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HDBaseT vs. Network Video Distribution in Commercial AV

A Comparative Analysis of HDBaseT and AV-over-IP for Hospitality, Corporate, and Other Mission-Critical Environments

Abstract

This white paper presents a technically grounded comparison between HDBaseT and AV-over-IP for commercial video distribution. Both technologies are examined across six critical engineering parameters: switching logic and signal determinism, network infrastructure requirements, end-to-end latency, picture fidelity and compression, control architecture, and total cost of ownership (TCO).

The scope of this analysis is confined to locally distributed video infrastructure. It explicitly excludes over-the-air (OTA) broadcast, cloud-dependent content delivery, and software-defined video over Ethernet (SDVoE) operating at 10 Gbps, as these categories introduce independent variables including internet dependency, service uptime, and specialized switching hardware that fall outside the cost and complexity envelope relevant to the mid-market.

Both HDBaseT and AV-over-IP are evaluated on their technical merits. Where objective data indicates a clear advantage for either standard, this paper states that conclusion directly and provides supporting references. Practitioners are encouraged to consult the cited source materials when specifying systems for individual deployment contexts.

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Executive Summary

Commercial environments increasingly rely on high-definition video distribution for communications, entertainment, and operational monitoring. The reliability and fidelity of that infrastructure is no longer incidental, it is mission critical. Against this backdrop, integrators and procurement teams must choose between two structurally different distribution architectures: HDBaseT or AV-over-IP (AVoIP).

This paper reaches the following principal conclusions:

- HDBaseT, a plug-and-play technology operating independent of the Ethernet network, delivers deterministic signal transport with effectively zero latency (see Section 2.2). For most commercial deployments with fewer than 64 endpoints, this architecture is demonstrably simpler to commission, more secure by design, and lower in total cost of ownership than a managed IP-based equivalent.
- AVoIP operating at OSI Layer 3 over a 1 gigabit Ethernet (1GbE) network offers architectural flexibility and theoretically unlimited scale via networked infrastructure. These advantages are most apparent in large-scale, multi-building or campus-wide deployments where the fixed 100m physical reach of HDBaseT presents a genuine logistical constraint.
- For deployments in the primary commercial mid-market, such as sports bars, hospitality venues, corporate boardrooms, medical facilities, and eSports environments, HDBaseT consistently demonstrates lower capital expenditure, reduced commissioning time, superior picture fidelity, and lower operational risk than comparable 1 Gbps AVoIP systems.

1. Video Distribution System Topologies

The fundamental divergence between the two video distribution architectures, HDBaseT and AVoIP, occurs where the signal routing logic resides, and how that choice propagates through every subsequent aspect of system design, deployment, and maintenance.

1.1 HDBaseT: Network Independent, Centralized Architecture

HDBaseT, developed by Valens Semiconductor and standardized by the HDBaseT Alliance, is a self-contained protocol stack. It defines its own physical signaling, framing, addressing, and control mechanisms, essentially covering all 7 layers of the OSI Model, independent of the IP network stack. In a matrix-based deployment (any input to any output), all routing decisions are handled internally by dedicated switching hardware. There is no dependency on IP addressing, MAC tables, or network management protocols. It presents like a physical layer technology due to its simplicity of installation.

Key architectural characteristics of HDBaseT:

- **Integrated connection negotiation —** Link parameters are established autonomously at the hardware level upon physical connection of the transmitter (source) and receiver (destination), either directly or via a matrix.
- **Deterministic signal path —** Because HDBaseT operates independently, there is no contention mechanism, and no de-jitter buffer. A dedicated physical circuit is established,

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removing reliance on software configuration or third-party firmware to establish a valid signal path. The resulting signal transit time is constant and independent of network load.

- **Independence —** Because HDBaseT distribution is separate to the IP network, it has no IP identity and occupies no bandwidth on the building's data LAN. Changes to the corporate network, such as firmware updates, VLAN reconfiguration, switch replacement, or IT maintenance schedules, do not affect HDBaseT video system behaviour.

Many sources and displays have HDBaseT ports embedded within them, such as cameras, projectors, and panel displays. Implementing such devices enables direct connection, as depicted in figure 1.

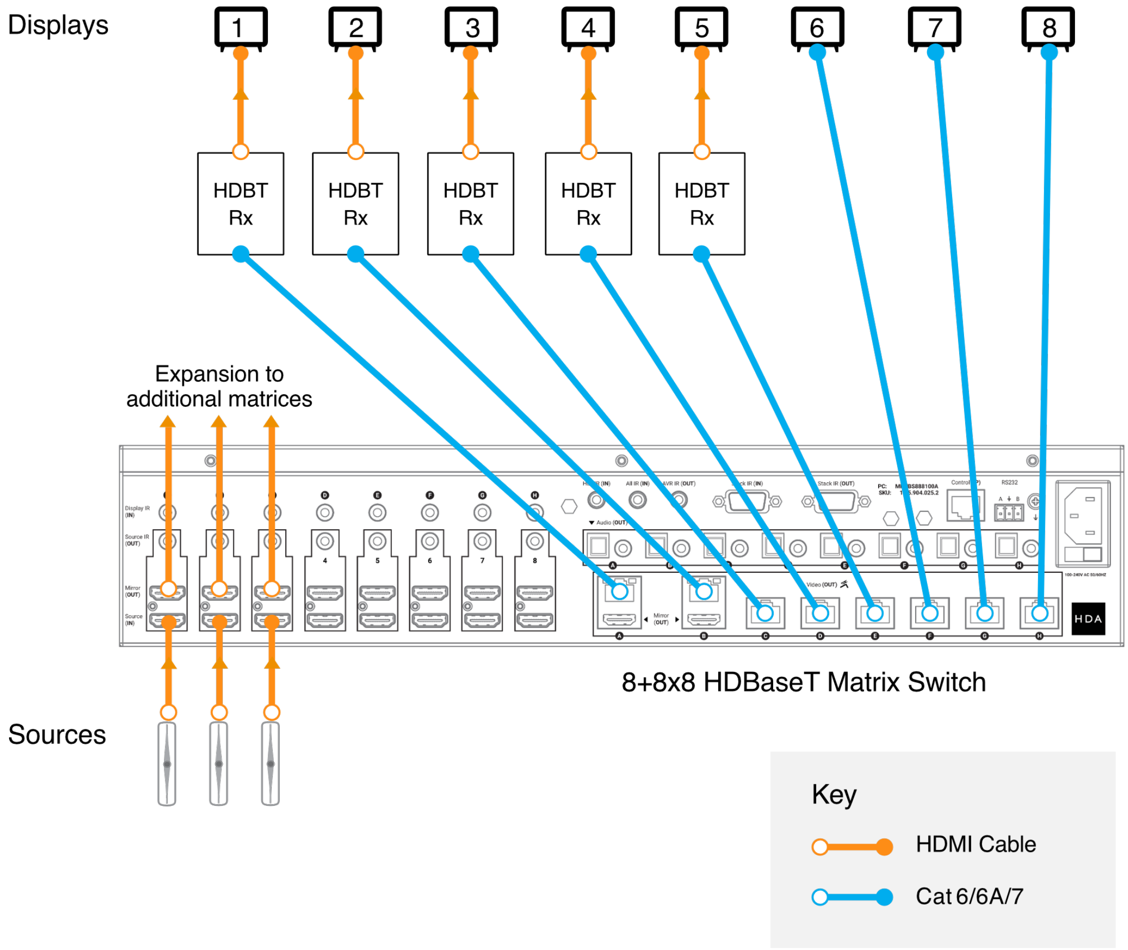

Figure 1 Example of HDBaseT system topology for a simple 3-source, 8-display configuration. Displays #6-8 depict option for direct connection where equipped with native HDBaseT port, negating the need for HDBaseT receiver. Image courtesy of HDA Systems, UK

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1.2 AV-over-IP: Network-Dependent, Decentralized Architecture

AVoIP systems distribute video as a stream of discrete data packets across an IP network (OSI Layer 3). This decentralized model places routing responsibility with managed network switches, introducing a dependency on third-party IT infrastructure and its associated configuration requirements.

Key architectural characteristics:

- Reliable AVoIP deployment requires Layer 3 managed switches capable of supporting IGMP Snooping and Querier configurations (v2 or v3), Multicast routing, Quality of Service (QoS) policies, and, in most professional implementations, VLAN segmentation to isolate AV traffic from general data traffic.[1] If AV traffic is integrated into an existing data network without adequate VLAN segmentation, Multicast packets can flood the wider network, impacting non-AV services. Correct configuration typically requires network engineering expertise beyond the competency of a standard AV technician. Furthermore, modification of any of the abovementioned parameters by an IT administrator can disrupt video delivery without the AV integrator being involved or notified.

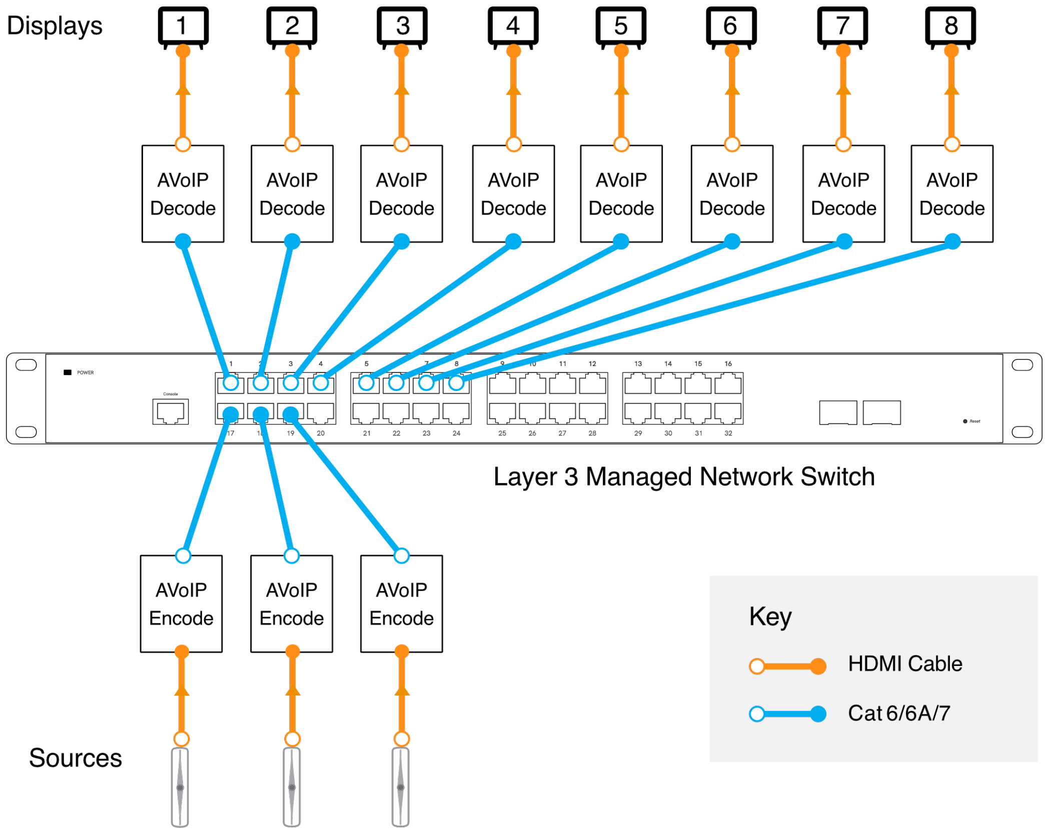

Figure 2 Example of AVoIP system topology for a simple 3-source, 8-display configuration. Every endpoint is connected to a encoder, decoder, or transceiver. Data is compressed and packetized over the network.

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- AVoIP employs packet-switched, stochastic (random) routing. Each video frame is fragmented into discrete UDP/IP packets. The switch must parse the destination IP of every packet individually, introducing variable inter-packet arrival times — a phenomenon known as jitter. Jitter must be absorbed by a de-jitter buffer at the decoder, which is itself a source of processing latency.
- Third-party firmware risk — because the routing function is executed by network switch software rather than purpose-built AV hardware, system behaviour is subject to vendor firmware update cycles outside the integrator's control.

2. Technical Performance Analysis

2.1 Picture Fidelity and Compression

Video picture fidelity plays a critical role across commercial, industrial and medical environments, where the clarity, accuracy, and detail of a displayed image directly affect decision-making, safety, and outcomes. Resolution and dynamic range are two of the most important factors shaping that fidelity.

Dynamic range governs how well a display reproduces contrast and color depth. Standard Dynamic Range (SDR) has long served as the baseline for most commercial and industrial displays, but High Dynamic Range (HDR) is increasingly adopted where accurate representation of subtle tonal variations — such as in medical imaging[2,3] or quality control — can be the difference between catching a critical detail and missing it entirely. Together, image resolution and dynamic range choices must be tailored to the specific demands of each setting, balancing cost, performance, and the level of precision required.

An HDR signal requires a minimum 10-bit signal, typically accompanied by metadata that defines the maximum and frame-average light level parameters. It is crucial that the video transport be able to maintain the video signal at its native bitrate from end-to-end, along with the accompanying metadata.

A 4K/60 signal, either 8-bit 4:4:4/RGB or 10/12-bit HDR 4:2:0/4:2:2, represents a raw data rate of approximately 18 Gbps over HDMI®.[4] Transporting this over HDBaseT or AVoIP require very different approaches:

<u>HDBaseT</u>

HDBaseT spec 3.0, implemented in the VS3000 chipset family, transports all video formats up to the equivalent of 18 Gbps through HDMI,[5] uncompressed and uncompromised. In fact, HDBaseT only removes the encoding overhead used in HDMI for transport, but does not decode the HDMI signal itself. This ensures that not only is the full color depth, dynamic range and spatial detail of the source content preserved, but the frame-embedded metadata natively remains in place.

<u>AVoIP</u>

Transmitting these formats over 1 GbE requires a compression ratio of at least 18:1. At this level, lossy artifacts are measurable and, especially under high-motion or high-detail content conditions, visible. It is also imperative that the AVoIP system be able to retain the HDR metadata,

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where applicable, to accompany the compressed video signal, the process for which may differ by manufacturer. AVoIP systems may employ only codec-based compression, or a combination of the following:

- Codec-based compression (lossy) — this involves decoding the HDMI signal into separate video and audio before compressing and packetizing the data. Any accompanying source metadata needs to be extracted, transmitted, and reconstituted into the HDMI signal at the receiving end for it to be useable by the display (or other Sink). Most AVoIP systems use this alone
- Chroma down-sampling (lossy) — converting a 4:4:4/RGB signal to 4:2:0, reducing bandwidth by up to 50%. In most applications this may have negligible consequences, but can be an important consideration where the highest color fidelity is expected from 4:4:4/RGB sources.
- Down-sampling a 10-bit signal to 8-bit. This effectively strips the foundation of the HDR video signal (reducing 1,024 levels per color channel to only 256 levels), potentially introducing posterization (color banding), white clipping, and/or black crush in the displayed image. System designers are advised to avoid this technique if HDR video is required.

Static or low-motion content such as digital signage, slide presentations, etc., generally require much lower source bandwidth. As such, the requisite compression ratios used in AVoIP systems may be proportionally lower, reducing the apparent difference in performance from HDBaseT. However, some content types remain susceptible to image smearing at any level of compression. For example, macroblocking in JPEG2000 compression can cause the fine lines and cell contents in a Microsoft Excel® spreadsheet to blur and lose legibility, depending on the user-selected zoom level within the app. Uncompressed transmission exhibits no such issues.

For high-motion content characteristic of sports, gaming, and live broadcast, the implications of compression continue to remain material.

2.2 End-to-End Latency

Latency is the elapsed time between signal output at the source and display at the destination, being the sum of transport time and image processing time. Acceptable latency depends on use case, but for applications requiring real-time interactivity and control — medical imaging, live sports, eSports, or KVM — it is a critical design factor.

The human Latency Perception Threshold (LPT) varies by sensory modality and task:

- Fastest impulse interpretation is 2 ms [6,7]
- Fastest time to process what's in an image is 13 ms [8]
- Fastest reaction time is 100 ms [9]

Since video system users are concerned with perceiving image content, not merely impulses like flicker, this paper treats 13 ms as the threshold for "real-time" or "zero latency."

Some high-performance surgical monitors and consumer displays in Game Mode achieve image processing times, colloquially called "input lag," of roughly 10–15 ms. This already consumes the entire real-time budget before accounting for any transport latency, though less demanding applications have more headroom.

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HDBaseT Latency

HDBaseT delivers video over 100 m of cable with characteristic latency below 10 μs (0.01 ms) — over 1,000 times faster than the 13 ms real-time threshold. In practice, HDBaseT does not contribute to the source-to-glass latency budget.

AVoIP Latency

The latency characteristic with AVoIP is codec-dependent:

- H.264-based solutions can range widely from 150 - 500 ms of source-to-glass delay, which may be minimized with more compute power.
- JPEG2000 intra-frame codecs are the prevailing standard for low-latency 1 Gbps AVoIP. They commonly reduce latency to roughly one video frame interval: ~16.7 ms at 60 fps, 41.7 ms at 24 fps. Optimised implementations using frame tiling can reduce this to 10–15 ms,[10] meeting the real-time threshold at the transport level, though display processing latency must still be budgeted separately.

For applications requiring real-time perception and interaction, system designers should define a total latency budget for each application, ensuring the combined transport and display processing delay stays within target.

2.3 Control Architecture: Native Pass-Through vs. Abstracted API

HDBaseT incorporates native control transport directly within the standard itself, carrying RS-232/UART, IR, CEC, and USB signals alongside video and audio over a single cable and without requiring additional control hardware or a separate network layer.[11] The matrix switch handles these control signals natively, allowing commands to pass transparently between the HDBaseT transmitter and receiver. Control is therefore included as part of the overall switching platform rather than being dependent on an external processor or software translation layer.

In AVoIP systems, control signals must typically be converted into network packets by a control processor, routed across the IP network, and then interpreted by each endpoint decoder. This introduces an additional software and network dependency that does not exist in the native transport model of HDBaseT. As a result, both video and control become reliant on the correct operation of the wider network infrastructure and associated control stack.

2.4 Infrastructure Cabling and Distance

Both HDBaseT spec 1.0/2.0 and 1 Gbps AVoIP can operate over Cat 5e or Cat 6 to a maximum of 100 m (328 ft). HDBaseT spec 3.0 requires Cat 6A U/FTP for full 4K/60 4:4:4 (or equivalent) performance at 100 m.[12]

AVoIP supports distance extension by adding network switches as transparent repeaters, enabling multi-building or campus-scale distribution without additional dedicated cabling infrastructure. This represents a genuine structural advantage at large scale, particularly with the distance potential with SFP-based optical fiber uplinks. By comparison, HDBaseT extends reach through dedicated inline extenders, which add cost and complexity at the point of each extension.

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2.5 Security Posture

HDBaseT carries no IP identity. It cannot be addressed, scanned, or accessed via any network-based attack vector. The video infrastructure is physically isolated from the operator's data environment by design, without requiring VLAN configuration or firewall rules.

HDBaseT extender and matrix devices do commonly feature Ethernet ports, but not for video distribution. Instead, they serve one of two other functions:

1. To optionally tunnel Ethernet signals across an HDBaseT link as part of the 5Play feature set. The HDBaseT transport remains transparent to the LAN.
2. To connect an HDBaseT device to the internet for Web GUI access, third party integration (e.g., automation control), and firmware updates.

In both instances, the network connection is separate from the audiovisual distribution and does not impact the data payload over HDBaseT.

With AVoIP, each encoder and decoder is an individually addressable IP endpoint. Unless isolated via a dedicated VLAN or physical air gap, these devices constitute network-facing assets that require security patching, MAC-address management, and inclusion in IT department vulnerability assessments.

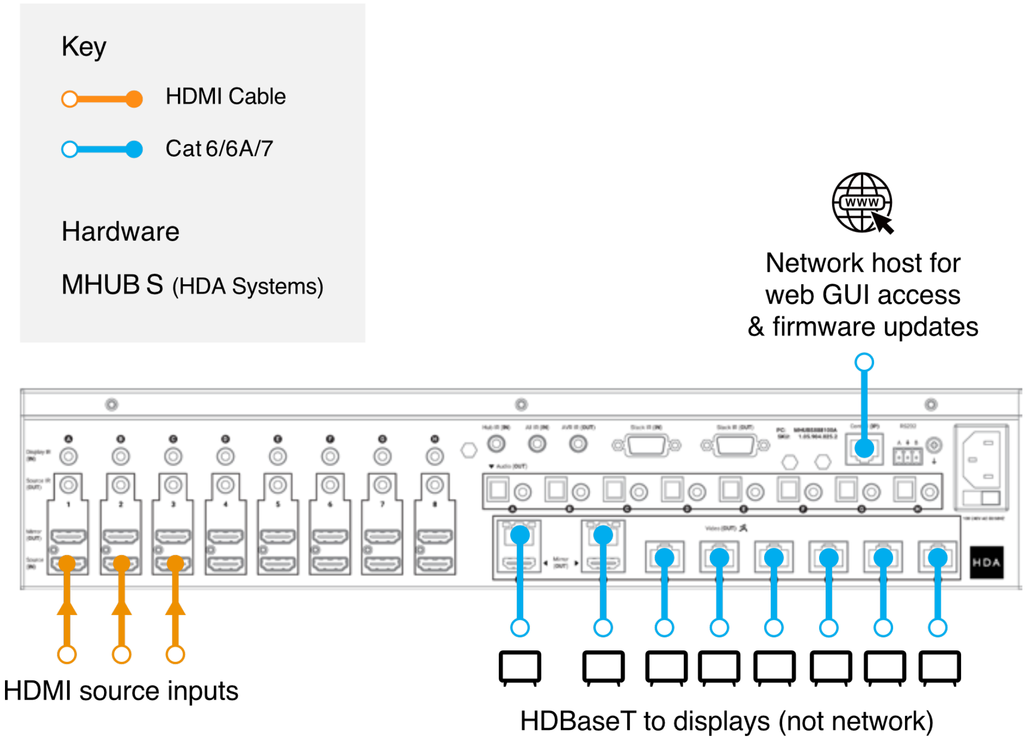

Figure 3 An HDBaseT device is commonly network-connected to enable internet for remote access monitoring, control, and updates, but the HDBaseT system for video distribution is completely separated from the network.
Image courtesy of HDA Systems, UK

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3. Comparative Summary

Feature/Criterion	HDBaseT (VS series chipset)	AVoIP (1 GbE standard)
Switching Logic	Hardware-based; deterministic circuit switching	Software-defined; stochastic packet switching
Network Requirement	None — operates independently of IP infrastructure	Managed Layer 3 switch with IGMP/ VLAN support
External Dependencies	Point-to-point physical link only	Switch firmware, network configuration, QoS policy
End-to-End Latency	10 μs	16.7–500+ ms (codec-dependent) [10,13]
Compression Ratio (4K60)	Uncompressed, lossless	~18:1 (lossy; chroma subsampling common)
Control Mechanism	Native 5Play pass-through: RS-232, IR, CEC [14]	Abstracted API over IP; software-dependent
Security Profile	No IP footprint; physically isolated	IP endpoint; requires VLAN and patch management
Cabling / Distance	Cat 5e/6 (spec 1.0/2.0) Cat 6A (Spec 3.0) to 100 m	Cat5e/6 to 100 m; extendable via additional switches
Deployment Skill Level	AV technician; no network engineering required	Requires IT/network engineering competency
Scale Ceiling	Practical upper limit ~64 endpoints per matrix	Scalable beyond 64 endpoints via network fabric

Table 1 Summary of the principal technical parameters across both architectures.

4. HDBaseT in the Commercial Mid-Market

The following analysis applies the technical findings above to the deployment characteristics common in mid-market commercial projects: hospitality venues, corporate offices, medical facilities, and eSports or control-room environments. In these contexts, projects typically range from 4 to 64 endpoints, involve a single building, and are installed and maintained by AV integrators rather than dedicated IT teams.

4.1 Total Cost of Ownership

Industry commentary consistently characterizes HDBaseT as the more cost-effective option for small-to-mid-sized installations, since it avoids network-switch configuration and specialized IT labor, while AVoIP's cost advantage tends to emerge at scale, where its flexibility and easier expansion offset the added switch hardware and configuration overhead.

For example, for a typical 16-zone HDBaseT installation, the system Bill of Materials comprises the matrix switch, transmitters, receivers, and standard category cable. No managed switching hardware is required, and commissioning does not necessitate network engineering resource. Furthermore, as noted in Section 1.1, utilizing endpoint devices that feature a native HDBaseT port negates the need for a separate transmitter/receiver, further reducing overall implementation cost.

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By comparison, an equivalent 16-zone 1 Gbps AVoIP system requires enterprise-grade managed switches with validated Multicast support. All AVoIP endpoints require separate encoders/decoders, and control processor programming. However, AVoIP can become more cost-effective for larger deployments due to its scalability.

Additionally, AVoIP system components are typically not interoperable with other brands, or even other series within the same brand. Some exceptions may apply, such as some AVB/TSN and AES67 systems. Where interoperability is limited, any modification to the system in future will generally require adherence to the specific brand and series. HDBaseT, on the other hand, is interoperable to the lowest common functionality between brands, though maintaining distinction between spec 1.0/2.0 and spec 3.0 is recommended.

4.2 Commissioning and Fault Isolation

The independent architecture of HDBaseT removes the software configuration layer entirely from commissioning. An installer verifies cabling continuity and link negotiation; there is no IP addressing, no IGMP Querier setup, and no VLAN boundary to configure. In the event of a signal fault, the diagnostic path is straightforward at the physical layer: cable, termination, transmitter, receiver.

AVoIP commissioning requires validation of switch configuration, IGMP Snooping state, Multicast group membership, and QoS policy, each of which may involve coordination with the building's IT department. Post-installation, any firmware update applied to the network switch by IT staff may alter multicast behaviour and disrupt video delivery without any change to the AV system itself.

4.3 Approval and IT Governance

In corporate and healthcare environments, any new IP endpoint typically requires security approval from the IT department. This can add weeks to a project timeline. HDBaseT systems, carrying no IP identity, fall outside this governance process in most organisations, enabling faster project sign-off and commissioning.

4.4 Signal Fidelity for High-Motion Content

In sports bars, eSports arenas, and high-end hospitality venues, the visible quality of fast-motion content — live football, motor racing, gaming, etc. — is commercially significant. The 18:1 compression ratio applied by 1 Gbps AVoIP systems, as noted in Section 2.1, produces measurable macroblocking artifacts under high-motion conditions. Additionally, where the source is natively 4:4:4/RGB, such as gaming or any other GPU-sourced content, chroma will commonly be reduced from 4:4:4 to 4:2:0 as part of a compression scheme.

4.5 Latency in Interactive Applications

Applications involving real-time human feedback — surgical imaging, KVM operation, eSports, or live production — require latency that is perceptually transparent. As noted in Section 2.2:

- 1 Gbps AVoIP solutions commonly exhibit latency of one video frame (~16.7 ms @ 60 fps), which is detectable in cursor tracking or other input devices
- HDBaseT can tunnel USB signals along with the audiovisual stream, with both exhibiting latency of just 10 µs, well below the threshold to qualify it as real-time/zero latency.

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5. Sector-Specific HDBaseT Application Analysis

5.1 Sports Bars, Hospitality and Showrooms

Relevant parameters: picture fidelity, commissioning speed, cost, resilience.

HDBaseT preserves full chroma fidelity and dynamic range for high-motion broadcast content. Commissioning requires no IT department involvement, reducing project duration and eliminating the risk of network configuration errors disrupting service. Hardware fallback control directly at the matrix front panel ensures the venue retains operational continuity even if a control system fault occurs.

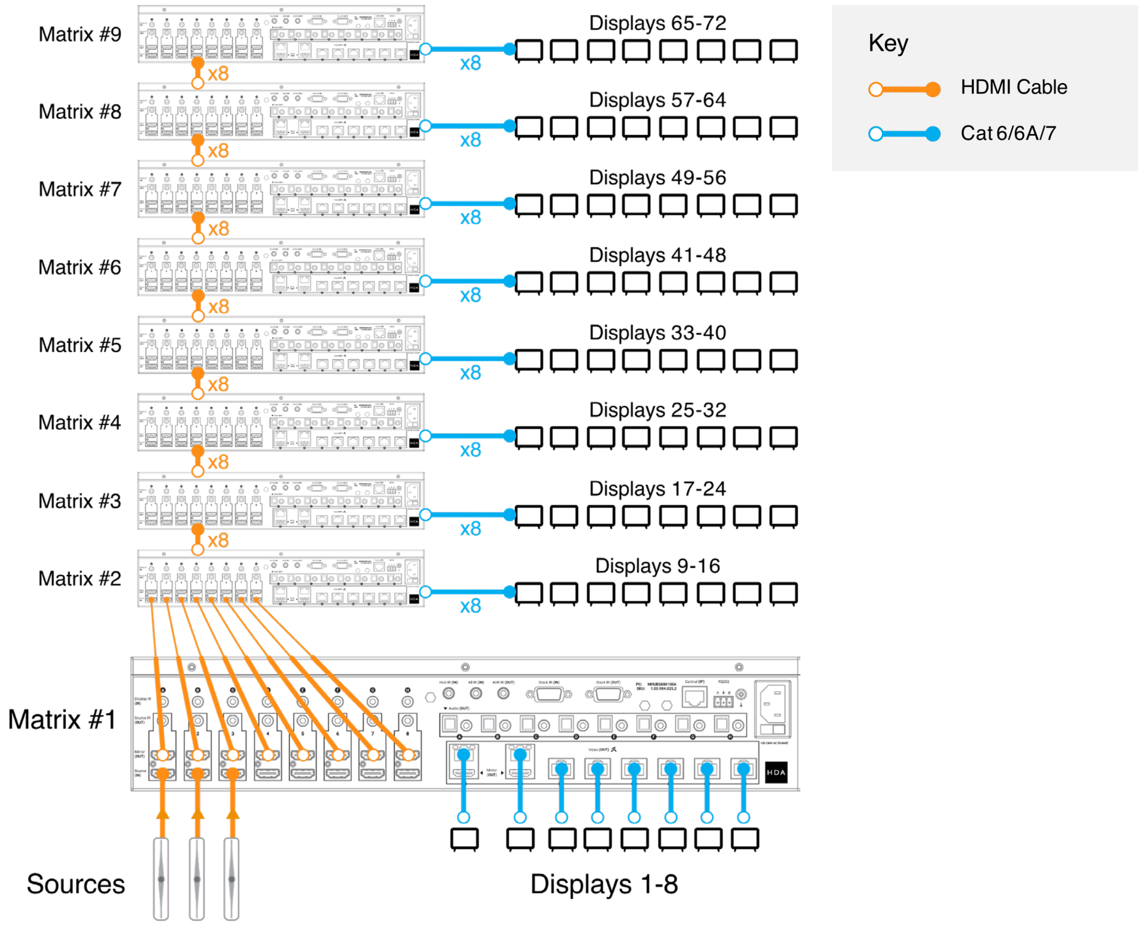

Figure 4 Example of a large scale video distribution system prioritizing lossless picture quality.
See [Appendix A](#) for case study details

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5.2 Corporate Boardrooms and Meeting Spaces

Relevant parameters: security, simplicity, latency, IT governance, reliability.

The non-IP architecture of HDBaseT eliminates the requirement for IT security review of individual AV endpoints. There are no network-accessible devices requiring patch management. Plug-and-play matrix operation reduces dependency on specialist AV programming resource for day-to-day use. If there's an issue requiring system reboot, this can be performed without disrupting network-connected systems. In fact, for HDBaseT-enabled devices with Web GUI, reboot can usually be performed remotely, minimizing down time and improving operational efficiency.

Latency is also an important consideration in corporate meeting spaces. During presentations, a delay in the video leads to the mouse cursor trailing behind its actual location, and delayed responses to presenter's clicker inputs, both of which can result in disruptive mistiming or unwanted actions. Meanwhile, poor lip-sync with remote teleconference participants and other AV content can cause unwanted distraction. Minimizing latency to as close to real-time as possible allows technology to not get in the way of user intent and engagement.

5.3 Medical and Surgical Suites, Security-Sensitive Sites

Relevant parameters: fidelity, latency, no network contention, infection-control cabling.

Ultra-low latency and uncompromised image fidelity are functional requirements in surgical robotic and endoscopic imaging applications. Any delay between instrument movement and visual feedback, or any degradation in resolution and dynamic range can significantly affect procedural precision.

The 10 µs latency and reliably of HDBaseT meets this requirement natively over standard medical-grade category cabling without requiring the hospital's IT team to configure AV-specific multicast routing in clinical network segments.

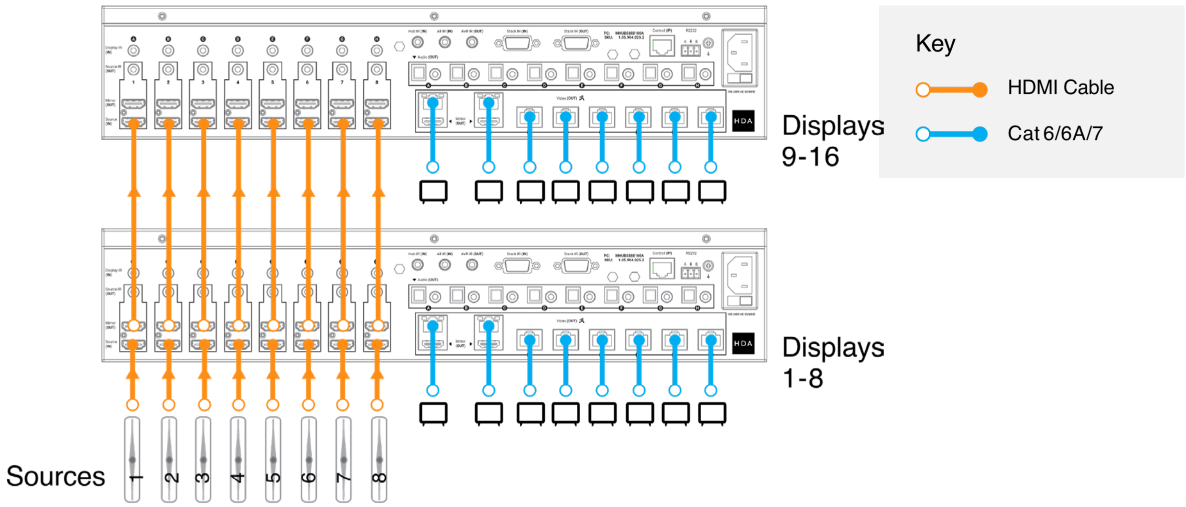

Figure 5 Example of a video distribution system prioritizing network independence for security.
See Appendix B for case study details

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5.4 eSports Venues and Command-and-Control Centres

Relevant parameters: latency, fidelity, hardware fallback.

Competitive eSports and operational control rooms require frame-accurate video, high-resolution display of fine detail (maps, HUDs, data overlays), accurate display of color and dynamic range to identify in-game elements in any virtual lighting conditions, and real-time user interactivity. Pro gamers typically demand no more than 10-15 ms of source-to-glass latency to best support their ultra-fast responses and interactivity.

Gaming, from general consumer through to pro level, benefits from high frame rates. This often involves reducing the spatial (in-frame) resolution in favor of maximizing the temporal (time-based) resolution, thereby reducing motion blur for greater detail rendering and fluid motion. For example, setting the spatial resolution to 1080p or 1440p while increasing frame rate from 60 to 120 fps. After all, detail at 1080p is better than blur in 4K.

The uncompressed transmission of HDBaseT preserves the temporal resolution in the video that 18:1 compression may compromise, and 10 µs latency in the simultaneous transmission of both video and USB user control signals ensures that it fully supports the very fast reaction times of competitive play.

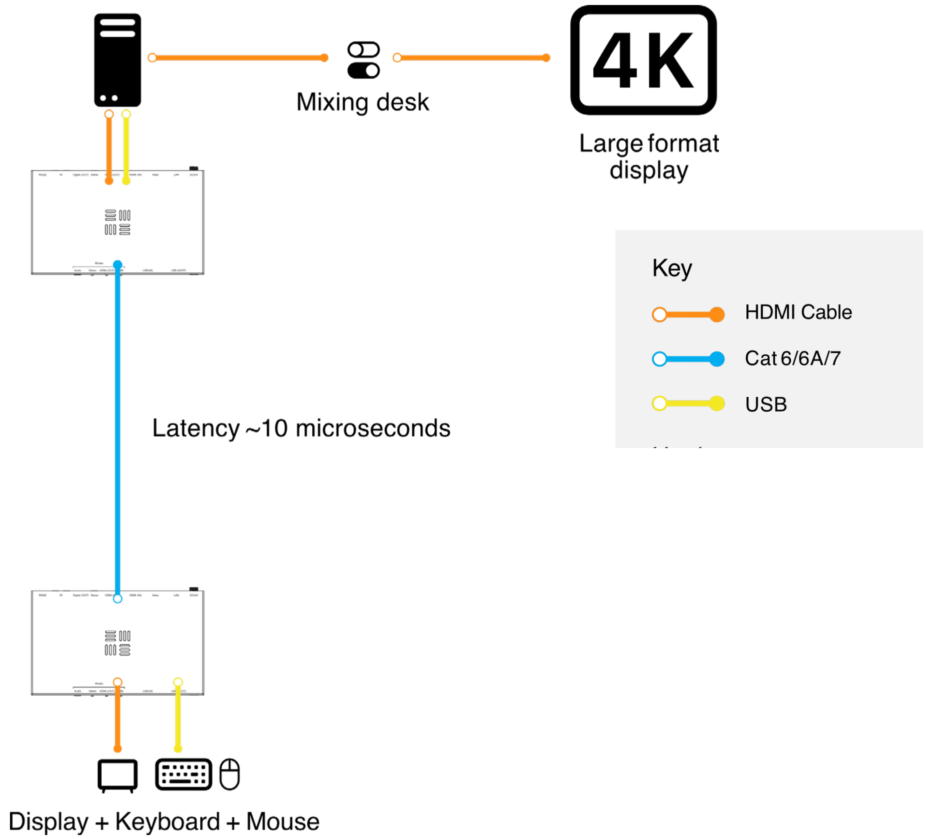

Figure 6 Example of a video extension system prioritizing zero latency/real-time + USB control for pro interactivity.
See Appendix C for case study details

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5.5 High-End Residential

Relevant parameters: fidelity, latency, infrastructure independence, serviceability.

All video content delivered into homes via streaming, disc, or broadcast, namely TV programs and movies, use very high rates of compression with codecs such as H.265, AV1 or VP9. Compression ratios are commonly around 500:1 and up to 1,000:1. Chroma is invariably 4:2:0. Even with such heavy compression, these codecs can retain impressively high fidelity, but the big trade-off is that they also exhibit relatively high latency. Decoding this content in the source device can be sub-1 second with hardware acceleration, but buffereing is typically implmented to counter any variablity in the stream for uninterrputed viewing. The result is several seconds of dealy.

In practice this doesn't matter as it all happens before the content leaves a source device via the HDMI output. However, once it's left the source, minimizing latency is very important for maintaining lip-sync — e.g., between the AV receiver and display — and for user interactivity, namely operating a remote/control system as noticeable on-screen delay can frustrate the user.

Residential deployments investing in advanced display technologies benefit from the lossless transport of HDBaseT, preserving the high fidelity of the source video without compromise or delay. Furthermore, infrastructure independence means the video system continues to operate if the home network or broadband connection is disrupted (notwithstanding any disruption to streaming content), reducing service calls for the integrator.

6. Conditions Favoring AV-over-IP

A technically rigorous assessment requires an explicit statement of conditions under which AVoIP is the more appropriate choice.

- Scale beyond 64 endpoints — the centralized matrix architecture of HDBaseT becomes logistically impractical at very large endpoint counts. The ability with AVoIP to route signals across an existing network fabric, or across multiple buildings via fibre uplinks, makes it the more practical architecture for stadium-scale or campus-wide distribution.
- Existing high-grade managed network infrastructure — where Cat 6A or optical fiber with enterprise-grade managed switching is already installed and IT-managed, AVoIP can leverage that infrastructure, potentially reducing incremental hardware cost.
- Advanced image processing requirements — software-defined AVoIP decoders support video wall tiling, picture-in-picture composition, and real-time content manipulation more natively than fixed-matrix HDBaseT architectures. Where these capabilities are a primary requirement, AVoIP offers greater flexibility.
- Indefinite distance extension — deployments requiring video transport beyond 100 m without intermediate equipment rooms are better served by the ability of AVoIP to bridge via network switches.

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7. Comparison Summary

Table 2 provides a high-level specification guide for technology selection.

Requirement	Recommended Technology
Minimal latency required (live video, gaming, surgical imaging, meeting spaces)	**HDBaseT**
Simplified IT department involvement in AV commissioning	**HDBaseT**
Highest picture fidelity up to 4K/60 4:4:4 or 4K/60 12-bit HDR	**HDBaseT**
Deployment of 4–64 endpoints in a single building	**HDBaseT**
Lower total cost of ownership at mid-scale	**HDBaseT**
Secure, non-networked signal transport	**HDBaseT**
Scale beyond 64 endpoints or multi-building distribution	**AV-over-IP**
Advanced video wall or image-processing capability	**AV-over-IP**
Extension beyond 100 m without dedicated extender hardware	**AV-over-IP**

Table 2 Technology selection guidance by operational requirement

8. Conclusion

HDBaseT and AV-over-IP are not competing technologies vying for the same application space, they are architecturally distinct solutions optimized for different deployment contexts. The choice between them should be determined by objective technical criteria rather than market positioning.

For the commercial mid-market such as the hospitality venue, the corporate boardroom and meeting spaces, the medical suite, or the eSports arena, the technical data consistently supports HDBaseT as the more appropriate choice. Its deterministic signal path eliminates the latency, jitter, and configuration complexity inherent in IP-based network architecture. Its uncompressed transmission preserves signal fidelity that 18:1 lossy codecs cannot match. Its non-IP architecture removes the system from IT governance processes, reduces commissioning time, and eliminates the network-based failure modes that introduce operational risk in always-on commercial environments.

Where deployments exceed 64 endpoints, require multi-building distribution, or depend on advanced software-defined image processing, AV-over-IP is the more scalable and flexible architecture and should be specified accordingly.

Practitioners are encouraged to conduct site-specific assessment of endpoint count, distances, existing network infrastructure, content type, and latency requirements before finalizing technology selection. The references cited in Section 9 provide primary technical data to support that process.

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10. About the Author

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Meyer Projects founder David Meyer is an industry veteran of more than 30 years, technical writer and educator, standards contributor, former CEDIA APAC Board member, and was technical consultant to CEDIA's Education & Standards (2016-2025) as video and connectivity SME. He is author of dozens of industry trainings and white papers including CEDIA publications: *AV-over-IP Systems* (2020), *HDBaseT for 4K and 8K Video* (2020), *Designing Timing-Aware Networks* (2020), *HDMI 2.1a Technology for Integrators* (2024), *Infrastructure Cabling for Voice, Data, and Video* (2019), and the *Video Principles* series (2018).

Disclaimer: While every effort has been made to ensure factual accuracy and balanced technical assessment in this publication, readers are advised to conduct independent validation of performance claims for specific deployment contexts. All latency and compression figures are drawn from published technical specifications or peer-reviewed industry sources cited herein.

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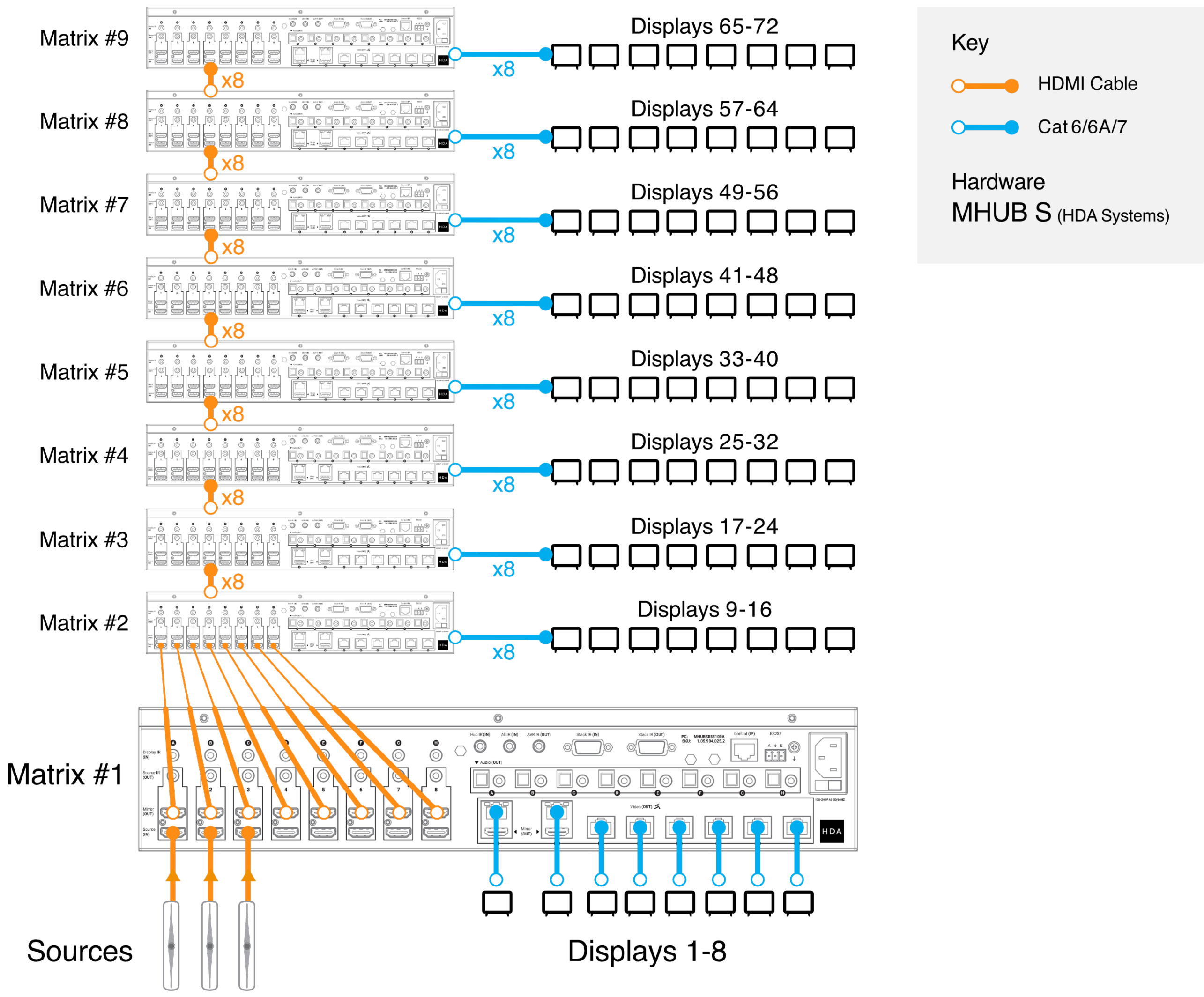
APPENDIX A: CASE STUDY

DALLAS SHOWROOM | 72 DISPLAY VIDEO DISTRIBUTION

Superior Picture Quality at Scale

SUPERIOR PICTURE | EASE OF INSTALLATION | CONTROL (CEC)

A premium consumer electronics showroom in Dallas required content distribution to 72 displays, including high-bitrate demonstration footage designed to showcase the latest television technologies. Image quality was identified as the primary decision-making criterion, alongside operational simplicity for showroom staff. The solution deployed consisted of nine HDA Systems MHUB S (8+8x8) 100A matrix systems operating in a stacked configuration, providing visually lossless distribution, predictable performance, and intuitive day-to-day operation without reliance on network infrastructure.



Case study and image courtesy of HDA Systems, UK

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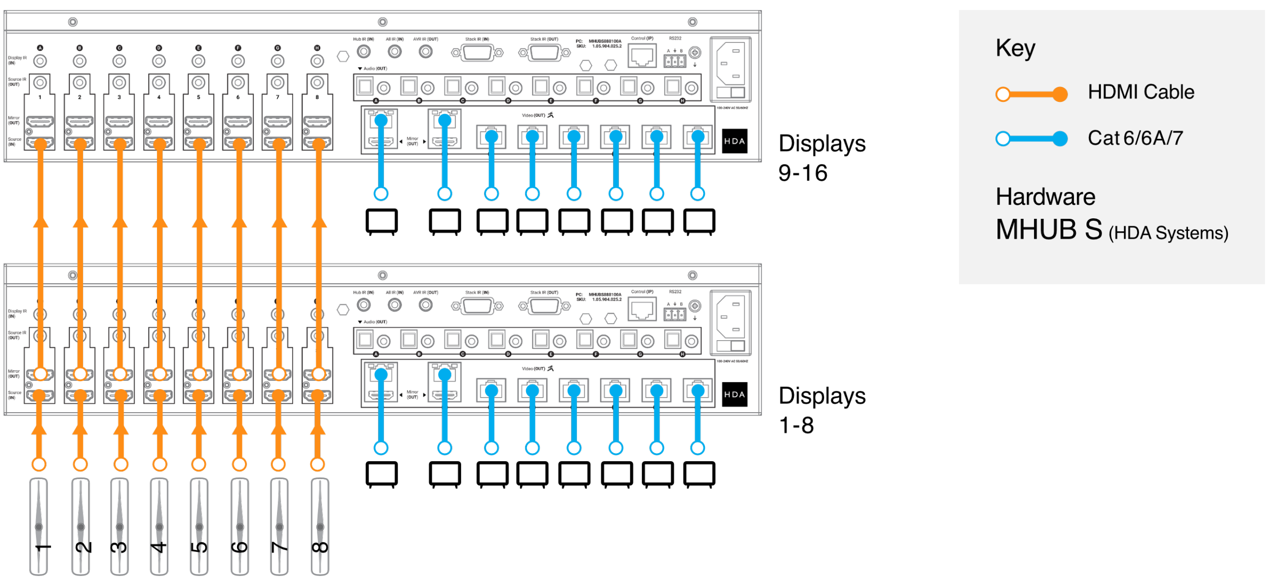
APPENDIX B: CASE STUDY

LONDON CASINO | NETWORK-ISOLATED AV INFRASTRUCTURE

Secure AV Distribution Without Network Dependency

SUPERIOR PICTURE | EASE OF INSTALLATION | CONTROL (CEC)

A London casino required a distributed AV solution throughout its gaming floor while adhering to strict cybersecurity and operational compliance requirements. AV-over-IP was excluded due to security policies restricting access to network infrastructure and the use of unauthorised third-party switching equipment. HDA Systems MHUB S (8+8x8) 100A was selected because it operates independently of the data network, providing deterministic performance and simplified deployment. System control was achieved through direct RS-232 communication and integrated automation capabilities, ensuring reliable operation without introducing additional network complexity.



Case study and image courtesy of HDA Systems, UK

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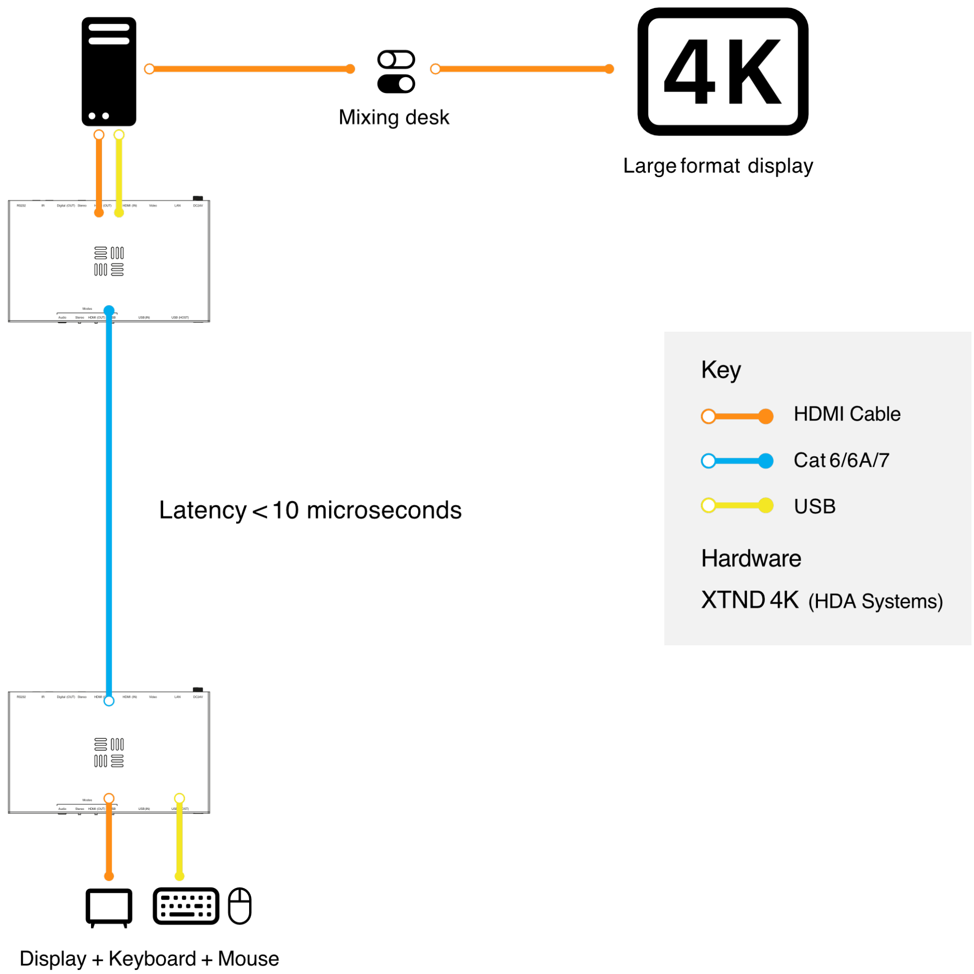
APPENDIX C: CASE STUDY

LONDON E-SPORTS EVENT | KVM DISTRIBUTION ENVIRONMENT

Ultra-Low Latency for Competitive Gaming

SUPERIOR PICTURE | ULTRA LOW LAG | CONTROL (USB)

A London-based e-sports event required ultra-low latency video and USB extension for multiple gaming rigs (x15), where even minor delays could negatively impact player performance. HDA Systems XTND 4K (100) eARC + USB extenders were selected to deliver high-quality video and responsive peripheral control within a KVM environment. The architecture enabled gaming hardware to be relocated away from player positions, allowing production teams unrestricted access to mixing and content creation equipment while maintaining the performance expectations of a professional competitive gaming event.



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