

# VPX Series

VPX-TC1-PRO • VPX-TX1-WP2

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



VPX-TC1-PRO



VPX-TX1-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 a long 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 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 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. Contact your dealer if any items are missing or damaged.

### Box Versions

#### VPX-TC1-PRO

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

### Wall Plate 2 Gang Versions

#### VPX-TX1-WP2

- 1 QTY VPX-TX1-WP2 1G RJ-45 Copper Transmitter Unit with 2 HDMI Inputs & USB 2.0

*Power supplies are sold separately.*

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

## 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)



- **Dante/AES67 Option**  
LCN-DTE-2 - 2 Channel Dante/AES67  
LCN-DTE-8 – 8 Channel Dante/AES67 (Coming Soon)

- **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)



- **DXB-8i**  
(8 Button IP Wall Plate)



- **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 CA0026-1**



- **IR Emitter CA0061-1**



- **IR Blaster CA0049-1**

- **RS-232 Adaptor CA0052-F2T3R**  
(3.5mm TRS to FEMALE DB9 2-TX 3-RX)  
**RS-232 Adaptor CA0052-F3T2R**  
(3.5mm TRS to FEMALE DB9 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 Pro 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 only one frame (16.6ms) 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 and a small form factor saving a lot of money in 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 1G RJ-45 Ethernet switch. When the VPX-TC1 is set up to be a transmitter, the 2 HDMI 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 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 Protocol Guide (Available only on Customer Portal)

## Features

- ◆ Configure as Encoder or Decoder
- ◆ 4K60 4:4:4 UHD 120m over 1G CAT 5e
- ◆ HDMI 2.0b, HDCP 2.2
- ◆ HDR10, HDR10+, Dolby Vision
- ◆ LPCM up to 12-channels, Dolby Digital Plus, Dolby TrueHD DTS HD Master Audio & ATMOS
- ◆ 12-bit color depth processing, 16bits OSD
- ◆ Enterprise Security (AES 256, 802.1x, HTTPS, SSH, & Active Directory)
- ◆ One Frame Latency (16.6ms)
- ◆ Low Power Design
- ◆ Seamless Switching
- ◆ MJPEG Preview at 720p up to 30 frames
- ◆ Video Wall with Image Rotation
- ◆ 1G LAN PoE and SFP for Fiber or 2<sup>nd</sup> RJ-45
- ◆ 2 HDMI Inputs, 1 HDMI Output (box version)
- ◆ Line In/Out Stereo
- ◆ RS-232 Serial Port and IR (In/Out)
- ◆ Channel Mapping with EPG & On-Screen Preview (box version)
- ◆ Integrated Web Server for Configuration
- ◆ 2 USB 2.0 for Cameras
- ◆ 3 USB 2.0 for HID Devices, Mass Storage, etc.
- ◆ Dante® 2/8 Ch Audio License Options & Dante Controller
- ◆ Rack and Under Table Mounting (box version)
- ◆ Wall Plate Available in White or Black



**\*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-TC1-PRO 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 (Bluetooth, Memory, etc.) & keyboard/mouse for HID functionality. This port has up to 170Mbps throughput.
- **Camera:** For decoder mode, a USB 2.0 camera up to 1080p30 can be routed to an encoder.

## 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 currently 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 Rear



### Rear

From left to right:

- **48VDC:** 48 Volt isolated power input
- **LAN Connector LED's:**
  - Left LED Green = 1G/Good (1G is required for proper operation)
  - Left LED Orange = 10/100 or Bad Connection
  - 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.

- **USB 2.0:** 170Mbps USB 2.0 Type C to be connected to a host (PC) for peripherals from a routed decoder.
- **Camera:** 200Mbps USB 2.0 Type C to be connected to a host (PC) for camera from routed decoder.
- **Control IR Out:** Infrared control output 30kHz-60kHz. IR emitter must be mono 3.5mm TS.
- **HDMI in 1/ In 2:** HDMI inputs up to 4K60 4:4:4.
- **HDMI Out:** HDMI Output to Display up to 4K60 4:4:4. Output can be native or scaled (e.g. from 1080p to 4K60/4:4:4).
- **Audio In:** Analog stereo audio input.
- **Audio Out:** Analog stereo audio output. De-embedded audio output from HDMI stream. HDMI multichannel audio (up to 7.1) is down mixed (PCM) to stereo (2 channel).
- **Control RS-232:** Serial port pass-through and control up to 115Kbps.
- **SFP:** SFP Cage for Multi-mode or Single Mode Fiber and RJ-45 LAN with optional modules available from Aurora.

## VPX-TX1-WP2 Front



### Buttons

- **In 1:** Selects HDMI Input 1 (Illuminates when selected or autosensed from last plugged).
- **In 2:** Selects HDMI Input 2 (Illuminates when selected or autosensed from last plugged).

### Connectors

- **HDMI In 1/2:** HDMI inputs up to 4K60 4:4:4 (Auto sense feature available)
- **USB:** USB 2.0 Type A to be connected to a host (PC) or device (i.e., Mouse, keyboard, etc.). Bottom connector can be changed between Host or Device and between Camera or peripherals.

### 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

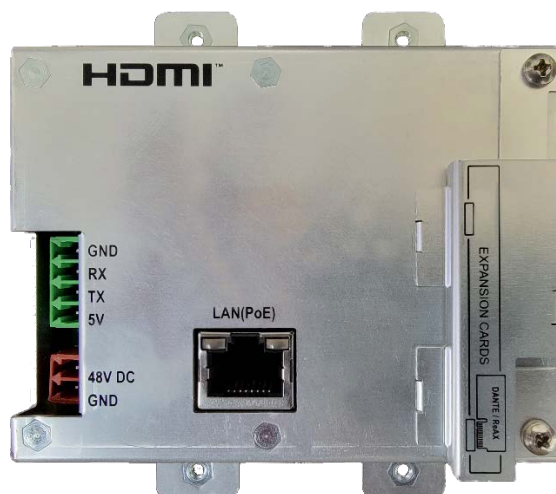
- **Source Indication:** Red LED to be lit on the button corresponding to the source.
- When power is first applied, all front LEDs will light white for a second.
- All LEDs will light white to indicate that the firmware update is in progress.
- Selected input source LED will light red.
- Both In1 and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



## VPX-TX1-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. Also, has 5V for connection to DXB-8 8 button wall controller.
- **Expansion Slot for Dante® Hardware Option:** Cover supplied for card protection. (Note: there is a Dante Software Option)

**\*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". Wall box portion depth is 1.404" without option card and 2.25" with option card.**

## 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.

### 1GbE Ethernet Switch

It is important to use a non-blocking IGMP 1GbE switch with IGMP snooping and Jumbo packets. It is possible to use the VPX without jumbo packets as it uses 1508 packets which is slightly larger than a standard packet, but most modern switches will accommodate as they normally need extra for the VLAN. Also, if Jumbo is set you can set for 1600 MTU as it does not need full jumbo size. The size of the switch is based on the requirements of the project. Consider this if extra port capacity is required for future expansion. If you run out of port capacity, you can always add another 1GbE switch in the future. The VPX, when set to encoder (TX), determines the bandwidth that will be multicast across the network. 24bit 4k@60Hz can peak at about 850Mbps (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 170Mbps 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 required 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 a good idea to consider overhead and assume 15% bandwidth loss to play it safe. Since each port is bi-directional 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).

### 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. Non-blocking switch assures full bandwidth is available for all ports as required.

## 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 (RXS-1). It can also be controlled from other Aurora control products or third-party control systems with the available VPX API. To obtain the VPX Control API commands you must be 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 the EDID. 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 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 the compatibility.

For example, there are 2 displays one 1080p the other 4k UHD. If the EDID of the 4K display is used, the 1080p will not see an image if the source is capable of 4K. If the 1080p EDID is used, then both will see the image but the 4K will never benefit from 4K content. In a situation where this is unacceptable, a 4K scaler can be used on the 1080p screen to down scale the 4K content so the 4K EDID can be used and the better screen can have a benefit. Note scalers do add frame latency and can affect image quality based on the quality of the scaler. Therefore, it is always ideal to use destinations with similar capabilities for optimal performance.

Audio can be impacted just as easily. If a destination is 6-channel surround sound capable and the other destination is not, then the EDID from the 5.1 destination cannot be used, or there will be no audio on the other destination. In most commercial installations, it should not be an issue to choose the lowest common denominator, which is 2-channel 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 audio and the other 1080p with multichannel 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 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 the 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 850Mbps without USB data. With USB data make sure full 1Gbps is available.

### 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 almost 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

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 (93~830)
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. Connect a 1GbE network switch and make certain IGMP Snooping, IGMP Querier, and Jumbo Frames(MTU 1600+) are enabled as per the VPX Series Network Switch Recommendations and Configuration document which can be found on the Aurora website. VPX requires a frame size of 1600MTU or greater for full 4K video streaming but should work on most modern-day switches without jumbo packets.
2. Connect CAT cable RJ-45 accordingly to the network switch and to the VPX units.

### 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, hold the MENU button for 6 seconds to switch modes. The VPX-TX1-WP2 is always an Encoder.
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-TX1-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 through 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 will also be 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, hold the MENU button for 6 seconds to switch modes. The VPX-TX1-WP2 cannot be switched to Decoder.
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 through 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® Option

This is done with licensing which can be obtained by an authorized Aurora dealer. Once the license is enabled, Dante will be operational. AES will be available at the end of 2022 with a firmware update for the software version.

### 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 all encoder sources, if possible, are outputting at the same resolution, frame rate, color space, and HDCP capability. If using sources with differing resolution, frame rate, color space, or HDCP support, enable HDCP Fastswitch mode on the encoder and/or set the scaler on the decoder to the display's native resolution.***
- ***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.***
- ***Remember to setup EDID for proper operation.***

## 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. Default username and password is “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.**

### Encoder Mode Web Pages

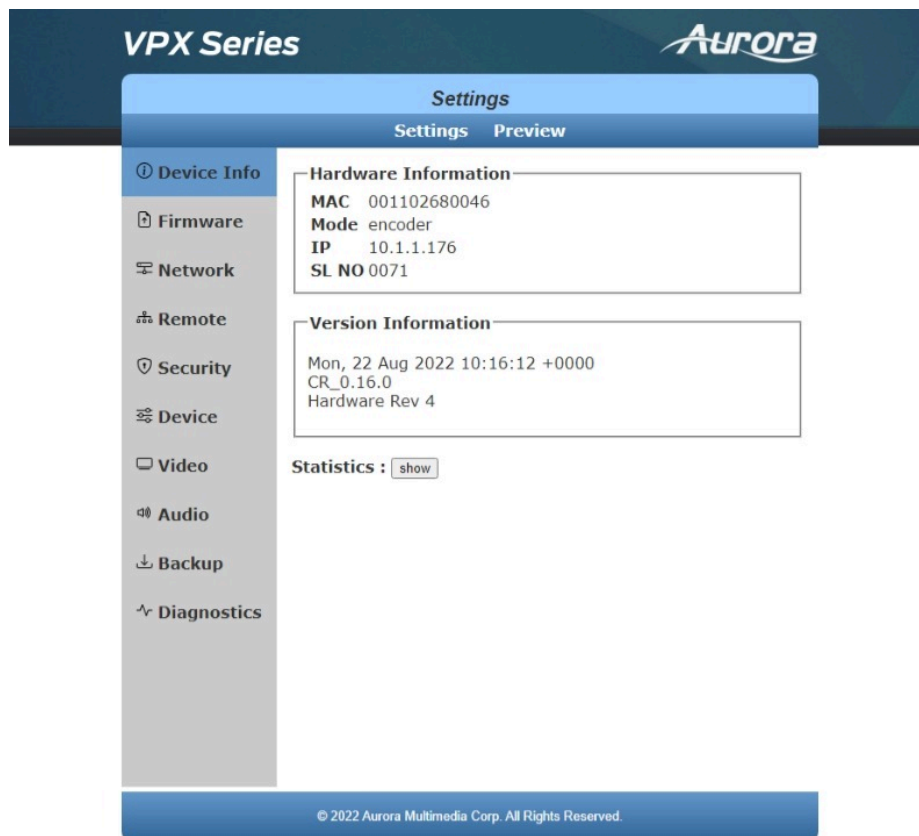
The Encoder pages are comprised of 2 tabs, Settings, and Preview. Settings has 10 sub selections as described below.

#### 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.

**Statistics** is very useful when diagnosing the unit as it reveals important 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.



## Firmware

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





## Network

The Network tab allows the setup of the IP address, Subnet, and Gateway. The Host ID and Host Name must be unique for every unit. The VPX has an internal network switch and another great 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. The 'Network' tab is selected in the left-hand navigation menu. The main content area is divided into two sections: 'IP Mode' and 'VLAN'.  
**IP Mode:** Radio buttons for 'Auto IP', 'DHCP' (selected), and 'Static'. Below are three input fields for IP address, subnet, and gateway, with values 10.1.1.176, 255.255.255.0, and 10.1.1.1 respectively. An 'Apply' button is below these fields.  
**Host ID:** An input field with the value '0071' and an 'Apply' button. A note below states: 'Note: Host id should be a 4 digit value (ranging from 0000-9999)'.  
**Host Name:** An input field with the value 'vpx-series' and an 'Apply' button.  
**VLAN:** A section titled 'VLAN' with an 'Enable VLAN' checkbox (unchecked). Below are two input fields: 'Video Port:' and 'Dante Port:'. The 'Dante Port:' field has an 'Apply' button. A note below states: 'Note: Ports can have values ranging from 2 to 4095'.  
At the bottom of the page, there is a copyright notice: '© 2022 Aurora Multimedia Corp. All Rights Reserved.'

## Remote

The Remote tab has options pertaining to RS-232 settings for the Serial over IP.

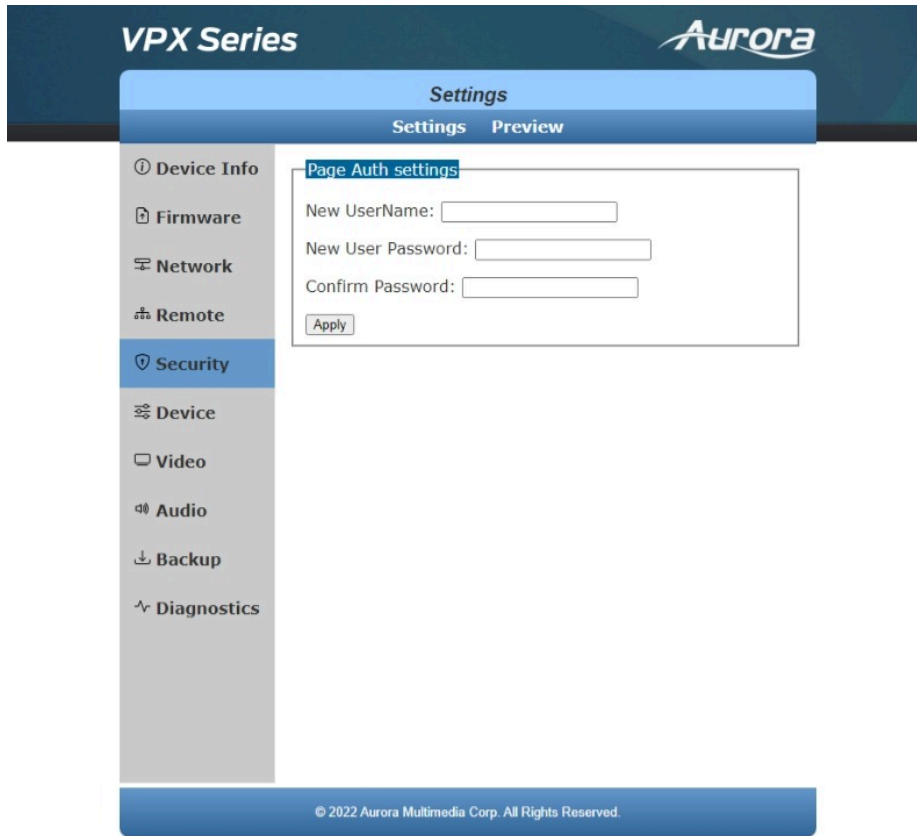
The screenshot shows the Aurora VPX Series Settings interface. The top navigation bar includes 'Settings' and 'Preview'. A left sidebar lists various settings categories: Device Info, Firmware, Network, Remote (selected), Security, Device, Video, Audio, Backup, and Diagnostics. The main content area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

- Enable Serial over IP
- Operation Mode:**
  - Redirection
  - Telnet
- Redirect to:**
  - Remote Username:
  - Remote Password:
- Baudrate Setting:**
  - Baudrate: 115200
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
- 

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## Security

Change the password settings for the VPX from this web page.



The screenshot shows the Aurora VPX Series Settings interface. The top navigation bar includes "VPX Series" and the "Aurora" logo. Below this is a "Settings" header with "Settings" and "Preview" tabs. A left sidebar lists various settings categories: Device Info, Firmware, Network, Remote, Security (highlighted), Device, Video, Audio, Backup, and Diagnostics. The main content area is titled "Page Auth settings" and contains three input fields: "New UserName:", "New User Password:", and "Confirm Password:". An "Apply" button is located at the bottom of the form. A footer at the bottom of the page reads "© 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 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.

Factory default and reboot can also be selected from this page.



## Video

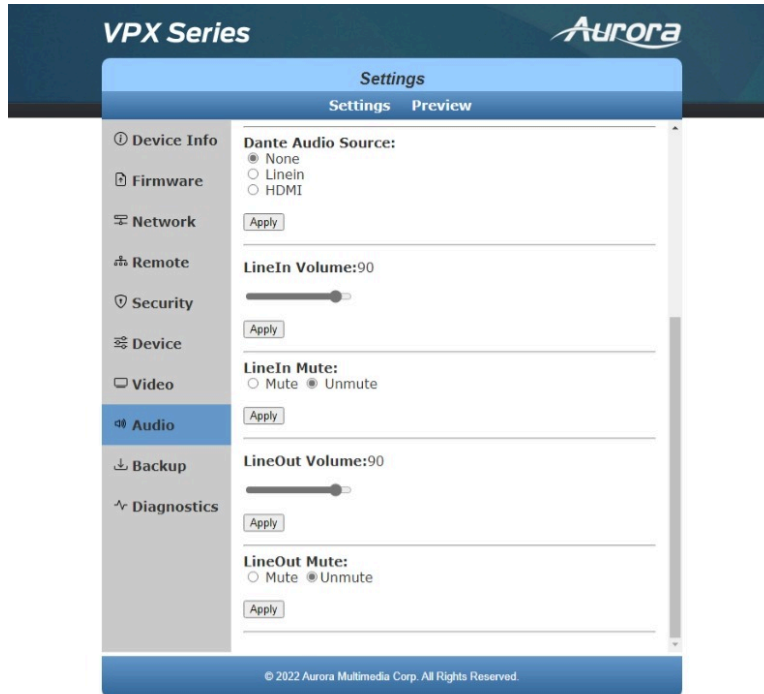
From this page you can select the local HDMI In 1 or 2. In addition the HDCP for the encoder can be set for compatibility or to turn it off so it forces a device to no HDCP which is useful for Video Conferencing devices.

HDCP fast switch mode allows for improved switching speed by forcing same-level HDCP encryption on any connected input, including those which do not use HDCP. This removes the need for repeated handshaking when switching between streams as the HDCP encryption level stays constant. Do not enable this feature if any of the displays do not support HDCP.



## Audio

Audio allows the routing of the various audio combinations including volume levels.



## Backup

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



## 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. Very useful when there are many units in a rack to quickly identify the location.

The page also has console enable for debugging and the ability to send commands directly to the unit for testing.



## 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.

**Statistics** is very useful when diagnosing the unit as it reveals important 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.



## Firmware

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



## Network

The Network tab allows the setup of the IP address, Subnet, and Gateway. The Host ID and Host Name must be unique for every unit. The VPX has an internal network switch, and another great feature is the ability to set VLAN for the Video and the Dante Audio.

The screenshot shows the 'Settings' page for the 'VPX Series' in the 'Network' tab. The interface includes a sidebar with navigation options: Device Info, Firmware, Network (selected), Remote, Security, Device, Video, Audio, Backup, Channel map, PIP, and Diagnostics. The main content area is titled 'Settings' and has sub-tabs for 'Settings', 'Preview', and 'VideoWall'. Under 'IP Mode', there are radio buttons for 'Auto IP', 'DHCP' (selected), and 'Static'. Below this are three input fields for IP address (10.1.1.176), Subnet (255.255.255.0), and Gateway (10.1.1.1), followed by an 'Apply' button. The 'Host ID' section has an input field with '0071' and an 'Apply' button, with a note: 'Note: Host id should be a 4 digit value (ranging from 0000-9999)'. The 'Host Name' section has an input field with 'vpx-series' and an 'Apply' button. The 'VLAN' section has a checkbox for 'Enable VLAN' (unchecked), input fields for 'Video Port' and 'Dante Port', and an 'Apply' button. A note at the bottom states: 'Note: Ports can have values ranging from 2 to 4095'. The footer contains the copyright notice: '© 2022 Aurora Multimedia Corp. All Rights Reserved.'

## Remote

The Remote tab has options pertaining to RS-232 settings for the Serial over IP. It also allows the selection of the encoder associated to the decoder from this page and to send an EDID to it.



## Security

Change the password settings for the VPX from this web page.



The screenshot displays the Aurora VPX Series web interface. At the top, the header includes "VPX Series" and the "Aurora" logo. Below the header is a "Settings" tab, with sub-tabs for "Settings", "Preview", and "VideoWall". A left-hand navigation menu lists various settings categories: Device Info, Firmware, Network, Remote, Security (highlighted in blue), Device, Video, Audio, Backup, Channel map, PIP, and Diagnostics. The main content area shows the "Page Auth settings" section, which contains three input fields: "New UserName:", "New User Password:", and "Confirm Password:". An "Apply" button is located below these fields. At the bottom of the interface, a 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 last active.

CEC allows the testing of CEC commands.

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.

Factory default and reboot can also be selected from this 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, Remote, Security, Device (highlighted), Video, Audio, Backup, Channel map, PIP, and Diagnostics. The main content area is titled 'Settings' and contains the following sections:

- Device Type:** (Changing device type will cause the device to restart)  
 ENCODER  DECODER  
[Apply]
- Auto Sense:**  Enable  Disable  
Priorities:  
IN Port 1: [1] [v]  
IN Port 2: [1] [v]  
Stream : [1] [v]  
[Apply]
- CEC Commands:**  
[TV OFF] [v] [Send]
- Front Panel Lock:**  Enable  Disable  
[Apply]
- [Factory Default] [Reboot]

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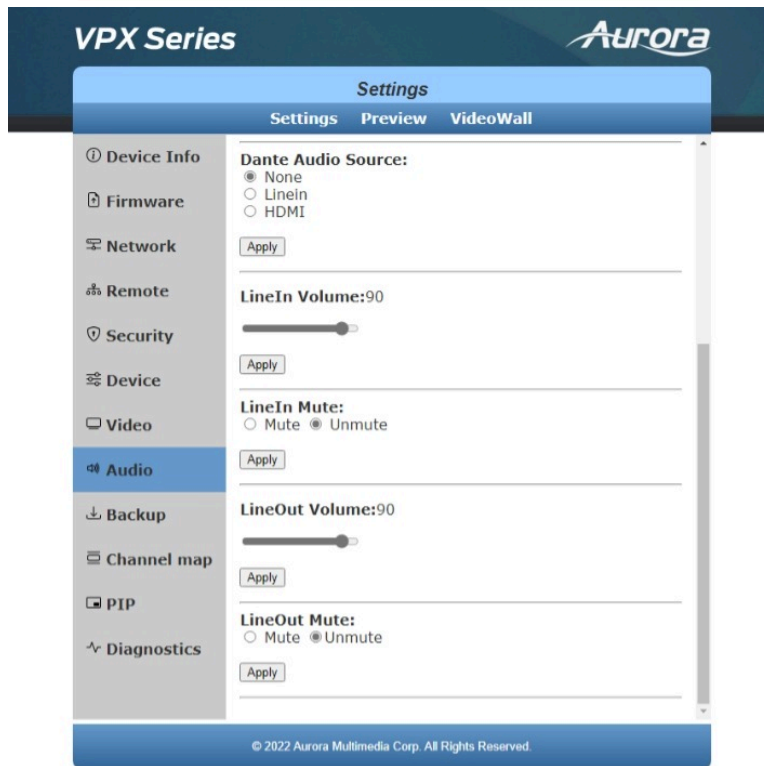
## Video

From this page you can select the source and set scaler resolutions. Setting the scaler to the display's native resolution will greatly 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.



## Audio

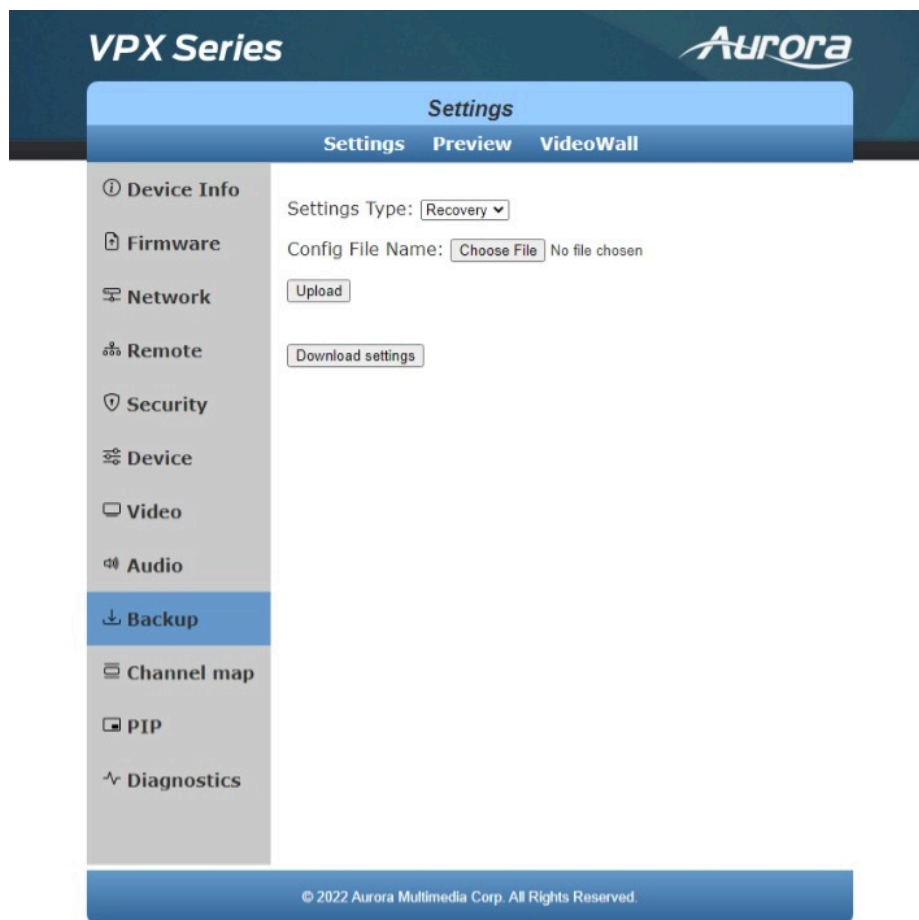
Audio allows the routing of the various audio combinations including volume levels.





## 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

The channel map feature allows the uploading of a comma delimited file (csv) to configure the decoders access to encoder units. The file can be formatted to a channel number, channel labeling, and a description. Once uploaded anything in the table will be selected from the decoders up and down buttons, IR remote, or a command from a control system. To the end user the unit will appear to behave like a cable tuner box.

Bitmap File is for the OSD display when there is no signal.



## PiP

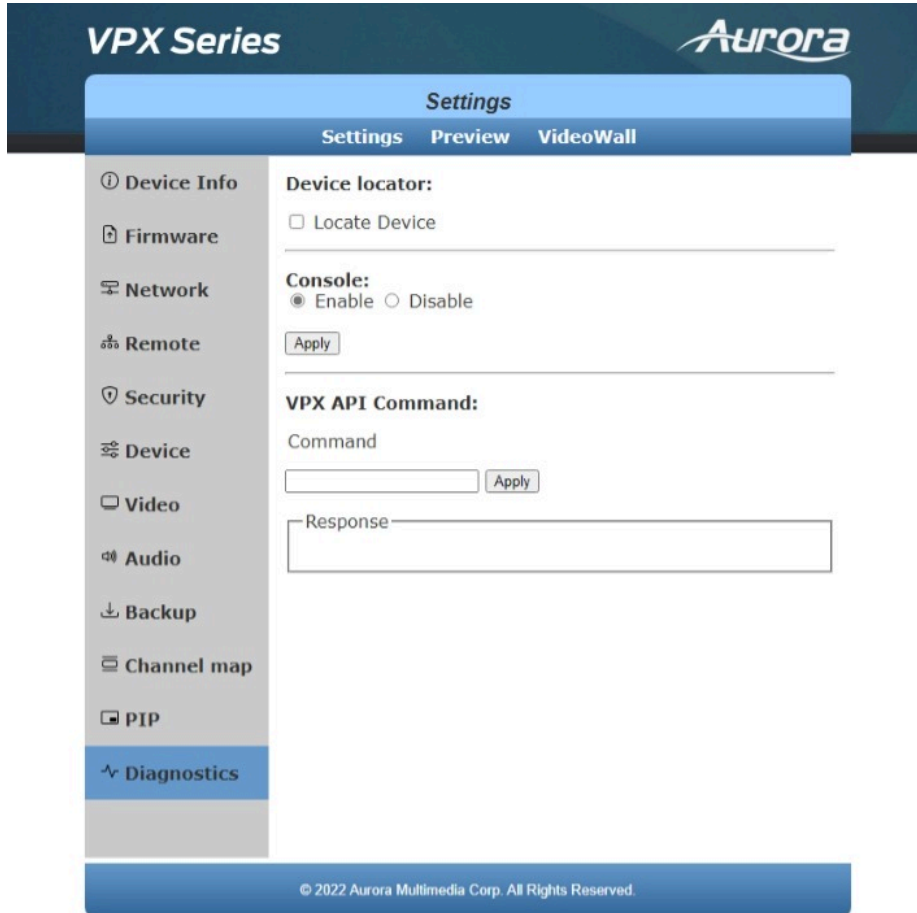
This will enable or disable the Picture in Picture function on the VPX.



## 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. Very useful when there are many units in a rack to quickly identify the location.

The page also has console enable for debugging and the ability to send commands directly to the unit for testing.



## 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 videowall can be configured.

### VPX Series Aurora

#### 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: "This" device connected by your browser

Show OSD

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## VPX Series

### Aurora

#### Video Wall

Settings Preview VideoWall

Advanced

**Step 1:** Choose Control Target

←	↓	↓	↓	↓	↓	↓
▶	This	r0c1	r0c2	r0c3	r0c4	r0c5
▶	r1c0	r1c1	r1c2	r1c3	r1c4	r1c5
▶	r2c0	r2c1	r2c2	r2c3	r2c4	r2c5
▶	r3c0	r3c1	r3c2	r3c3	r3c4	r3c5
▶	r4c0	r4c1	r4c2	r4c3	r4c4	r4c5
▶	r5c0	r5c1	r5c2	r5c3	r5c4	r5c5
▶	r6c0	r6c1	r6c2	r6c3	r6c4	r6c5

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:

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

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

Console API Command:

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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.

### 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

◀ ▶ Move    ● Ok



Current Video Info

-----

Progressive HDMI

1920X1080 60Hz

HDCP: On

Refresh

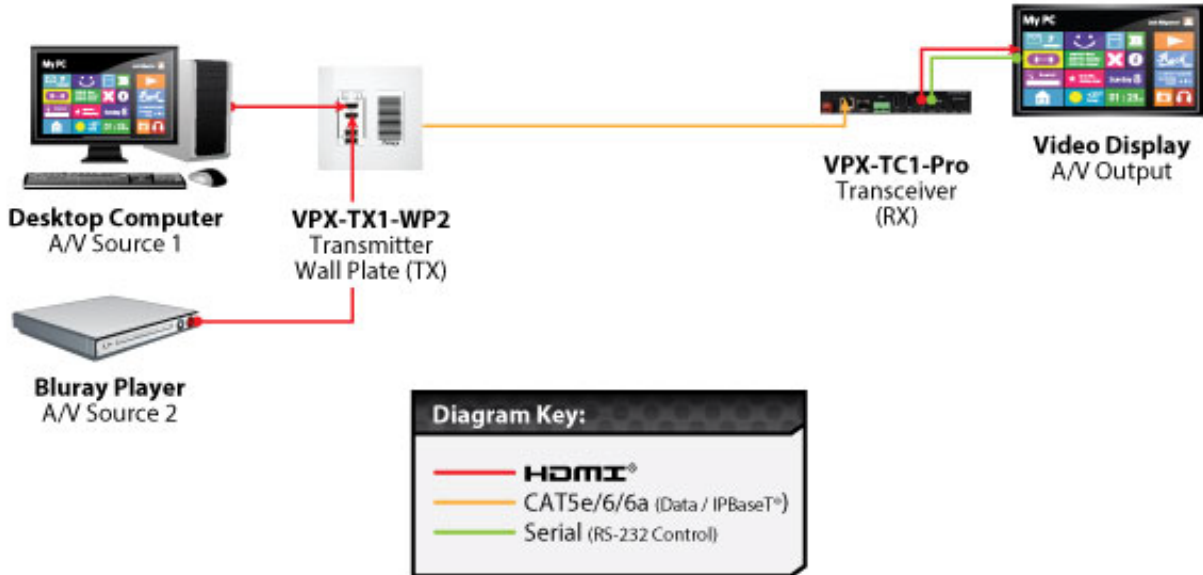
Connect



## APPLICATIONS

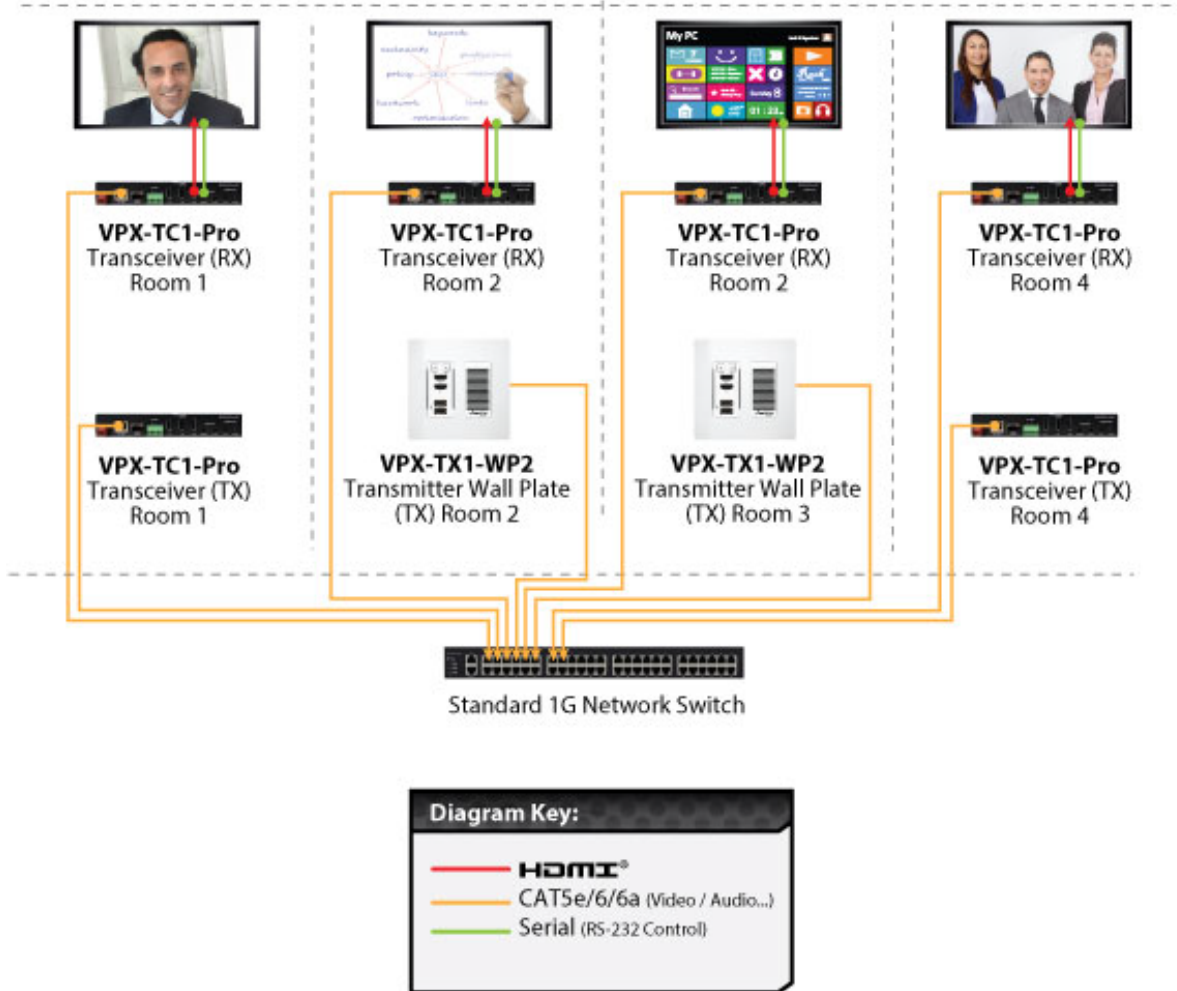
### Example 1: VPX-TX1-WP2 to VPX-TC1 Decoder (point-to-point)

When the VPX Series is connected point to point, no configuration is required, as the units will auto identify and make a tunnel between both ends for the video, audio, RS-232, IR, USB, and Ethernet. With the copper version a maximum distance of 100m (328ft) can be achieved.



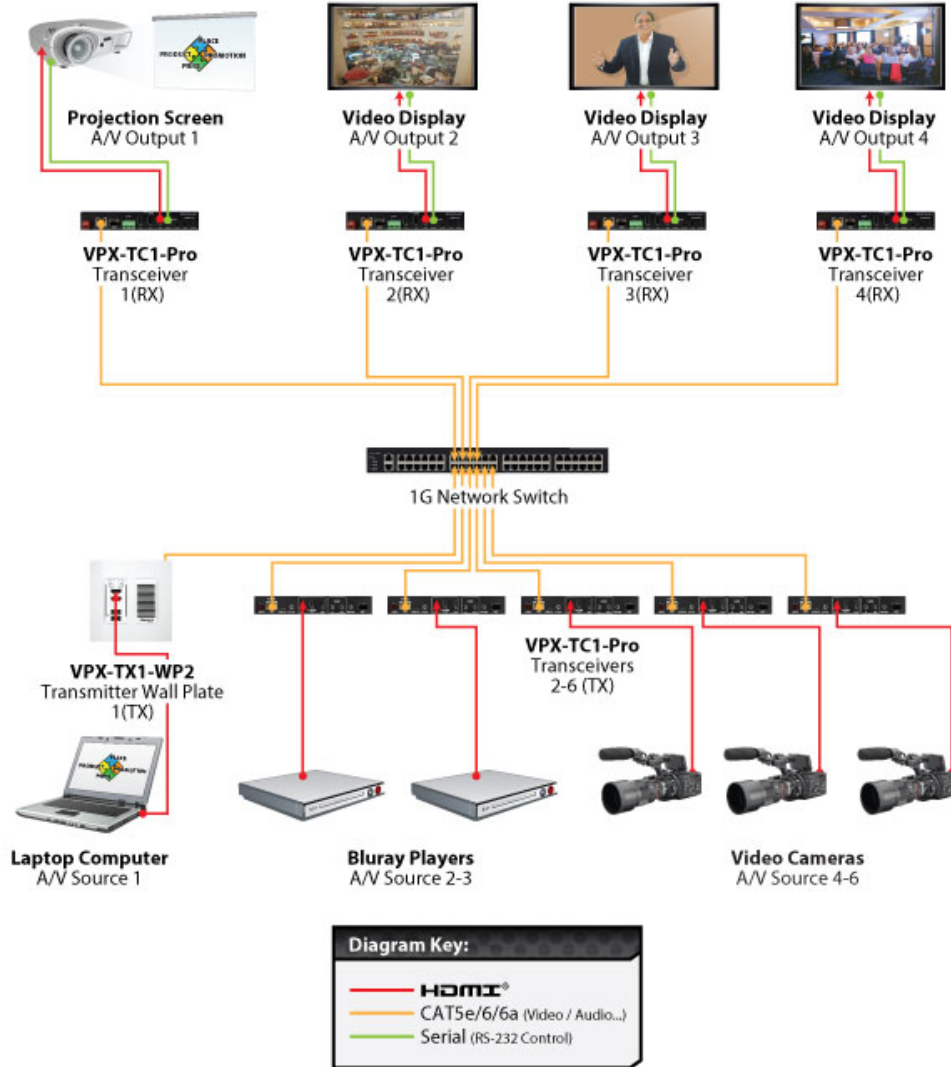
## Example 2: VPX Multi-Room

The VPX Series is perfect for multi-room applications with its flexibility. A nearly 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.



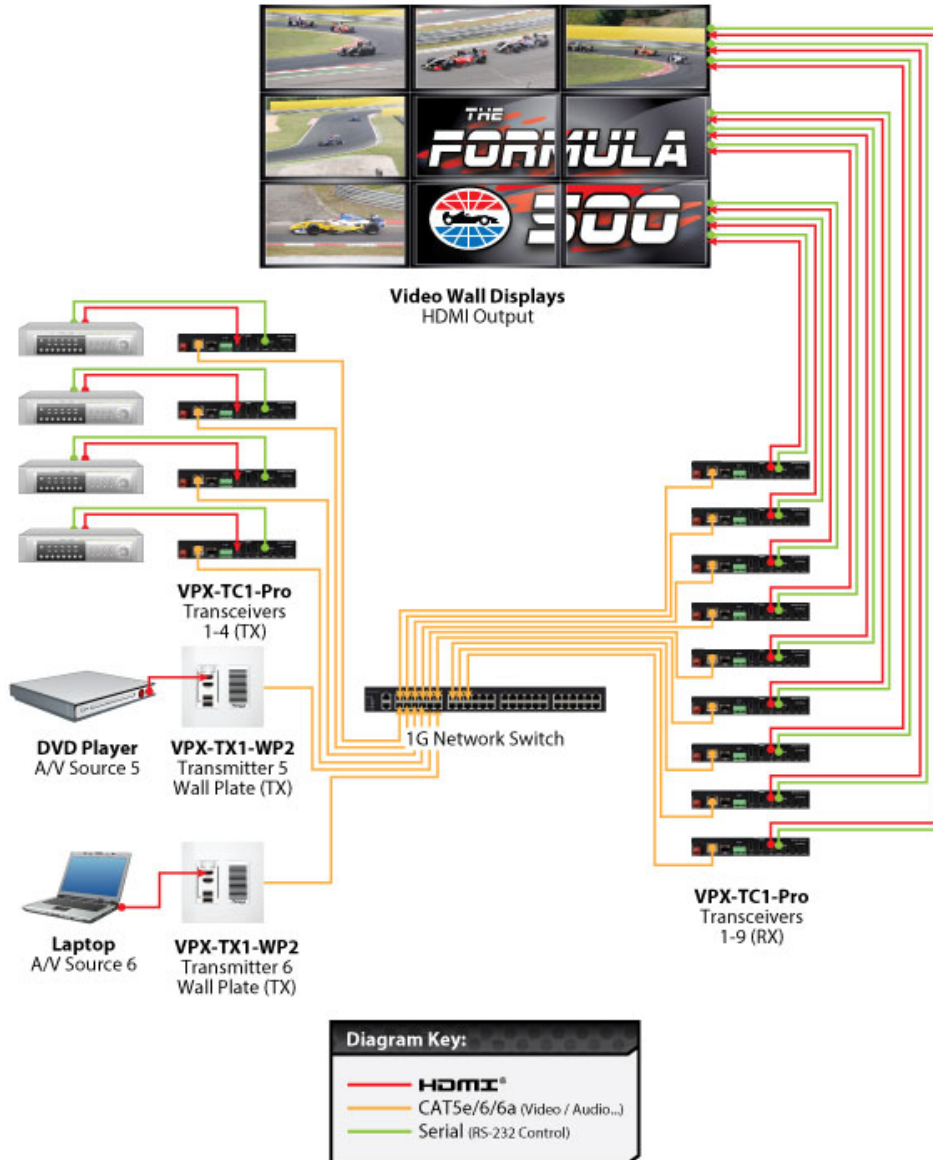
## Example 3: Matrix – Multiple VPX to Multiple VPX

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 is no longer a premium.



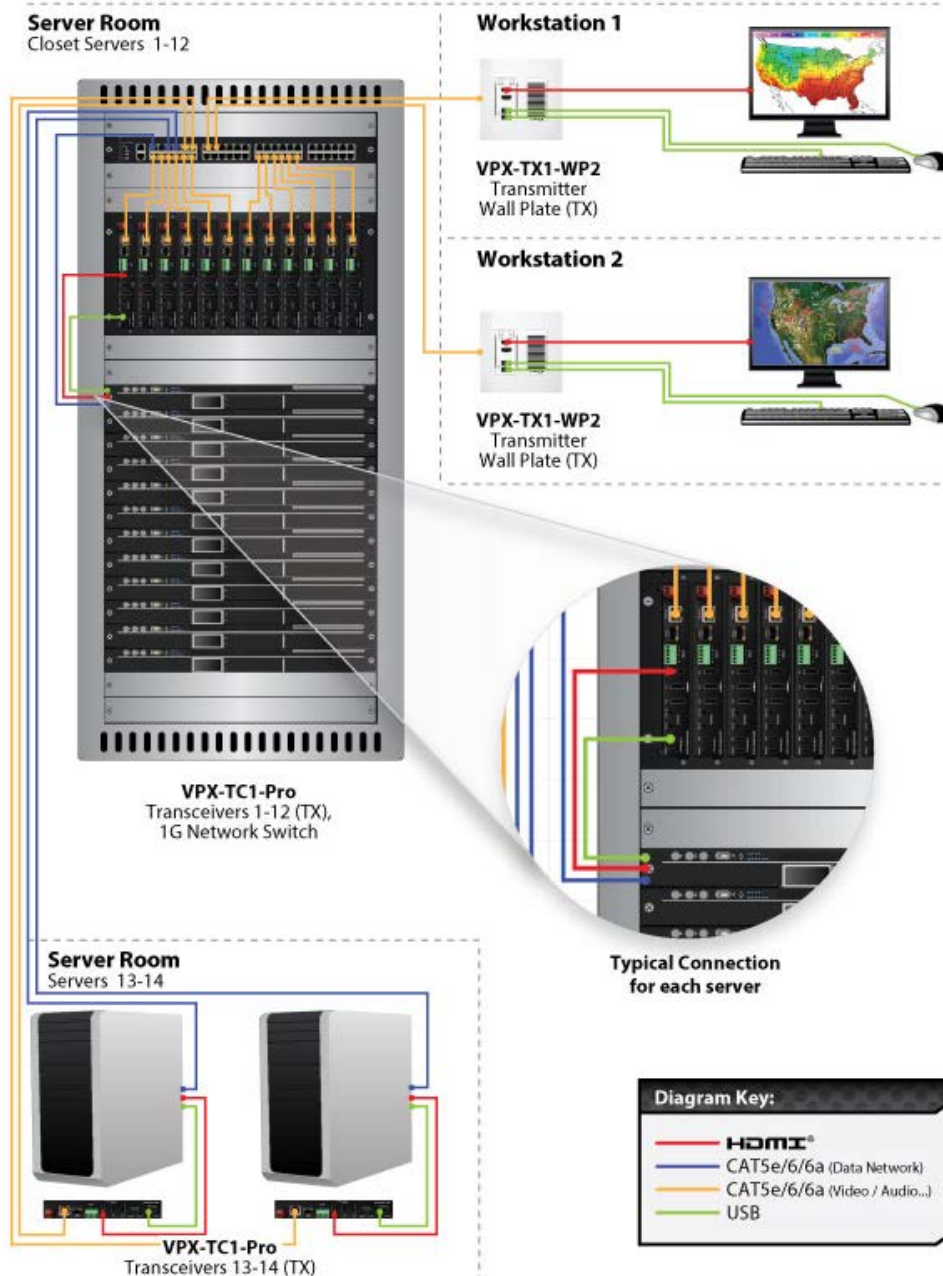
## Example 4: Video Wall

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



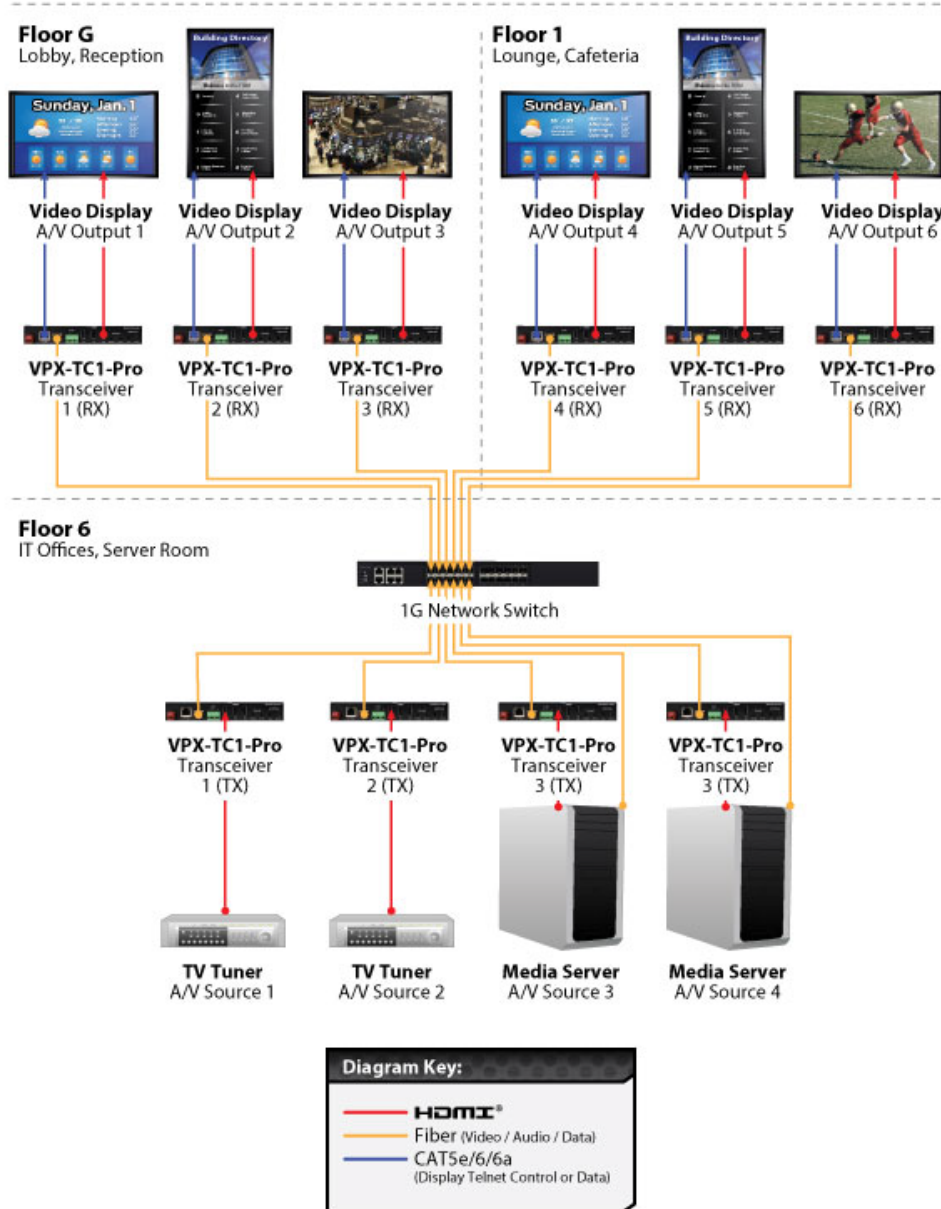
## Example 5: KVM Utilizing USB 2.0

Command & Control and NOC centers are perfect for the VPX Series, especially with the USB 2.0 running at a full 170Mbps. 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 floating 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.



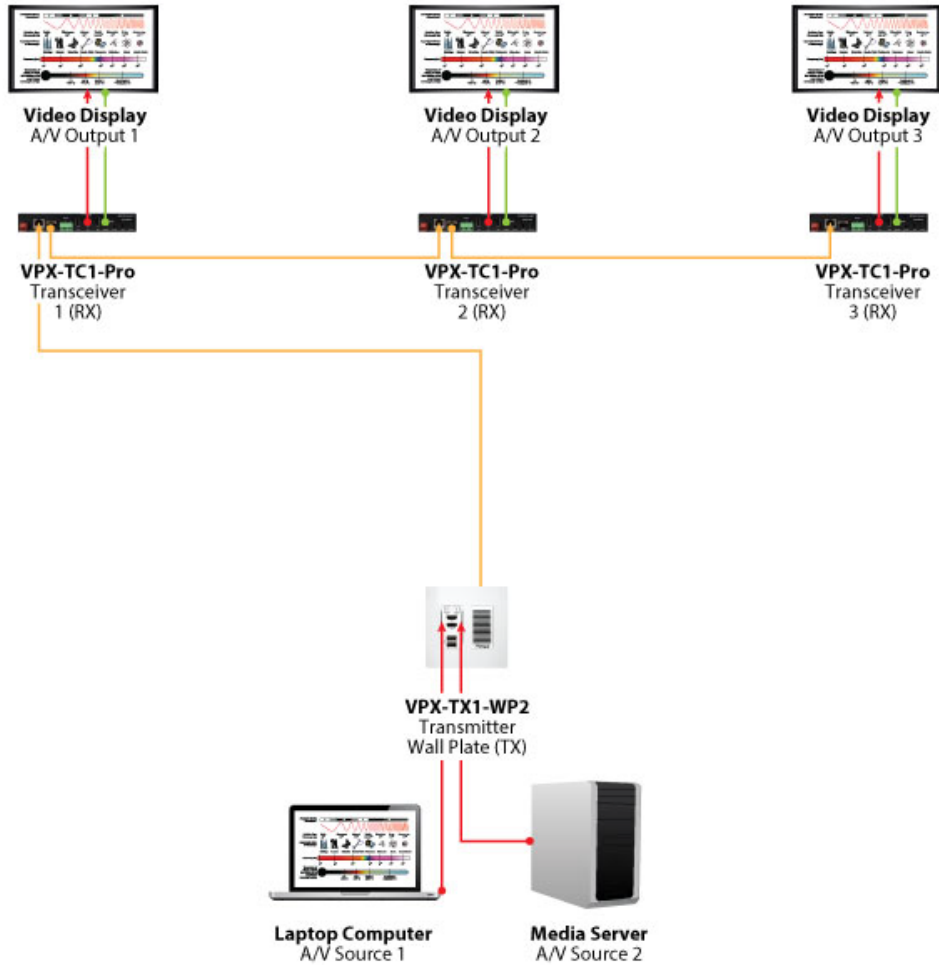
## Example 6: VPX-TC1-PRO with Local Ethernet Control

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 power by PoE. Following units would require local power. If a unit in the chain is not power or has an issue the remaining units in the chain will no longer function.

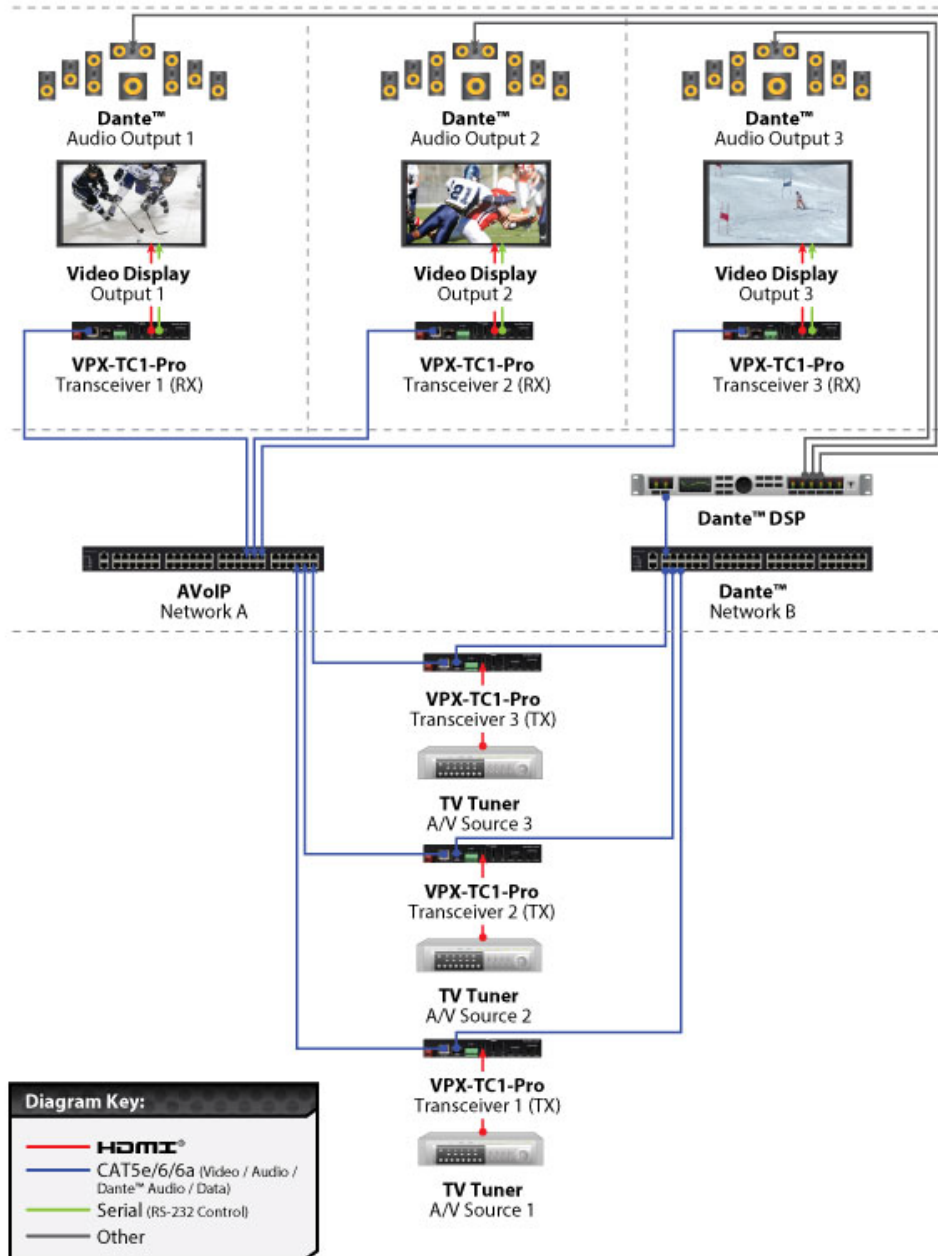


**Diagram Key:**

- HDMI®
- CAT5e/6/6a (Video / Audio)
- Serial (RS-232 Control)

## Example 8: VPX-TC1-PRO Independent Dante®/AES67 Switch

In some cases, it may be desired to have the Dante® on its own Ethernet Switch. The VPX-TC1-PRO has a mode allowing the traffic of the Dante®/AES67 to only be assigned to one of the 2 LAN ports.

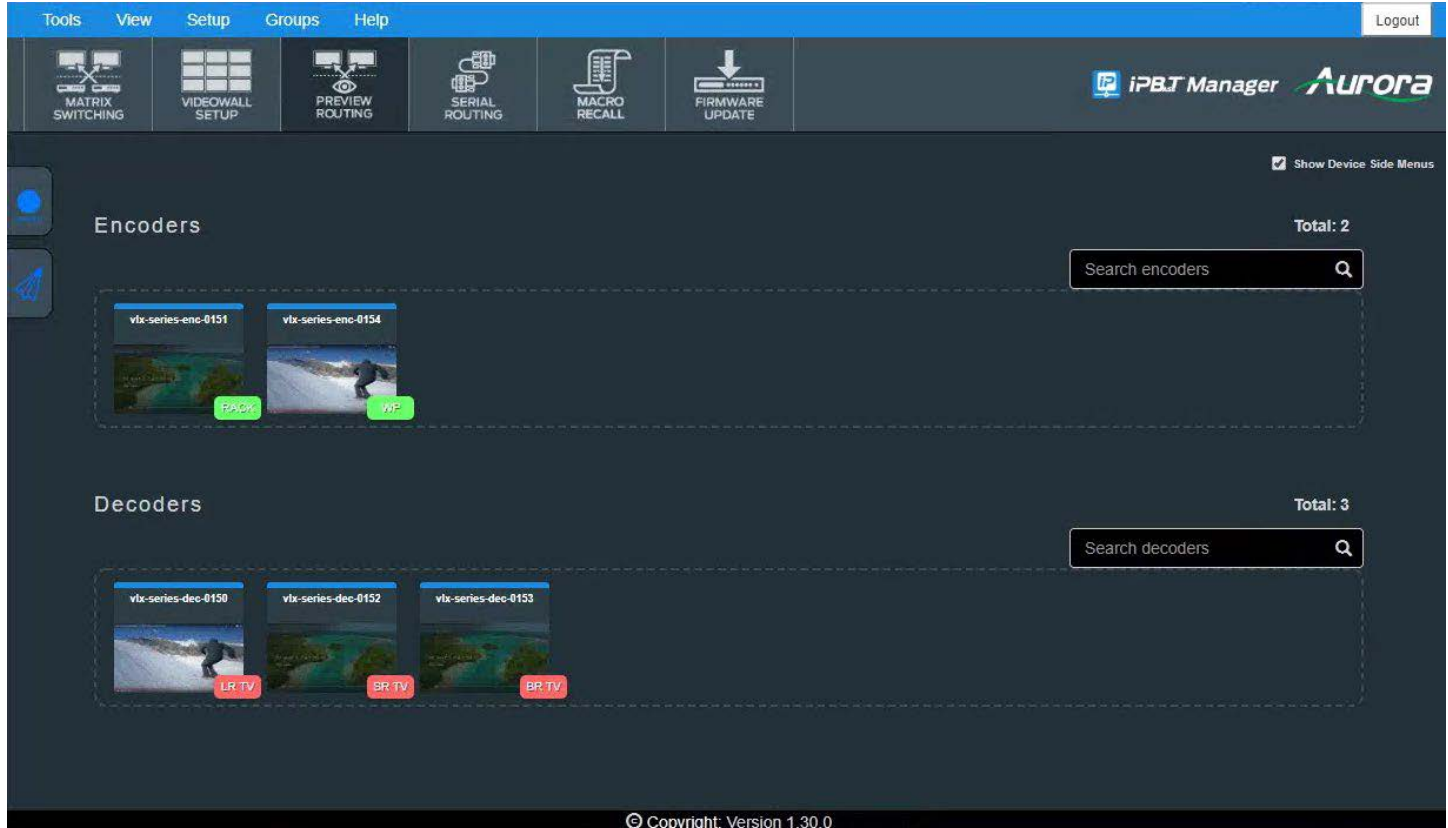




## SOFTWARE

### IPBaseT Manager PC Control Tool

The IPBaseT Manager is a 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

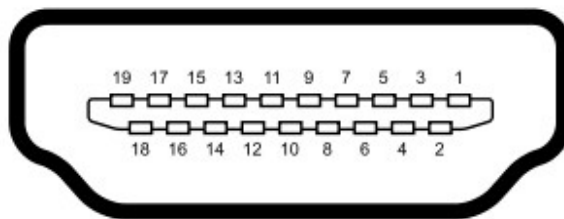
- Matrix Switching
- Video Wall Setup and Control
- RS-232 Routing and Control
- IR (Infrared) Remote Control Routing
- Horizontal and Vertical Viewing
- Macro Store and Recall
- Connection Manager

- 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 detail 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

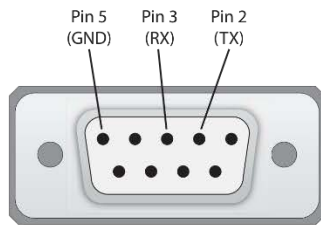
The RS-232 is a 3.5mm TRS connector. Tip is TX (output), ring is RX (input), and Sleeve is ground. To simplify connections Aurora offers pre-molded RS-232 cables in null and none nulled in male and female DB9.

### CA0052 Selection Guide

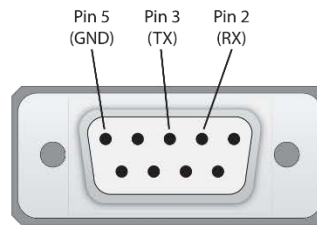
#### CA0052 (all versions) TRS Male



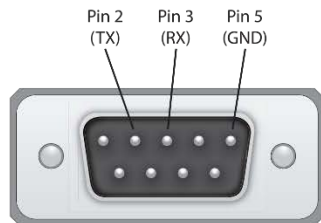
#### CA0052-F2T3R DB9 Female (Crossover)



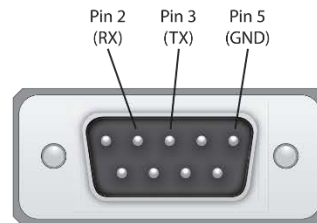
#### CA0052-F3T2R DB9 Female (Straight)



#### 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 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.

#### Display Will Not Show a Picture

- All devices are powered on.
- Unit is set properly for Decoder. LED status will show this.
- Check routing with IPBaseT Manager.
- A picture is achieved when connecting the source directly to the display.
- 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.
- All the cables are qualified.
- The Switch supports IGMP snooping and this function is enabled.
- Look at status LED and make certain unit is linked. The enter button on the front changes the link status.

#### 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 on 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 volume on 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 (SoIP).

### **Routing a Source to Multiple Displays is Tearing**

- Check network switch is properly configured for IGMP and supports Jumbo packets. VPX requires Jumbo Frames/MTU 1600 or higher for full 4K video streaming.

### **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 as 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. Some displays will not scale or use memory and just sync to the native signal.

### **Audio is Different Between Displays or the Analog Output**

- If displays are different brands this can happen based on the design. It is always ideal to use 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 updates firmware through the web interface of the unit. If 0.18.1 or higher which will also update firmware through IPBaseT manager or ftp, make certain you are using the latest IPBaseT manager that supports the VPX. This can be found on the Aurora portal. If not in secondary mode to reattempt firmware update press and hold UP and DOWN while applying power. The OLED display will show "Secondary" mode alongside the device IP.



## APPENDIX 2

### Firmware Update

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

You must be signed 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 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 be signed up to the Customer Portal in order to download IPX 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 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, Jumbo packet 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 topology. 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/850Mbps 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 mean that every packet will be transmitted to all possible destinations. This is why any network switch used with VPX Series has to 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 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 to always enable 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 Query
7. Enable IGMP Query on VLAN1
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 should be standard function but if not, it may need to be enabled. VPX requires Jumbo/MTU Packet of 1600 or better for full 4K60 4:4:4 video streaming.

## **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
<b>Technical</b>	
Compression	Mimix™ 14:1
Latency	1 Frames (16.6ms)
HDMI Inputs	2 (HDMI 2.0b, HDCP 2.2)
HDMI Outputs	1 (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
Audio Support	Up to 12 Channels
Video Stream Bandwidth	93Mbps – 850Mbps (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 2.0 Type C (Host for Camera) 1 USB 2.0 Type C (Host for HID/Mass Storage) 1 USB 2.0 Type A (Camera) 2 USB 2.0 Type A (HID/Mass Storage 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-TX1-WP2
<b>Technical</b>	
Compression	Mimix™ 14:1
Latency	1 Frames (16.6ms)
HDMI Inputs	2 (HDMI 2.0b, HDCP 2.2)
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 – 850Mbps (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 (Euro 4 Pin)
USB Connector	1 USB 2.0 Type C (Host for Camera) 1 USB 2.0 Type C (Host for HID/Mass Storage) 1 USB 2.0 Type A (Camera) 2 USB 2.0 Type A (HID/Mass Storage Devices)
Expansion Port	Dante® 2Ch/8Ch and ReAX™
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	6.4 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-TX1-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.



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