

## USERS GUIDE



# VLX Series

VLX-TC1-C • VLX-TCW2H-C • VLX-TCW2V-C

1GbE Visual Lossless Low Latency AV over IP



VLX-TCW2V-C



VLX-TCW2H-C



VLX-TC1-C

**iPBT**  
ASE

Manual Number: 181008

Firmware Rev: 3.18.0 or Higher

## 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

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## TABLE OF CONTENTS

<b>PACKAGE CONTENTS .....</b>	<b>5</b>
<b>OPTIONAL ACCESSORIES .....</b>	<b>6</b>
<b>INTRODUCTION.....</b>	<b>9</b>
About.....	9
Documentation.....	9
Features.....	10
VLX-TC1-C Front.....	11
VLX-TC1-C Rear.....	13
VLX-TCW2H-C Front.....	14
VLX-TCW2V-C Front.....	16
VLX-TCW2H-C & VLX-TCW2V-C Rear .....	18
VLX-TC1-C Dante Option Slot.....	19
VLX-TCW2 Wall Plate Additional Button & LED Functions .....	19
<b>UNDERSTANDING THE BASICS .....</b>	<b>20</b>
Direct Connection with No Ethernet Switch .....	20
1GbE Ethernet Switch .....	20
Network Infrastructure .....	20
Isolated Network or Users Network .....	20
Controlling the VLX.....	21
Controlling the VLX for Redundancy .....	21
<b>EDID and its Importance</b> .....	21
Videowall Capabilities .....	22
Ethernet Bandwidth Usage .....	22
USB Network Bandwidth Requirement: .....	22
Typical Video Network Bandwidth: .....	23
Bandwidth Table: .....	23
<b>HARDWARE INSTALLATION.....</b>	<b>24</b>
Network Setup .....	24
Encoder Setup .....	24
Decoder Setup .....	24
Control Setup .....	25
Dante Option Card Setup .....	25
<b>Web Setup Pages .....</b>	<b>26</b>
Encoder Mode Web Pages .....	26

System Tab.....	26
Network Tab.....	31
Functions Tab .....	32
Remote Tab .....	33
Management Tab.....	34
Preview Tab .....	35
Decoder Mode Web Pages.....	36
System Tab.....	36
Videowall Tab .....	41
Network Tab.....	43
Functions Tab .....	44
Remote Tab .....	45
Management Tab.....	46
Preview Tab .....	47
<b>APPLICATIONS.....</b>	<b>48</b>
Example 1: VLX-TCW2 Configured as Transmitter to VLX-TC1 Configured Receiver .....	48
Example 2: VLX Multi-Room.....	49
Example 3: Matrix - Multiple VLX to Multiple VLX .....	50
Example 4: Video-Wall.....	51
Example 5: KVM utilizing USB 2.0.....	52
<b>SOFTWARE.....</b>	<b>53</b>
<b>CONNECTOR PIN DEFINITION .....</b>	<b>55</b>
HDMI .....	55
CAT5e/6/6A.....	55
RS-232.....	56
IR (Infrared).....	56
<b>APPENDIX 1 Troubleshooting.....</b>	<b>58</b>
<b>APPENDIX 2 Firmware Update.....</b>	<b>60</b>
<b>APPENDIX 3 Protocol .....</b>	<b>60</b>
<b>APPENDIX 4 Recommended Cabling.....</b>	<b>61</b>
<b>APPENDIX 5 Recommended Network Switches.....</b>	<b>62</b>
5.1 Switch Speed .....	62
5.2 Packets Routing.....	62
5.3 Ethernet Switch Configuration .....	63
5.4 PoE (Power over Ethernet).....	63
<b>APPENDIX 6 Technical Specifications .....</b>	<b>65</b>

<b>APPENDIX 7</b>	<b>Warranty.....</b>	<b>67</b>
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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

#### 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.***

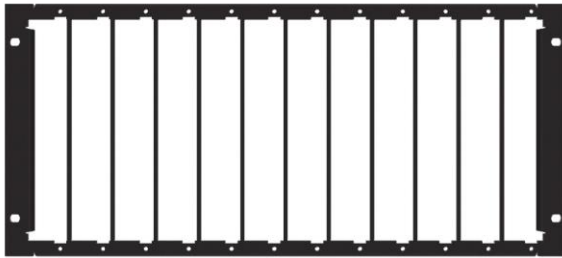
Note: Go to [www.aurorammm.com](http://www.aurorammm.com) for latest manual and firmware.

## 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)



- IPE-DTE-1 (Dante Option Card)



- VLX-LCVR (VLX Wall Plate LAN Port Cover)



- DXB-8 (8 Button Wall Plate)



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





- PS0094-2 (48V 25 Watt Wall Supply) Available in -US, -AU, - EU, and -UK worldwide models.



- IR Receiver CA0026-1



- IR Emitter CA0061-1



- IR Blaster CA0049-1

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



- LVR-2G 2 Gang Electrical Ring



## 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. Fast-switching of the sources further enhances the presentation (Matching source resolutions and frame-rate required). 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 (50Mbps) 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
- 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
- IPBaseT® for Better Education

## Features

- ◆ Configure as Transmitter (Encoder) or Receiver (Decoder)
  - ◆ 4K60 4:2:0/4K30 4:4:4 Over 1G CAT5e/6/6a
  - ◆ HDMI 2.0, HDCP 2.2
  - ◆ Visually Lossless with only 1.5 Frame Latency
  - ◆ 1080P to 4K and 4K to 1080P Scaling
  - ◆ 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 with lockout function
  - ◆ Auto Sense Switching
  - ◆ 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.*

## 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.
- LAN connector LED's (Rear):
  - Left LED Green = 1G/Good.
  - Left LED Orange = 10/100 or Bad Connection.
  - Right LED is Orange, for general LAN activity.

### 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.
- Enter Button – Pressing will toggle Link On/Off. This stops streamed Video, IRoIP, SoIP and USBoIP. If the VLX device is connected in the network the status led will go on/off to indicate that link has gone on/off.

### 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

### **Special Functions**

- Factory Default - Press Power and Menu for 5 seconds. The USB Host LED will blink to indicate factory default and the unit will reboot.
- Reboot - Press Power button for 5 seconds. Power LED go off and the board reboots.
- Secondary Firmware Image Mode - Press Power and Down button while powering up for 5 seconds. The Host and Device LEDs will keep blinking and both Encoder and Decoder LEDs will be on.
- IP Information on RS-232 – Press and hold Up and Down for 5 seconds and the units IP information will reveal on RS-232 port at 9600 baud 8N1.

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

## 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. LAN connector LED's (Rear): <ul style="list-style-type: none"> <li>Left LED Green = 1G/Good. (1G Req'd for proper operation)</li> <li>Left LED Orange = 10/100 or Bad Connection.</li> <li>Right LED is Orange, for general LAN activity.</li> </ul>
USB 2.0	50Mbps 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.
Control IR Out	Infrared control output 30kHz-60kHz. IR emitter must be mono 3.5mm TS.

**Commented [A1]:** We should state if scaling is possible

**Commented [A2]:** The audio is downmixed from multichannel to stereo? We should state at this point the functionality.

## 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 – 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.

### **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**

- 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.
- Encoder mode is indicated by a blue led on stream button.
- Both **In1** and **In2** LEDs will light Red to indicate secondary mode.

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



## 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 – 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.

### **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**

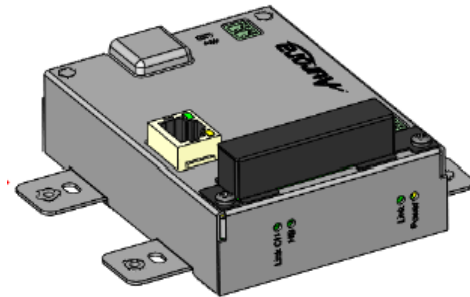
- When power is first applied, all front LEDs will light white for a second.
- All LEDs will light white to indicate that the firmware update is in progress.
- Selected input source LED will light red.
- Encoder mode is indicated by a blue led on stream button.
- Both **In1** and **In2** LEDs will light Red to indicate secondary mode.

### **VGA Port Resolutions**

- 800x600
- 1024x768
- 1280x720
- 1280x768
- 1280x800
- 1280x960
- 1280x1024
- 1360x768
- 1440x900
- 1600x1200
- 1680x1050
- 1920x1080

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

## VLX-TCW2H-C & VLX-TCW2V-C Rear

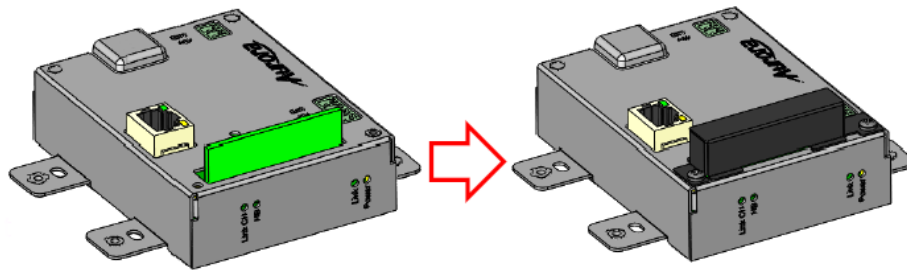


### Rear

- 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.

## VLX-TCW2 Wall Plate Additional Button & LED Functions

### LED Indications

- Encoder/Decoder Indication - Blue LED to be lit on Stream button in Encoder Mode.
- Source Indication - Red LED to be lit on the button corresponding to the source.

### Button Functionalities

- Secondary boot - Press and hold the IN2 button while booting.
- Factory default - Press and hold the IN2 and Stream button for 5 seconds.
- Encoder Decoder Selection - Press and Hold Stream button for 5 seconds
- Reboot - Press and Hold IN1 button for 5 seconds.

## 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, 50Mbps 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 3<sup>rd</sup> 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 3<sup>rd</sup> 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 scalers 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

#### Bandwidth Table:

Following table is the network bandwidth requirement matrix which measured from playing a video clip. The video clip can be downloaded from [http://download.microsoft.com/download/a/d/6/ad6fc147-e95f-4ffd-a2e8-cbd09ca91b00/Amazon\\_1080.exe](http://download.microsoft.com/download/a/d/6/ad6fc147-e95f-4ffd-a2e8-cbd09ca91b00/Amazon_1080.exe) (107MB). The average network bandwidth is measured by profiling Ethernet MAC layer traffic. The value in ( ) is the performance variation.

Video Resolution	Quality Level	Max Frame Rate	Avg. Network Bandwidth (Mbps)
3840x2160 (2160p30)	Auto	30	218 (146~268)
1920x1080 (1080p)	Auto	60	133 (80~210)
1280x720 (720p)	Auto	60	147 (112~177)
1600x1200 (UXGA)	Auto	60	81 (57~105)
1280x1024 (SXGA)	Auto	60	113 (79~150)
1024x768 (XGA)	Auto	60	81 (72~120)
800x600 (SVGA)	Auto	60	66 (49~82)
640x480 (VGA)	Auto	60	43 (29~56)



## HARDWARE INSTALLATION

### Network Setup

1. Connect a 1GbE network switch and make certain IGMP Snooping and Jumbo/MTU Packet features are enabled as per the VLX Series Network Switch Recommendations and Configuration document which can be found on the Aurora website. VLX requires Jumbo/MTU Packet of 8192 or better for full 4K video streaming.
2. Connect CAT cable RJ-45 accordingly to the network switch and to the VLX 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 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 if factory default units or the IP Address within the range of what has been set for the units.
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 VLX protocol.

## Dante Option Card Setup

1. Remove power from the box or wall plate unit.
2. If the Dante option is not already installed remove the 4 screws from each side of the VLX unit for the box version to remove the top cover or the 2 screws on the rear of the wall plate version to remove the option card cover.
3. Note the MAC address on the IPE-DTE card before installing into the unit to identify which unit the card is associated to. The Dante option will have its own MAC and IP Address independent of the VLX unit.
4. Insert IPE-DTE card into the edge connector. Note on the box version there is a silk screen outline showing which direction it should be installed. Failure to install in the correct orientation could result in damage to the IPE-DTE card.
5. Reassemble the box or wall plate and power on.

### 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:

- 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.

## Web Setup Pages

Web Setup pages can be accessed by typing in the IP address of the unit followed by /setup (example: 192.168.100.1). You will then be prompted for a password. Default password is admin. Make certain if all the VLX units are already connected to the 1GbE network that each VLX 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.

### Encoder Mode Web Pages

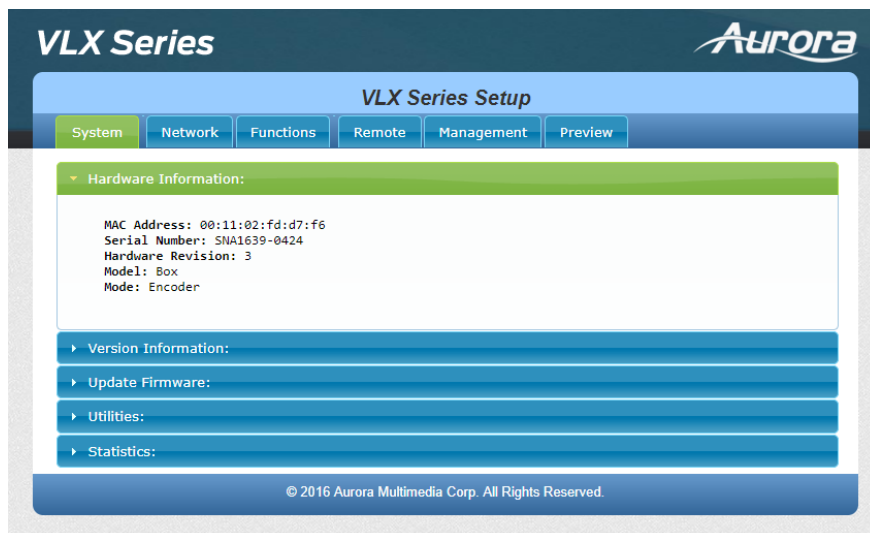
The Encoder pages are comprised of 4 tabs, System, Videowall, Network, and Functions. The videowall tab will do nothing for encoder mode at this time.

#### System Tab

The System Tab has 4 selections of Version Info, Updating of Firmware, Utilities and Statistics.

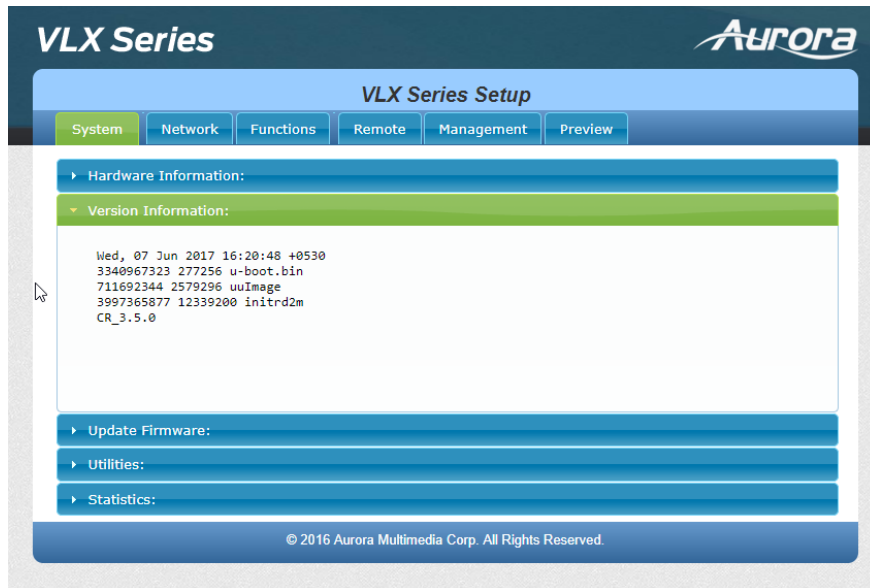
#### Hardware Information

Shows the Units MAC Address, Serial Number and Mode.



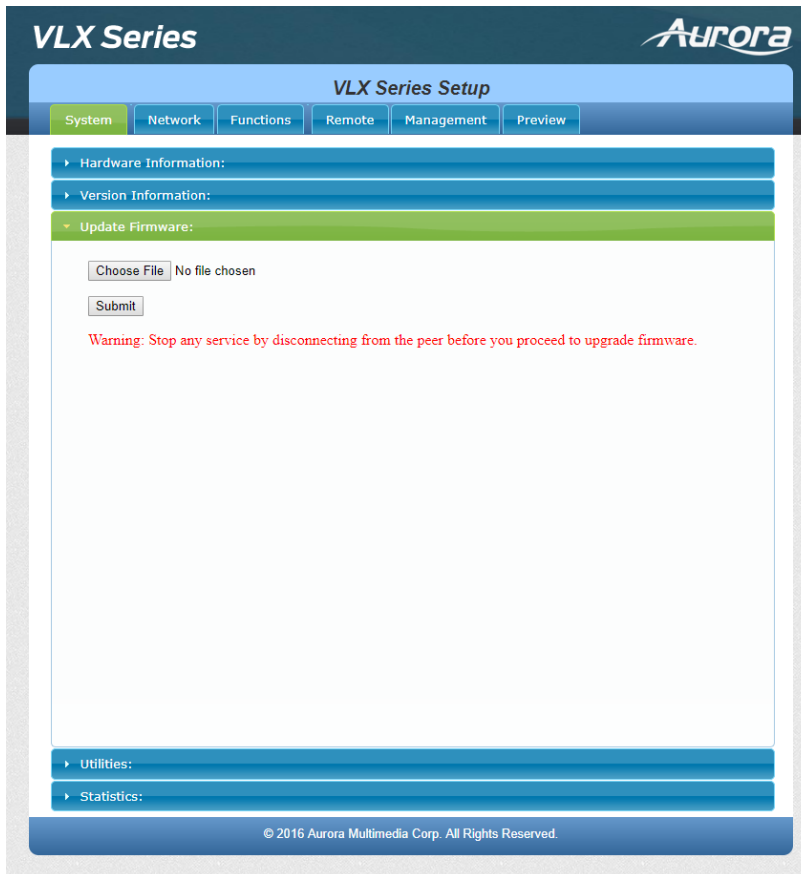
## Version

Version 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.



### Update 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.



The screenshot displays the 'VLX Series Setup' web interface. At the top, there's a header with 'VLX Series' on the left and the 'Aurora' logo on the right. Below the header is a navigation bar with tabs: 'System' (highlighted in green), 'Network', 'Functions', 'Remote', 'Management', and 'Preview'. The main content area is titled 'VLX Series Setup' and contains several expandable sections: 'Hardware Information:', 'Version Information:', 'Update Firmware:', 'Utilities:', and 'Statistics:'. The 'Update Firmware:' section is currently expanded, showing a 'Choose File' button next to the text 'No file chosen', and a 'Submit' button below it. A red warning message is displayed: 'Warning: Stop any service by disconnecting from the peer before you proceed to upgrade firmware.' At the bottom of the interface, a footer contains the copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

## Utilities

The selection allows factory defaults, remote rebooting, resetting of EDID as well as the ability to manually enter API commands. The Host ID can also be set up here.

The screenshot displays the 'VLX Series Setup' utility interface for Aurora. The interface is organized into several sections:

- Navigation Bar:** Includes tabs for System, Network, Functions, Remote, Management, and Profile.
- Left Sidebar:** Contains links for Hardware Information, Version Information, Update Firmware, and Utilities (the active section).
- Commands Section:**
  - Factory Default:** A button to reset the device to factory settings.
  - Reboot:** A button to restart the device.
  - Locate Device:** A checkbox with an 'Apply' button.
- Settings Section:**
  - Device Type:** Radio buttons for Encoder and Decoder, with an 'Apply' button.
  - Auto Sense:** Radio buttons for Enable and Disable, with an 'Apply' button.
  - Local Display Source:** Radio buttons for HDMI-1 and HDMI-2, with an 'Apply' button.
  - Stream Source:** Radio buttons for HDMI-1 and HDMI-2, with an 'Apply' button.
  - HDCP Version:** Radio buttons for HDCP 1.4 & 2.2, HDCP 1.4, and None, with an 'Apply' button.
  - Audio Input:** Radio buttons for HDMI, LineIn, and None, with an 'Apply' button.
  - Limit HDMI Audio bitrate:** A checkbox with an 'Apply' button.
  - Analog Audio Output:** Radio buttons for Enabled and Disabled, with an 'Apply' button.
  - Dante Audio:** Radio buttons for HDMI, LineIn, and None, with an 'Apply' button.
  - LineIn Volume:** A slider control.
  - Audio Mute:** Radio buttons for Mute and Unmute, with an 'Apply' button.
  - Debug Console:** Radio buttons for Enable and Disable, with an 'Apply' button.
  - Front Panel Lock:** Radio buttons for Enable and Disable, with an 'Apply' button.
- Console API Command:** A text input field with an 'Apply' button.
- Output:** A text area for displaying command results.

The footer of the interface includes a 'Statistics' link and a copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

## Statistics

This selection 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.

The screenshot displays the 'VLX Series Setup' interface for the 'Aurora' brand. The 'Statistics' tab is selected, showing the following information:

- State Machine:** State: s\_attaching
- Network:**
  - ID (Host Name): 0424
  - IP Address: 192.168.1.150
  - Subnet Mask: 255.255.255.0
  - Default Gateway: 192.168.1.1
  - MAC Address: 001102FDD07F6
  - Casting Mode: Multicast Mode
  - Link Status: on
  - Link Mode: 1G
- Video:**
  - EDID Used:

```
00 ff ff ff | ff ff ff 00 | 04 69 c4 23 | 0b 6b 00 00 |
0c 1a 03 03 | 80 33 1d 78 | 2a e5 95 a6 | 56 52 9d 27 |
10 50 54 bf | ef 00 d1 c0 | b3 00 95 00 | 81 80 81 40 |
81 c0 71 4f | 01 01 02 3a | 80 18 71 38 | 2d 40 58 2c |
45 00 fd 1e | 11 00 00 1e | 00 00 00 ff | 00 47 33 4c |
4d 54 4a 20 | 32 37 34 30 | 33 0a 00 00 | 00 fc 00 41 |
53 55 53 20 | 56 43 32 33 | 39 0a 20 20 | 00 00 00 fd |
00 32 4b 18 | 53 11 00 0a | 20 20 20 20 | 20 20 01 93 |
02 03 22 71 | 4f 01 02 03 | 11 12 13 04 | 14 05 0e 0f |
1d 1e 1f 90 | 23 09 17 07 | 83 01 00 00 | 65 03 0c 00 |
ff ff 8c 0a | d0 8a 20 e0 | 2d 10 10 3e | 96 00 04 03 |
00 00 00 18 | 8c 0a d0 8a | 20 e0 2d 10 | 10 3e 96 00 |
10 09 00 00 | 00 18 8c 0a | d0 90 20 40 | 31 20 0c 40 |
55 00 04 03 | 00 00 00 18 | 8c 0a d0 90 | 20 40 31 20 |
0c 40 35 00 | 10 09 00 00 | 00 18 01 1d | 00 bc 52 d0 |
1e 20 b8 28 | 55 40 10 09 | 00 00 00 1e | 00 00 00 41 |
```
  - Local Video Output: attached=n
  - Video Timing Information:

```
Timing Table: Index[13] [1920]x[1080] [60]Hz
Pixel Rate: 148500KHz, Htotal: 2200, vtotal: 1125
Hbp: 148, Vbp: 36, Hact: 44, Vsw: 5
Progressive, HPos, VPos
color depth: [0]
HDCP: [0FF]
HDCP convert: Disable
capture windows: [1920]x[1080] [60]Hz
compress windows: [1920]x[1080] [60]Hz
Active windows: [1920]x[1080] [60]Hz
CRT windows: [1920]x[1080]
Scan Mode: Progressive
Signal Type: HDMI 16:9
```

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### Network Tab

The Network tab allows the setup of the IP address, Subnet, and Gateway. In addition, the mode of point to point (Unicast) or matrixing (Multicast) can be selected under Casting mode.

The screenshot displays the 'VLX Series Setup' web interface. At the top, the 'Network' tab is selected among 'System', 'Network', 'Functions', 'Remote', 'Management', and 'Preview'. The 'IP Setup' section features three radio buttons for 'IP Mode': 'Auto IP', 'DHCP', and 'Static', with 'Static' currently selected. Below this, there are input fields for 'IP Address' (192.168.1.150), 'Subnet Mask' (255.255.255.0), and 'Default Gateway' (192.168.1.1), each followed by an 'Apply' button. The 'Host ID' section has a text input field containing '0424' and an 'Apply' button. The 'Host Name' section has a text input field containing 'vlx-series' and an 'Apply' button. A footer bar at the bottom contains the copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'



## Functions Tab

The Functions tab has selections pertaining to the Video over IP, Maximum bit Rate which is useful for bandwidth restricted networks, and USB over IP settings.

The screenshot shows the 'VLX Series Setup' web interface with the 'Functions' tab selected. The interface has a dark blue header with the 'VLX Series' logo on the left and the 'Aurora' logo on the right. Below the header is a light blue bar with the title 'VLX Series Setup' and a navigation menu with tabs: 'System', 'Network', 'Functions' (highlighted in green), 'Remote', 'Management', and 'Preview'. The main content area is divided into two sections: 'Video over IP' and 'USB over IP'. The 'Video over IP' section contains a checkbox for 'Enable Video over IP' (checked), a checkbox for 'Enable Video Wall' (checked), a 'Maximum Bit Rate' dropdown menu set to 'Best Effort', and a 'Maximum Frame Rate' slider set to 'Capture up to 100% of frames'. An 'Apply' button is at the bottom right of this section. The 'USB over IP' section contains a checkbox for 'Enable USB over IP' (checked), a 'Compatibility Mode' section with two options: 'Mouse not responding well (Check when USB mouse responding is slow and queer)' (unchecked) and 'K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)' (checked). An 'Apply' button is at the bottom right of this section. A footer bar at the bottom of the interface contains the copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

**VLX Series** Aurora

**VLX Series Setup**

System Network **Functions** Remote Management Preview

**Video over IP**

☒ Enable Video over IP

☒ Enable Video Wall

Maximum Bit Rate: Best Effort

Maximum Frame Rate: Capture up to 100% of frames

Apply

**USB over IP**

☒ Enable USB over IP

Compatibility Mode:

☐ Mouse not responding well (Check when USB mouse responding is slow and queer)

☒ K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)

Apply

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## Remote Tab

The Remote tab has options pertaining to RS232 control.

The screenshot shows the 'VLX Series Setup' web interface with the 'Remote' tab selected. The interface includes a header with the 'VLX Series' logo and the 'Aurora' logo. Below the header is a navigation bar with tabs for 'System', 'Network', 'Functions', 'Remote', 'Management', and 'Preview'. The 'Remote' tab is active, displaying the 'Serial over IP' configuration section. This section contains a checkbox for 'Enable Serial over IP', which is checked. Below this is the 'Operation Mode' section with two radio buttons: 'Redirection' and 'Telnet'. The 'Baudrate Setting' section includes four dropdown menus for 'Baudrate' (set to 115200), 'Data bits' (set to 8), 'Parity' (set to None), and 'Stop bits' (set to 1). An 'Apply' button is located at the bottom right of the configuration area. The footer of the interface displays the copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

**VLX Series** **Aurora**

**VLX Series Setup**

System Network Functions **Remote** Management Preview

**Serial over IP**

☒ Enable Serial over IP

**Operation Mode:**

☐ Redirection

☒ Telnet

**Baudrate Setting**

**Baudrate:** 115200

**Data bits:** 8

**Parity:** None

**Stop bits:** 1

Apply

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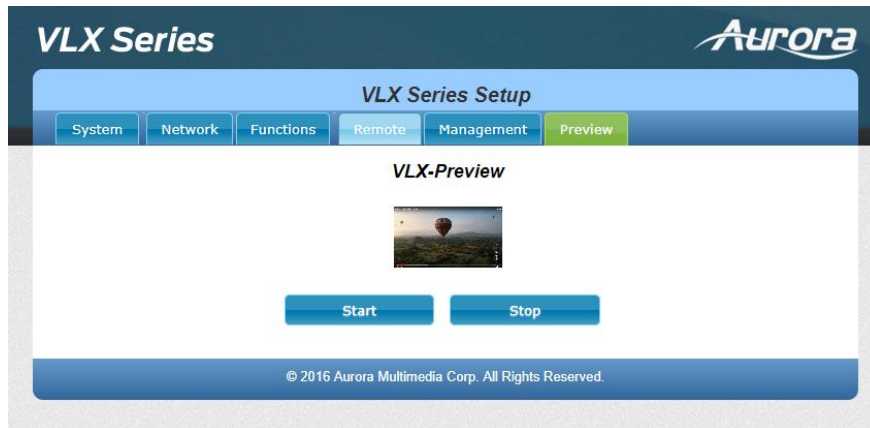
## Management Tab

The Management tab manages routing of streaming video sources and mode selection and configuration of serial over IP settings.

The screenshot displays the 'VLX Series Setup' web interface. At the top, the 'VLX Series' logo is on the left and the 'Aurora' logo is on the right. Below the header is a navigation bar with tabs: 'System', 'Network', 'Functions', 'Remote', 'Management' (which is highlighted in green), and 'Preview'. The main content area is divided into two sections. The first section, titled 'Update Settings', contains a 'Settings Type' dropdown menu set to 'Recovery', a 'Config File Name' field with a 'Choose File' button and the text 'No file chosen', and an 'Upload' button. The second section, titled 'Backup Settings', contains a 'Download' button. At the bottom of the interface, a footer bar contains the copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

### Preview Tab

The Preview tab allows you to look at the active video source.



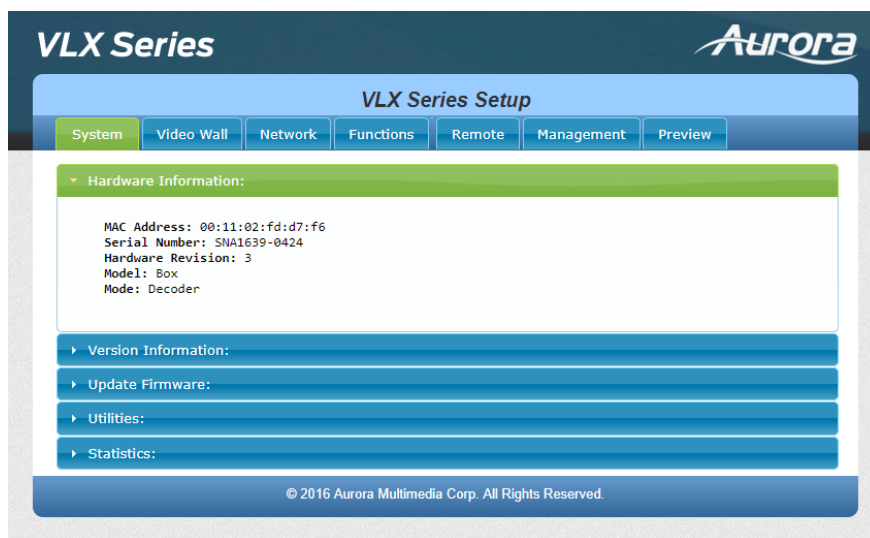
## Decoder Mode Web Pages

### System Tab

The System Tab has 5 selections of Version Info, Updating of Firmware, Utilities, Statistics, and Remote.

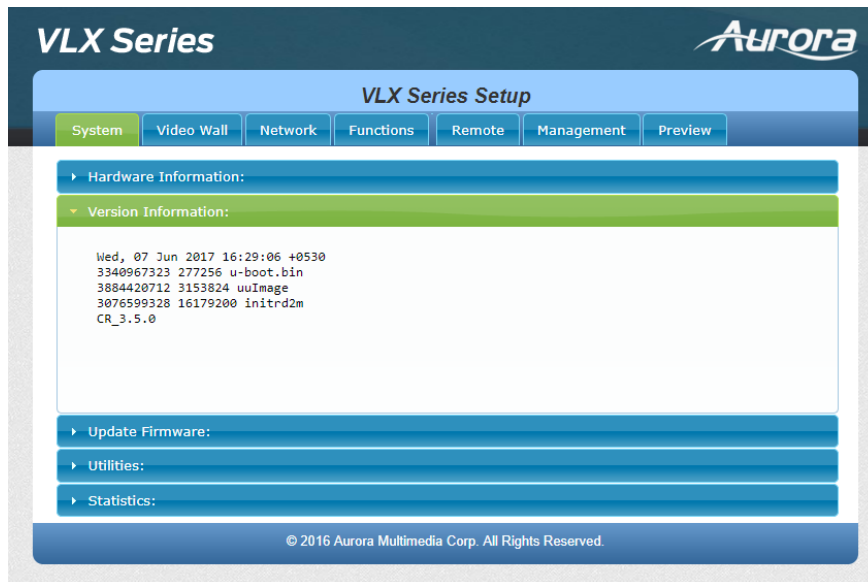
### Hardware Information

Shows the Units MAC Address, Serial Number and Mode.



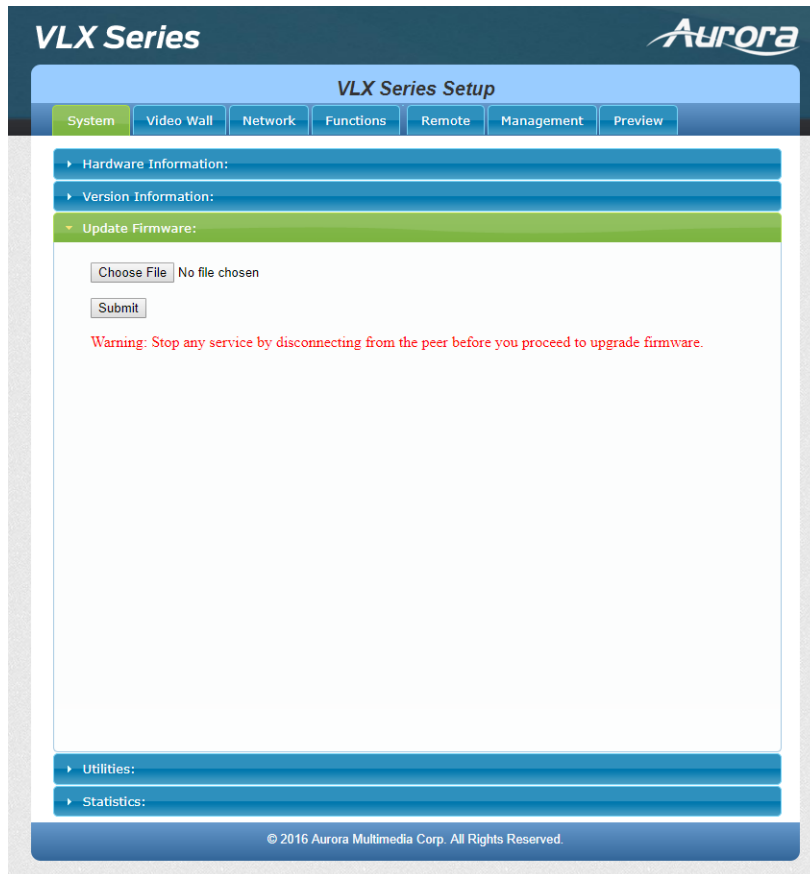
## Version

Version 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.



### Update 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.



The screenshot displays the 'VLX Series Setup' web interface. At the top, there is a header with 'VLX Series' on the left and the 'Aurora' logo on the right. Below the header is a navigation bar with tabs: 'System' (highlighted in green), 'Video Wall', 'Network', 'Functions', 'Remote', 'Management', and 'Preview'. The main content area is titled 'VLX Series Setup' and contains several expandable sections: 'Hardware Information:', 'Version Information:', 'Update Firmware:', 'Utilities:', and 'Statistics:'. The 'Update Firmware:' section is currently expanded, showing a file upload area with a 'Choose File' button and the text 'No file chosen', followed by a 'Submit' button. Below the upload area, a red warning message reads: 'Warning: Stop any service by disconnecting from the peer before you proceed to upgrade firmware.' At the bottom of the interface, a footer contains the copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

## Utilities

The selection allows factory defaults, remote rebooting, resetting of EDID as well as the ability to manually enter API commands.

The screenshot displays the Aurora VLX Series Setup web interface. The top navigation bar includes tabs for System, Video Wall, Network, Functions, Remote, Management, and Preview. The main content area is titled 'VLX Series Setup' and features a sidebar with expandable sections: Hardware Information, Version Information, Update Firmware, and Utilities. The Utilities section is currently expanded, showing a 'Commands' area with buttons for 'Factory Default' and 'Reboot', and a 'Locate Device' checkbox with an 'Apply' button. Below this is a 'Settings' section with various configuration options, each with an 'Apply' button: 'Device Type' (Encoder/Decoder), 'Auto Sense' (Enable/Disable), 'Local Display Source' (HDMI-1, HDMI-2, STREAM), 'Audio Output' (HDMI, LineOut, None, Both), 'LineOut Volume' (a slider set to 5), 'Audio Mute' (Mute/Unmute), 'Debug Console' (Enable/Disable), and 'Front Panel Lock' (Enable/Disable). At the bottom of the Utilities section is a 'Console API Command' area with an input field, an 'Apply' button, and an 'Output' text area. A 'Statistics' section is partially visible at the very bottom. The footer of the interface contains the copyright notice: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'



## Statistics

This selection 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.

VLX Series

Aurora

VLX Series Setup

SystemVideo WallNetworkFunctionsRemoteManagementPreview

Hardware Information:

Version Information:

Update Firmware:

Utilities:

Statistics:

State Machine

State: s\_search

Network

ID (Host Name): 0424

IP Address: 192.168.1.150

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

MAC Address: 001102FDD7F6

Casting Mode: Multicast Mode

Link Status: on

Link Mode: 1G

Video

Local Video Output:

attached=y

EDID=

00 ff ff ff | ff ff ff 00 | 04 69 c4 23 | 0b 6b 00 00 |  
0c 1a 01 03 | 80 33 1d 78 | 2a e5 95 a6 | 56 52 9d 27 |  
10 50 54 bf | ef 00 d1 c0 | b3 00 95 00 | 81 80 81 40 |  
61 c0 71 4f | 01 01 02 3a | 80 18 71 28 | 2d 40 58 2c |  
45 00 fd 1e | 11 00 00 1e | 00 00 00 ff | 00 47 33 4c |  
4d 54 4a 30 | 32 37 34 30 | 33 0a 00 00 | 00 fc 00 41 |  
53 55 53 20 | 56 43 32 33 | 39 0a 20 20 | 00 00 00 fd |  
00 32 4b 18 | 53 11 00 0a | 20 20 20 20 | 20 20 01 93 |  
02 03 22 71 | 4f 01 02 03 | 11 12 13 04 | 14 05 0e 0f |  
1d 1e 1f 90 | 23 09 17 07 | 83 01 00 00 | 65 03 0c 00 |  
ff ff 8c 0a | d0 8a 20 e0 | 2d 10 10 3e | 96 00 04 03 |  
00 00 00 18 | 8c 0a d0 8a | 20 e0 2d 10 | 10 3a 96 00 |  
10 09 00 00 | 00 18 8c 0a | d0 90 20 40 | 31 20 0c 40 |  
55 00 04 03 | 00 00 00 18 | 8c 0a d0 90 | 20 40 31 20 |  
0c 40 55 00 | 10 09 00 00 | 00 18 01 1d | 00 bc 52 d0 |  
1e 20 b8 28 | 55 40 10 09 | 00 00 00 1e | 00 00 00 41 |

Video Timing Information:

Not AvailaTale

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## Videowall Tab

The Videowall tab is comprised of the basic and advanced selections.

### Basic

Basic selection has the controls for a user to setup a videowall very easily by entering the active area and the total area. The VLX will figure out the proper slicing of the image based on this information and position/layout.

The screenshot displays the 'VLX Series Setup' window for the 'Aurora' brand. The 'Basic Setup' tab is active, showing three main configuration sections:

- Bezel and Gap Compensation:** Includes input fields for OW (1), OH (1), VW (1), and VH (1). A diagram shows a monitor layout with dimensions OW, OH, VW, and VH, and a unit of 0.1mm.
- Wall Size and Position Layout:** Includes dropdowns for Vertical Monitor Count (1), Horizontal Monitor Count (1), Row Position (0), and Column Position (0). A diagram shows a 2x2 grid of monitors with dimensions for Horizontal Monitor Count, Vertical Monitor Count, and Row Position. The unit is 'Panel'.
- Preferences:** Includes a 'Stretch Type' dropdown set to 'Fit In' and a 'Clockwise Rotate' dropdown set to '0'.

At the bottom, there is an 'Apply To: "This" device connected by your browser' section with a 'This' dropdown and an 'Apply' button. Below this is a 'Show OSD' checkbox. The footer shows '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

### Advanced

Advanced selection has the controls for a user to do more custom controls of the videowall including image rotation.

## VLX Series Setup

System

Video Wall

Network

Functions

Remote

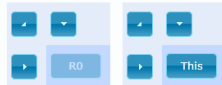
Management

Preview

Basic Setup:

Advanced Setup:

## Step 1: Choose Control Target

☐ Show OSD

## Step 2: Control Options

Reset to Basic Setup:

Reset

Stretch Type:

Fit In

Apply

Clockwise Rotate:

0

Apply

Screen Layout (Row x Column):

1

x

1

Apply

Row Position:

0

Apply

Column Position:

0

Apply

Horizontal Shift:

Left Right 0

Apply

Vertical Shift:

Up Down 0

Apply

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

0

Apply

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

0

Apply

Console API Command:

Apply

### Network Tab

The Network tab allows the setup of the IP address, Subnet, and Gateway. In addition, the mode of point to point (Unicast) or matrixing (Multicast) can be selected under Casting mode.

The screenshot shows the 'VLX Series Setup' interface with the 'Network' tab selected. The interface includes a header with the 'VLX Series' logo and the 'Aurora' logo. Below the header is a navigation bar with tabs: System, Video Wall, Network (selected), Functions, Remote, Management, and Preview. The main content area is titled 'IP Setup' and contains three sections: 'IP Mode' with buttons for 'Auto IP', 'DHCP', and 'Static' (selected); 'IP Address' with a text field containing '192.168.1.150'; 'Subnet Mask' with a text field containing '255.255.255.0'; and 'Default Gateway' with a text field containing '192.168.1.1'. An 'Apply' button is located at the bottom right of the 'IP Setup' section. Below this is the 'Host ID' section with a text field containing '0424' and an 'Apply' button. The 'Host Name' section has a text field containing 'vlx-series' and an 'Apply' button. At the bottom of the interface is a footer with the text '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

**VLX Series** *Aurora*

**VLX Series Setup**

System Video Wall **Network** Functions Remote Management Preview

**IP Setup**

**IP Mode:** Auto IP DHCP **Static**

**IP Address:** 192.168.1.150

**Subnet Mask:** 255.255.255.0

**Default Gateway:** 192.168.1.1

Apply

**Host ID**

0424 Apply

**Host Name**

vlx-series Apply

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## Functions Tab

The Functions tab has selections pertaining to the Video over IP, Maximum bit Rate which is useful for bandwidth restricted networks, and USB over IP settings.

The screenshot shows the 'VLX Series Setup' web interface with the 'Functions' tab selected. The interface has a dark blue header with 'VLX Series' on the left and the 'Aurora' logo on the right. Below the header is a light blue bar with the title 'VLX Series Setup' and a navigation menu with tabs: System, Video Wall, Network, Functions (highlighted in green), Remote, Management, and Preview. The main content area is divided into two sections: 'Video over IP' and 'USB over IP'. The 'Video over IP' section contains a checked checkbox for 'Enable Video over IP', a checked checkbox for 'Enable Video Wall', a 'Scaler Output Mode' dropdown menu set to 'Pass-Through', a 'Timeout for Detecting Video Lost' dropdown menu set to '10 seconds', and an unchecked checkbox for 'Turn off screen on video lost'. An 'Apply' button is at the bottom right of this section. The 'USB over IP' section contains a checked checkbox for 'Enable USB over IP', a 'Compatibility Mode' section with a checked checkbox for 'K/M over IP' (with a note in parentheses: '(Uncheck when mouse/keyboard/touch panel not working as expected)'), and another 'Apply' button at the bottom right. A footer bar at the bottom of the interface contains the copyright text: '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

**VLX Series** **Aurora**

**VLX Series Setup**

System Video Wall Network **Functions** Remote Management Preview

**Video over IP**

☒ Enable Video over IP

☒ Enable Video Wall

Scaler Output Mode: Pass-Through

Timeout for Detecting Video Lost: 10 seconds

☐ Turn off screen on video lost

Apply

**USB over IP**

☒ Enable USB over IP

Compatibility Mode:

☒ K/M over IP (Uncheck when mouse/keyboard/touch panel not working as expected)

Apply

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## Remote Tab

The Remote tab allows the selection of the encoder to route to the unit.

The screenshot shows the 'VLX Series Setup' web interface with the 'Remote' tab selected. The interface includes a navigation bar with tabs for System, Video Wall, Network, Functions, Remote, Management, and Preview. The 'Remote' tab is active, displaying the 'Remote Connection' section with an 'Apply To:' dropdown and 'Apply', 'Send EDID', and 'Disconnect' buttons. Below this is the 'Serial over IP' section, which has a checked 'Enable Serial over IP' checkbox. Under 'Operation Mode', 'Telnet' is selected with a radio button, while 'Redirection' is unselected. The 'Baudrate Setting' section contains four dropdown menus: 'Baudrate' (115200), 'Data bits' (8), 'Parity' (None), and 'Stop bits' (1). An 'Apply' button is located at the bottom right of the 'Serial over IP' section. The footer of the interface states '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

**VLX Series** **Aurora**

**VLX Series Setup**

System Video Wall Network Functions **Remote** Management Preview

**Remote Connection**

Apply To:  **Apply** **Send EDID** **Disconnect**

**Serial over IP**

☒ Enable Serial over IP

**Operation Mode:**

☐ Redirection ☒ Telnet

**Baudrate Setting**

Baudrate: 115200

Data bits: 8

Parity: None

Stop bits: 1

**Apply**

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## Management Tab

The Management tab manages routing of streaming video sources and mode selection and configuration of serial over IP settings.

The screenshot displays the 'VLX Series Setup' web interface, specifically the 'Management' tab. The interface has a dark blue header with 'VLX Series' on the left and the 'Aurora' logo on the right. Below the header is a light blue navigation bar with tabs for 'System', 'Video Wall', 'Network', 'Functions', 'Remote', 'Management' (which is highlighted in green), and 'Preview'. The main content area is divided into three sections: 'Bitmap/Channel Map', 'Update Settings', and 'Backup Settings'. The 'Bitmap/Channel Map' section includes a 'Select Bitmap File:' dropdown menu, 'Apply', 'Delete', and 'Erase Disk' buttons, a 'Select File To upload:' section with a 'Choose File' button and 'No file chosen' text, a 'Disk space used:' progress bar at 0%, and an 'Upload' button. The 'Channel Map' section has radio buttons for 'Enable' and 'Disable' (with 'Disable' selected), and an 'Apply' button. The 'Update Settings' section features a 'Settings Type:' dropdown menu set to 'Recovery', a 'Config File Name:' section with a 'Choose File' button and 'No file chosen' text, and an 'Upload' button. The 'Backup Settings' section contains a single 'Download' button. At the bottom of the interface is a dark blue footer bar with the text '© 2016 Aurora Multimedia Corp. All Rights Reserved.'

**VLX Series** **Aurora**

**VLX Series Setup**

System Video Wall Network Functions Remote **Management** Preview

**Bitmap/Channel Map**

Select Bitmap File:  **Apply** **Delete** **Erase Disk**

Select File To upload: **Choose File** No file chosen Disk space used:  0%

**Upload**

**Channel Map:**

☐ Enable ☒ Disable **Apply**

**Update Settings**

Settings Type: **Recovery**

Config File Name: **Choose File** No file chosen

**Upload**

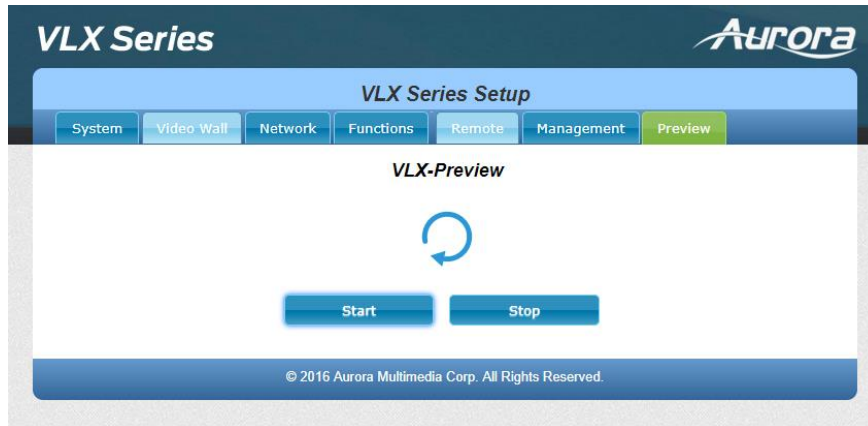
**Backup Settings**

**Download**

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### Preview Tab

The Preview tab allows you to look at the active video output.

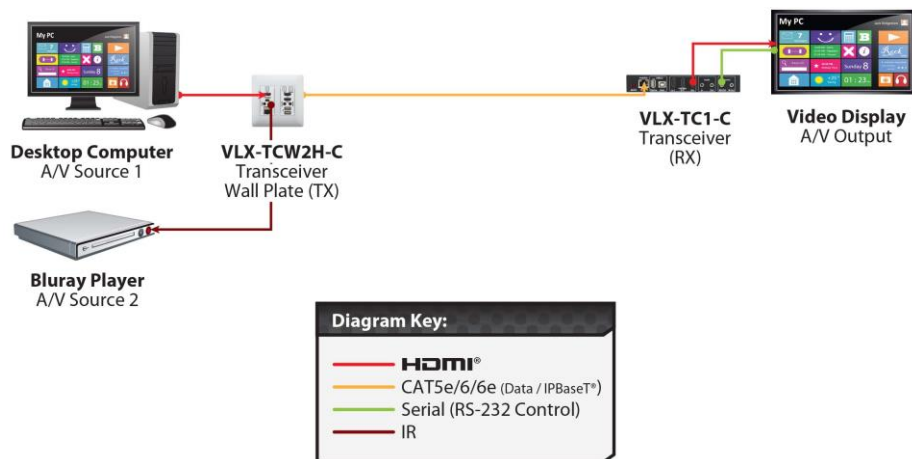




## APPLICATIONS

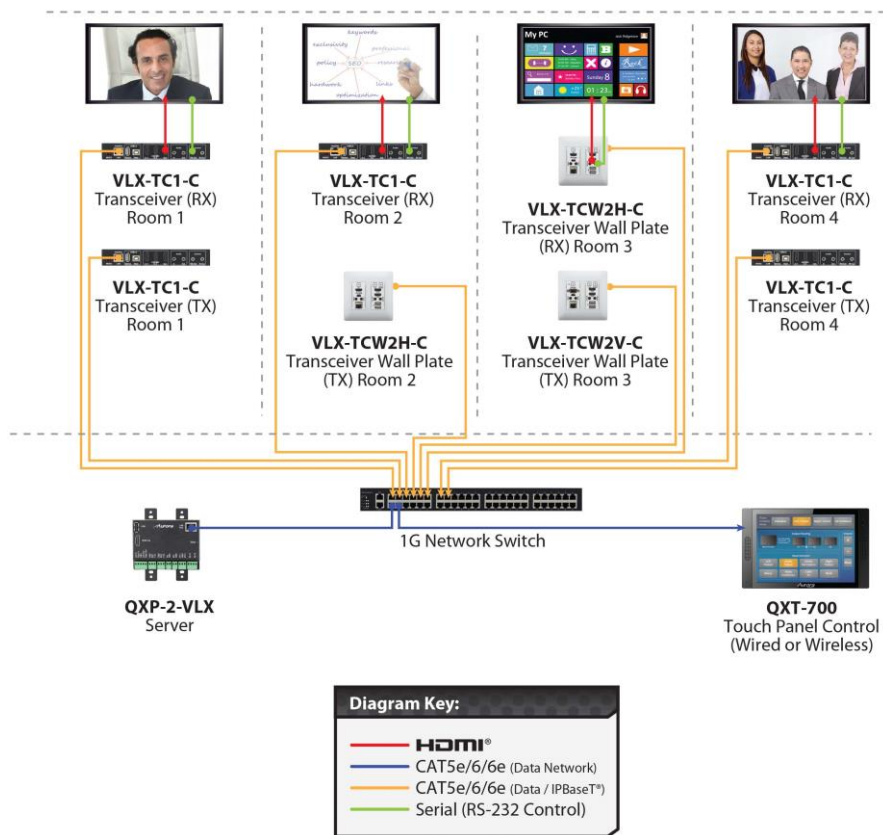
### Example 1: VLX-TCW2 Configured as Transmitter to VLX-TC1 Configured Receiver

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 (328ft) can be achieved.



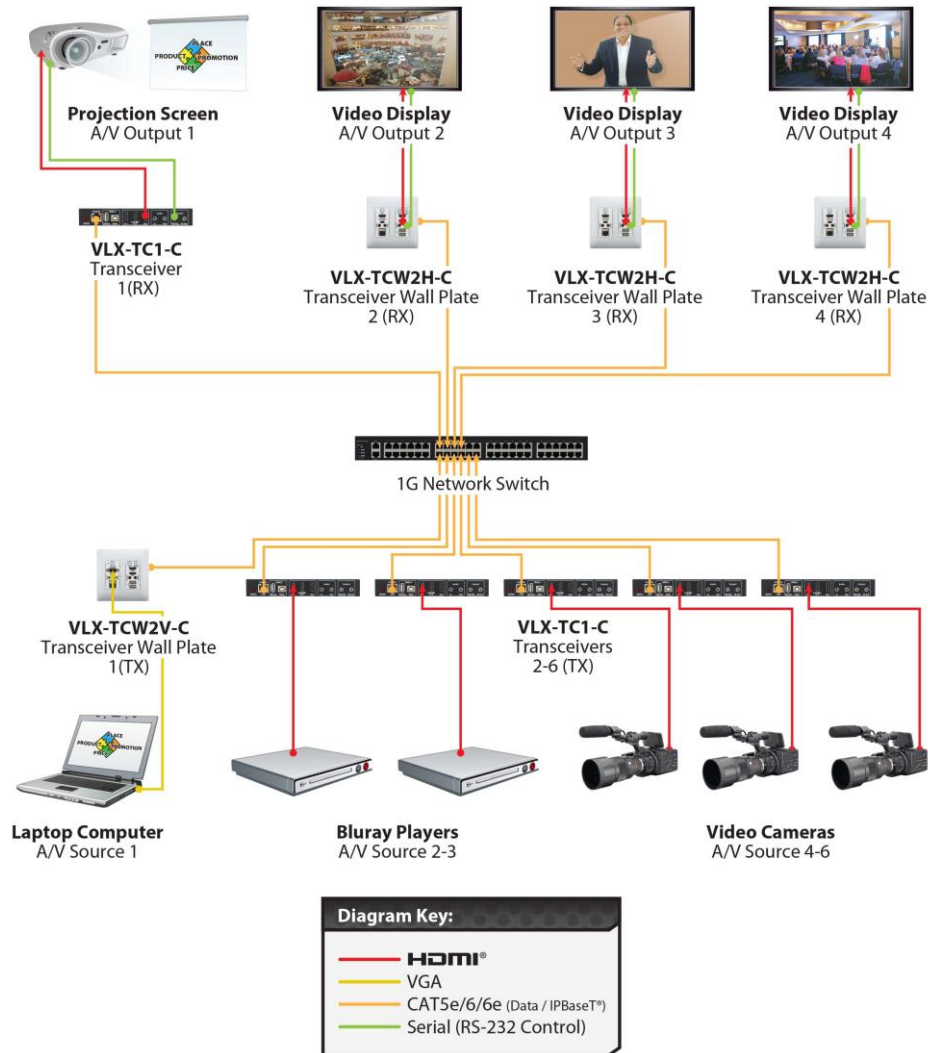
## Example 2: VLX Multi-Room

The VLX 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.



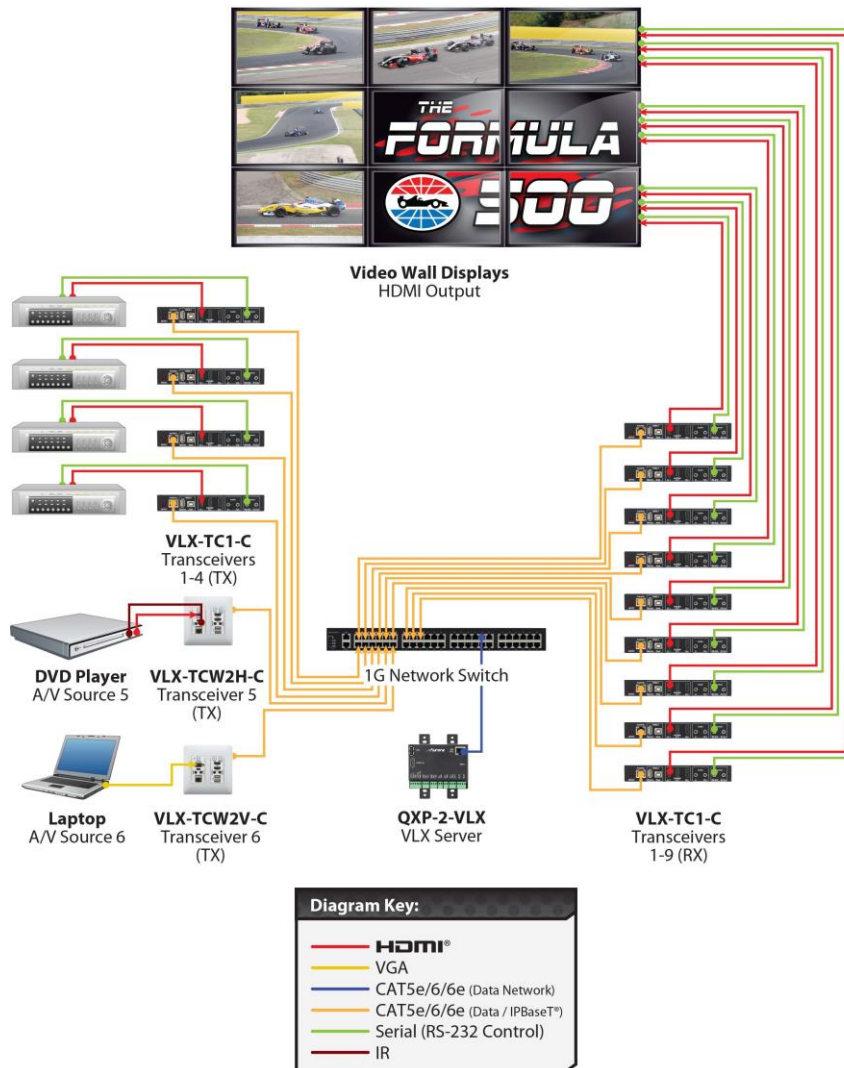
### Example 3: Matrix - Multiple VLX to Multiple VLX

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



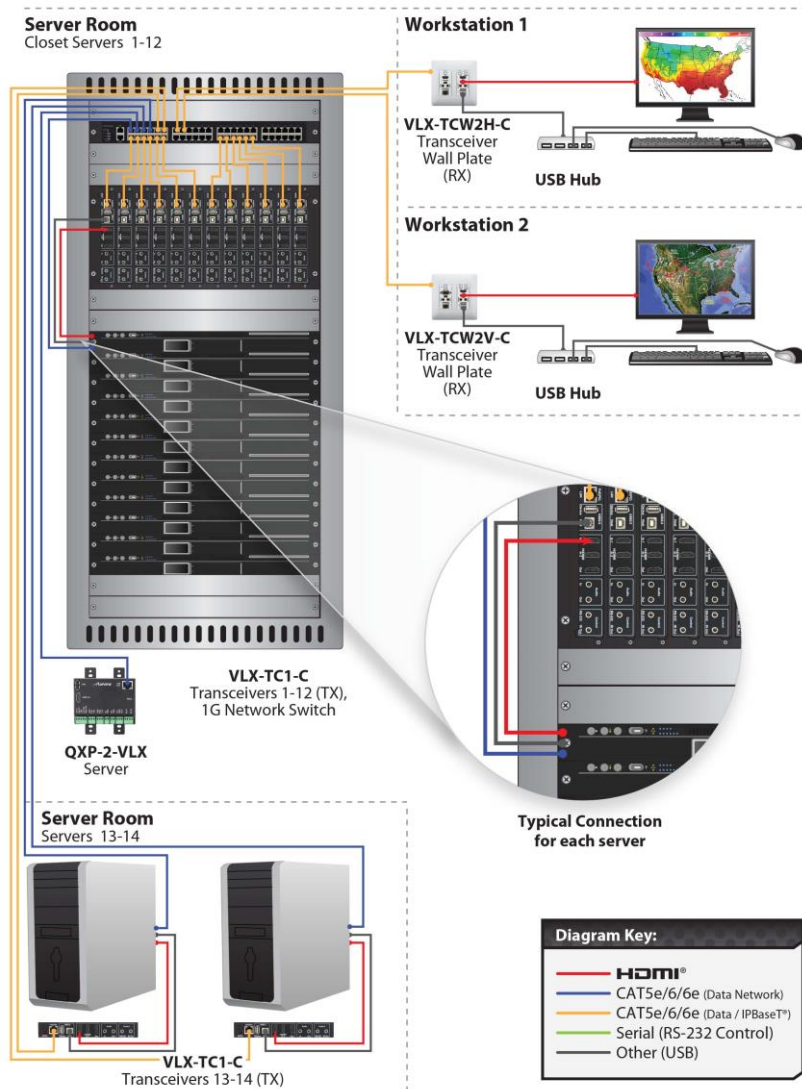
#### Example 4: Video-Wall

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



### Example 5: KVM utilizing USB 2.0

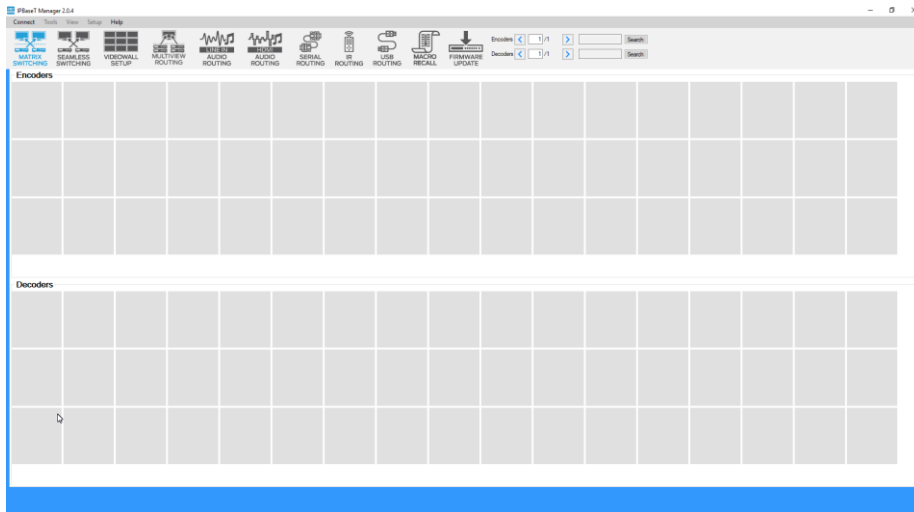
Command & Control and NOC centers are perfect for the VLX Series, especially with the USB 2.0 running at a full 50Mbps. With the VLX it is no longer just keyboard and mouse but full USB peripheral routing as well.



## 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 VLX series products on a network. While the IPBaseT manager is a 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 VLX can also work decentralized as well for smaller installations.

#### **Features**

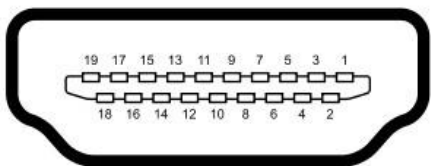
- Matrix Switching
- Video Wall Setup and Control
- RS-232 Routing & Control
- IR (Infrared) Remote Control Routing
- Horizontal and Vertical Viewing
- Macro Store and Recall
- Connection Manager
- Advanced Debug Logging

- Touch Screen Friendly Layout
- Configuration File for Cloning Presets and Connections on Other PCs
- Firmware Updating

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) when it becomes available.

# CONNECTOR PIN DEFINITION

## HDMI



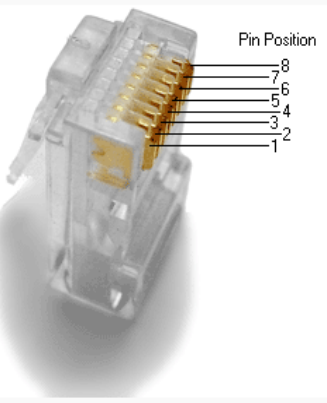
















Type A (Receptacle) HDMI

Pin 1	TMDS Data2+	Pin 8	TMDS Data0 Shield	Pin 15	SCL
Pin 2	TMDS Data2 Shield	Pin 9	TMDS Data0–	Pin 16	SDA
Pin 3	TMDS Data2–	Pin 10	TMDS Clock+	Pin 17	DDC/CEC Ground
Pin 4	TMDS Data1+	Pin 11	TMDS Clock Shield	Pin 18	+5 V Power
Pin 5	TMDS Data1 Shield	Pin 12	TMDS Clock–	Pin 19	Hot Plug Detect
Pin 6	TMDS Data1–	Pin 13	CEC		
Pin 7	TMDS Data0+	Pin 14	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

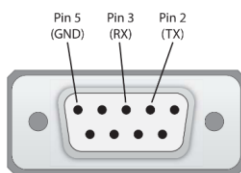
The RS-232 is a 3.5mm TRS connector. Tip is TX (output), ring is RX (input), and Sleeve is ground. To simplify connections Aurora offers pre-molded RS-232 cables in null and none nulled in male and female DB9.

### CA0052 Selection Guide

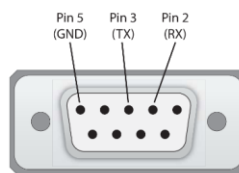
#### CA0052 (all versions) TRS Male



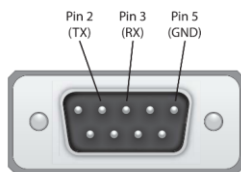
#### CA0052-F2T3R DB9 Female (Crossover)



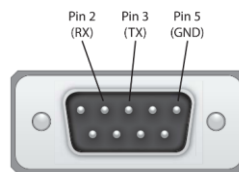
#### CA0052-F3T2R DB9 Female (Straight)



#### 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 Emitter CA0061-1



## **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 are 1G.

### **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.
- 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 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 requires Jumbo/MTU Packet of 8192 or better for full 4K video streaming.

#### **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.

## **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 in order to download firmware with instructions on how to update.

## **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 VLX protocol. The protocol is only available to authorized Aurora dealers.

## APPENDIX 4    Recommended Cabling

The VLX Series has the ability to go the distance. While regular CAT 5e will go 100m (330ft), CAT 6 and 6A can go much further. Below we have tested the following cabling from West Penn and the results of the testing with 4K video. Please note if using a different brand cable when exceeding the industry standard 100m (330ft) we highly recommend to verify the results first prior to installation as not all cables perform the same.

### **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 VLX will work with most non-blocking, IGMP, Jumbo packet 1Gbps network switch. Layer 3 will allow more control, however, Layer 2 will work as well. 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 VLX Series.

### 5.1 Switch Speed

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

VLX Series technology is used to transmit visually lossless 8:1 compress video up to 4K 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 4K and that is just for audio and video. It is therefore easy to understand why the VLX requires 1GbE network switches.

### 5.2 Packets Routing

To enable the transmission of a source to multiple destinations, VLX 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 VLX Series has to support IGMP Snooping. VLX 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 a 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.

### 5.3 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 must be enabled. VLX requires Jumbo/MTU Packet of 8192 or better for full 4K video streaming.

### 5.4 PoE (Power over Ethernet)

The VLX Series uses around 6 watts of power, however, the PoE is unclassified for up to 12.9 watts (15.4 Watts Total) as the USB on the VLX 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 VLX devices. Some switches can only supply a certain amount 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 VLX but you may need to disable the detection of the PoE for those ports in the Ethernet switch.

## APPENDIX 6 Technical Specifications

Model Name	VLX-TC1
Technical	
Compression	8:1
Latency	1.5 Frames (25ms)
HDMI Inputs	2 (HDMI 2.0, HDCP2.2)
HDMI Outputs	1 (HDMI 2.0, HDCP2.2)
Audio Analog	Stereo Line In/Out (3.5mm TRS)
1G Copper Ethernet	RJ-45
LAN	RJ-45 10/100/1000M PoE (PSE)
Video Bandwidth	340MHz
Video support	Up to 4K60 4:2:0/4K30 4:4:4
Audio support	Up to 7.1 Channel
RS-232	Up to 115k Baud (3.5mm TRS)
IR Output	3.5mm TRS
USB Connector	1 USB 2.0 Type A, 1 USB 2.0 Type B 2 USB 1.1 Type A
Expansion Port	Dante® Option
Interface	IR or Keypad via OSD, Webserver
Mechanical	
Housing	Black Aluminum Enclosure
Dimensions [L x W x H]	175 x 102 x 27.7mm [6.875" x 4" x 1.09"]
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	6 Watts
Operation temperature	0~40°C [32~104°F]
Storage temperature	-20~60°C [-4~140°F]
Relative humidity	20~90% RH [no condensation]
Package Contents	1x VLX-TC1

**Specifications subject to change without notice.**

Model Name	VLX-TCW2
Technical	
Compression	8:1
Latency	1.5 Frames (25ms)
HDMI Inputs	1 HDMI 2.0/HDCP2.2 (VLX-TCW2V) 2 HDMI 2.0/HDCP2.2 (VLX-TCW2H)
HDMI Outputs	1 HDMI 2.0/HDCP2.2
VGA/YPbPr Inputs	1 15 Pin HD Female (VLX-TCW2V)
Audio Analog	Stereo Line In/Out (3.5mm TRS)
1G Copper Ethernet	RJ-45
LAN	RJ-45 10/100/1000M PoE (PSE)
Video Bandwidth	340MHz
Video support	Up to 4K60 4:2:0/4K30 4:4:4
Audio support	Up to 7.1 Channel
RS-232	2 qty Up to 115k Baud (3.5mm TRS)
IR	3.5mm TRS
USB Connector	1 USB 2.0 Type A, 1 USB 2.0 Type B
Expansion Port	Dante® Option
Interface	IR or Keypad via OSD, Webserver
Mechanical	
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 1G PoE
Power consumption	6 Watts
Operation temperature	0~40°C [32~104°F]
Storage temperature	-20~60°C [-4~140°F]
Relative humidity	20~90% RH [no condensation]
Package Contents	1x VLX-TCW2

**Specifications subject to change without notice.**

## **APPENDIX 7     Warranty**

### **Limited 3 Year Warranty**

Aurora Multimedia Corp. ("Manufacturer") warrants that this product is free of defects in both materials and workmanship for a period of 3 years as defined herein for parts and labor from date of purchase. This Limited Warranty covers products purchased in the year of 2009 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.
- F. Part(s) are no longer available for product.

In the event that 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.

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

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