

# Digital Video

## VLX Series

Visual Lossless Low Latency  
4K AV IP Distribution over 1GbE Switching



## 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 only 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 the ventilation slots if applicable on the product or place any heavy object on top of it. Blocking the air flow 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 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

All trademarks in this document are the properties of their respective owners.



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• *iPBaseT Revolutionary 4K2K AV Distribution System*

iPBaseT® technology combines 4K uncompressed video with zero-latency seamless switching, video wall and multiviewer modes, digital audio, USB 2.0, Ethernet, and control. Utilizing the bandwidth of a standard 10G copper or Fiber Optic networks, iPBaseT supports a large, seamless UHD Video and audio matrix, and it does so while replacing multiple technologies and products with a single-box distributed platform. The days of needing a separate AV switcher, control system, video-wall processor, audio/DSP converter, and more are a thing of the past!

*VLX Series:*

The VLX Series Products provides one of the most advanced IP Streaming solutions on the market utilizing Aurora's iPBaseT technology, which synergizes various IP/AV standards to work together as one. It is the industry's first 4K UHD transceiver with only 1.5 frame (25ms) latency and visually lossless compression. The VLX-TCW2H has 2 HDMI® ports. Using a transmitter (encoder) and receiver (decoder), respectively, used to be the standard – until now. The VLX Series can be set up as either one to make installation, inventory, and troubleshooting easier.

AV COMPARISON CHART

	MATRIX	IP STREAMING	VLX	IPX
4K UHD with zero compression and zero latency	YES	NO	Visually Lossless Low Latency	YES
Transceiver topology for simplified inventory	NO	NO	YES	YES
Standard network switch infrastructure for easy scalability	NO	YES	YES	YES
Transceiver wall plate	NO	NO	YES	YES World's Only
Videowall processing	NO	YES	YES	YES
USB port to use as host or device	NO	NO	YES	YES
Full-bandwidth Gigabit Ethernet pass-through for data	NO	NO	NO	YES
Easy field serviceability	NO	NO	YES	YES
Integrated 2-input to 1-output HDMI® switch	NO	NO	YES	YES
Seamless switching	Premium Cost	Premium Cost	Fast Switch	YES
Configure any IPX/VLX as TX or RX on the fly	NO	NO	YES	YES
ExtremeUSB® (USB 2.0 480Mbps) option	NO	NO	Integrated USB 2.0 Not Extreme	YES
Dante® network audio option	NO	NO	YES	YES

**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**

**VLX-TC1-C**

- 1 qty VLX-TC1-C 1G RJ-45 Copper Tranceiver Unit
- 2 qty Mounting Ears and screws

**Wall Plate 2 Gang Versions**

**VLX-TCW2V-C**

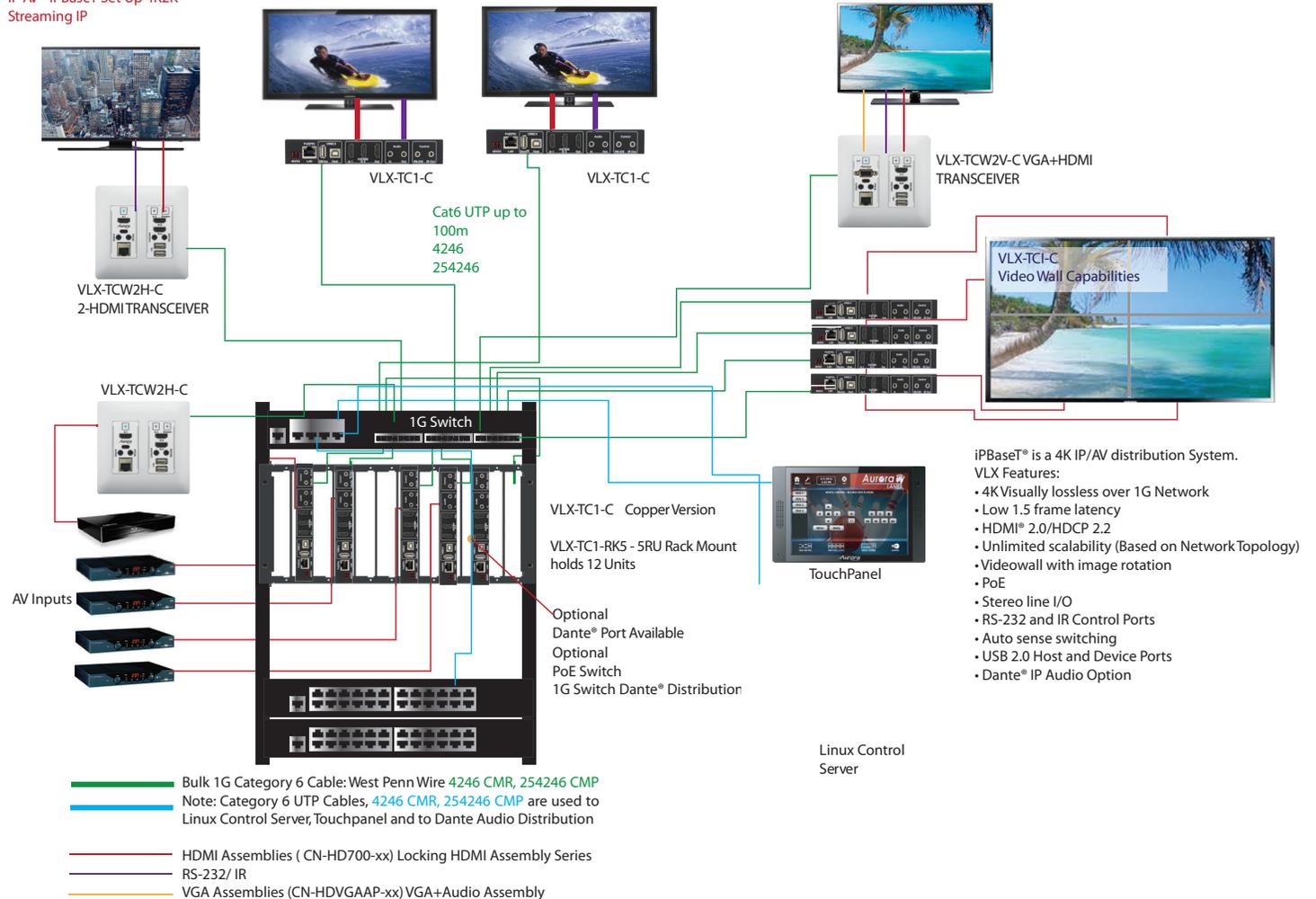
- 1 qty VLX-TCW2V-C 1G RJ-45 Copper Tranceiver Unit with VGA and HDMI inputs

**VLX-TCW2H-C**

- 1 qty VLX-TCW2H-C 1G RJ-45 Copper Tranceiver Unit with Two HDMI Inputs

Power supplies are sold separately.

IP AV - iPBaseT Set Up 4K2K Streaming IP

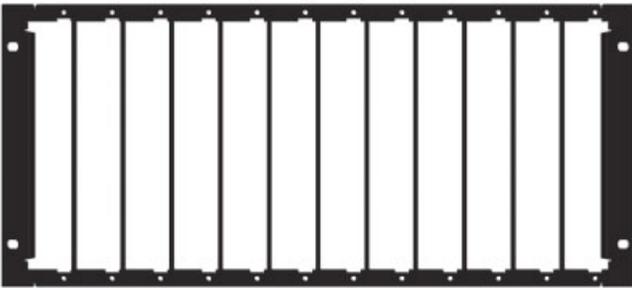


*Optional Accessories*

- VLX-TC1-RK1 (1RU Rack mount holds 2 units)  
Includes 4 Rails and 1 Blank



- VLX-TC1-RK5 (5RU Rack mount holds 12 units)  
Includes 24 rails and 4 Blanks



- VLX-TC1-BLK (Blank Plate for Rack Mounts)  
& VLX-TC1-RAIL (For VLX-TC1 use in rack mounts)



- VLX-DTE (Dante Option Card)



- DXB-8 ( 8 Button Wall Plate) Available in White or Black

- PS0081-1-US (48V 24 Watt PoE Injector) United States



## INTRODUCTION

### About

The VLX Series provides one of the most advanced IP Streaming solutions on the market utilizing Aurora's iPBaseT® technology, which synergizes various IP/AV standards to work together as one. It is the industry's first 4K UHD transceiver with only 1.5 Frame (25ms) latency and visually losses compression. Using a transmitter (encoder) and receiver (decoder), respectively, used to be the standard – until now. The VLX Series box or wall plates can be set up as either one to make installation, inventory, and troubleshooting easier.

Another industry first is the option slot to add other IP capabilities, like Dante® audio, for a more complete, distributed system. Audio, video, data, and control can be sent securely to one or many units using off-the-shelf 1G RJ-45 Ethernet switch. When the VLX is set up to be a transmitter, the 2 HDMI inputs (VLX-TC1-C, VLX-TCW2H-C) or VGA/HDMI inputs (VLX-TCW2V-2) 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 VLX 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 (480Mbps) for memory sticks. Each VLX USB feature can also be set as a host or a device. 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 VLX Series.

### Documentation

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

- VLX Series Network Switch Recommendation & Configuration
- QXP-2-VLX User Guide
- VLX Series Protocol Guide (Available only on Customer Portal)
- iPBaseT® FAQ (Frequently Asked Questions)
- iPBaseT® VLX Series AV Evolution for an Industry Revolution (Features and the benefits over tradition

Matrix)

- iPBaseT® Brochure

## Features

- Configure as Transmitter (Encoder) or Receiver (Decoder)
- 4K UHD Over 1G CAT5e/6/6a
- HDMI 2.0, HDCP 2.2
- Visually Lossless with only 1.5 Frame Latency
- 128 per source with HDCP, Larger for Non-Encrypted Sources
- Videowall with Image Rotation
- 1G LAN PoE
- 2 HDMI Inputs, 1 HDMI Output (VLX-TC1-C, VLX-TCW2H-C)
- 1 VGA/1 HDMI Inputs, 1 HDMI Output (VLX-TCW2V-C)
- Line In/Out Stereo
- RS-232 Serial Port & IR (In/Out)
- On Screen Display (OSD)
- Integrated Web Server for Configuration and control
- USB 2.0 Host and Device ports
- Two USB 1.1 for HID devices (VLX-TC1-C)
- Dante® IP Audio Option
- Front Keypad & IR Remote
- Rack & Under Table Mounting (VLX-TC1-C)
- 2 Gang Mounting for Wall plates (VLX-TCW2V-C, VLX-TCW2H-C)
- Available in White or Black (VLX-TCW2V-C, VLX-TCW2H-C)

\* 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. dimensions. dimensions.dimensions. dimensions. dimensions.dimensions.

**VLX-TC1-C Front**



**LEDs**

- Power/Status – Power will light green when unit is on or in standby. Status will blink at a normal pace during regular operation and slower pace when in standby.
- Encoder/Decoder – Encoder (transmit) or Decoder (receiver) will be lit when set accordingly.
- HDMI 1/HDMI 2 – Will light accordingly based on input selection. If both are lit, then it is the remote stream when set as a decoder. If neither is lit, then no source is routed.
- 232 TX/RX – Will blink when RS-232 data is being sent or received.
- IR TX/RX – Will blink when IR signal is being sent or received
- Host/Device – For USB option. Host will be lit if set for PC to be connected to the USB. Device will be lit if set for peripherals like keyboard or mouse is to be connected.

**Buttons**

- Power Button – Press and hold for 5 seconds for power standby.
- Menu Button – Press and hold for 5 seconds to switch between encode/decode mode.
- Up Button - Select next input source.
- Down Button - Select previous input source.
- Up/Down Button – Press and hold for 5 seconds to output IP info, at 9600 baud rate, on RS-232 port.

**Miscellaneous**

- IR Window – Future use for 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 IR photo receiver which is with carrier and inverted. Use a stereo 3.5mm TRS connector.
- USB HID – Dual Type A USB 1.1 Connectors for keyboard/mouse

Note: Default Settings - 9600 baud rate; default IP DHCP 169.xxx.xxx.xxx range; autosense of.

**VLX-TC1-C Rear**



**Rear**

**From left to right**

48VDC	48 Volt DC isolated power input.	
LAN		10/100/1000Mbps
LAN. Can power the unit with PoE from injector or switch.		
USB 2.0	480Mbps USB 2.0 Type A to be connected to a host (PC) or Type B for device (ex. Mouse, keyboard, etc.).	
HDMI In 1/ In 2	HDMI inputs up to 4K30p/4:4:4 or 4K60p/4:2:0.	
HDMI Out	HDMI Output to Display up to 4K30p/4:4:4 or 4K60p/4:2:0. Output can be native or scaled (e.g. from 1080p to 4K30p/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 downmixed to stereo (2 channel).	
Control RS-232	Serial port pass-through and control up to 115Kbps.	

**VLX-TCW2H-C Front**



**Buttons**

- In 1 – Selects HDMI Input 1 (Lights Red, Green, or Blue).
- In 2 – Selects HDMI Input 2 (Lights Red, Green, or Blue).
- Stream – Selects remote stream assigned when set as decoder (Lights Red, Green, or Blue). If held for 5 sec will switch between encode and decode modes. Stream button will light blue when in encode mode.

**Connectors**

- HDMI In 1/2 – HDMI inputs up to 4K30 4:4:4/4K60 4:2:0.
- HDMI Out – HDMI Output to Display.
- RS-232 – Serial port pass-through and control up to 115Kbps.
- IR Output – For InfraRed output of 30kHz-60kHz. Uses 3.5mm TS emitter.
- Audio In – Stereo audio input.
- Audio Out – Audio de-embedded output.
- Ethernet – 10/100 LAN.
- USB – 480Mbps USB 2.0 Type A to be connected to a host (PC) or device (ex. Mouse, keyboard, etc.).

**Miscellaneous**

- IR Window – Future use for IR remote or IR pass-through.

Note: Default Settings - 9600 baud rate; default IP DHCP 169.xxx.xxx.xxx range; autosense of.

**VLX-TCW2V-C Front**



**Buttons**

- In 1 – Selects VGA (Lights Red, Green, or Blue).
- In 2 – Selects HDMI Input 2 (Lights Red, Green, or Blue).
- Stream – Selects remote stream assigned when set as decoder (Lights Red, Green, or Blue). If held for 5 sec will switch between encode and decode modes. Stream button will light blue when in encode mode.

**Connectors**

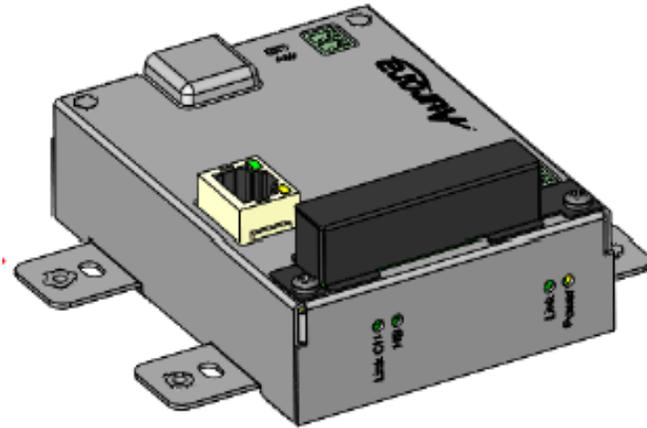
- VGA In – VGA input up to 1900 x 1200 @ 60Hz
- HDMI In – HDMI inputs up to 4K30/4:4:4 or 4K60/4:2:0.
- HDMI Out – HDMI Output to Display.
- RS-232 – Serial port pass-through and control up to 115Kbps.
- IR Output – For InfraRed output of 30kHz-60kHz. Uses 3.5mm TS emitter.
- Audio In – Stereo audio input.
- Audio Out – Audio de-embedded output.
- Ethernet – 10/100 LAN.
- USB – 480Mbps USB 2.0 Type A to be connected to a host (PC) or device (ex. Mouse, keyboard, etc.).

**Miscellaneous**

- IR Window – Future use for IR remote or IR pass-through.

Note: Default Settings - 9600 baud rate; default IP DHCP 169.xxx.xxx.xxx range; autosense of.

*VLX-TCW2H-C & VLX-TCW2V-C Rear*

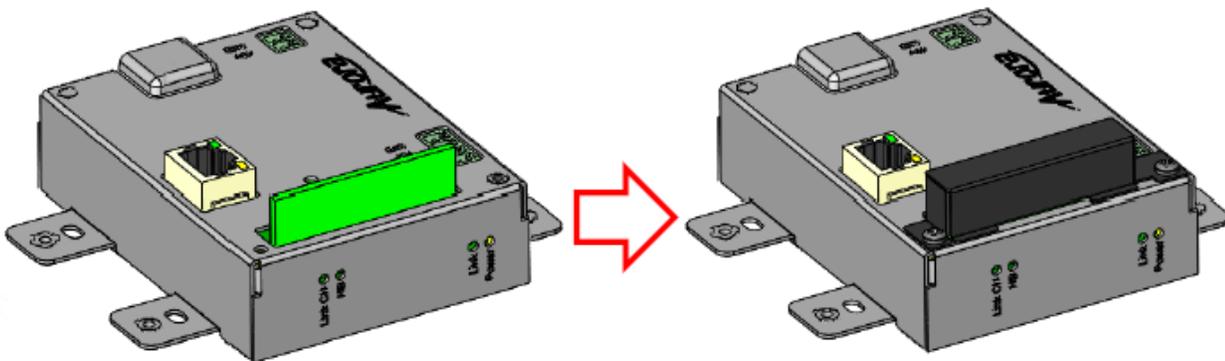


**Rear**

- 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 option. Cover supplied for card protection.

Wall plate versions require full 2 gang electrical box space. Some electrical boxes and mud rings do not accommodate the full size. VLX-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.

*VLX-TC1-C Dante Option Slot*



- Option Card Slot for Dante option.

Note: The MAC address for the Dante option will be on the card label.

## UNDERSTANDING THE BASICS

### Direct Connection with No Ethernet Switch

The VLX Series is designed to automatically tunnel the video, audio, USB, RS-232, and IR if they are connected without an Ethernet switch.

### 1GbE Ethernet Switch

It is important to use a non-blocking IGMP 1GbE switch with IGMP snooping and Jumbo packets. The size of the switch is based on the requirements of the project. With this in mind, consider 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 VLX, when set to encoder (TX), determines the bandwidth that will be multicast across the network. 24bit 4k@30Hz can peak at about 850Mbps and 425Mbps for 24bit 1080p@60Hz (Data Rate in bits per second = Color Depth x Horizontal Resolution x Vertical Resolution x Frame Rate) but typically averages 218Mbps for full motion 4K video. This does not include the 10/100 LAN, 480Mbps USB, RS-232, IR over the same transmission if required. If 10 units are set as encoders, and 4K@30Hz is the desired video resolution, then 8.5Gbps of bandwidth will be required if uplinked to another switch. If the available bandwidth between the two 1GbE switches is less than 8.5Gbps, then packets will drop and information will be lost. It is also a good idea to take into account 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. If bandwidth is tight the VLX has the ability to cap the bandwidth at 200Mbps which will work well for most applications. (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 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 has to 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 VLX units are connected to. Non-blocking switch assures full bandwidth is available for all ports as required.

### Controlling the VLX

To simplify control of the VLX, each unit can be controlled via. It can also be controlled from other Aurora control products or 3rd party control systems with the available VLX API. In order to obtain the VLX Server API commands you must be dealer status otherwise an NDA is required and is at the discretion of Aurora. The VLX can also work without the server as a 3rd party control can communicate directly to each unit to change settings or make routes. This makes the VLX extremely flexible and for low cost smaller systems very cost effective.

### Controlling the VLX 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 scalars do add frame latency and can affect image quality based on the quality of the scaler. This is why 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.

### Videowall Capabilities

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

### Ethernet Bandwidth Usage

The VLX streaming bandwidth is dynamic with the compression a low fixed 8:1 compression. With no USB activity and a still image fed into a decoder the VLX will use as little as 216Kbps of network bandwidth. Maximum throughput is 820Mbps.

#### USB Network Bandwidth Requirement:

- 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 won't 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 long, iso packets may be discarded and causes audio glitch. It is important to use fast-leave high quality switches for this application.
- For most of USB devices, the network bandwidth requirement will be almost the same as what it takes on USB bus.

#### Typical Video Network Bandwidth:

- Still frame < 216Kbps
- Web browsing 70-100Mbps (1920x1080) 60fps
- YouTube full screen 21-132Mbps (1920x1080) 60fps
- Movie average 165-315Mbps (1920x1080) 60fps

## HARDWARE INSTALLATION

### Network Setup

1. Connect a 1GbE network switch and make certain IGMP Snooping features are enabled.
2. Connect CAT cable RJ-45 accordingly to the network switch and to the VLX units.
3. Connect a QXP-2-VLX Server to the network switch and power on. Follow instructions for the QXP-2-VLX to set the IP address for remote control.

### 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 euro connector or PoE via LAN connection. Unit will take about 30 seconds to initialize.
3. Make certain the unit's LED is set to Encode. If not, for box version use the front menu button by holding for 5 seconds or the stream button on the wall plate version.
4. For the box version select the input to be streamed using the front up or down buttons to choose HDMI 1 or 2. The HDMI 1/2 LED will light accordingly.
5. Every VLX unit has a unique MAC and IP addresses. It 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 euro connector or PoE via LAN connection. Unit will take about 30 seconds to initialize.
3. Make certain the unit's LED is set to Decode. If not, for box version, use the front menu button by holding for 5 seconds or the stream button on the wall plate version.
4. For the box version select the input to be streamed using the front up or down buttons to choose HDMI 1, 2, or stream. The HDMI 1/2 LED will light accordingly. If both are lit, then stream is selected. For the wall plate use the labeled buttons accordingly.
5. Every VLX unit has a unique MAC and IP addresses. It 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. Ensure that the IP address of the PC is in 169.254.xx.xx domain
2. Launch the windows scanning application `node_list.bat` 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 to communicate directly with the VLX protocol

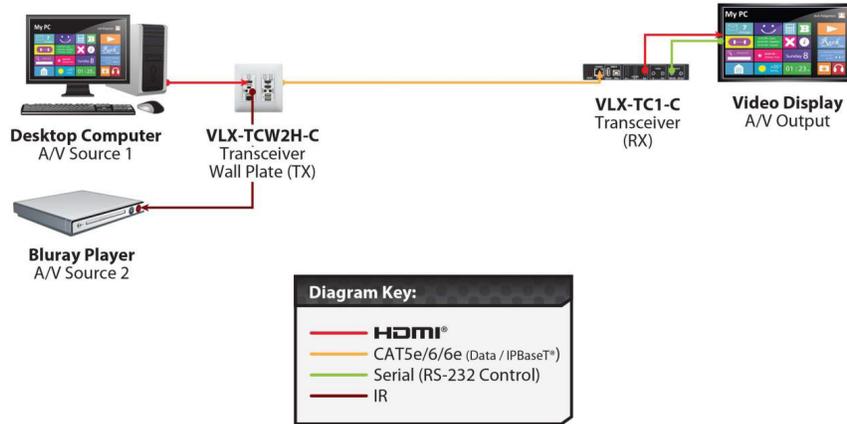
### Important:

- Take note of the MAC Address of every unit. It can be found on the underside or rear of the unit. The MAC Address is how you will identify the unit relative to its location.
- Make certain all units are using the latest firmware.
- Remember to setup EDID for proper operation

**APPLICATIONS**

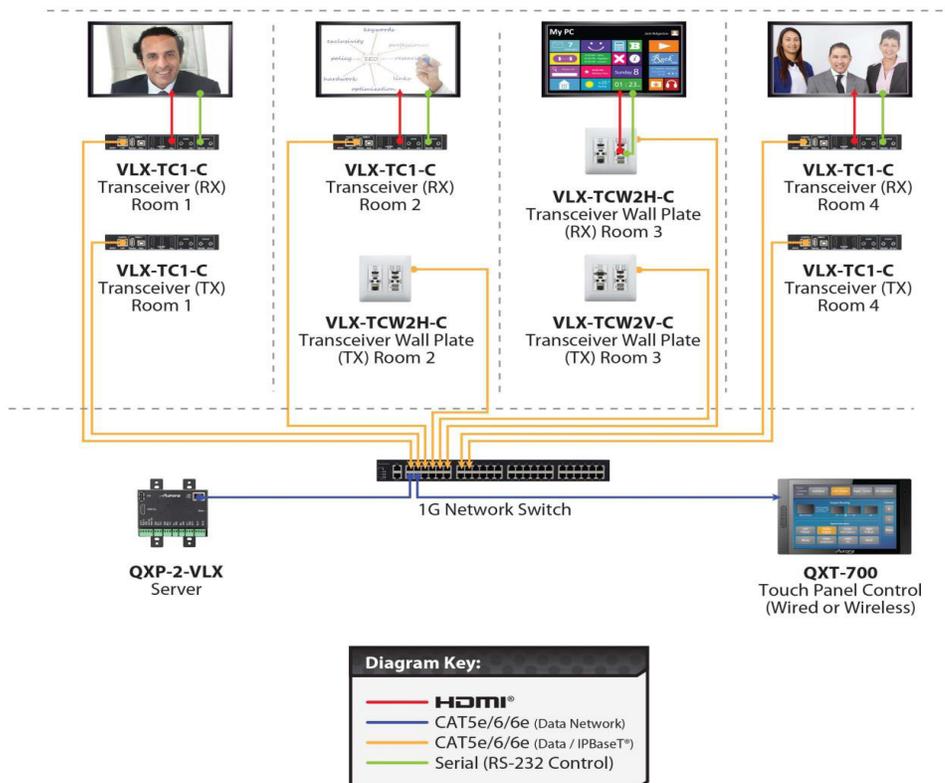
**Example 1: VLX-TCW2 Configured as Transmitter to VLX-TC1 Configured Receiver**

When the VLX 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 (328f) can be achieved.



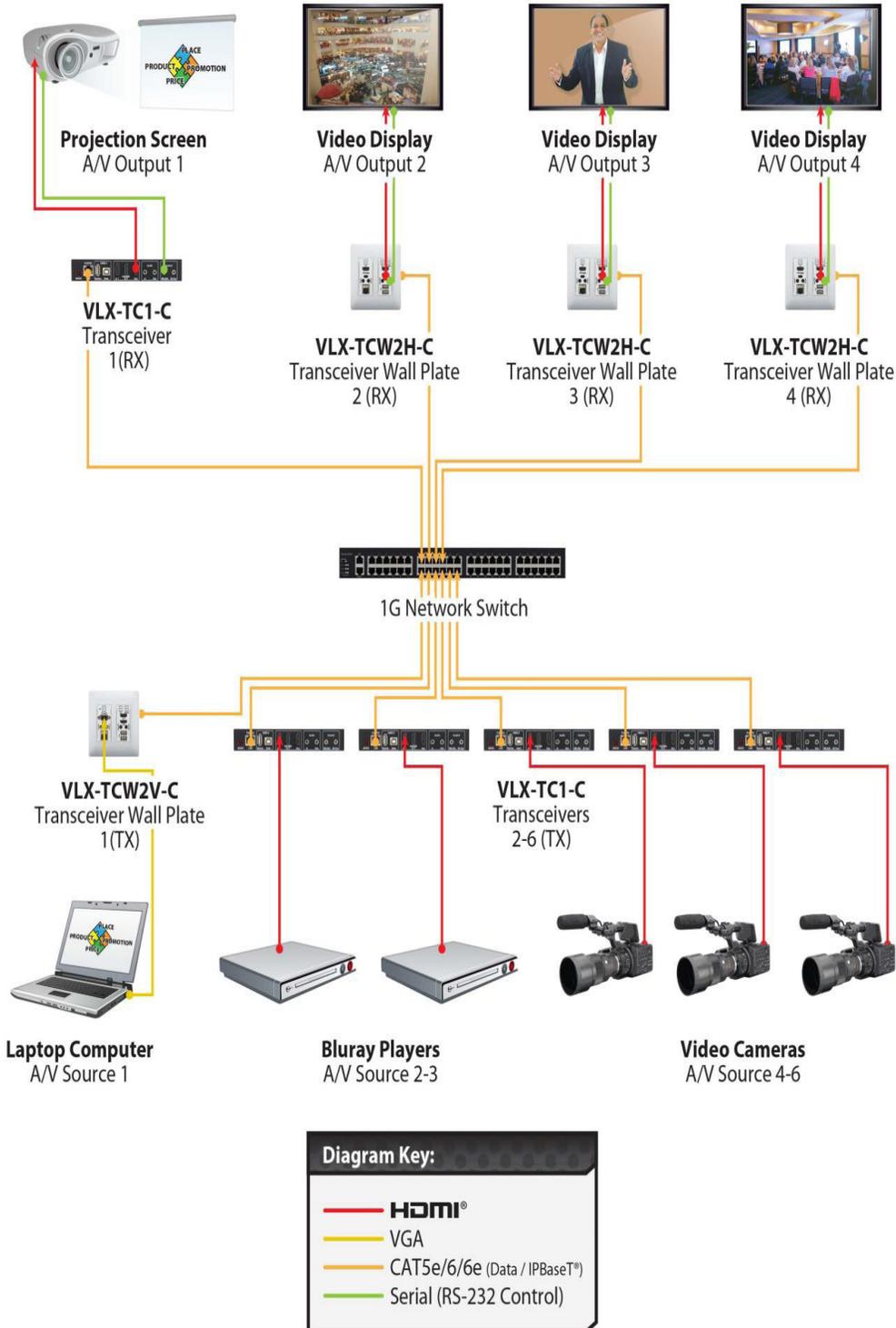
**Example 2: VLX Multi-Room**

The VLX series is perfect for multi-room applications with its flexibility. A nearly unlimed 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.



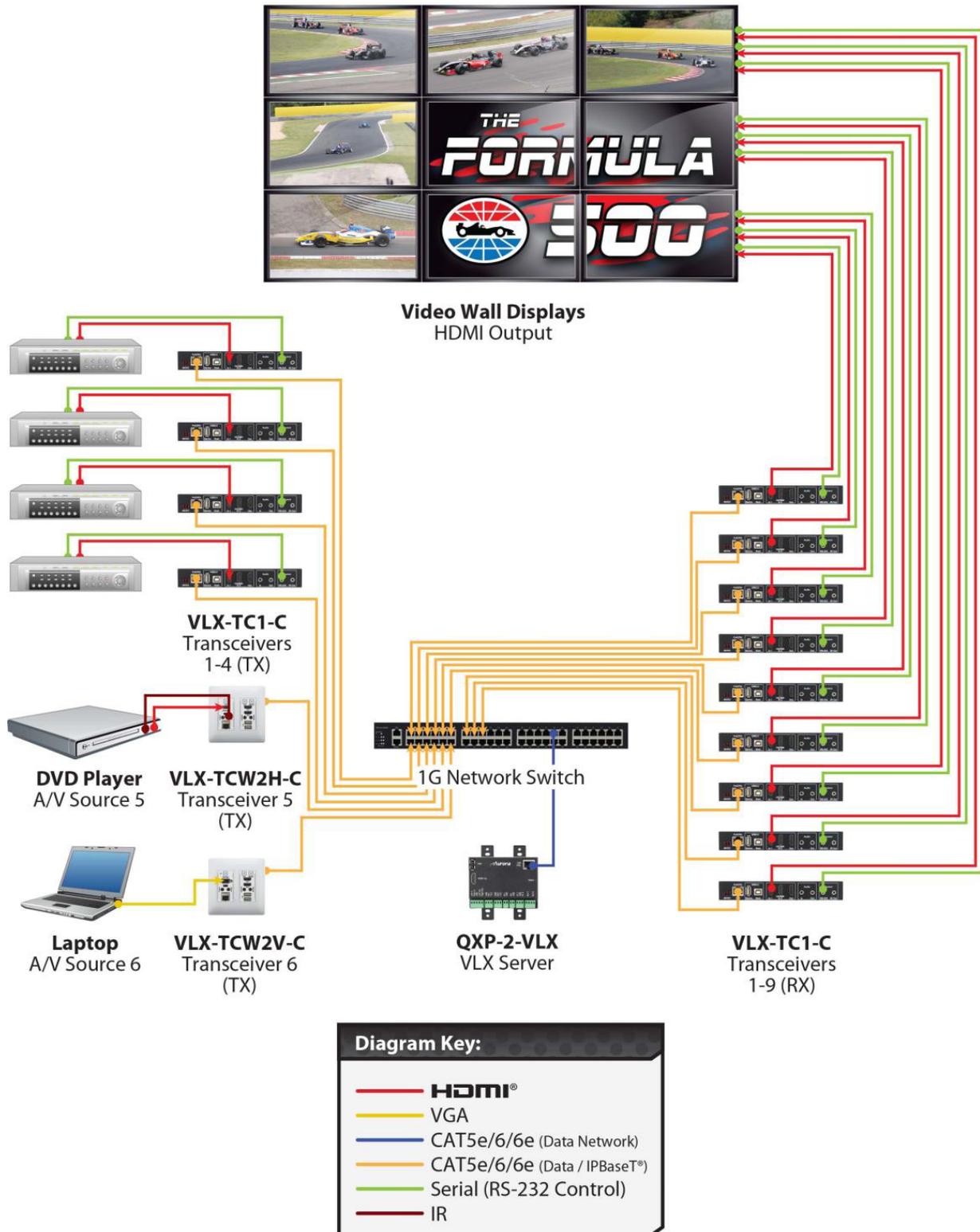
**Example 3: Matrix - Multiple VLX to Multiple VLX**

The VLX can take the place of any typical card cage matrix system, adding flexibility and performance never seen before. Even features like seamless switching is no longer a premium.



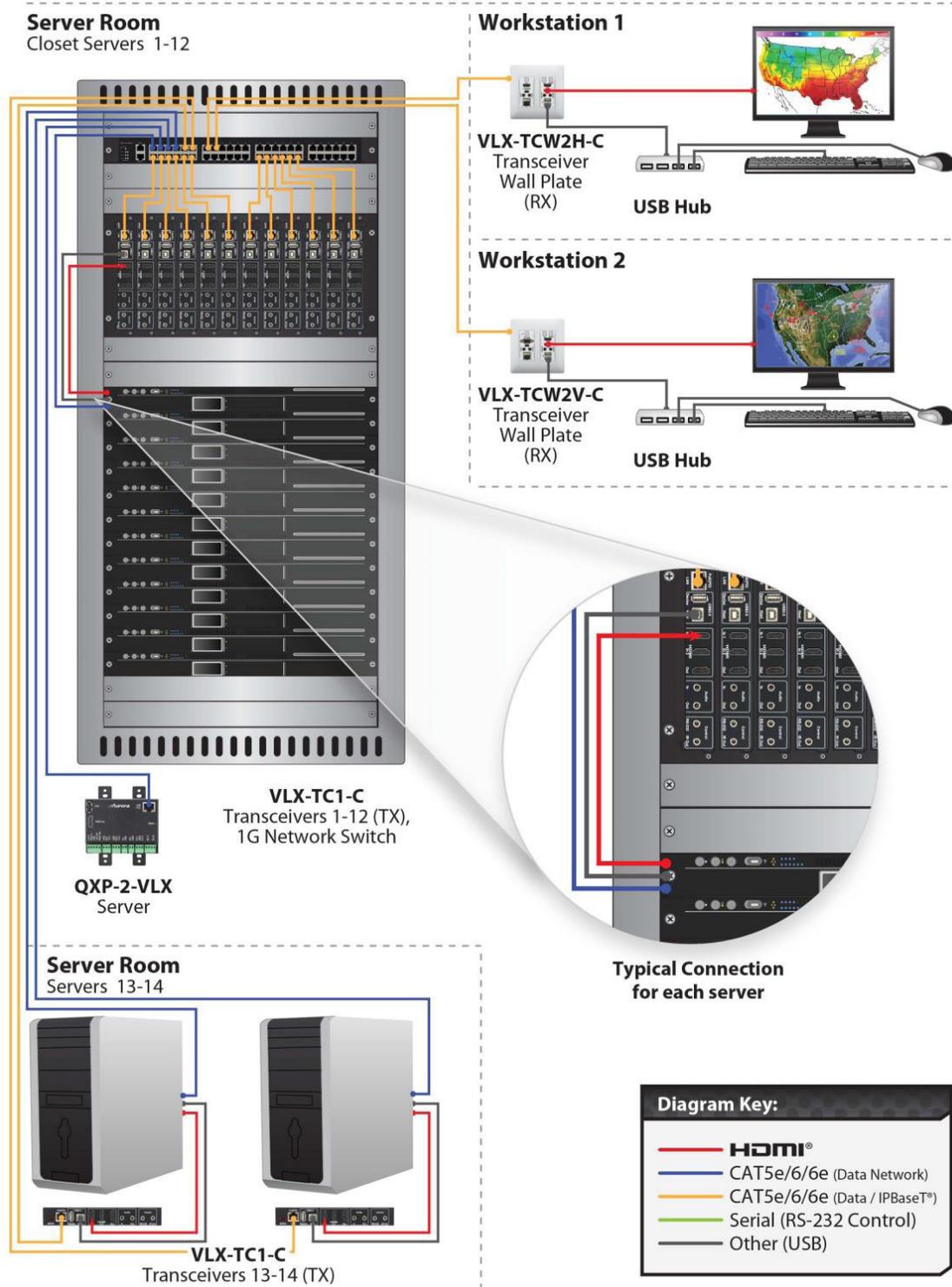
Example 4: Matrix - Video Wall

The VLX is capable of 4K video-walls. Up to 8x8 size can be created with 4K inputs



Example 5: KVM utilizing USB 2.0

Command & Control and NOC centers are perfect for the VLX series, especially with the USB 2.0 running at a full 480Mbps. With the VLX it is no longer just keyboard and mouse but full USB peripheral routing as well.



Recommended Cabling and Connectivity

**Bulk Cable | Category 6 UTP**

**Category 6 | UTP**



Standard Spool Size: 1000ft

**Features:**

- TIA-EIA Category 6 Cable
- NEC Type CMR and CMP
- (UL) Listed: UL 1666 and NFPA262
- Meets 300V requirements as specified in the NEC

**Applications:**

- Indoor for:**
- 1GBaseT, 10/100Mb Data
  - Horizontal Cabling
  - Voice Backbone
  - AV Digital Video
  - Digital Integration

Catalog No.	No. of Conductors	Cond. Type & Nom. DCR	Insulation Type & Thickness	Shielding	Jacket Type & Thickness	Nom. O.D	NEC Type	Nom. Capacitance & Impedance	Jacket Colors
			Inches		Inches				
4246	4 Pair	23 AWG Solid 24Ω/Mft	Polyolefin	None UTP	PVC	.220	CMR	14pf/ft 100Ω	 GY, BL, WH, BK, GN, OR, YE, PK, RD, VT
254246	4 Pair	23 AWG Solid 24Ω/Mft	FR Polyolefin/FEP	None UTP	Plenum Thermo Plastic	.225	CMP	14pf/ft 100Ω	 GY, BL, WH, BK, GN, OR, YE, PK, RD, VT
4246-OSP	4 Pair	23 AWG Solid 24Ω/Mft	Thermo-Plastic	None UTP Water-Block	UV Resistant PE	.266	Outdoor	14pf/ft 100Ω	 BK
4246-IO	4 Pair	23 AWG Solid 24Ω/Mft	Thermo-Plastic	None UTP Water-Block	UV Resistant Polyolefin	.271	Indoor/ Outdoor CM	14pf/ft 100Ω	 BK

Primary Color Code: See Page 22 Table: A

**Cable Accessories | AV**

**Category 6 | UTP Modular Plugs**

Catalog No.	Description
32-6EZP	Cat6 UTP EZ Plug
32-6198UL	Cat6 UTP Crimp Plug with Loading Bar
TL-EZRJ45PROCT	Crimp Tool RJ45 and RJ11
32-1900-xx	Boots - xx: WH,BK,BU,RD,GY,OR,YE,GN



**Category 6 | UTP RJ45 Jacks**

Catalog No.	Description
KJ458MT-C6C-XX	8 Position Cat6 RJ45 JACK - XX: WH,BK,GY,GN,OR,RD,YE
KRJ45/6S	Cat6 Feed Thru Adaptor
TL-3650	Punchdown tool - Adjustable
KJMT-8600	Multipair Punchdown tool
15010C	Cat6 and Cat6A Stripping tool
TL-CATWIREST	Cat Cable Pair Separation Tool



KJ458MT-C6C-WH

## Cable Assemblies | AV - CAT 6 UTP

### Category 6 | UTP Assemblies- Snag Proof

Catalog No.	Length	Jacket Colors
C6C-114CC-3FB	3 Foot Cat6	Replace CC: BK, BU, GY, RD, GN, WH, YE, OR
C6C-114CC-7FB	7 Foot Cat6	
C6C-114CC-10FB	10 Foot Cat6	
C6C-114CC-15FB	15 Foot Cat6	
C6C-114CC-20FB	20 foot Cat6	
C6C-114CC-25FB	25 Foot Cat6	



BK - BLACK
BU - BLUE
GY - GRAY
RD - RED
GN - GREEN
WH - WHITE
YE - YELLOW
OR - ORANGE

## Patch Panels | AV

### Category 6 | UTP Patch Panels

Catalog No.	Description
12458MD-C6C	12 Port Cat6 Panel 1.75- 1RU
24458MD-C6C	24 Port Cat6 Panel 1.75- 1RU
48458MD-C6C	48 Port Cat6 Panel 3.50- 2RU
48458HD-C6C	48 Port Cat6 High Density: 1.75 - 1RU
12458M-C6C	12 Port Mini Panel w/ 89D Bracket Cat6
12458MH-C6C	12 Port Mini Hinged Panel Cat6
24458A-C6C	24 Port Cat6 Panel 1.75- 1RU - ANGLED
48458A-C6C	48 Port Cat6 Panel 3.50- 2RU - ANGLED
CMB-250P	Panel mount Cable Mng. Bar 2.50" Deep



24458MD-C6C

## APPENDIX 1 Troubleshooting

It is advisable to make certain all units are using the latest firmware before troubleshooting.

### VLX Web Server is not responding

- Make certain every VLX 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 built in web page of decoder.
- 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.
- Te Switch supports IGMP snooping and this function is enabled.

### 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. Te VLX 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

### VLX RS-232 control is not working

- Check wiring for RX, TX, and Ground. (VLX 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.

### Routing a source to multiple displays is tearing

- Check network switch is properly configured for IGMP and supports Jumbo packets.

### VLX 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.

## Recommended Network Switches

### SignalMax

065-7861PoE-24PS-L 24 Port 1G PoE Copper Switch with SFP

065-7861PoE-FP - Full Power 24 Port 1G PoE Copper Switch With SFP

### Cisco

WS-C2960S-24PS-L 24 Port 1G PoE Copper Switch

WS-C2960S-24PSQ-L 24 Port 1G PoE Copper Switch

WS-C2960X-48FPS-L 48 Port 1G PoE Copper Switch with 4 SFP **Huawei**

S5700-28P-PWR-LI-AC 28 Port 1G PoE Copper Switch 24 RJ-45 and 4 SFP

S5700-48TP-PWR-SI 48 Port 1G PoE Copper Switch 44 RJ-45 and 4 SFP

### Netgear

GS108PE 8 Port 1G PoE Copper Switch 4 with PoE and no SFP



2833 West Chestnut Street  
Washington, PA 15301  
Toll Free: 800-245-4964  
sales@westpennwire.com



[www.westpennwire.com](http://www.westpennwire.com)