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 71 million devices worldwide and has a distribution and service network that reaches customers in more than 80 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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Network Management Suite

Industrial Cybersecurity

Modular Gigabit Switches

Unmanaged Switches

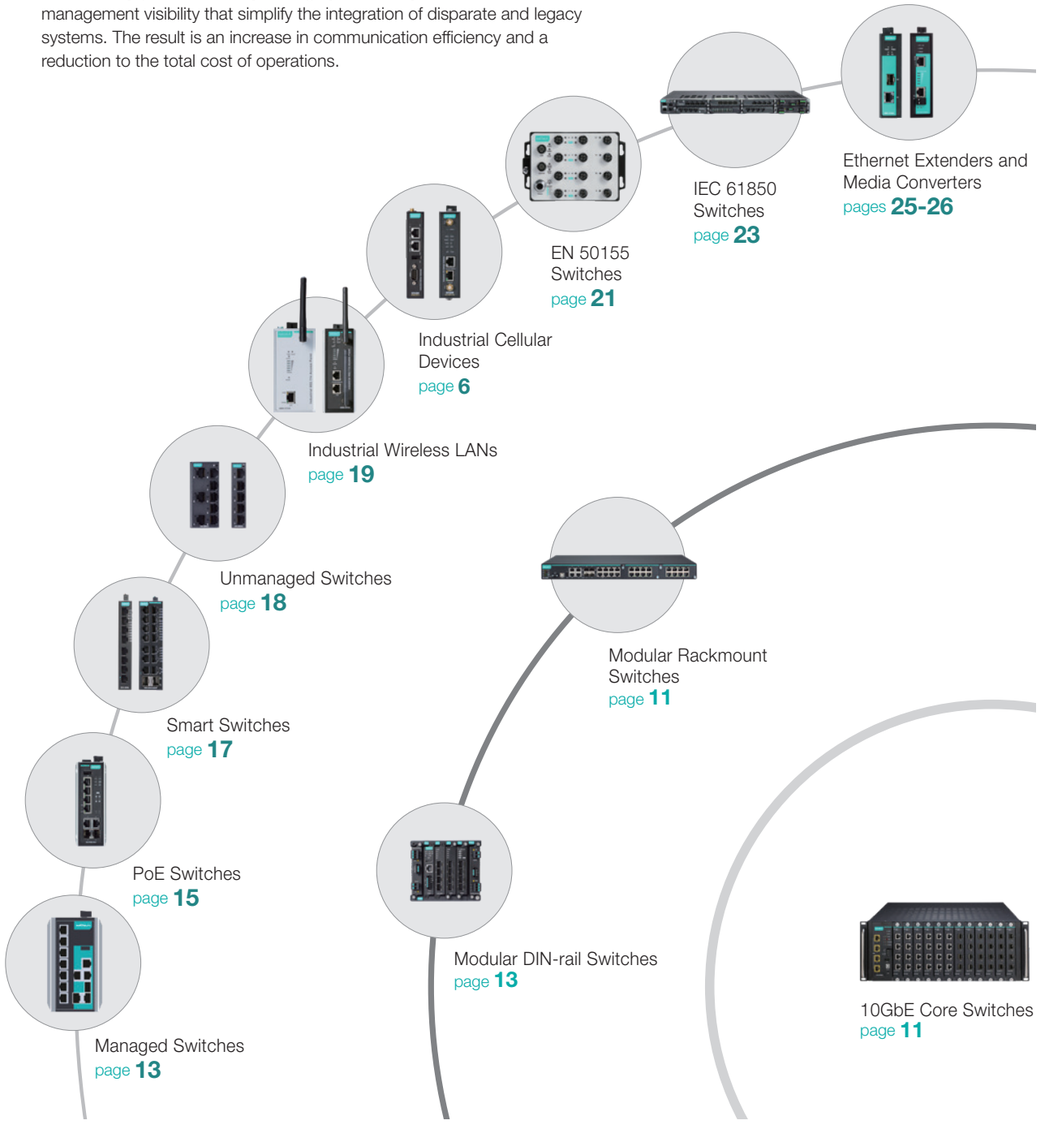
Industrial Wireless

www.moxa.com

Build Future-ready Network Infrastructure

Moxa's industrial network solutions enable seamless OT/IT convergence and connectivity to create a digital future that can accelerate data collection and utilization to boost operational efficiency, innovation, and growth in every industry.

Moxa's comprehensive portfolio of industrial network solutions allows customers to optimize their networks now and into the future. Our solutions include products with industry-proven reliability, strong cybersecurity features, and advanced management visibility that simplify the integration of disparate and legacy systems. The result is an increase in communication efficiency and a reduction to the total cost of operations.



pages 3-8

Security

Defense-in-depth Cybersecurity

- Firewall, VPN, NAT, and secure routing for data and network protection
- Network devices with security features based on the IEC 62443 standard
- Critical assets protection with industrial IPS/IDS
- Security dashboard for event detection and prevention
- Cloud-based secure remote access hardware, software, and services

pages 11-26

Connectivity

Industrial Ethernet Communication Backbone

- High-performance LANs composed of 10GbE/GbE/Fiber/PoE/DSL connections
- Highly robust wireless devices based on 802.11n Wi-Fi/4G LTE cellular
- Industry-proven availability and reliability
- Easy to use for OT/IT integration

pages 9-10

Manageability

Automation-friendly Network Management

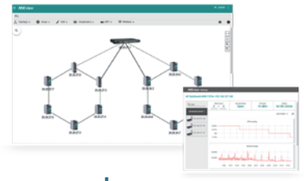
- Easy mass deployment
- Real-time wired and wireless topology monitoring
- Easy tracking of events and roaming status
- Mobile app and alerts
- RESTful APIs for easy integration

▶ 2021 Highlights

Enhanced Security, High Performance

The EDR-G9010 Series offers 10-port GbE performance and defense-in-depth security capabilities. It includes firewall/NAT/VPN protection and Layer 2 switching functions to meet bandwidth-hungry applications that require field-proven reliability and multi-layer security.

See page 5



Visualize Wireless Networks

MXview Wireless expands network visibility to dynamic Wi-Fi connections and features client roaming playback to simplify wireless monitoring and troubleshooting. MXview users can now visualize wired and wireless networks for easy operations and to maximize uptime.

See pages 9-10

Layer 3 Scalability

The new MDS-G4000-L3 Series switches provide full-Gigabit modularity and layer 3 scalability to simplify complex network deployment. The hot-swappable media (RJ45, SFP, PoE) and power (HV, LV) modules offer hundreds of port combination to meet your network needs.

See pages 13-14

Smart Devices for IA Operations

The SDS-3000 series of 8/16-port industrial smart switches are some of the smallest in the world that can be monitored on HMI/SCADA systems, while keeping the configuration and operation easy and flexible. The slim, simple, and smart design makes the smart switch the best fit for control cabinets in smart manufacturing.

See page 17

Strengthen the Defense of Your Industrial Networks

With cyberattacks targeting industrial networks more and more, it is crucial to identify and mitigate vulnerabilities before they can be exploited. Moxa provides holistic OT/IT integrated network security solutions to enhance your network defense against cyberthreats on two fronts.

One solution to reinforce your network infrastructure is to equip it with device-by-device and layer-by-layer security capabilities to ensure legitimate data traffic on the network remains safe.

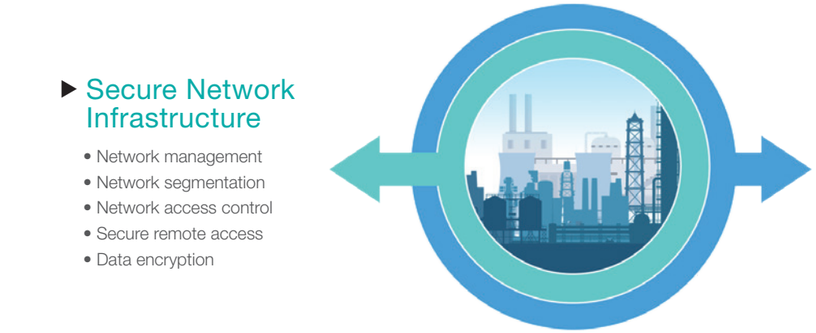
You can also add Moxa's industrial cybersecurity solution to protect your critical assets and networks with specific OT protocol and packet inspection, as well as pattern-based protection against vulnerabilities.

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

- Centralized network and security management and remote connection management
- Secure network and edge connectivity with hardened industrial networking devices
- Protect critical assets with industrial IPS/IDS

Learn more about our OT/IT Integrated Network Security Solution



▶ Secure Network Infrastructure

- Network management
- Network segmentation
- Network access control
- Secure remote access
- Data encryption

▶ Industrial Cybersecurity Solution

- Security management
- Network segmentation
- Industrial IPS firewall
- Industrial IPS/IDS
- Allowlist

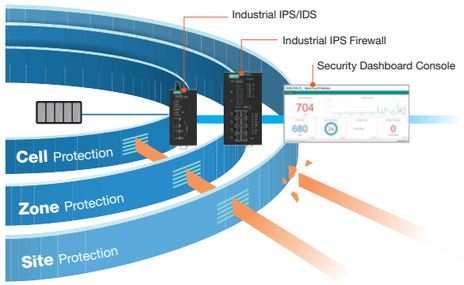
Moxa Security Advisories

The Moxa Cyber Security Response Team (CSRT) is taking a proactive approach to protect our products from security vulnerabilities and help our customers better manage security risks. To stay informed about the latest security updates and potential vulnerabilities, subscribe to our Security Advisories.

Industrial Cybersecurity Solution

Moxa's industrial cybersecurity solution is specifically designed to secure industrial networks from both an OT and IT perspective.

The solution protects the network with a holistic cell-to-site defense approach to help you create a multi-layer defense for your industrial network.



IEC-G102-BP Series

Industrial IPS/IDS

- Ultra-compact industrial security box with IPS/IDS
- Fine-grained policy enforcement with allowlisting control
- Bump-in-the-wire installation without impacting the network

IEF-G9010 Series

Industrial IPS Firewall

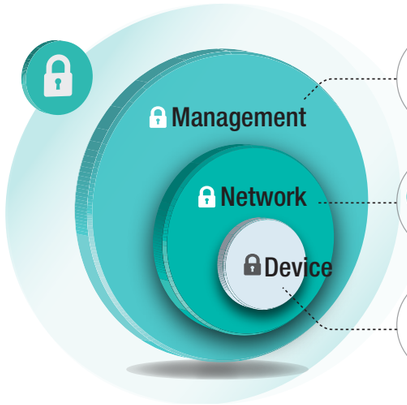
- Compact, security-hardened, and rugged design
- Fine-grained Layer 2 to Layer 7 firewall policy with IPS capability
- Industrial NAT and network segmentation

Security Dashboard Console

Security Management Software

- Centralized cybersecurity management with real-time dashboards
- OT visibility including device identification and network traffic analyzer
- Automatically deploy virtual patches without disrupting operations

Secure Network Infrastructure



▶ Moxa Offers

Network Management
Visualized management for security auditing and monitoring

- MXview / MXview Wireless
- MXconfig / MXview ToGo

Network Protection
Defense-in-depth protection for industrial control systems

- Industrial Secure Routers
- Secure Remote Access

Device Security
Hardened devices with embedded security functions

- Industrial Ethernet Switches
- Industrial Serial Device Servers
- Industrial Protocol Gateways

▶ Featured Products

EDS-(G)500E Series

8/10/12/16/18/28 Ports Layer 2 Managed Switches

- User authentication
- Network access control (port lock, sticky MAC, 802.1x, ACL)
- Network redundancy (STP/RSTP/Turbo Ring/Turbo Chain)

NPort 6000 Series

Secure Terminal Servers

- Authentication servers (RADIUS/TACACS+)
- Set up devices easily with the *Security Hardening Guide*
- HTTPS (TLS 1.2 embedded)/SSH/SNMPv3

MXview

Industrial Network Management Software

- Network security status at a glance
- Predefined security profiles
- Visualized console for security policy management

Working in local area networks (LANs) is often taken for granted, but they are especially vulnerable while processing data and during communication.

▶ Moxa Offers

- All-in-one firewall/NAT/VPN/router/switch*
- Industrial VPN for end-to-end access
- Ethernet and cellular redundancy
- Security features based on the IEC 62443 standard
- Industrial-grade reliability

*L2 switching is only supported by the EDR-G9010 and EDR-810 Series.

Build Your First-line Network Defense

Secure routers are usually the first line of defense that help protect your network against cyberthreats. Moxa's industrial-grade routers and gateways provide wired and wireless secure network access to protect your critical networks and assets while maintaining fast data transmission rates.

High Security Meets High Throughput

Don't let cyberthreats stop your high-speed network operations. The EDR-G9010 Series secure routers bring 10-port full Gigabit connectivity and robust security features to safeguard critical assets on control networks and ensure safe remote access.

EDR-G9010 Series

10-port Gigabit Industrial Secure Router

- All-in-one firewall/NAT/VPN/router/switch
- 8-port TX GbE and 2-port SFP GbE
- Comprehensive redundancy mechanisms, including Turbo Ring and VRRP
- Advanced Deep Packet Inspection (DPI) for Modbus TCP/UDP and DNP3 traffic*

*Available in Q3, 2021.

*DNV certification is available in Q4, 2021.

Secure Substation Monitoring

A widely distributed power grid needs IEC 61850 certified VPN solutions to monitor the intelligent electrical devices (IEDs) in each remote substation.

Solutions and Benefits

Moxa's EDR-G9010 Series works as a VPN firewall that provides a multilayered defense and Gigabit ports for device connections without incurring additional costs.

- Full Gigabit VPN routing and switching
- IPsec for data encryption
- Firewall for local network segmentation and data filtering
- Supports 120/240 VDC/VAC input voltage options*
- IEC 61850-3/IEEE 1613 certified

*Available in Q4, 2021.

Best Value

NAT-102*

Industrial NAT Device

- Complete NAT functionality
- Automatic network access control
- Extremely compact size

*Available in Q3, 2021.

Low-power LTE for Secure Remote Data Collection

Providing sufficient power and security to maintain remote and hard-to-wire network operations is a challenge. The slim and low-power OnCell 3120-LTE-1 gateways utilize LTE Cat 1 technology to facilitate long-lasting operations. The robust built-in VPN security and reliable cellular connectivity enable secure and uninterrupted long-haul data collection from serial and Ethernet devices.

OnCell 3120-LTE-1 Series

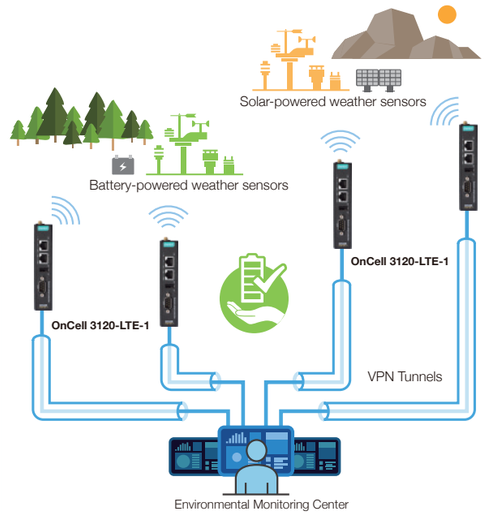
Industrial LTE Cat 1 Cellular Gateways

Reliable and Secure Connections

- IPsec, GRE, and OpenVPN for secure connections
- Dual-SIM and GuaranLink for reliable cellular connectivity
- WAN failover between cellular and Ethernet

Low-power Operation

- 4 W during normal operation and 40 mW when in standby
- Time Scheduling for power saving cycles
- Wakeup control via SMS



Environment Monitoring

Global LTE Connectivity

- Supports EU, US, and AU bands
- Supports global cellular operators including Verizon, AT&T, PTCRB, FCC ID, RCM, and KC

Friendly Deployment

- Serial/Ethernet-to-cellular flexibility
- Import configurations and upgrade firmware using the ABC-02 USB configuration backup and restoration tool

Rugged Design

- -30 to 70°C operating temperature
- ATEX, IECEx, and CID2 certified for use in hazardous locations

▶ Cellular Secure Gateways/Routers

	OnCell 3120-LTE-1	OnCell G3150A-LTE	OnCell G3470A-LTE
4G	LTE Cat 1	LTE Cat 3	LTE Cat 3
Supported Bands	EU, AU, US	EU	EU
Ethernet Ports	2 FE	1 FE	4 GbE
Serial Ports	1 x RS-232/422/485		–
VPN	IPsec, GRE, OpenVPN	IPsec, GRE, OpenVPN	IPsec
NAT/Firewall	NAT, Port forwarding, IP/MAC/Port filtering		

▶ Secure Routers

	EDR-G9010	EDR-G903	EDR-G902	EDR-810
Ethernet Ports	8 GbE + 2 GbE SFP	3 GbE Combo	1 GbE + 1 GbE Combo	8 FE + 2 GbE SFP
Layer 2 Switch	✓	–	–	✓
VPN	IPsec	IPsec, OpenVPN		
NAT	1-to-1, N-to-1, Port forwarding			
Firewall	DDoS, Ethernet protocols, ICMP, IP address, MAC address, Ports			

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

▶ Moxa Offers

- Supports wired and global LTE communications
- Security-oriented design for remote access
- Ready-to-go MRC Quick Link Service
- Supports private-owned MRC Server
- MRC Client mobile app* for monitoring the remote connection

*Available in Q3, 2021.

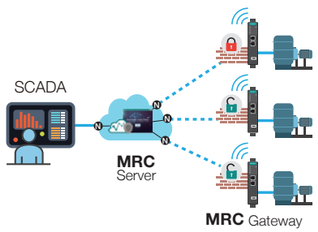
Secure Remote Connections for Maintenance and Collaboration

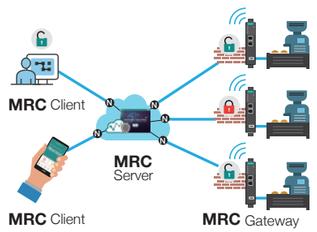
Remote access to PLCs, HMIs, and automation networks is becoming more common for many machine builders, industrial plants, and critical facilities. Moxa introduces the security-oriented Moxa Remote Connect (MRC) solution suite and service that provide strong data encryption and secure tunneling between your local and remote systems, leading to fewer site visits, better efficiency, and improved services for remote collaboration and predictive maintenance from anywhere.

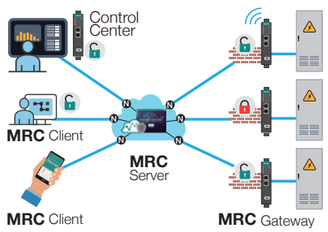
Cloud server options
- Ready-to-go, free MRC Quick Link Service
- Privately-owned MRC server portal

Three Scenarios

Scenario	One-to-many Data Acquisition	Many-to-many Remote Services	Machine-to-machine Remote Monitoring and Maintenance
Needs	A wastewater plant needed to collect data for water temperatures and tank levels of each remote pumping station. • Permanent and stable remote connections • Easy deployment without requiring advanced IT knowledge	An SI located in Asia needed to convert its on-site technical support to provide remote services for an edible-oil processing plant in Africa. • Secure and isolated connections between various refinery process stations and remote support teams • Remote access must be controlled by on-site operators	A power transfer switch equipment provider wanted to improve its regional services via centralized machine monitoring and secure remote access when an alert is sent. • Remote machine status monitoring • Using existing tools for remote maintenance
Moxa's Solutions	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.	At the plant in Africa, an MRC gateway was integrated into each SCADA station. Only the machine operators can enable or disable the remote access connections. The technical teams in Asia installed the MRC Client software to access the corresponding SCADA to provide on-demand support.	Machine providers installed MRC gateways at the control center and at each site connected to their machines to enable machine-to-machine communication for machine monitoring. Once an alarm has been activated, maintenance staff can use the MRC Client software to remotely troubleshoot the machine using existing tools as if they were locally connected to the machine.







MRC Suite

Moxa Remote Connect (MRC) is a cloud-hosted security platform consisting of MRC gateways, the MRC Server, and MRC Clients.

- Security with embedded firewall and allowlist for remote access control
- AES-256 encryption algorithm to protect data
- Smart IP mapping for easy field IP management

Read Our Customer Case Study

YNY Technology's Remote Service Preserves the Supply of Edible Oil in Kenya

"We are delighted to have Moxa as our reliable technology partner."

Jiat Yong
CEO, YNY Technology
Existing MRC solution customer

MRC Client

A Windows-based application installed on laptops/ computers to build a secure link to the MRC Server.

- Supports Windows 7/10
- Download for free from Moxa's website
- Mobile app for real-time connection monitoring

MRC Server

A cloud-based server that manages scalable secure connections between MRC gateways and MRC clients.

Encrypted tunnel

Encrypted tunnel

- Supports both the MRC Quick Link Service and privately-owned MRC server portals
- Flexible year-based license upgrades and extensions

MRC Gateways

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

- Ethernet or LTE WAN connectivity
- Up to 25 local devices per gateway and support for site-to-site connections
- An embedded allowlist and firewall enable high levels of access control

MRC Quick Link Service

- 5-year free service
- 5 GB monthly data volume
- 5 concurrent online nodes

Visit to learn how to register your MRC gateways to activate your MRC Quick Link Service in three steps.

Why MRC, and how it works

Watch our video showing how MRC makes remote access easy, secure, and flexible.

Access Control Permissions

The MRC suite provides four types of access control to help users determine whether remote connection requests should be authorized or rejected.

Gateway Permission

Machine operators can use USB authorization keys to control which gateways can be remotely accessed.

Service Permission

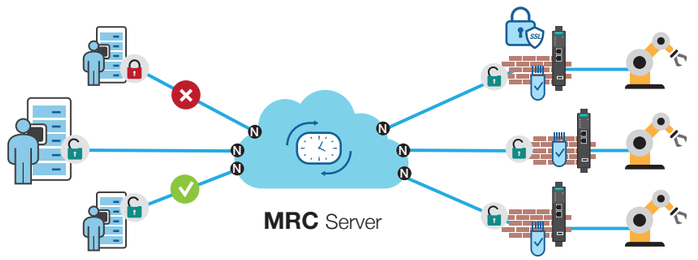
Through the MRC Server, the server manager can restrict which services of the device can be remotely used.

Client Permission

Server managers can specify which clients can access which machine.

Time Permission

Server managers can configure specific time frames during which MRC clients can access remote devices.



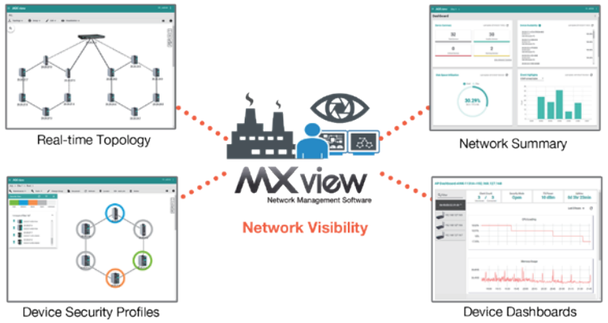
Every minute of system downtime is costly. MXstudio provides real-time visibility to enable swift troubleshooting without the need for advanced IT expertise.

Gain Visibility to Boost Your Network Availability

MXstudio is an industrial network management software suite that provides full visibility and troubleshooting functions for OT networks to ensure maximum uptime throughout all stages of network deployment, management, and maintenance.

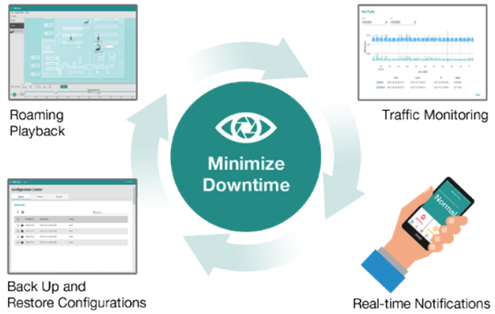
Visualization for Easy Operation

MXstudio features information-packed dashboards that offer more visibility into performance, network traffic, availability, events, and roaming history, all of which simplify network management. With the MXview Wireless add-on module, MXview extends this visibility to Wi-Fi networks, featuring dynamic topologies for at-a-glance monitoring.



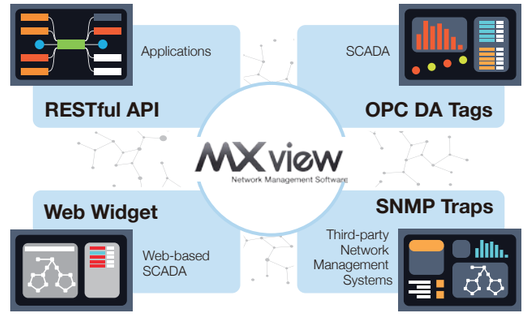
Network Insight for Uptime Optimization

MXstudio provides comprehensive analysis and historical data playback features, which help identify network issues more quickly and improve response rates for better operational uptime and performance.



Easy Integration Into Your IT/OT Systems

- Supports a web widget and RESTful API to embed MXview into SCADA systems and web-based applications
- Provides group health OPC tags for SCADA/HMI integration
- SNMP traps for third-party network management systems (NMS)



▶ Moxa Offers

- Live topology monitoring
- Roaming monitoring and playback for advanced wireless functions
- Mass configuration to save time and reduce errors
- Easily embed MXview into OT/IT systems
- Dashboard view with a complete network summary
- Mobile app and instant alerts

Try Out MXview

Download the free trial version here

▶ MXstudio Series Industrial Network Management Suite

An all-around solution to support you through all stages of your network's lifecycle.

Deployment

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

Faster Mass Deployment

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

Operation

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

Smart Visualization

MXview provides a real-time visual overview of the network topologies that allows engineers to monitor and manage the networks more easily.

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.

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.

Remote Monitoring

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

Mobile Monitoring

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

MXconfig

Industrial Network Configuration Tool

- Configuration is 10x faster than deploying switches one by one
- Link sequence detection eliminates manual configuration errors
- Security Wizard for device security setup and updates

MXview

Industrial Network Management Software

- Automatic topology visualization
- Security View for viewing the security level of network devices
- SFP Fiber Check for fiber link status and warnings
- Dashboard view with a complete network summary
- Easy integration through RESTful API, web widget, OPC DA tags, and SNMP traps

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

MXview Wireless Add-on Module

- Dynamic topology view for Wi-Fi networks
- Client roaming playback for troubleshooting
- Device dashboards and performance charts for wireless devices

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

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

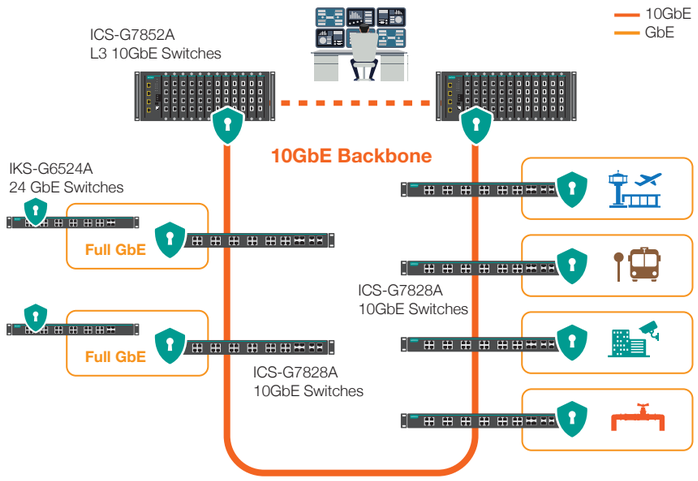
Moxa's industrial Ethernet rackmount switches boost your productivity with 10GbE/GbE performance, help protect against cyberthreats, and work reliably in harsh environments.

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



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

▶ Moxa Offers

- Up to 4 10GbE and 48 GbE uplinks
- Fanless routers and switches
- Devices with -40 to 75°C operating temperature
- Security features based on the IEC 62443 standard
- High-level EMI/EMC shielding

▶ 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

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	CE/FCC EN/UL 61010-2-201 GL/ABS/LR/NK* EN 50121-4	CE/FCC

*IKS-6728A/6726A only.

IACS-level Security

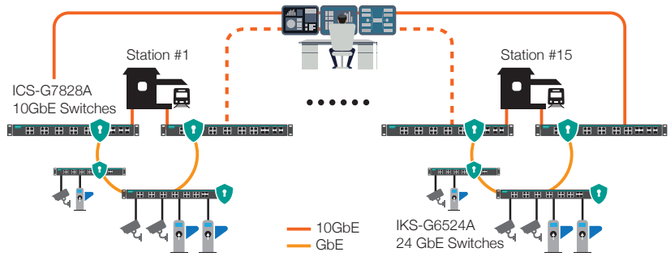
To enhance endpoint security and protect data aggregation against cyberthreats, all of Moxa's industrial rackmount switches have IACS (Industrial Automation Control System) security features that are available via firmware updates.

- 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

▶ 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.



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 can operate in temperatures ranging from -40 to 75°C and supports up to 28 fiber ports for long distance transmissions
- Supports Turbo Ring and Turbo Chain technologies for flexible and redundant ring expansion and fast failure recovery in under 50 ms (up to 250 nodes)

▶ 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	4
10/100 FE	–	–	–	–	24	24
Operating Temperature	-10 to 60°C	-40 to 75°C	-10 to 60°C	-40 to 75°C		

Reliable Switches With **Versatile** Options

Moxa provides a wide array of field-proven DIN-rail managed switches to build rock-solid communication infrastructure. Our portfolio offers the flexibility to adapt to specific application requirements including installing new products in confined spaces, meeting power voltage requirements, and mitigating security threats.

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

- A wide selection of fixed and modular managed switches
- Industry-proven reliability
- Millisecond-level network redundancy
- Security features based on the IEC 62443 standard

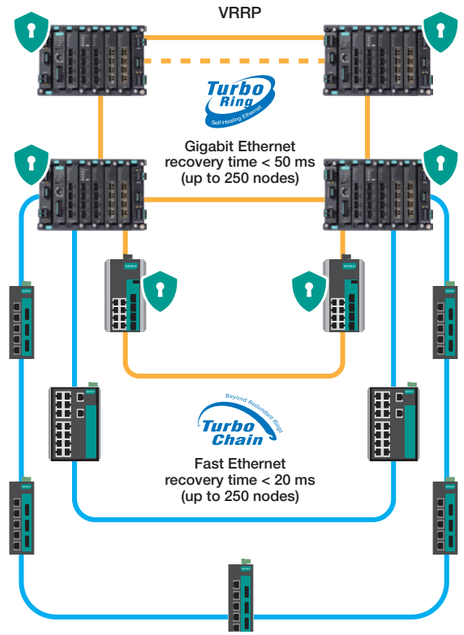
MDS-G4000-L3 Series
Layer 3 Modular Switches
Supports Layer 3 routing and flexible aggregation

MDS-G4000 Series
Layer 2 Modular Switches
Data aggregation for mining applications

EDS-(G)500E Series
Layer 2 Managed Switches
Superior EMI resistance and security features for power transmission systems

EDS-500A Series
Layer 2 Managed Switches
Gigabit fiber uplinks for ITS monitoring

EDS-400A Series
Layer 2 Managed Switches
Fieldbus interoperability for factory automation



-40°C 70°C
5 Years
IEC
IECEx
DNV
IEC 61850-3 IEEE 1613
NEMA TS2
EN 50121-4

L2/L3 Availability

- Supports VRRP for automatic routing failover
- Turbo Ring for Fast Ethernet redundancy under 20 ms
- Turbo Chain for flexible and redundant ring expansion

Embedded Security

- Advanced security features based on the IEC 62443 standard (EDS-500E and MDS-G4000 Series only)
- Supports MXview to easily manage the security status of network devices

OT Interoperability

- Supports multiple industrial protocols for SCADA integration

Compact Design

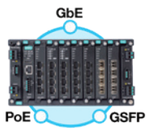
- All models are smaller than a 3U half-rack

▶ MDS-G4000 Product Family

Compact Modularity for Routing and Switching Scalability

Moxa has recently added the MDS-G4000-L3 Series, which includes Layer 3 routing functionality, to the MDS-G4000 product family. The MDS-G4000 product family was designed to maximize performance in ultra-compact casings and enable cross-network data aggregation for flexible scalability.

The MDS-G4000 product family includes a variety of hot-swappable media modules (RJ45, SFP, and PoE) and power units (24/48 VDC and 110/220 VAC/VDC) that allow for flexible configurations and nonstop continuity. The switches can be deployed to support mission-critical operations in applications such as oil and gas, substations, and mining.



Flexibility

- Up to 28-port Gigabit scalability allowing for hundreds of media combinations
- Up to 24 GbE PoE+ / 24 GSFP media options
- Supports DIN-rail, rack*, and wall-mounting options

*Only the MDS-G4028/G4028-L3 supports rack-mounting.

Continuity

- Hot-swappable power and port modules
- Passive backplane to minimize failure rates
- Power outage protection during firmware upgrades to avoid malfunctions

Availability

- Supports VRRP Layer 3 routing redundancy
- Supports Turbo Ring and Turbo Chain for Gigabit redundancy under 50 ms
- Dual isolated redundant power modules

Security

- Security features based on the IEC 62443 standard
- 3-level user security
- MAC-based IP assignment

Reliability

- A robust, industrial-grade design with superior vibration and shock resistance
- Compliant with multiple industry standards

Usability

- OT-friendly HTML5 dashboards for device summary, smart search, and configurations

▶ Modular-type Managed Switches

▶ Fixed-type Managed Switches

	MDS-G4000-L3	MDS-G4000	EDS-G500E	EDS-500E	EDS-500A	EDS-400A
Switch Types	Layer 3	Layer 2	Layer 2			
No. of Ports	12, 20, 28		8, 12, 16	10, 18, 28	5, 8, 16, 18	5, 8
Gigabit Ports	12, 20, 28		8, 12, 16	3, 4, 4	–	–
Fiber Ports	Up to 24		Up to 4*	3, 4, 4	Up to 2*	Up to 3*
Fiber Type	SFP		SFP	SFP	ST, SC	ST, SC
Industrial Certifications	C1D2, ATEX Zone 2, IEC 61850-3, IEEE 1613, EN 50121-4, NEMA TS2		C1D2, ATEX Zone 2, IEC 61850-3, IEEE 1613, DNV, ABS, LR, NK, EN 50121-4, NEMA TS2		C1D2, ATEX Zone 2, IECEx*, DNV, EN 50121-4, NEMA TS2	

* Available for selected models only.

"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.

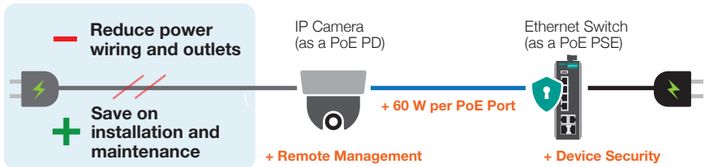
▶ Moxa Offers

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

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 to keep surveillance networks up and running even in harsh environments.



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 IP cameras
- 12/24/48 VDC dual power inputs
- High PoE port density up to 48 ports

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.

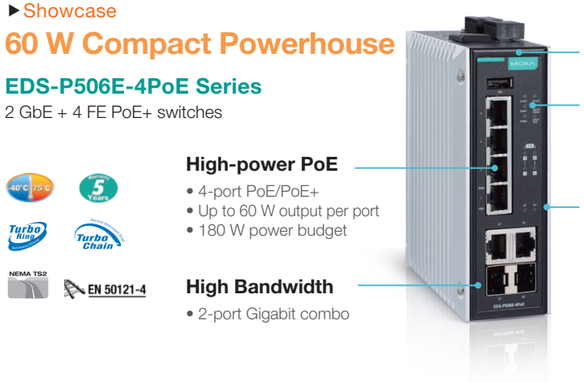
- Device-level cybersecurity
- Supports system-level security integration for increased protection
- Supports MXstudio for network device security profiling and monitoring

▶ Showcase

60 W Compact Powerhouse

EDS-P506E-4PoE Series

2 GbE + 4 FE PoE+ switches



High-power PoE
- 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
- Fast Ethernet recovery time < 20 ms
- Level 4 EMS immunity
- Models with -40 to 75°C operating temperature
- Industrial certifications

▶ Use Case

A Smart City Infrastructure

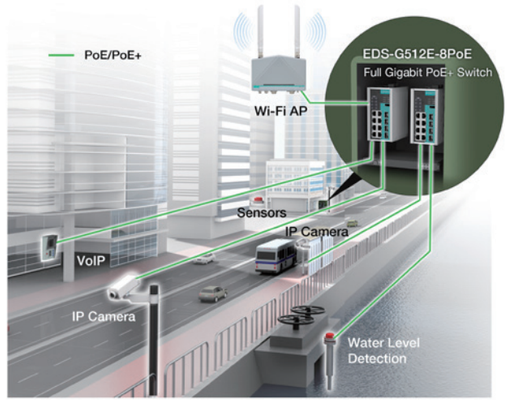
A city in Asia planned to upgrade their infrastructure by utilizing EDS-G512E PoE switches to integrate city surveillance, data collection, and public services.

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

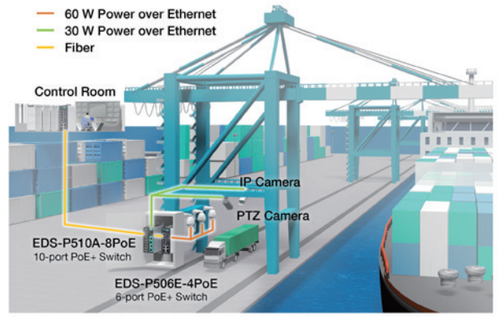
An OCR system required high-capacity PoE switches and IP cameras to facilitate automatic freight container loading, unloading, and tracking at port terminals.

System Requirements

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

Why Moxa

- The EDS-P506E-4PoE 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

	ICS-G7800A/ G7700A	MDS-G4000/ G4000-L3	EDS-G512E-8PoE	IKS-6728A-8PoE	EDS-P510A-8PoE	EDS-P506E-4PoE	TN-5508A-8PoE TN-5516A-8PoE	TN-4500A
Ports	-/2/4 10G + 48 GbE	28 GbE	12 GbE	4 GbE + 24 FE	2 GbE + 8 FE	2 GbE + 4 FE	8/16 FE	4 GbE + 12/20/24 FE
PoE Ports	48 PoE+	24 PoE+	8 PoE+	8/16/24 PoE+	8 PoE+	4 PoE+	8 PoE+	14/16/18/20 PoE+
PoE Output	36 W	36 W	36 W	36 W	36 W	60 W	30 W	30 W

Unmanaged Switches

	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	36 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.

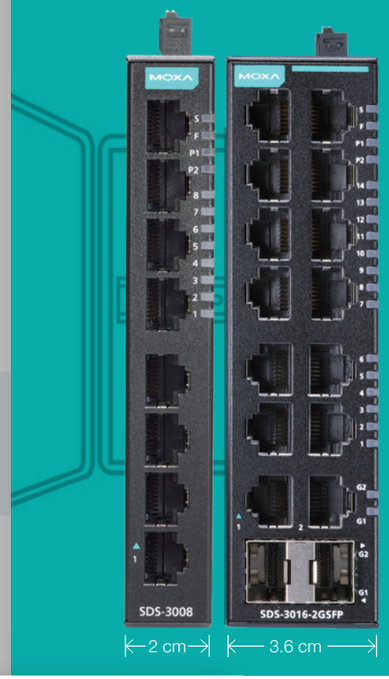
▶ Moxa Offers

- 8/16-port Ethernet smart switches
- The ideal managed switch functions for automation applications
- One-click profile setup for seamless SCADA/HMI integration
- Simple GUI for easy configuration and diagnostics
- 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 and installation, interoperable communication, and ultimately, help reduce downtime.

The SDS-3000 switches have multiple mounting options to ensure they can be installed easily in a variety of applications. You can use either a web GUI or a rotary DIP switch to quickly select IA protocols and enable SCADA/HMI integration for monitoring and maintenance.



SDS-3008/3016 Series
8/16-port Smart Switches

OT Management
- One click to enable SCADA/HMI/NMS integration
- Supports EtherNet/IP, PROFINET, and Modbus TCP protocols

Robust Reliability
- Security features based on the IEC 62443 standard
- Supports RSTP/STP/MRP (Client) network redundancy
- -40 to 75°C operating temperature (-T models)

Ease of Use
- One-page dashboard GUI for easy configuration and diagnostic reports
- Rotary DIP switch for IA profile settings (SDS-3016 Series only)
- Compatible with Moxa's ABC-02 configuration backup and restoration tool

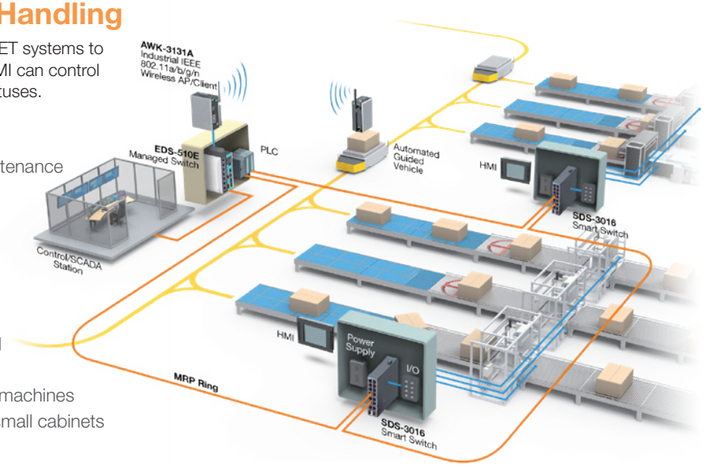
▶ Application Note

Network Monitoring for Material Handling

A material handling plant utilized Ethernet switches and PROFINET systems to build their operational infrastructure. As a result, their SCADA/HMI can control and 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 SDS-3016 Smart Switches
- Just one click to enable PROFINET mode on the switches, allowing the network to be monitored through SCADA/HMI
- Supports MRP Client for rapid network redundancy
- A higher port count allows more data to be collected from machines
- Compact and flexible mounting design that fits easily into small cabinets



Gear Up Your Edge Network for **Expanding Connectivity**

With ultra-small versatile industrial unmanaged switches

To address the needs of rapidly expanding industrial networks, Moxa has developed a new series of industrial unmanaged Ethernet switches—the EDS-2000 Series—with an extra-small footprint that offer reliability, easy deployment, and flexibility for a variety of industrial applications.

Extra-small design for easy placement into control cabinets

Enhanced data efficiency via QoS and BSP functions

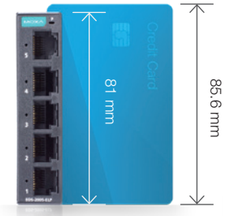
Automatic warnings for power and port failures*

Up to 2 Gigabit combo ports for high-speed and flexible uplinks*

Redundant power inputs* with a range from 9.6 to 60 VDC for higher reliability

Reliable operation in extreme cold and hot conditions

Ultra-compact Size
For easy deployment into cabinets



EDS-2005-EL Series Credit Card

*Only available for the EDS-2000-ML Series.

Moxa Offers

Moxa's wide array of 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.

Rich Options
- Full Gigabit options
- Flexible copper and fiber options
- QoS and BSP functions for traffic efficiency
- Redundant power inputs
- -40 to 75°C operating temperature
- Diverse industrial certifications

▶ Unmanaged Switches

Entry
Best Value

Advanced
High-port Density

Standard
Hardened Design

Full Gigabit
High Bandwidth

	EDS-2000-EL	EDS-2000-ML	EDS-200A	EDS-G200/G300
Features	• Extra-small size • QoS, BSP DIP switch • Metal/plastic housing	• High port density • QoS, BSP DIP switch • Relay output warning	Redundant dual 12/24/48 VDC inputs	• Fiber Gigabit connections • Jumbo frame supported for enhanced performance
Ethernet Ports	5/8	10/16/18	5/8	5/8
Gigabit Ports	–	2	–	5/8
Fiber Ports	Up to 1*	Up to 2	Up to 2*	Up to 2*
Operating Temp.	-10 to 60°C / -40 to 75°C (-T models)			
Industrial Certifications	CE/FCC, UL 61010-2-201, EN 62368-1 (LVD), CISPR (EN 55032)	C1D2, ATEX, IECEx, DNV**, EN 50121-4, NEMA TS2, UL 61010-2-201	C1D2, ATEX, IECEx, DNV, ABS, LR, NK, EN 50121-4, NEMA TS2, UL 508 ***	

*Available for some models only.
**DNV is for the EDS-2010/2018-ML Series only.
***IECEx is for the EDS-205A Series only, NEMA TS2 is for the EDS-200A Series only.

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

▶ Moxa Offers

- Industrial-grade reliability
- AeroMag for easy Wi-Fi deployment and maintenance
- Dynamic topology for checking the status of Wi-Fi connections at a glance
- Security features based on the IEC 62443 standard
- Millisecond-level roaming handoff times for uninterrupted mobility

Building Field-proven and Error-free **Wireless Networks**

There is no need to suffer from unreliable wireless connections due to signal interference, weak signals, or slow failover. Moxa's AWK Series products provide field-proven wireless connectivity and innovative software features to optimize your wireless network for reliability, availability, and security.

AeroMag is a zero-configuration tool that optimizes your WLAN operations all the way from deployment, to operation, to troubleshooting in just a few clicks. The MXview Wireless module for MXview offers real-time visibility of your wireless network through a dynamic topology for more efficient monitoring and troubleshooting. By combining enhanced network security and a hardened design fit for extreme conditions, Moxa's AWK Series provides field-proven Wi-Fi connectivity to meet the requirements of various mission-critical applications.

Availability

- Turbo Roaming for fast handovers under 150 ms
- AeroMag for error-free WLAN deployment and adaptation
- Supports MXview Wireless for dynamic monitoring and roaming playback

Reliability

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

Security

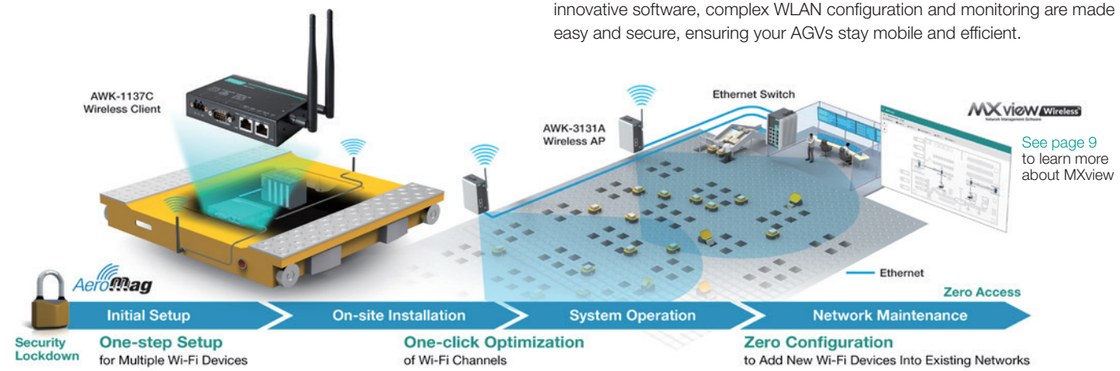
- Reinforced device-level access control based on the IEC 62443 standard
- Supports the latest iteration of WPA2
- Supports HTTPS/SSL, RADIUS, and SSH
- Supports ICMP and filtering based on MAC address, IP protocol, and ports

Keep Your AGVs on Track

With Automatic Wi-Fi Adaptation and Optimization

AGV systems rely on seamless Wi-Fi connectivity while on the move. For AGV system operators with limited IT knowledge, configuring wireless devices and performing WLAN maintenance can be quite daunting.

To address these challenges, Moxa provides the tools to build fast, secure, and seamless Wi-Fi networks that meet the demands of your AGV applications. Our AWK Series provides field-proven Wi-Fi capability that can withstand noise, vibration, and extreme temperatures. Leveraging our innovative software, complex WLAN configuration and monitoring are made easy and secure, ensuring your AGVs stay mobile and efficient.



See page 9 to learn more about MXview

▶ Challenges

How to Build Rugged and Secure AGV Operations

How to Deploy a Reliable Wireless Network and Make Swift Adjustments to Accommodate Changing Wi-Fi Environments

How to Ensure Seamless, Uninterrupted Wireless Communications

▶ Moxa's All-around Solutions

Seamless Roaming and Reliability

AWK-1137C Series

Robust and Compact Devices

- Compact design to fit into machines
- Anti-vibration stability
- Isolation protection for antenna and power inputs
- Client-based Turbo Roaming for seamless roaming with < 150 ms handoff times between APs
- One-to-many NAT to simplify device setup

Easy Deployment

AeroMag

Automatic WLAN Setup and Optimization

- One-step setup for mass AWK Wi-Fi device configuration
- One-click optimization by choosing the best available radio channels
- Zero-configuration when adding new devices into existing WLAN networks
- Zero-access Lockdown to block unauthorized devices
- Supports an error-free Wi-Fi network lifecycle

Visible Wi-Fi Connectivity

MXview Wireless

Dynamic Monitoring and Efficient Troubleshooting

- Dynamic topology view shows the status of wireless links and connection changes at a glance
- Visual, interactive roaming playback function to review the roaming history of clients
- Device dashboards for Wi-Fi APs and clients with detailed device information and performance charts
- Real-time event notifications

▶ 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. Client-based Turbo Roaming with < 150 ms handoff times			
Link Interfaces	1 GbE (PoE-powered)		1 GbE	2 FE, 1 RS-232/422/485
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
Operating Temperature	-40 to 75°C	-25 to 60°C /-40 to 75°C (-T models)	0 to 60°C /-40 to 75°C (-T model)	
Radio Certifications	FCC, CE, MIC, ANATEL, WPC, SRRC, KC, RCM			
Industrial Certifications	–	C1D2, ATEX Zone 2, IECEx	–	E mark E1

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

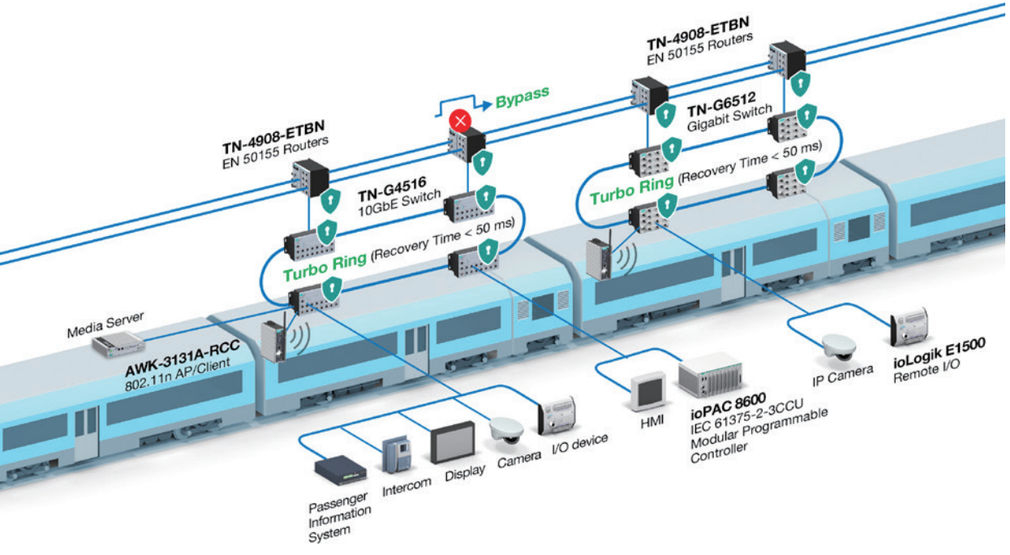
Ethernet-connected Onboard Networks

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

TN-G4516 Series
10GbE Full Gigabit PoE Switches
- Up to 4 10GbE and 12 GbE ports
- Push-pull Ethernet connectors
- 8 GbE PoE ports with total 120 W power budget

TN-G6500 Series
12-port Full Gigabit Switches
- Up to 8 PoE/PoE+ links
- Turbo Ring for Gigabit recovery time under 50 ms
- Security features based on the IEC 62443 standard

AWK-3131A-RCC Series
Onboard 802.11n AP/Client
- IEEE 802.11n compliant
- Up to 300 Mbps data rate
- ACC technology for inter-carriage wireless connections



Performance
» GbE and 10GbE for network convergence
» 802.11n with up to 300 Mbps data rate

Security
» Device-level cybersecurity
» TN-4908-ETBN for firewall protection

Reliability
» Complies with all EN 50155 mandatory test items
» Seamless failover with network redundancy and bypass

▶ EN 50155 Switches

	Router	GbE Router	Full GbE	10GbE	High Port Density	Gigabit IP54	IP54
	TN-5916/5916-ETBN	TN-4900/4900-ETBN*	TN-G6512	TN-G4516	TN-4516A/4524A/4528A	TN-5510A/5518A	TN-5508A/5516A
10GbE	–	–	–	4	–	–	–
GbE	–	8	12	12	Up to 4	2	–
Fiber GbE	–	–	–	–	Up to 2	Up to 2**	–
FE	16	Up to 8	–	–	12/24	8/16	8/16
PoE	–	Up to 12 PoE+	8 PoE+	Up to 12 PoE+	Up to 20 PoE+	Up to 8 PoE+	Up to 8 PoE+

*Available in Q3, 2021.
**Available for the TN-5510A Series only.

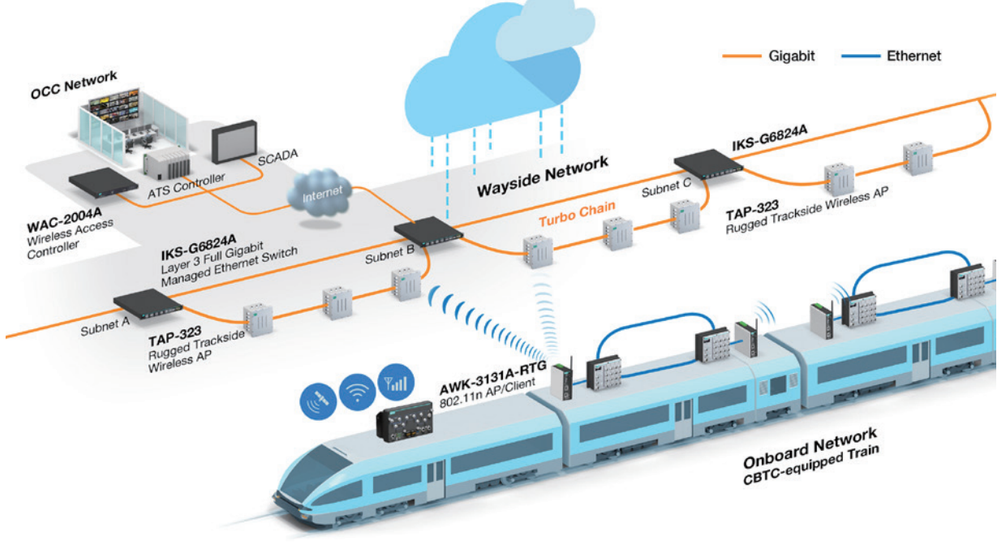
Train-to-ground Wireless Solutions

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 Series
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 rated
- Dual-AP and switch combo device
- Gigabit Ethernet/fiber redundancy with Turbo Chain

WAC-2004A 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 rate
» Turbo roaming under 50 ms*

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

Reliability
» Complies with all EN 50155 mandatory test items
» Compliant with EN 50121
» IP68-rated APs and clients
» Wi-Fi radio redundancy

▶ Wireless LAN and Access Controller

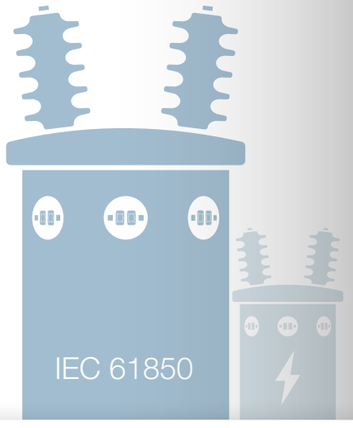
	AWK-3131A-RCC	AWK-3131A-RTG	TAP-213	TAP-323	WAC-2004A
Best Scenarios	Auto-carriage, Passenger Wi-Fi	Train-to-ground	Train-to-ground	Train-to-ground	Wi-Fi Controller
Wi-Fi Capability	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n	–
Network Interfaces	1 GbE	1 FE	1 GbE + 1 GSFP	2 GSFP + 4 FE	1 GbE
Wi-Fi Roaming	–	Controller-based Turbo Roaming* < 50 ms handoff times (with WAC Series)			–
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
- Security features based on the IEC 62443 standard



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 3 and Layer 2 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
- Security features 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

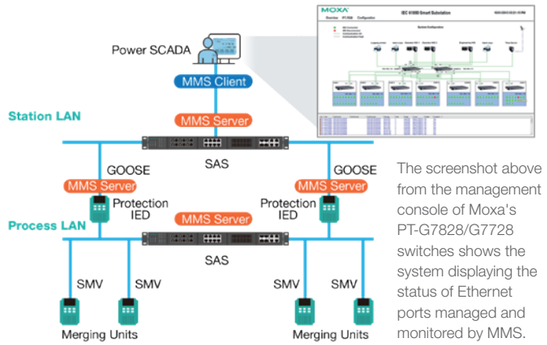
- 4-port GbE PRP/HSR module for zero failover time
- RSTP Grouping for multiple couplings of HSR and RSTP
- IEEE 1588v2 time synchronization
- Dual isolated redundant power inputs
- -40 to 85°C operating temperature
- Built-in MMS server for power SCADA monitoring

▶ Proven PRP/HSR Interoperability

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

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.

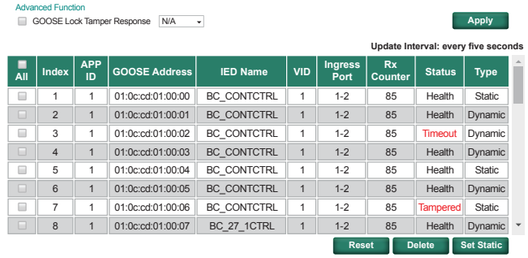


The screenshot above from the management console of Moxa's PT-G7828/G7728 switches shows the system displaying the status of Ethernet ports managed and monitored by MMS.

GOOSE Check

The PT-G7828/G7728 switches feature a GOOSE Check function that monitors GOOSE packets, and sends alerts to the power SCADA and NMS systems immediately when any time-out or tampered GOOSE packets are detected.

Together with GOOSE Lock that forms an allowlist of legitimate GOOSE packets, the PT-G7728/G7828 can block malicious traffic to defend the network.



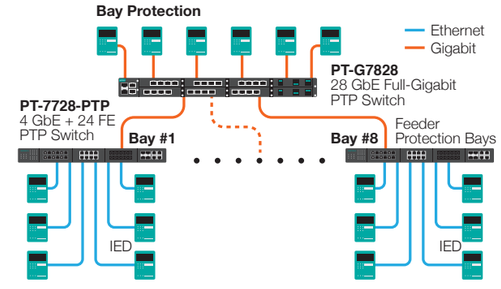
▶ Use Case

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	MDS-G4000
Device Design	Modular	Modular	Fixed ports with single-slot module	Modular	Compact fixed ports	Modular
Max. No. of Ports	28 GbE	4 GbE + 24 FE	4 GbE + 24 FE	4 GbE + 24 FE	3 GbE	28 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, IEEE 1613 Class 2				IEC 61850-3, IEEE 1613
Operating Temperature	-40 to 85°C					-40 to 75°C

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

▶ Moxa Offers

- Long-distance connectivity (up to 8 km)
- Plug-and-play deployment
- Industrial-grade reliability for hazardous environments
- Easy maintenance with local and remote management tools

Extend **Ethernet** Over Existing Copper **Wires**

As an alternative to investing in new cables for system upgrades, Moxa's IEX-402 Series Ethernet extenders provide users with greater flexibility for using existing copper wires to link devices together over long distances, saving users significant time and money.

Easy Installation

Supports an automatic CO/CPE negotiation function that enables plug-and-play, and is configuration-free for easy deployment.

High Reliability

The IEX-402 Series supports link fault pass-through (LFPT) and can interoperate with Turbo Ring and Turbo Chain.

Easy Management

The Ethernet extenders have LED indicators for on-site troubleshooting. Users can also remotely manage the connection status via MXview network management software.

▶ Case Study An oil and gas case in **Australia**

Building a Subsea Oil and Gas Control Application With Industry-specific Cables

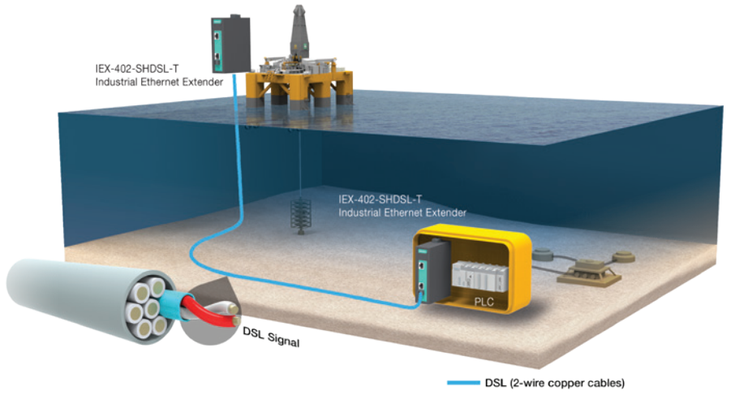
For subsea control applications, great efforts are made to install industry-specific cables under the sea. In this project, the most important requirement is to leverage the existing infrastructure to reduce costs and time spent on installing cables. The installation must be quick and support remote management in extremely hazardous environments.

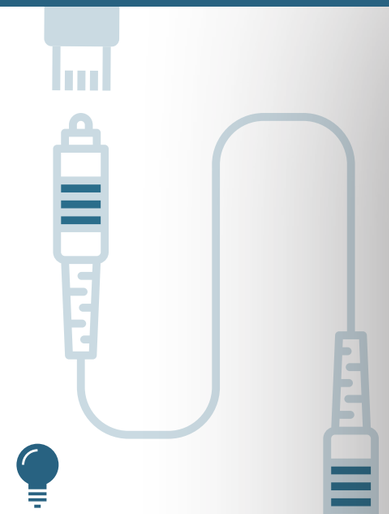
System Requirements

- Utilize existing industry-specific wires under the sea to lower the risk of damaging cables
- Easy installation, diagnosis, and management
- Reliable operation in harsh environments

Why Moxa

- The IEX-402 Series allows users to extend Ethernet over existing industry-specific cables
- Easy installation with auto CO/CPE negotiation
- -40 to 75°C operating temperature and rugged design for harsh environments





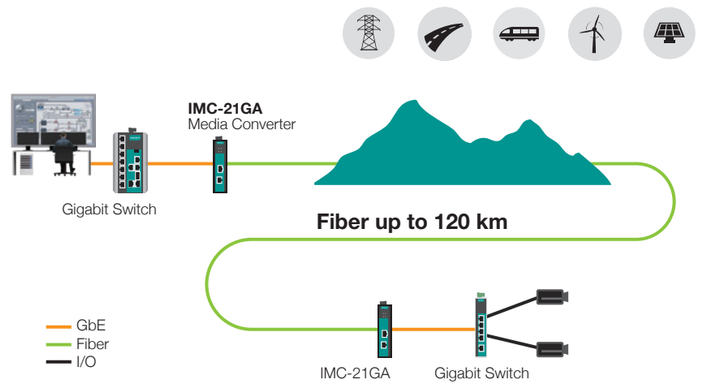
Optical fiber can upgrade Ethernet connections in terms of throughput, distance, and reliability.

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 a 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 data transmissions up to 120 km

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
- Industrial certifications for hazardous locations

▶ 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)		-10 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	UL 60950-1	UL 60950-1