

# PoE Application Note



## ❖ Digital Mining

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- ▶ Real-time Video Streaming and Monitoring Network for Autonomous Haulage System in Surface Mining
- ▶ CCTV Surveillance Solutions for Onboard Mining Locomotives
- ▶ Powering Up IP Surveillance and Wi-Fi Communications through Centralized Underground Security Monitoring

## ❖ Smart Rail

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- ▶ Communication Network for Tramway Ticketing System

## ❖ Intelligent Transportation

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- ▶ Smart City Traffic Improvement with Intelligent Transportation System
- ▶ Traffic Monitoring and Plate Recognition for Highway Surveillance
- ▶ PoE Networks for Intersection CCTV Surveillance

## ❖ Oil and Gas

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- ▶ Remote Pipeline Monitoring

## ❖ Power Substations

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- ▶ Security Monitoring Network for Power Substation Access Control

## ❖ Container Terminal Automation

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- ▶ Reliable PoE Networks for Crane OCR Systems

Lear more about Moxa PoE solutions, please visit: <https://event.moxa.com/mat/anz/poe-solutions/index.htm>



# Real-time Video Streaming and Monitoring Network for Autonomous Haulage System in Surface Mining

## Moxa Products



**TN-5500A Series**  
**EN 50155 M12 Managed PoE Switches**

- Up to 2 Gigabit ports with optional bypass relay function
- 8 PoE and Ethernet combo ports compliant with IEEE 802.3at/af
- 30 W maximum per PoE port with a total power budget of 120 W



**V2406C Series**  
**EN 50155 x86 Industrial Computers**

- Intel® Celeron®/Intel® Core™ i3/i5/i7 high-performance processors
- 2 hot-swappable HDD/SSD slots, 2 Mini PCIe expansion slots
- M12 connectors



**OnCell G4300-LTE4 Series**  
**Industrial LTE Cat 4 Secure Cellular Routers**

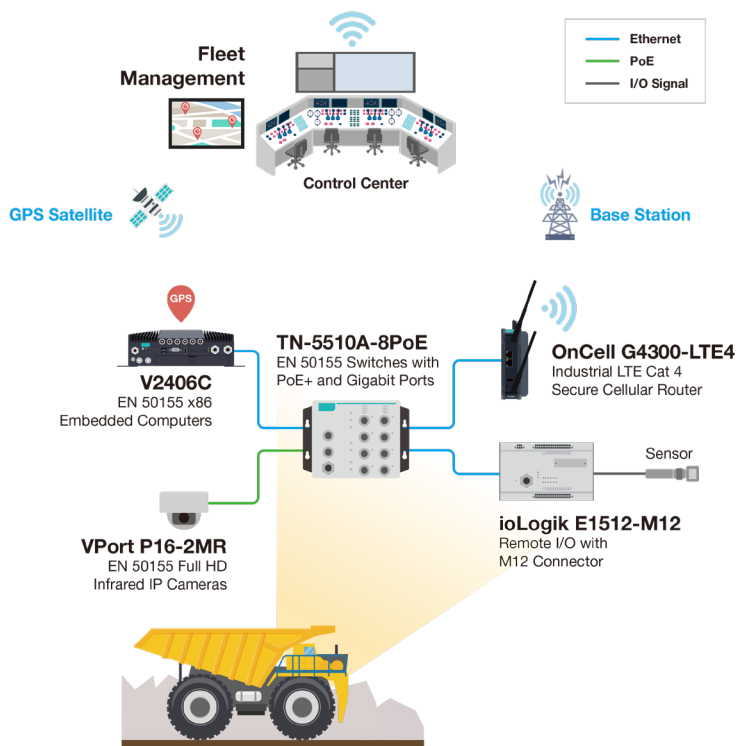
- Support global cellular bands, including those in America, Australia, Europe, Asia, and Japan
- Advanced cybersecurity features, including secure boot, VPN, firewall, and NAT
- Rugged and compact design

## Requirements

- A reliable cellular communication and networking solution for real-time monitoring of autonomous mining trucks
- A compact, robust design for on-board equipment that withstands constant vibration and harsh environments
- PoE switches for powering the powered devices (PDs) on trucks
- Ease of configuring and diagnosing

## Why Moxa

- High MTBF and five-year warranty
- Anti-shock and anti-vibration PoE switches, IP cameras, remote I/O, and industrial computers with M12 connectors, all with dust-tight IP rating
- OnCell LTE Cat 4 cellular router featuring VPN, firewall, and NAT functions to protect internal networks from unauthorized access
- Fanless design that delivers outstanding thermal performance
- Awarded multiple industry certifications
- ABC-01 Series configurators offer automatic network configuration backup and restoration, improving maintenance efficiency while reducing system downtime





# CCTV Surveillance Solutions for Onboard Mining Locomotives

## Moxa Products



**TN-5308A Series**  
EN 50155 M12 Unmanaged PoE Switches

- M12 connectors
- Up to 8 IEEE 802.3af compliant PoE and Ethernet combo ports
- IEEE 802.3/802.3u/802.3x support
- -40 to 75°C wide operating temperature range



**V2406C Series**  
EN 50155 x86 Industrial Computers

- Intel® Celeron®/Intel® Core™ i3/i5/i7 high-performance processors for network video recorder
- 2 hot-swappable HDD/SSD slots, 2 Mini PCIe expansion slots
- M12 connectors



**VPort P16-1MP-M12 Series**  
EN 50155 720P IP Cameras

- Clear color image output during day and night
- High quality image performance in changing lighting conditions



**VPort P16-1MP-M12-IR Series**  
EN 50155 720P IP Cameras

- Built-in IR illuminator and ICR for low lux environments
- Up to 3 H.264 or MJPEG independent video streams



**MPC-2101/2121 Series**  
EN 50155 x86 Industrial Panel Computers

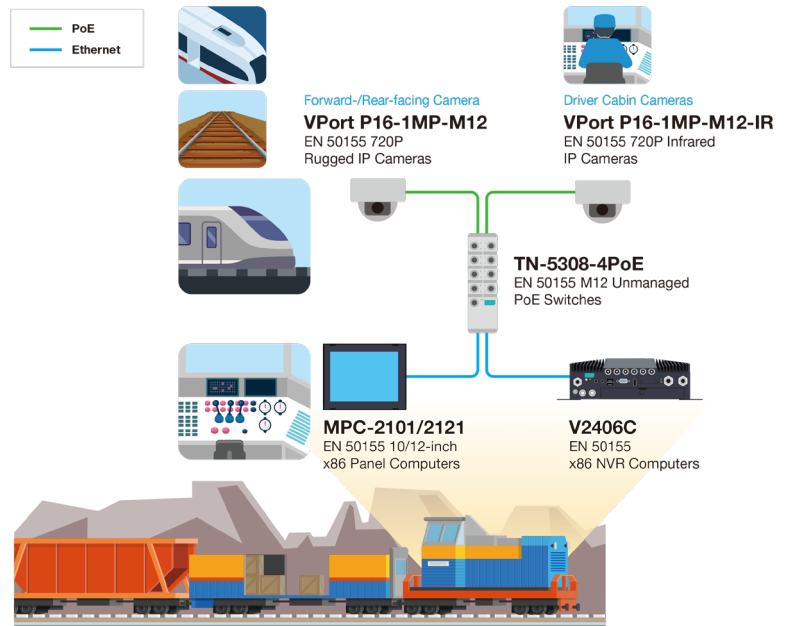
- 10/12-inch panel computer
- Intel Atom® processor E3845 1.91 GHz
- 1000-nit sunlight-readable LCD
- Wide operating temperature range of -40 to 70°C without a fan or heater

## Requirements

- Continuous CCTV monitoring with crystal-clear image quality and a wide dynamic range suitable for both dark and light environments
- High-performance video streams for smooth video surveillance
- Vibration, humidity, and dust-resistant devices with a temperature tolerance range of -40 to 75°C and ability to withstand harsh environments

## Why Moxa

- EN 50155 IP cameras provide superior image quality under any lighting condition
- Optimal streaming performance in low-bandwidth environments and easy monitoring of devices' operation status in the driver's cabin
- Compact, industrial-grade switches to power up cameras
- Computers, switches, IP cameras, and panel displays are all equipped with M12 connectors for enhanced anti-shock and anti-vibration performance
- High MTBF & five-year warranty







# Powering Up IP Surveillance and Wi-Fi Communications through Centralized Underground Security Monitoring

## Moxa Products



**MDS-G4028 Series**  
28G-port Layer 2 Full  
Gigabit Modular Managed  
PoE Switches

- PoE output 36 W per port, 720 W maximum power budget
- Hot-swappable modules for uninterrupted operations
- Rugged diecast design for harsh environments
- -40 to 75°C wide operating temperature range
- Dual power inputs



**AWK-4252A Series**  
Industrial IEEE 802.11ac  
Wireless AP/Client

- Concurrent dual-band Wi-Fi with aggregated data rates up to 1.267 Gbps
- Easy network setup with NAT
- Millisecond-level client-based dual band Turbo Roaming
- P68-rated; -40 to 75°C wide operating temperature range
- IEC 62443-4-2 certified



**MXview One Series**  
Industrial Network  
Management Software

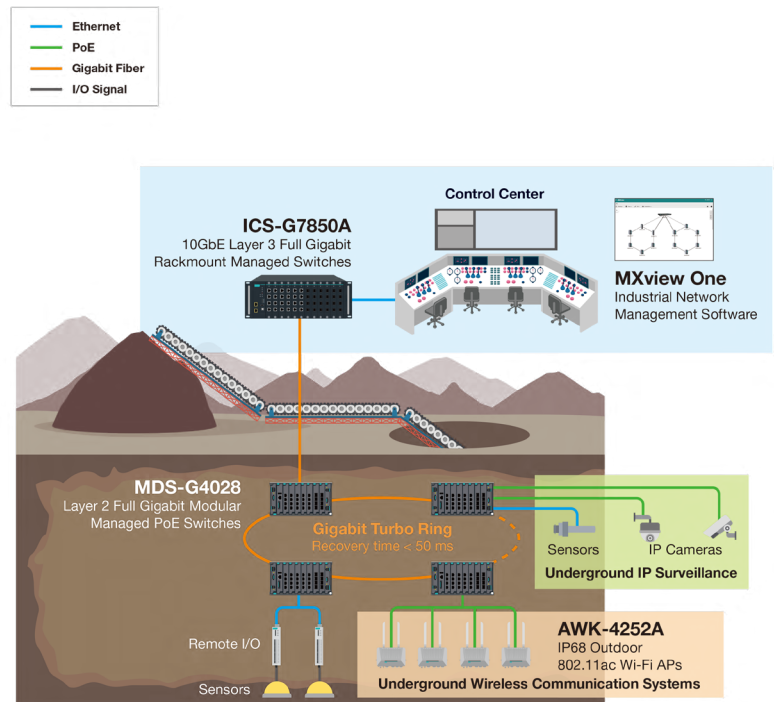
- Visualize the network topology, network traffic, and devices status in real time
- Real-time alert notifications
- Ease to manage and configure
- Monitor the status of Moxa AWK wireless devices with MXview Wireless add-on module

## Requirements

- PoE to connect and power IP cameras, security devices, and Wi-Fi access points (APs)
- Compact devices that fit in confined spaces
- Rugged design with high vibration resistance to withstand the environmental hazards of mining sites

## Why Moxa

- MDS-G4000 Series' modular, flexible design provides up to 24 PoE ports, which not only supply sufficient power to numerous IP cameras and Wi-Fi APs, but also allow for future expansion
- Rugged, compact housing that fits in confined cabinet spaces
- Robust diecast frame can withstand 30 G shocks and up to 10 G of force
- Hot-swappable modules that can be easily replaced without tools, minimizing downtime
- Wide operating temperature range suitable for outdoor environments





# Communication Network for Tramway Ticketing System

## Moxa Products



**RKS-G4028 Series**  
28G-port Full Gigabit  
Rackmount Managed  
PoE Switches

- Support IEEE 802.3bt PoE up to 90 W output per port
- Gigabit Turbo Ring and Turbo Chain (recovery time < 50 ms @ 250 switches), and STP/RSTP/MSTP for network redundancy
- Dual isolated power inputs
- High EMC immunity
- -40 to 75°C wide operating temperature range



**AWK-3252A Series**  
Industrial IEEE 802.11ac  
Wireless AP/Client

- Concurrent dual-band Wi-Fi with aggregated data rates up to 1.267 Gbps
- Easy network setup with NAT
- Millisecond-level client-based dual band Turbo Roaming
- Built-in 2.4 and 5 GHz band pass filter
- -40 to 75°C wide operating temperature range
- IEC 62443-4-2 certified



**V2403C Series**  
x86 Industrial Computers

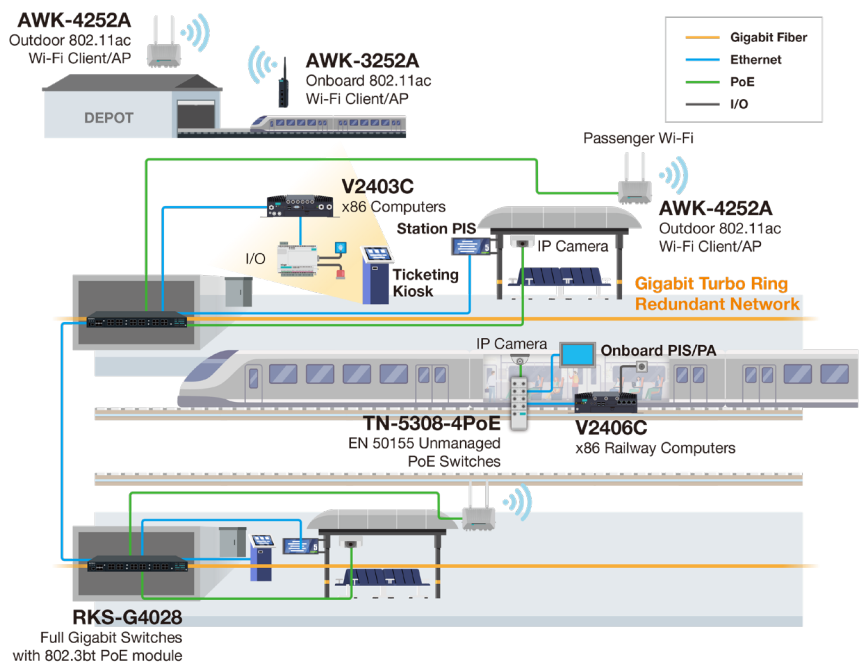
- Intel® Celeron®/Intel® Core™ i3/i5/i7 high-performance processors for network video recorder
- Dual display (HDMI, DP), 4 serial ports, 4 GbE ports, 4 DIs, 4 DOs, 4 USB, and 2 Mini PCIe slots
- Compliant with EN 50121-4 for wayside applications

## Requirements

- Long-distance data transmission from multiple ticketing kiosks for traffic analysis
- Redundant network connectivity to ensure uninterrupted system operations
- Industrial-grade durability to withstand onboard shocks and vibrations
- Cost-effectiveness

## Why Moxa

- RKS-G4028 Series' fiber module supports long-distance communication
- RKS-G4028 Series with optional 802.3bt PoE module supports 90 W power output per port
- Turbo Ring and Turbo Chain technologies support Gigabit network recovery time of less than 50 ms at 250-switch load
- RKS-G4028 Series features a wide operating temperature range from -40 to 75° C
- EN 50121-4 certified to withstand extreme wayside conditions
- Complete communication networks with network infrastructure, edge connectivity, and computing solutions to ensure interoperability and reduce system integration costs





# Smart City Traffic Improvement with Intelligent Transportation System

## Moxa Products



**EDS-4012 Series**  
8+4G-port Managed Ethernet Switches with 8 802.3bt PoE Ports Option

- High-capacity 90 W IEEE 802.3bt PoE per port
- Fast Ethernet switches with the option for 4 Gigabit SFP uplink ports
- Fast recovery time (< 20 ms @ 250 switches)
- Compliant with the IEC 62443-4-2 cybersecurity standard
- Dual power inputs



**V2403C Series**  
Rugged IIoT Embedded Computer

- Dual display (HDMI, DP), 4 serial ports, 4 GbE ports, 4 DIs, 4 DOs, 4 USB, and 2 Mini PCIe slots
- Cellular and Wi-Fi 5 wireless capability with Gigabit Ethernet
- Certified by Azure and AWS
- Power ignition management
- -40 to 70° C wide operating temperature range



**MXview One Series**  
Industrial Network Management Software

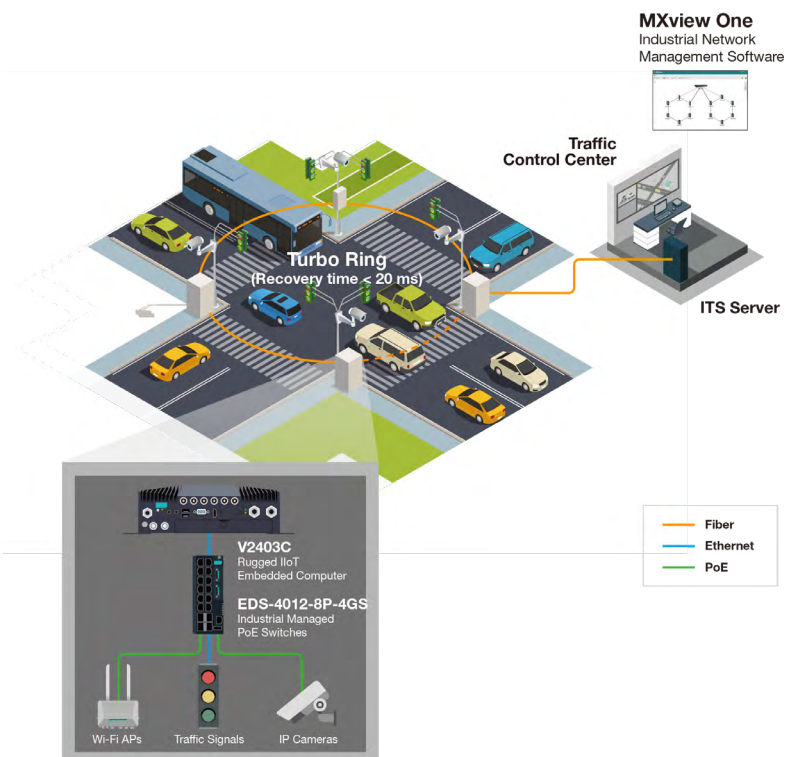
- Visualize the network topology and status for maximum visibility
- Real-time alert notifications to respond swiftly and minimize downtime
- Easily manage and configure Moxa network devices remotely

## Requirements

- Effective traffic management solution for communication between vehicles, operators, and onsite control stations
- Remote monitoring as part of onsite failure detection
- Real-time data collection from various roadside sensors
- Robust design that withstands outdoor harsh environment

## Why Moxa

- Comprehensive solution for real-time response
- Moxa's V2403C Series is a cutting-edge computing platform that acts as a roadside unit (RSU) for collecting data from sensors and surveillance videos from cameras. Via Moxa's EDS-4012 Series managed switches, it also serves as a bridge between edge computing devices and the ITS server for real-time communication.
- Moxa's EDS-4012 Series managed PoE switches supply adequate power to IP cameras for surveillance, and to Wi-Fi APs for municipal free internet service.
- Moxa's Turbo Ring technology ensures a network recovery time of less than 20 ms and STP/ RSTP/MSTP offers network redundancy, thereby helping maintain stable networks for real-time communication.
- Industry certified for secure and stable operation under harsh conditions







# Traffic Monitoring and Plate Recognition for Highway Surveillance

## Moxa Products



### EDS-4008 Series

**8-port Managed Ethernet Switches with Options of 4 802.3bt PoE Ports or 4 Gigabit Uplink Ports**

- Support for IEEE 802.3bt PoE for up to 90 W output per port
- Extensive power input options
- Compact and flexible housing
- Compliant with IEC 62443-4-2 industrial cybersecurity standards
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), and RSTP/STP for network redundancy



### MXview One Series

**Industrial Network Management Software**

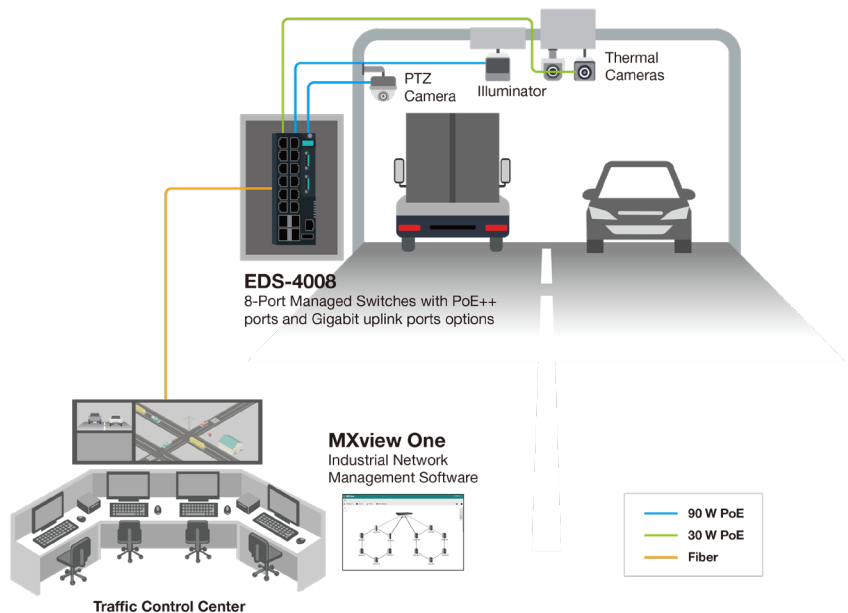
- Visualize the network topology and status for maximum visibility
- Real-time alert notifications to respond swiftly and minimize downtime
- Easily manage and configure Moxa network devices remotely

## Requirements

- High-bandwidth fiber network backbone to transmit high volumes of data back to the control center
- High tolerance for outdoor operations
- 802.3bt PoE and high power PoE for powering outdoor PTZ IP cameras
- Network redundancy with secure data encryption capabilities
- Real-time monitoring of events and network status

## Why Moxa

- High bandwidth supports HD CCTV throughput
- Fanless design that features a wide operating temperature range from -40 to 75°C
- 90 W PoE for PTZ cameras (Smart PoE automatically configures the switch for up to 90 W power supply as required)
- Supports Turbo Ring and Turbo Chain featuring less than 20 ms network redundancy
- NEMA TS2 certification
- MXview One Series real-time network management tool provides intuitive, easy-to-use visualization tailored for automation engineers





# PoE Networks for Intersection CCTV Surveillance

## Moxa Products



**EDS-P206A Series**  
6-port Unmanaged Ethernet  
Switches with 4 IEEE  
802.3af/at PoE Ports

- IEEE 802.3af/at compliant PoE and Ethernet combo ports
- Maximum 30 W output per PoE port
- 12/24/48 VDC redundant power inputs
- Intelligent power consumption detection and classification
- -40 to 75°C wide operating temperature range



**SPL-24 Series**  
PoE Splitters

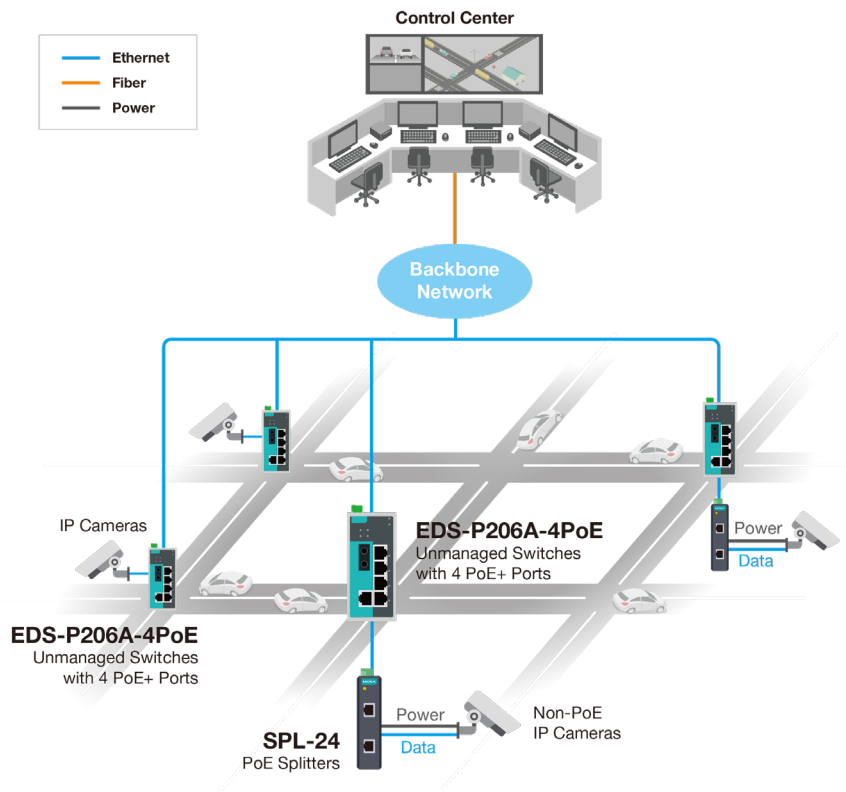
- IEEE 802.3af compliant; splits power and data from PoE equipment
- Support maximum output power of 12.95 W at 24 VDC
- Short-circuit protection for power output
- -40 to 75°C wide operating temperature range

## Requirements

- HD CCTV surveillance systems to be installed as part of a nationwide municipal public safety program with a limited budget
- Both PoE and existing non-PoE IP cameras for real-time intersection traffic monitoring
- Limited space for additional installation and cabling
- Systems must withstand outdoor conditions

## Why Moxa

- EDS-P206A-4PoE Series unmanaged PoE switches and SPL-24 Series PoE splitters offer cost-effective PoE solutions that can be implemented at a national scale and integrate with existing devices
- Wide operating temperature range from -40 to 75° C and high MTBF to withstand extreme weather conditions
- Small form factor offers installation flexibility







# Remote Pipeline Monitoring

## Moxa Products



**MDS-G4020 Series**  
20G-port Layer 2  
Full Gigabit Modular  
Managed PoE Switches

- PoE output 36 W per port, maximum 720 W power budget
- Hot-swappable modules for uninterrupted operations
- Rugged die-cast design for harsh environments
- -40 to 75°C wide operating temperature range
- Dual power input
- HTML5 dashboards for easy configuration
- Gigabit Turbo Ring and Turbo Chain network redundancy (recovery time < 50 ms @ 250 switches)



**MXview One Series**  
Industrial Network  
Management Software

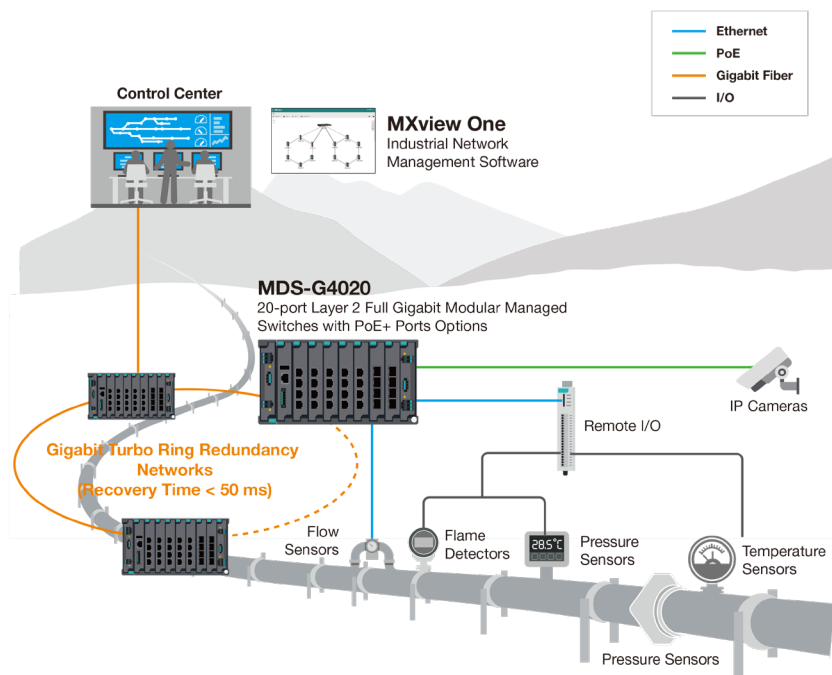
- Visualize the network topology and status for maximum visibility
- Real-time alert notifications to respond swiftly and minimize downtime
- Easily manage and configure Moxa network devices remotely

## Requirements

- Long-distance Gigabit network backhaul to connect subsystems in the field
- Reduce power cabling issues for remote IP cameras and other PDs
- Reliable, high-density Ethernet switches with multiple interfaces that can aggregate real-time video, voice, and data from remote subsystems
- Resilient industrial-grade devices that can operate in harsh conditions
- Din-rail design to fit inside cabinets

## Why Moxa

- Modular switches with fiber interfaces to connect pipeline subsystems to the remote control center over long distances
- Adequate PoE power supply
- Gigabit Turbo Ring supports network recovery time less than 50 ms
- Fanless, compact, and rugged ATEX Zone 2-and C1D2-certified design featuring DIN-rail installation
- MXview One Series network management software offers real-time monitoring of network status from the control center





# Security Monitoring Network for Power Substation Access Control

## Moxa Products



### EDS-P510A Series 8+2G-port Gigabit Managed PoE Switches

- 8 built-in PoE ports compliant with IEEE 802.3af/at
- Up to 36 W output per PoE+ port
- 3 kV LAN surge protection
- PoE diagnostics for powered-device mode analysis
- 2 Gigabit combo ports for high-bandwidth and long-distance communication



### IKS-6728A Series 24+4G-port Gigabit Rackmount Managed Ethernet Switches

- Gigabit Turbo Ring and Turbo Chain (recovery time < 50 ms @ 250 switches), and STP/RSTP/MSTP for network redundancy
- 1 kV LAN surge protection
- 4 Gigabit combo ports for high-bandwidth communication
- 8 built-in PoE ports compliant with IEEE 802.3af/at, with a 36 W maximum output per PoE+ port (IKS-6728A-8PoE)



### MXview One Series Industrial Network Management Software

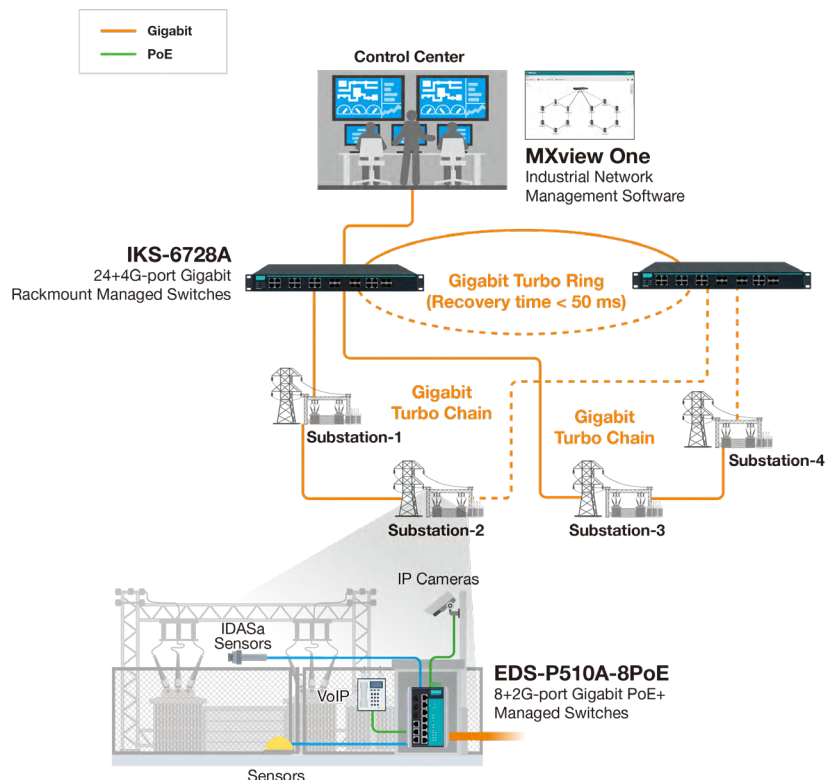
- Visualize the network topology and status for maximum visibility
- Real-time alert notifications to respond swiftly and minimize downtime
- Easily manage and configure Moxa network devices remotely

## Requirements

- Millisecond-level recovery networks to connect more than 150 substations nationwide
- 24/7 reliability for continuous security monitoring
- Connectivity and availability during EMI and surge conditions
- Reduce power cabling issues for remote IP cameras and VoIP
- Real-time monitoring and management to reduce costly visits to remote unmanned locations

## Why Moxa

- EDS-P510A Series PoE switches allow for high bandwidth, long-distance transmission as well as PoE+ power supply to remote powered devices
- EDS-P510A Series and IKS-G6728A Series support Turbo Ring and Turbo Chain network redundancy
- Industrial-grade products designed to withstand harsh operating conditions
- Embedded Smart PoE function enables the EDS-P510A Series PoE switches to detect failures and auto-reboot powered devices to ensure continuous operation





# Reliable PoE Networks for Crane OCR Systems

## Moxa Products



**EDS-P510A Series**  
8+2G-port Gigabit Managed PoE Switches

- 8 built-in PoE ports compliant with IEEE 802.3af/at
- Up to 36 W output per PoE+ port
- 3 kV LAN surge protection
- PoE diagnostics for powered-device mode analysis
- 2 Gigabit combo ports for high-bandwidth and long-distance communication



**EDS-P506E Series**  
4+2G-port Gigabit Managed Ethernet Switches with 4 PoE Ports Compliant with IEEE 802.3af/at

- Built-in 4 PoE+ ports support up to 60 W output per port
- Wide-range power inputs of 12/24/48 VDC
- Smart PoE functions for remote power device diagnosis and failure recovery
- 2 Gigabit combo ports for high-bandwidth communication



**MXview One Series**  
Industrial Network Management Software

- Visualize the network topology and status for maximum visibility
- Real-time alert notifications to respond swiftly and minimize downtime
- Easily manage and configure Moxa network devices remotely

## Requirements

- PoE switches to overcome wire-deployment obstacles at height or on the ground
- Each port supplies 60 W power to high-resolution cameras, including PTZ cameras, for accurate container recognition
- Robust switches must withstand outdoor environments, particularly constant exposure to humid and salt-rich coastal air
- High-reliability networks to ensure real-time image processing and transmission
- User-friendly network management software that allows operators to manage the crane OCR system network remotely and effectively

## Why Moxa

- Complete PoE switches portfolio that satisfies all IP camera power sourcing requirements
- To power up multiple cameras, the EDS-P506E-4PoE Series supports up to four 60 W PoE ports with a 180 W power budget
- High EMI protection, a fanless design for harsh outdoor environments, and a wide operating temperature range from -40 to 75°C
- Smart PoE function supports automatic powered device (PD) failure detection and rebooting for network recovery, eliminating or minimizing the need for manual inspection or maintenance
- MXview One Series network management software features real-time visualization of network status to improve crane OCR system reliability

