iPBT For Better Education

How the Aurora AV over IP allows for a better educational experience.

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1 Introduction

Aurora's IPBaseT® technology allows schools to achieve not only in room automation and AV signal extension but a full collaborative experience between classrooms and schools district wide. It will increase participation between students, teachers, principals, and overall faculty. School spirit will increase with targeted paging capabilities and even limit disruptions.

1.1 What is IPBaseT®?

IPBaseT® combines a variety of 4K IP technologies and features under one unified protocol using a simplified topology. Uncompressed video with zero-latency, visually lossless video with low latency, seamless switching, videowall and multi-viewer modes, digital audio, USB 2.0, Ethernet, and control are just some of the core capabilities of IPBaseT®. Utilizing the bandwidth of a standard 1Gbps copper (VLX Series) or 10Gbps copper or fiber (IPX Series), IPBaseT® supports large scalable audio/video distribution, and it does so while replacing multiple technologies and products with a "single-box" distributed platform. The need for separate AV switcher, control system, videowall processor, audio/DSP converter, and more are in the past.

1.2 IPBaseT® Solution Highlights

- Transceiver Design, which eliminates the need for 2 different SKUs (Transceiver & Receiver). This allows for easier servicing and 24/7 operation.
- Various models providing up to 4K60 4:4:4 (18Gbps) for future proofing.
- Device & Wall Plate available in copper versions and fiber too for 10Gbps. Very flexible for infrastructure wiring.
- Dante® Audio integrated with a video IP product to allow low bandwidth audio mixing between rooms and targeted paging. An industry first by Aurora.
- Directional USB 2.0 over IP, allowing where the computer vs peripheral is located relative to the encoder or decoder. Another first by Aurora.
- IP Channel mapping allowing a unit set as decoder to use an IR remote to change the configuration of the matrix. End user experience is same as changing channels on a cable box.
- PoE over 1GbE (VLX Series) and 10GbE (IPX Series). When 10G switches announce PoE in 2017 the IPX Series will be ready and will allow single wire no power supply installations. Aurora is leading the way being another first in industry.
- Remote power over fiber using a single plenum rated sheathing with OM3 and 1 pair 18 AWG copper. Allows use of standard 48V supply to remotely power units.

1.3 Changing the Topology of AV

The Aurora patent pending transceivers allow for better serviceability, better reliability, and new applications. The typical encoder/decoder topology requires at least 2 different SKU to be supported and kept in inventory. This causes stock disproportions, as each system ratio of encoders to decoders are different with each project. Customers can now cost effectively manage spares on site for 24/7 operation, as there is only a singular device to maintain. Even wall plates can be interchanged with box versions. Applications and servicing are simplified as each IPBaseT® device can provide both encoding and decoding functions. This presents new dynamic design possibilities for portable roll about carts, conference facilities and AV distribution in general, maximizing function and performance, while minimizing investment in hardware.

IPBaseT® solves common problems with USB over IP. Aurora's USB is reversible, so the computer or device can be on either the encoder or decoder units. The industry norm is only one direction and there is no choice. Overall IPBaseT® solves problems and changes the topology of the industry, making everything easier and full featured.

1.4 Changing Education Now and the Future

Currently, most classrooms are being designed for point-to-point operation typically from a wall plate or cart to a display(s). Unfortunately, it only solves the issue of extending connectivity and control automation. Aurora's IPBaseT® solutions go beyond just that. It brings teachers, students, principals, and parents together in a way that promotes better education, school spirit, and security. It can be utilized for asset management, energy management, and much more. IPBaseT® is not only changing the topology of AV but the topology of education and learning environments.

1.4.1 Paging everyone or just the one

Current paging systems typically page throughout the entire school or zones. IPBaseT® makes it possible to page not only school wide or to a zone but to an individual classroom. This prevents disrupting other classes and keeps focus where it needs to be. Additionally, paging does not have to be just audio, as IPBaseT® allows for video too.

1.4.2 School Spirit

Why limit events to just the auditorium, field, or cafeteria? A low-cost camera can be utilized to transmit through the system any event to the rest of the school or district. Students can also create newsrooms and broadcast school information – operations that are by the student, for the students. It allows teachers to educate students on improved methods of communication and the responsibility of free speech.

1.4.3 Lesson for one, lesson for all

Current systems limit the content to just the one room. IPBaseT® has virtually no boundaries as it can be shared with any number of classrooms. Teachers can now collaborate lessons beyond the confined walls with another teacher(s). With the Dante® option and Dante® mixers, the microphones of each room can be combined for full 2-

way communication. Substitute and student teachers can benefit, as an experienced teacher can remotely share the lesson while the substitute/student teacher learns from the experience, all while keeping students on track.

1.4.4 Keeping assets

Another great feature of IP based systems is the ability to track the status. When a device is plugged into an IPBaseT® system, it can be monitored. This allows for asset management and the appropriate party can be notified in the event a change occurs in the device.

1.4.5 Be Green

With inner connectivity, the usage of the rooms can be monitored and remotely controlled. In the event equipment is left on, the system can be automated to turn off projectors as an example, by a specific time to save on power and bulb life. This in turn saves power and money.

1.4.6 Staying Secure

IPBaseT® is not only for classrooms. It can be used anywhere and for just about anything audio or video related. Security is a priority in schools and the IPBaseT® products can be utilized with cameras for transmitting hi-resolution, real-time video for use in an emergency. Please note: Image quality is important as digital zoom only works as well as the resolution and the image quality sent. This is critical when identifying a situation.

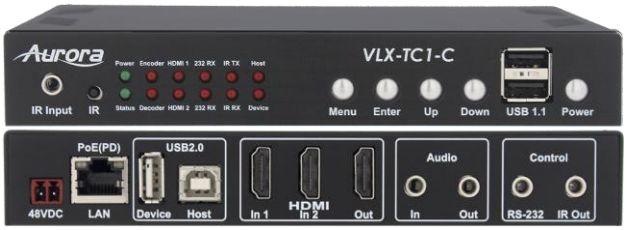
1.4.7 Emergency Situations

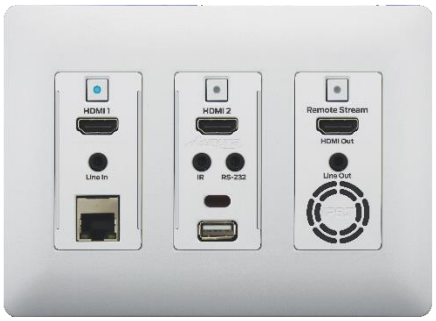
Certain IPBaseT® products store images internally that can be recalled as needed. All products can be remotely controlled to force a stream of choice. In the event of an emergency, and the type thereof, proper information and a “what to do” message can be sent to each classroom. For example, in the event of a fire, an image or video can appear on the display with audible message stating nearest exits. For an earthquake, a message to get in doorways or under desks can be sent and to provide comfort to students lessening the chance of panic or increased anxiety.

1.4.8 Scalability for the future

IPBaseT® is fully scalable, so systems can start confined to individual rooms and later linked up as required. Additional rooms can be added as needed, since the network determines the size of the system. All IPBaseT® products are 4K capable for the highest UHD quality when needed, yet still having support for legacy devices.

1.5 Award Winning Technology

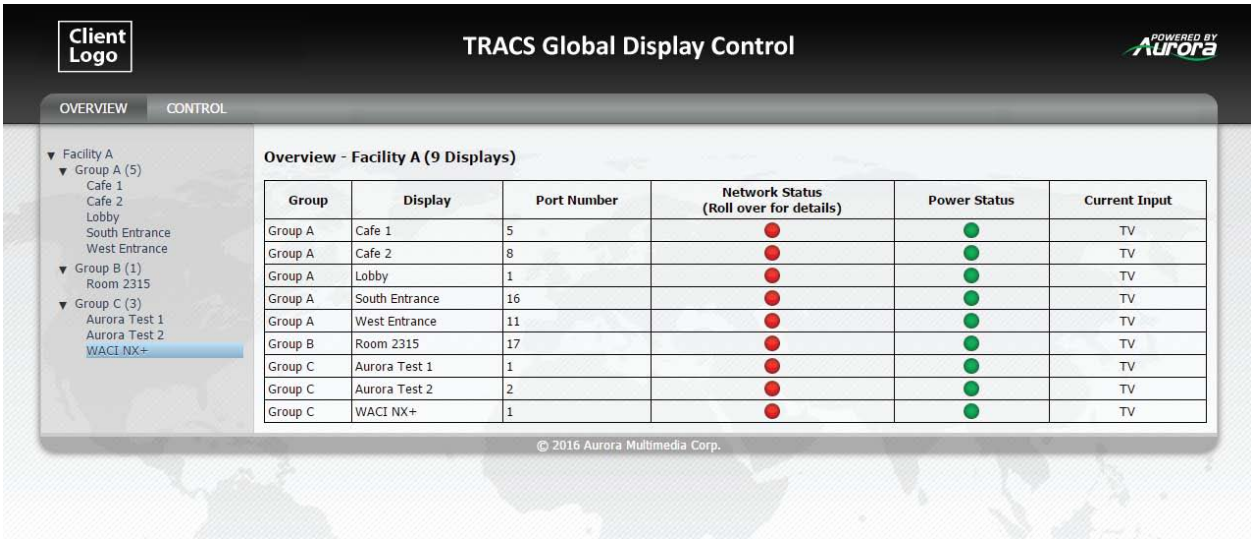




Made in the USA

2 School or District Wide Management

Aurora offers a software product called TRACS to manage control, assets, reports usage, alerts, and more.



3 Collaboration Improves Education

Statistics have shown up to a 28 percent academic improvement with students participating in cooperative learning. Statistics are based and limited to a classroom divided into groups for students to work together in a variety of activities. IPBaseT® takes cooperative learning to another level by turning an entire classroom into a group to interact with other classrooms. Now students and teachers become immersed in a fully interactive experience with improved styles of teaching, new types of student personalities, and most important, a new way of sharing knowledge outside the confines of their own classroom. The expectation is to further increase academic performance and communication skills.

4 Applications

The following is a variety of applications common to the education market. It is always recommended for a professional to review what is required specific to your application to make certain the correct parts and infrastructure is utilized.

Aurora has a Certified IPBaseT® Product Specialists program for integrators/installers to assure they are properly trained with the technology.

4.1 Products

Below are just some of the products that make up a typical room solution in the applications to follow.

4.1.1 DXB-8i Eight Button IP Control Wall Panel

The DXB-8i allows full control of the devices in the room with the simplicity of pushing a backlit button. Turning on or off a projector, adjusting the amplifier volume, or changing sources, are just a sampling of what this button panel can do. The DXB-8i has 60 different button caps to choose from to match the devices or functions to be controlled.

4.1.2 VLX-TCW2V/H AV over IP Wall Plate

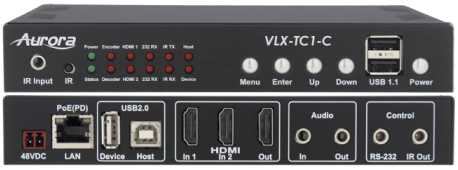
The VLX-TCW2V-C and VLX-TCW2H-C are AV over IP wall plates allowing the input sources (PC, Blu-ray, etc.) to be sent in high quality over a network to any other VLX Series device. The VLX wall plates can also receive signals too and output to a display. USB 2.0 can be extended and shared (KVM) over the network too.

4.1.3 VLX-TC1-C AV over IP Box Unit

The VLX-TC1-C is an AV over IP unit capable of visual lossless video resolutions up to 4K. It can embed and de-embed audio as well as extend USB 2.0 to any location. The VLX-TC1-C can even do videowalls and image rotation amongst other advanced features.

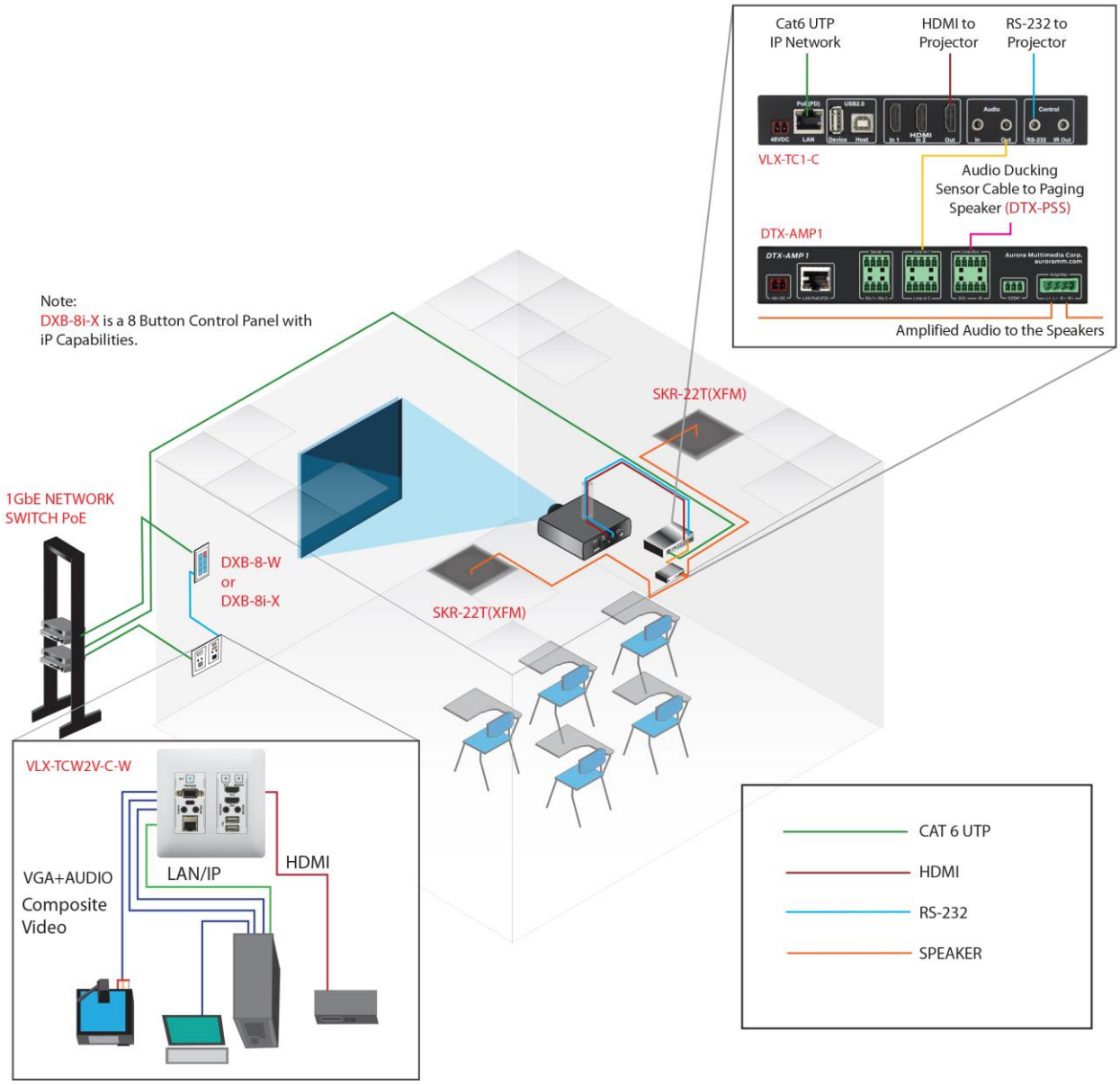
4.1.4 DTX-AMP1 IP Amplifier 2 x 35 Watt

The DTX-AMP1 is the world's first Dante PoE++ amplifier capable of 2 x 35 watts. In addition, it has DSP capabilities that allows equalization, mixing, echo cancellation, noise cancellation, paging with ducking, and more.



4.2 Wall Plate to Projector with Control, Amplifier and Speakers

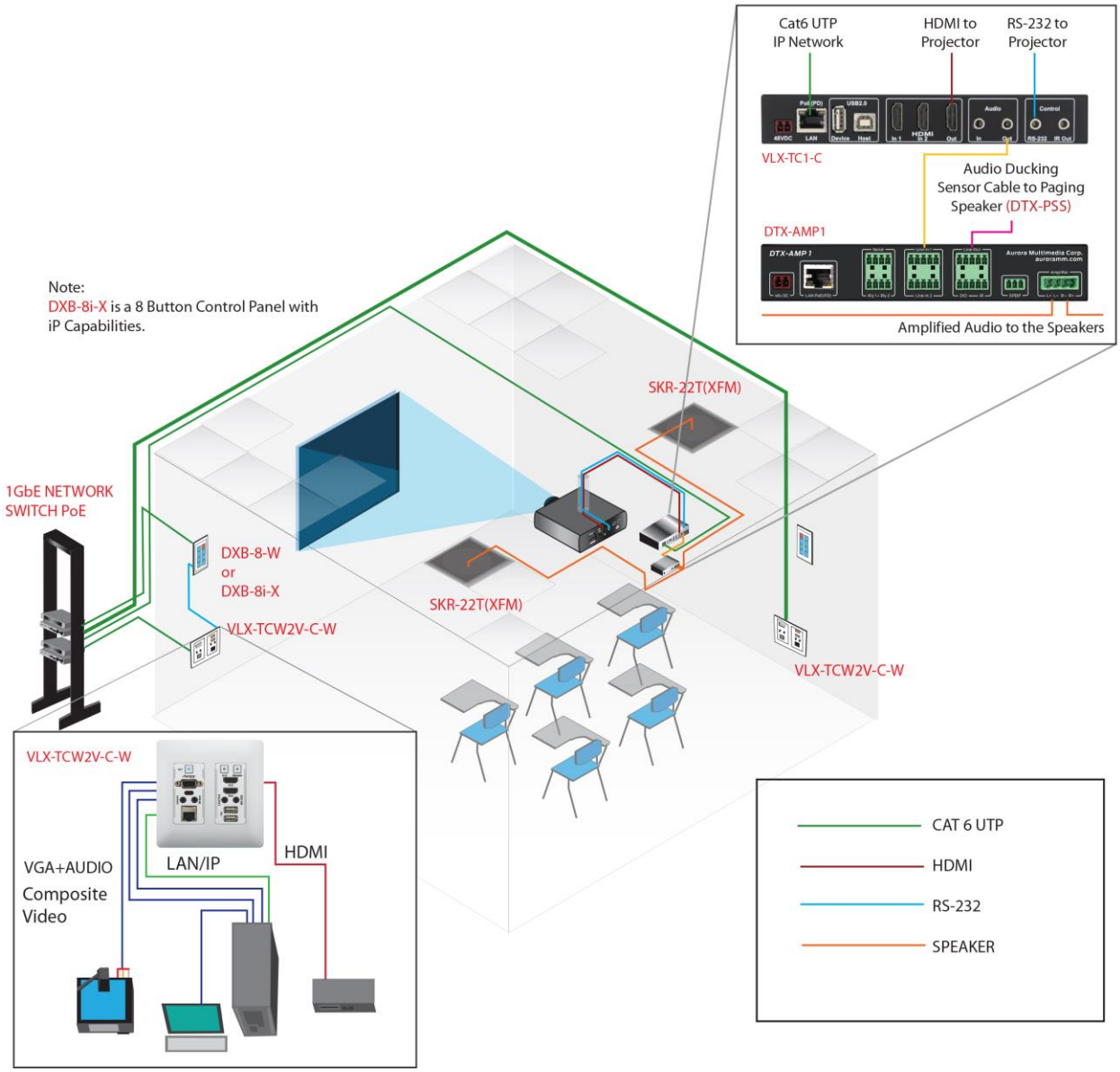
This application is a button controller (DXB-8i), wall plate with VGA and HDMI inputs (VLX-TCW2-C), and box set as decoder for the projector (VLX-TC1-C). They are all powered and connected with a PoE switch. In addition, the Aurora DTX-AMP1 and SKR-22T complete the end to end solution with amplifier and speakers.



QTY	Part Number	Description
1	DXB-8i	8 Button 1 Gang Backlit IP Controller
1	VLX-TCW2V-C	4K AV over IP 2 Gang Wall Plate with VGA and HDMI
1	VLX-TC1-C	4K AV over IP Box Unit
1	DTX-AMP1	2x35 Watt IP Amplifier with Equalizer and Control Ports
2	SKR-22T	2x2 Ceiling Tile Speaker

4.3 Two Wall Plates to Projector with Control, Amplifier and Speakers

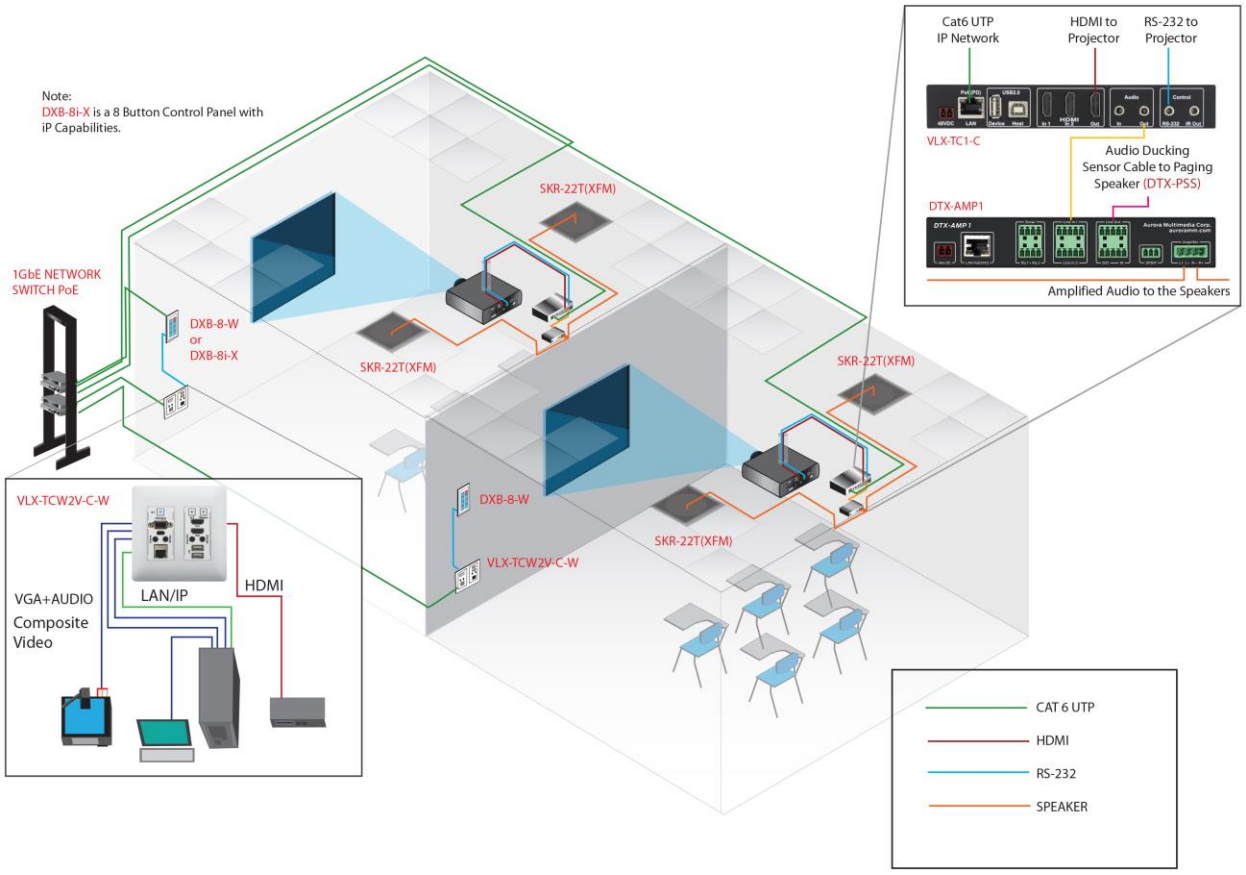
This application is a button controller (DXB-8i), two wall plates with VGA and HDMI inputs (VLX-TCW2-C), and box set as decoder for the projector (VLX-TC1-C). They are all powered and connected with a PoE switch. In addition, the Aurora DTX-AMP1 and SKR-22T complete the end to end solution with amplifier and speakers.



QTY	Part Number	Description
1	DXB-8i	8 Button 1 Gang Backlit IP Controller
2	VLX-TCW2V-C	4K AV over IP 2 Gang Wall Plate with VGA and HDMI
1	VLX-TC1-C	4K AV over IP Box Unit
1	DTX-AMP1	2x35 Watt IP Amplifier with Equalizer and Control Ports
2	SKR-22T	2x2 Ceiling Tile Speaker

4.4 Room Collaboration Between Two Rooms

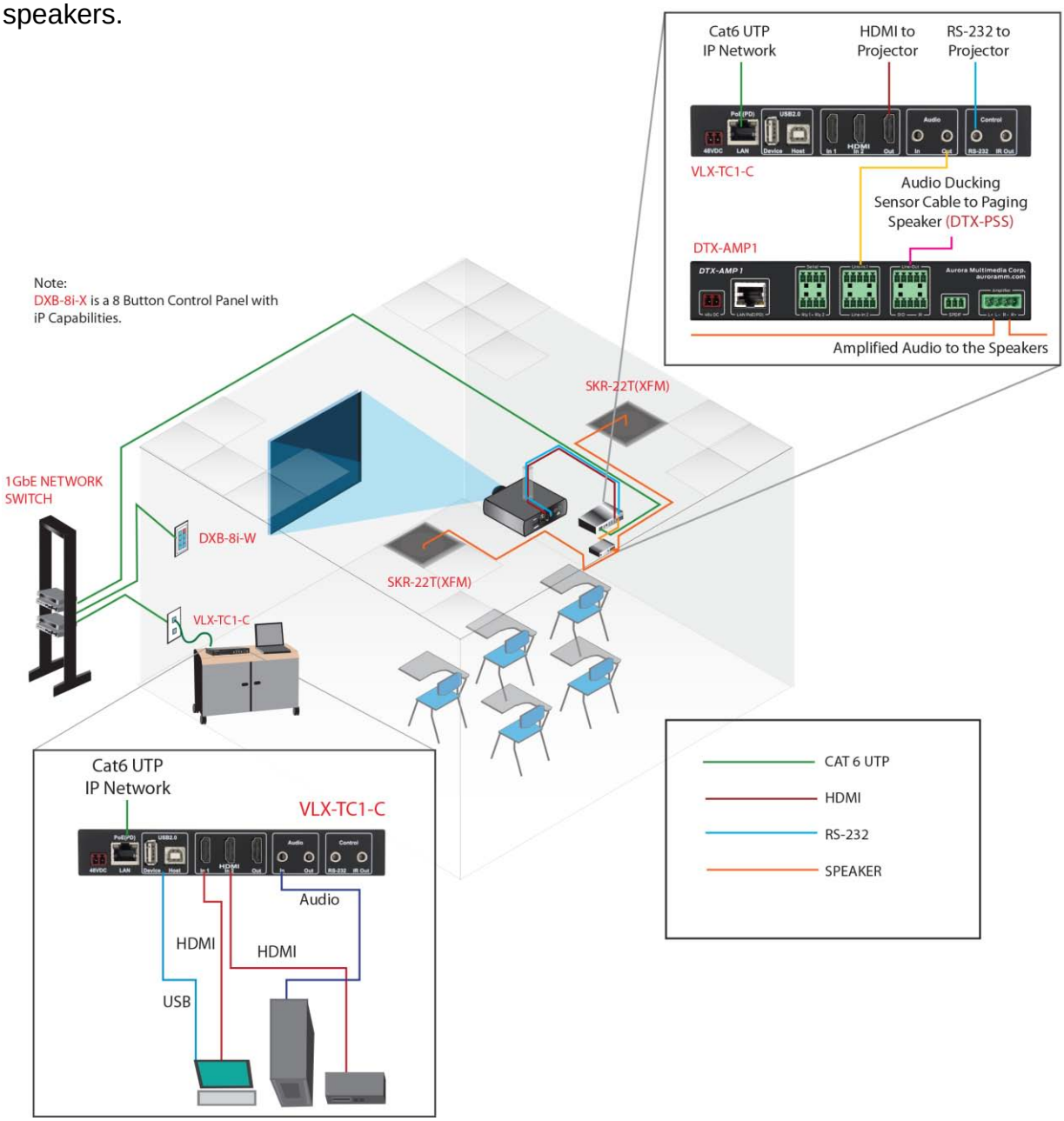
This application shows a classroom sharing content with other classrooms. If Dante® option is used the microphone audio can be mixed creating full collaboration between the room(s).



QTY	Part Number	Description
2	DXB-8i	8 Button 1 Gang Backlit IP Controller
2	VLX-TCW2V-C	4K AV over IP 2 Gang Wall Plate with VGA and HDMI
2	VLX-TC1-C	4K AV over IP Box Unit
2	DTX-AMP1	2x35 Watt IP Amplifier with Equalizer and Control Ports
4	SKR-22T	2x2 Ceiling Tile Speaker
4	IPE-DTE-1	Dante Option for VLX-TCW2V-C and DTX-AMP1

4.5 Roll-about Cart - Wired

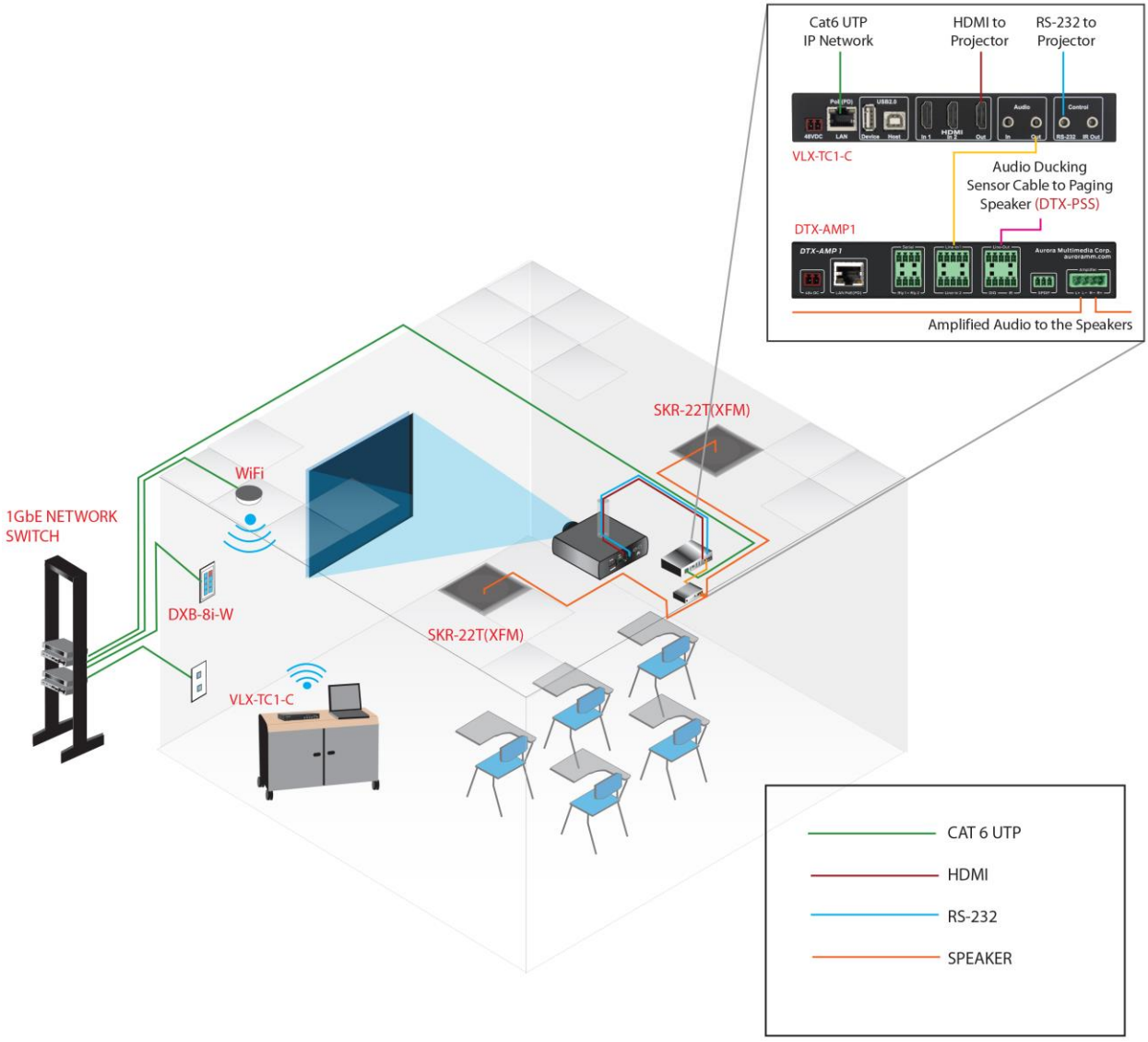
Sometimes classrooms need flexibility with a cart. When a cart is required, two box versions (VLX-TC1-C) can be used; one in the cart and the other by the projector. Aside from power, only a single CAT cable is needed to plug into the wall. In addition, the Aurora DTX-AMP1 and SKR-22T complete the end to end solution with an amplifier and speakers.



QTY	Part Number	Description
1	DXB-8i	8 Button 1 Gang Backlit IP Controller
2	VLX-TC1-C	4K AV over IP Box Unit
1	DTX-AMP1	2x35 Watt IP Amplifier with Equalizer and Control Ports
2	SKR-22T	2x2 Ceiling Tile Speaker

4.6 Roll-about Cart - Wireless

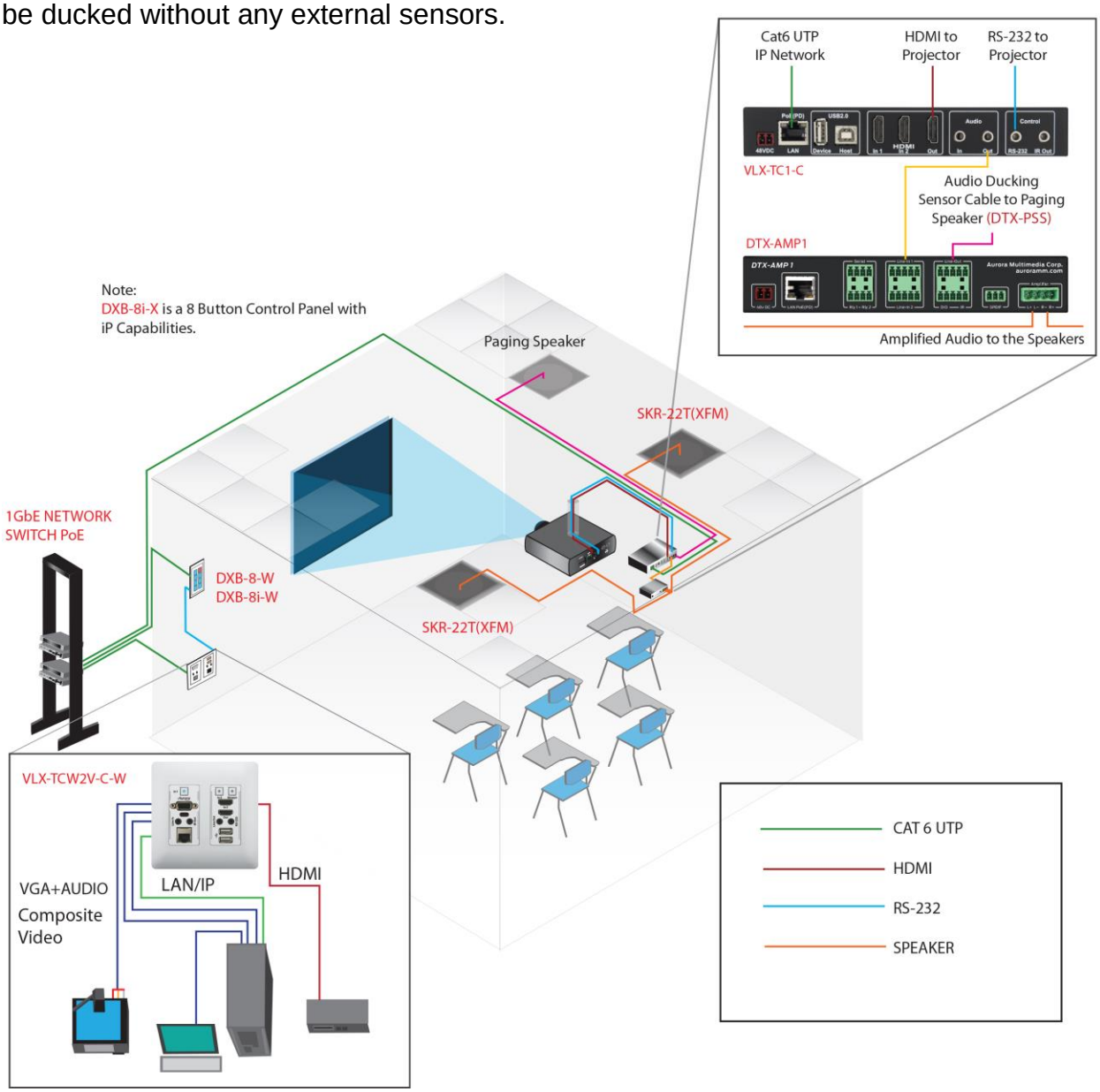
Sometimes classrooms need flexibility with a cart but without the wires. When a cart is required, two box versions (VLX-TCW2-C) can be used one in the cart and the other by the projector. Please Note: 802.11AC WiFi is needed at each side to transmit the data. In addition, the Aurora DTX-AMP1 and SKR-22T complete the end to end solution with amplifier and speakers.



QTY	Part Number	Description
1	DXB-8i	8 Button 1 Gang Backlit IP Controller
2	VLX-TC1-C	4K AV over IP Box Unit
1	DTX-AMP1	2x35 Watt IP Amplifier with Equalizer and Control Ports
2	SKR-22T	2x2 Ceiling Tile Speaker

4.7 Audio Paging with Ducking

When audio paging is not incorporated within the IPBaseT® infrastructure, a paging speaker sensor is available (DTX-PSS). This sensor adheres onto the existing paging speaker and connects to the (VLX-TC1-C) to duck (lower) the program audio when announcements are made. However, when utilizing Dante® or Video Paging, audio can be ducked without any external sensors.



QTY	Part Number	Description
1	DXB-8i	8 Button 1 Gang Backlit IP Controller
1	VLX-TCW2V-C	4K AV over IP 2 Gang Wall Plate with VGA and HDMI
1	VLX-TC1-C	4K AV over IP Box Unit
1	DTX-AMP1	2x35 Watt IP Amplifier with Equalizer and Control Ports
2	SKR-22T	2x2 Ceiling Tile Speaker
1	DTX-PSS	Paging Ducking Sensor

5 IPBaseT® Partners and Warranty

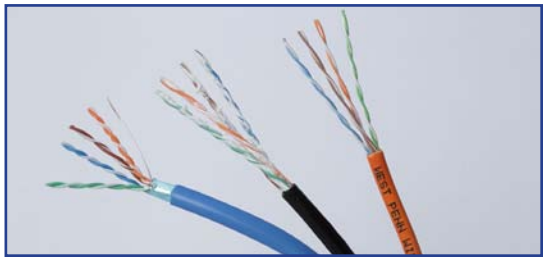
Aurora has a variety of Certified IPBaseT® strategic partners and product partners. This assures a complete end to end experience with proper support and interoperability. Aurora offers a 5-year limited warranty (3-year limited standard) when using Aurora products with IPBaseT® partner's products from front to back excluding the display and sources. Extended warranties are available at an additional cost if the installation is not an end to end certified installation. Listed below are Aurora partners and any updates can be found at www.auroramm.com

Bulk Cables

Category 6 / 6A UTP Cables for VLX Products

WEST PENN WIRE
AV, SECURITY & NETWORKING SOLUTIONS
Since 1971

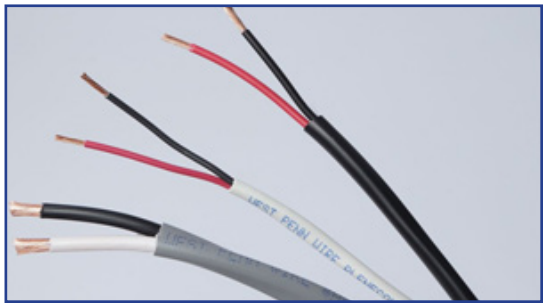
Environment	Category 6 UTP	Category 6A UTP
Non Plenum	4246	4246A
Plenum	254246	254246A
Indoor/Outdoor	4246IO	
Outside Plant	4246OSP	
Armored		



Bulk Cables

Speaker Cables

Environment	18 AWG	16 AWG	14 AWG
Non Plenum	224	225	226
Plenum	25224B	25225B	25226B
Indoor/Outdoor	AQC224	AQC225	AQC226



HDMI Assemblies

Type	Part Number	Description
Economy	CN-40HDMI-xx	Economy Replace xx: 3, 6, 10,15 ft
Locking 25lbs	CN-HD700-xx	25lb. Locking Replace xx: 2,4,8,16,25,35 ft
18G HDMI2.0a	CA-HDMI-ccc-xx	18G HDMI2.0a Replace ccc (Color) • BLK • BLU • RED • GRN Replace xx: (Length in meters) 05, 1, 2, 3, 5

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