



Defend Your Industrial Networks

Visit www.moxa.com/Security to learn more



Your Trusted Partner in Automation

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With over 30 years of industry experience, Moxa has connected more than 57 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.

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Build Future-ready Network Infrastructure



Network Management Suite



Industrial Secure Routers



Full Gigabit Switches



Industrial Wireless



Industrial Smart Switches

Build Future-ready Network Infrastructure

Enabled by connected networks, digitalization accelerates data collection and utilization to boost efficiency, innovation, and growth in every industry. Network connectivity is key to digital success, laying the core foundation for a smart future.

To successfully leverage insights from big data, every industry relies on network infrastructure to interconnect more people, processes, and machines to improve operational performance, flexibility, reliability, and cost-efficiency in increasingly complex systems.

Futureproof Industrial Network Solutions

To address the growing challenges of network size, complexity, and cybersecurity threats, Moxa provides industrial network infrastructure that consolidates high-performance, layered security, rugged features, protocol compatibility, and hassle-free easy-to-use software tools to simplify the complex integration of disparate and legacy systems.

Ensure that your networks can take on future challenges by leveraging Moxa's latest technologies and solutions to enhance your network capability, scalability, and flexibility. Moxa's large portfolio of Ethernet solutions helps customers optimize industrial network infrastructure to achieve best-in-class reliability, security, efficiency, and simplicity for IIoT network deployments, upgrades, and expansions, even in harsh environments.

Technology Showcases

Time-Sensitive Networking

Time-Sensitive Networking (TSN) is an update to IEEE Ethernet that enables time synchronization and deterministic Ethernet communication on a single network infrastructure.



Moxa is actively participating in the evolution of TSN technologies, paving the way to IIoT/Industry 4.0 with unified standard Ethernet infrastructure for our customers. Moxa has also participated in several interoperability plugfests at the Industrial Internet Consortium (IIC), Edge Computing Consortium (ECC), LNI 4.0, and Alliance of Industrial Internet (AII).

Highlights

New Additions



See page 9

10GbE in Extreme Environments

Your field networks deserve 10GbE uplinks. Moxa's ICS/1U Series 10GbE switches have an extended operating temperature range of -40 to 75°C to meet the growing number of IIoT connectivity applications in harsh environments.

Optimal Modularity

Moxa optimizes your network connectivity with a compact, modular Ethernet switch for field-proven reliability to meet ever-changing demands on performance, availability, security, and integration, while minimizing lifecycle costs from installation to maintenance.



See page 11

Low-power IIoT Over Cat 1 LTE

The new OnCell 3120-LTE-1 Series enables a massive leap in M2M/IIoT connectivity by connecting your serial and Ethernet devices to 4G LTE networks and consuming less than 40 mW of power in standby mode.

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Security

Defense-in-depth Cybersecurity

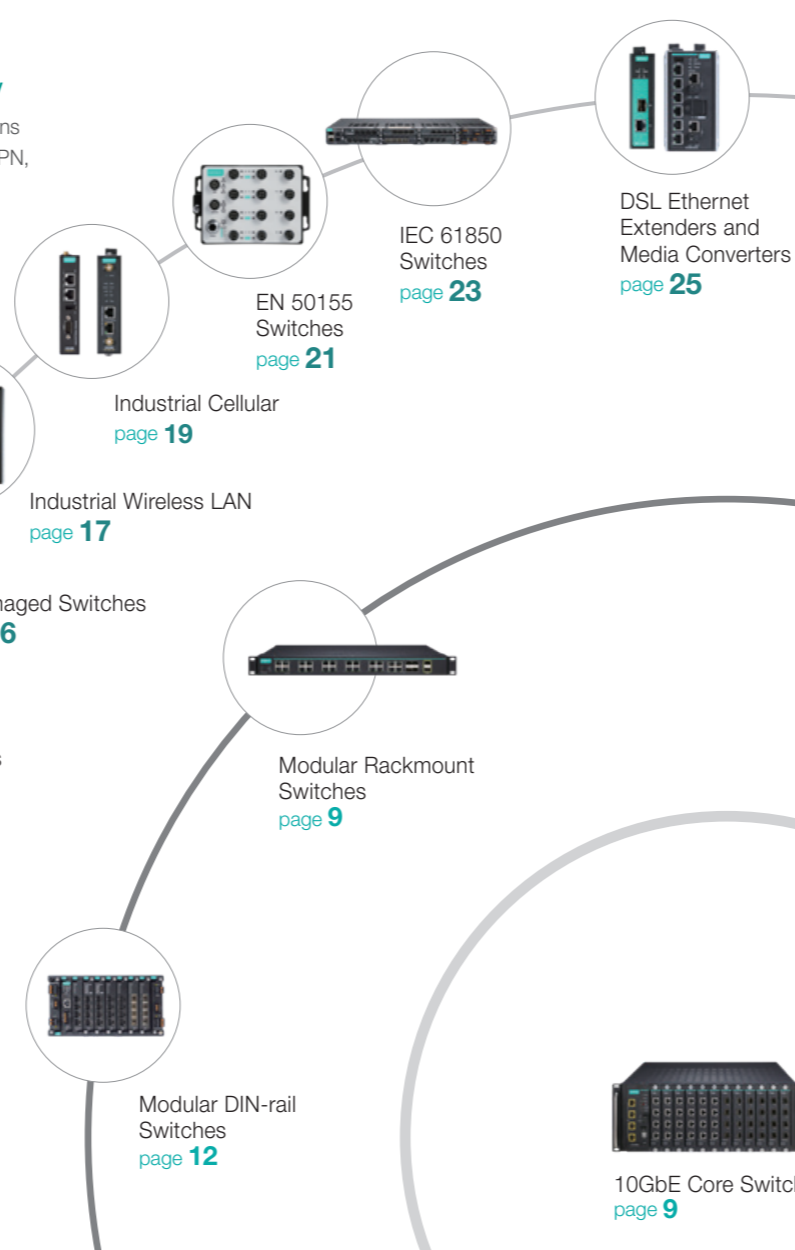
- Network devices with security functions
- Network security with firewall, NAT, VPN, and device-level security protection
- Network management for optimized security profiling and real-time event notifications

Secure Routers

page 4

Secure Remote Access

page 5



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Connectivity

Industrial Ethernet Communication Backbone

- High-performance LANs and WLANs composed of 10GbE/GbE/4G LTE/802.11n/PoE/Fiber/DSL connections
- Millisecond-fast network redundancy
- Millisecond-fast wireless handoff times
- Industrial Ethernet interoperability
- Web/graphic UIs
- Industry-proven reliability



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Manageability

Automation-friendly Network Management

- Easy mass deployment
- Live network monitoring
- Easy event tracking
- Mobile app and alerts
- RESTful APIs for easy integration



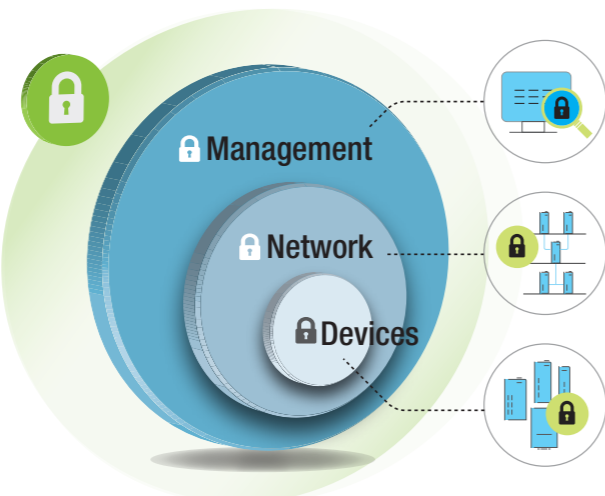
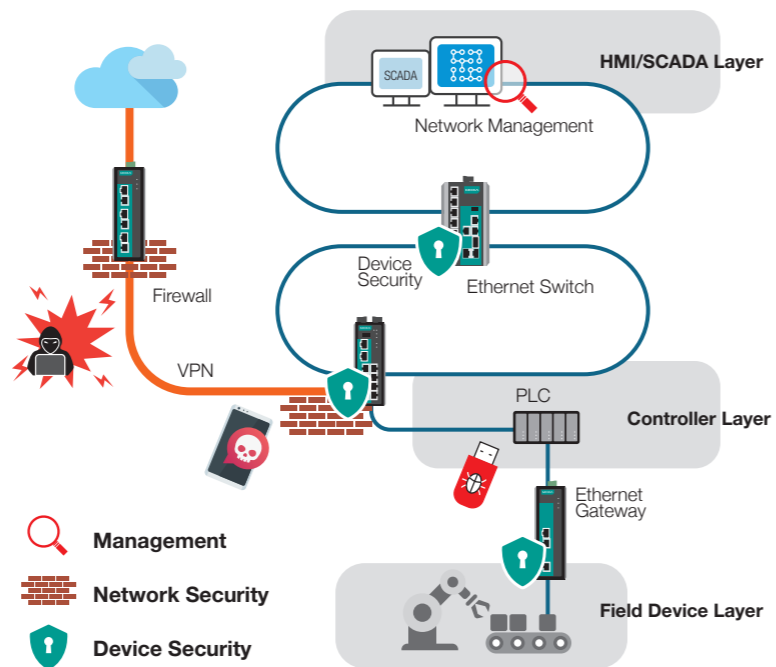
10GbE Core Switches page 9

Defend Industrial Networks at all Levels

No network is immune from cyberthreats. Additionally, there are many different kinds of cyberthreats, and they can endanger industrial control systems (ICS) in different ways.

Security risks can come from any point in the network. Whether they come from unauthorized or unintended access or from internal or external sources, ICS managers need to implement deep and extensive defenses to protect operational networks against threats and losses.

Moxa provides a defense-in-depth framework composed of WAN/LAN filters, data encryption, access control security, and management tools across a variety of industrial routers, firewalls, VPNs, switches, and diverse Ethernet infrastructure devices to help ICS customers and system integrators protect their networks with multi-layered security.



Security Management

Defined policies and security management

- MXview / MXview ToGo
- MXconfig

Secure Network Infrastructure

Defense-in-depth cybersecurity for IACS Networks

- Industrial secure routers
- Secure remote access

Device Security

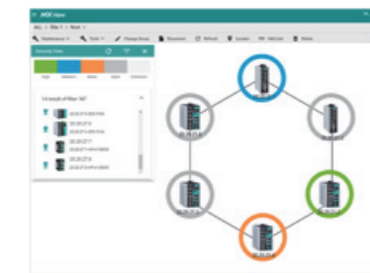
Hardened devices with embedded security

- Industrial Ethernet switches
- Industrial serial device servers
- Industrial protocol gateways

Management Level

Real-time Management

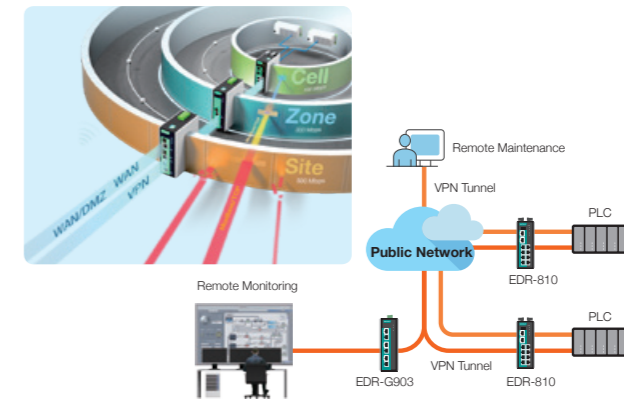
With MXview's Security View, network administrators can oversee and strategically optimize the security of the network using Security Wizard, which facilitates easy mass configuration of the security settings of Moxa's network devices.



Network Level

Firewall Protection

The EDR Series industrial secure routers create security segments that divide your network into isolated zones and cells to restrict untrusted access and traffic. The EDR family also performs deep Modbus TCP inspection to block malicious attacks.



VPN Tunnels for Secure Remote Access

Standard VPN tunnels provide constant secure connections. The EDR Series provides encrypted IPsec VPN tunnels or OpenVPN clients for secure remote access between field and remote applications, such as oil and gas, power, and ITS networks.

Device Level

Device Security

Device security is the first step to keeping your network secure. Moxa's Ethernet switches, routers, gateways, and wireless devices have enhanced security features, based on the IEC 62443 standard, that protect devices and strengthen network security.



As the number of cyberincidents on ICS/SCADA networks continues to grow, industrial networks are no longer immune to internal or external cyberthreats.

Moxa Offers

- Industrial switches with security functions
- Industrial firewalls for LAN protection
- Industrial VPN for secure end-to-end access
- Industrial NMS for real-time event notifications

Moxa Offers

All-in-one Secure Routers



EDR-G903
3 GbE 3-in-1 Secure Router

- 2 WANs, 1 DMZ, firewall/NAT/VPN
- 500 Mbps firewall throughput
- 150 Mbps VPN throughput



EDR-G902
2 GbE 3-in-1 Secure Router

- 1 WAN, firewall/NAT/VPN
- 300 Mbps firewall throughput
- 60 Mbps VPN throughput



EDR-810
2 GbE + 8 FE Secure Router/Switch

- 1 WAN, firewall/NAT/VPN
- 110 Mbps firewall throughput
- 17 Mbps VPN throughput

Secure Remote Connections for Maintenance and Collaboration

Remote access to PLCs, HMIs, and automation networks is becoming more common for many machine builders, industrial plants, and critical facilities. Moxa provides secure remote access with end-to-end VPN encryption to protect your remote business interactions.

To add an extra layer of security for remote collaboration, Moxa offers secure industrial VPN routers and cloud-based secure remote access solution.

Both solutions provide strong encryption and secure tunneling between your local and remote systems, leading to fewer site visits, better efficiency, and improved services for remote collaboration and predictive maintenance from anywhere.

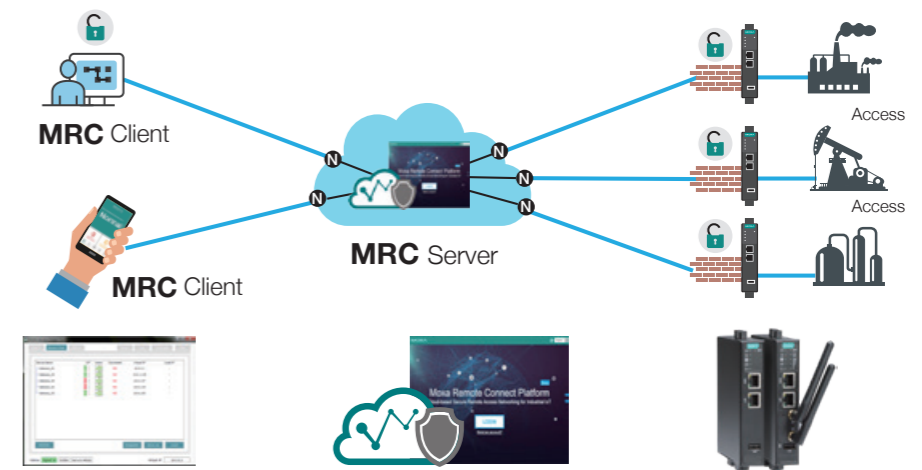


Cloud-based Secure Remote Access

The Moxa Remote Connect (MRC) provides easy and flexible remote access that includes the MRC client software, industrial MRC gateways, and a cloud-based server.

The MRC helps establish scalable secure remote connections between field machines and off-site maintenance engineers for remote monitoring, diagnosis, and troubleshooting purposes, and are ideal for predictive maintenance applications.

- Plug-and-play auto-configuration
- On-demand remote connections controlled by field site operators
- An embedded firewall allows remote access under whitelist control
- Firewall-friendly with IT policy compliance
- Smart IP mapping for easy field IP management



MRC Client

A Windows-based application installed on laptops/computers to build a secure link with an MRC server.

- Supports Windows 7/10
- Downloadable from Moxa's website

MRC Server

A cloud based server that can manage scalable remote connections between MRC gateways and MRC clients.

- Enables scalable VPN connections
- Support for running on a public cloud platform or virtual machine platform

MRC Gateways

Connect Ethernet-based machines to a MRC server through secure tunnels over the Internet.

- Ethernet or LTE WAN connectivity
- Up to 25 local devices or site-to-site connection
- -40 to 75°C operating temperature (-T models)



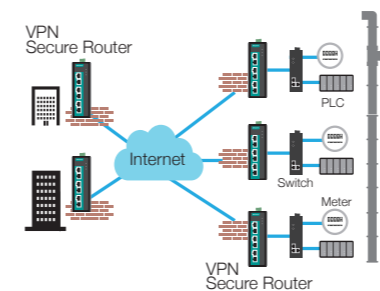
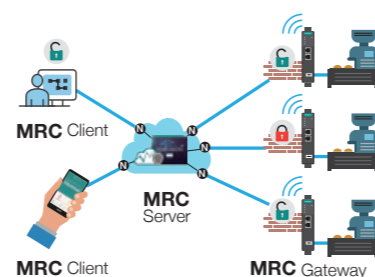
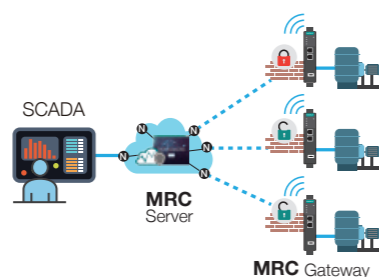
It is better to be safe than sorry when it comes to granting remote access to company networks and assets.

► Moxa Offers

- IPsec VPN for site-to-site access
- OpenVPN for P2P VPN star topologies
- Cloud-based platform to manage secure remote access

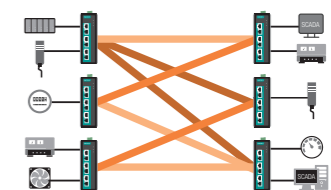
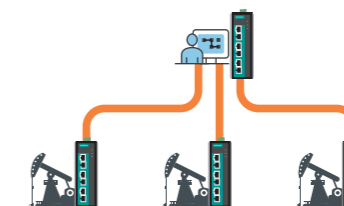
Three Scenarios

Use Case	One-to-many Data Acquisition for a Wastewater Plant	Many-to-many Remote Maintenance for Bakery Machines	Site-to-site Remote Monitoring for a Gas Transfer Station
Needs	<p>A wastewater plant needed to collect data for water temperatures and tank levels of each remote pumping station.</p> <ul style="list-style-type: none"> • Permanent and stable remote connections • Easy deployment without advanced IT skills 	<p>A bakery machine manufacturer wanted to improve efficiency for remote machine maintenance.</p> <ul style="list-style-type: none"> • Remote access controlled by the local bakery machine operator • Multiple mobile remote access connections needed for service efficiency 	<p>A gas pipeline system required VPN tunnels between gas stations and the control center to secure data transmissions.</p> <ul style="list-style-type: none"> • Multiple site-to-site VPN links • L2 packet transmission through VPN • Certified for use in oil and gas applications
Moxa's Solutions	<p>The plant customer installed cellular MRC gateways at each pumping station to build wireless VPN tunnels between the SCADA system in the control center and remote sites.</p>	<p>Each machine integrates an MRC gateway for machine operators to enable or disable remote access connections. Maintenance staff only need to use the MRC client software to access machines for monitoring and maintenance from anywhere.</p>	<p>The EDR Series builds persistent secure tunnels for both local network security and remote data authentication.</p>



Standard VPN Solutions

Moxa provides industry-certified secure routers with standard VPN technologies to help users deploy secure data transmission tunnels in critical environments.



OpenVPN supports star topologies, which allow users achieve secure data transmission between multiple networks with fewer VPN servers. In addition, OpenVPN supports L2 packet transmission through secure tunnels for enhanced security.

IPsec supports mesh network topologies, which can provide users with secure data transmissions in high performance environments.



EDR Series Industrial Secure Routers

	OpenVPN	IPsec VPN
Concurrent VPN Tunnels	Client Mode: max. 2 external servers Server Mode: max. 5 external clients	EDR-G903: Max. 100 IPsec tunnels EDR-G902: Max. 50 IPsec tunnels EDR-810: Max. 10 IPsec tunnels
Encryption	AES-128/192/256 CBC, Blowfish CBC, DES CBC, DESEDE3 CBC	3DES, AES-128, AES-192, AES-256, DES
Protocols	OpenVPN (client and server), UDP, and TCP Tunnel mode (routing) and TAP mode (bridge)	IPsec, L2TP (server), PPTP (client)

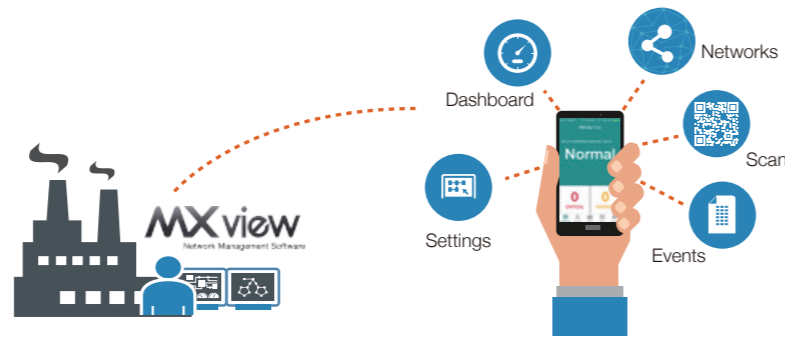


Every minute of system downtime is costly.

MXstudio provides real-time visibility to enable immediate troubleshooting and remediation without the need for advanced IT expertise.

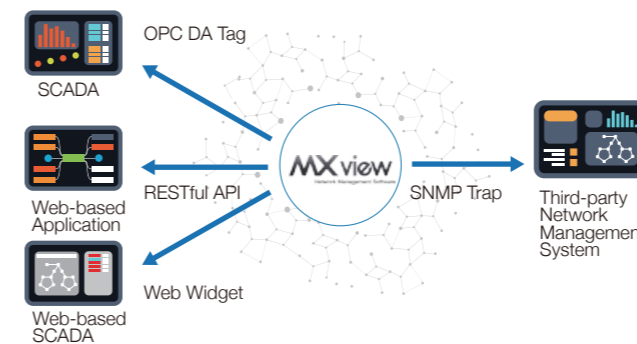
Gain Visibility to Ensure Operational Availability and Security

Network visibility is more crucial than ever with more and more interconnected devices in industrial applications. MXstudio is an industrial network management software suite that provides visibility of operation technology (OT) for improved operational management and efficiency throughout network deployment, monitoring, maintenance, and diagnostics.



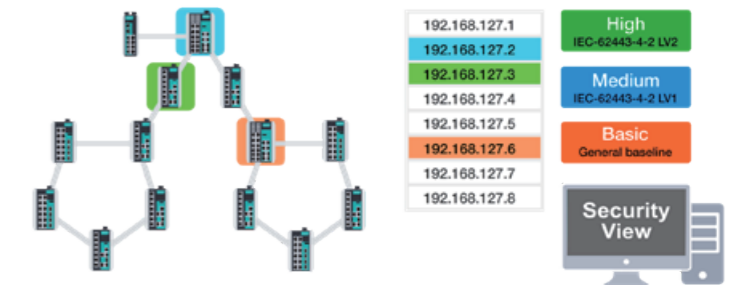
Tools To Enrich Your Dashboards

- Displays a network summary on a dashboard
- Supports a web widget and RESTful APIs to supply network data to your web-based application dashboard
- Provides OPC DA tags for SCADA/HMI integration
- Event traps for third-party NMS collaboration



Optimizes Your Security Settings

With Security View, network managers can see the security profile, and then use Security Wizard to adjust device security to provide better protection to the network.



► Moxa Offers

- Live topology monitoring
- Easy event tracking
- Mobile app and alerts
- Network health updates sent to SCADA systems
- Mass configuration to save time and reduce errors
- A dashboard view with a network summary



Trial Download

Start with the free 20-node trial version now

Deployment

Deploying devices one-by-one is both time-consuming and error-prone.

10x Faster

MXconfig speeds up network deployment through group configuration, duplication, and link sequence detection.

MXconfig

Industrial Network Configuration Tool

- Configuration is 10x faster than deploying switches one-by-one (with 100 switches)
- Link sequence detection eliminates manual configuration errors
- Security View and Security Wizard provide optimized security profiling

Operation

Monitoring network health and traffic and responding to events is resource intensive.

Smart Visualization

MXview provides a real-time visual overview of physical network topologies that OT engineers can view and click to manage the network easily.

MXview

Industrial Network Management Software

- Automatic topology visualization
- Security View for viewing the security level of network devices
- Security Wizard for device security setups and updates
- A network management dashboard to quickly view network status
- Easy integration with third-party management systems

Maintenance

Network backups require repetitive manual tasks that increase maintenance time, costs, and the risk of errors.

One-click Backup

MXview's Configuration Center supports one-click bulk configuration backup, allowing scheduled backups, firmware upgrades, and selectable rollbacks for easy maintenance.



- Scheduling periodic configuration backups
- Comprehensive reports, including inventory, traffic, and availability reports

Troubleshooting

Unstructured troubleshooting leads to delays and incorrect network diagnoses, wasting time and resources.

Quick Diagnostics

MXview facilitates event search and playback functions for easy event tracking. MXstudio's N-Snap utility enables one-click device information collection to help engineers identify and analyze changes to the network.

N-Snap

Industrial Network Snapshot Tool

- A standalone utility to take network snapshots for quick troubleshooting
- Automatically compares network and device data, and highlights the differences

Remote Monitoring

Having automation engineers monitor network screens 24/7 is inefficient and costly.

Mobile Monitoring

MXview ToGo sends alerts straight to your mobile phone to keep you posted on network status and events.

MXview ToGo

Mobile Monitoring Tool

- Real-time notifications to help reduce downtime
- Quickly check the status of networks and devices
- Search and map devices with one click



Utilize 10GbE to Empower Network Edge Performance

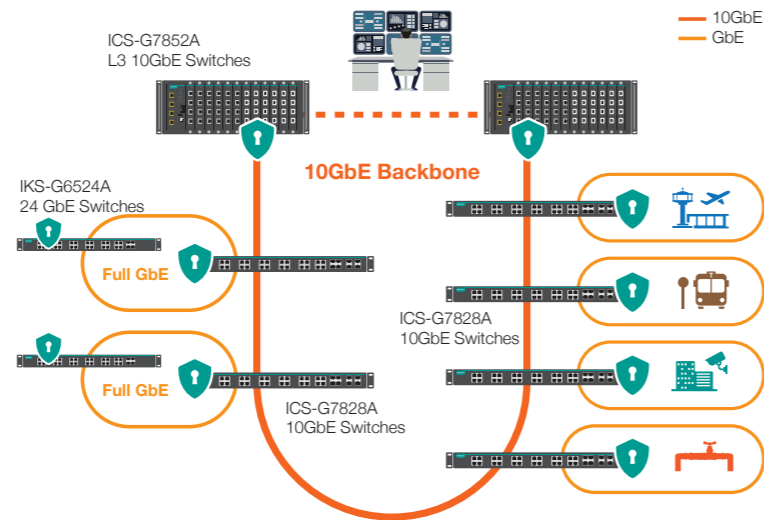
Moxa's industrial Ethernet rackmount switches boost your productivity with 10GbE/GbE performance, help protect against cyberthreats, and work reliably in harsh environments.

Moxa's rackmount switches, including both ICS Series 4U/1U and IKS Series, have high-density copper, fiber, and PoE interfaces with 10GbE/GbE/FE connectivity, industry-specified security features, and millisecond-fast failover-recovery to reduce downtime and maximize productivity.

10GbE Edge Data Aggregation

Moxa's fixed and modular industrial rackmount switches enable 10GbE edge-to-core backbone convergence to simplify your network infrastructure.

- Enabling 10GbE edge-to-core backbone convergence
- Two or four 10GbE uplinks and up to 48 GbE uplinks
- Flexible combinations of 10GbE/GbE/FE for multiple network types
- SFP modules that allow data transmission of up to 120 km



Layer 3 Rackmount Switches

	ICS-G7852A/G7850A	ICS-G7828A/G7826A	ICS-G7848A	IKS-G6824A
10GbE	4/2	4/2	-	-
GbE	48	24	48	24
Operating Temperature	-10 to 60°C	-40 to 75°C*	-10 to 60°C	-40 to 75°C

* -T models available in Q3, 2019

Robust Reliability

Moxa's rackmount switches can connect to multiple endpoints for data aggregation in tough conditions. The rackmount switches allow you to increase uptime and lower the total cost of ownership (TCO).

- Network recovery times within milliseconds
- High MTBF values with no fan or heater
- Hot swappable operation
- Dual-isolated power supply

Ensure Reliability Comparison of Rackmount Ethernet Switches

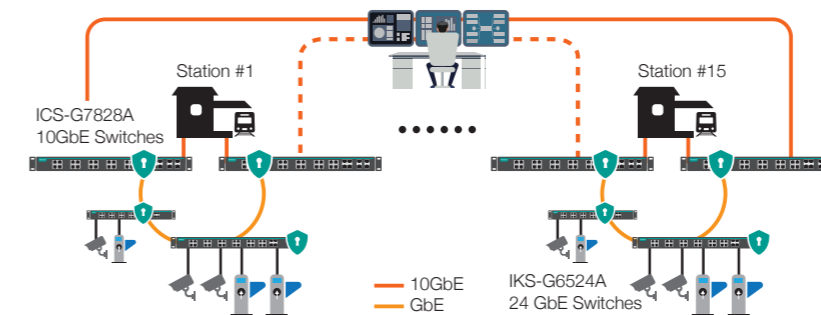
	Moxa Switches	Commercial Switches
ESD	+/- 8 KV	+/- 4 KV
Radiated RFI	10 V/m @ 80 MHz to 1 GHz	3 V/m @ 80 MHz to 1 GHz
Surge	2 KV	1.5 KV
EFT	1 KV	0.5 KV
Operating Temperature	-10 to 60°C -40 to 75°C	0 to 40°C
Heat Dissipation	Fanless	Fan
Industrial Certifications	EN 60950-1, CISPR 32, FCC Part 15B Class A *NEMA TS2, *DNV GL/ABS/LR/NK, *EN 50121-4, *NEMA TS2	CE/FCC

* IKS-6728A/6726A only

Use Case

10GbE Backbone for Tram Networks

An urban tram system required a reliable network backbone between 15 stations to ensure operational safety and security.



Layer 2 Rackmount Switches

	ICS-G7752A/G7750A	ICS-G7528A/G7526A	ICS-G7748A	IKS-G6524A	IKS-6728A/6726A	IKS-6728A-8PoE
10GbE	4/2	4/2	-	-	-	-
GbE	48	24	48	24	4/2	2
10/100 FE	-	-	-	-	24	16
Operating Temperature	-10 to 60°C	-40 to 75°C*	-10 to 60°C	-40 to 75°C	-40 to 75°C	-40 to 75°C

* -T models available in Q3, 2019

IACS-level Security

To enhance endpoint security and protect data aggregation against cyberthreats, all of Moxa's industrial rackmount switches have IACS (Industrial Automation Control Systems) security features that are available via firmware updates.

- Enhanced network protection with built-in security features based on the IEC 62443 standard
- Security control for data and access protection
- Supports MXstudio for device security profiling and monitoring



Network requirements

- High-capacity aggregation and long-haul transmission
- Network resilience for operational safety and security
- Flexible network deployment and expansion in outdoor conditions

Why Moxa

- ICS-G7828A switches provide 10GbE coupling and 10GbE uplinks for data aggregation at every station
- ICS-G7828A supports up to 28 fiber ports for long-distance transmissions in wide temperatures
- Supports Turbo Ring and Turbo Chain technologies for flexible and redundant ring expansion and fast failure recovery in under 50 ms



Your network field infrastructure deserves 10GbE capabilities that are tough enough to withstand harsh environments and enhance your network performance.

Moxa Offers

- Up to 4 10GbE and 24 GbE uplinks
- Fanless routers and switches
- Devices with -40 to 75°C operating temperature range
- Device security based on the IEC 62443 standard
- High-level EMI/EMC shielding

Optimize Reliability and Productivity

Moxa's DIN-rail managed switches are built to achieve uninterrupted connectivity for maximum availability. Our portfolio of switches was designed with availability, security, reliability, integration, and scalability in mind so you can ensure operational reliability and efficiency when expanding your network infrastructure.

Optimized Network Reliability at All Levels

	MDS-G4000 Series	EDS-500E Series	EDS-400A/500A Series
Bandwidth	12 to 28-port full Gigabit	6 to 28-port GbE/FE	5 to 18-port GbE/FE
PoE+	Up to 24-port PoE+	Up to 8-port PoE+	Up to 8-port PoE+
Security	TACACS+, IEEE 802.1X, HTTPS, SSH (Excluding EDS-400A Series)		
Security Enhancement	Advanced security based on IEC 62443		-
Redundancy Protocols	Turbo Ring, Turbo Chain, STP, RSTP		
Multicast Redundancy	-	V-ON	-
Industrial Protocols	-	EtherNet/IP, PROFINET, Modbus TCP protocols	
EMS	Level 3	Level 4	Level 3
Dual Power Inputs	LV: 18 to 72 VDC HV: 90 to 264 VAC, 88 to 300 VDC	12/24/48/-48 VDC	12/24/48 VDC
Industrial Certifications	C1D2, ATEX Zone 2, IEC 61850-3 Ed.2 Class1, IEEE 1613, NEMA TS2, EN 50121-4	C1D2, ATEX Zone 2, IEC 61850-3 Ed.2 Class1, IEEE 1613, DNV GL, ABS, LR, NK, NEMA TS2, EN 50121-4	C1D2, ATEX Zone 2, DNV GL, NEMA TS2, EN 50121-4

Enhanced Security

Moxa uses enhanced device security to protect devices as well as connected endpoints.

- Device-level data and access security based on the IEC 62443 standard
- Supports MXstudio to easily manage the security status of network devices

Enhanced Availability

Moxa technologies and tools help maximize network availability.

- Turbo Ring for fast Ethernet redundancy under 20 ms
- Turbo Chain for flexible and redundant ring expansion
- ABC-02-USB device for configuration/backup



Unreliable network equipment often increases maintenance costs and downtime. Therefore, we make every effort to ensure our network equipment is reliable to help reduce risk and errors.

► Moxa Offers

- Devices with -40 to 75°C operating temperature range
- Millisecond-level network redundancy
- Device-level security based on the IEC 62443 standard

► MDS-G4000 Series

Modularity for Future Adaptability

The MDS-G4000 Series industrial switches have dual power and add-on line modules with up to 28-port Gigabit connectivity to meet your current and future requirements.

This feature-rich platform has optimized user interfaces that use responsive web design to ensure the device is user-friendly for field operations.



High Availability for Easy Maintenance

- Gigabit redundancy under 50 ms
- Hot-swappable power and line modules
- Dual isolated redundant power modules
- Passive backplane to minimize failure rates

Future-ready Modularity

- Diverse module options up to 24 GbE PoE+ / 24 GSFP
- Ultra compact size (218 mm x 115 mm x 163.25 mm) fits in most cabinets

Security

- Device security based on the IEC 62443 standard

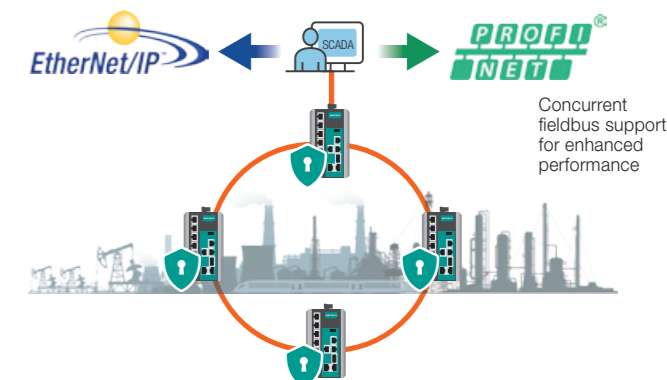
Optimal User Interfaces

- User-friendly web UI/OS that offers a device summary, smart search, configurations, and more
- Uses HTML5 to ensure the same user experience across different platforms and browsers

► EDS-500E Series

Extra Reliability for Versatility in the Field

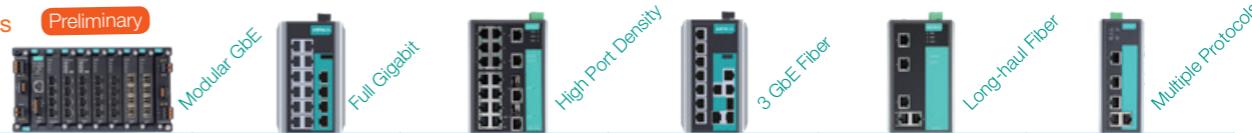
The EDS-E Series industrial Ethernet switches provide best-in-class reliability and performance with high-density Gigabit bandwidth, multiple industrial certifications, and IACS compliant cybersecurity features in compact metal enclosures to ensure suitability for a broad range of field installation environments.



Best-in-class Reliability

- Up to 28-port GbE/FE links
- Device security based on the IEC 62443 standard
- Supports fieldbus for SCADA/HMI monitoring
- V-ON for multicast redundancy
 - L2 redundancy with under 50 ms recovery times
 - L3 redundancy with under 300 ms recovery times
- Fiber link monitoring and alarm notifications
- Diverse range of industrial certifications

► Managed Switches



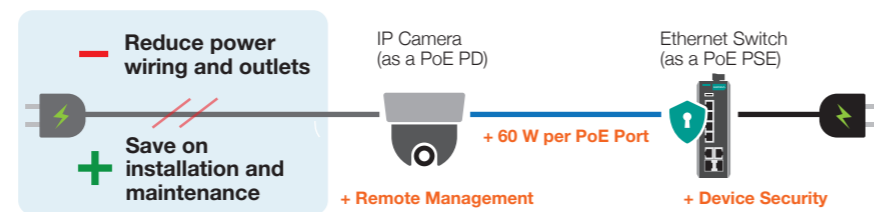
	MDS-G4000	EDS-G500E	EDS-518E/528E	EDS-510E	EDS-500A	EDS-400A
No. of Ports	12/20/28	8/12/16	18/28	10	5/8/10/16/18	5/8
Gigabit Ports	12/20/28	8/12/16	4	3	-	-
Fiber Ports	Up to 24	Up to 4*	4	3	Up to 2*	Up to 3*
Fiber Type	LC	LC	LC	LC	ST, SC	ST, SC

*Available for some models only

Power Your Critical Surveillance Equipment With **Smart PoE** Switches

To address the growing connectivity and power requirements of surveillance infrastructure, Moxa's PoE/PoE+ Ethernet switches function as a power source. These switches provide up to 48 Gigabit PoE+ ports with either 36 W or 60 W per PoE+ link to power PTZ cameras and other wireless devices.

Unlike commercial PoE solutions, Moxa's PoE/PoE+ solutions boast cybersecurity features, millisecond-fast recovery, high EMI/surge protection, and -40 to 75°C operating temperature ranges to keep surveillance networks up and running even in harsh environments.



"Less is more" is the beauty behind Moxa's PoE switches. They reduce the amount of cabling required while still providing high power and smart management to deliver data and PoE with a lower total cost of ownership.

► Moxa Offers

- IEEE 802.3af/at interoperability
- Up to 48 Gigabit PoE+ ports
- 4 kV LAN surge protection
- Smart PoE power management
- Device-level security based on the IEC 62443 standard

Power+

Moxa's PoE+ switches combine high power and high bandwidth to carry power, video, and data over Ethernet cables.

- 60 W and 36 W PoE+ outputs for PTZ and power-hungry cameras
- 12/24/48 VDC dual power inputs
- Fiber options for long-distance transmissions

Management+

Built-in Smart PoE functions for remote PD links, diagnostics, and failure recovery.

- Supports PoE/PoE+ standard, non-standard, and legacy PDs for easy deployment
- Automatic PD check and reboot for fault-tolerant recovery
- Remote management by MXview or Web UI

Cybersecurity+

The PoE/PoE+ managed switches reinforce access authentication and control to protect the device and connected PDs.

- Device-level cybersecurity
- Supports system-level security integration for increased protection
- Supports MXstudio for network device security profiling and monitoring

► Showcase

60 W Compact Powerhouse

EDS-P506E-4PoE Series

2 GbE + 4 FE PoE+ switches



- High PoE Power**
- 4-port PoE/PoE+
 - Up to 60 W output per port
 - 180 W power budget

- High Bandwidth**
- 2-port Gigabit combo



- Dual Power**
- 12/24/48 VDC inputs

- Smart Management**
- Built-in Smart PoE for easy PD links, diagnostics, and monitoring
 - LED indicators for maintenance

- High Reliability**
- Built-in device security
 - Ethernet failover under 20 ms
 - Level 4 EMS immunity
 - Models with -40 to 75°C operating temp.
 - Industrial certifications

► Use Case

A Smart City Infrastructure

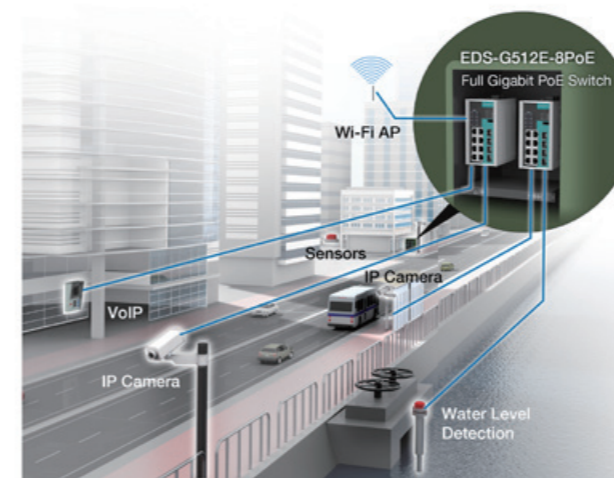
A city in Asia planned to upgrade their infrastructure by utilizing EDS-G512E PoE switches to integrate city surveillance, data collection, and public services.

System Requirements

- Reliable data collection and a strong power supply
- Uninterrupted network reliability
- Network protection against cyberattacks

Why Moxa

- 12-port Gigabit and high PoE+ output for bandwidth and power-hungry IP cameras and wireless APs
- Extreme robustness for reliable operation in challenging conditions
- Device-level cybersecurity for access protection



► Use Case

Optical Character Recognition (OCR) Systems

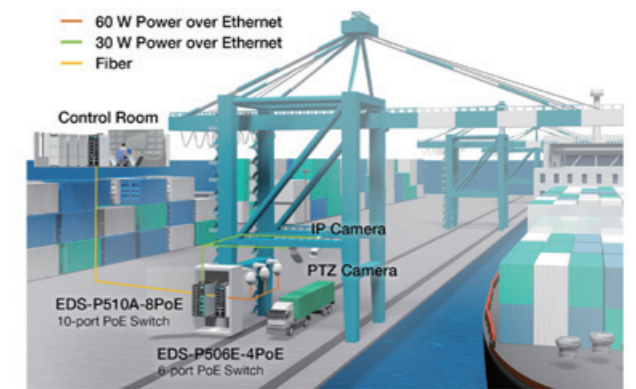
An OCR system required high capacity PoE switches and IP cameras to facilitate automatic freight container loading, unloading, and tracking at port terminals.

System Requirements

- Withstand outdoor and salty air conditions
- High PoE output to support PTZ camera functions
- Easy deployment, management, and maintenance

Why Moxa

- EDS-P506E switches deliver up to 60 W per PoE link to power multiple PTZ cameras
- Fault-tolerant design that automatically performs failure checks of IP cameras and reboots them if needed
- Gigabit recovery under 50 ms for network availability



► PoE/PoE+ PSE Portfolio

Managed Switches	48 G PoE+	12 G PoE+	Best Value	Compact	60 W	3G Combo	EN 50155	
	ICS-G7800A/ICS-G7700A	EDS-G512E-8PoE	IKS-6728A	EDS-P510A-8PoE	EDS-P506E-4PoE	EDS-P510	TN-5508A-8PoE/TN-5516A-8PoE	TN-4500A
Ports	0/2/4 10G + 48 GbE	12 GbE	4 GbE + 24 FE	2 GbE + 8 FE	2 GbE + 4 FE	3 GbE + 7 FE	8 FE / 16 FE	4 GbE + 12/20/24 FE
PoE Ports	48 PoE+	8 PoE+	8/16/24 PoE+	8 PoE+	4 PoE+	4 PoE	8 PoE+	14/16/18/20 PoE+
PoE Output	36 W	36 W	36 W	36 W	60 W	15.4 W	30 W	30 W

Unmanaged Switches

	Fuji GbE	Good Value	EN 50155
	EDS-G205A-4PoE	EDS-P206A-4PoE	TN-5308-4/8PoE
Ports	5 GbE	6 FE	8 FE
PoE Ports	4 PoE+	4 PoE+	4/8 PoE+
PoE Output	30 W	30 W	30 W

Single-port PSE

	INJ-24A	INJ-24	IMC-P101
PoE Output	60 W	30 W	15.4 W
Power Input	24/48 VDC	24/48 VDC	48 VDC



Network complexity and environmental limitations hinder the efficiency of industrial automation network deployment and maintenance for most IA engineers.

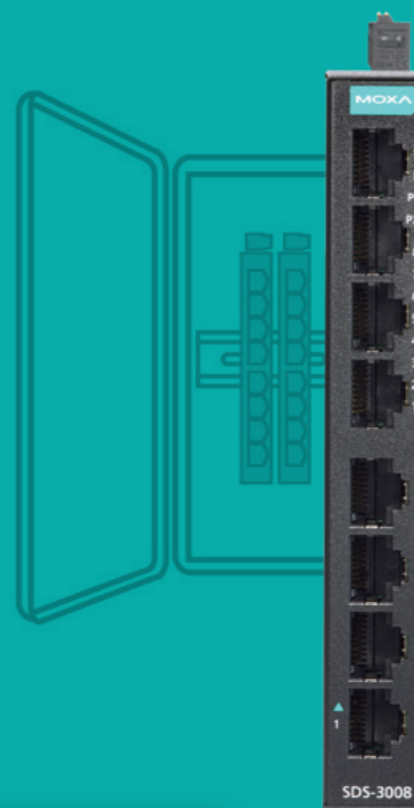
► **Moxa Offers**

- 8-port Ethernet smart switching
- Basic managed switch functions
- One-click profile setup for seamless SCADA/HMI integration
- Simple GUI for easy configuration
- Flexible mounting and slim design
- Industrial-grade reliability

Smart, Simple, Efficient Networking

Moxa's smart switches simplify daily tasks for industrial automation (IA) engineers with easy configuration, installation, and reduced downtime.

The palm-sized SDS-3008 features versatile mounting for easy installation, smart UI configurations for simplified operations, support for multiple IA protocols (EtherNet/IP, PROFINET, Modbus TCP) for distributed SCADA/HMI monitoring, and flexible replacement parts for network design and maintenance.



OT Management

- One-click settings for SCADA/HMI/NMS integration
- Supports EtherNet/IP, PROFINET, and Modbus TCP protocols



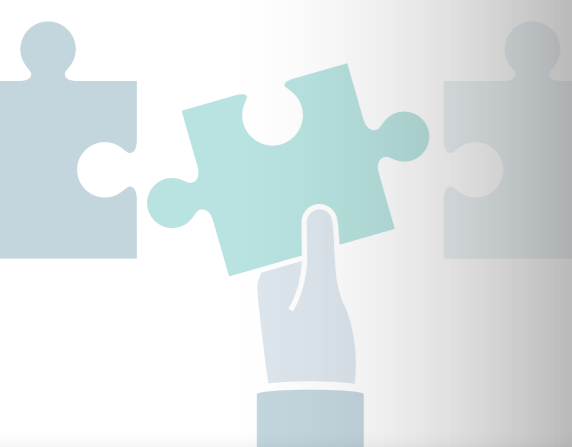
Robust Reliability

- Device security and network access control
- Supports RSTP/STP network redundancy
- -40 to 75°C operating temperature (-T models)



Ease of Use

- Dashboard GUI for configuration without requiring specialized IT knowledge
- ABC-02 device for configuration/backup



► **Use Case**

Network Monitoring for Bottling Process

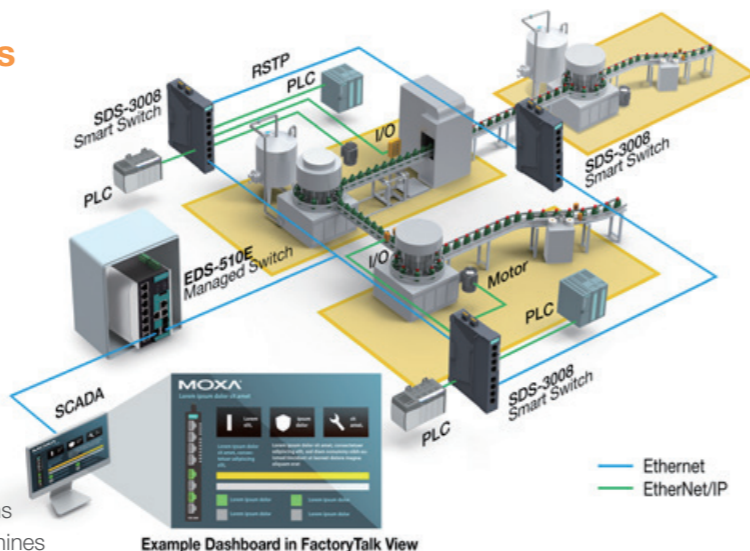
A bottling plant utilized Ethernet switches and EtherNet/IP technology to build their operational infrastructure and enable their SCADA/HMI systems to monitor all processes, networking devices, and network statuses.

Network Requirements

- Minimal IT skills required for network deployment and maintenance
- Supports SCADA/HMI monitoring
- Reliable network performance
- Easy diagnostics for maintenance

Why Moxa

- The SDS-3008 has a graphical UI for user-friendly configuration
- Supports network redundancy, security, and hardened features
- Supports EtherNet/IP profiles for fast deployment
- The status of the switch can be monitored on SCADA and HMI systems
- Small form factor fits well into both existing cabinets and process machines



Example Dashboard in FactoryTalk View

Industrial Unmanaged Switches You Can Trust

Moxa's industrial unmanaged switches provide rock-solid reliability that withstands extreme conditions to earn the confidence and satisfaction of global customers through thousands of long-term deployments around the world.

With a reputation for industrial network reliability, Moxa's unmanaged Ethernet switches continue to uphold stringent quality, mixed copper and fiber flexibility, and compliance with industry standards to meet the challenges of industrial applications today and tomorrow.



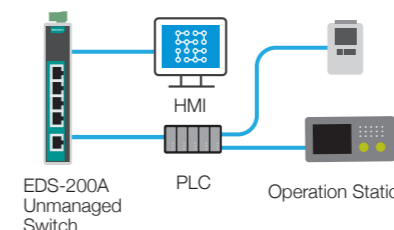
Flexibility and Reliability

- Full Gigabit options
- Flexible copper and fiber combinations
- Supports long-distance fiber links
- Redundant power inputs
- -40 to 75°C operating temperature (-T models)
- Diverse range of industrial certifications
- High MTBF values

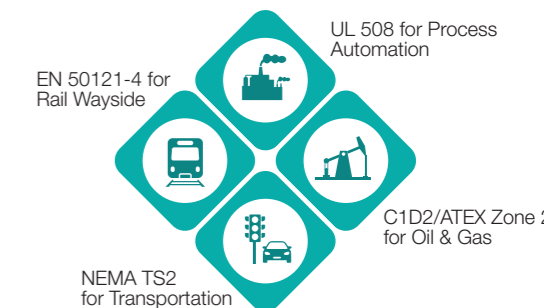
Industrial Reliability With Plug-and-play Simplicity

The EDS-205A/208A unmanaged switches have proven to be durable winners in over 600,000 unit deployments with best value in terms of reliability, cost-efficiency, and ease-of-use.

Over 600,000 Deployments



- **Cost-effective**
- **Plug and Play**
- **Gigabit, Copper, and Fiber Options**
- **Industrial Reliability**



► **Unmanaged Switches**



	EDS-G200/G300	EDS-300	EDS-200A	EDS-200
Features	<ul style="list-style-type: none"> • Fiber Gigabit connections • Jumbo frame supported for enhanced performance 	<ul style="list-style-type: none"> • Relay output for port break and power failure • Redundant dual 24 VDC power inputs 	<ul style="list-style-type: none"> • Redundant dual 12/24/48 VDC inputs • NEMA TS2 for transportation 	<ul style="list-style-type: none"> • MTBF values over 3,900,000 hours • Compact size and cost-effective
Ethernet Ports	5/8	5/8/9/16	5/8	5/8
Gigabit Ports	5/8	-	-	-
Fiber Ports	Up to 2*	Up to 3*	Up to 4*	1*
Operating Temp.	-10 to 60°C / 0 to 60°C / -40 to 75°C			
Industrial Certifications	C1D2, ATEX Zone 2, DNV GL, UL 508			UL 508

* Available for some models only



Wireless connections set us free from wiring hassles but raise concerns about availability, security, and reliability of networks.

► **Moxa Offers**

- Speeds up to 300 Mbps
- Industrial-grade reliability
- Device security based on the IEC 62443 standard
- AeroMag for easy Wi-Fi deployment and maintenance
- Millisecond-level roaming handoff times

Building Field-proven and Future-ready **Wireless Networks**

There is no need to suffer from unreliable wireless connections due to signal interference, weak signals, or slow failover.

Moxa's WLAN products provide 802.11n wireless connectivity and innovative functions to optimize your wireless network for reliability, availability, and security.

By combining innovative technologies, such as fast roaming, effortless Wi-Fi deployment, enhanced network security, hardened reliability against extreme conditions, Moxa's AWK series devices provide field-proven and future-ready Wi-Fi connectivity to meet various mission-critical applications.



■ **Availability**

Moxa's Turbo Roaming technology provides client handoff times under 150 ms between APs to ensure seamless mobility for your industrial equipment on the move.

- Turbo Roaming for fast handoff times under 150 ms
- AeroLink Protection for redundant Wi-Fi links
- MXstudio support for real-time monitoring and management



■ **Reliability**

Moxa's wireless products enhance network reliability and prevent ambient interference from affecting industrial operations.

- Noise avoidance with 500-V insulation on power ports
- Level-4 ESD protection on antenna ports
- -40 to 75°C operating temperature (-T models)
- Anti-vibration design



■ **Security**

Moxa adopts the IACS guideline for device security enhancements and advocates a defense-in-depth strategy to secure your wireless networks.

- Reinforces device-level access control based on the IEC 62443 standards
- Supports HTTPS/SSL, RADIUS, and SSH
- Supports ICMP and filtering based on MAC address, IP protocol, and ports
- Supports MXstudio for real-time event monitoring

► **Challenges**

Wi-Fi mobility is a welcome change in industrial operations; but for system operators with limited IT knowledge, configuring devices and WLAN maintenance can be quite daunting.

■ **Easy Development**

Moxa's AeroMag tool helps you setup, update, and secure your WLANs with no IT skills required, providing effortless connectivity that adapts to changes in the operating environment.



AeroMag is a great tool for deploying wireless devices in various industrial environments, thereby providing secure and reliable WLAN operations without operators having to worry about setting up and maintaining complex WLANs.

► **Use case**

Manufacturing

A fiberglass yarn manufacturer integrated AeroMag devices into their mobile automated guided vehicles to expand the capacity of their production lines through automatic material handling and parts processing.

► **Use case**

eBus

A bus company leveraged AeroMag technology to connect their fleet of busses so that they can transmit surveillance footage back to the control center for effective monitoring.

► **Use case**

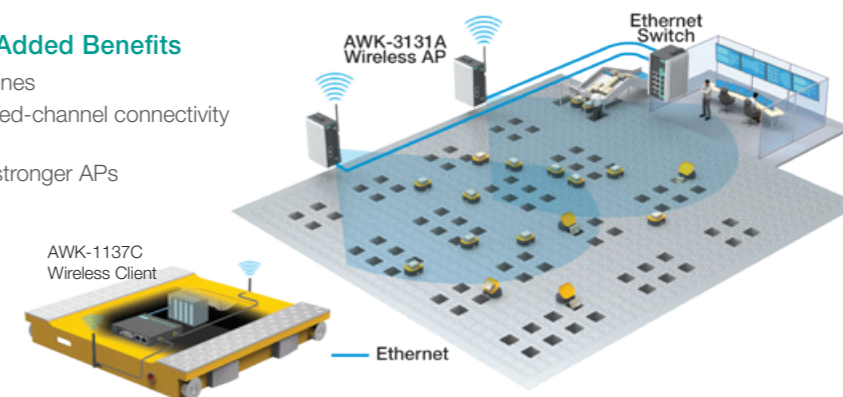
Oil Fracturing

An oil company installed AeroMag devices on their fracturing trucks to ensure secure wireless connection for the trucks to continuously transmit and receive data.

■ **Smart Wi-Fi Strategy**

Integrate AWK-1137C Into Your Machines for Added Benefits

- Compact form factor that enables integration into machines
- AeroMag Client for easy WLAN deployment and optimized-channel connectivity with an AeroMag AP
- Client-based Turbo Roaming automatically switches to stronger APs at < 150 millisecond handoff times
- One-to-many NAT to simplify device setup
- Anti-vibration design to provide stability when installed on moving vehicles and shuttles
- Durability with a wide operating temperature range
- Solid yet flexible installation options
 - DIN-rail mounting (LEDs on the side panel)
 - Wall mounting (LEDs on the front panel)



► **Wireless AP/Bridge/Client**



Model	AWK-4131A	AWK-3131A	AWK-1131A	AWK-1137C
Operation Mode	AP/Client/Client-router/ Master/Slave	AP/Client/Client-router/ Master/Slave	AP/Client	Client/Client-router/Slave
Wi-Fi Interface	802.11a/b/g/n, up to 300 Mbps data rate			
Link Interfaces	1 GbE			2 FE, 1 RS-232/422/485
PoE	PoE powered devices			-
AP Capacity	Up to 60 Clients per AP	Up to 60 Clients per AP	Up to 30 Clients per AP	-
AeroMag	AeroMag AP/Client		-	AeroMag Client
Wi-Fi Roaming	Client-based Turbo Roaming with < 150 ms handoff times			
Operating Temperature	-40 to 75°C	-25 to 60°C / -40 to 75°C (-T model)	0 to 60°C / -40 to 75°C (-T model)	
Radio Certificates	FCC, CE, MIC, ANATEL, WPC, SRRC, KC, RCM			
Industrial Certifications	-	C1D2, ATEX Zone 2, IECEx	-	eMark



Providing sufficient power to all active devices to maintain reliable and secure remote networks is a challenge for most industrial operators.

► **Moxa Offers**

- Devices with low power consumption
- Cellular redundancy
- VPN support
- Device security based on the IEC 62443 standard
- Industrial-grade reliability
- Europe, US, and Australia LTE band support

Boost Your IIoT Deployment With **Low-power LTE Cellular** Connectivity

Industries and cities around the world are seeking to accelerate IIoT deployment to achieve future readiness.

Moxa's compact OnCell 3120-LTE-1 gateways adopt LTE technology to accelerate IIoT connectivity, providing 4G speeds, low power consumption, reliability, industrial-grade security, and long-haul communications for connecting serial and Ethernet devices to cellular networks.

Wide network coverage and low power consumption make the OnCell 3120-LTE-1 suitable for widespread deployment in power-constrained IIoT networks.

Future-ready Mobility

OnCell 3120-LTE-1 combines LTE Cat 1 technology with existing 2G and 3G bands to deliver global coverage, making it easy to migrate to 4G for future-ready M2M and IIoT applications.

Applications

- Transportation
- Utility data collection
- Pipeline monitoring for water, and oil and gas facilities
- Oil/gas wellhead monitoring
- Environmental monitoring

Security

- VPN, IPsec, GRE, and OpenVPN
- Device security based on IEC 62443
- OnCell Central Manager (OCM) for secure private IP connections

Redundancy

- Dual SIMs
- GuaranLink for connection checking and relinking

Global LTE

- Supports US, EU, and Australia bands
- 10 MB downlink and 5 MB uplink
- Serial/Ethernet-to-cellular
- Deep signal penetration in buildings and underground locations

Low Power

- 4 W for normal operation
- 40 mW during standby



► **Application**

Solar-powered Water Treatment Plants

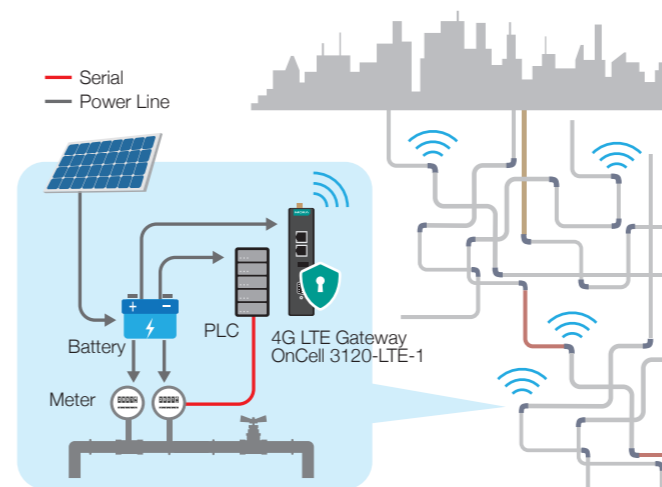
Water-treatment systems require reliable data collection and monitoring throughout the treatment and distribution processes to ensure the safety and quality of drinking water.

System Requirements

- Secure and reliable data transmission
- Flexible IP assignment
- Low power consumption
- Easy troubleshooting

Why Moxa

- OnCell-3120-LTE-1 consumes only 40 mW while on standby, increasing battery life and reducing maintenance costs
- Device-level security and VPN functions for network security
- Supports OCM for cost-effective private IP assignment
- Front-panel LEDs for easy link diagnostics
- Serial and Ethernet ports for efficient data collection



► **Application**

Smart Street Lighting Systems

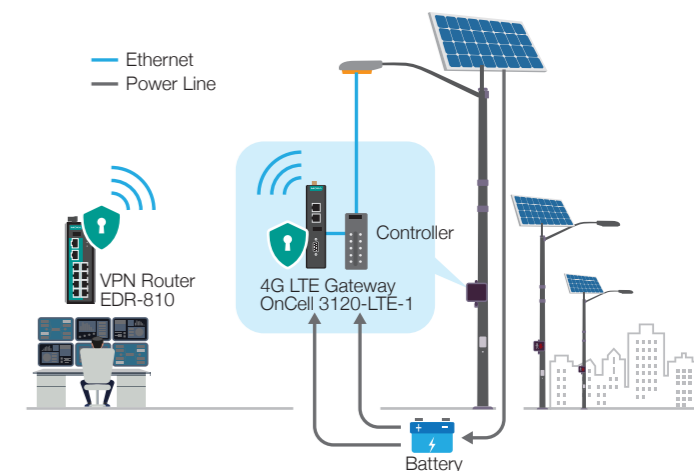
As governments continue to implement smart city infrastructures, street lights are increasingly being connected to automatically adjust brightness and conserve energy without compromising on public safety.

System requirements

- Compact form factor for installation inside small wayside cabinets
- VPN security for lighting control applications
- Device durability to withstand industrial environments

Why Moxa

- The small form factor of the OnCell-3120-LTE-1 enables installation in pole-mounted cabinets
- Built-in device security to block unauthorized access
- IPsec, GRE, and OpenVPN support for secure VPN tunneling
- OCM tool that enables secure Internet access through private IPs
- Hardened design to withstand extreme conditions

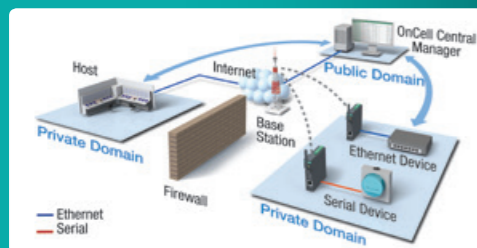


Watch Over Your Cellular Access

OnCell Central Manager (OCM)

Moxa's OCM hosts centralized private IP management for OnCell devices enabling secure private IP enrollment, configuration, monitoring, and firmware updates over the Internet.

- Cost-effective and secure private IP connectivity
- End-to-end data exchange over the Internet
- Device monitoring on various platforms



► **Cellular Gateways/Routers/Modems**

	OnCell 3120-LTE-1	OnCell G3150A-LTE	OnCell G3470A-LTE	OnCell 5104-HSPA
4G	LTE Cat 1	LTE Cat 3	LTE Cat 3	-
3G, 2G	UMTS/HSPA, GSM/GPRS/EDGE			
Ethernet	2 FE	1 FE	4 GbE	5 FE
Serial	1 RS-232/422/485	1 RS-232/422/485	-	-
SIM Cards	2	2	2	2
VPN/Firewall	VPN: IPsec, GRE, and OpenVPN (* OnCell G3470A only supports IPsec) Firewall filter: MAC, IP protocol, port-based, access IP list			Firewall filter: WAN IP filtering
Device Security	Based on the IEC 62443 standard			
Power Inputs	9 to 36 VDC	Dual, 12-48 VDC		
Operating Temperature	-30 to 55°C / -30 to 70°C (-T models)	0 to 55°C / -30 to 70°C (-T models)	-30 to 55°C / -30 to 70°C (-T models)	
Industrial Certifications	UL 60950-1, ATEX Zone 2, IECEx			UL 60950-1

Enable **Smart** Railways With Ethernet

Moxa provides Ethernet-compliant railway solutions for onboard, train-to-ground, and wayside communication and control systems that enhance operational capacity, efficiency, and passenger services.



Using divergent networks to provide multiple services in railway systems can be costly and cumbersome to deploy, maintain, and scale.



► Moxa Offers

- EN 50155 proven reliability from trains to tracks
- Ethernet compatibility across different train builders
- One-stop-shop wired and wireless portfolios
- Quality based on IRIS Rev. 0.3 certification

Ethernet-connected Onboard Networks

Moxa's EN 50155 Ethernet solutions enable high-bandwidth communications for CCTV and passenger information systems (PIS), Wi-Fi connectivity, and other train-wide communication services in space-limited onboard environments.

TN-5916-ETBN Series EN 50155 16-port NAT Router

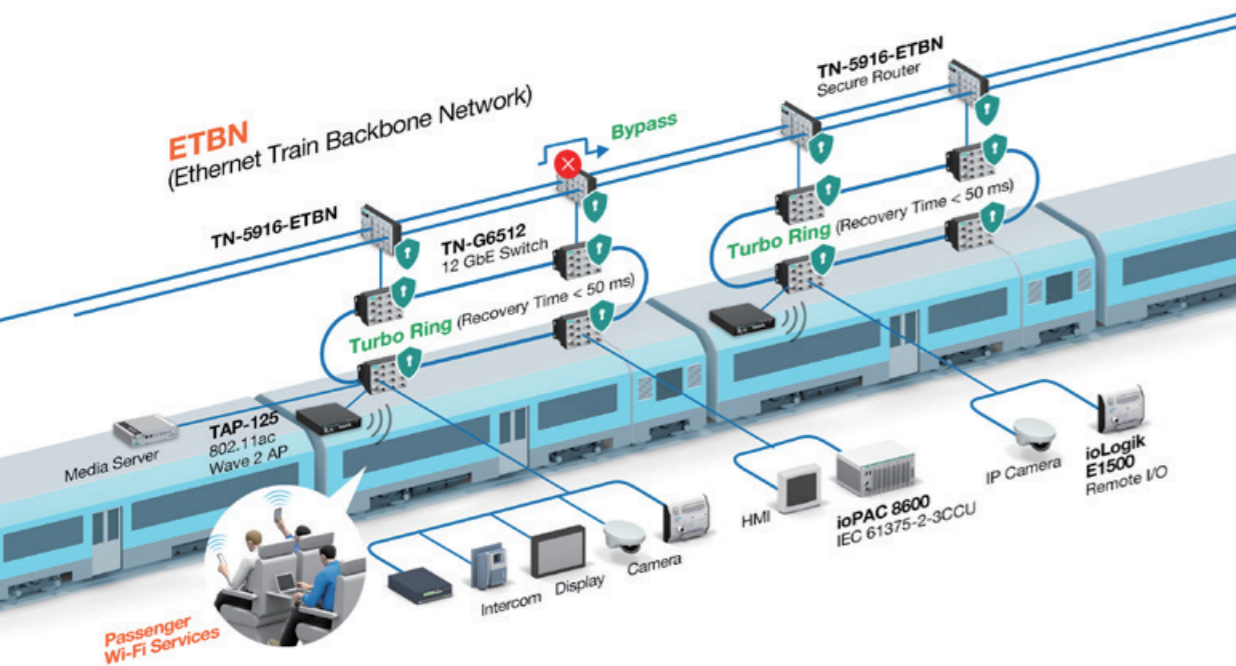
- IEC 61375-2-5/-2-3 compliance
- Dual bypass relay
- Firewall feature and IEC 62443 based device security

TN-G6500 Series 12-port Full Gigabit Switches

- Up to 8 PoE/PoE+ links
- Gigabit recovery time under 50 ms
- Device security based on the IEC 62443 standard

TAP-125 Series Industrial Wireless AP

- IEEE 802.11ac Wave 2 compliant
- Up to 2600 Mbps data rate
- Supports up to 120 clients with client isolation



Performance

- » Gigabit for network convergence
- » 802.11ac supports up to 120 clients

Security

- » Device-level cybersecurity
- » TN-5916-ETBN for firewall protection

Reliability

- » Compliant with a portion of EN 50155
- » Seamless failover with network redundancy and bypass

► Onboard Network Showcase

	Router	Layer 3	Full Gigabit	High Port Density	Gigabit	
	TN-5916	TN-5816A/5818A	TN-G6512	TN-4500A	TN-5518A/5510A	TN-5516A/5508A
GbE	-	Up to 2	12	Up to 4	2	-
Fiber GbE	-	-	-	Up to 2	Up to 2	-
FE	16	16	-	12/20/24	16/8	16/8
PoE	-	-	8 PoE+	Up to 20 PoE+	Up to 8 PoE+	Up to 8 PoE+

Train-to-ground Wireless Solutions

From vital train-to-ground communications (such as CBTC) to onboard infotainment systems, high bandwidth and rapid handoffs for wireless transmissions on fast-moving trains are more crucial than ever. Moxa provides robust 802.11n-based train-to-ground connectivity to ensure real-time train status updates and control for smooth rides and passenger safety.

AWK-3131A-RTG / TAP-213 Series Onboard 802.11n AP/Client

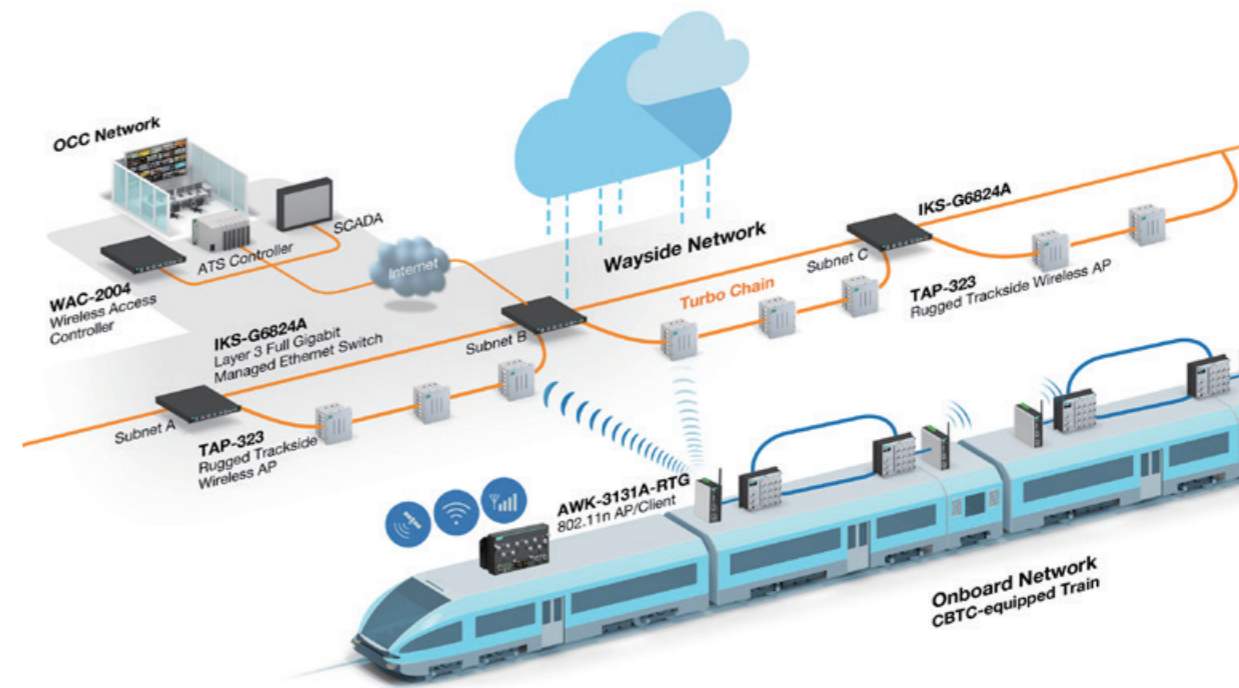
- PoE powered or dual DC inputs
- Wi-Fi redundancy with AeroLink Protection

TAP-323 Series Trackside 802.11n Dual Radio AP

- IP68 rating
- Dual-AP and switch combo device
- Fast Ethernet/Fiber redundancy with Turbo Chain

WAC-2004 Series Industrial Wireless Access Controller

- IEEE 802.11i/802.1x-compliant security
- Up to 450 Mbps throughput for tunneling
- Supports device failover check



Performance

- » Up to 300 Mbps data rates
- » Turbo roaming under 50 ms*

Security

- » Device-level security
- » WPA/WPA2 and 802.1x security

Reliability

- » Compliant with a portion of EN 50155
- » EN 50121 compliance
- » IP68 rated APs and clients
- » Wi-Fi radio redundancy

► T2G Network Showcase

	Preliminary					
	TAP-125	AWK-3131A-RCC	AWK-3131A-RTG	TAP-213 Series	TAP-323 Series	WAC-2004 Series
Best Scenarios	Passenger Wi-Fi	Auto-carriage	Train-to-ground	Train-to-ground	Train-to-ground	Wi-Fi Controller
Wi-Fi Capability	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n	-
Network Interfaces	1 5GbE	1 GbE	1 FE	1 GbE + 1 GSFP	2 GSFP + 4 FE	1 GbE
Wi-Fi Roaming	Controller-based Turbo Roaming* < 50 ms handoff times (with WAC-2004)					-
Reliability	-40 to 75°C operating temperature			IP68 rated, -40 to 75°C operating temperature		

*Turbo Roaming performance can vary based on infrastructure and parameter configurations. Users can view product manuals for more information.



In substation automation systems (SAS), network devices that were released at different times and from different vendors may lack interoperability, which results in reduced performance and increases operating costs and risks.

► **Moxa Offers**

- IEC 61850-3 Ethernet switches for vendor-independent interoperability
- High bandwidth and high port density options
- Maximum reliability and availability
- Built-in device security

Embrace **IEC 61850** Infrastructure for **Future-proof Substations**

Moxa's PT-G7828/G7728 switches are designed in accordance with IEC 61850-3 Edition 2 Class 2 and IEEE 1613 Class 2 standards. The switches integrate cutting-edge hardware and software functions to optimize system availability and interoperability for substation automation systems (SAS).

The modular switches offer up to 28-port full Gigabit routing and switching with selectable RJ45/SFP/PoE+ interfaces and dual power modules for various applications.

Embedded with the innovative GOOSE Check feature, MMS server capability, and nanosecond-level time synchronization, the PT-G7828/G7728 switches ensure the accuracy of time-critical operations in power substations.

Built for Maximum System Availability

PT-G7828/G7728 Series

Layer 2/3 28-port Gigabit rackmount switches



- **Minimize Errors**
- **Detect Errors**
- **Solve Errors**

Extended Performance

- Up to 28 full GbE ports with RJ45/SFP/PoE+ modules
- Up to 24 PoE+ connections

Deterministic Ethernet

- All ports support IEEE 1588 v2 PTP
- IEC 61850 QoS to prioritize critical GOOSE/SMV transmission

All-round Reliability

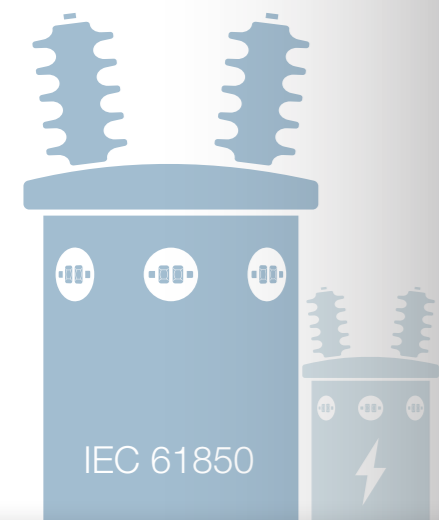
- IEC 61850-3 and IEEE 1613 compliance
- Dual, redundant isolated power modules
- Device security based on the IEC 62443 standard

Specific Manageability

- Built-in MMS to support centralized monitoring from PSCADA
- Embedded GOOSE monitoring for predictive maintenance
- 1 second dying gasp for failure alarm and reduced downtime

Smart Diagnosis and Maintenance

- Hot-swappable power and line modules
- PTP sync LEDs for fast PTP diagnostic



Next Generation SAS

PT-7728-PTP Series

24 FE + 4 GbE PRP/HSR Modular Rackmount Switches

- 4-GbE-port PRP/HSR module for zero failover time
- RSTP Grouping for multiple couplings of HSR and RSTP
- IEEE 1588v2 time synchronization
- Dual isolated redundant power inputs
- -40 to 85°C operating temperature range
- Built-in MMS server for power SCADA monitoring

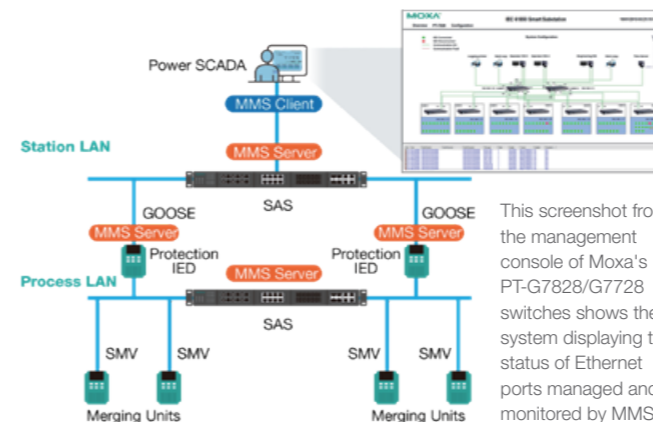


► **Proven PRP/HSR Interoperability**

Moxa's PT-7728-PTP and PT-G503 RedBox were the only DUTs (devices under testing) that provided dual connections between PRP/HSR and RSTP network segments in the 2015 PRP/HSR Interoperability Test, conducted by UCAIug.

MMS for Power SCADA Supervision

With a built-in MMS server, the PT-G7828/G7728 switches can be controlled, monitored, and managed via the centralized power SCADA system for enhanced efficiency and availability.



This screenshot from the management console of Moxa's PT-G7828/G7728 switches shows the system displaying the status of Ethernet ports managed and monitored by MMS.

GOOSE Check

The PT-G7828/G7728 switch detects time-out and tampered GOOSE packets and sends immediate alerts to the power SCADA and NMS systems in a time-aligned sequence. This feature can be utilized to accelerate troubleshooting and diagnosis during commissioning, operation, and maintenance.

Index	APP ID	GOOSE Address	IED Name	VID	Ingress Port	Rx Counter	Status	Type
1	1	01.0c.cd.01.00.00	BC_CONTCTRL	1	1-2	85	Health	Static
2	1	01.0c.cd.01.00.01	BC_CONTCTRL	1	1-2	85	Health	Dynamic
3	1	01.0c.cd.01.00.02	BC_CONTCTRL	1	1-2	85	Timeout	Dynamic
4	1	01.0c.cd.01.00.03	BC_CONTCTRL	1	1-2	85	Health	Dynamic
5	1	01.0c.cd.01.00.04	BC_CONTCTRL	1	1-2	85	Health	Static
6	1	01.0c.cd.01.00.05	BC_CONTCTRL	1	1-2	85	Health	Dynamic
7	1	01.0c.cd.01.00.06	BC_CONTCTRL	1	1-2	85	Tampered	Static
8	1	01.0c.cd.01.00.07	BC_27_1CTRL	1	1-2	85	Health	Dynamic

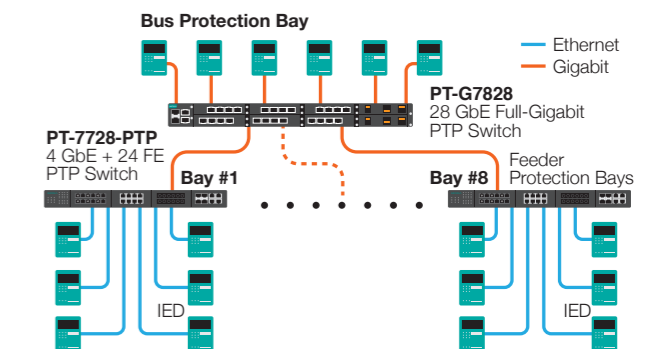
► **Use Case**

Gigabit PTP Switches for Smart Substation Maintenance

In order to maintain bay-level changes with minimal modifications to the core infrastructure, the substation managers use PT-G7728 full Gigabit modular switches to enhance backbone aggregation capability, providing sufficient bandwidth to bridge distributed feeder protection bays.

Why PT-G7728 Switches

- 28 Gigabit ports for dynamic traffic flows
- Hot-swappable modularity for scalable expansion with minimum MTTR (mean time to repair) values



► **IEC 61850-3 Switches**

	PT-G7828/G7728	PT-7828/7728	PT-7528	PT-7728-PTP	PT-G503
Device Design	Modular	Modular	Fixed ports with single-slot module	Modular	Compact fixed ports
Max. No. of Ports	28 GbE	4 GbE + 24 FE	4 GbE + 24 FE	4 GbE + 24 FE	3 GbE
Max. No. of PTP Ports	28	-	-	14	3
Zero-time Redundancy	-	-	-	PRP/HSR	PRP/HSR
Proprietary Redundancy	Turbo Ring, Turbo Chain (Ethernet recovery time < 20 ms, Gigabit recovery time < 50 ms)				
RSTP Grouping	-	-	-	✓	✓
MMS Server	✓	✓	✓	✓	✓
GOOSE Check	✓	-	-	-	-
IEC 61850 QoS	✓	✓	✓	✓	-
Industrial Certifications	IEC 61850-3 Edition 2 Class 2, IEEE 1613 Class 2		IEC 61850-3 and IEEE 1613 Class 2		
Operating Temperature	-40 to 85°C				



No new infrastructure is needed if your existing DSL infrastructure can support Ethernet network extensions, helping you cut costs and complexity.

► Moxa Offers

- Flexibility with point-to-point extenders and multi-drop switches
- Long-distance connectivity up to 8 km
- Plug-and-play deployment
- Network redundancy
- Easy maintenance with local and remote management tools

Extend Ethernet Over Existing DSL Copper Wires

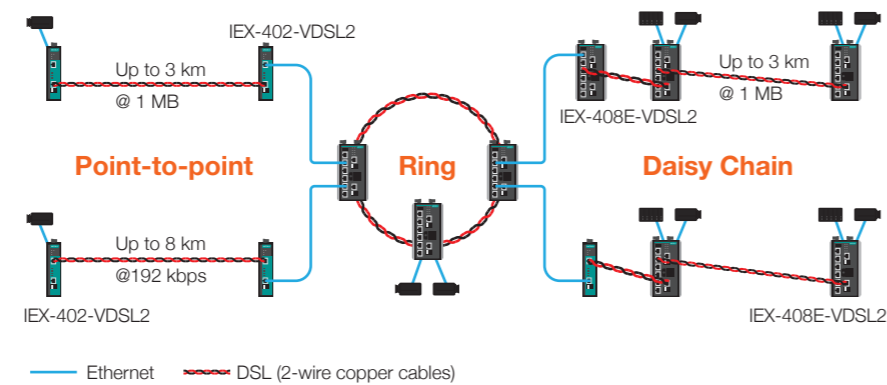
Moxa's IEX series of DSL Ethernet extenders provides easy and cost-effective Ethernet-to-DSL bridges to expand your last-mile networks beyond the 100-meter Ethernet limit, with tremendous savings on time and costs for long-haul connections.

Leveraging DSL infrastructure, both the IEX-402 Series and IEX-408E Series provide diverse and reliable options to meet your point-to-point and multi-drop applications in ring, chain, or daisy-chain topologies. The IEX-408E switches provide 2-port VDSL2, 6-port Ethernet, and fast Ethernet redundancy to connect multiple distributed LANs and devices with great flexibility and seamless connectivity.

Both the IEX-402 and IEX-408E models guarantee device reliability with industrial certifications, save time with zero-configuration, and make maintenance easy with LED indicators and a web console.

Extension Scenarios

Scenario	Point-to-point	Point-to-point	Multi-drop
Distance	Up to 3 km	Up to 8 km	Up to 3 km
Recommendation	Ethernet Extender IEX-402-VDSL2 Series	Ethernet Extender IEX-402-SHDSL Series	Ethernet switch with DSL links IEX-408E-2VDSL2 Series
DSL Technology	VDSL2 for up to 3 km @ 1 Mbps	G. SHDSL for up to 8 km @ 192 kbps	VDSL2 for up to 3 km @ 1 Mbps



	IEX-402-SHDSL	IEX-402-VDSL2	IEX-408E-2VDSL2
Ethernet Ports	1 FE	1 FE	6 FE
DSL Ports	1 G. SHDSL	1 VDSL2	2 VDSL2
Distance	Up to 8 km	Up to 3 km	Up to 3 km
Redundancy	Link fault pass-through (LFPT)	Link fault pass-through (LFPT)	Turbo Ring, Turbo Chain fast redundancy, and DSL bypass
Operating Temperature	-10 to 60°C / -40 to 75°C (-T models)		
Industrial Certifications	UL 508, EN 50121-4, SafetyNET p	UL 508, EN 50121-4, NEMA TS2, ATEX/C1D2	UL 61010, EN 50121-4, NEMA TS2, ATEX/C1D2, IEC 61850-3

► Ethernet Extenders



Optical fiber can upgrade Ethernet connections in terms of throughput, distance, and reliability.

► Moxa Offers

- Gigabit fiber conversion
- Superior EMI immunity
- Long-distance transmissions
- Industrial-grade reliability

► Ethernet Media Converters

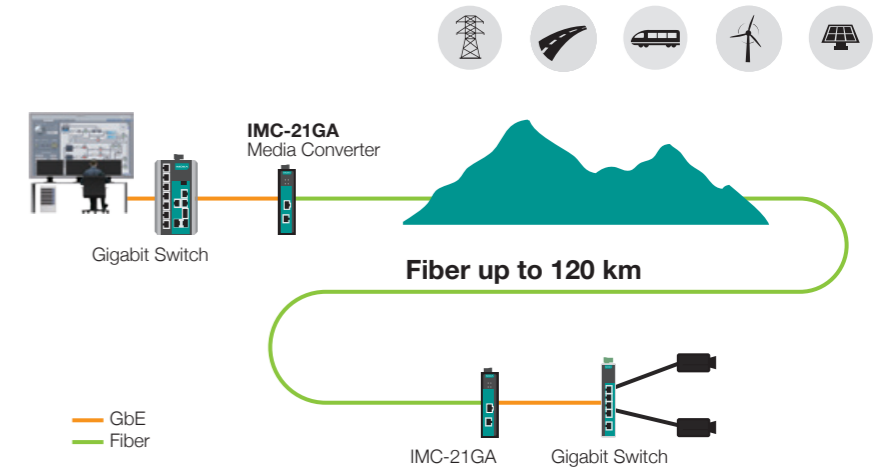
	IMC-101G	IMC-101	IMC-21GA	IMC-21A
Ethernet Ports	1 GbE	1 FE	1 GbE	1 FE
Fiber Ports	100/1000Base SFP slot	100BaseFX (SC or ST)	100/1000Base-SX/LX or 100/1000Base SFP slot	100BaseFX (SC or ST)
Single-mode Transmission Distance	Up to 120 km	Up to 40 km	Up to 120 km	Up to 40 km
Dual Power Inputs	12 to 45 VDC	12 to 45 VDC	12 to 48 VDC	12 to 48 VDC
Operating Temperature	0 to 60°C / -40 to 75°C (-T models)			
Industrial Certifications	UL 508, C1D2, ATEX Zone 2, IECEX,	UL 508, UL 60950-1 C1D2, ATEX Zone 2, IECEX, DNV GL	UL 60950-1	UL 60950-1

Extend the Distance of Ethernet Over Fiber

Moxa offers industrial media converters that provide copper-to-fiber Gigabit-speed extensions of up to 120 km over single-mode fiber in harsh conditions.

Moxa's Ethernet-to-fiber media converters feature innovative link fault pass-through, relay output, industrial-grade reliability, and compact design to withstand industrial environments.

Both IMC-101G and IMC-21GA fiber converters are perfect for megapixel machine vision inspection, public IP surveillance, and outdoor applications that require Gigabit throughput and EMI immunity with fewer hops regardless of distance.



Long-haul Options

- The IMC-21GA supports Gigabit single/multi-mode models with an SC connector and SFP slot for flexible deployment from 0.5 to 120 km
- The IMC-101G supports single-mode fiber for up to 120-km data transmissions

Easy Maintenance

- Link fault pass-through to easily trace network link failures
- A compact size and DIN-rail mounting for easy installation
- LED indicators for easy maintenance

Industrial Reliability

- Power failure and port break alarms by relay output
- Redundant power inputs
- -40 to 75°C operating temperature range
- industrial certifications for hazardous locations

