KVM over IP Matrix System
Extreme Flexibility, Absolute Control
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Why KVM over IP?

In addition to the unlimited distances offered by a networked solution, utilizing over IP technology for video, audio, and control data distribution and extension offers boundless flexibility and scalability for centralized or distributed network operation.

Advantages include the fact that controllers can configure connectivity architecture and the overall size of the KVM installation based on specific requirements, and systems can be designed to accommodate large distances, unlimited users, any-input-to-any-user configurations, high performance and varying levels of system redundancy and resilience.

So, the major benefit of IP-based KVM in the control room is limitless scalability and flexibility. An IP-based KVM system also provides more extension options beyond traditional keyboard-monitor-mouse, including server sharing, video extension, and multicasting.

For these reasons, IP-based control units mean you can upgrade your IP management efficiency at the same time as increasing productivity and reducing operational costs.

Leading the World in KVM Innovations

World acclaimed for innovations that drive connectivity and access solutions, ATEN brings you the advanced KVM over IP Matrix System. Leveraging our expertise in network and video technologies, we’ve brought together a unique blend of features that offer the optimum solution for extended applications in different environments.

Our KVM over IP Matrix System allows virtual KVM matrices to be installed in control rooms to create workspace flexibility with instant access to various servers and video sources. The ultimate benefits are the video wall function and shared access modes, combined with advanced security options. These make the KVM over IP Matrix System perfect for security, broadcasting and traffic control rooms. Furthermore, in retail environments, the system can connect point-of-sales consoles with computers to centralize the IT infrastructure in a server room. With additional support for touch screens, full HD, and virtual media, our solution provides the ultimate in flexibility and flow.

ATEN’s near-40 years of excellence and more than 500 patents in these related areas means that we are at the forefront of the seamless integration of A/V with IT. We understand the increasing complexity of control room and server room requirements; we provide end-to-end design and manufacturing, and we strive to be as competitive as possible. And all that know-how translates into the right KVM over IP control solution for you.
The ATEN KVM over IP Matrix System is an innovative solution that combines KE Series Extenders with the KE Matrix Management Software (CCKM) to extend, control and monitor access to computers across a network in a multitude of ways. The system lets you set up a matrix of workstations that access computers across a network with the flexibility to configure each connection for the seamless data flow required for any and all applications.

The KE Series Extenders (KE99XX / KE89XX / KE69XX) are installed at computers and workstations, and are configured via the KE Management Software to create connections between them over a LAN. This allows Extenders to bridge a connection between the workstations and the remote computers they access from anywhere on different LAN segments.

Powered by ATEN’s advanced graphics processor and high performance Gigabit Ethernet controller, the extenders delivers video up to 4K with vivid color and multicasting across a network without any delay.

All models feature ATEN’s EDID Expert technology, which selects the optimum EDID settings for smooth power-up and highest quality display, as well as full USB and high speed virtual media support. Extender setups can be configured for one-to-one, one-to-many, many-to-one, and many-to-many workstation-to-computer connections.

Via an intuitive GUI, the KE Matrix Management Software allows you to define the connections and manage KE Series Extenders with features such as device auto-detection, username/password authentication, switching and sharing of connections, scheduling, permissions, and more.

The KE Matrix Management Software also offers redundancy settings that enable you to set primary and secondary servers in case of server problems, in addition to powerful security features that include external authentication support for LDAP and RADIUS, and more.

Whether you’re extending computer access for a monitoring, broadcasting, editing or workstation setup, the KVM over IP Matrix System gives you the flexibility and control to manage any number of extended computers.
Eliminate Distance Limitations

Don’t let distance or space limitations disrupt your creativity and production. The KE Series Extenders can extend and deploy computers with 4K displays across multiple stations in a variety of applications that suit any environment. Expand computer use to stations across multiple rooms with dynamic access.
KE9950 / KE9952 / KE8950 / KE8952
4K DisplayPort / HDMI KVM over IP Extender

The KE9950 / KE9952 / KE8950 / KE8952 4K DisplayPort / HDMI KVM over IP Extenders route KVM, audio, USB, and serial signals at unlimited distances via Cat 5e/6 over a LAN or via a SFP fiber optic transceiver module over an optical Ethernet network, the Features include:

- All models support up to 4K (3840 x 2160 @ 30Hz, 4:4:4) and are compatible with HDCP
- Provides fast-switching, secured data transmission (with AES-128 bit encryption) for flawless and visually lossless video compression quality.
- Supports in both extender and matrix modes for multi-display installations and video wall applications.
- The KE9952 / KE8952 feature PoE functionality, so the transmitters and receivers can receive power and communications over a single cable.

KE9900ST / KE8900ST / KE8900SR
Slim DisplayPort / HDMI KVM over IP Extender

The KE9900ST / KE8900ST / KE8900SR are compact and affordable high performance IP-based transmitters / receiver, which provide more flexible combinations to build up an over IP solution that enables users to locate computers in a secure and temperature-controlled environment, away from users’ workstations. Features include:

- Up to 1920 x 1200 @ 60Hz visually lossless and low latency video transmissions
- Can be paired with any KE Series for a cost-saving solution that stays within budget.
- Space-saving 0U design transmitter can be set on a desk, mounted on a wall or at the rear of a rack. supports DVI-D input.
The KE6910 / KE6912 DVI-D Dual Link Single Display KVM over IP Extenders have exclusive features that are designed for the air traffic control (ATC) industry with uninterrupted reliability and efficient monitoring and management for real time operation and decision-making. Features include:

- 2K x 2K video resolution (2048 x 2048 @ 60Hz) support
- Connection redundancy
- Adaptive fast switching within 0.3 seconds
- Authentication lock for automatic log-ins
- Power and network redundancy
- Disconnection alert

Both models support SFP fiber module for up to 10 km long-distance transmission, while the KE6912 features PoE functionality.
KE6900 / KE6940
Single Display /
Dual Display DVI KVM over IP Extender

KE6900ST
Slim Single Display DVD-D KVM over IP Transmitter

The KE6900 / KE6940 DVI KVM over IP Extender solution consists of a transmitter that connects to the computer and a receiver that provides console access from a remote location. This is perfect for use in any type of installation where you need the KVM console to be placed for your convenience, but you want the computers to reside in a secure location. Features include:

• Up to 1920 x 1200 @ 60Hz visually lossless and low latency video transmissions
• Ability to route audio, KVM, USB and serial data separately.
• The KE6900 supports one DVI-I input and the KE6940 supports two DVI-I inputs. The KE6900ST, a transmitter, supports DVI-D input.

Comparison

<table>
<thead>
<tr>
<th>Model</th>
<th>KE9950</th>
<th>KE9952</th>
<th>KE9900ST</th>
<th>KE8950</th>
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<th>KE6900</th>
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<td>HDCP</td>
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<tr>
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</tbody>
</table>

Note: *Supported by KE Matrix Management Software (CCKM)
Flexible Configuration to Meet Your Needs

The KVM over IP Matrix System is designed for the ultimate in flexibility when setting up and managing devices on a network. By utilizing a network connection, we provide a straightforward and easy installation process, followed by simple, intuitive management with the CCKM, which allows you to create various types of connections. Customized connections can be defined by you and set with user and group access permissions.

**Extender Mode**

One-to-One: This is the simplest setup; using a single transmitter to receiver connection that extends a computer’s distance from the keyboard, mouse and monitor. One-to-one setups can be directly connected by a Cat 5e/6 cable between two units – up to 100 meters. The KE995X / KE895X / KE691X series can also be connected via optical fiber cables for distances up to 10 kilometers. You can also manage point-to-point connections, set up over a LAN with no distance limitations, by assigning each device an IP address.

![One-to-One Setup Diagram]

**Extender Mode**

**Splitter Mode – Shared Connection**

One-to-Many: This setup allows a remote computer to be shared among multiple KVM receivers. Share and collaborate on projects with coworkers to increase productivity, exchange information and provide training. With the KE Series Extenders you can configure how to share a computer when multiple users access it: Exclusive (first user has control - others no access); Occupy (first user has control - others view only - when first is inactive - next user to move the mouse takes control); Share (all users have control at the same time); or View Only (all users can only view the content but have no control).

![Splitter Mode Diagram]
Switch Mode – Switching Access

Many-to-One: This setup over a network allows the KVM receivers to switch access between different computers individually and simultaneously; and allows the streaming of video, audio, USB, and serial connections from different computers.

Matrix Mode – Multicast efficiently and intelligently

Many-to-Many: This setup delivers the ultimate in flexibility and performance by allowing multiple KVM consoles to switch access between different computer resources across a network. This provides dynamic and flexible extender setups with superior video quality and smooth KVM operations without delays or lags. Utilizing network bandwidth efficiently is crucial for media post production, live video streaming, and monitoring control. Multicasting helps optimize network traffic by directing information to the designated receivers without increasing network bandwidth.

*For one-to-many, many-to-one, or many-to-many use, the installation requires a network switch with IGMP functionality.
More KVM over IP Matrix Advantages

IP Network Technology
Eliminates the distance restrictions of control room management; enables a faster response to mission-critical data center emergencies.

Flexible and Scalable
The ATEN KVM over IP Matrix System allows computers and stations to be deployed anywhere then the KE devices extend the connections flawlessly.

Dynamic Management
Makes it easy to administer all KE devices over a network with a new intuitive user-friendly web based GUI.

Intuitive Boundless Switching
ATEN’s KE Matrix Management Software provides an intuitive way to switch control to another receiver by simply moving your mouse cursor across the screen border and onto the target computer display. Move the mouse cursor in any direction to switch the control focus without limitations.

Stunning Video Quality up to 4K
ATEN’s advanced graphics processor delivers high-definition images up to 3840x2160 @ 30Hz (KE9952 / KE9950 / KE8952 / KE8950) at 36-bit color depth / 1920x1200 @ 60Hz at 24-bit color depth (KE6940 / KE6900 series) for stunning colors and razor-sharp video quality even with the most intense video streams.

Visually Lossless Compression for Flawless Graphics
KE Series Extenders deliver real-time true to life images to the receiver’s display using lossless compression so that the original data is perfectly reconstructed – technology that delivers the same video quality locally as is generated on the remote computer.

Advanced Color Space and All Popular Interfaces Supported
ATEN’s full KE product range supports both RGB and YCbCr color space and the most widely-used types of video interface, including DisplayPort, HDMI, and DVI, to fulfill every demand from any control room environment.

Single / Dual Output Options
The KE9950 / KE9952 / KE8950 / KE8952 / KE6900 / KE9900ST / KE8900ST / KE8900SR / KE6900ST models support an DisplayPort / HDMI / DVI display at each end; while the KE6940 supports two DVI displays at each end providing a dual-display output.
PoE Functionality
The KE9952 / KE8952 / KE6912 features PoE (power over Ethernet) functionality, so the transmitter and receiver can receive power and communications over a single cable.

Zero Delay Switching
ATEN’s unique Fast Switching technology features instant switching between different video resolutions on remote computers to a local display without latency. This provides immediate viewing of critical information for video surveillance or monitoring applications.

Range of Access Rights
Administrators can set four permission types to manage access requirements: Exclusive, Occupy, Share, and View only.

Immediate Share
Users can push and pull screen content to and from other consoles for collaboration, troubleshooting, or simply sharing.

Virtual USB
If the special functions of your keyboard or mouse are required but do not work with the console ports, you can plug the keyboard or mouse into the USB port and select “Generic USB Device Mode” to enable USB bypass and make those special functions available for console use.

Digital Audio Support
The KE99 / KE89 series supports full bass response for high quality 7.1 channel surround sound systems via DisplayPort / HDMI. HDMI audio can be extracted and stereo audio can be embedded.

Flexible Network Connectivity
All KE devices support unlimited distances via Cat 5e/6 over a LAN, while the KE995X / KE895X / KE691X series also supports connectivity via a SFP fiber optic transceiver module over an optical Ethernet network.

Video Wall Versatility
With unprecedented video quality and unmatched resolutions the video wall functionality allows users to create multiple video walls with up to 8 x 8 displays (64 displays).

Secure Data Transmission
The KE series utilizes AES-128 bit encryption to secure KVM / audio / RS232 / data before it’s transmitted over a network and decrypts on the receiver.

Blistering Fast Connectivity
With an integrated Gigabit chipset that allows a higher bandwidth throughput at up to 10x the speed of conventional 10/100 Mbps devices, we ensure a smooth network transmission that delivers high resolution graphics and crystal clear video flawlessly.
ATEN Real Visual Compression Technology

ATEN Real Visual technology is an advanced image compression technology that has been specially refined for utilization in the KE series of KVM over IP Extenders. It provides the highest rate of video data integrity for resolutions up to 4K@30Hz over a 1GB network switch, and provides high quality imaging for both text and natural scenery.

ATEN Real Visual compression is one of the most effective methods of image compression. By using ATEN Real Visual technology, the details of video in 4:4:4 color sampling can be preserved in the transmission process. The human eye is particularly sensitive to low frequency information (also called luminance) in images, and so because ATEN Real Visual compression boosts information in this area, effectively reducing distortion, this is what makes it especially useful in video applications over long distances.

The ATEN Real Visual technology compression process from the local transmitter to the remote receiver has a latency of about 1-2 frames. Compared to other kinds of compression, such as Standard H.264 that has a latency of more than 10 frames, ATEN Real Visual compression is therefore especially useful in KVM applications where it can mirror mouse movements with latency less than 32ms so that it does not impair the operator’s experience. ATEN Real Visual compression also produces a higher rate of image integrity than other kinds of compression. For example, it completely eliminates JPEG mosquito aliasing effects, and this is extremely important for word processing or applications that require the highest video quality possible (4:4:4), such as medical imaging.

**Video Quality Compression**

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ATEN Real Visual 4:4:4 Color Space
Achieves the best still graphic images with clear text and delicate lines

JPEG 4:2:0 Color Space
Generates undesirable blocking artifacts and color bleeding

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Dynamic Advanced Management - CCKM

ATEN’s KE Matrix Management Software (CCKM) provides IT administrators with tools to centralize the control and management of KE Series Extenders in their IT environment. Currently in its latest version with a new easy-to-use installation wizard, it allows simple, intuitive administration of all KE devices with an enhanced user-friendly, web-based GUI.

The CCKM’s Primary-Secondary architecture safeguards data transmissions through built-in redundancy factors, including automated database backup of Primary and Secondary servers and device configurations in addition to real-time database updating. Redundancy ensures that if the Primary server goes down, the KE Matrix system will remain functioning, since a redundant Secondary server maintains all the required services until the Primary server comes back up.

Through the CCKM, the KE Series Extenders provide advanced features for username and password authentication, user authorization and auto-detection of all transmitters and receivers. With secure transmissions in mind, the KE Series implement AES-128 bit encryption, while RADIUS, LDAP and AD ensure secure authentication.

**Dashboard**
Provides system status, KE connections, user login, schedule profiles and current sessions at a glance.

**Real-time Preview**
Monitor all transmitters simultaneous on one screen.

**Boundless Switching**
Switch between computers by moving the mouse across the display border.

**Intelligent Dual Video Output Management**
Using KE6940T, two video outputs from a PC can be delivered to multiple receivers as two separate sources. This is especially beneficial for single display receivers (e.g. KE6900R / KE8950R / KE8952R / KE9950R / KE9952R) because operators can switch to either one of sources from the OSD instead of accessing source 1 only.
Virtual Transmitter
Separate KVM, audio, USB, or RS-232 data streams from different transmitters can be combined into virtual transmitters and connected to multiple receivers.

![Diagram of virtual transmitter setup]

Easy Device Replacement
Device configurations are saved to help bypass the setup process when replacing transmitters/receivers with same settings.

Configuration Copy & Paste
Select any required configurations you want to keep, paste them to the new devices, and everything is ready to go.

Install Wizard
Detects all devices in the LAN automatically for quick installation.

Instant Link
Connect transmitters and receivers with a simple drag-and-drop.
Versatile Video Walls

ATEN’s KE Matrix Management Software allows you to create custom video walls with up to 8 x 8 displays in various configurations, providing flexible, scalable installations with predefined display content that is easy to schedule.

Single Source
A source from a single transmitter can be cropped into sections for flexible display configurations:

Multiple Sources
Multiple sources from multiple transmitters offer unlimited combinations:

Video Wall Synchronization
The KVM over IP Matrix System’s multicast functionality means it is able to broadcast packets. When the network switch receives the packets, it simultaneously sends them to all of the designated KE devices in the installation for display:
ATEN Solutions in Action
Utilities & Process Control Centers

In Utilities & Process Control Centers, operators continuously monitor and control constant flows of manufacturing, industrial control process, infrastructure/equipment status, and the dynamic change on demand to guarantee production and distribution in the best possible way. The challenges include providing an integrated real-time overview of process flow and equipment status for better situational awareness and decision making, along with a flexible and ergonomic system deployment for efficient yet managed access to devices. Information integration and visualization are especially important in these scenarios – from detailed network distribution information to topological overviews of the service area – in addition to redundancy/backup support to ensure continuous operations.
**Power Distribution Company, China**

A state-owned power distribution company in China was looking to relocate and upgrade their large-scale dispatch control center to centrally monitor and manage dual-display and single-display workstations while incorporating an additional KVM solution for 96 communication control servers.

**Challenges:**
- Desktop extension of multiple single and dual-view workstations distributed across different areas of the power distribution system.
- Providing local and remote data center access from the communication control department to the dispatch center (and an additional monitoring control room).
- Desktop monitor to video wall switching for 2D visualization of the power grid and geographic information.

**ATEN solution**

Utilized their existing, robust network infrastructure to provide remote access and extended control of both single and dual-view workstations and remote monitoring and management over IP.

- **KE6940T/R – Dual Display DVI KVM over IP Extender**
- **CCKM – KE Matrix Management Software**
- **KN4132V – 32-Port Cat 5 KVM over IP Switch with Virtual Media**
Control Rooms for City Surveillance, Italy

The State Police in Turin required a new control center to monitor crowd behavior and detect incidents during large public events. With the help of ErrElle Net, an industry specialist, several video walls and flexible workstations were set up using ATEN's KVM and AV signal distribution hardware.

ErrElle Net combined the forces of ATEN's hardware-based video wall processor with flexible workstations powered by a virtual KVM over IP matrix system. The State Police in Turin were able to improve operational flexibility while operators can monitor different urban areas and instantly communicate with agents in the field.

Challenges:

- Require mass media distribution with multiple video walls installed in three different control rooms for targeted surveillance operations.
- Operators need to remote access multiple computers, which are stored safely in a separate server area.
- Operators without any technical knowledge need to be able to control the video walls in each control room.
**ATEN solution**

Allowed simple, centralized access control of dual-display DVI servers in Full HD resolution. Provided secure, long distance data transmission and remote access of computers on the KVM installation via intranet. Mass media distribution through modular video matrix with many commonly used interfaces and seamlessly connects a large amount of screens and sources.

- CCKM – KE Matrix Management Software
- KE6940T/R – Dual Display DVI KVM over IP Extender
- KE6900T/R – Single Display DVI KVM over IP Extender
- VM3200 – 32 x 32 Modular Matrix Switch
- VK2100 – Control Box
- VE805R – HDMI HDBaseT-Lite Receiver with Scaler
Applications

The ATEN KVM over IP Matrix system is designed specifically to unlock the distance limitations and provide exceptional clarity for video intensive applications.

**Control and Monitoring**
The ATEN KVM over IP Matrix System provides versatile video walls for controlling multiple computers on one or many displays with multiple user access, meeting the demanding requirements of traffic control centers.

**Media Post Production**
The ATEN KVM over IP Matrix System can flawlessly distribute video up to 4K and digital audio to multiple workstations, facilitating effective collaboration in real time on a variety of media content.

**Command Centers**
The ATEN KVM over IP Matrix System can provide responsive, resilient yet secure operations for content integration, interagency collaboration, and mass-distribution in government or military agencies.

**Security and Surveillance**
The ATEN KVM over IP Matrix System eliminates the limitations and costs of surveillance software while offering versatile and customizable viewing layouts, allowing multiple local and remote access.

**Banking and Trading**
The ATEN KVM over IP Matrix System can multicast imaging and allow shared access to fulfill the needs of timely distribution of high quality images between hospital floors or across large facilities.

**Medical**
The ATEN KVM over IP Matrix System can multicast imaging and allow shared access to fulfill the needs of timely distribution of high quality images between hospital floors or across large facilities.

**Air Traffic Control (ATC)**
The ATEN KE6910 / KE6912 exclusive 2K x 2K resolution, authentication lock, and connection redundancy allow operators to make precise decisions with clear visual in real time with the highest reliability.
KVM over IP Matrix System
Extreme Flexibility, Absolute Control

Printed 03/2019 V2.0
PAPE-0089-K16

ATEN International Co., Ltd., established in 1979, is the leading provider of AV/IT connectivity and management solutions. Offering integrated KVM, professional AV, and intelligent power solutions, ATEN products connect, manage, and optimize AV/IT equipment in corporate, government, education, broadcasting and media, and transportation environments. ATEN has 570+ issued international patents and a global R&D team that produces a constant stream of innovative solutions, resulting in a comprehensive portfolio of products available worldwide.

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