name of the VPX encoder to be assigned to this virtual channel
- **HostID**<sup>6</sup> - The host ID of the VPX encoder to be assigned to the virtual channel
- **Description** - An extended description of the virtual channel

<sup>5</sup> Channel numbers must be sequential, starting with 0 (zero).

<sup>6</sup> For more info on host name and host ID, see the 'join command' section above, on page 3.

Channel Mapping sample in text editor:

```
ChNo,ChName,HostName,HostID,Description
0,Laptop,vlx-series,0231,Desktop wall plate
1,Desktop,vlx-series,0133,Room computer for meetings
2,Digital Signage,vlx-series,0089,Corporate signage feed
3,Cable TV,vlx-series,5201,Television tuner
4,Media Player,vlx-series,2832,Streaming media services.
```

**Channel Mapping sample in Excel:**

**NOTE:** When opening or editing the channel mapping CSV file in a spreadsheet editor like Excel, it may format the device IDs as numbers, automatically removing the leading zeros. You must format the HostID column as text to prevent automatic number formatting.

	A	B	C	D	E
1	ChNo	ChName	HostName	HostID	Description
2	0	Laptop	vlx-series	231	Desktop wall plate
3	1	Desktop	vlx-series	133	Room computer for meetings
4	2	Digital Signage	vlx-series	89	Corporate signage feed
5	3	Cable TV	vlx-series	5201	Television tuner
6	4	Media Player	vlx-series	2832	Streaming media services.

*Incorrectly formatted HostID (Excel default)*

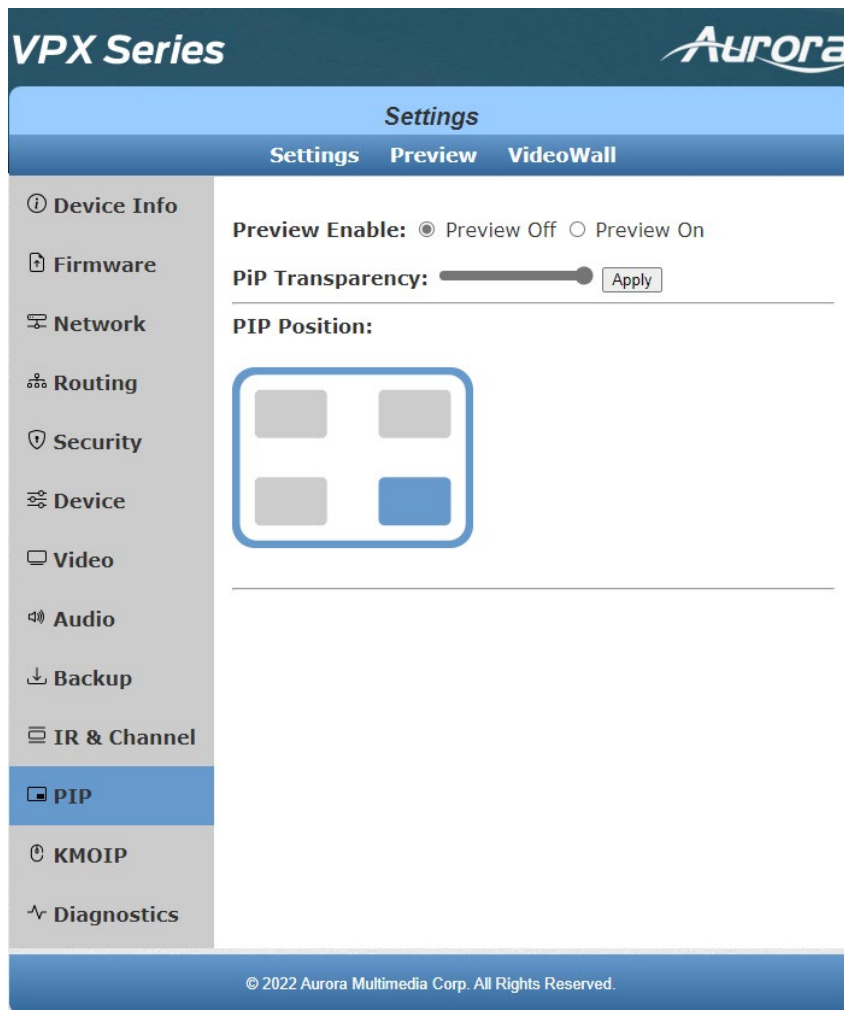
	A	B	C	D	E
1	ChNo	ChName	HostName	HostID	Description
2	0	Laptop	vlx-series	0231	Desktop wall plate
3	1	Desktop	vlx-series	0133	Room computer for meetings
4	2	Digital Signage	vlx-series	0089	Corporate signage feed
5	3	Cable TV	vlx-series	5201	Television tuner
6	4	Media Player	vlx-series	2832	Streaming media services.

*Correctly formatted HostID (column formatting set to 'text')*

After you create and save your file, navigate to the *Management* tab on the VPX decoder web setup pages. Under *Bitmap/Channel Map*, press the *Choose file* button, then select and upload your CSV file. Then, press the upload button. To enable channel mapping to the IR remote control buttons and VPX front panel buttons, enable the appropriate options in the web setup pages.

## PIP

This will enable or disable the Picture in Picture function on the VPX. You can also set the transparency and position. PiP is limited to 15 frames per second.



## KMOIP

The Roaming Feature allows a mouse to move from screen to screen and automatically make the connection to the PC on the new screen.

The Hot Key has 8 available place holders that can be defined. Press the assigned keyboard button 3 times within less than 700ms per press to trigger the hotkey.

The screenshot shows the Aurora VPX Series Settings interface. The left sidebar contains a navigation menu with the following items: Device Info, Firmware, Network, Routing, Security, Device, Video, Audio, Backup, IR & Channel, PIP, KMOIP (highlighted), and Diagnostics. The main content area is titled 'Settings' and has sub-tabs for 'Settings', 'Preview', and 'VideoWall'. The 'KMOIP Roaming Feature' section is active, showing an 'Enable' radio button (selected) and a 'Disable' radio button. Below this is an 'Apply' button. The 'Hotkey Configuration' section, indicated by an information icon, contains eight rows, each for a hotkey (Hotkey1 through Hotkey8). Each row includes a text input field for the hotkey name, a 'HexCode' label, a 'Select' button, a dropdown menu currently showing 'VPX\_API', and a 'Clear' button. An 'Apply' button is located at the bottom of the hotkey configuration section. The footer of the interface reads '© 2022 Aurora Multimedia Corp. All Rights Reserved.'

## Diagnostics

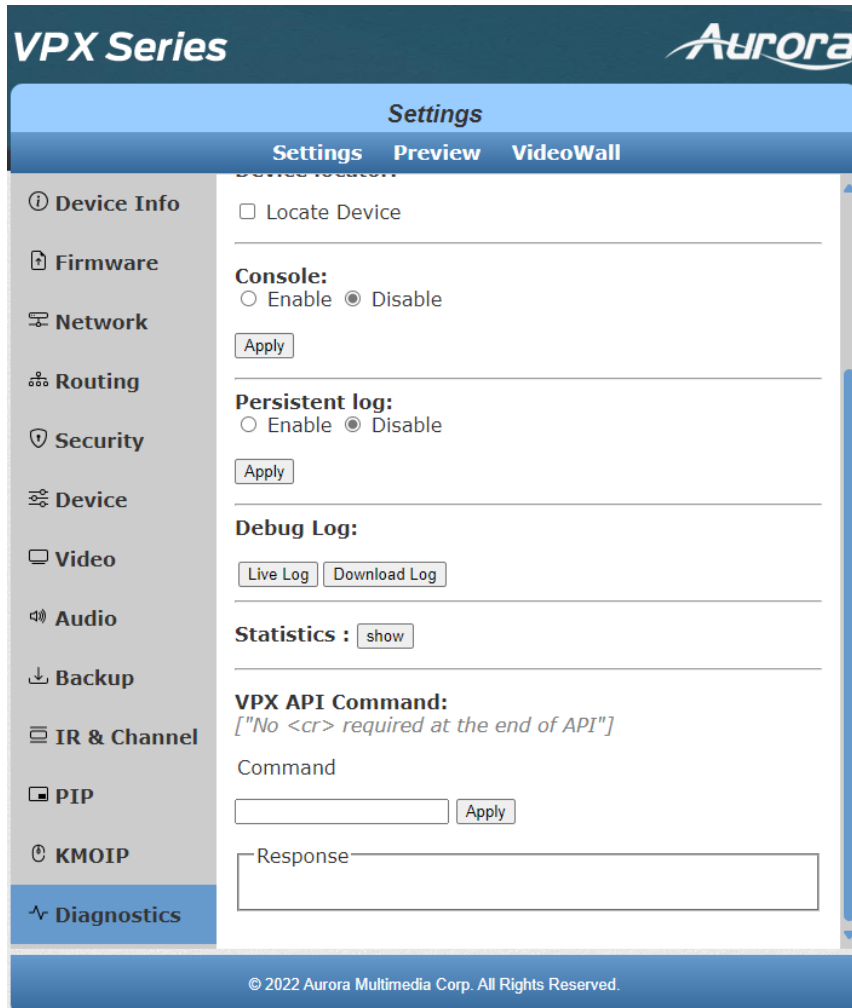
This page is for advanced troubleshooting of the VPX. It also has a handy feature called Locate Device which puts an indicator on the units display to help find which physical unit it is. It is particularly useful when there are many units in a rack to quickly identify the location.

You can also enable the debug console for advanced logging out the RS-232 port as well as the LAN port using the Live Log function. To test the VPX IP commands, there is a VPX API command to test right from the web page.

The screenshot shows the Aurora VPX Series Settings interface. The top navigation bar includes 'Settings', 'Preview', and 'VideoWall'. The left sidebar lists various settings categories: Device Info, Firmware, Network, Routing, Security, Device, Video, Audio, Backup, IR & Channel, PIP, KMOIP, and Diagnostics (which is currently selected). The main content area is titled 'Settings' and contains several sections:

- Version Information:** Displays system information including the date and time (Fri, 02 Aug 2024 05:48:20 +0000), firmware version (CR\_3.14.6), hardware ID (10), and model (TC1-PRO).
- Device locator:** Includes a checkbox for 'Locate Device'.
- Console:** Includes radio buttons for 'Enable' and 'Disable' (selected), and an 'Apply' button.
- Persistent log:** Includes radio buttons for 'Enable' and 'Disable' (selected), and an 'Apply' button.
- Debug Log:** Includes 'Live Log' and 'Download Log' buttons.
- Statistics:** Includes a 'show' button.
- VPX API Command:** A section for testing commands.

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Live Log is one of the best diagnostic features as it tracks not only what is happening but what has happened. We can tell if it was the VPX, the equipment it is connected to, or end user misuse. If the NTP is setup on the Network page the logs will be time and date stamped, otherwise it will show time relative to the last boot. This log can be downloaded and sent to Aurora for quick diagnosing of the issue at hand.

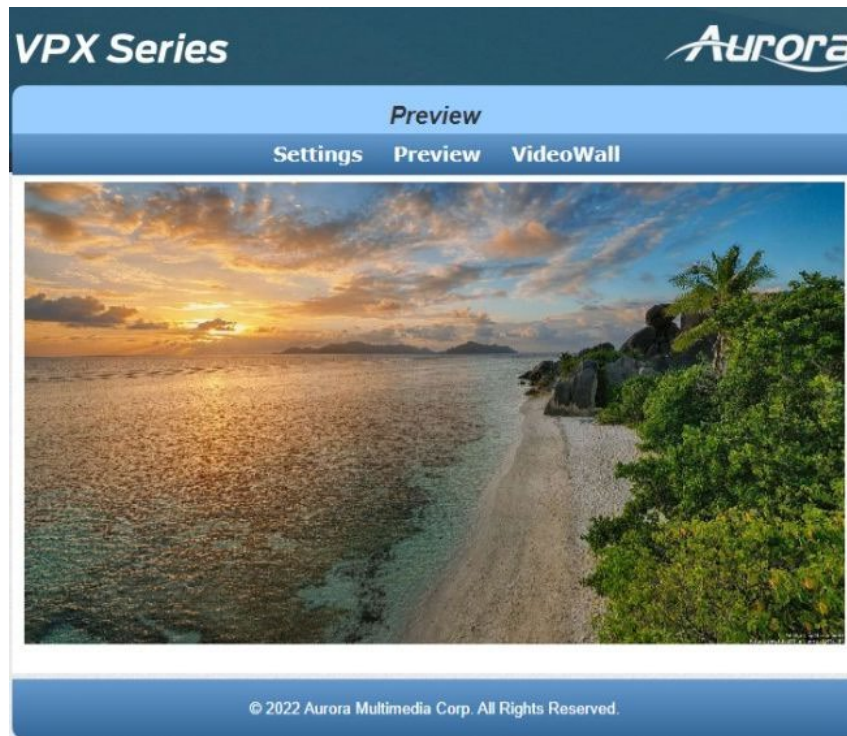
The screenshot displays the Aurora VPX Series Settings interface. At the top, the 'Settings' tab is active, with 'Settings', 'Preview', and 'VideoWall' options visible. A 'Device Info' window is open, showing a 'Log from Device' section with the following entries:

```
07:58:51 LM: Got uds query (q_param_get::AURACAST_SRC)
07:58:52 LM: Got uds query (q_param_get::AURACAST_SRC)
07:58:53 LM: Got uds query (q_param_get::AURACAST_SRC)
07:58:54 LM: Got uds query (q_param_get::AURACAST_SRC)
07:58:55 LM: Got uds query (q_param_get::AURACAST_SRC)
```

A 'Clear Log' button is located at the bottom left of the log window. The footer of the interface reads: © 2022 Aurora Multimedia Corp. All Rights Reserved.

## Preview Tab

The Preview tab allows you to look at the active video source. If no source is available, it will show the No Signal image.



## Videowall Tab

From this page up to an 8x8 video wall can be configured.

### VPX Series

#### Video Wall

Settings Preview VideoWall

Advanced

**Bezel and Gap Compensation:**

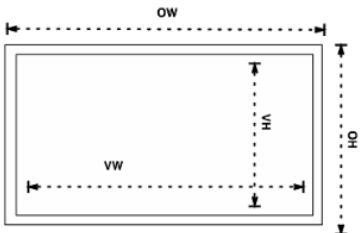
Bezel and Gap Compensation

Overall Width (OW):

Overall Height (OH):

Video Width (VW):

Video Height (VH):



UNIT: 0.1mm

**Wall Size and Position Layout:**

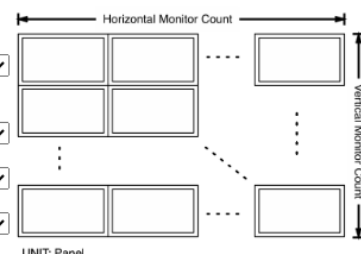
Wall Size and Position Layout

Vertical Monitor Count:

Horizontal Monitor Count:

Row Position:

Column Position:



UNIT: Panel

Apply To: "All" device(s) in the list

Show OSD

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## VPX Series Aurora

### Video Wall

Settings   Preview   VideoWall

**Advanced**

**Step 1:** Choose Control Target

←

↓

→

This

Show OSD

**Step 2:** Control Options

Reset to Basic Setup:

---

Stretch Type:

---

Clockwise Rotate:

---

Screen Layout (Row x Column):

X

---

Row Position:

---

Column Position:

---

Horizontal Shift:

---

Vertical Shift:

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Horizontal Scale Up (N pixels/column\_count):

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Vertical Scale Up (N pixels/row\_count):

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## EPG (Electronic Programming Guide)

The EPG works with the channel mapping feature when a unit is set to a decoder. First, make a spreadsheet (.csv format) with 4 columns for channel number, Encoder IP or Host name, OSD channel label, and Description. Load it into the decoder unit through the built-in web page as per prior section. Once loaded, the decoders front up and down arrows, IR remote, or IP commands will change the channels entered in the spreadsheet. When the EPG is not selected, the channel number and label will appear in the upper corner and the channels will change accordingly just like a TV cable unit. When the EPG is selected to appear, a graphic with the spreadsheet listing will appear. The up and down will scroll through and enter will select the channel to change. While scrolling a preview will appear in the upper right. The lower right will show the current channel information. See [Channel Map](#) section for instructions on how to create and upload.

### Channel Guide

Ch No	Channel Name	Description
0000	Apple_TV	Room 1
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable
-	Unavailable	Unavailable

◀ ▶ Move    ● Ok



Current Video Info

-----

Progressive HDMI

1920X1080 60Hz

HDCP: On

Refresh

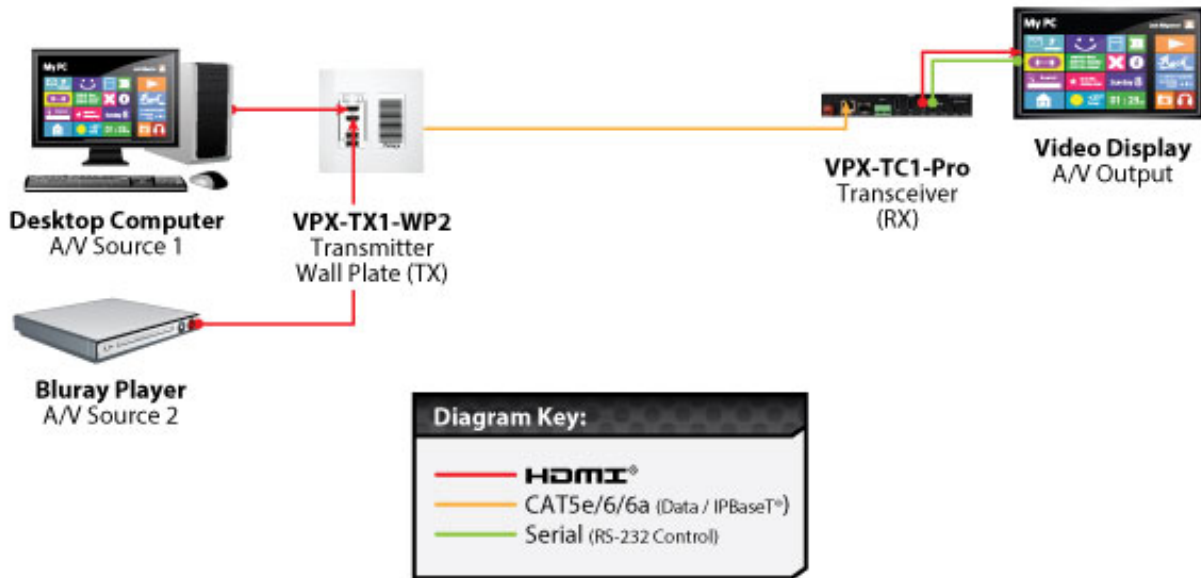
Connect

## APPLICATIONS

### Example 1: Point-to-Point Operation

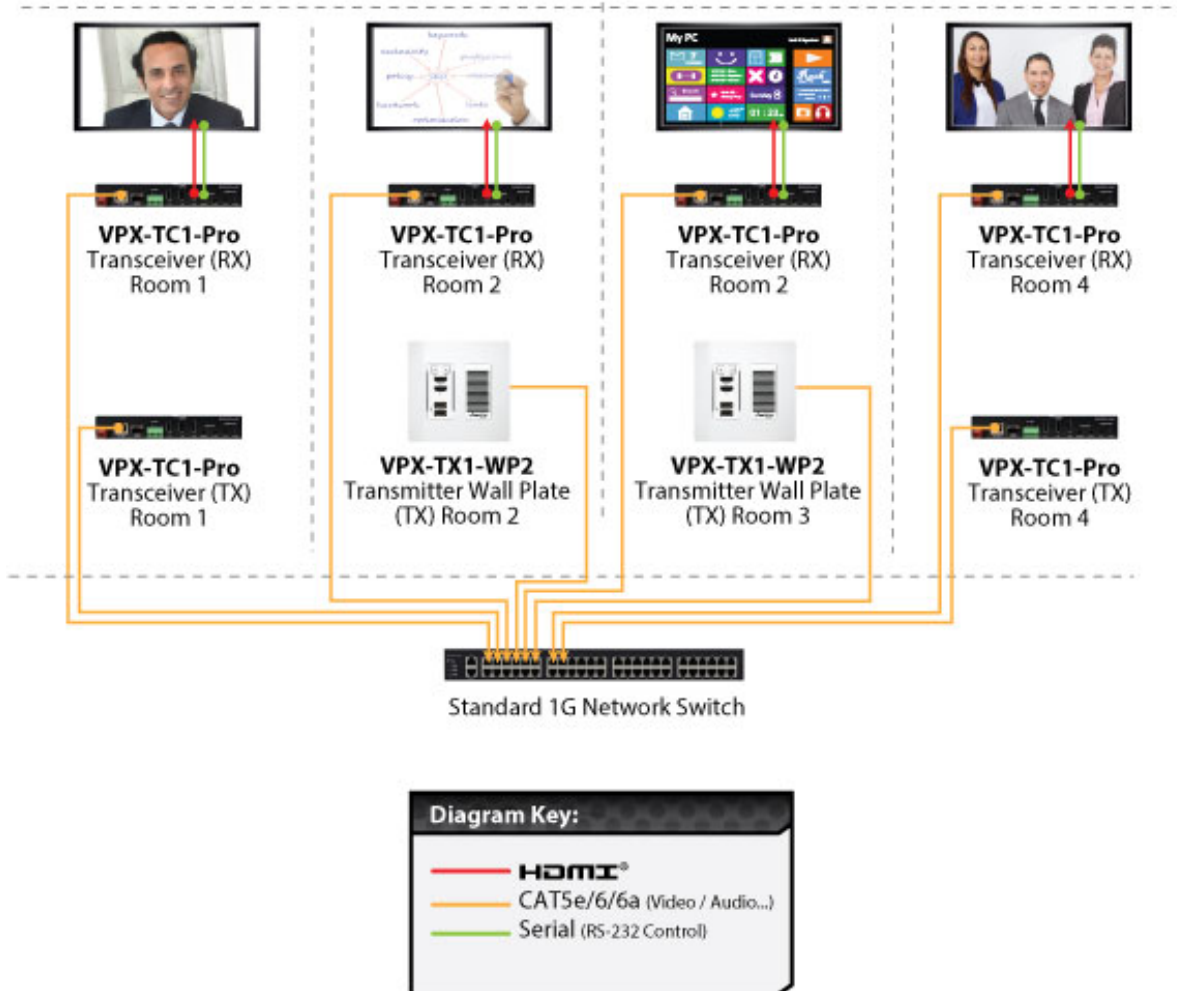
When the VPX Series is connected point to point, an initial configuration is required, however, the units will remember the last settings even after reboot or power loss. Note when in point-to-point mode each side will need a power supply. You can also use 2 power supplies on one side provided one of the supplies is a PoE injector for the far end unit.

To initially set up the units, either connect to a 1Gbps network switch with a PC or use the SFP slot and install the RJ-45 SFP (Aurora Part# IPA-SFP-RJ45-1) to allow connection of the PC into the pair. Then go to the decoder units IP Address and setup pages and make the connection to the encoder and any other settings like baud rate or scaler.



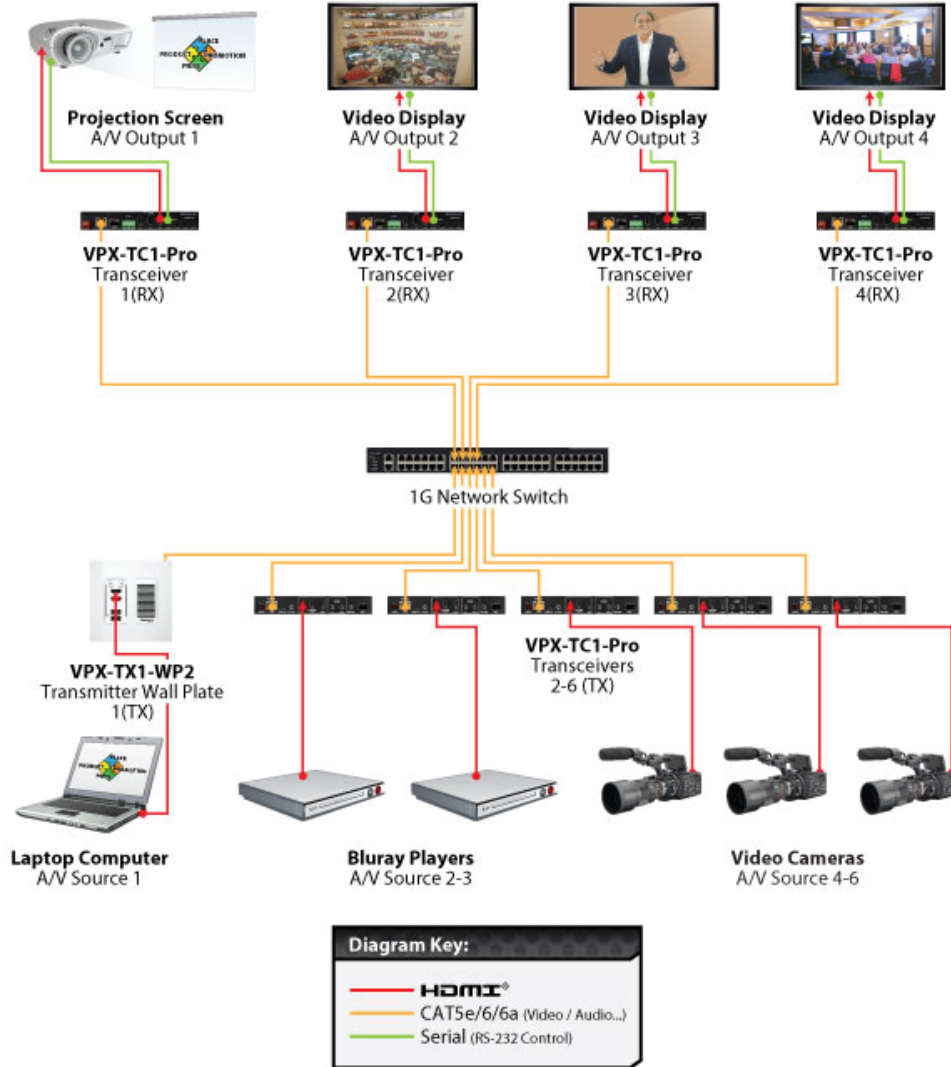
## Example 2: VPX Multi-Room

The VPX Series is perfect for multi-room applications with its flexibility. An unlimited number of rooms can share video, audio, data, and control in real-time. The scalability is only limited by the size of the network switch and infrastructure.



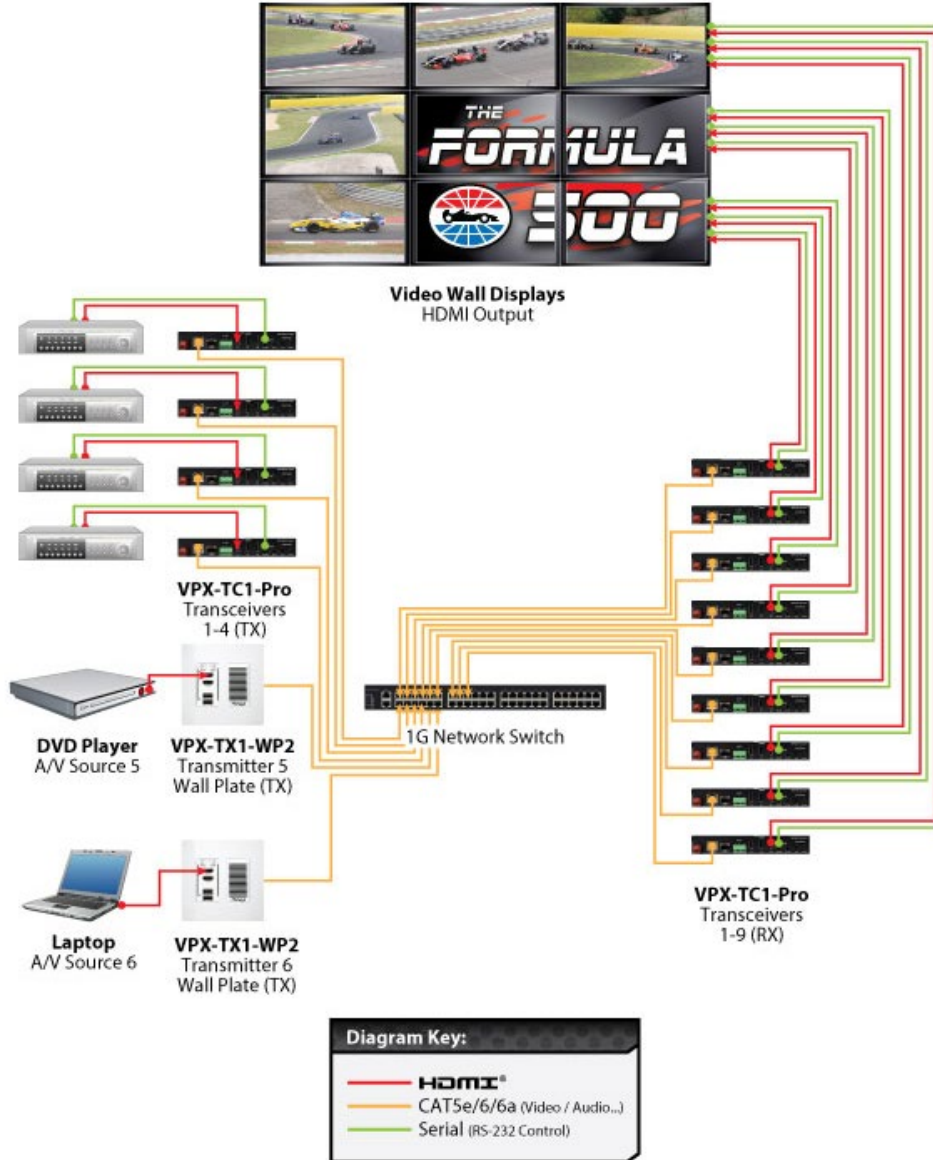
## Example 3: Matrix – Multiple VPX to Multiple VPX

The VPX can take the place of any typical card cage matrix system, adding flexibility and performance never seen before. Even features like fast switch are no longer a premium.



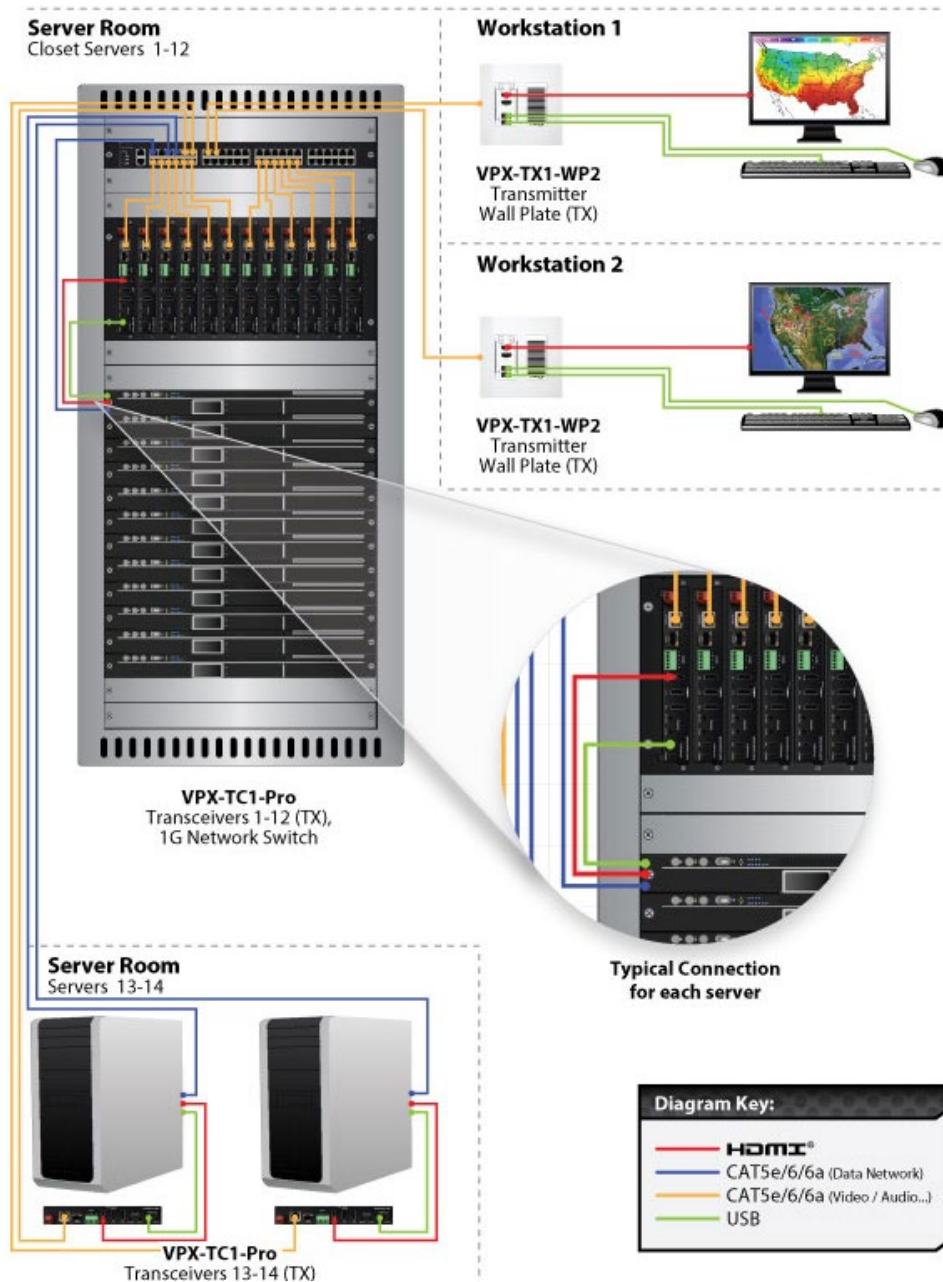
## Example 4: Video Wall

The VPX Series is capable of 4K video walls. Up to 8x8 size can be created with 4K input.



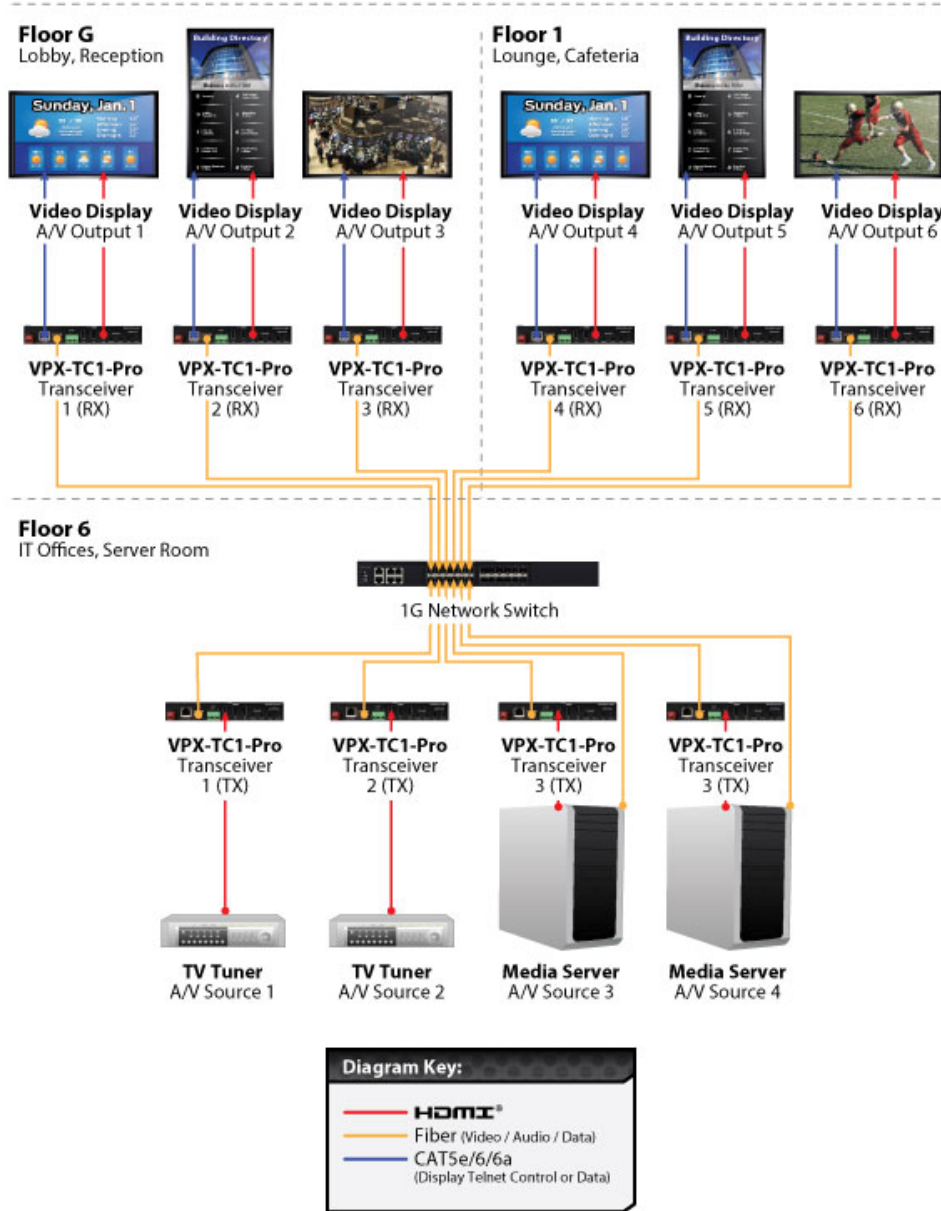
## Example 5: KVM Utilizing USB 2.0

Command & Control and NOC centers are perfect for the VPX Series, especially with the USB 2.0 running at a full 200Mbps. With the VPX it is no longer just keyboard and mouse but full USB peripheral routing as well. To make this feature easy, the VPX has floating mouse and hot key functions. The roaming mouse will automatically move the mouse to the next encoder/PC accordingly based on the direction it was traveling. The hotkey function allows a button on the keyboard to be selected that will bring up a menu on the decoder to show the choices of the encoders to select and switch to. Press the button quickly 3 times within 750ms of each press to trigger the hot key.



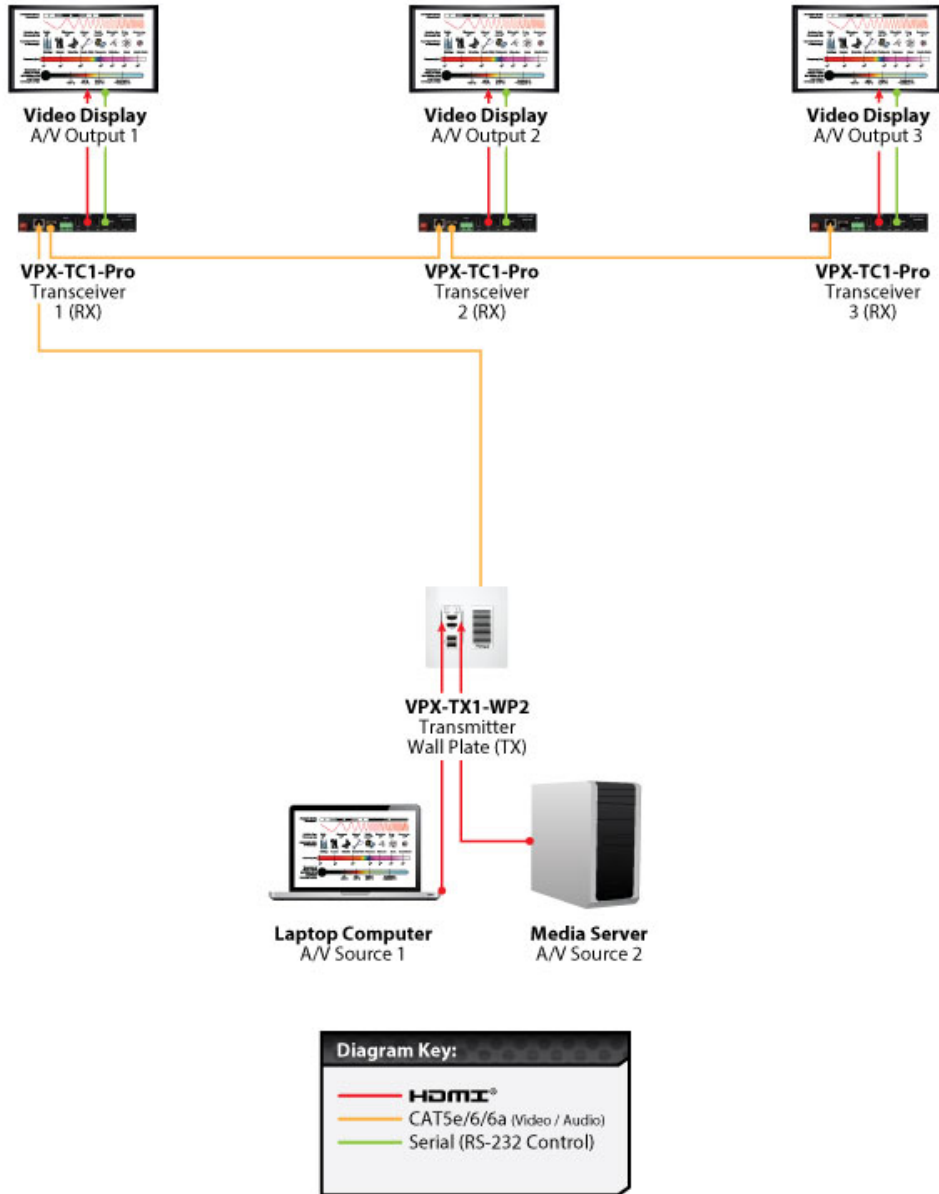
## Example 6: VPX-TC1-PRO with Local Ethernet Control

Using the SFP a multimode fiber, single-mode fiber, or RJ-45 Copper, the VPX can connect to an ethernet switch and to a local device that requires Ethernet. If a copper switch is used with PoE the same can be accomplished by using the main RJ-45 to power and the SFP to do the local control.



## Example 7: VPX-TC1-PRO Daisy Chain

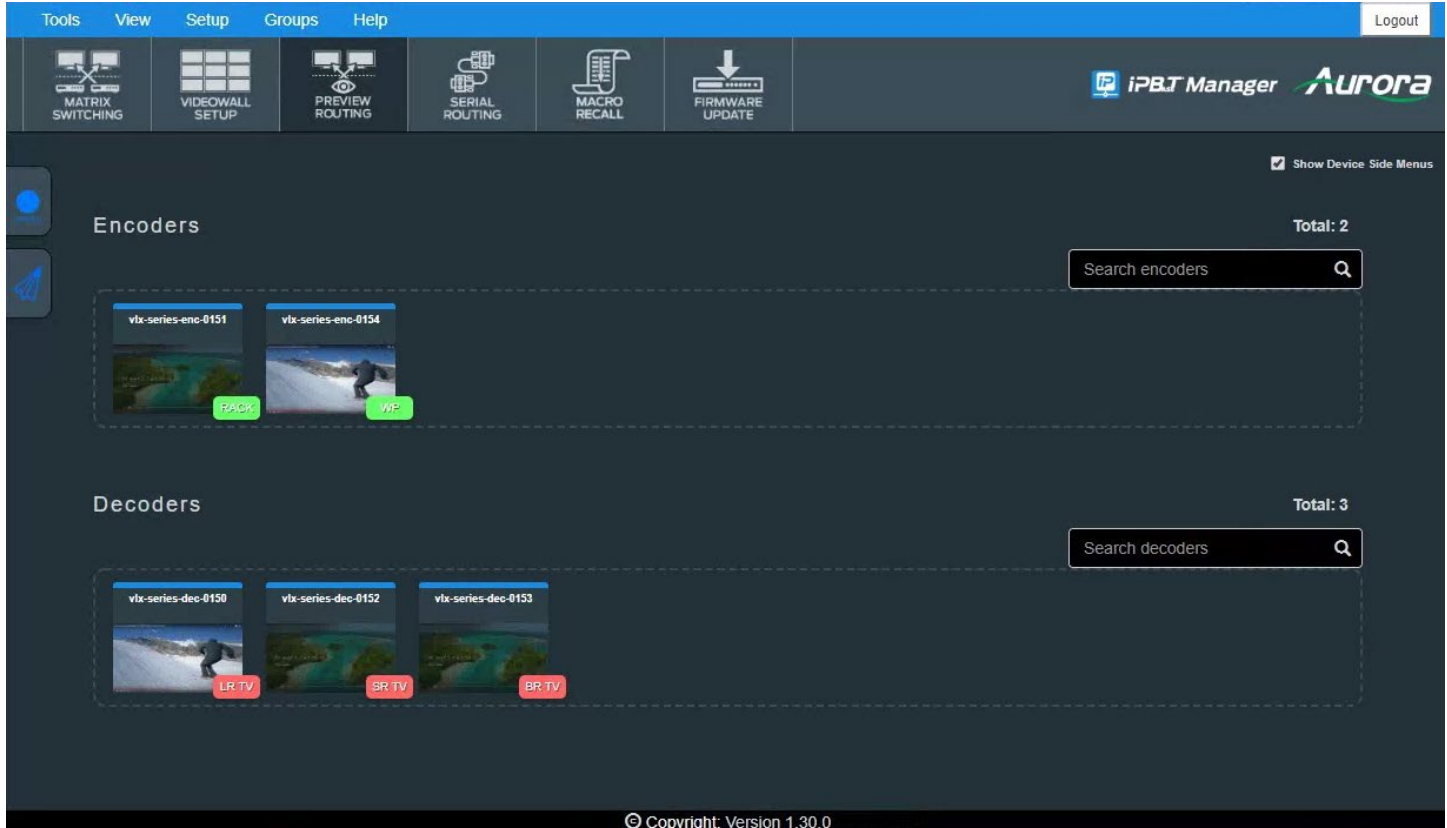
The VPX-TC1-PRO can be used in a Daisy chain mode with RJ-45 to RJ-45 or a mix of fiber. Note when using daisy chain only the first unit can be powered by PoE. The following units would require local power. If a unit in the chain is not powered or has an issue the remaining units in the chain will no longer function.



## SOFTWARE

### IPBaseT Manager PC Control & Setup Tool

The IPBaseT Manager is Windows® based software available at the Aurora customer portal on [www.auroramm.com](http://www.auroramm.com).



IPBaseT Manager allows a user to control the various capabilities of VPX series products on a network. While the IPBaseT manager is client software, the IPBaseT Server handles all the communication handling and is the target for all communication. This allows for centralized communications and the ability to run many clients on a network seamlessly. The VPX can also work decentralized as well for smaller installations.

#### Features

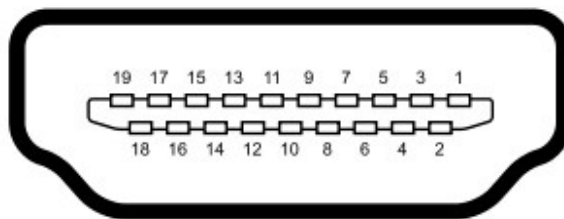
- Matrix Switching
- Video Wall Setup and Control
- RS-232 Routing and Control
- IR (Infrared) Remote Control Routing
- Horizontal and Vertical Viewing
- Macro Store and Recall
- Connection Manager

- Advanced Debug Logging
- Touch Screen Friendly Layout
- Configuration File for Cloning Presets and Connections on Other PCs
- Firmware Updating
- High-Resolution Previews
- Macro Recording
- Light/Dark Themes
- Embedded User Guide
- User Logging and Profiles
- Device Grouping
- Tagging
- Preview routing
- EDID editor
- Rapid deployment tool
- Touch screen/mobile friendly layout
- User and group management
- Macro recording

For full details of the IPBaseT Manager Software tool and setup, the manual can be found at the Aurora website [www.auroramm.com](http://www.auroramm.com).

## CONNECTOR PIN DEFINITION

### HDMI



Type A (Receptacle) HDMI

<b>Pin 1</b>	TMDS Data2+	<b>Pin 8</b>	TMDS Data0 Shield	<b>Pin 15</b>	SCL
<b>Pin 2</b>	TMDS Data2 Shield	<b>Pin 9</b>	TMDS Data0-	<b>Pin 16</b>	SDA
<b>Pin 3</b>	TMDS Data2-	<b>Pin 10</b>	TMDS Clock+	<b>Pin 17</b>	DDC/CEC Ground
<b>Pin 4</b>	TMDS Data1+	<b>Pin 11</b>	TMDS Clock Shield	<b>Pin 18</b>	+5 V Power
<b>Pin 5</b>	TMDS Data1 Shield	<b>Pin 12</b>	TMDS Clock-	<b>Pin 19</b>	Hot Plug Detect
<b>Pin 6</b>	TMDS Data1-	<b>Pin 13</b>	CEC		
<b>Pin 7</b>	TMDS Data0+	<b>Pin 14</b>	Reserved (N.C. on device)		

## CAT5e/6/6A

### T568A and T568B Wiring

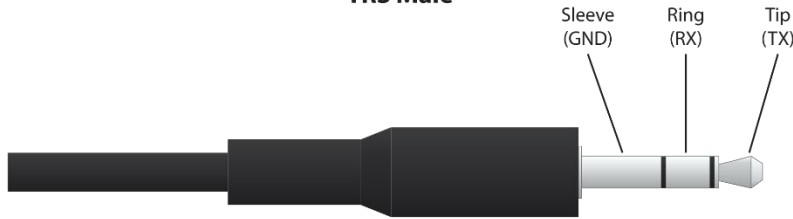
Pin	T568A Pair	T568B Pair	Wire	T568A Color	T568B Color	Pins on plug face (socket is reversed)
1	3	2	tip	white/green stripe	white/orange stripe	
2	3	2	ring	green solid	orange solid	
3	2	3	tip	white/orange stripe	white/green stripe	
4	1	1	ring	blue solid	blue solid	
5	1	1	tip	white/blue stripe	white/blue stripe	
6	2	3	ring	orange solid	green solid	
7	4	4	tip	white/brown stripe	white/brown stripe	
8	4	4	ring	brown solid	brown solid	

## RS-232

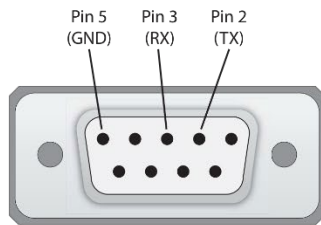
The RS-232 is a 3.5mm TRS connector. Tip is TX (output), ring is RX (input), and Sleeve is ground. To simplify connections Aurora offers pre-molded RS-232 cables in null and none nulled in male and female DB9.

### CA0052 Selection Guide

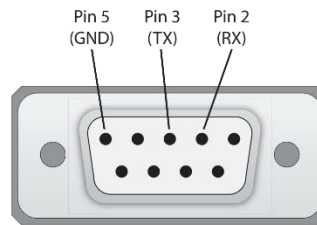
#### CA0052 (all versions) TRS Male



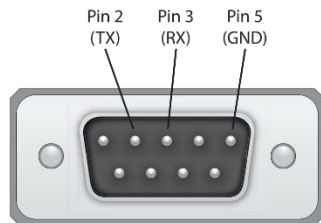
#### CA0052-F2T3R DB9 Female (Crossover)



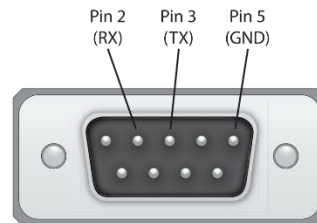
#### CA0052-F3T2R DB9 Female (Straight)



#### CA0052-M2T3R DB9 Male (Crossover)



#### CA0052-M3T2R DB9 Male (Straight)



## IR (Infrared)

It will autosense a TS or a TRS connector to determine if an IR emitter (TS) or IR receiver (TRS) is inserted. The IR receiver must be with carrier inverted to work. The tip is signal, ring is 5V, and sleeve is ground.

### IR Receiver CA0026-1 (30kHz – 60kHz)



### IR Receiver CA0026-1 (30kHz – 60kHz)



## APPENDIX 1

### Troubleshooting

It is advisable to make certain all units are using the latest firmware before troubleshooting. Also make sure all network connections are operating on 1G.

#### VPX Not Working Properly on End Clients Network

We always recommend AV installers to use a brand switch they are comfortable with and certified in as well for quick and easy installations. Sometimes this is not possible because the end client prefers it to be on their network. The challenge is typically lack of access for security reasons to the switch setup which means the end client must properly set their own switches to accommodate. This makes troubleshooting extremely challenging at times. We recommend the AV installer purchase a low-cost switch like a **Netgear GS308EPP** (8 port PoE+ small form factor) to carry with them as it comes in handy in general to prove out customer network issues versus product issues.

Simply disconnect a few encoders and decoders from their network and plug it into the GS308EPP. If the VPX works normally it suggests the customer's network switch is not configured properly. The GS308EPP works out of the box with no need to set anything up but will quickly prove out any VPX specific issues. If the VPX still has issues and the cabling has been verified with process of elimination, then it could be something with VPX firmware or hardware.

#### VPX Web Server is Not Responding

- Make certain every VPX unit has a unique IP Address set for the webserver. Disconnect unit from 1G network and connect PC directly to 1G LAN and check to see if webserver appears in browser. If not trying restoring defaults and try again. Repeat this for every unit. Another method is using the server to issue commands to change the webserver IP settings over the 1G.
- Make certain PC is on same VLAN as the VPX
- Check to see if the PC is on the same network IP address and subnet range as the VPX.

#### Display Will Not Show Encoder Video or the No Signal Image

- All devices are powered on.
- Unit is set properly for Decoder. OLED status will show this.
- Check routing with IPBaseT Manager.
- Display is set to the correct signal source input mode using display's remote. Example, switching to HDMI 1 if HDMI 1 interface is connected to the RX via a HDMI cable.
- Verify the cables are good or rated for the distance. Also, check the switch to see there is a 1G link. If not, that would indicate a bad cable.
- Look at the status LED and make certain unit is linked. The enter button on the front changes the link status.
- Try turning off the Genlock feature on the decoder. Also, try turning on the scaler.

#### Display Will Not Show Encoder Video but Does Show the No Signal Image

- Check if the switch IGMP snooping and unregistered multicast set up correctly. Also, make certain if multiple switches are uplink together there is only one switch with the querier enabled for the VLAN the VPX is on. More than one querier will cause issues.
- Make sure all units have the same firmware.
- Make sure the Super Secure Mode is either off on all units (factory default) or all on if desired.
- If Super Secure mode is used, the switch must be set up for Jumbo packets of at least 1600 MTU.
- If using the USB-C on the wall plate, make certain the cable is rated to do video.

## Switching Speed Between Encoders is Slow

- Make certain scaler is enabled and genlock are on. Check switch configuration. Fast Leave should be enabled. If switching time is longer than 1 second with the above enabled, it will most likely be switch settings. If not enabled for other requirements switching time should take no longer than 4 seconds typically.

## Switching Time Between Local HDMI Inputs Takes Longer

- The VPX can only fast switch between encoders. Locally on an encoder or decoder it can take up to 4 sec depending on the destination. They also do not have scaling like the stream output on the decoder.

## VPX with Dante/AES67 Enabled Intermittently Locking Up

- If Dante or AES67 is on separate VLAN, Dante must be static only as there is only 1 MAC Address for both IP. Only one DHCP can be assigned and that will be for the main video stream. Check if QOS is set for Dante related products. Note that only the VPX Dante VLAN when separated could be set to QOS. Otherwise avoid QOS on video VLAN.

## Dante/AES67 Not Working

- This must be enabled in the audio setup page. If enabled, check to see if it is registered. Note: Dante requires a license key to be bought, installed, and registered. If this has been done check audio pathway settings.
- Please ensure all applicable settings and configurations are applied in Dante Controller Software.

## Display Has Image with Wrong Color

- Make certain to learn the EDID from the display and save into each unit HDMI input ports.
- If different displays are used with the same source, an EDID with a common denominator must be used. For example, if one destination is 4K UHD and the other is 1080p and the 4K EDID is utilized, the 1080p screen will not get an image if the source is 4K capable. In this case it would be better to use a 1080p EDID.

## Audio Not Working

- Make certain correct audio path is selected. The IPX can choose between analog input and HDMI.
- Verify correct EDID usage. If EDID has 5.1 surround sound listed and display cannot do 5.1 there will be no audio. Lack of EDID will also cause a source to output DVI which lacks audio.
- Check the volume on the display or amplifier.

## VPX RS-232 Control is Not Working

- Check wiring for RX, TX, and Ground. (VPX 3.5mm Tip is TX, Ring is RX, Sleeve is GND).
- Check the baud rate of the unit.
- Confirm the protocol being utilized with a terminal program.
- Ensure the proper serial control mode is selected (SolP) and the correct IP port as per the Protocol document.

## Routing a Source to Multiple Displays is Tearing

- Check network switch is properly configured for IGMP.

## VPX Server is Responding Poorly

- Check network switch is properly configured for IGMP with snooping.

## Displays Not Showing Same Video Frame as Others

- If displays are different brands this can happen depending on the scaler circuitry utilized inside the display and the amount of buffering used.
- If displays are different brands trying using same native resolution of the displays or set to game mode. Some displays will not scale or use memory and just sync to the native signal.
- Check to see if Genlock is enabled on the VPX decoder.
- Check to see if decoders are set up similar with scaler turn on for example.

## Audio Latency is Different Between Displays

- If the displays are different brands this can happen based on the design. It is always ideal to use the same models for consistency or a central source for audio to keep in sync.

## Unit Won't Load Firmware or Displaying "Secondary" Mode

- Use the internal web pages to load the firmware into the unit. Versions prior to 0.18.1 only update firmware through the web interface of the unit. If 0.18.1 or higher, which will also update firmware through IPBaseT Manager or TFTP, make certain you are using the latest IPBaseT Manager version that supports the VPX. This can be found on the Aurora portal. If not in secondary mode, to re-attempt firmware update press and hold UP and DOWN while applying power. The OLED display will show "Secondary" mode alongside the device IP.

## Bluetooth Auracast Not Working

- VPX must be a decoder
- Orange LED should be lit solid on the BT-AC1. If not press button 3 times quickly till it does.
- Check Device Settings if Bluetooth is enabled.
- Make certain device you are connecting with has Auracast capabilities.

## Test Pattern Always Showing

- VPX Encoder has the Test Pattern Feature under Video Settings enabled. Turn this off and the HDMI source will return.

## APPENDIX 2

### Firmware Update

For the latest firmware updates please go [www.auroramm.com](http://www.auroramm.com).

You must sign up to the Customer Portal to download firmware with instructions on how to update.

***\*Note: Aurora suggests using IPBaseT Manager for performing batch firmware updates. IPBaseT Manager will download the latest VPX firmware when the program is installed or updates.***

***\*Note: If updating from a firmware prior to 0.18.1, only use the device web page to update firmware. Updating via IPBaseT manager or TFTP can cause firmware corruption resulting in the need to use secondary mode followed by loading via web page.***

## APPENDIX 3

### Protocol

For the latest protocol please go [www.auroramm.com](http://www.auroramm.com).

You must sign up to the Customer Portal to download the VPX protocol. The protocol is only available to authorized Aurora dealers.

## APPENDIX 4

### Recommended Cabling

#### **Cat 5e UTP (Unshielded): 100m (330ft)**

Any brand on the market is made to Category 5e or better specification.

#### **Cat 6 UTP (Unshielded): 143m (470ft)**

Cable Brand: West Penn Wire

Part Number: 4246. Cat 6 UTP CMR Part Number: 254246. Cat 6 UTP CMP

#### **Cat 6A UTP (Unshielded): 182m (600ft)**

Cable Brand: West Penn Wire

Part Number: 4246A. Cat6 A UTP CMR Part Number: 254246A. Cat6A UTP CMP

## APPENDIX 5

### Recommended Network Switches

The VPX will work with most non-blocking IGMP capable 1Gbps network switch. Layer 3 will allow more control for uplinks in larger systems; however, Layer 2 will work as well especially if it is non-blocking typology. It is highly recommended to communicate with the representative of the desired network switch brand to confirm configuration and capabilities. Below are some models that have been tested with the VPX Series.

#### Switch Speed

The VPX Series requires the switch to be a 1GbE.

VPX Series technology is used to transmit visually lossless 14:1 compress video up to 4K60 4:4:4 along with other AV signals such as audio, USB and control signals. For video alone, it means raw bandwidth of about 218Mbps average/800Mbps peak for 4K60 and that is just for audio and video. It is therefore easy to understand why the VPX requires 1GbE network switches.

#### Packets Routing

To enable the transmission of a source to multiple destinations, VPX devices make use of Multicast. The default behavior of layer 2 Ethernet switch is to broadcast those packets which means that every packet will be transmitted to all destinations. This is why any network switch used with VPX Series must support IGMP Snooping. VPX end points use IGMP protocol to assign the end points into multicast groups and the router uses IGMP snooping to efficiently route multicast packets only to receivers that want to receive them.

Many switches have the IGMP Snooping feature disabled by default and manual configuration is required. Often, a simple check mark near “Enable IGMP Snooping” is the only thing needed to enable IGMP Snooping. However, the implementation of IGMP Snooping is vendor specific and additional configuration is often needed.

An Ethernet switch can be informed that a device wants to leave a multicast channel by sending it an IGMP LEAVE GROUP packet. Once received, the time it takes for the switch to apply the new configuration may vary from one switch to the other. Most switches implement and include a FASTLEAVE configuration option. When enabled, it takes much less time for a particular port to leave a multicast group to assign the port to a different multicast group. The end results are a noticeably shorter video switching time. Aurora recommends always enabling the FASTLEAVE option when available.

#### Ethernet Switch Configuration

The following list includes all network switch configuration options that Aurora Engineers have come across so far. Look for these or similar options when configuring your switch.

1. Enable IGMP Snooping
  - a. Must be enabled.
2. Enable IGMP Snooping on VLAN 1
  - a. Must be enabled when all ports default to VLAN1.
3. Filter/Drop Unregistered Multicast Traffic
  - a. If not applied, the behavior of the switch will be to broadcast multicast packets if the switch has no known destination for that packet.
  - b. Must be enabled if found.

4. Unregistered Multicast Flooding
  - a. Must be disabled if found.
5. Filter Unregistered Multicast (different wording than number 4 above)
  - a. Must be enabled if found.
6. Enable IGMP Querier
  - a. This must be enabled on the primary AV switch and must only be enabled on a single switch.
  - b. If doing a multi-switch deployment, this should be enabled only on the core switch.
7. Enable IGMP Querier on VLAN1
  - a. This must be enabled on the primary AV switch and must only be enabled on a single switch.
  - b. If doing a multi-switch deployment, this should be enabled only on the core switch.
8. Set IGMP Version to IGMP V2
  - a. Must be set if found.
9. Enable FASTLEAVE on Port X
  - a. This is optional. Should be enabled, if found.
10. Enable FASTLEAVE for VLAN1
  - a. This is optional. Should be enabled if found.
11. Jumbo/MTU Packets are not required. Only if the Super Secure mode (defaulted off) is selected will Jumbo packets be required.

## **PoE/PoE+ (Power over Ethernet)**

The VPX Series uses around 8 watts of power (standard PoE 12.9 Watts), however, the PoE can supply up to 20 watts with PoE+ as the USB ports on the VPX can supply up to 5 watts. When selecting a PoE switch always make certain the power supply of the PoE switch is proper to the port count (15.4W x qty of ports). For example, a 24 port PoE switch must have at least 369.6 Watts (24 at 15.4W) for it to properly supply all 24 VPX devices. Some switches can only supply a certain number of ports with PoE. If it is necessary to use a particular switch, then PoE injectors for the remaining ports can be used or the local power supply for the VPX but you may need to disable the detection of the PoE for those ports in the Ethernet switch.

## APPENDIX 6

### Technical Specifications

Model Name	VPX-TC1-PRO/VPX-TC1-LT
<b>Technical</b>	
Compression	Mimix™ 14:1
Latency	Zero Frames (1.78ms)
HDMI Input(s)	2 HDMI 2.0b, HDCP 2.2 (Pro), 1 HDMI 2.0b, HDCP 2.2 (LT)
HDMI Output	HDMI 2.0b, HDCP 2.2
Encryption	AES 256
Audio Analog	Stereo Line In/Out (3.5mm TRS)
1G Ethernet	RJ-45 and SFP
LAN	RJ-45 10/100/1000M PoE
Video Bandwidth	600MHz
Video Support	Up to 4K2K 4:4:4 @ 60Hz (Pro), Up to 4K2K 4:4:4 @ 30Hz (LT),
Audio Support	Up to 12 Channels
Video Stream Bandwidth	93Mbps – 800Mbps (4K60 4:4:4) Packet Size Under 1600 1Gbps with USB and Audio
USB Bandwidth	200Mbps (Camera), 170Mbps (HID/Mass Storage Devices)
RS-232	Up to 115k Baud (3.5mm TRS)
IR In	3.5mm TRS (Tip Signal, Ring – 5V, Sleeve – Ground)
IR Out	3.5mm TS (Tip Signal, Sleeve – Ground)
USB Connector	1 USB Type C USB 2.0 Data (Host) Two USB 2.0 Type A for Camera/HID/Mass Storage Devices (Devices)
Expansion Port	Dante® 2Ch/8Ch and ReAX™
Interface	IR or Keyboard via OSD, Web Server
<b>Mechanical</b>	
Housing	Black Aluminum Enclosure
Dimensions (L x W x H)	177.04 x 150.7 x 26.42mm [6.97" x 5.93" x 1.04"]
Weight	.453kg [1lbs]
Mounting	Optional: Rack Mount Vertical, Rack Mount Horizontal, Under Table Mount
Power Supply	48v DC (2 Pin Euro) or PoE+ (LAN)
Power Consumption	8 Watts, up to 20 Watts allowable with USB & PoE+
Operation Temperature	0~40° C [32~104° F]
Storage Temperature	-20~60° C [-4~140° F]
Relative Humidity	20~90% RH [No Condensation]
<b>Package Contents</b>	1x VPX-TC1-PRO, 2x Mounting Ears

**\*Note: Specifications subject to change without notice.**

Model Name	VPX-TC1-WP2
<b>Technical</b>	
Compression	Mimix™ 14:1
Latency	Zero Frames (1.78ms)
HDMI Input	HDMI 2.0b, HDCP 2.2
HDMI Output	HDMI 2.0b, HDCP 2.2
Analog Audio	Euro Connector Stereo Line In/Line Out
Encryption	AES 256
1G Ethernet	RJ-45 and SFP
LAN	RJ-45 10/100/1000M PoE
Video Bandwidth	600MHz
Video Support	Up to 4K2K 4:4:4 @ 60Hz
Audio Support	Up to 12 Channels
Video Stream Bandwidth	93Mbps – 800Mbps (4K60 4:4:4) Packet Size Under 1600 1Gbps with USB and Audio
USB Bandwidth	200Mbps
RS-232	Up to 115k Baud (Euro 4 Pin)
USB Connector	1 USB Type C for Video and USB 2.0 Data (Host) 1 USB 2.0 Type A (Devices)
Interface	IR or Keyboard via OSD, Web Server
<b>Mechanical</b>	
Housing	Aluminum
Dimensions [L x W x H]	2 Gang 3.728" x 2.83" (4.331" with tabs) x 1.404"
Weight	1.13g [2.5lbs]
Mounting	Wall-mounting Decora® 2 Gang
Power supply	48V DC (2 pin Euro) or PoE (LAN)
Power consumption	8 Watts
Operation temperature	0~40°C [32~104°F]
Storage temperature	-20~60°C [-4~140°F]
Relative humidity	20~90% RH [no condensation]
<b>Package Contents</b>	1x VPX-TC1-WP2

**\*Note: Specifications subject to change without notice.**

## APPENDIX 7

### Warranty

#### Limited 5 Year Warranty

Aurora Multimedia Corporation (“Manufacturer”) warrants that this product is free of defects in both materials and workmanship for a period of 5 years as defined herein for parts and labor from date of purchase. This Limited Warranty covers products purchased in the year of 2019 and after. Motorized mechanical parts (Hard Drives, DVD, etc.), mechanical parts (buttons, doors, etc.), remotes and cables are covered for a period of 1 year. Touch screen displays are covered for 1 year; touch screen overlay components are covered for 90 days. Supplied batteries are not covered by this warranty. During the warranty period, and upon proof of purchase, the product will be repaired or replaced (with same or similar model) at our option without charge for parts or labor for the specified product lifetime warranty period.

This warranty shall not apply if any of the following:

- A. The product has been damaged by negligence, accident, lightning, water, act-of-God or mishandling; or,
- B. The product has not been operated in accordance with procedures specified in operating instructions; or,
- C. The product has been repaired and or altered by other than manufacturer or authorized service center; or,
- D. The product's original serial number has been modified or removed; or,
- E. External equipment other than supplied by manufacturer, in determination of manufacturer, shall have affected the performance, safety or reliability of the product; or,
- F. Part(s) are no longer available for product.

In the event the product needs repair or replacement during the specified warranty period, product should be shipped back to Manufacturer at Purchaser's expense. Repaired or replaced product shall be returned to Purchaser by standard shipping methods at Manufacturer's discretion. Express shipping will be at the expense of the Purchaser. If Purchaser resides outside the contiguous US, return shipping shall be at Purchaser's expense.

**No other warranty, express or implied other than Manufacturer's shall apply.**

Manufacturer does not assume any responsibility for consequential damages, expenses or loss of revenue or property, inconvenience or interruption in operation experienced by the customer due to a malfunction of the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period. This warranty does not cover damage to the equipment during shipping and Manufacturer assumes no responsibility for such damage. This product warranty extends to the original purchaser only and will be null and void upon any assignment or transfer.



## Aurora Multimedia Corporation

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