

KVM system manufacturers argue that their extenders and switchers may be the answer to many AV signal distribution and management needs in a range of applications.

# Instant feedback

KVM systems allow source computers to be located away from end points, essential in medical applications for hygiene and security.

**W**e regularly hear about AV and IT convergence in the AV industry. Services that were once the domain of AV specialists: like audio and video distribution, voice and video conferencing and in-room equipment control are migrating to IP-networks and coming under the domain of the IT department.

While posing a threat to the established and traditional AV industry and forcing many integrators to become expert in IT technology, this situation brings with it considerable opportunity to establish exciting new offerings to customers. We can now take advantage of devices and techniques developed for, and widely used in, the professional IT sector; many of which were, in turn, originally developed for the consumer market; like touch screens, voice control and device positioning.

A technology that is extremely well established in the IT world, but is under-used and undervalued in the AV world is that of keyboard, video and mouse (KVM) extension and switching.

Distributing video signals over anything but the shortest distance has always posed a

problem. Direct connection between displays and the computer systems and media players that feed them is limited to a few metres using conventional methods. Greater distances require AV extenders that convert the video data into some intermediate form for long-distance transmission, commonly HDBaseT over a CatX cable or fibre. However the basic and most common video extenders are capable of just sending the video signal in one (forward) direction, from a computer to a remote screen, although the latest incarnation of HDBaseT now includes USB transfer. They are incapable of receiving commands from the user to manage the operation of the source device and provide an interactive experience. KVM extenders add that return path; allowing mice, touch screens, sensors, cameras and other interactive devices to be included.

Growing use of interactivity in AV installations is increasing the need for KVM extenders. "KVM

*“KVM solutions are designed for real-time interaction and introduce zero or micro-seconds of latency.”*

*- Jamie Adkin, Adder Technology*

solutions are needed in a growing number of applications,” observes AJ Shelat, VP of sales, Hall Research. “Traditional KVM applications are used for video, keyboard and mouse, however the growth comes out of integrating the increasing number of USB devices that are used with PCs. There are many USB peripheral devices, like large format touch screen displays, document cameras, VTC cameras, microphones, that require integration into today’s pro AV installs. The applications can range from education, huddle and conference rooms, medical, command and control centres, museums, video conferencing, collaboration and digital signage.”

Development of KVM systems has focused on delivering equipment that does not introduce perceivable latency, visual artefacts or delay in user response. In the IT sector, their role is to separate computers from user workstations, either by direct connection or over a network. “KVM solutions are designed for real-time >



< interaction and introduce zero or micro-seconds of latency,” points out Jamie Adkin, VP of sales for Adder Technology. “That real-time nature makes the user feel connected to the technology: a touchscreen responds instantly, a pen feels connected to a graphics tablet and a cursor is synchronised to the mouse movement.”

KVM extenders are deployed in critical installations in which reliability and continued operation is essential. They have been developed to provide highly robust operation and are capable of delivering ongoing performance in more hostile and difficult situations than commercial AV-grade technology; although this does come at a cost. They can, therefore, solve problems in AV installations. Nicola Jagger, project manager at D J Willrich cites an example: “During a recent museum installation we came up against some long cable runs of over 100 metres that were interrupted by several patch panels. Standard DVI extenders were unable to reliably drive signals over those lengths, but we found that the KVM extenders, using a different transmission methodology worked perfectly.”

In addition to providing direct point-to-point extension, KVM signals can also be distributed through switches and over networks so that any display device or user workstation can access any source device. This is an extremely practical way of installing flexible systems of unlimited size and layout that can be configured and switched to suit current and future end user requirements. There are two distinct types of KVM switching systems: direct KVM and KVM-over-IP. Direct KVM requires a dedicated point-to-point connection from the switch to each end point, whilst KVM-over-IP operates over an established, or dedicated, IP network.

Each has particular advantages and disadvantages, as Shelat explains: “Direct KVM delivers the easiest installation with little to no network configuration required and the signal will have no impact on the building’s data network. However ease of installation comes with the loss of scalability and flexibility of installation. The integrator may need to pull a dedicated cable and not be able to use existing network infrastructure. KVM-over-IP solutions give the integrator the ability to leverage the existing network infrastructure, possibly add



[Top to bottom] Conference rooms, control rooms, museums and retail are all applications where KVM can come in handy

more locations or route signals through a virtual matrix switch. The downside is that this type of deployment will require some level of networking knowledge, possible signal delays or latency issues from increased network traffic, and may require additional network equipment.”

Direct KVM solutions need physical point-to-point connections between the devices and through the switch. This, points out Owen Haigh, head of global product management for Lindy, “provides real time, uncompressed, platform-independent connection. KVM-over-IP solutions remove the physical connection between devices and deliver the freedom to reach across the whole IP network. They do, however, add cost in terms of signal delay and bandwidth restriction. In many cases it is better to create a separate physical network to access users without touching the existing in-house network and reducing its performance.”

Adkin is an advocate of KVM-over-IP systems, pointing out how they have evolved as a technology to the highly capable solutions of today: “KVM-over-IP has long been used as a term to describe remote access technologies that use low-bandwidth, unreliable WAN networks.

For eight years, we’ve been providing customers with IP-based high performance KVM systems utilising standard 1Gb/s network technology that outperform the proprietary solutions from flexibility, scalability and cost perspectives.”

The advantages of direct KVM systems make them particularly applicable to installations that require instant switching of sources, total reliability and absolute image quality. “Dedicated cabling allows a lower level of compression to be used, resulting in higher quality images with less signal latency,” explains Mark Hempel, head of product management at IHSE. “This is particularly important in high-end, near-broadcast, applications such as those found in entertainment installations and sports stadiums and in mission-critical systems like control rooms and command centres. An emerging technology, and one that is expanding very rapidly, is that of immersive display using virtual reality headsets and large close-pitch videowalls. It allows architects and car designers for example, to interact with their designs in a virtualised world and collaborate in real time.

“Virtual reality systems are also used in museums and retail applications to create virtual experiences to visitors and customers. KVM systems allow expensive source computers to be located well away from the end points and shared as required, whilst still being accessed from anywhere on-site. This brings security, flexibility and worthwhile cost savings to customers. However running an immersive display or headset requires very fast interaction between the headset or pointing devices and the computers that generate the visual images. A delay in the round trip path of more than 20ms can cause motion sickness in the viewer. Our extenders introduce minimal delay and can handle these types of application well.”

An IT heritage has led to the inclusion of advanced capabilities and features in KVM technology that bring new possibilities and flexibility to the AV world. Single point-to-point extenders can handle almost all forms of analogue and digital audio and video signals as well as managing single, dual and quad head computer setups and can readily transport 4K video and higher resolutions. In addition to USB HID, bidirectional high speed USB2.0 and

>

< USB3.0 can be transmitted, allowing special devices like hard disks and video cameras to be accommodated so that they can be accessed wherever they are located and displayed wherever they need to be seen.


A significant difference between KVM and standard AV extenders lies in the selection of codecs used to reduce signal bandwidth. Those used for video extension in AV systems are generally tailored to moving images. KVM codecs are more than capable of handling video images without corrupting the image in any way. However they are also tuned to manage the short straight lines and curves of text displayed on computer screens, in a manner that video extenders are unable to do so well. Interactive sessions often display on-screen text and data material and this differentiation could be quite important in user applications and a point that should be borne in mind when selecting which type of extender to use.

Nicolas Jaud, product marketing manager for Aten, points to another inherent feature: "KVM solutions incorporate security procedures that

are not mandatory in traditional digital signage applications. More frequently nowadays, administrators want to decide who can access or share resources. KVM solutions already include user permission rights and credentials to control access to the system."

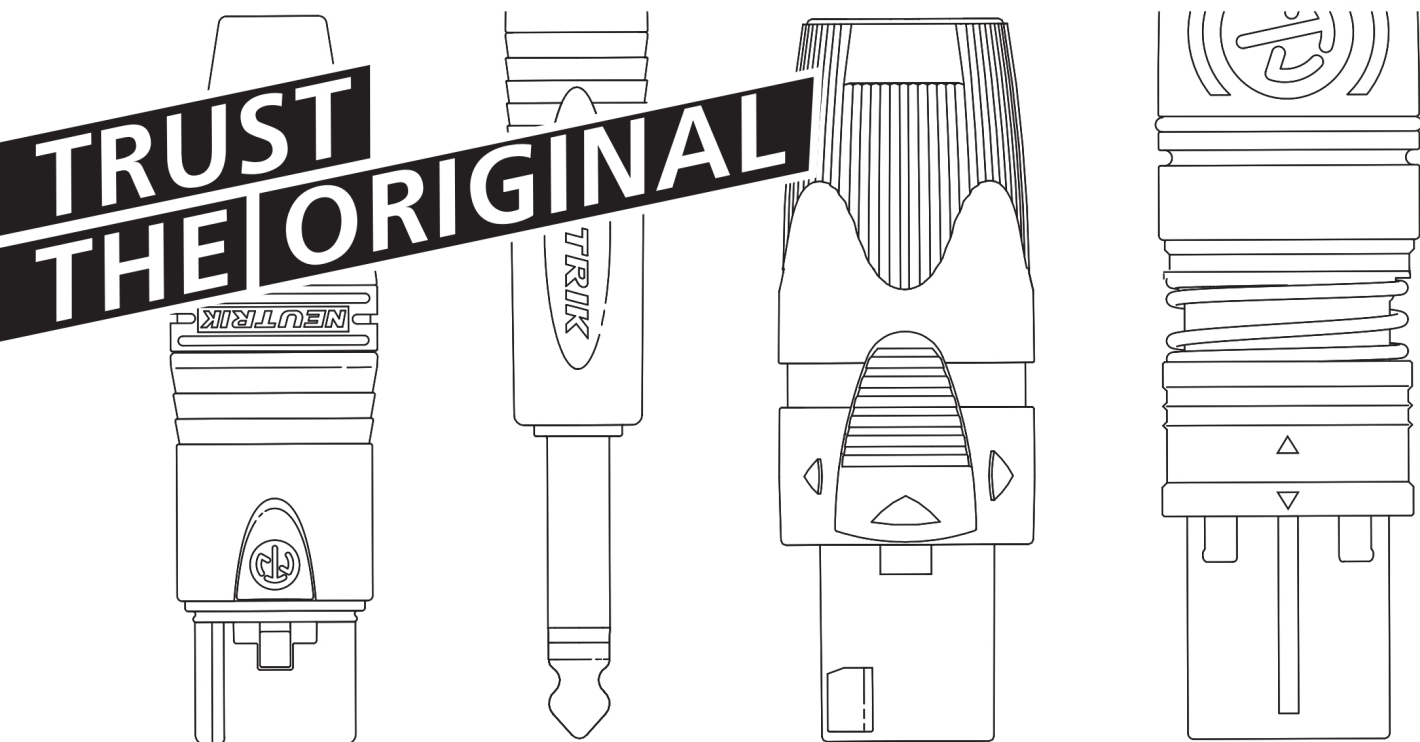
It is also easily possible to replicate audio and video signals, allowing single sources to be displayed simultaneously on multiple screens, useful for digital signage applications. The crucial benefit that KVM solutions provide over other forms of video distribution lies in the capability to incorporate user interaction, even in situations in which a single interactive application is shared between several users. The system can be configured to prioritise and

manage interactive responses in multi-users set ups in a variety of ways.

A wealth of other features and control capability is already incorporated into currently available KVM technology, making it eminently suited to many AV applications. This will develop further as the market evolves, as Adkin sums up: "The experience we all get from devices in our pocket is so high that we expect the same of the professional AV equipment we deploy in our facilities. Customers are always searching for tighter integrations, greater flexibility and robust security because they save time, money and deliver results. KVM provides viable and cost-effective solutions and the market continues to grow rapidly because of it." 

**“KVM-over-IP solutions remove the physical connection between devices and deliver the freedom to reach across the whole IP network.”**

- Owen Haigh, Lindy



Neutrik UK Ltd. | Westridge Business Park | Cothey Way | Ryde, Isle of Wight PO33 1QT | GREAT BRITAIN  
P: +44-1983-811 441 | F: +44-1983-811 439 | E: sales@neutrik.co.uk

www.neutrik.com

**NEUTRIK®**