



SYSTEM DESIGN GUIDE

CONTROL APPLICATION EXAMPLES

Impera™ and Apprimo™

A fundamental aspect of most AV systems is a control interface. Whether selecting sources or changing volume levels or lighting, users want the ability to adjust the environment to their preference. Ideally, control interfaces should provide the flexibility for technology managers to customize experiences for the end-users who rely on AV solutions in conference rooms, learning environments, and presentation spaces.

Good control UI is intuitive, providing users with descriptive labels and/or text indicating what buttons to press or phrases to say to perform a desired function. Ideally, the control system should be device-agnostic, allowing users to control devices from many manufacturers for all aspects of a room or space's environment, whether audio, video, climate, or lighting.

For most spaces, Biamp control solutions provide the right interface for all integrated AV hardware. We deliver easily configurable control products that empower professionals to simplify complex AV environments for those who depend on easy, reliable connections for every meeting, lecture, and presentation.

Plus, Biamp's Project Designer software gives AV integrators the easiest and most intuitive software for configuring control interfaces — no coding required.

SYSTEM DESIGN GUIDE

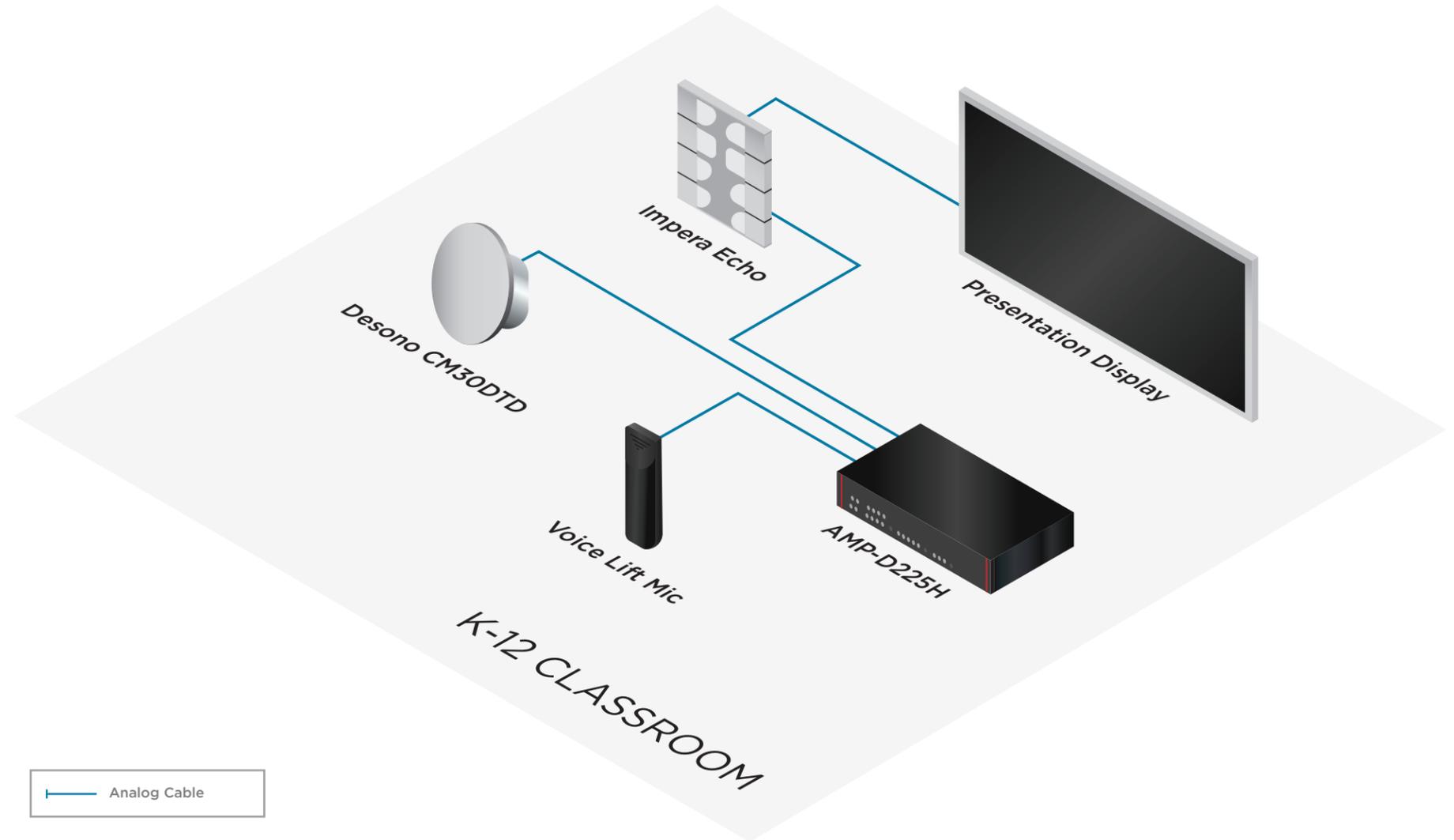
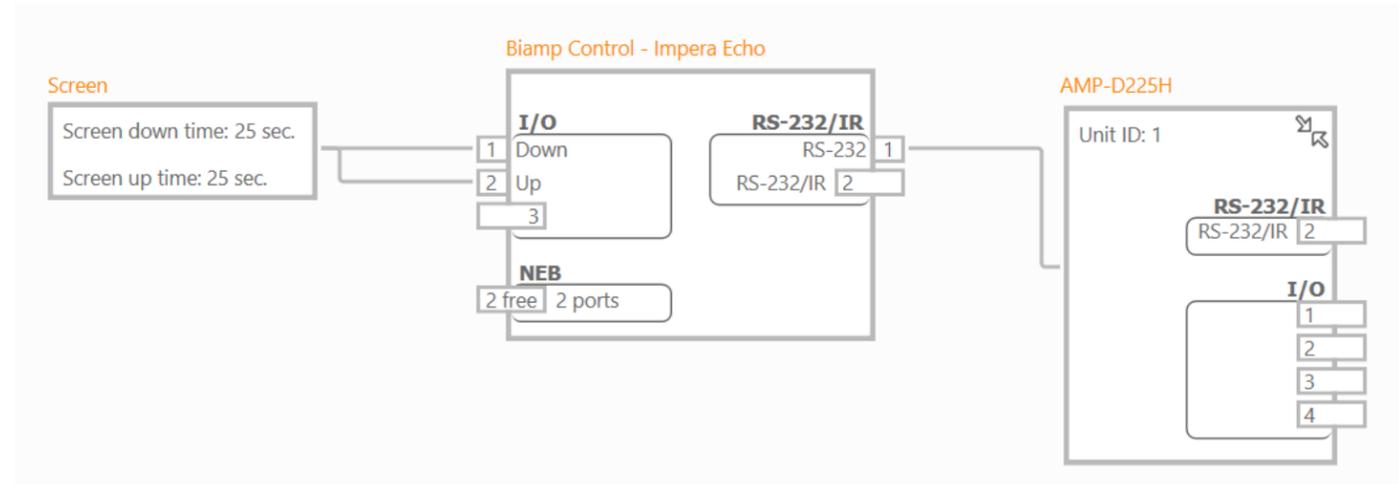
K-12 CLASSROOM

Student experiences in school classrooms are critical to their success, and the classroom's AV system is an important aspect of keeping students engaged, connected, and happy. The Impera Echo control pad is an excellent fit for a K-12 classroom. The rugged construction provides the durability required for such a high touch environment, while the eight mechanical buttons support display operations and source select, as well as volume control for the teacher's voice lift microphone.

The audio performance, ease of use, and versatility of the AMP-D225H make it well-suited for K-12 applications. It switches seamlessly between up to four audio sources and delivers 25 watts per channel of output power. The Desono CM30DTD ceiling loudspeakers deliver crystal clear audio over the entire frequency spectrum filling every inch of the classroom with extraordinary audio.

SYSTEM FEATURES

- Crystal clear audio delivered to every inch of the classroom with our Desono ceiling speakers
- Biamp's commercial amplifier has no need for internal cooling fans making it able to be placed in a classroom without being distracting
- Impera Echo is configurable via Project Designer giving you the flexibility to design your system for your needs
- Impera Echo allows you to configure a room at the touch of a button



SYSTEM DESIGN GUIDE

CONFERENCE ROOM

With a hybrid or otherwise geographically dispersed workforce, the quality of conferencing solutions is becoming a critical component of success for many businesses. Whether discussing the latest product offerings with a client or collaborating with team members to solve a problem, it's crucial that the meeting's focus be on the topic of conversation and not on the room's AV equipment.

Our next generation TesiraFORTÉ X series of audio signal processors are tailor-made for modern meeting rooms, reducing the amount of hardware and connections needed for system build out. Biamp's groundbreaking Launch feature analyzes and optimizes the acoustic performance of the room with the touch of a button, making it easy to deliver extraordinary experiences consistently across the organization.

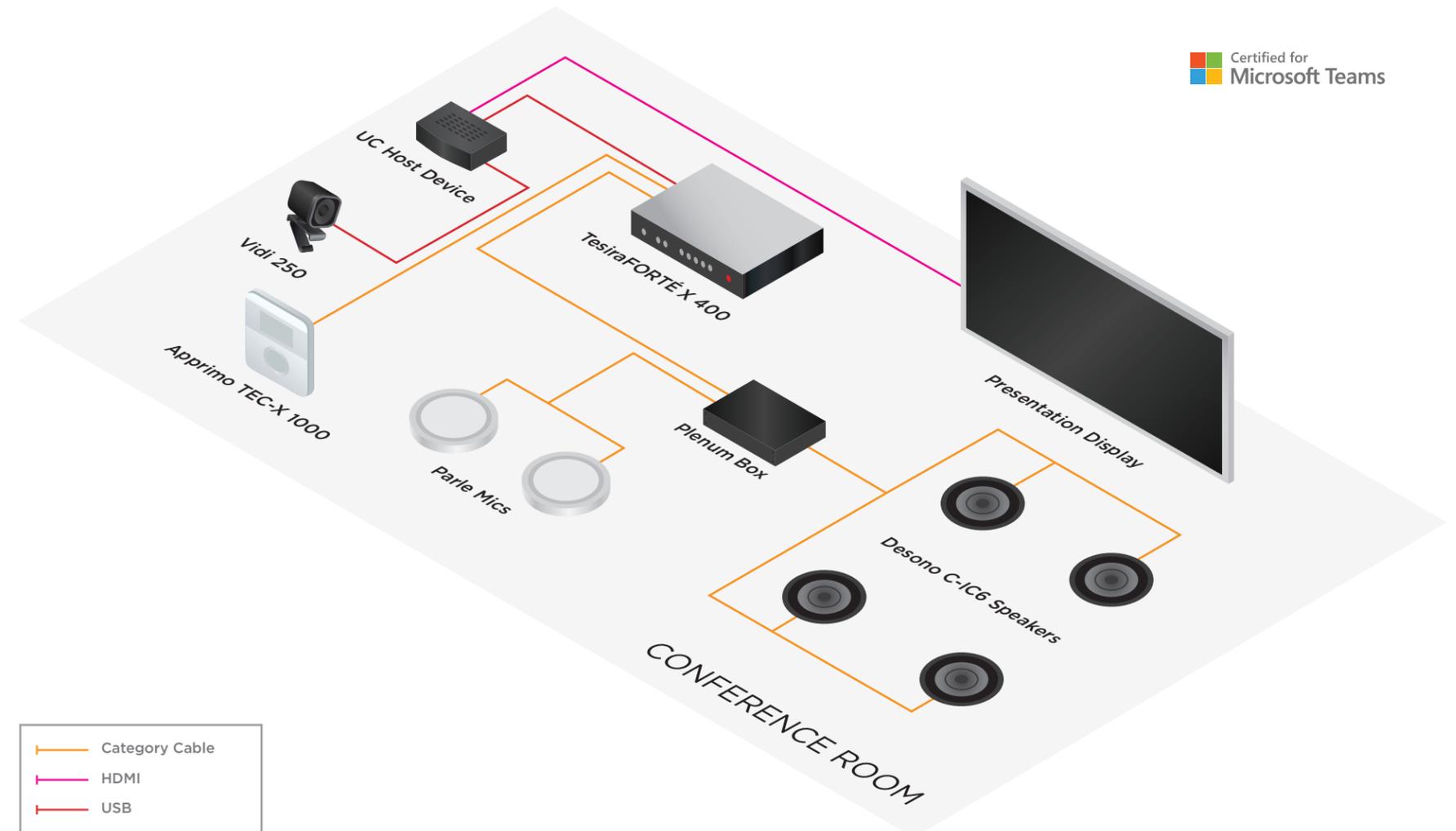
The award-winning Parlé microphones track the voices of meeting participants as they move around, ensuring participants are heard clearly and always understood. The Parlé TCM-XA is also equipped with a 2-channel PoE+ amplifier — with a burst mode feature to handle peak signals — making loudspeaker connections quick and easy. Designed to provide superior voice reproduction in conferencing environments, Desono C-IC6 loudspeakers deliver superior audio clarity for the entire room while their category cable connections allow installers to get meeting spaces up and running in half the time.

The 4k ePTZ Vidi 250 conferencing camera has a 120° field of view, allowing everyone in the room to be seen. The Vidi 250 uses auto framing technology to adjust the focus and zoom to keep participants in view, while the premium camera optics prevent common forms of image distortion.

Easily identified by its signature rotary knob, the Apprimo TEC-X 1000 touch panel is an excellent room control for conference rooms of all sizes. It can be quickly programmed and customized within Tesira software as the needs of a room change over time, making the TEC-X 1000 a very flexible, cost effective control solution.

SYSTEM FEATURES

- TesiraFORTÉ X series provides USB connectivity to any soft codec host and is certified for use with Microsoft Teams
- Four 90° zones can simultaneously identify and steer toward talkers, allowing participants to move freely around a space
- Audio levels remain consistent because of Tesira's best in class AGC processing—whether the talker is facing toward or away from the microphone
- TesiraFORTÉ X is equipped with Biamp's groundbreaking Launch feature. With Launch, the acoustic performance of the room is analyzed and optimized at the touch of a button, making it easy to deliver extraordinary experiences consistently across your organization.
- Apprimo TEC-X touch panels allow you to configure the room at the touch of a button or turn of a knob



SYSTEM DESIGN GUIDE

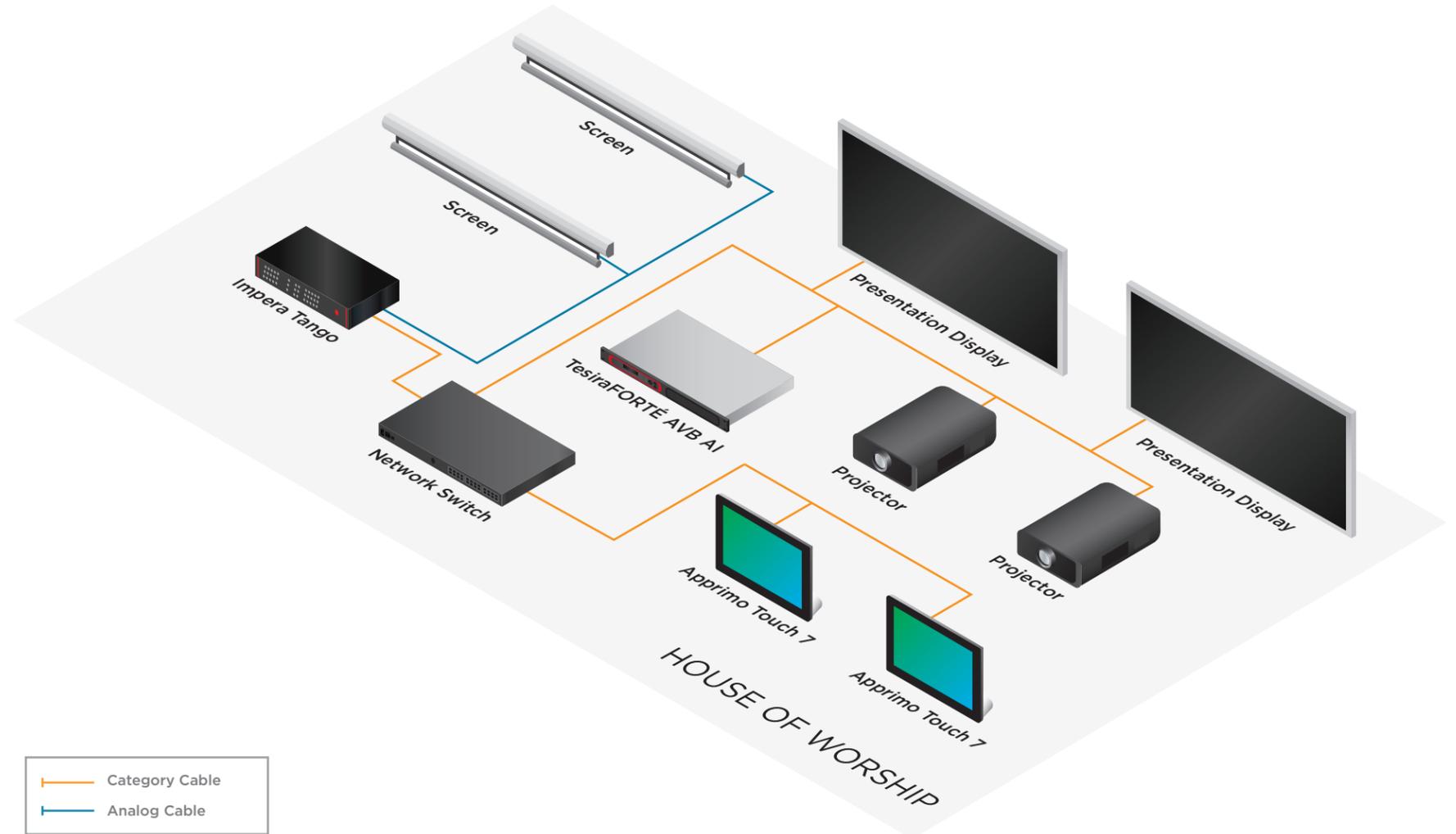
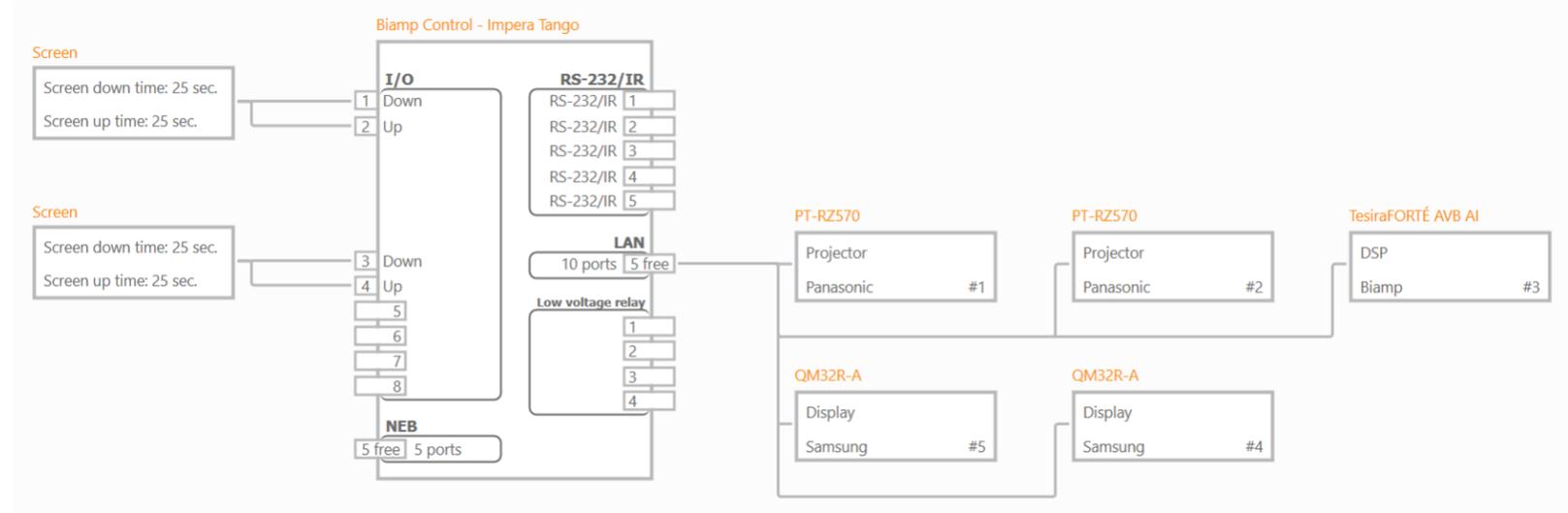
HOUSE OF WORSHIP

AV systems in houses of worship have to address broad sets of requirements for worship leaders to communicate their message and keep their congregations engaged. The audio needs to be clear throughout the sanctuary, which is often architecturally challenging for voice reinforcement. Video is also increasingly used during services for many reasons.

A variety of services often take place in the sanctuary — including weekly worship, weddings, small group bible studies, funerals, and more — so being able to quickly reconfigure the AV system for each activity is important. And since many houses of worship are operated by volunteers who have little to no AV experience, the simplicity of the control system and use of presets is critical. In this scenario, Tesira is ideal for managing the audio and signal processing in the sanctuary, while an Impera controller with an Apprimo touch panel creates a simple yet powerful user interface for controlling the AV system with the press of a few buttons and sliders.

SYSTEM FEATURES

- TesiraFORTÉ supports inputs from up to 12 analog microphones
- Impera Tango can trigger presets in Tesira for reconfiguring system settings based on the activity being conducted in the sanctuary
- Impera controllers are configured using Project Designer software, a drag and drop interface that requires no programming
- Project Designer ships with several pre-defined templates, covering most common use case scenarios



SYSTEM DESIGN GUIDE

MULTIPURPOSE ROOMS

Tesira is an ideal platform for multipurpose rooms because it's particularly adept at supporting situations that require rapid reconfiguration. Through the use of presets or room combiner block, the entire AV system, including microphone routing, can be easily reset according to how the rooms are divided or combined for the next meeting or event.

In this 4-room divisible space example, AmbientSense™ can be employed to automatically adjust audio levels in each room. The installed sensing microphones detect ambient noise levels and an adaptive DSP algorithm increases or decreases the volume of the audio accordingly.

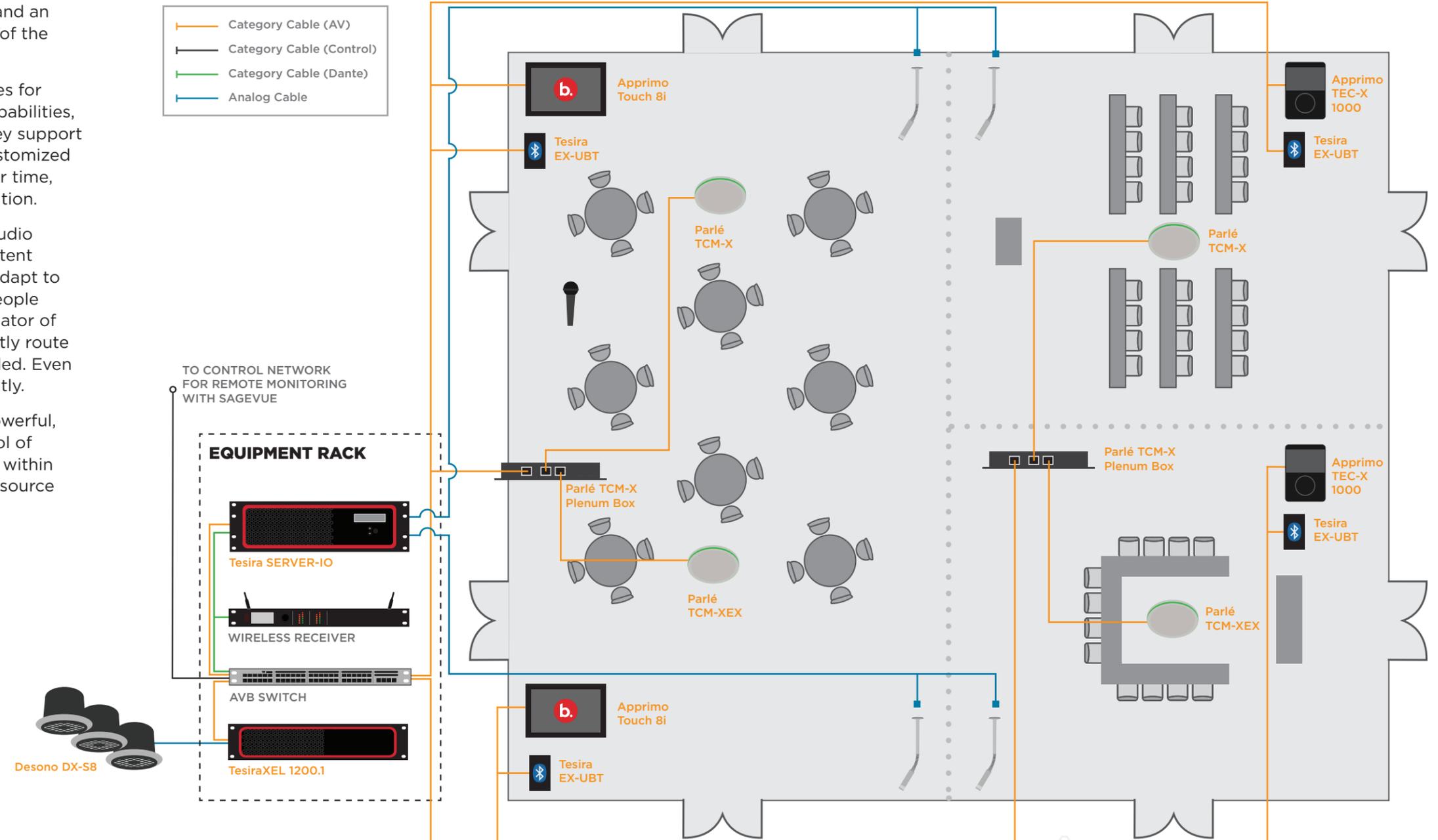
Apprimo TEC-X touch panels provide user-friendly interfaces for multipurpose rooms via highly intuitive capacitive touch capabilities, delivered at the price of a keypad controller. In addition, they support all TTP commands and can be quickly programmed and customized within Tesira software as the needs of the room change over time, making TEC-X a very flexible and cost effective control solution.

Our TCM Beamtracking microphones provide exceptional audio quality to the far end while simultaneously achieving consistent room coverage. They require no aiming and automatically adapt to room reconfigurations because they actively track to the people speaking. Specific to divisible spaces, another key differentiator of our Beamtracking microphones is the ability to independently route microphone traffic via Tesira software to anywhere it's needed. Even daisy-chained TCM microphones can be routed independently.

Another option is to use Tesira's room combiner block, a powerful, easy-to-use tool that manages the signal routing and control of combinable/divisible spaces. It can support up to 32 rooms within a single divisible space, with combinable levels, mutes, and source tracking.

SYSTEM FEATURES

- Tesira's room combiner block supports up to 32 rooms within a single divisible space, with combinable levels, mutes, and source tracking
- Ambient sensing mics can be employed to automatically adjust audio levels in each room
- Bluetooth-enabled Tesira EX-UBTs can be used to stream background music from online services
- The room's AV system can be easily monitored and managed remotely with Biamp SageVue™
- SageVue can send automatic alerts for any system issues and can secure access to the AV system to prevent unauthorized changes
- Apprimo TEC-X touch panels allow you to configure the room at the touch of a button or turn of a knob



SYSTEM DESIGN GUIDE

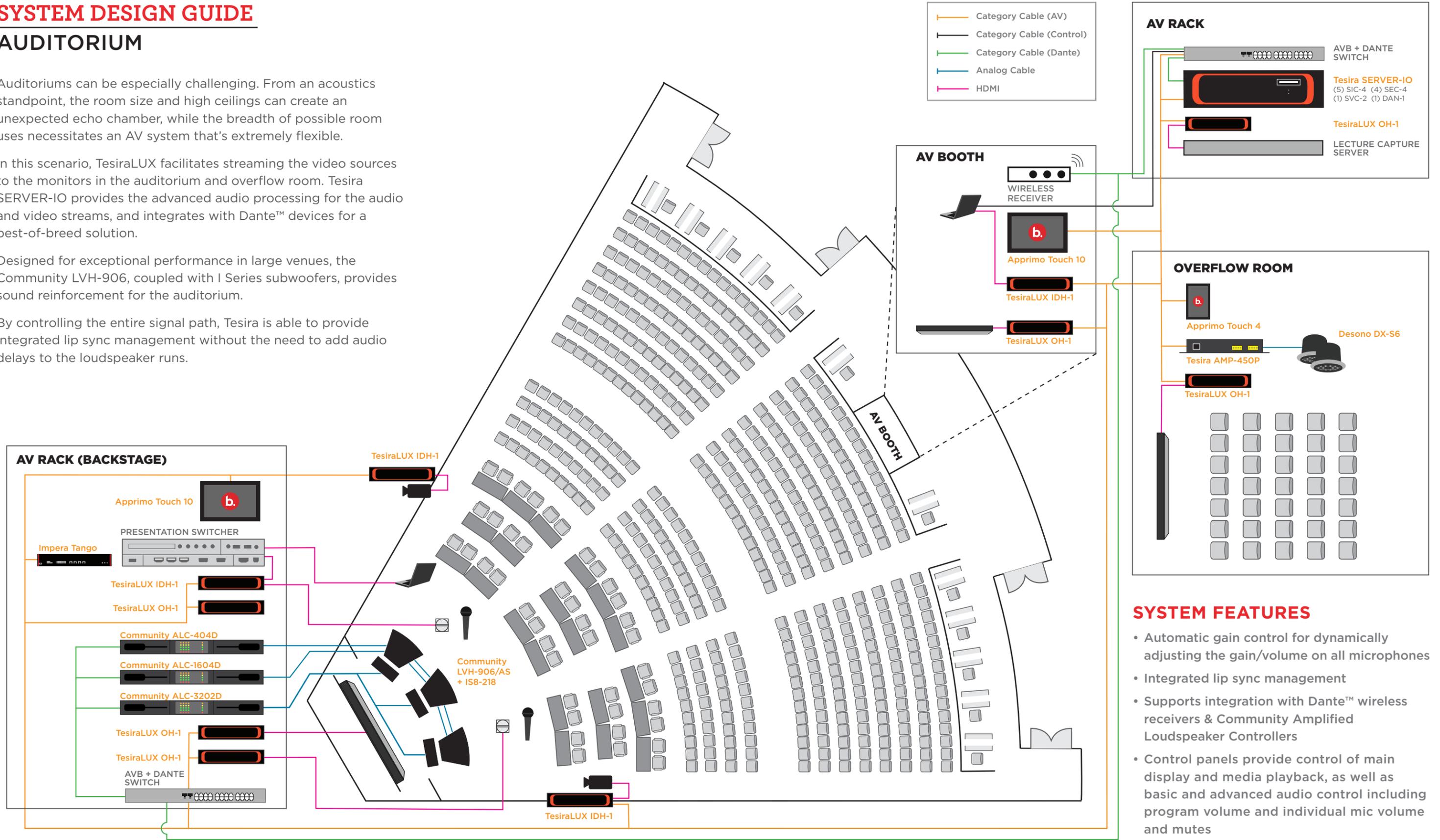
AUDITORIUM

Auditoriums can be especially challenging. From an acoustics standpoint, the room size and high ceilings can create an unexpected echo chamber, while the breadth of possible room uses necessitates an AV system that's extremely flexible.

In this scenario, TesiraLUX facilitates streaming the video sources to the monitors in the auditorium and overflow room. Tesira SERVER-IO provides the advanced audio processing for the audio and video streams, and integrates with Dante™ devices for a best-of-breed solution.

Designed for exceptional performance in large venues, the Community LVH-906, coupled with I Series subwoofers, provides sound reinforcement for the auditorium.

By controlling the entire signal path, Tesira is able to provide integrated lip sync management without the need to add audio delays to the loudspeaker runs.



SYSTEM FEATURES

- Automatic gain control for dynamically adjusting the gain/volume on all microphones
- Integrated lip sync management
- Supports integration with Dante™ wireless receivers & Community Amplified Loudspeaker Controllers
- Control panels provide control of main display and media playback, as well as basic and advanced audio control including program volume and individual mic volume and mutes

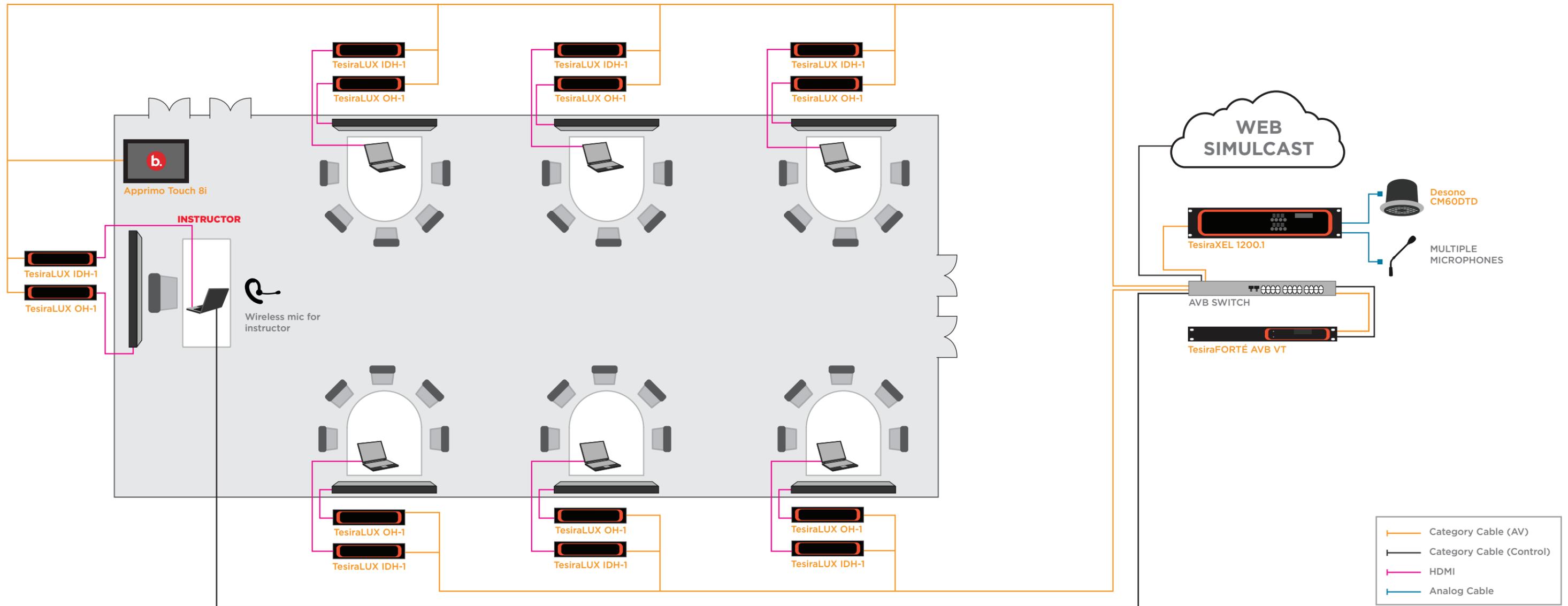
SYSTEM DESIGN GUIDE

ACTIVE LEARNING CLASSROOM

Technology plays a key role in the effectiveness of an active learning classroom. In this scenario, Tesira provides both the audio and video processing for the entire classroom. TesiraLUX facilitates bi-directional screen sharing between the instructor's station and the student "pods," while TesiraFORTÉ provides sound reinforcement and mix-minus for the microphones located in each pod. The instructor can connect their laptop to the TesiraFORTÉ via USB and use a soft codec like Microsoft Teams® or Zoom® to broadcast the lesson to remote students.

SYSTEM FEATURES

- Audio and video processing and routing throughout the classroom
- Mix-minus control for dynamically adjusting the sound distribution to student pods
- DSP support for "collaboration mode" (independent audio and video at each pod) and "presentation mode" (the same audio and video at every pod)
- Sessions can be broadcast to remote students simultaneously via soft codec and USB connectivity
- Control panel provides control of main display and student displays, as well as basic and advanced audio control including program volume and individual mic volume and mutes



SYSTEM DESIGN GUIDE

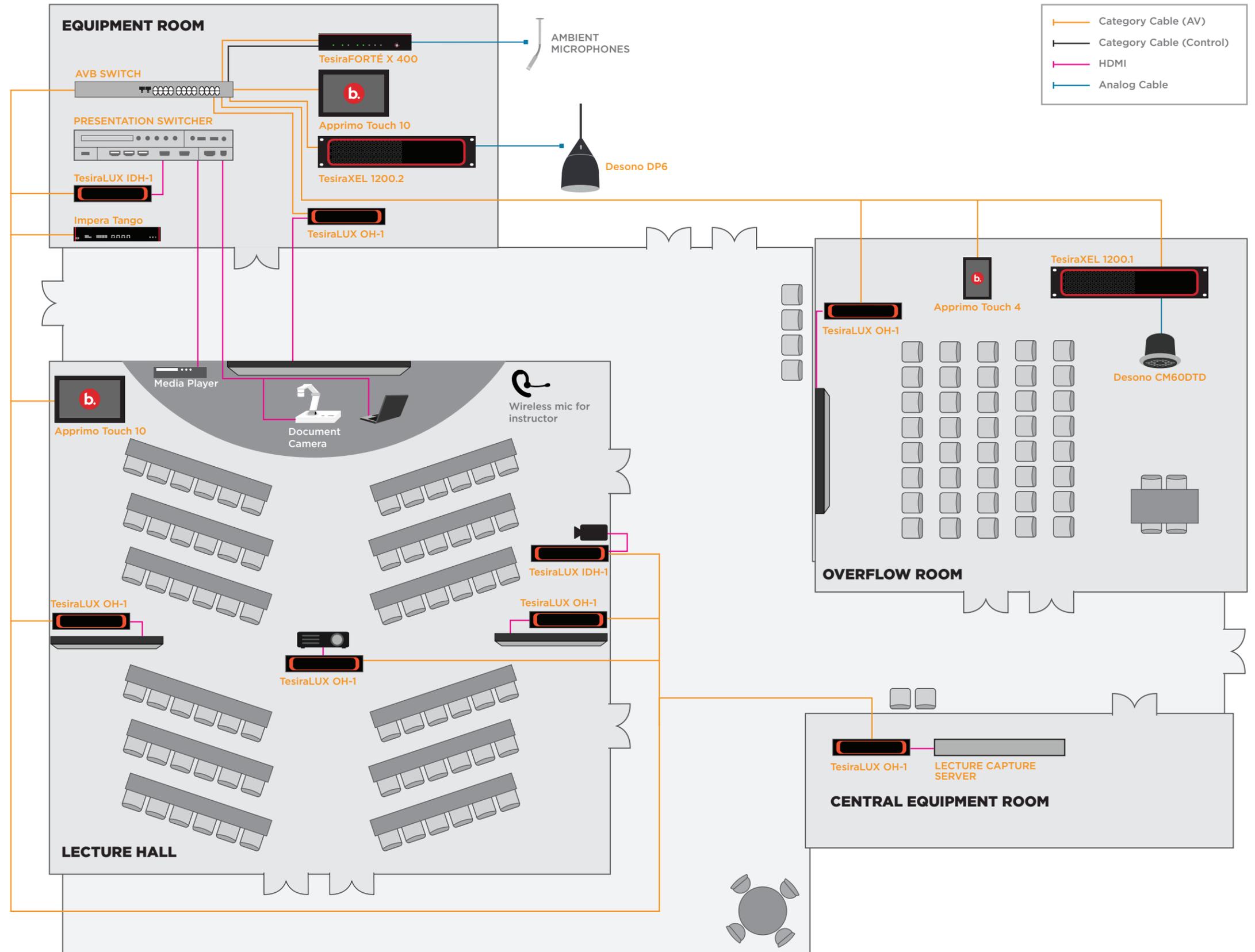
LECTURE CAPTURE

There is often a multitude of video sources to account for in effective lecture capture. From document cameras, to spreadsheets and presentations, to live or streaming video, the lecture capture system must be able to accommodate a broad swath of bandwidth and resolution requirements. In this scenario, Tesira provides the audio and video processing for both the lecture hall and overflow room. TesiraLUX facilitates streaming the video sources to the monitors in the lecture hall, overflow rooms, and lecture capture server. TesiraFORTÉ provides the sound reinforcement for the lecture hall and advanced audio processing for the video streams as needed.

Low latency lip sync is crucial for the monitors in the rear of the lecture hall. By controlling the entire signal path, Tesira is able to provide integrated lip sync management without the need to add audio delays to the loudspeaker runs.

SYSTEM FEATURES

- Audio and video processing and routing throughout the lecture hall and overflow room
- Automatic gain control for dynamically adjusting the gain/volume on all microphones
- Integrated lip sync management for displaying instructor camera feed in the rear of the lecture hall
- Interfaces with lecture capture server
- Control panels provide control of main display and media playback, as well as basic and advanced audio control including program volume and mic volume/mute



SYSTEM DESIGN GUIDE

COURTROOMS

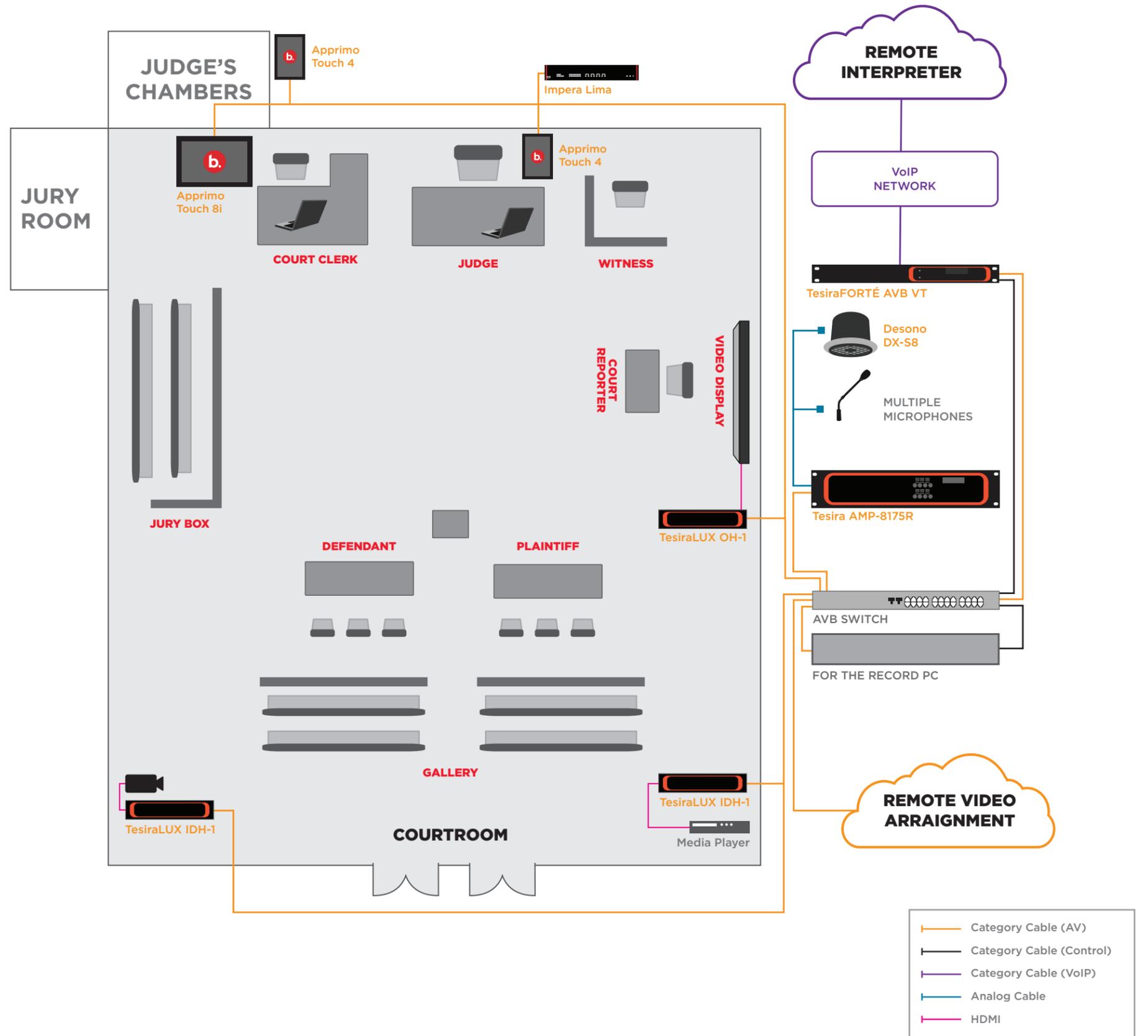
To do their jobs effectively, legal professionals rely on the accuracy, clarity, and dependability of courtroom recordings. In this scenario, Tesira provides the audio and video processing for both the courtroom and remote arraignment room.

TesiraFORTÉ AVB VT reliably manages the audio for all courtroom proceedings, including the levels of speakers and microphones, recording, remote arraignment, and audio playback of such media as DVDs, MP3 players, recorders, or other devices. VoIP connectivity enables the capability for remote testimony and interpretation, further streamlining cases by allowing courts to interact with qualified personnel without incurring travel costs or increasing logistical coordination.

The AVB card installed in the PC running the court recording software allows the courtroom and remote arraignment audio to be recorded for transcription later.

SYSTEM FEATURES

- Audio processing and routing throughout the courtrooms
- Automatic gain control for dynamically adjusting the gain/volume on all microphones
- VoIP for remote interaction with the courtroom (language interpretation and/or remote testimony)
- Interfaces seamlessly with digital evidence recording software
- Professional digital audio processing for high-quality sound reinforcement and recording
- Industry-leading Acoustic Echo Cancellation (AEC) for clear distance conferencing without echo or feedback
- Control panel provides control of main display and media playback, as well as basic and advanced audio control including program volume and individual mic volume and mutes



SYSTEM DESIGN GUIDE

EQUIPMENT TABLES

K-12 CLASSROOM

Product	Function
Impera Echo	Provides easy control of all room functions.
AMP-D225H	Used for source selection; provides amplification to loudspeakers in the classroom.
Desono CM30DTD	Delivers audio to the classroom with extremely low distortion.
Voice Lift Microphone	Allows students to hear everything the teacher says without requiring the teacher to strain their voice.
Presentation Display	Allows all students to view a presentation or video being shown in the classroom.

HOUSE OF WORSHIP

Product	Function
TesiraFORTÉ AVB AI	Handles digital signal processing and routing for the sanctuary.
Impera Tango	Serves as a controller for Biamp touch panels, providing easy control of all room functions.
Apprimo Touch 7	Touch screen user interface for controlling the sanctuary's AV system.
Community ALC-404AN	Provides amplification to loudspeakers in the sanctuary.
Community IC6-1082	Provides high performance sound reinforcement in the sanctuary.
Community IS6-115	Subwoofers for full low frequency support in the sanctuary.

CONFERENCE ROOM

Product	Function
MRB-L-X400-C	Large Room Bundle with white ceiling microphones. Included equipment: (1) TesiraFORTÉ X 400 (1) Parlé TCM-XA Ceiling Microphone with Amplifier (1) Parlé TCM-XEX Expansion Ceiling Microphone (4) Desono C-IC6 Ceiling Loudspeakers (1) 25' (7.5m) Plenum Cat 5e Cable (7) 10' (3m) Plenum Cat 5e Cable (1) BPAK (1) Room Deployment Instructions
Apprimo TEC-X 1000	Provides a customizable yet intuitive interface for room control via touch screen and/or rotary encoder; supports all TTP commands.
Vidi 250	Premium 4k ePTZ camera with auto-framing technology.
UC Host Device	Connected to TesiraFORTÉ via USB, it allows customers to take full advantage of microphones and loudspeakers in the room as part of their UC calls.
Presentation Display	Allows all meeting participants to view a presentation or valuable data being shared in the meeting.

MULTIPURPOSE ROOM

Product	Function
Tesira SERVER-IO AVB (2) DSP-2 cards (1) SAC-4 card (1) DAN-1 card	Handles all audio processing and routing for the multipurpose room. Provides a Dante interface to the wireless microphone receiver. Ambient noise compensation automatically adjusts volume levels to ensure the audio remains intelligible.
Apprimo TEC-X 1000	Provides a customizable yet intuitive interface for room control via touch screen and/or rotary encoder.
Apprimo Touch 8i	Touch screen user interface for controlling the AV system in the larger space.
Tesira EX-UBT	AVB/USB adapter provides remote USB audio capabilities and wireless Bluetooth connectivity.
TesiraXEL 1200.1	Provides asymmetric amplification to ceiling loudspeakers in the multipurpose room.
Desono DX-S8	Provides high performance sound reinforcement in the multipurpose room.
Parlé TCM-X	Beamtracking ceiling microphone provides extraordinary audio quality to the far end; allows people to move around freely by dynamically tracking them.
Parlé TCM-XEX	Expansion Beamtracking microphone intended to be daisy-chained as a second ceiling microphone in conjunction with a TCM-X.

SYSTEM DESIGN GUIDE

EQUIPMENT TABLES

AUDITORIUM

Product	Function
Tesira SERVER-10 (3) DSP-2 cards (5) SIC-4 cards (4) SEC-4 cards (1) SVC-2 card (1) DAN-1 card	Handles all audio processing and routing for the auditorium and overflow room. Provides a Dante interface to the wireless microphone receiver, and Community ALCs. The SVC-2 card provides a VoIP interface for broadcasting the audio to remote participants.
TesiraLUX IDH-1	Acts as an AVB talker. Processes video signals from input sources.
TesiraLUX OH-1	Acts as an AVB listener. Outputs networked video to displays.
Tesira AMP-450P	Provides PoE-based amplification to ceiling loudspeakers in the overflow room.
Desono DX-S6	Provides high performance sound reinforcement in the overflow room.
Community LVH-906/AS	Provides high performance sound reinforcement in the auditorium.
Community IS8-218	Subwoofers that are mounted horizontally behind each LVH-906 for full low frequency support.
Community ALC-404D	Provides amplification to the LVH-906 in the auditorium (1 required for each LVH-906).
Community ALC-1604D	Provides amplification to the LVH-906 in the auditorium (1 required for each LVH-906).
Community ALC-3202D	Provides amplification to the subwoofers in the auditorium.
Impera Tango	Controller for Biamp touch panels; provides easy control of system functions.
Apprimo Touch 4	Touch screen user interface for controlling the AV system in the overflow room.
Apprimo Touch 10	Touch screen user interface for controlling the AV system in the auditorium.

ACTIVE LEARNING CLASSROOM

Product	Function
TesiraFORTÉ AVB VT	Provides dedicated DSP to the classroom, and the ability to use USB Audio via a computer, allowing soft codec integration.
TesiraLUX IDH-1	Acts as an AVB talker. Processes video signals from cameras, laptops, and media players.
TesiraLUX OH-1	Acts as an AVB listener. Outputs network video to displays.
TesiraXEL 1200.1	Provides amplification to all ceiling loudspeakers.
Apprimo Touch 8i	Touch screen user interface for controlling the AV system in the classroom.
Desono CM60DTD	Provides high performance sound reinforcement in the classroom.

LECTURE HALL

Product	Function
TesiraFORTÉ X 400	Provides dedicated DSP to the lecture hall and overflow room.
TesiraLUX IDH-1	Acts as an AVB talker. Processes video signals from input sources.
TesiraLUX OH-1	Acts as an AVB listener. Outputs networked video to displays.
TesiraXEL 1200.2	Provides amplification to pendant loudspeakers in the lecture hall.
TesiraXEL 1200.1	Provides amplification to ceiling loudspeakers in the overflow room.
Impera Tango	Controller for Biamp touch panels; provides easy control of system functions.
Apprimo Touch 4	Touch screen user interface for controlling the AV system in the overflow room.
Apprimo Touch 10	Touch screen user interface for controlling the AV system in the lecture theater.
Desono DP6	Provides high performance sound reinforcement in the lecture hall.
Desono CM60DTD	Provides high performance sound reinforcement in the overflow room.

COURTROOMS

Product	Function
TesiraFORTÉ AVB VT	Handles all audio processing and routing. Provides VoIP connection into the telephone system for remote interpretation and/or remote testimony and remote control of the system capability by the interpreter via DTMF (touch-tone phone).
Tesira AMP-8175R	Provides amplification to the loudspeakers in the courtroom.
Desono DX-S8	Provides high performance sound reinforcement in the courtroom.
Impera Lima	Controller for Biamp touch panels; provides easy control of system functions.
Apprimo Touch 4	Touch screen user interface for controlling the AV system in the judge's chambers.
Apprimo Touch 8i	Touch screen user interface for controlling the AV system in the courtroom.
Computer running court recording software	Captures all audio from court proceedings via installed AVB sound card.
TesiraLUX IDH-1	Acts as an AVB talker. Processes video signals from input sources.
TesiraLUX OH-1	Acts as an AVB listener. Outputs networked video to displays.

CONTROL PRODUCTS

CONTROL PADS



Impera Echo



Impera Echo Plus



Impera Oscar



Impera Sierra II



Impera Uniform

CONTROL PANELS



Apprimo Touch 8

TOUCH PANEL CONTROLLERS



Impera Lima



Impera Tango



Impera Alfa II

TOUCH PANELS



Apprimo TEC-X 1000



Apprimo TEC-X 2000



Apprimo Touch 4



Apprimo Touch 7



Apprimo Touch 10