



Cloud-Based VPN Platform

MRC Solutions
Moxa Remote Connect Solutions for IIoT

- Plug-and-play auto-configuration
- Firewall-friendly with IT policy compliance
- Smart IP Mapping for easy field IP management
- Smart Protection to secure remote access control and data privacy
- Smart Tunneling to support general applications

Industrial Smart Switches

SDS-3008 Series
Industrial 8-port Smart Switches

- Multi-protocols for SCADA/HMI monitoring
- Superslim and versatile mounting
- Dashboard-style UI for easy configuration

Industrial LTE Cellular Gateway

OnCell G3150A-LTE Series
Industrial LTE Cellular Gateway

- Ethernet/serial to 4G LTE cellular
- Dual SIMs for redundant backhaul
- GuaranLink 4-tier check for cellular availability
- ATEX Zone 2/IECEX compliance for hazardous locations
- VPN tunnels with IPSec, GRE, and OpenVPN options
- Security features based on the IEC 62443 standard

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. With over 30 years of industry experience, Moxa has connected more than 50 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 industry with reliable networks and sincere service for industrial communications infrastructures.

The Americas

Moxa Americas
Toll Free: 1-888-MOXA-USA
Tel: +1-714-528-6777
Fax: +1-714-528-6778
usa@moxa.com

Europe

Moxa Germany
Tel: +49-89-37003-99-0
Fax: +49-89-37003-99-99
europe@moxa.com

Asia-Pacific

Moxa Asia-Pacific and Taiwan
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231
asia@moxa.com
japan@moxa.com
taiwan@moxa.com

China

Moxa Shanghai
Tel: +86-21-5258-9955
Fax: +86-21-5258-5505
china@moxa.com

Moxa Brazil

Tel: +55-11-2495-3555
Fax: +55-11-2495-6555
brazil@moxa.com

Moxa France

Tel: +33-1-30-85-41-80
Fax: +33-1-30-47-35-91
france@moxa.com

Moxa India

Tel: +91-80-4172-9088
Fax: +91-80-4132-1045
india@moxa.com

Moxa Beijing

Tel: +86-10-5976-6123/24/25/26
Fax: +86-10-5976-6122
china@moxa.com

Moxa UK

Tel: +44-1844-355-601
Fax: +44-1844-353-553
uk@moxa.com

Moxa Russia

Tel: +7-495-287-0929
Fax: +7-495-269-0929
russia@moxa.com

Moxa Korea

Tel: +82-2-6268-4048
Fax: +82-2-6268-4044
korea@moxa.com

Moxa Shenzhen

Tel: +86-755-8368-4084
Fax: +86-755-8368-4148
china@moxa.com



Optimize Your Network Infrastructure for More Industrial IoT Opportunities





Optimize Your Network Infrastructure for More IIoT Opportunities

While the Industrial Internet of Things (IIoT) with its wave of innovation ushers in immense opportunities for businesses, it also opens the door to new threats. The underlying network infrastructure, therefore, must overcome this ever-growing number of challenges to sustain truly reliable connectivity. Only reliable networks—defined by uninterrupted connectivity—will be ready to support new industrial applications as opportunities arise.

To turn challenges into opportunities, Moxa's solutions reinforce cybersecurity, interoperability, and the management of industrial network infrastructure (INI) to bring more legacy and disparate networks into one industry-grade Ethernet backbone. Furthermore, these solutions raise the security level of the entire network's communication to help customers drive nonstop productivity and cost reduction.

Moxa Industrial Network Infrastructure

With a large Ethernet product portfolio, which is distinguished by innovative features and broad expertise, Moxa helps its customers and partners optimize industrial network infrastructures to achieve operational efficiency, availability and reliability in various industrial environments.



Edge-to-Cloud Cybersecurity Enhancement

More connectivity creates more productivity but also more cyberthreats. Moxa extends its defense-in-depth cybersecurity from the edge to the cloud across private and public networks.

Device-Level Defense

Moxa embeds security features based on the IEC 62443 standard in its edge-to-core industrial switches and wireless devices to enhance cybersecurity in all levels of a network infrastructure.

Network System Security

Moxa's industrial secure routers provide an all-in-one firewall, VPN, NAT, and switch functionality; together with a wide variety of network devices that are embedded with security features based on the IEC 62443 standard Moxa provides flexible and powerful security building blocks to help system integrators construct secured systems.

Cloud-Based Secure Remote Access

Moxa's cloud-based secure remote connection solutions strengthen secure and transparent tunnels for industrial applications. These solutions also benefit OEM machine builders and service integrators when they perform remote services or data acquisition over the Internet for distributed field operations.

Highlights

Moxa Remote Connect page 7

Moxa provides cloud-based VPN solutions for industrial customers to increase their remote application capabilities via VPN tunnels or mesh with no need for the involvement of IT experts or investment for a cloud system.

Smart Switch page 15

Designed for easy connections and SCADA/HMI monitoring, the superslim SDS-3008 enables smart connectivity with regard to multi-protocols interoperability, horizontal and vertical installations, and dashboard-style configuration.

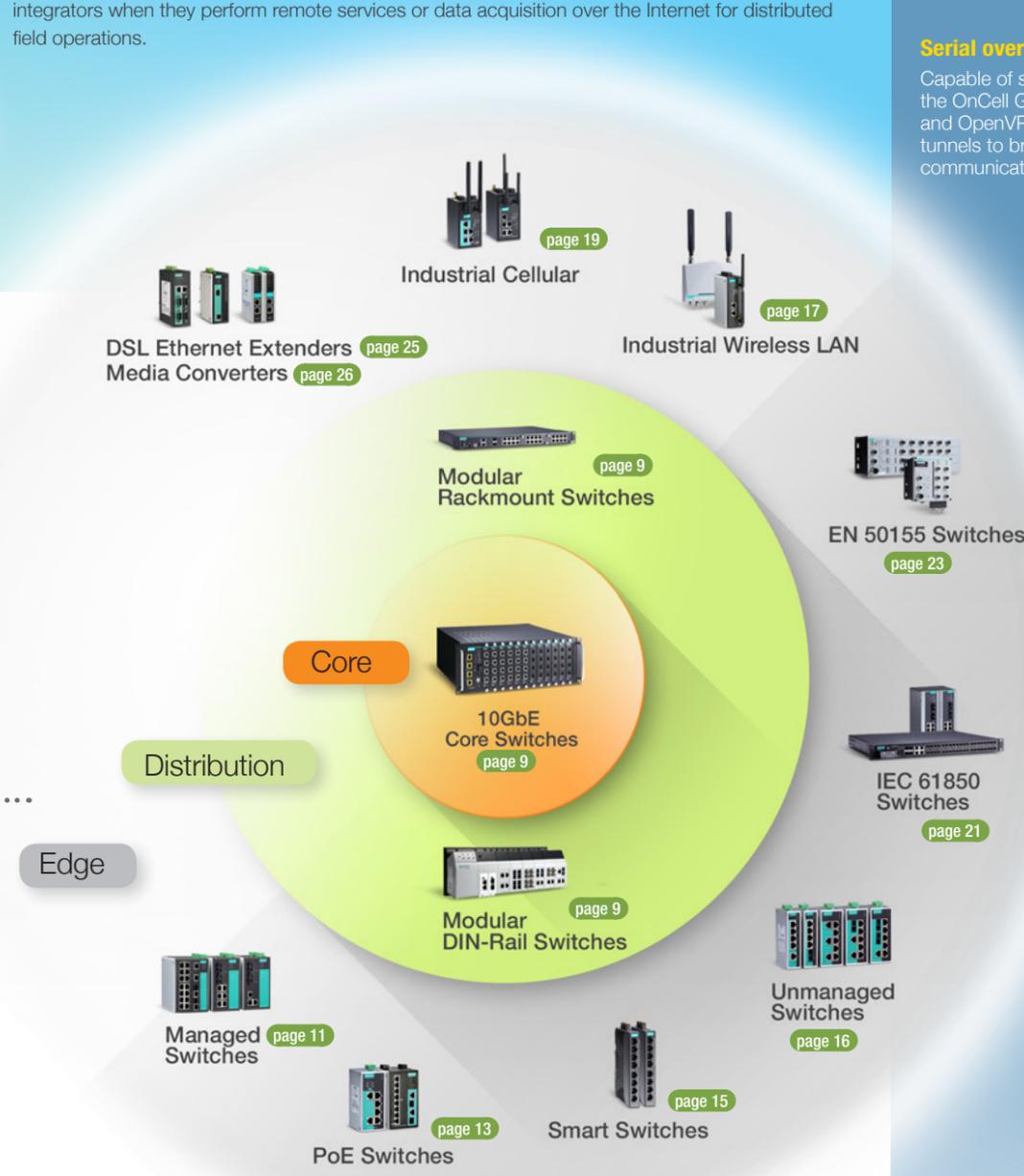
Security Upgrade page 11

To meet more IIoT scenarios, Moxa releases firmware upgrades that offer security features based on the IEC 62443 standard to secure routers, switches, and wireless product lines.

Serial over Secure LTE page 19

Capable of serial, Gigabit, and LTE connectivity, the OnCell G3150A-LTE supports IPSec, GRE, and OpenVPN protocols up to 5 concurrent VPN tunnels to bridge legacy to Ethernet over LTE cellular communication.

- Optimized Performance**
 - Seamless LAN and WLAN connectivity with a diverse combination of 10GbE/GbE/4G LTE/ 802.11n/PoE/Fiber/DSL interconnections
- Strengthened Security**
 - Firewall routing for secure LAN and WAN connections
 - Standard VPN for IPSec/OpenVPN secure remote access
 - Cloud-based VPN for site-to-site secure remote connections
 - Centralized private IP management for secure cellular P2P connection
 - Embedded security features based on the IEC 62443 standard
 - Device-level cybersecurity monitoring and management
- Easy Management**
 - Configuration is 10 times faster than one-by-one deployment
 - Live topology monitoring
 - Easy event tracking
 - Mobile app and alerts
 - Informs SCADA about network health
- Seamless Mobility**
 - 4G LTE and 802.11n Gigabit wireless
 - Millisecond-level roaming handovers
 - AeroLink Protection for site-to-site redundant radio links
 - Dual SIMs and GuaranLink for reliable cellular connectivity
- Powering Productivity**
 - Ethernet redundancy < 20 ms (@250 switches)
 - Multicast routing redundancy < 300 ms
 - Controller-based roaming < 50 ms
 - Redundant radio links < 300 ms



Visualized Security and Mobility for Easy IloT Network Management

- Mass Configuration to Save Time and Reduce Errors
- Live-View Topology Monitoring and Alerting
- Event Playback and N-Snap for Diagnostics
- MXview ToGo for Mobile Operation
- Device-Level Cybersecurity Management

Advanced Cybersecurity Management



To enhance cybersecurity management, MXstudio adds device-level cybersecurity to network management. A security view is built in to display the security level and status of Moxa's network devices. Flexible security settings are enabled with a newly added Security Wizard.

Video
Ramp Up Your Network Security

Third-Party Support and Collaboration

Easy SCADA Integration with Lower TCO

MXstudio can act as an OPC server to feed SCADA OPC tags with real-time network status, saving investment on thousands of OPC tags for SCADA communication.

An example of this in practice is one leading semiconductor manufacturer that has taken full advantage of this feature to benefit from cost savings and optimal operational efficiency.

Collaboration with Third-Party NMSs

MXview can operate with large network systems by setting trap receivers and sending SNMP traps to up to two other network management software platforms, which may focus on end-to-end service availability rather than physical network connectivity.



Visualize IloT Network Complexity for Easy Management

A clear visibility of network status makes complex network administration simple and easy to operate. MXstudio is a suite of automation-friendly industrial network management software that presents all network settings, conditions, and traceable records on visualized, engineer-friendly interfaces for easy installation, operation, maintenance, diagnostics, and mobile monitoring and alerting. MXstudio includes MXview, MXconfig, N-Snap, and mobile MXview ToGo.

Challenges

10x Faster MXconfig

MXconfig speeds up network deployment through flexible group configuration, duplication, and link sequence detection. A Security Wizard is added for easy device security settings and changes.

Installation

One-by-one device deployment is a laborious, time-consuming, and error-prone task.

Smart Visualization MXview

MXview offers a live map of the physical network topology. Non-IT engineers can click on the live-view graphic to easily and quickly manage all network statuses, traffic, and activities. A security view allows for a single view of the security status of all devices to ensure optimal cybersecurity.

Mobile App MXview ToGo

Use your mobile devices for instant network status monitoring and event information anytime, anywhere for reduced downtime.

Diagnostics

Delayed and incorrect network diagnoses waste time and resources when troubleshooting blindly.

Operation

Making sense of and responding to network health, traffic, and activities can be daunting, especially for mission-critical applications.

Quick Diagnostics MXview

MXview enables event search and playback functions, such as video playback for easy event tracking.

Maintenance

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

N-Snap

MXstudio's N-Snap also enables one-click device information collection to help engineers identify and analyze changes.

One-Click Backup MXview

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

	MXconfig	MXview	N-Snap	MXview ToGo
Industrial Network Configuration Tool				
Industrial Network Management Software	<ul style="list-style-type: none"> • Configuration is 10X faster than one-by-one deployment (with 100 switches) • Link sequence detection eliminates manual configuration errors • Security Wizard for easy device security setting 	<ul style="list-style-type: none"> • Automatic topology discovery and visualization with VLAN/IGMP grouping • Security view for the security status of devices • Event playback for reviewable diagnostics • Third-party devices supported by a MIB compiler and MIB browser • OPC tags for easy SCADA/HMI management 	<ul style="list-style-type: none"> • A standalone utility to take network snapshots for quick troubleshooting • Automatically compares network and device data, and highlight the differences 	<ul style="list-style-type: none"> • Real-time notification for reduced downtime • Quick network and device status checking • Only one click for easy device search and mapping
Industrial Network Snapshot Tool				
Mobile Monitoring Tool				
Security View				
Security Wizard				
MXview ToGo				

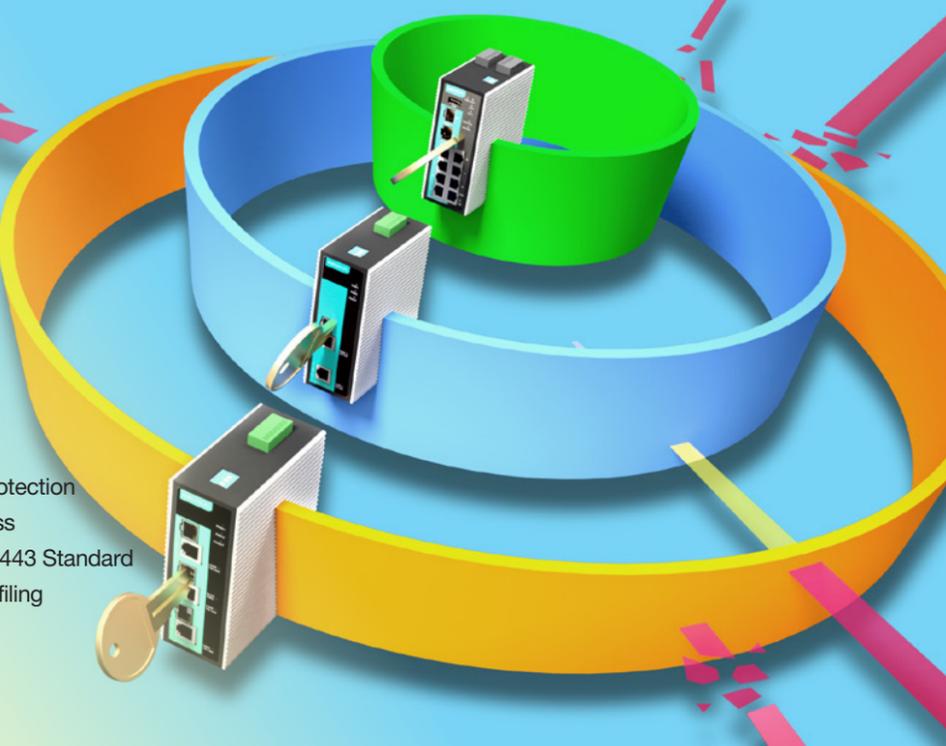
Support List for Moxa's Networking Devices

	Managed Ethernet Switches	Wireless AP/Clients	Secure Routers	PROFIBUS-to-PROFINET Gateway	Serial-to-Ethernet Device	Ethernet Extender	Remote I/Os	Third-Party SNMP Devices
MXview	✓	✓	✓	✓	✓	✓	✓	✓
MXconfig	✓	✓	✓	✓	✓	✓	-	-
N-Snap	✓	✓	-	-	-	✓	-	-
MXview ToGo	✓	✓	✓	✓	✓	✓	✓	✓



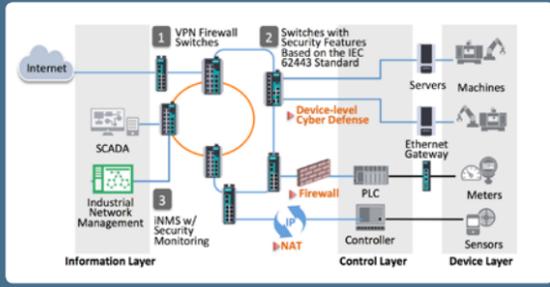
Ramp Up Your Network Security

- Industrial Firewall for Critical Device Protection
- VPN Routing for Secure Remote Access
- Security Features Based on the IEC 62443 Standard
- MXstudio for Easy Device Security Profiling and Monitoring



IACS Defense-in-Depth Cybersecurity

With cyberattacks rife in the age of the Industrial Internet of Things, Industrial Automation and Control Systems (IACS) require strengthened cybersecurity to ensure that mission-critical facilities and services are safe and secure. Moxa provides a defense-in-depth framework with a wide variety of cybersecurity building blocks, which include industrial secure routers, Ethernet devices with security features based on the IEC 62443 standard and management tools, to help system integrators deploy systemwide cybersecurity for industrial automation and control systems.



An ITS Network in Europe

Secure Infrastructure for Tramway Stations

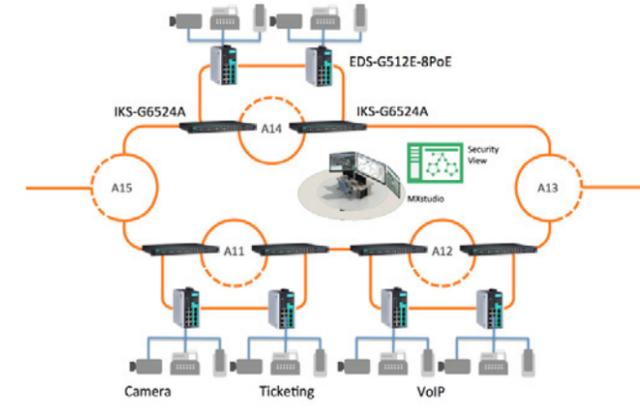
A tramway system adopted EDS-G512E-8PoE switches to implement security measures, and also MXstudio to deploy efficient large-scale network management.

Solution & Benefits

- The PoE+ switches provide device-level password and account lockout mechanism, as well as TACACS + central authentication to prevent unauthorized access
- MXstudio for easy network deployment and maintenance

Future Upgrades

- Updates MXstudio with MXconfig's Security Wizard to complete the security parameter setup with just a few clicks
- Updates IKS-G6524A firmware to add security features based on the IEC 62443 standard for the protection of aggregated switches



An Energy Network in North America

Remote Wind Farm Monitoring

The customer used the EDR-810 to deploy reliable field VPN gateways that protect communications between the wind farm's SCADA and Cloud SCADA systems.

Solution & Benefits

- The IPSec VPN gateway brings field information to the cloud with ease
- -40 to 75°C wide operating temperature range for low-cost

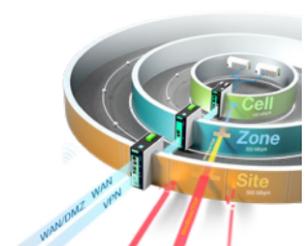


White Paper
How to Choose the Right Industrial Firewall

All-in-One Secure Router

Moxa's all-in-one EDR industrial secure routers are capable of critical asset protection and secure remote access to construct multilayer cybersecurity in multiple industrial protocols and harsh environments.

- All-in-one design for flexibility and economical deployment
- Best-in-class VPN and firewall throughput
- Built-in Modbus TCP packet inspector



Device-Embedded Security

With firmware, Moxa adds device security capabilities, based on the IEC 62443 standard to the lines of Ethernet switches, routers and wireless devices to strengthen the cybersecurity of mission-critical infrastructures.

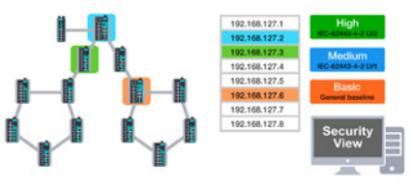
- Device identification and authentication for access control and management
- Prevents intrusions and attacks
- Protects sensitive data
- Audits network events



Security Management

With MXview's Security View and MXconfig's Security Wizard, network administrators can see a full picture of the security levels of Moxa's network devices, allowing for quick responses to any vulnerabilities that are identified on a network.

- Security status at a glance
- Security setup in 3 steps
- Faster time for deployment



Portfolio with Security Features Based on the IEC 62443 standard

- Secure Routers
- Industrial Wi-Fi
- Industrial Switches
- Rail Wayside Wi-Fi
- IEC 61850 Switches
- Industrial Cellular

Please check www.moxa.com for the latest update.

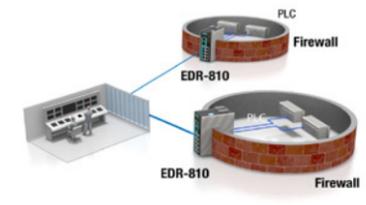
White Paper
Tips on How to Ramp Up the Security of Industrial Networks

Why 62443-4-2?
Ramp Up Your Network Security

All-in-One Industrial Secure Routers

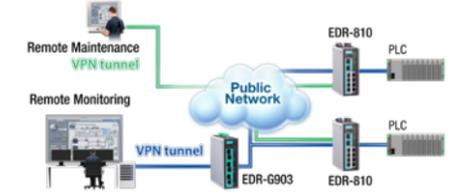
Transparent Firewalls

The EDR series provides a transparent firewall function that allows you to protect control networks and critical devices, such as PLCs and RTUs, without the need to reconfigure the network settings, making the deployment faster and easier.



Secure Remote VPN Access

Using IPSec, L2TP over IPSec, or OpenVPN technologies, the EDR series can set up encrypted IPSec VPN tunnels or five OpenVPN clients for secure remote access between industrial networks and remote applications, such as water treatment, oil and gas, power, or ITS networks.



Modbus Packet Inspection

All EDR routers come with PacketGuard™ to perform deep Modbus TCP protocol inspection and execute control actions from Modbus Master Commands and Modbus Slave Response, and vice versa.



Secure Routers

	EDR-G903	EDR-G902	EDR-810
Target Requirement	Dual WAN redundancy	Security between WAN and LAN communication	Multiple ports for direct device connections
Interface	2 WANs (Combo); 1 LAN (Combo)	1 WAN (Combo); 1 LAN (RJ45)	Configurable WAN/LAN for up to 16 interfaces
Firewall Throughput	40,000 fps	25,000 fps	10,000 fps
Firewall/NAT	512/256 policies	256/128 policies	256/128 policies
IPSec VPN	100 IPSec tunnels	50 IPSec tunnels	10 IPSec tunnels
IPSec VPN Throughput	150 Mbps	60 Mbps	17 Mbps
WAN Backup	Dual WANs	-	-
DMZ	1	-	-
Layer 2 Switch Function	-	-	VLAN, IGMP, RSTP, Turbo Ring V2

Extend Industrial Applications over Secure Remote Connections

- Agility for Industrial Secure Remote Access
- Smart Features for Easy Deployments
- Web-Portal-Based Centralized Cellular Management



Remote Automation Counts On Security and Connectivity

Reliable remote automation holds the potential to push the boundaries of industrial manufacturing and yield unprecedented levels of production. However, security and connectivity are the main barriers holding back remote industrial applications. Moxa provides standard VPN secure routers and innovative cloud-based Secure Remote Access (SRA) solutions to ensure secure interconnections between machines, machine service engineers, and machine supervisory servers over the Internet. For both machine operators and machine service providers, the benefits are significant time and cost savings on remote monitoring and maintenance for improved efficiency and maximum uptime.

3 Scenarios for Industrial SRA Applications

Several scenarios exist in IIoT applications where OEM machine builders or service providers host machine monitoring and deliver maintenance services to machine operators.

1-to-1/1-to-Many Interconnections

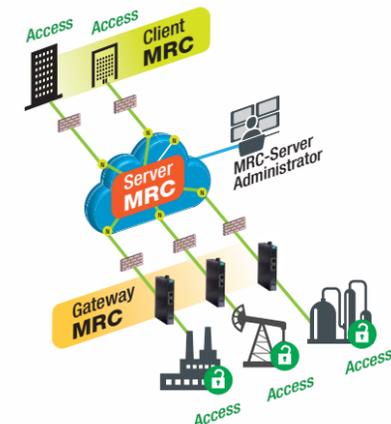
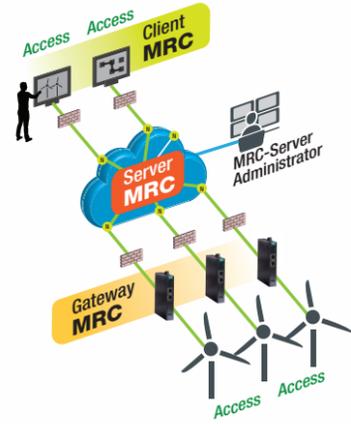
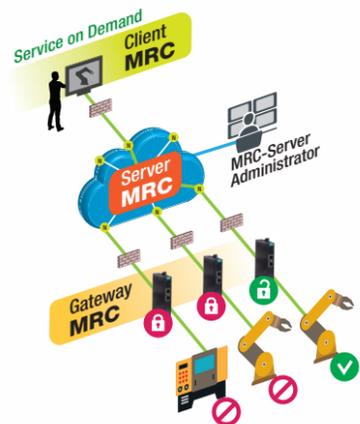
Machine assets owners, operators, and machine service engineers rely on SRA solutions to build up a secure and easy-to-use connection tunnel between the service engineer and the remote machines for remote diagnosis, maintenance, and troubleshooting.

Multiple-to-Multiple Interconnections

The SCADA server utilizes the connectivity platform to enable remote monitoring of field machines for predictive maintenance. Multiple machine service engineers can also access the remote machines and SCADA server at the same time to jointly perform a diagnosis and troubleshooting.

Site-to-Site Network Infrastructure

A secure mesh-type tunnel infrastructure can be built to enable secure internetworking between the enterprise networks, factory networks, and field networks. The site-to-site mesh network allows all the interconnected networks to communicate with each other like within a local network.

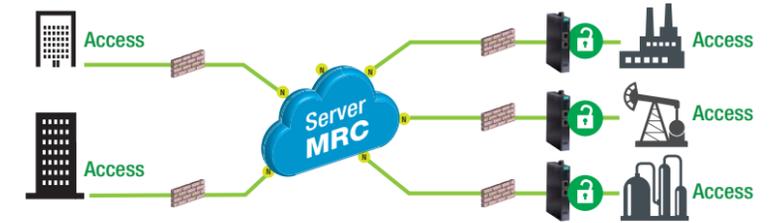


3 SRA Solutions

Cloud-Based Secure Remote Access Solution

The Moxa Remote Connect (MRC) solutions comprise VPN client software, industrial VPN gateways, and a VPN server platform. The MRC solutions provide an easily managed and secure connectivity platform that helps establish VPN interconnections between supervisory servers, field machines, and service engineers for remote monitoring, diagnosis, troubleshooting, and maintenance.

- Plug-and-play auto-configuration
- Firewall-friendly with IT policy compliance
- Smart IP Mapping for easy field IP management
- Smart Protection to secure remote access control and data privacy
- Smart Tunneling to support general software applications



MRC Client

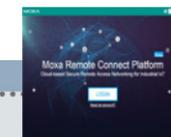
A Windows-based application installed in laptops/computers to build secure connections with an MRC server over the Internet.

MRC Server

A centralized secure connectivity platform that manages secure interconnection between MRC gateways and MRC clients over the Internet.

MRC Gateway

Connect Ethernet-based machines to a MRC server for secure remote connection over the Internet.



MRC Server

MRC Server Software

- Centralized secure connectivity software
- Supports general software applications



MRC Client

MRC Client Software

- Easy installation on servers or laptops
- Support Windows 7/8/10 (32- and 64-bit)
- Download from Moxa's website



MRC Gateway

MRC Gateway Series

- Ethernet or LTE WAN connectivity
- 25 local devices or site-to-site capacity
- -40 to 75°C operating temperature range

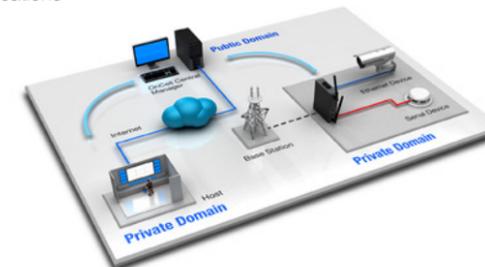
Note: The LTE version is only available in the U.S.

Centrally Managed Cellular Solutions

Moxa provides 3G/4G-connected SRA solutions consisting of OnCell series cellular products and OCM (OnCell Central Manager) software.

The OCM offers a centralized private IP solution that allows easy mobile device management, secure data exchange, and access control over the Internet.

- A cost-effective private IP solution
- Enables secure data exchange and access control over the Internet
- Supports rugged cellular hardware suitable for hazardous locations



OnCell Central Manager See page 19

Centralized private IP software for large-scale OnCell device management

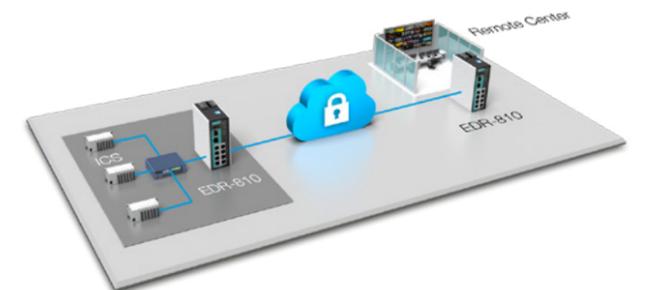
Download
LTE Gateways Applications



Standard VPN Solutions

Moxa provides industrial secure routers of standard VPN interfaces to help system integrators deploy secure communication tunnels between remote fields with ease. The IPSec and OpenVPN technologies bridge different networks to secure interconnectivity that is required for industrial applications.

- Wired and wireless IPSec and OpenVPN products for flexible and secure network deployment
- Embedded firewall functionality



EDR series

Industrial secure routers with all-in-one firewall/NAT/VPN See page 6



OnCell Series

Industrial 3G/4G cellular gateways/routers See page 19

Increased Security and Availability for High-Speed IIoT Networks

- 24 to 52-Port FE/GE/10GbE
- Multicast Routing Redundancy Under 300 ms
- Security Features Based on the IEC 62443 Standard
- Built-In Industrial Reliability
- Lower Total Cost of Ownership



Critical Security and Availability for High-Speed Networking

A high bandwidth and high port density help IIoT expansion in speed and scale, but they also raise the risk of cyberattacks and link failures. Moxa's 10GbE/GbE industrial rackmount switches provide modular flexibility with 24 to 52-port routing and switching capability, security features based on the IEC 62443 standard and millisecond-fast multicast traffic redundancy to strengthen mission-critical IIoT infrastructures, such as city/transportation/manufacturing surveillance applications, with improved cybersecurity, industrial-grade failover, and device reliability.

White Paper
Securing Network Devices with the IEC 62443-4-2 Standard

Data Aggregation Security

To protect data aggregation and processing against cyberthreats, Moxa upgrades its IKS series of industrial rackmount switches with security features based on the IEC 62443 standard.

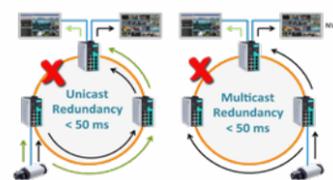
- Security features based on the IEC 62443 standard
- Sensitive data and access protection
- Supports MXstudio for easy device security profiling and monitoring



Multicast Availability

In response to the growing number of multicast scenarios, Moxa's rackmount switches are capable of V-ON protocol for millisecond-level multicast routing and switching redundancy.

- Layer 2 unicast and multicast traffic recovery < 50 ms
- Layer 3 unicast and multicast traffic recovery < 300 ms
- Millisecond-level router redundancy



Watch the lab test and see how the technology achieves millisecond-level network recovery upon media and node failure.

Video
A test and comparison video

Industrial Reliability

Moxa's industrial rackmount switches provide built-in reliability that delivers superior EMI shielding and extreme temperature resilience without relying on a fan or heater.

- Wide operating temperature range
- High-level EMI/EMC shielding
- Hot-swappable operation (ICS-G7000A 4U series only)
- Redundant power supply with isolated protection



White Paper
Ensure nonstop IP surveillance with an optimized industrial Ethernet network

Maximum Uptime and Lower TCO

Ensures Control Room Reliability

Does your control room provide enough protection to prevent network interruptions caused by electrical noise, power surge, EMI, or link failure?

Now, you can choose Moxa's industrial-grade switches that come with industrial-grade reliability and availability to protect your core networks against potentially adverse conditions.

	Moxa Industrial Rackmount Switches	Commercial Rackmount 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, EN 50121-4, FCC Part15, CISPR (EN 55022) class A	CE/FCC

Video
Enhance control room reliability with industrial-grade rackmount switches

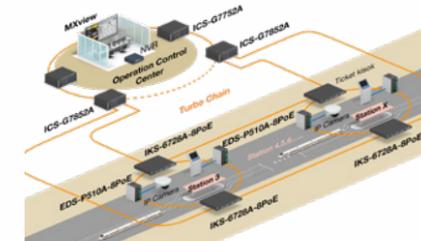
Multicast Video Surveillance

Building a Video-Optimized Network for a Major Tramway

A city tramway needs a reliable communication network along a stretch of 22.4 kilometers that includes 37 stations and 11 electrical substations.

System Requirements

- More than 250 IP cameras with a multicast delivery across VLANs
- A multiservice infrastructure composed of layer 2 and layer 3 networks
- Millisecond-level redundancy is a must for both network switching and routing



Why Moxa

- V-ON™ technology guarantees layer 2 network redundancy under 50 ms and layer 3 multicast redundancy under 300 ms.
- MXstudio suite makes network installation, operation, maintenance, and diagnostics easy
- Industrial-grade design and a 5-year warranty

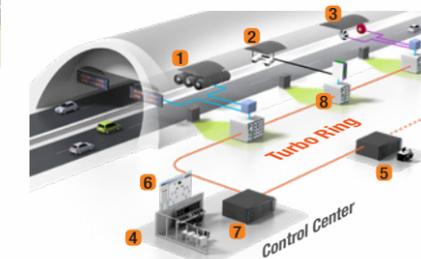
Fully Integrated Tunnel Monitoring

10GbE Core Backbone for Critical Tunnel Surveillance

A U.S. tunnel used Moxa's edge-to-core Ethernet solutions to deploy a robust communication infrastructure for the real-time monitoring of IP surveillance, mass evacuations, variable message signs, and radio broadcast systems.

Solutions & Benefits

- MXview provides efficient event monitoring through live color visualization
- ICS-G7820 10GbE switches for real-time data and video aggregation
- EDS-611/619 modular switches for flexible and durable outdoor connectivity
- VPort 461 video encoders for cost-efficient H.264 IP video migration
- High reliability with built-in self-healing recovery and wide temperature operation



- 1 Traffic operation system
- 2 CCTV detection system
- 3 Fire alarm system
- 4 Operation and maintenance control
- 5 Fire department room
- 6 MXview industrial network management software
- 7 ICS-G7850: 48G+2 10GbE-port switch
- 8 EDS-611/EDS-619: Modular switches

Layer 3 Switches

	10GbE	10GbE	Full GbE	Full GbE
	ICS-G7852A/G7850A	ICS-G7828A/G7826A	ICS-G7848A	IKS-G6824A
10GbE	4/2	4/2	-	-
GbE	48/48	24/24	48	24
PoE+	48 PoE+	-	48 PoE+	-

Layer 2 Switches

	10GbE	10GbE	Full GbE	Full GbE	Best Value	Up to 24 PoE+
	ICS-G7752A/G7750A	ICS-G7528A/G7526A	ICS-G7748A	IKS-G6524A	IKS-G728A/G726A	IKS-G728A-8PoE
10GbE	4/2	4/2	-	-	-	-
GbE	48/48	24/24	48	24	4/2	4
10/100 FE	-	-	-	-	24	24
PoE/PoE+	48 PoE+	-	48 PoE+	-	-	24 PoE+

Extra Reliability for Edge Productivity

- Up to 28-Port FE/GE Links
- Security Features Based on the IEC 62443 standard
- Multiple Industrial Protocols for SCADA/HMI Monitoring
- Diverse Industry Certifications



Productivity Counts on Network Reliability

Bolstering a network's reliability reduces downtime that translates into huge cost savings, especially in complex and remote industrial applications.

Moxa's EDS-E Series of industrial Ethernet switches reinforces edge infrastructure with high-density Gigabit bandwidth, level-four EMC protection, and security features based on the IEC 62443 standard. Furthermore, these switches are all compact and metal encased.

The EDS-E Series also offers multicast traffic redundancy, which is perfect for distributed surveillance applications that are required to minimize latency to milliseconds.

EDS-528E Series

24+4G-port managed Ethernet switches

- 24+4G combo ports
- L2 multicast redundancy < 20 ms
- Security features based on the IEC 62443 standard
- Diverse industrial protocols for SCADA/HMI monitoring
- Fiber link monitoring and alarm notifications



Operational Security

The EDS-500E Series of switches is the first choice for IACS networks that require systemwide security integration.

- Security features based on the IEC 62443 standard
- Multiple protocols for plant-floor interoperability
- Supports MXstudio for easy device security profiling and monitoring

Multicast Availability

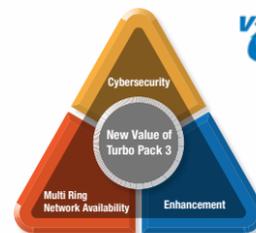
V-ON recovers multicast traffic from failures within milliseconds to minimize packet latency or loss for mission-critical data distribution.

- Layer 2 recovery time under 50 ms
- Layer 3 unicast and multicast traffic recovery time under 300 ms



Security and Availability Upgrades

- Security features based on the IEC 62443 standard for improved ICAS cybersecurity
- Centralized management of device identification and authentication
- High availability with multiple ring redundancy or high-bandwidth utilization



Extra Reliability

Enhances devices' robustness against environmental threats, including EMI, surge, noise, shock, vibration, and extreme temperature variations.

- Level-4 EMC immunity
- Fanless, -40 to 75°C operating temperature range
- Compliance with C1D2/ATEX, DNV, NEMA TS2, EN 50121-4, IEC 61850, IEEE 1613 standards



The Next Generation of Industrial Ethernet Switches



	EDS-528E	EDS-G516E	EDS-G512E	EDS-G508E	EDS-518E	EDS-510E
Max. No. of Ports	4 G + 24 FE	16 G	12 G	8 G	4 G + 14 FE	3G + 7 FE
Gigabit RJ45 Ports	4	12	8	8	4	3
Gigabit SFP Ports	4 (Combo)	4	4	-	4 (Combo)	3 (Combo)
MTBF (hours)	774,634 hrs	805,491 hrs.	816,823 hrs.	808,970 hrs.	723,953 hrs.	723,532 hrs.
Cybersecurity	Device security based on the IEC 62443 standard					
Industrial Protocols	EtherNet/IP, PROFINET, and Modbus/TCP protocols supported					
Certifications	EN 50121-4, IEC 61850-3, IEEE 1613 compliant		Class 1 Div. 2/ATEX Zone 2, DNV, GL, ABS, LR, NK, NEMA TS2, EN 50121-4, IEC 61850-3, IEEE 1613 compliant			

EDS 400A/500A/500E/600/700/800 Series SMART Edge Connectivity for Industrial IoT Applications

- S Security**
EDS-500E: security features based on the IEC 62443 standard
EDS 400A/500A/600/700/800: Enhanced security with TACACS+, IEEE 802.1X, HTTPS, and SSH support
- M Management**
Easy network management with MXstudio management suite, local management by web browser, CLI, USB/serial console, ABC-02-USB, and Windows utility
- A Availability**
Fast Ethernet redundancy under 20 ms with up to 250 switches
- R Reliability**
Fanless and wide-temperature operation with RMA < 0.5%
- T Integration**
Supports EtherNet/IP, PROFINET, and Modbus/TCP protocols for easy PLC and SCADA integration

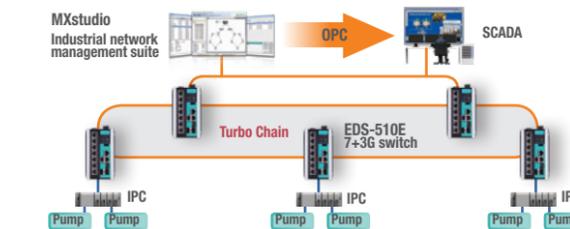
An FA Network in Taiwan

Environmental Monitoring for Air Purification Systems

A semiconductor plant invested in thousands of dry pumps for an exhaust system to protect workers from toxic gases. They used the EDS-510E switches and MXstudio to simplify the pump system control and monitoring.

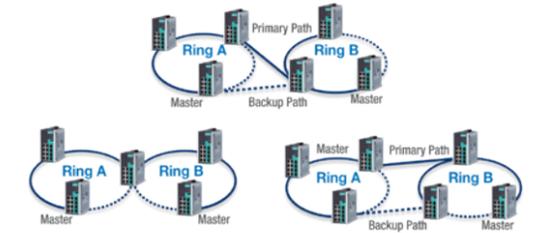
Solution & Benefits

- MXstudio enables SCADA systems to monitor the network status
- The EDS-510E has 3 GbE ports for creating a GbE redundant ring and GbE uplink
- Turbo Ring and Turbo Chain achieve Gigabit redundancy < 50 ms



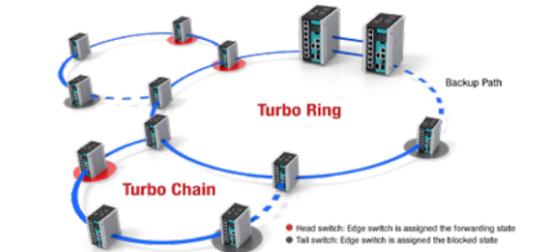
Turbo Ring Enable Ring and Media Redundancy

- Supports flexible ring topology: ring coupling, dual-ring, and dual homing
- Self-healing redundancy under 20 ms* at a full load of 250 switches
- Reduced cabling and planning costs



Turbo Chain Increase Redundant Network Topology Flexibility

- Redundancy under 20 ms* at a full load of 250 switches
- Unlimited redundant network expansions
- Live node expansion without network interruptions
- Tremendous savings on cabling costs



* Note: 10G/1G Ethernet recovery time < 50 ms



Managed Ethernet Switches



Modular Gigabit
EDS-828 L3 4G+24
EDS-728 L2 4G+24

- Layer 3 routing (EDS-828)
- Up to 4 Gigabit uplinks
- Flexible modular deployment

Modular Gigabit
EDS-619 3G+16-port
EDS-616 16-port EDS-608 8-port
EDS-611 3G+8-port

- High density multifiber connections
- Hot-swappable module w/IEEE 1588 PTP support

Gigabit & Fast Ethernet
EDS-518A 2G+16-port
EDS-510A 3G+7-port

- 2 or 3 Gigabit ports for building redundant ring or uplink services
- Intelligent managed and security features

Fast Ethernet
EDS-516A 16-port
EDS-508A 8-port
EDS-505A 5-port

- 10/100BaseT(X) and 100BaseFX (multimode/single-mode)
- Up to 3 fiber ports (EDS-408A 3 fiber series only)

	Layer 3		Modular				GbE + FE		Fast Ethernet				
	EDS-828A	EDS-728A	EDS-619	EDS-616	EDS-611	EDS-608	EDS-518A	EDS-510A	EDS-516A	EDS-508A	EDS-505A	EDS-408A	EDS-405A
No. of Ports	28	28	Up to 19	Up to 16	Up to 11	Up to 8	18	10	16	8	5	8	5
Gigabit RJ45/SFP Ports	4	4	3/3	-	3/3	-	2/2	3/3	-	-	-	-	-
Max. 10/100TX Ports	24	24	Up to 16	Up to 16	Up to 8	Up to 8	16, 14	7	16, 14	8, 6	5, 3	8, 6, 5	5, 3
Max. 100FX Ports	-	-	Up to 16	Up to 16	Up to 8	Up to 8	0, 2	-	0, 2	0, 2	0, 2	0, 2, 3	0, 2



Power Up Heavy-Duty IP Cameras Over Ethernet

- IEEE 802.3af/at interoperability
- Up to 48G 36W PoE+ Links
- 3 kV LAN Surge Protection
- Easy and Efficient PoE Power Management

High-Power, High-Bandwidth Delivery

Powering network devices can be challenging when it comes to power capacity, reliability, and monitoring. Moxa provides a broad range of PoE/PoE+ switches with up to 48-port fiber optic Gigabit PoE+ links to deliver high-speed data transmissions and carry high power over long distances.

Surge protection of 3 kV LAN and industrial features are designed to ensure operational reliability. A unique SmartPoE tool makes PoE network deployment and maintenance easy. All of its features help PTZ and outdoor IP cameras applications achieve high-power and high-speed connectivity with extreme reliability.

Extra Power



- Up to 48-port Gigabit TX/SFP PoE+ links
- 15.4W / 30W / 36W / 60W PoE/PoE+ wide PoE output selection
- Supports a wide range of power inputs from 12V to 48VDC
- Wide selection of PoE/PoE+ switches, splitters,

SmartPoE Technology

Through SmartPoE, Moxa's PoE/PoE+ switches can power any PoE-powered devices connected to your PoE network with ease and efficiency.

SmartPoE supports all types of PDs for smart configuration, efficient utilization, and easy maintenance.



Full Spectrum of Hardware and Software



- Full PoE PSE portfolio of L3/L2 10GbE/GbE/FE switches
- Full range of PoE PD (powered devices)
- SmartPoE for easy PoE linking and power management

Optimized Reliability



- 3 kV LAN surge protection
- -40 to 75°C operating temperature range
- Fast Ethernet redundancy under 20 ms (@250 switch)



Smart Diagnostics

- Auto PD detection of power class, status, and errors
- Smart suggestions for PD configuration



Smart Powering

- Power modes for IEEE 802.3af/at, legacy and nonstandard PDs



Smart Monitoring

- PoE output timetabling and monitoring
- Smart cutoff and active event warning
- LED indicators for easy maintenance



Managed PoE+/PoE Switches



	ICS-G7852A/50A/48A	ICS-G7752A/50A/48A	EDS-G512E-8PoE	IKS-6728A-8PoE	EDS-P510A-8PoE	EDS-P506E-4PoE	EDS-P510	TN-5508-4PoE TN-5516-8PoE
Ethernet Ports	0 / 2 / 4 10GbE +48 GE	0 / 2 / 4 10GbE +48 GE	12 GE	4 GE + 24 FE	2 GE + 8 FE	2 GE + 4 FE	3 GE + 7 FE	8/16 FE
PoE Ports	48 PoE+	48 PoE+	8 PoE+	8 / 16 / 24 PoE+	8 PoE+	4 PoE+	4 PoE	4/8 PoE
PoE Output	36 W	36 W	36 W	36 W	36 W	60 W	15.4 W	15 W

An Application Note

Smart Factory Automation

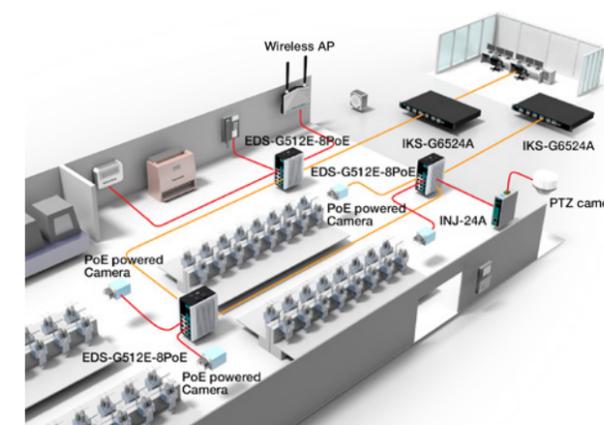
In a factory environment, a high density of devices, along with their specific power requirements, pose challenges with regard to interference avoidance and system maintenance. Moxa's PoE/PoE+ portfolio helps factory floors power, CCTV surveillance and Wi-Fi infrastructure for improved smart factory applications.

System Requirements

- Reduced cabling and interference
- High capacity and reliability for data and power transmission

Why Moxa?

- A wide selection of GE/FE copper/fiber PoE/PoE+ modules
- Up to Gigabit 60W, and 48G 36W PoE+ output
- -40 to 75°C operating temperature range
- Rich options of PoE-powered IP cameras and wireless devices



An ITS Network in India

24x7 HD City Surveillance

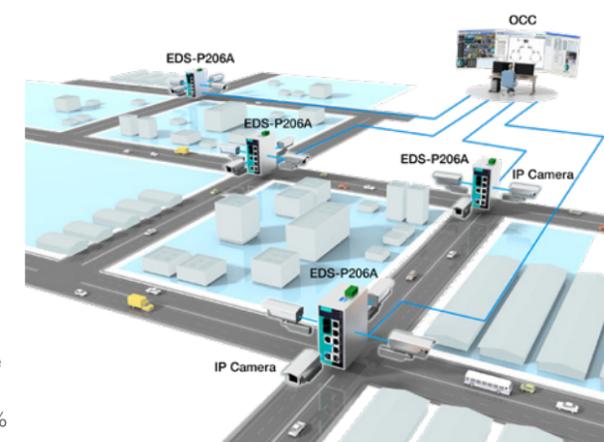
A safe-city project includes 1250+ HD IP cameras and covers 440 junctions to ensure public safety in a city.

System Requirements

- PoE capability for connecting PoE IP cameras
- Long-distance transmissions and durability to withstand harsh outdoor conditions

Why Moxa?

- EDS-P206A-4PoE switches were selected to support every IP cameras on the streets with high-power and high-speed video links with a zero drop rate
- Outdoor stability with diverse industry standards compliance
- -40 to 75°C operating temperature range and a humidity range of up to 95%



PoE/PoE+ Showcase

EDS-P506E-4PoE Series
4+2G-port PoE+ switches with 4 PoE+ ports

- 4-port up to 60W PoE+
- PoE diagnostic for powered device analysis
- 2 Gigabit combo ports for high-bandwidth and long-distance communication
- 4 kV LAN surge protection for extreme outdoor environments

IKS-6728A-8PoE Series
24+4G-port modular PoE+ switches

- Up to 24-port/720 W full loading
- Up to 36 W output per PoE+ port
- 3 kV LAN surge protection

INJ-24A Series
60 W GbE PoE+ Injectors

- Up to 60 W PoE+ output
- 3 kV LAN surge protection
- 24/48 VDC redundant power inputs

Powered Device

ioLogik P1200 Series
PoE remote I/O

- Power Daisy Chain: power multiple devices with only 1 PSE port
- Use the power output channel to supply power directly to field site components
- CGI commands for easy integration with surveillance systems

AWK-3131A/4131A Series
802.11n wireless AP/ bridge/client

- 802.11n MIMO throughput
- Millisecond-level Turbo Roaming

See page 17

Unmanaged PoE+/PoE Switches



	EDS-G205A-4PoE	EDS-P206A-4PoE	EDS-P308	TN-5308-4/8PoE
Ethernet Ports	5 GE	6 FE	8 FE	8 FE
PoE Ports	4 PoE+	4 PoE+	4 PoE	4/8 PoE
PoE Output	36 W	30 W	15.4 W	15.4 W



	INJ-24A	INJ-24	IMC-P101
Ethernet Ports	1 GE	1 GE	1 FE
PoE Output	60 W	30 W	15.4 W
PoE Input	24/48 VDC	24/48 VDC	48 VDC

The Best Fit for Your Control Cabinets

- Multi-Protocols for SCADA/HMI Monitoring
- Super Slim for Versatile Mounting
- Dashboard-Style UI for Easy Configuration



Industrial Unmanaged Switches

The World's Best-Selling Industrial Unmanaged Switches

- Rugged Designs for Harsh Industrial Applications
- Redundant Dual Power Inputs
- MTBFs and Ultra-Low Failure Rates
- Diverse Industrial Standards Compliance



Smart Field Experience and Efficiency

The beauty of complex factory automation and control systems lies in their ability to streamline processes. Moxa's smart switches simplify daily tasks with their easy configuration, installation, and field-site monitoring.

Designed for easy connections, SCADA/HMI monitoring, and higher controllability, the superslim SDS-3008 improves the factory-floor user experience with multiple major IA protocols (EtherNet/IP, PROFINET, ModbusTCP) capabilities, versatile mounting, LED display, and dashboard-style configuration.



SDS-3008 series

Industrial 8-port smart Ethernet switches

- Slim design for cabinets with confined spaces
- Dashboard-style UI for easy configuration
- Native EIP/PN/Modbus IA protocols
- Seamless HMI/SCADA monitoring
- Supports RSTP/STP redundancy
- LED display for easy maintenance
- ABC-02 backup for easy configuration restore

A Stalwart of the Industrial IoT

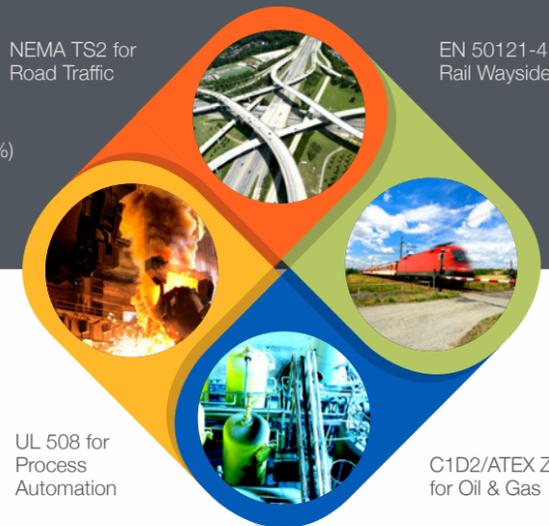
Moxa provides the world's most robust and best-selling unmanaged switches for industrial Ethernet infrastructure. (*)

Moxa's unmanaged switches uphold leading quality, including high MTBFs, low RMAs under 0.3%, and stringent standards that are required for operational reliability in harsh environments.

- Full Gigabit with fiber options
- Fanless and a -40 to 75°C wide operating temperature range
- Redundant power inputs
- High MTBFs and low RMAs (<0.3%)
- Diverse industry certifications
- 5-year warranty

NEMA TS2 for Road Traffic

EN 50121-4 for Rail Wayside



UL 508 for Process Automation

C1D2/ATEX Zone 2 for Oil & Gas

Smart Monitoring

Seamless SCADA/HMI integration and monitoring through IA protocols, including EtherNet/IP, PROFINET, and Modbus/TCP



Smart Mounting & Display

Best fit for control cabinets with upright mount/LED displays, or side mount/LED displays.



Smart UI

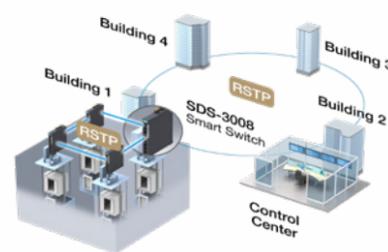
A single-page user-friendly dashboard for easy navigation and configuration



Best-Fit Applications

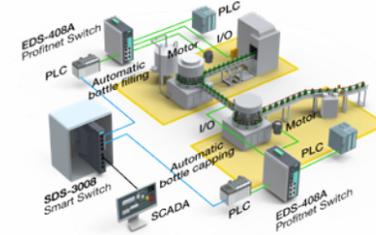
Scenario: Elevator Automation

Needs: Mechanic service engineers are not familiar with network deployment, management, and maintenance



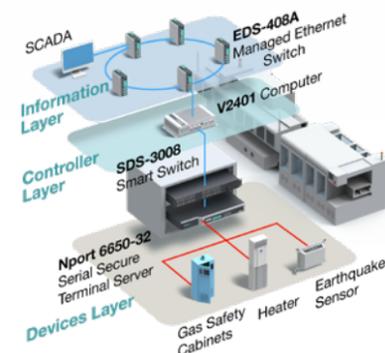
Scenario: Bottling Process Plant

Needs: It is expected that the plant's SCADA/HMIs can monitor everything, including networking devices and network status.



Scenario: Facility Management and Control Systems (FMCS)

Needs: Ensure the integrity of data collected from massive FMCS subsystems



Why Moxa's Smart Switches?

- Smart UI simplifies operations during all phases
- Concurrent multiple IA protocols supported for spare parts and network design flexibility
- Profile-based monitoring allows remote monitoring for reduced downtime
- RSTP/STP for rapid network redundancy
- ABC-02 backup for configuration restore

Video
SDS-3008 Smart Switches

Download
Application Guide

+600 K Deployments



EDS-205A/208A Series of unmanaged switches

The EDS-205/208A unmanaged Ethernet switches have proven to be durable winners that have stood the test of time in over 600,000 unit deployments.

The EDS-205A/208A switches offer the best value in terms of reliability and cost-efficiency for applications in harsh industrial environments (such as maritime, railway, highway, and mobile applications) and hazardous locations (such as oil and gas applications).

Download 2017 Smart Factory Solutions

*According to a report from IHS technology in December 2014.



Unmanaged Ethernet Switches



- Full Gigabit**
EDS-G308 8G-port
EDS-G205 5G-port
- Fiber Gigabit connections
 - 9K Jumbo frame supported
 - Redundant dual 12/24/48 VDC inputs



- Gigabit & Fast Ethernet**
EDS-210A 8+2G / 9+1G-port
- Up to 4 10/100 FX or 8 10/100 TX Ethernet ports
 - Redundant dual power inputs



- Fast Ethernet**
EDS-316 16-port
EDS-309 9-port
EDS-308 8-port
EDS-305 5-port
EDS-208 8-port
EDS-205 5-port
- Plug-n-play connections
 - Broadcast storm protection
 - Relay alarm for port and power failure (EDS-300 series only)
 - Compact and cost-effective

	Full GbE			Fast Ethernet							
	EDS-G308	EDS-G205	EDS-316	EDS-309	EDS-308	EDS-305	EDS-210A	EDS-208A	EDS-205A	EDS-208	EDS-205
No. of Ports	8	5	16	9	8	5	10	8	5	8	5
Gigabit RJ45/SFP Ports	8/0, 6/2	4 RJ45 1 combo	-	-	-	-	1/1, 0/1	-	-	-	-
10/100TX Ports	-	-	16, 15, 14	6	8, 7, 6	5, 4	4, 8	8, 7, 6	5, 4	8, 7	5
100FX Ports	-	-	0, 1, 2	3	0, 1, 2	0, 1	4, 1 (SFP)	0, 1, 2	0, 1	0, 1	-

Unbreakable Wireless Networks

- 802.11n MIMO Throughput
- Power and Antenna Input Isolation Protection
- AeroMag for Easy Wi-Fi Deployment and Maintenance
- AeroLink Protection for Wi-Fi Failover
- Millisecond-Level Handover



Strengthen Wireless Connectivity

You don't need to put up with unreliable wireless connections anymore due to surrounding interference, obstacle links, or slow failover. Moxa's WLAN solutions combine 802.11n speed and MIMO coverage with Turbo Roaming technology that enables fast roaming within milliseconds; AeroMag that provides easy and fast network deployment and maintenance; a dual isolation design that protects both power and antennas from electrical interference; and a set of industrial-grade designs such as anti-vibration and wide operating temperatures to achieve unbreakable wireless connection in challenging conditions.

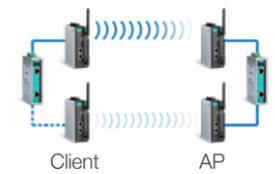
Easy Deployment and Maintenance

- Moxa's AeroMag technology can save you significant time and effort with AeroMag device settings for easy and error-free wireless deployment and maintenance without affecting the network security.
- One-step configuration of multiple Wi-Fi device settings
 - One click for device changes, channels refresh and optimization
 - Zero configuration for adding new Wi-Fi devices into existing networks



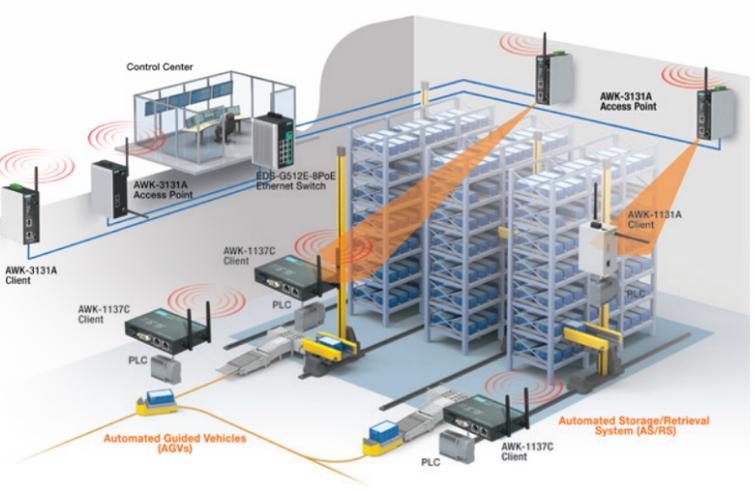
Maximum Availability

- Turbo Roaming for fast handoffs under 150 ms
- AeroLink Protection for redundant Wi-Fi links
- MXstudio management for live-view monitoring and alerts



Rugged Reliability

- 500 V insulation on power and antenna ports for noise avoidances against electrical interference
- Fanless, -40 to 75°C wide operating temperature range
- Anti-vibration design



*AGV stands for Automated Guided Vehicle; AS/RS for Automated Storage and Retrieval Systems

Construct Reliable AGV and AS/RS* Applications

Challenges

- Wireless network deployment and maintenance is complex
- Surrounding EMI/RFI noise
- Signal obstructions in signal paths
- Harsh environments

AWK-3131A Series Wi-Fi Access Points

- AeroMag for easy and optimized configuration of APs
- 500 V insulation at the antennas ports against factory-floor noise
- 2 x 2 MIMO dual antenna for extended signal coverage
- -40 to 75°C wide operating temperature range

AWK-1137C Series Wi-Fi Clients

- AeroMag for automatic AP-Client links and channel refresh
- 2 x 2 MIMO dual antenna for extended signal coverage
- Turbo Roaming for secure and fast handovers < 150 ms
- 500 V insulation against noise from AGV's onboard motors
- Anti-vibration with IEC 60068-2-6 standards
- -40 to 75°C capability for sub-zero temperature operations

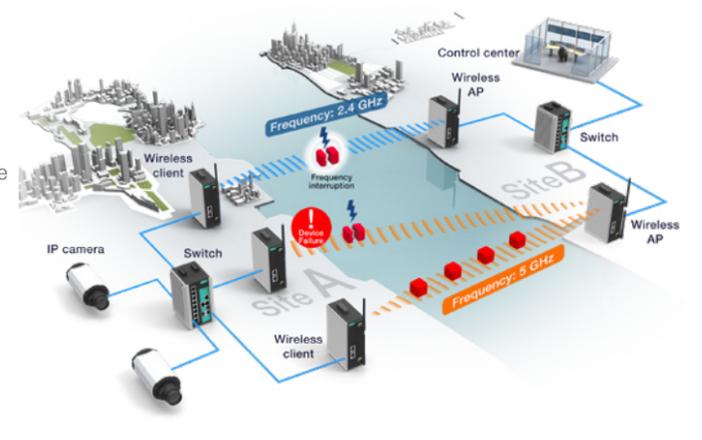
AeroLink Protection

Enables the Most Reliable P2P Connection

Moxa's AeroLink Protection harnesses the full speed of 802.11n MIMO throughput for mission-critical point-to-point connections in the AWK-A Series. AeroLink Protection provides the most reliable end-to-end communication by setting up multiple wireless backup connections at each client end, and then running auto switchover between the available backups once the active device or frequency is down.

- Auto switchover between active/backup radio links
- End-to-end recovery < 300 ms
- Supports two or more redundant radio links

White Paper
Redundant Wireless Bridges



An FA Network in Japan

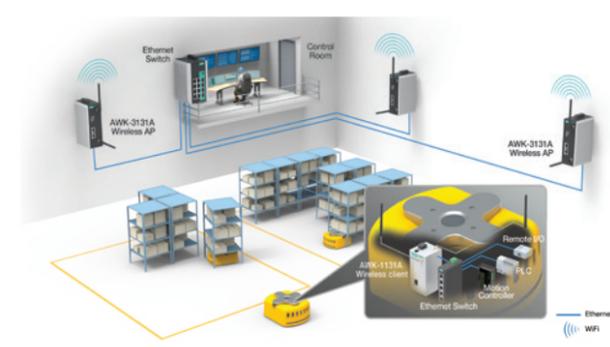
Smart Wireless AGV Warehouses

A wireless AGV system was built to improve inventory accuracy.

- Uninterrupted wireless operation
- Configurable roaming sensitivity to adapt to different-sized factories
- Device reliability withstands harsh environments

Solution & Benefits

- All AWK devices support fast roaming under 150 ms.
- Easy to adjust roaming parameters to fulfill different roaming requirements
- Dual isolation protects power and RF ports from an inrush current interference



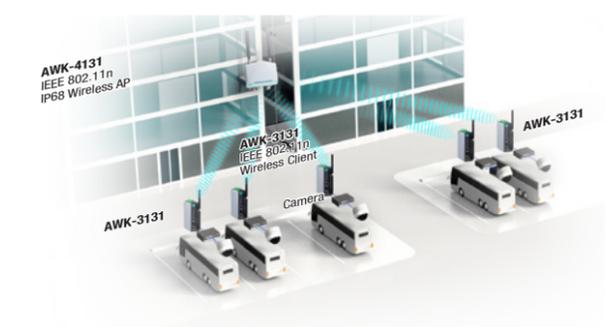
An ITS Network in the US

Video Transmission for A Bus Surveillance

In order to provide a stable transmission of surveillance video of buses entering a bus depot, a rugged design was required for both on-vehicle clients and outdoor APs to ensure robust operations.

Solution & Benefits

The AWK clients and APs use IEEE 802.11n and MIMO (multiple in multiple out) technologies to achieve HD event video transmissions.



Download
Industrial Wireless Success Stories

AWK-A Series Portfolio



AWK-4131A Series
Industrial 802.11n AP/Bridge/Client

- One SFP Gigabit combo
- IP68 protection
- AeroMag AP enablement

AWK-3131A Series
Industrial 802.11n AP/Bridge/Client

- One RJ45/SFP Gigabit combo
- AeroMag AP enablement

AWK-1131A Series
Industrial 802.11n AP/Client

- One Gigabit link
- Supports MAC clone for Ethernet client

AWK-1137C Series
Industrial 802.11n Client

- Two Ethernet ports
- One serial interface
- AeroMag client enablement

	AWK-4131A	AWK-3131A	AWK-1131A	AWK-1137C
Standards	802.11a/b/g/n up to 300 Mbps			
No. of RFs	1 (2.4/5 GHz), capable of 5 GHz DFS for reduced channel congestion			
AP Capacity	Max 60 Clients/AP	Max 60 Clients/AP	Max 30 Clients/AP	n/a
AeroMag	AeroMag AP		n/a	AeroMag Client
Dual Isolation	Power and antenna isolations			
Wi-Fi Redundancy	AeroLink Protection for redundant Wi-Fi links		n/a	n/a
Wi-Fi Handover	Client-based Turbo Roaming < 150 ms handover			
Stability	Anti vibration with IEC 60068-2-6 compliance			
Operating Temp	-40 to 75°C	-25 to 60°C / -40 to 75°C	0 to 60°C / -40 to 75°C	
Approvals	UL 60950-1, CE/FCC/TELEC with DFS	UL 60950-1, CE/FCC/TELEC with DFS UL/cUL CID2, ATEX Zone 2	UL 60950-1, CE/FCC/TELEC with DFS	

Secure Remote Access over 4G Cellular

- Supports European and U.S. LTE Bands
- Security Features Based on the IEC 62443 standard
- Dual SIM and GuaranLink for Reliable Connectivity
- VPN Connection with IPSec, GRE, and OpenVPN Support
- Cost-Effective Private IP Connections

Secure and Reliable 4G LTE Access

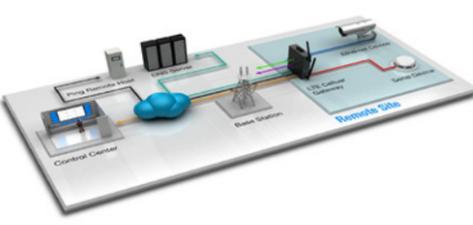
Cellular reliability is always a top priority in mission-critical applications. Moxa's industrial cellular products come with dual SIMs and four-tier GuaranLink to reinforce cellular redundancy. The OnCell products embed ICAS-required cybersecurity and VPN capability to secure data transmission over 4G LTE broadband. Together with OCM (OnCell Central Manager), which applies IP blocking to prevent unauthenticated IP attacks, OnCell LTE solutions ensure the security and stability of the remote connections monitored by you.



- OnCell G3150A-LTE Series Industrial LTE Serial/Ethernet IP Gateways**
- Up to 50 Mbps LTE uplink
 - Serial-to-cellular for legacy bridging
 - Dual SIMs and GuaranLink for uninterrupted connections
 - Dual power inputs and isolation protection
 - ESD level-4 antenna-port protection
 - ATEX, IECEx certifications
 - IPSec, GRE, and OpenVPN support
 - Security features based on the IEC 62443 standard

Robust Connections

The OnCell Series of gateways comes with dual SIM for cellular service redundancy, and a GuaranLink mechanism that enables a four-tier connection check for maximum uptime and real-time alerts in the event of any link failures.



Secure Connections

Built with security features based on the IEC 62443 standard the OnCell G3150A-LTE supports IPSec, GRE, and OpenVPN server/client to establish VPN tunnels between two networks. Together with OCM's private IP blocking, the OnCell G3150A-LTE prevents



Hardware Reliability

Coupled with dual power inputs and an extreme operating temperature range, the OnCell G3150A-LTE features power isolation and high-level EMS immunity to ensure operational reliability in harsh environments.



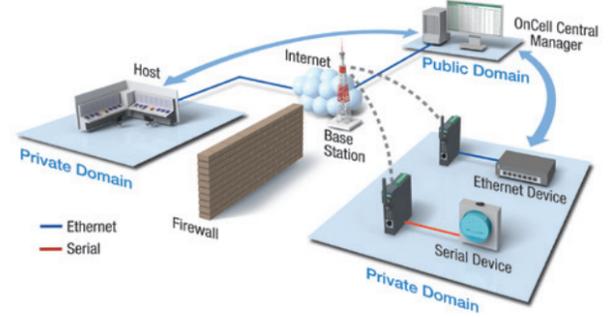
Download LTE Gateways Applications

Watch over Your Cellular Access

OnCell Central Manager (OCM)

Moxa's OCM hosts centralized private IP management to manage OnCell devices with easy-to-view and secure IP enrollment, configuration, monitoring, and firmware updates over the Internet. The OCM tool allows remote data pooling and forwarding via a private IP connection for secure data communication.

- Cost-effective and secure private IP connectivity
- End-to-end data exchange over the Internet
- Remote access for OnCell device management, grouping, monitoring, configuration, and firmware upgrade
- Easy-to-view device monitoring on various platforms



An ITS Network in Europe

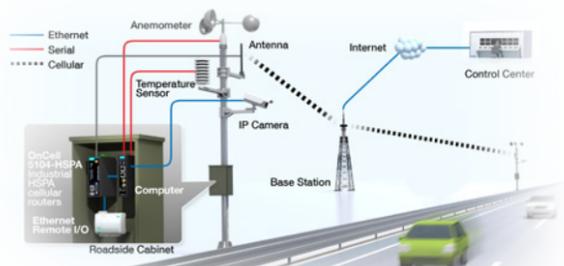
Reliable Cellular for Real-Time Road Traffic Monitoring

System Requirements

- High-bandwidth cellular network for data and high-quality image transmissions
- Multiple LAN ports are required to connect several devices to ease cabinet installation
- Redundant mechanism to deliver real-time traffic information

Why Moxa?

- OnCell 5104-HSPA offers up to 14.4/5.76 Mbps (download/upload)
- Four built-in Ethernet ports for multiple device connections in a small cabinet
- Dual-SIM cards provide a backup option in case a link fails



An Application Note

Intelligent Transportation Systems

System Requirements

- High-bandwidth wireless network to transmit traffic information fast to the traffic control center
- Equipment that can withstand harsh environments and high temperatures inside roadside cabinets for 24/7 operations
- Easy deployment and maintenance of a large number of remote devices

Why Moxa?

- 4G-LTE data rates of up to 50 Mbps upload for smooth data transmissions
- Dual-SIM and GuaranLink feature for redundant cellular links
- Flexible serial/Ethernet-to-cellular link for flexible ITS network integration
- OCM provides web-accessible remote configuration and monitoring for easy deployment and maintenance with reduced downtime



An Application Note

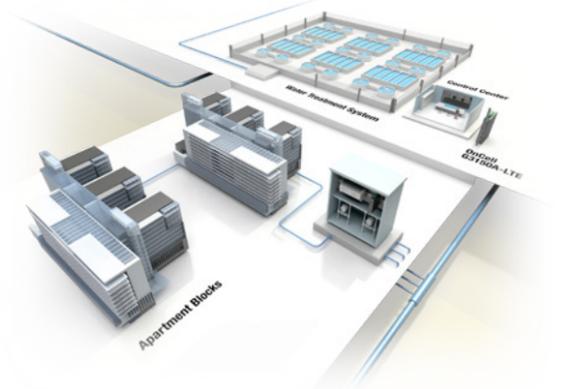
Water Treatment Systems

System Requirements

- Secure and reliable long-distance transmissions of process parameters
- Access to private IP devices from the Internet for centralized management and control
- Easy to troubleshoot connection issues

Why Moxa?

- Security features based on the IEC 62443 standard to prevent unauthorized access
- Multiple VPN tunnel options for secure connections
- Front-panel LEDs for easy link diagnostics
- OCM makes mobile device management easy and secures data exchange and access control over the Internet through centralized private IP management



	OnCell 3150A-LTE	OnCell 3470A-LTE	OnCell 5104-HSPA	OnCell G3150-HSPA	OnCell G3151-HSPA	OnCell G3151	OnCell G3251
4G	LTE	LTE					
3G			UMTS/HSPA		UMTS/HSPA		
2G			GSM/GPRS/EDGE			GSM/GPRS	
Ethernet LAN	1 x 10/100M	4 x GbE	4 x 10/100M	1 x 10/100M	1 x 10/100M	1 x 10/100M	1 x 10/100M
SIM	2 x 3 V		2 x 3 V	1 x 3 V	1 x 3 V		1 x 3V
Serial	1 x RS-232/422/485				1 x RS-232/422/485		2 x RS-232/422/485
VPN	IPSec, GRE, OpenVPN		IPSec				
I/O				2 DI, 1 DO			
Power				Dual 12-48 VDC		Single 12-48 VDC	
Operating Temperature	0 to 55°C or -30 to 70°C		-30 to 55°C or -30 to 70°C			-30 to 55°C	

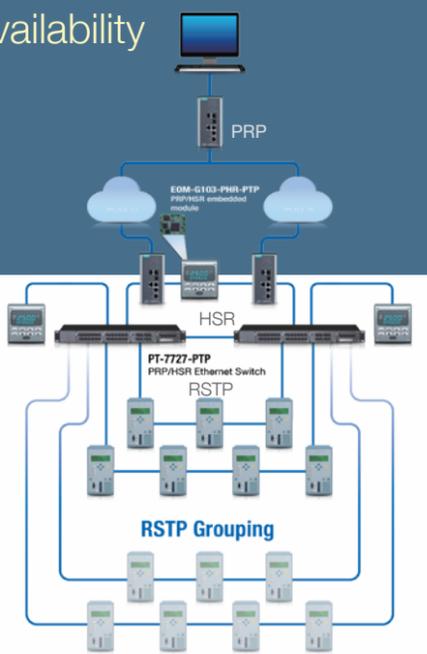
A Switch to Migrate RSTP to PRP/HSR Networks

- PRP/HSR Zero-Time Recovery
- Up to 24+4G Modular Switching
- RSTP Grouping for HSR-RSTP Coupling
- IEC 61850-3, IEEE 1613 Class 2, IEEE 1588v2 Compliant



A Flexible Topology and Budget for PRP/HSR Availability

Zero failover time is becoming the new standard for mission-critical industrial applications (such as power systems) to prevent downtime and costly losses. To leverage bumpless PRP (Parallel Redundancy Protocol) and HSR (High-availability Seamless Redundancy) protocols, which are defined in IEC 62439, Moxa's PRP/HSR solutions ensure more than zero packet loss and zero-time redundancy, as they also bridge legacy RSTP devices to PRP/HSR networks with flexible hybrid topologies and budget options for substations that want to construct new networks or add PRP/HSR segments to their existing RSTP



Legacy Migration

Leveraging the interoperability between PRP, HSR, and RSTP protocols, the PT-7728-PTP switches allow groups of RSTP devices and SANs (Single Attached Nodes) to interconnect to enlarge the PRP/HSR network coverage at no extra costs.

Advantage and Availability

Through couplings of RSTP and HSR rings, the PT-7728-PTP extends the lifespan of the legacy devices and infrastructures, and also enables zero-time failover to achieve the highest network availability with IEC 62439-3 PRP/HSR support.

Proven Interoperability

The PT-7728-PTP switch demonstrated its redundancy and interoperability capabilities in the 2015 PRP/HSR Interoperability Test, conducted by UCalug. 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.

Moxa's PRP/HSR Portfolio

PT-7728-PTP PRP/HSR Switch	PT-G503-PHR-PTP PRP/HSR RedBox	DA-820 PRP/HSR Computer	EOM-G103-PHR-PTP PRP/HSR Embedded Module
Connects multiple SANs and RSTP devices to a PRP/HSR network	Quickly enables legacy devices to connect with a PRP/HSR network	Visualizes management for PRP/HSR devices and network connection	Easy integration to turn a SAN device into a PRP/HSR connection

RSTP Grouping

The PT-7728-PTP features RSTP Grouping that enables multiple couplings of RSTP rings to HSR-based networks. A pair of PT-7728-PTP switches can migrate more than a thousand RSTP devices to HSR networks—far more than the maximum of 40 hops allowed in a typical RSTP ring.

The technology creates valuable flexibility for substations that want to add PRP/HSR segments to their legacy RSTP-based networks.

- PT-7728-PTP Series**
24+4G PRP/HSR Modular Rackmount Switches
- 4G-port PRP/HSR module for zero-time failover
 - RSTP Grouping for multiple couplings of HSR and RSTP
 - IEEE 1588v2 nanosecond-level synchronization
 - Isolated redundant power inputs
 - -40 to 85°C operating temperature range
 - Built-in MMS data modeling for SCADA in power systems

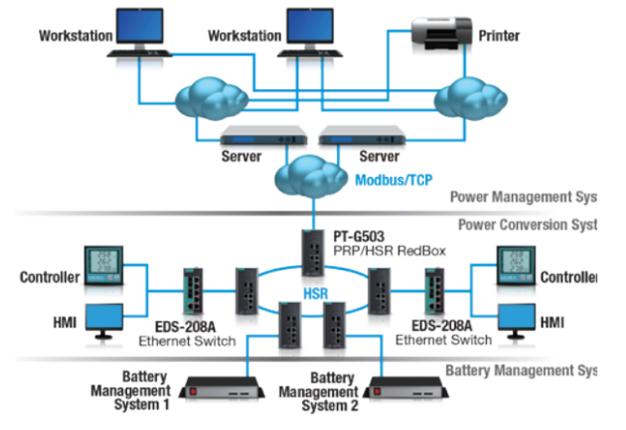
A Power Conversion System in South

HSR Redundant Solutions in an Energy Storage System

Project Requirements
Implementing an ESS (Energy Storage System) network that allows the remote monitoring of the battery status of a 345-kV power generation substation

Why Moxa?

- PT-G503 makes HSR network configuration easy
- One dedicated Ethernet console for monitoring and troubleshooting
- Fiber Check™ provides monitoring and diagnostic functionality on SFP fiber ports



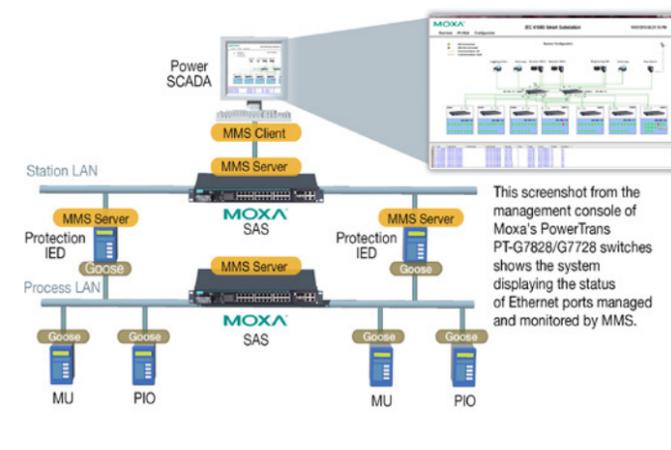
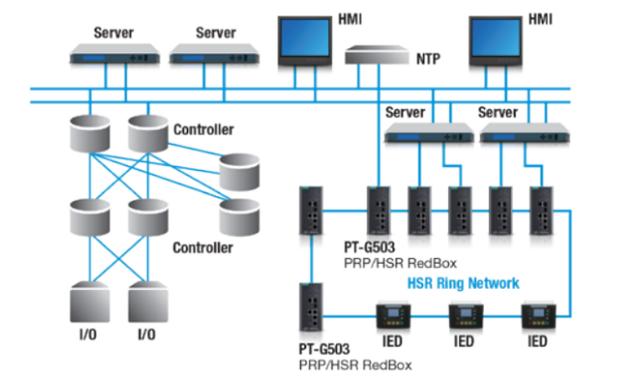
An Enterprise Substation in the North

PRP/HSR Solution for DCS of an Enterprise Substation

Project Requirements
The integration of an IEC 61850-3 Ethernet switch and Redbox into an Experion process server and IEC 61850 SCADA server for the underlying DCS of an enterprise substation.

Why Moxa?

- PT-G503 supports both PRP and HSR for flexible configuration
- Allows fiber port monitoring



PT-G7728/G7828 Series

28-port Full GbE Layer 2/Layer 3 Modular Switches

- IEC 61850-3 Edition 2 Class 2 compliance
- Hot-swappable power modules and media modules
- Up to 28-port IEEE 1588v2 PTP
- IEC 61850-90-4 MMS data modeling for power SCADA
- 0.5U modular design with thumb screw
- Single-side cabling and dual-side LED displays

Download IEC 61850 Substation Guidebook

PowerTran IEC 61850-3 MMS Switches Portfolio

	PT-G7828/G7728	PT-7828/7728	PT-7528	PT-7728-PTP	PT-G503
Max. No. of Ports	28	28	28	28	3
Max. Gigabit	28	4	4	4	3
Max. of PTP Ports	28	-	-	14	3
Layer 3	PT-G7828 only	PT-7828 only	-	-	-
MMS Server	✓	PT-7728 only	✓	✓	✓
Standard Redundancy	RSTP/STP/MSTP			PRP/HSR, RSTP/STP/MSTP	PRP/HSR
Proprietary Redundancy	Turbo Ring, Turbo Chain				
RSTP Grouping	✓	By request	By request	✓	✓
IEC 61850 QoS	✓	✓	✓	✓	-
Reliability	IEC 61850-3 and IEEE 1613 Class 2 Certified, -40 to 85°C operating temperature range				



Your Trusted Partner in Rail Automation

- Greater Ethernet Compatibility Across Different Train Builders
- Real-Time Responses to Traffic Demands
- Automatic Inter-Carriage Links
- Reliable Wireless Train-to-Ground Connections

EN 50155 Ethernet Switches

Full Ethernet Connected Railways

Traditionally, the rail industry has relied on disparate networks to keep trains rolling on train lines. Divergent networks bring rail systems multiple services but also tangible and intangible costs.

Moxa is the world's first IRIS-certified manufacturer that provides a complete portfolio of EN 50155 rugged Ethernet products. These products have been widely deployed in many rail and metro systems around the world.

With innovative solutions and technologies, Moxa helps rail customers capitalize on full-fledged Ethernet-integrated networks that connect trains to the trackside and all the way back to control center to achieve overall transport safety, efficiency, and significant cost savings and time-savings on railway operation and maintenance.



Future-Oriented Networks

IEC 61375 for Train-Wide Networks

IEC 61375 is the new standard for onboard Ethernet Train Backbone (ETB) to ensure onboard interoperability between local consist subnets, regardless of their respective network technology and manufacturer.

Tailored to IEC 61375 standards, the TN-5916 routers automatically assign IP addresses to the onboard devices of each consist to enable highly flexible and reliable interconnections between ETB and Ethernet Consist Network (ECN).



- TN-5916 ETBN Series**
EN 50155 16-port ETBN Router
- IEC 61375-2-5/-2-3 compliance
 - Dual bypass relay
 - Dual power with 24 to 110 VDC range

Passenger-Oriented Safety and Services

Improves Passenger Experience

The TN-4500A M12 managed switches drive higher connection capacity and higher PoE power output to improve operational efficiency and passenger services in space-limited onboard environments.

The TN-4500A Series provides up to 28-port Ethernet to accommodate video surveillance and more passenger services, up to two Gigabit fiber ports for reliable broadband transmission, and up to four port Gigabit for optional bypass relay functionality. The switch delivers up to 120W PoE+ power output to support Wi-Fi devices and IP cameras with no extra power wiring needed.



- TN-4500A Series**
EN 50155 M12 Ethernet Switches
- 16, 24 and 28-port models
 - Up to 4 Gigabit ports with up to 2 Gigabit fiber
 - Up to 20 PoE+ ports, 120 W power budget
 - Dual power with 24 to 110 VDC range

EN50155 ToughNet Switches

	Router	Layer 3	High Density	Gigabit	8 PoE+	Unmanaged
	TN-5916	TN-5816A/5818A	TN-4500A	TN-5518A/5510A	TN-5516A/5508A	TN-5308
Gigabit	–	2	Up to 4	2	–	–
Fiber	–	–	Up to 2	Up to 2	–	–
Fast Ethernet	16	16	12/20/24	16/8	16/8	8
PoE/PoE+	–	–	Up to 20 PoE+	Up to 8 PoE+	Up to 8 PoE+	8 PoE

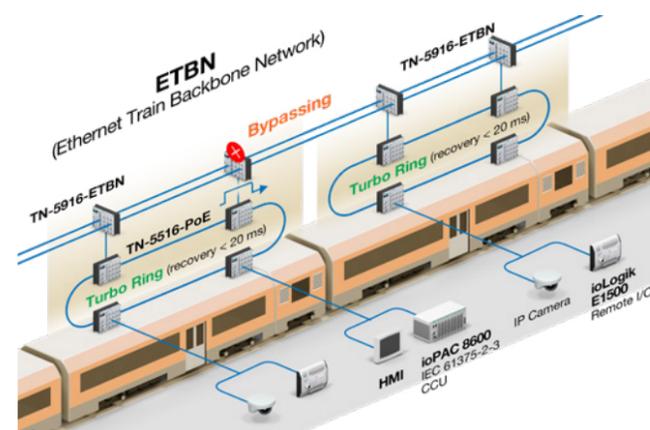
Onboard Architecture

Integrated IP solutions for TCMS Networks

Moxa's TCMS (Train Control and Management System) network solution consists of a controller and Ethernet router. Compliant with IEC 61375, the TN-5916 ETBN acts as an ETBN router and the ioPAC 8600 IO controller as a non-critical Computer Control Unit (CCU) to control end devices, such as IP cameras and remote IOs, in Train Real-time Data Protocol (TRDP) networks. Moreover, to provide comprehensive solutions, our VPort06-2 also supports IEC 61375-2-3, making it able to communicate with ETBN via a TRDP network.

IEC 61375 ETBN

- Ethernet bandwidth is up to 100 Mbps.
- With auto train-level IP assignment and R-NAT, no more effort is required to define IP schemes for different consists and trains.
- No communication interruptions in consists when a train is coupled and decoupled.
- With TCN-DNS, no effort is required to change or remap IP addresses when a train's direction is changed.
- No proprietary communication to be defined in devices and trains



Train-to-Ground Architecture

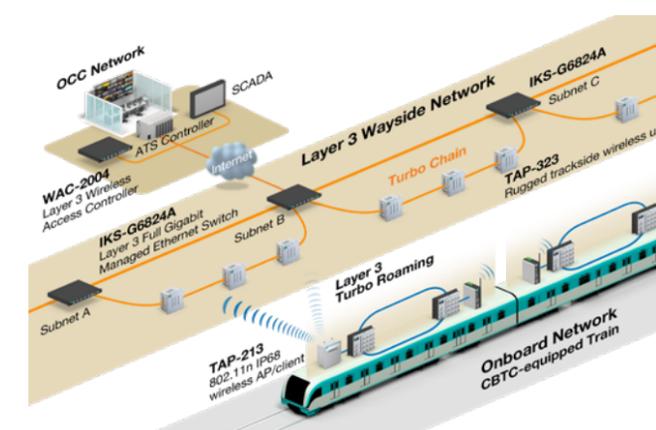
Travel Along with Wireless

In most metros, a wayside network consists of several subnets distributed across multiple base stations that require train-to-ground wireless networks that include onboard radio clients and wayside APs. All the devices need redundant links to manage and minimize the network outage.

Wayside APs are connected to different subnets by physically linking to station routers. Furthermore, higher redundancy, such as Moxa's Turbo Chain or RSTP, should be deployed while attaching those APs to the main backbone network.

Onboard, two clients are placed at each end of the train and associated by AeroLink Protection Wi-Fi redundancy. Each client connects to different wayside APs, and only one radio link is active at a time.

To secure communications across subnets, Moxa Wireless Access Controller (WAC-2004) enables a Layer-3 handover that conducts roaming delay of less than 50 ms. For safe operations, this capability allows for the seamless exchange of data between a moving train and the trackside.



Why Moxa?

Reliability and Availability

- Bypass relay in linear topology
- Turbo Ring for Ethernet redundancy under 20 ms
- EN 50155 compliance and M12 connectors for robust connections
- -40 to 75°C operating temperature range
- Dual power with wide power input range

Download Railway Brochure

Why Moxa?

Train-to-Ground Wireless Solutions

- Sub-50 ms layer 2/layer 3 fast secure roaming
- Up to 300 Mbps data rate for critical train-to-ground data transmissions
- Network latency under 1 ms
- EN 50155 compliant reliability
- IP 68 rated and full-function wireless units

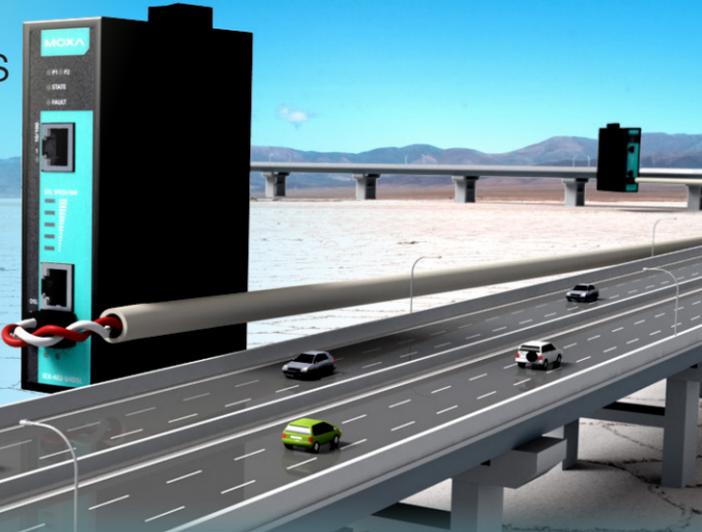
White Paper
Four Technologies for Train-to-Ground Communication

	WAC-2004	TAP-323*	TAP-213
Standard	–	802.11a/b/g/n	802.11a/b/g/n
No. of Radio	–	2 dual-band radios	1 dual-band radio
Wi-Fi Handover	–	Sub 50 ms wireless roaming (w/WAC-2004 controller)	Sub 50 ms wireless roaming (w/WAC-2004 controller)
Fiber	–	2	1
PoE	–	4 x M12	1
Redundancy	Primary/Backup Controllers	Turbo Chain / RSTP for wayside networking	AeroLink Protection for redundant Wi-Fi links
Reliability	–	IP 68 sealed, -40 to 75°C operating temperature range	

* TAP-323 available in 2018

A Long Reach and Big Savings With Existing Infrastructure

- Up to 100 Mbps Transmissions
- Plug-and-Play Deployment
- DSL Bypass and Millisecond-Level Redundancy
- Diverse Industry Certifications



Ensure a Long Reach and Immunity for Critical Ethernet Extensions

- Gigabit Fiber Conversions
- Superior EMI Immunity
- Long-Distance Transmissions
- Industrial-Grade Reliability



Ease and Reliability over Long-Distance Deployments

Simplifying long-distance network deployments is a challenge for engineers. The IEX-408E is a managed Ethernet extender switch that provides long-reach transmissions over twisted-pair copper wiring, allowing users to leverage legacy or existing industry-specific cables for cost-effective and faster deployments. The IEX-408E switch features plug-and-play installation, millisecond-fast redundancy, and multidrop connections over copper wires up to a 3-km distance or up to 100 Mbps speed in harsh environments.



- IEX-408E-2VDSL2 Series**
Industrial 6 FE + 2 VDSL2 Ethernet Extender
- Auto CO/CPE negotiation for plug-and-play deployment
 - Ethernet recovery < 50 ms
 - DSL bypass for multidrop failure tolerance
 - LED indicators for easy on-site troubleshooting
 - Supports MXview for remote management
 - Smart speed detection and adjustment
 - 12/24/48 VDC or 110/220 VDC/VAC power inputs



A Long Reach and High Reliability

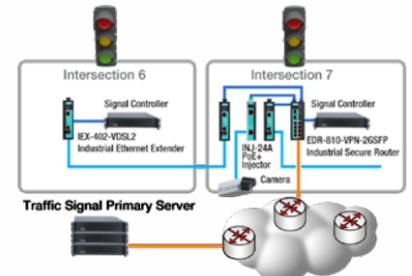
Network speed, reliability, and cost-efficiency should be the top considerations when critical network infrastructure needs to be extended beyond the 100-meter Ethernet limit. Moxa offers industrial media converters that provide EMI-immune, Gigabit-speed extensions of up to 80 kilometers (over single-mode fiber) in harsh conditions. Both IMC-101G and IMC-21GA fiber converters are perfect for megapixel machine vision inspection, public IP surveillance, and outdoor applications that are exposed to changeable elements but require a high level of performance reliability for real-time data transmissions over long-distance connections.

Why DSL?

I need to minimize user interruption

An ITS Application in North America
Secure Traffic Signal and CCTV Monitoring

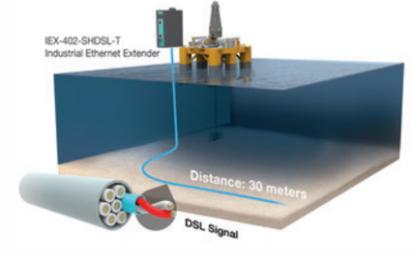
- Easy installation with auto CO/CPE negotiation
- The IEX-402 DSL extenders support P2P connections over long distances through existing copper wires



My application requires specific cabling

An Oil & Gas Application in Australia
Upgrading Subsea Oil & Gas Control with Existing Wires

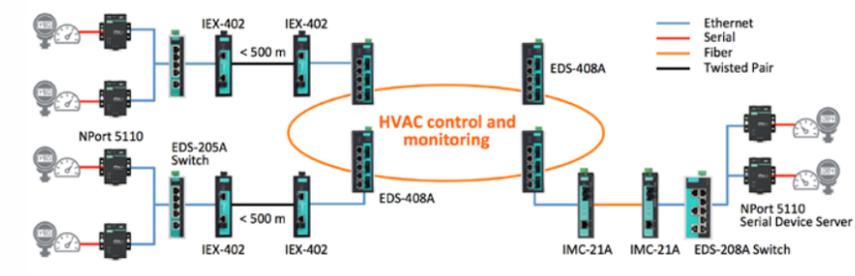
- Leveraging existing industry-specific cables for Ethernet extensions
- Compact, rugged, and a -40 to 75°C operating temperature range



Extending to larger bandwidth and long-distance networks

A Factory Automation Application in Taiwan
Extended Factory Emission Treatment and Monitoring

- The IEX-402 DSL Series supports hundreds of meters point-to-point data transmissions over existing RS-485/telephone wires



Why Ethernet to Fiber?

Long-Haul Options

- IMC-21GA: Supports single-/multimode models with SC/ST connectors and SFP slots for flexible deployment from 0.5 km to 120 km
- IMC-101G: Supports single-mode fiber 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
- Industry certifications for hazardous locations



	IEX-402-SHDSL	IEX-402-VDSL2	IEX-408E-2VDSL2
Ethernet port	1 x 10/100M	1 x 10/100M	6 x 10/100M
DSL port	1 x G. SHDSL	1 x VDSL2	2 x VDSL2
Distance	Up to 8 km	Up to 3 km	Up to 3 km
Redundancy	Link Fault Pass-Through (LFP)	Link Fault Pass-Through (LFP)	Turbo Ring, Turbo Chain fast redundancy; DSL bypass
Power Supply	LV: 12/24/48 VDC (9.6 to 60 VDC) HV: 110/220 VDC/VAC (88 to 330 VDC, 85 to 264 VDC)		
Operating Temperature	-10 to 60°C or -40 to 75°C (T models)		
Approvals	CE/FCC, UL 508, EN 50121-4 SafetyNET p	CE/FCC, UL 508, EN 50121-4 NEMA TS2, ATEX/C1D2	CE/FCC, UL 61010, EN 50121-4, NEMA TS2, ATEX/C1D2, IEC 61850-3

	IMC-101G Series	IMC-101 Series	IMC-21GA	IMC-21A
Ethernet Ports	10/100/1000BaseT(X)	10/100BaseT(X)	10/100/1000BaseT(X), auto MDI/MDI-X	10/100BaseT(X),
Fiber Ports	1000BaseSX/LX/LH/LHW/ZX/EZX	100/1000BaseFX (SC or ST)	100/1000Base-SX/LX or 100/1000BaseSFP slot	100/1000BaseFX (SC or ST)
Fiber Modes	Multi-mode or single-mode			
Dual Power Input	12 to 45 VDC	12 to 45 VDC	12 to 48 VDC	12 to 48 VDC
Operating Temperature	0 to 60°C, or -40 to 75°C	0 to 60°C, or -40 to 75°C	-10 to 60°C, or -40 to 75°C	-10 to 60°C, or -40 to 75°C
MTBF	500,540 hrs.	401,000 hrs.	2,762,058 hrs.	353,000 hrs.
Certification	UL 508, LVD (EN 60950-1), Class 1 Div. 2, ATEX Zone 2, IECEx, CE (EN 55022 Class A, EN 55024), FCC Part 15 Subpart B Class A			UL 60950-1 FCC Part 15 Sub part B Class A