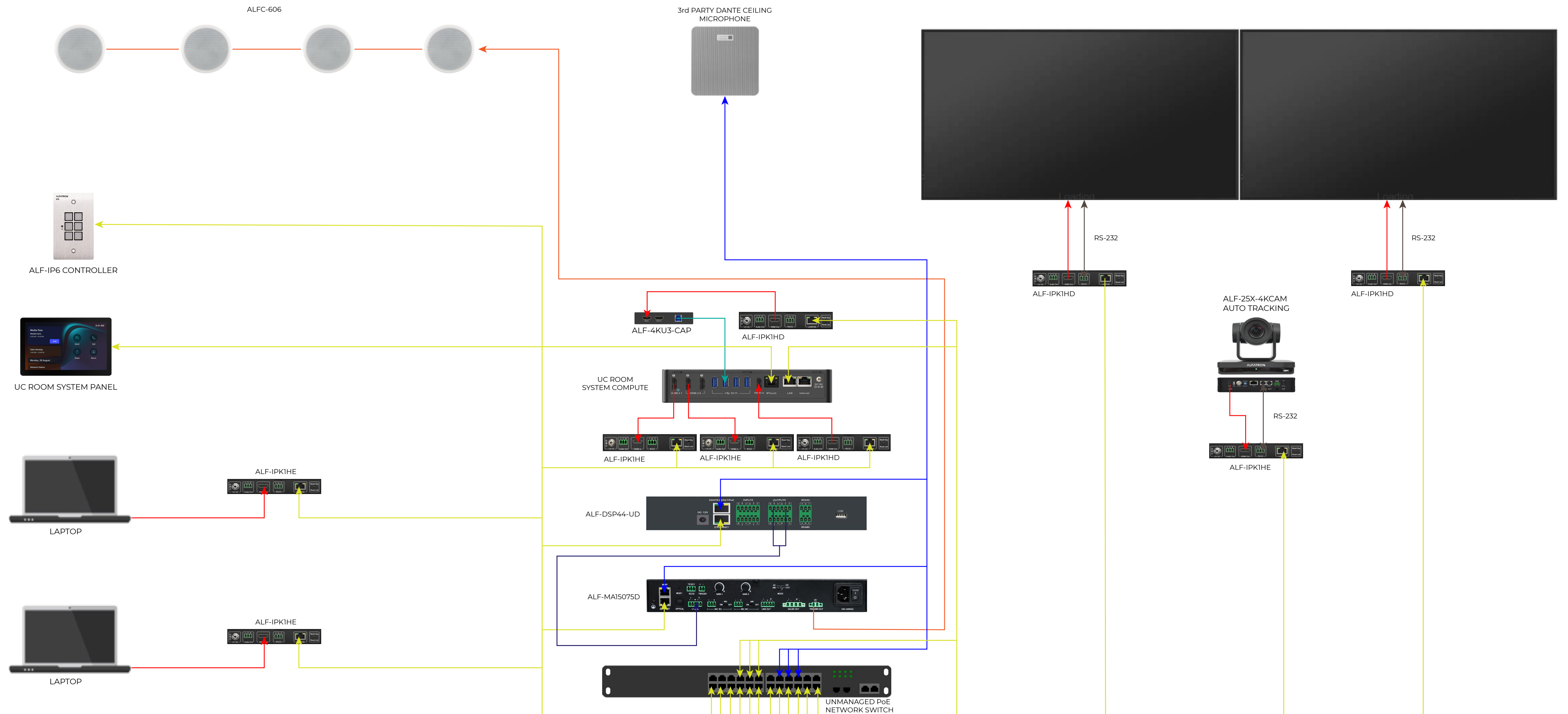




ALF-IPK1H-ED AVoIP BOARDROOM APPLICATION WITH UC ROOM SYSTEM



HDMI



LAN



DANTE



USB 30



USB 2.0



USB-C



HDBT



SPEAKER



AUDIO

Solution Overview

This boardroom solution replaces a traditional matrix switch architecture by using distributed AV over IP with ALF-IPK1H encoders and decoders. Instead of routing signals through a fixed hardware matrix, each source connects to an encoder and each display connects to a decoder, allowing video to be routed flexibly across the network. This approach removes the input/output limitations of conventional matrix switchers and enables scalable signal distribution to multiple displays, cameras, and USB peripherals. All AV signals are transported over a standard unmanaged network switch, and the AVoIP design does not require a managed switch or the complicated VLAN, IGMP, or multicast configurations typically associated with network-based AV systems, simplifying deployment while still providing reliable, low-latency video distribution.

The system integrates presentation and conferencing sources through multiple ALF-IPK1H encoders connected to laptops, the ALF-25X-4KCAM auto-tracking camera, and the UC room system computer. On the display side, ALF-IPK1H decoders feed the room displays, enabling any source to be routed to either screen or duplicated across both. The flexible AV-over-IP topology allows additional endpoints to be added without redesigning the system, providing a future-proof alternative to fixed matrix switching.

Audio is centrally managed by the ALF-DSP44-UD, which provides DSP processing for microphone inputs, program audio, and conferencing return feeds. The design supports both USB audio connectivity for UC platform integration and Dante audio networking for scalable digital audio transport. A Dante ceiling microphone feeds directly into the DSP, while processed audio is routed to the ALF-MA15075D, which also supports Dante connectivity, allowing audio to remain in the digital domain from input to amplification. The amplifier then drives the ceiling loudspeakers for consistent room coverage.

Control and peripheral integration are handled through the RS-232 ports available on the ALF-IPK1H encoders and decoders. Using Serial over IP, control commands can be sent across the network to displays, cameras, or other devices without requiring dedicated control cabling. This control can be managed using the ALF-IP6 wall controller or a third-party control system, providing flexible system automation including display power, source routing, and camera control.

For UC and streaming workflows, the solution includes the ALF-4KU3-CAP HDMI to USB capture card, allowing HDMI sources from the AV-over-IP system to be presented as USB video devices to conferencing platforms. This enables seamless integration between the distributed AV network and software-based collaboration systems running on the room PC.

Overall, this architecture delivers a scalable AV-over-IP boardroom solution where ALF-IPK1H encoders and decoders replace traditional matrix switching, the unmanaged network switch removes complex configuration requirements, DSP and Dante provide advanced audio processing, Serial over IP enables flexible control, and USB capture ensures full UC integration.

ALF-IPK1HD – Overview

The Alfatron ALF-IPK1HD is a 4K AVoIP decoder designed for professional video wall applications. It receives unicast streams from ALF-4K encoders and provides advanced video wall processing, including cropping, scaling, and positioning, allowing the creation of custom layouts such as 2×2 arrays or independent displays. The unit is controlled via an intuitive PC application or integrated into third-party control systems for automated layout and source management. It also supports serial-over-IP for direct display control, enabling power, input, and basic functions to be managed through the network. Operating over a standard unmanaged switch, the IPK1HD delivers flexible, scalable, and low-latency video wall deployment without complex network configuration.

ALF-IPK1HE – Overview

The Alfatron ALF-IPK1HE is a 4K AVoIP encoder designed for high-quality, low-latency video distribution across standard network infrastructure. It converts HDMI video and audio into unicast AVoIP streams, enabling reliable and flexible routing to any compatible Alfatron decoder, including the ALF-IPK1HD for video wall applications. The IPK1HE supports 4K UHD video, embedded audio, and network-based control, making it ideal for scalable multi-display environments. Because it operates entirely on unicast, the encoder works seamlessly on a standard unmanaged network switch, allowing fast and straightforward deployment with no specialized networking configuration required. Fully compatible with third-party control systems, the ALF-IPK1HE provides complete source routing, switching, and control integration, making it a robust and efficient solution for modern AV distribution systems.

ALF-DSP44-UD Overview

The ALF-DSP44-UD is a compact 4-in/4-out audio digital signal processor designed for meeting rooms, training spaces, and unified communications environments requiring flexible audio routing and processing. It features four analogue inputs and outputs along with four Dante inputs and outputs, enabling both local and networked audio integration. USB audio connectivity allows direct BYOD conferencing support, while RS-232, RS-485, and IP control provide seamless integration with control systems.

The processor incorporates advanced audio processing including acoustic echo cancellation, noise suppression, auto mixing, and matrix routing, ensuring clear speech for both in-room reinforcement and remote conferencing. Additional processing tools such as parametric EQ, compression, feedback suppression, delay, and automatic gain control allow precise tuning for different room environments.

High-quality 24-bit/48 kHz A/D and D/A conversion with wide dynamic range ensures professional audio performance, while onboard DSP engines handle routing, mixing, and signal optimisation. Configuration is completed through a dedicated software interface, allowing flexible control of inputs, outputs, and processing modules.

With its combination of Dante networking, USB audio for UC platforms, and comprehensive DSP processing, the ALF-DSP44-UD is well suited for hybrid meeting rooms, combinable training spaces, and presentation environments requiring both local voice reinforcement and unified communications audio management.

ALF-MA15075D Overview

The ALF-MA15075D is a compact 1U Class-D digital mixing amplifier designed for both low- and high-impedance systems. It delivers 2 × 75W at 4/8Ω or 150W at 70/100V, making it ideal for distributed commercial audio applications. Its Class-D design ensures energy efficiency, low heat output, and reduced inrush current, with automatic standby to minimize power consumption. It features Dante, optical, balanced analogue inputs, and two microphone inputs with phantom power support, along with stereo low-impedance, 70/100V, and balanced line-level outputs. Integrated DSP includes a five-band graphic EQ, TCP/IP web control, trigger input, and front-panel status LEDs, ensuring flexible control and efficient system integration.

ALF-4KU3-CAP Overview

The Alfatron ALF-4KU3-CAP is a 4K HDMI to USB video and audio capture card. It supports HDMI2.0 for input and output and USB3.0 for recording. The USB-B output can be used to power the device and capture videos with resolutions up to 4K@30 Hz or 1080p@120Hz. It can be widely used in video conference, multi-media broadcasting and other HDMI video capturing occasions.

ALF-ALF-25X-4KCAM Overview

The ALF-25X-4KCAM is a professional 4K auto-tracking USB PTZ camera designed for unified communications, training rooms, and presentation environments. Featuring intelligent auto-tracking, the camera automatically follows the active presenter, ensuring they remain properly framed without manual control, which improves engagement for remote participants.

The 25× optical zoom provides clear image capture even in larger rooms, while high-resolution 4K output delivers detailed video for conferencing and recording applications. With plug-and-play USB connectivity, the ALF-25X-4KCAM integrates easily with BYOD UC systems and supports platforms such as Teams, Zoom, and Webex.

Its smooth PTZ movement, multiple control options, and flexible mounting make it suitable for meeting rooms, lecture spaces, and combinable training venues requiring reliable presenter tracking and high-quality video performance.

Solution Bill of Quantities

- 5 x ALF-IPK1HE Encoders
- 4 x ALF-IPK1HE Decoders
- 1 x ALF-25X-4KCAM PTZ Cameras
- 1 x ALF-DSP44-UD Digital Signal Processors
- 1 x ALF-MA15075D Amplifiers
- 1 x ALF-IP6 Controllers (Optional)
- 4 x ALFC-606 Ceiling loudspeakers
- 1 x 4KU3-CAP Capture card
- 2 x ALF-TSC6 Table Box
- 2 x ALF-HDMI 6 HDMI Cable
- 7 x ALF-HDMI 2ft HDMI cables

Third Party Equipment

- 2 x Room Display
- 2 x Room Display mounting brackets
- 1 x POE Network switch
- 1 x 3rd Party Ceiling Microphone
- 1 x 3rd Party control system - Room controls UC panel

Solution Use Cases

1. Standard Boardroom Presentation & UC Meeting

In a typical boardroom meeting, users connect laptops via ALF-IPK1H encoders, which place their content directly onto the AV over IP network. The content is routed to one or both displays through ALF-IPK1H decoders without the limitations of a fixed matrix switch, allowing seamless switching between presenters. The ALF-25X-4KCAM provides auto-tracking for active speakers, while the Dante ceiling microphone and ALF-DSP44-UD handle clear voice pickup and processing. Audio is distributed via Dante to the ALF-MA15075D amplifier and ceiling speakers. For UC platforms, the ALF-4KU3-CAP converts selected HDMI content into USB, enabling high-quality video integration into the room PC for Teams or Zoom calls.

2. Hybrid Collaboration with Multiple Content Sources

During hybrid meetings, multiple in-room presenters and remote participants collaborate simultaneously. Different sources connected via ALF-IPK1H encoders can be dynamically routed to separate displays or duplicated as needed, enabling side-by-side content viewing without reconfiguration. The AV over IP system allows flexible expansion and routing across the unmanaged network switch without requiring complex setup. USB and Dante audio integration through the ALF-DSP44-UD ensures that both local microphones and remote audio are mixed and processed correctly, while the ALF-4KU3-CAP enables any selected visual source to be shared with remote participants as a USB feed.

3. Training or Workshop Environment with Flexible Layouts

In a training scenario, the system supports multiple instructors or group leaders connecting their devices through ALF-IPK1H encoders. Content can be routed independently to displays or shared across the room, allowing different groups to present or collaborate. The absence of a traditional matrix switch means the system can scale easily as additional endpoints are added. Audio from the Dante ceiling microphone is processed through the ALF-DSP44-UD to ensure speech clarity across the room, while the ALF-MA15075D distributes sound evenly through ceiling speakers. Control via ALF-IP6 or a third-party system allows simple switching between training modes, such as presenter focus or group collaboration.

4. Integrated Control & Automated Room Operation

In a fully automated setup, the ALF-IP6 controller or a third-party control system manages the entire environment using Serial over IP through the ALF-IPK1H endpoints. When a meeting starts, displays power on, the correct source is routed automatically, and camera positioning is adjusted. Users can switch sources, control volume, or manage displays without needing direct access to hardware. The AV over IP backbone ensures all devices communicate over the same network, eliminating dedicated control wiring. This creates a streamlined, scalable solution where video distribution, audio processing, and device control operate as a unified system without the complexity of traditional AV infrastructures.