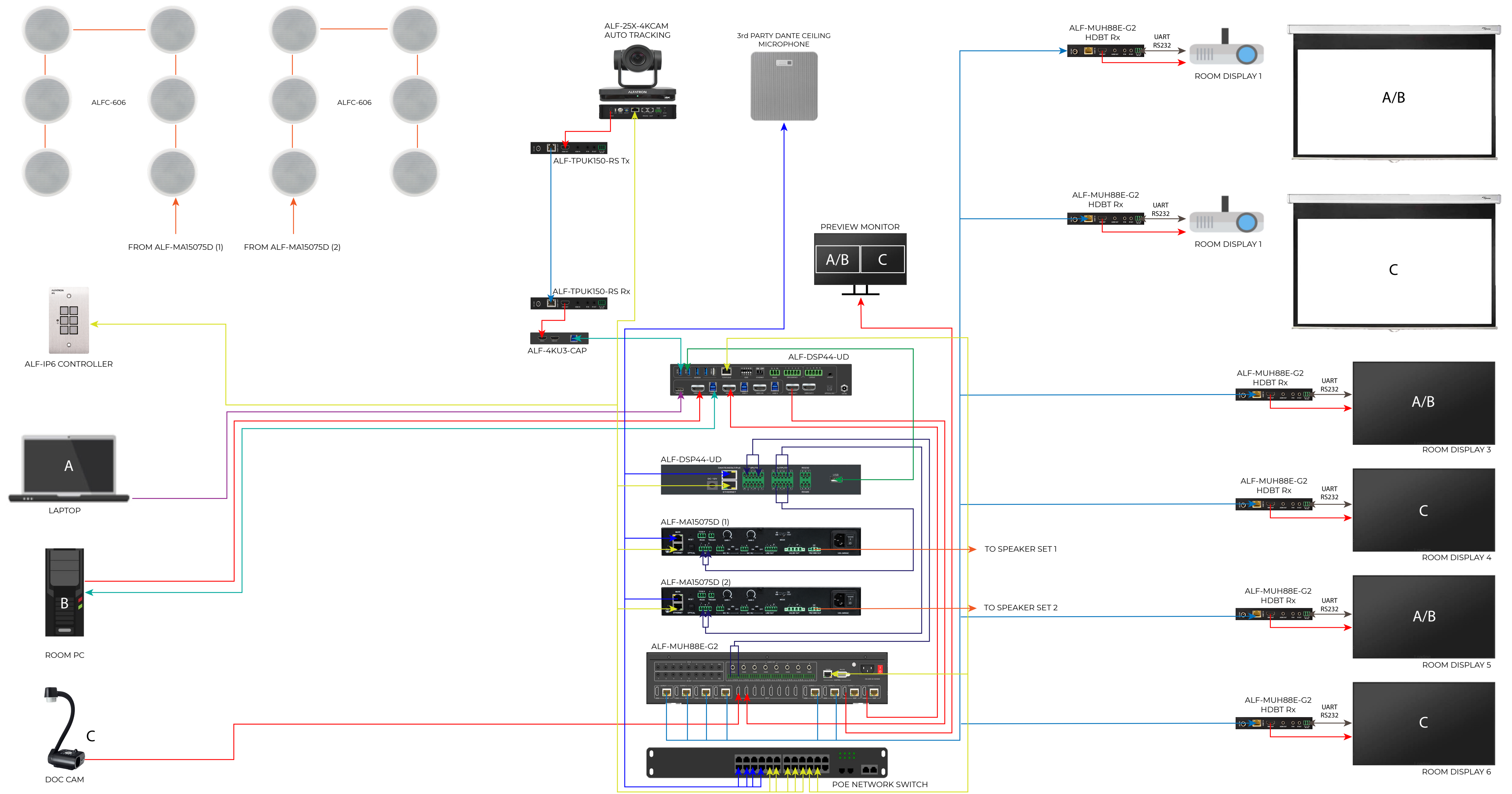
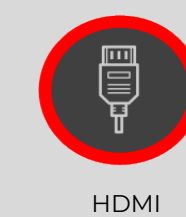






# ALF-MUH88E-G2 / ALF-MUK4-HUB BYOD HYBRID TRAINING/LECTURE VENUE WITH MULTI-VIEW



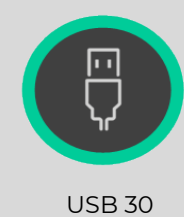
HDMI



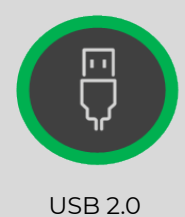
LAN



DANTE



USB 3.0



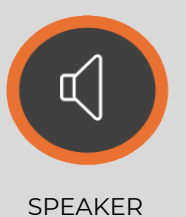
USB 2.0



USB-C



HDBT



SPEAKER



AUDIO

## SOLUTION OVERVIEW

This hybrid training and lecture solution is centred around the ALF-MUH88E-G2 matrix switcher and ALF-MUK4-HUB, providing flexible routing of multiple video sources to numerous room displays for collaborative learning and multi-view presentation scenarios. Sources such as a laptop, room PC, and document camera are connected into the system and can be independently routed or combined across displays, allowing instructors to present single content, dual content, or different sources to various display groups. The MUH88E-G2 distributes video via HDBaseT receivers located at each screen, enabling long-distance signal extension while also supporting serial UART control for display management, allowing centralized control of power, input switching, and device automation directly through the distribution infrastructure.

An MUK4-HUB is integrated to provide HDMI and USB switching, allowing seamless transition between connected room sources while also supporting multiview capabilities. This enables multiple images to be displayed simultaneously on a single screen, enhancing learning and training by allowing instructors to show presentation content alongside a document camera, PC feed, or camera image. The MUK4-HUB also functions as a USB hub, routing USB connectivity to shared room peripherals such as cameras, microphones, and other USB devices, ensuring simplified BYOD operation and seamless switching of USB resources between connected hosts.

The ALF-25X-4KCAM auto-tracking camera is incorporated to automatically follow the lecturer, providing dynamic framing and improved visibility for both in-room participants and remote learners. The camera integrates into the system for lecture capture, hybrid learning, or conferencing, ensuring presenters remain in view without manual control. Audio is managed through the DSP44-UD DSP platform, which provides advanced audio processing, mixing, and routing while also supporting Dante audio networking. This allows integration of Dante-enabled ceiling microphones for clear room audio pickup and flexible expansion across the network. Dante capability is also supported on the MA15075D amplifiers, enabling network-based audio distribution from the DSP to amplifier channels feeding ceiling speaker zones.

Amplified audio is delivered to distributed ceiling speakers to provide even coverage throughout the training space, while multiple amplifier channels allow zoning for divisible room configurations. A preview monitor allows instructors to view and confirm selected sources before routing them to room displays, ensuring seamless operation during live presentations. Overall, the solution delivers a powerful multi-display training environment combining matrix switching, HDBaseT distribution with UART control, multiview presentation, automatic camera tracking, USB and HDMI switching, Dante-enabled audio networking, and centralized DSP processing, creating a flexible and scalable platform for modern hybrid learning and collaborative training spaces.

## ALF-MUH88E-GEN2 Overview

The ALF-MUH88E-G2 is a professional 8×8 HDMI and HDBaseT matrix switcher designed to route multiple high-resolution video sources to numerous displays in training, corporate, and large presentation environments. The matrix provides eight HDMI inputs and eight mirrored HDMI and HDBaseT outputs, enabling flexible distribution of content to both local and remote displays simultaneously. HDBaseT extension allows long-distance transmission over a single category cable, supporting up to 4K@60Hz 4:4:4 video with 18Gbps bandwidth, while independent downscaling on outputs ensures compatibility with mixed resolution displays. This makes the unit ideal for multi-room training spaces, lecture venues, and collaborative environments requiring reliable multi-display routing.

Each HDBaseT output works with dedicated receivers to extend video, audio, control, and signal management to remote displays, simplifying installation and reducing cabling complexity. The system also supports audio de-embedding, HDR formats, and flexible EDID management to ensure stable performance across a variety of connected sources and displays. Mirrored HDMI outputs allow local monitoring or additional display connectivity, providing greater deployment flexibility in larger spaces.

Comprehensive control options include front panel operation, IR, RS-232, LAN, and web-based control, enabling integration with third-party automation systems. In addition, the MUH88E-G2 supports UART pass-through over HDBaseT, allowing serial control of remote displays and connected devices directly through the matrix infrastructure. This enables centralized control of display power, input switching, and device management without requiring additional control cabling, streamlining installation and system operation. The matrix also supports IR matrix routing and advanced switching modes, providing flexible signal management across multiple sources and displays.

Overall, the ALF-MUH88E-G2 delivers a scalable matrix switching platform combining high-bandwidth 4K distribution, HDBaseT extension, mirrored outputs, independent scaling, UART and serial device control, audio de-embedding, and multiple control interfaces, making it well suited for lecture theatres, divisible training rooms, control environments, and multi-display collaboration spaces requiring reliable signal routing and centralized control.

## ALF-MU4K-HUB Overview

The ALF-MU4K-HUB is a multi-format collaboration hub designed to simplify HDMI and USB switching in meeting rooms, training spaces, and hybrid learning environments. The unit provides multiple HDMI inputs with integrated USB switching, allowing connected laptops and in-room PCs to share video and USB peripherals such as cameras, microphones, and touch displays. When a presenter switches sources, associated USB devices automatically follow, enabling seamless BYOD operation without manual reconnection.

The hub also supports multiview functionality, allowing multiple video sources to be displayed simultaneously on a single screen, making it ideal for showing presentation content alongside a document camera, secondary laptop, or camera feed to enhance learning and collaboration. In addition, the ALF-MUK4-HUB operates as a USB hub for connected room peripherals, distributing shared USB devices to the active host system and ensuring consistent connectivity across sources. This combination of seamless HDMI switching, USB routing, and multiview capability provides a compact and flexible collaboration solution for modern AV environments.



### ALF-DSP44-UD Overview

The ALF-DSP44-UD is a compact 4×4 audio digital signal processor designed for professional audio routing, mixing, and processing in conferencing, training, and installed sound environments. The processor provides four analogue inputs and four analogue outputs together with four Dante inputs and four Dante outputs, enabling seamless integration of analogue sources and networked Dante microphones or other Dante-enabled devices. USB audio connectivity allows direct connection to room PCs or conferencing platforms, while RS-232, RS-485, and IP control support integration with third-party control systems and automation platforms.

The processor incorporates advanced DSP functionality including two channels of Acoustic Echo Cancellation, noise suppression, auto-mixing, parametric EQ, compressors, expanders, feedback suppression, acoustic gain compensation, ambient noise compensation, and delay, allowing precise tuning for speech intelligibility and balanced audio distribution. High-definition 24-bit/48kHz A/D and D/A conversion with approximately 110 dB dynamic range ensures professional audio performance across conferencing and training applications.

Dante networking allows flexible audio routing across the network, enabling Dante microphones to connect directly to the processor and allowing processed audio to be distributed to other Dante-enabled devices. Matrix routing capabilities enable multiple audio sources to be mixed and routed to different outputs, while configuration is handled through dedicated DSP control software providing graphical routing, processing adjustment, and system tuning. Overall, the ALF-DSP44-UD serves as a central audio processor combining analogue and Dante connectivity, advanced signal processing, USB audio integration, and flexible control interfaces for modern conferencing and training environments.

### ALF-25X4KCAM Overview

The ALF-25X-4KCAM is a professional 4K auto-tracking PTZ camera designed for lecture capture, training environments, conferencing, and hybrid learning applications. The camera features a high-resolution 4K image sensor combined with a 25× optical zoom lens, allowing clear capture of presenters and content even in larger rooms. Integrated auto-tracking technology automatically detects and follows the active presenter, dynamically adjusting pan, tilt, and zoom to keep the lecturer framed without manual intervention, improving engagement for both in-room participants and remote viewers.

The camera supports multiple video outputs including HDMI, USB, and IP streaming, enabling flexible integration with conferencing platforms, recording systems, and matrix switchers. USB connectivity allows plug-and-play use with soft codec platforms such as Teams, Zoom, and other UC applications, while IP streaming supports remote monitoring and lecture capture workflows. Control options including RS-232, RS-485, IP, and VISCA protocols allow integration with third-party control systems for preset recall and camera management, while the built-in auto-tracking functionality provides intelligent presenter following for a seamless and automated camera solution in modern AV installations.

### ALF-MA15075D Overview

The ALF-MA15075D is a compact multi-channel digital amplifier designed for distributed audio applications in meeting rooms, training spaces, and commercial environments requiring flexible zone-based sound reinforcement. The amplifier delivers four channels of amplification suitable for driving multiple ceiling speaker zones, while its Dante network audio support enables direct integration with Dante-enabled DSP processors and microphones for simplified audio distribution over standard network infrastructure. The unit supports both low-impedance and constant voltage speaker configurations, allowing flexible system design and scalable installations. Independent channel control provides precise level adjustment per zone, while the efficient Class-D design ensures reliable operation with low heat generation and reduced power consumption. With network-based audio input, compact form factor, and multi-zone amplification capability, the ALF-MA15075D provides a versatile solution for powering distributed speaker systems in modern AV installations.

### ALF-4KU3-CAP Overview

The ALF-4KU3-CAP is a professional 4K HDMI to USB capture interface designed for conferencing, lecture capture, and streaming applications where HDMI sources need to be connected to a computer for recording or live collaboration. The unit converts HDMI video and embedded audio to USB 3.0 for plug-and-play integration with laptops and conferencing systems without requiring drivers, while supporting HDMI input and loop-through output up to 4K@60Hz 4:4:4. USB capture supports resolutions up to 4K@30Hz and high-frame-rate 1080p, ensuring high-quality video performance for recording and streaming workflows. The device also includes HDMI loop output for local monitoring, analogue audio line-in and line-out for embedding or extracting audio, and UVC/UAC compatibility for seamless use with platforms such as Teams, Zoom, OBS, and other recording software, making it a flexible solution for capturing presentation, camera, or matrix-switched video sources.

### ALF-TPUK150-RS Overview

The ALF-TPUK150-RS is a high-performance HDMI extender kit designed to transmit 4K video, audio, and control signals over long distances using a single CAT6 cable. The system consists of a transmitter and receiver capable of extending HDMI signals up to 150 meters while supporting resolutions up to 4K@60Hz 4:4:4 with 18Gbps bandwidth and HDCP 2.2 compliance, ensuring high-quality video distribution for professional AV installations. It supports transmission of video, embedded audio, RS-232 control, and bi-directional IR, allowing remote control of source and display devices through the same cable infrastructure. An HDMI loop output is provided on the transmitter for local monitoring or cascading, and the unit also supports analogue audio de-embedding for integration with external audio systems. Designed for lecture rooms, meeting spaces, and large display installations, the ALF-TPUK150-RS provides long-distance signal extension with integrated control pass-through, simplifying installation while maintaining reliable high-resolution AV performance.



**ALC-606 Overview**

The ALFC-606 is a two-way 6-inch ceiling loudspeaker designed for distributed background music and voice reinforcement in commercial and education environments. The speaker features a coaxial driver design with an integrated back box, delivering clear and balanced audio suitable for both speech intelligibility and music playback. It supports both low-impedance 8Ω operation and selectable 70V/100V transformer taps at 30W, 15W, and 7.5W, allowing flexible system design and easy scalability in distributed audio installations. With a frequency response of 70Hz to 20kHz and sensitivity of approximately 90dB (1W/1m), the ALFC-606 provides consistent coverage across larger spaces. The integrated back box improves acoustic performance while simplifying installation, making the speaker ideal for meeting rooms, training facilities, retail spaces, and other venues requiring reliable ceiling-mounted audio coverage.

**ALF-IP6 Overview**

The ALF-IP6 is a programmable wall-mounted keypad controller designed to provide simple and intuitive AV system control within meeting rooms, training spaces, classrooms, and collaborative environments. Featuring six configurable buttons, it allows users to manage key room functions such as display power, input selection, volume control, and system on/off, enabling quick operation without complex interfaces. The controller communicates over IP and also includes RS-232 and dual IR ports for flexible integration with matrix switchers, displays, cameras, DSPs, and amplifiers, allowing centralized control of multiple AV devices. Its programmable functionality supports macro execution and automation, while customizable button assignments enable tailored control workflows for different room requirements. With a clean, low-profile wall-mounted design and reliable network-based control capability, the ALF-IP6 provides a compact and effective solution for straightforward AV system control and room automation.

Solution Bill of Quantities

- 1 x ALF-IP Controller (or 3rd party control sytem)
- 1 x ALF-25x-4KCAM Camera
- 1 x ALF-TPUK150-RS HDMI/HDBT extender kit
- 1 x ALF-4KU3-CAP HDMI-USB capture card
- 1 x ALF-MUK4-HUB Seamless HDMI & USB switcher
- 1 x ALF-DSP44-UD Digital signal processor
- 1 x ALF-CPL1 DSP Control panel (optional)
- 2 x ALF-MA15075D Amplifiers
- 12 x ALFC-606 ceiling loudspeakers
- 1 x ALF-USBC-6.5FT USB-C cable
- 4 x ALF-HDMI 6 HDMI Cable
- 6 x ALF-HDMI 2ft HDMI cables

Third Party Equipment

- 6 x Displays
- 6 x Display mounting brackets
- 1 x 1G Unmanaged PoE network switch
- 1 x 3rd party Dante ceiling microphone

Use Case Scenarios

1. Hybrid University Lecture Theatre

In a university lecture environment, instructors can present content from a laptop, in-room PC, or document camera, all routed through the matrix switcher to multiple displays positioned throughout the theatre. The multiview functionality allows presentation slides and document camera content to appear simultaneously on selected screens, improving visibility for students. The auto-tracking camera automatically follows the lecturer, ensuring consistent capture for recording or remote participants, while Dante-enabled ceiling microphones feed audio into the DSP for processing and distribution to ceiling speakers for clear reinforcement.

2. Corporate Training Room with BYOD Collaboration

In a corporate training space, participants can connect their own laptops through the collaboration hub, which switches both HDMI video and USB peripherals such as cameras and microphones. Trainers can display multiple sources simultaneously using multiview, such as presentation content alongside a live demonstration. The matrix distributes selected content to multiple displays across the room, while the tracking camera follows the presenter during movement. The DSP processes audio from Dante microphones and routes it for reinforcement, ensuring consistent sound coverage through ceiling speakers.

3. Advanced Collaboration and Workshop Environment

In a collaborative workshop setting, multiple presenters can share content from different sources simultaneously, displayed in multiview layouts on large screens. The document camera can be used for demonstrations, while the tracking camera captures the presenter for hybrid participation. The matrix distributes content to displays positioned around the room, allowing all participants to view relevant information. Audio from Dante microphones is processed through the DSP and reinforced through ceiling speakers, ensuring clear communication throughout the space while maintaining flexible control and switching of AV resources.