Oil & Gas  Total Solutions

Trusted, Hassle-free Industry-capable Network Provides Stronger Oil and Gas Security

Safety  Class I Div. 2/ATEX Zone 2, maritime approval
Availability  Unrivaled network redundancy solutions
Reliability  Industrial-grade design and high MTBF
Durability  Confidently withstand harsh oil & gas environments
Trustability  World-wide support and immediate local service

MOXA®
Maximize Synergy between Industrial Automation and Ethernet Networks for the Oil and Gas Industry

Oil and gas remains an indispensible fuel of the global economy, and natural resource exploration and production remains a lucrative and attractive endeavor. New oil platforms, rigs, and pipelines are constantly being constructed to meet the demand for oil, with a corresponding growth in the number of factories and control centers to process and manage oil extraction. To maximize efficiency and safety, these systems are becoming more integrated. Unfortunately, the traditional SCADA systems used by the oil and gas industry are inflexible and difficult to integrate because they are highly independent and have limited connectivity to other systems. This limitation will need to be overcome as oil facilities grow more complex and safety and reliability grow ever more important. Moxa provides a complete range of Ethernet products that create oil and gas facilities that are easy, safe, and cost-effective to maintain and operate.

Achieve Operational Excellence Through:

**Improved Flexibility**

Ethernet technology massively expands data transmission boundaries, allowing data to be accessed anywhere to achieve live monitoring of remote sites and real-time response to emergencies. Ethernet significantly enhances the flexibility and availability of data for SCADA systems as well as their integration capability with other networking devices, which is why it is a highly cost-effective and efficient technology. Moxa provides a wide array of Ethernet products, including industrial Ethernet switches, industrial wireless Ethernet devices, secure routers, IP cameras, I/O systems, serial-to-Ethernet device servers, and embedded PCs, helping customers make the most of Ethernet technologies. Highly integrated with serial, LAN, and WLAN, Moxa’s Ethernet products are available in a variety of port configurations such as fiber, copper, SFP, and PoE bandwidth options from 10/100 Mb to 10 Gb.

**Added Safety**

Safety is a top priority of the oil and gas industry, so on-site and off-site equipment must all be held to the highest standards. Devices must meet many different safety standards to ensure that they are able to resist damage from corrosion and vibration, and to ensure constant and reliable operation in hazardous environments. Moxa’s Ethernet products have passed a variety of certifications specially developed for oil and gas facilities, such as DNV/ABS/LR/NK/GL, UL/cUL C1D2, and ATEX II3 G C122. Apart from environmental approvals, Moxa’s security router products help enhance network and device security with comprehensive firewall, VPN, and advanced routing functions. In addition, Moxa’s Ethernet products support a number of security standards such as 802.1X, HTTPS, and SSL.

**Increased Redundancy and Availability**

Unexpected system downtime and failure to respond in real time can cause significant damage to oil and gas facilities, threatening assets and even lives. For this reason, it is highly important to keep the system functional at all times, even during an unforeseen event. Moxa’s Ethernet switches and wireless AP/Bridge/Clients support various redundancy features to ensure maximum communication system availability and instantaneous response. With Turbo Ring and Turbo Chain (response time < 20 ms), and dual RF and Turbo Roaming redundant technologies, Moxa products ensure maximum LAN and Wireless LAN network uptime and guarantee near real-time recovery. Moxa’s products also support power redundancy via dual VAC/VDC power inputs or PoE power sources.
Enhanced Reliability

Rugged design is essential for equipment used in oil and gas facilities since the environments are extremely harsh. Ability to withstand extreme weather conditions, temperature changes, vibration, and external damage such as chemical corrosion is therefore a must. Moxa’s Ethernet switches have an IP30/54/67/68 weatherproof housing, robust metal casing, wide temperature tolerance, vibration proofing, and conformal coating for erosion resistance, making them suitable for use in tough industrial environments. They also have other heavy-duty networking features, including high MTBF and EMI noise immunity.

Easier Management

Managing large-scale and geographically distributed oil and gas facilities is extremely difficult. In addition, to achieve the highest level of security in these unmanned sites, operators must be able to monitor and control each remote site anytime and anywhere. Moxa’s MXview network management software and SoftNVR-IA 32-channel IP surveillance software provide an easy-to-use UI to allow for real-time and remote network management, reducing management effort to a minimum. Moxa’s management systems work seamlessly with industrial systems by supporting OPC server functionality for communicating directly with industrial automation systems (SCADA, HMI, etc.). In addition, Moxa’s Modbus/TCP compatible network devices can directly connect to SCADA/HMI systems for immediate network monitoring.
Optimizing Wired and Wireless Communication for Marine Oil Platforms

Oil and gas communications networks are mission critical, but often must be deployed at offshore oil fields in an environment with severe hazards and challenges. To successfully monitor a drilling platform remotely, the entire infrastructure needs to be extremely reliable and available. In addition to redundant IP network systems with failover capability, the network equipment needs to comply with industrial standards that certify its ability to operate in an environment that features varying temperatures, corrosion, and vibration. Rugged and robust wireless solutions offer a flexible, versatile communications option for offshore oil rigs.

Network Requirements

- A scalable, high-performance industrial Ethernet backbone to support SCADA, DCS, ESD, and F&G control and safeguarding systems for integrated remote control and monitoring in real-time, increasing the safety of each platform.
- Continuous remote IP video monitoring and data acquisition for the process control system through highly reliable and cost-effective Ethernet LAN and WLAN connectivity from the oil platform to onshore operation center.
- A high level of network redundancy to maximize availability.
- Network equipment with high levels of reliability that can withstand harsh marine conditions to provide years of operation.
- Flexible, reliable wireless communication such as IEEE 802.11a/b/g technology between vessels, floating rigs, and fixed platform rigs, to deliver higher availability at lower deployment costs.

Moxa Solutions

- Moxa offers highly secure, robust, and available LAN solutions tailored for offshore data collection, including a full suite of industrial L3/L2 Ethernet switches, industrial wireless Ethernet, industrial secure routers, IP video products, Active Ethernet I/O, and serial-to-Ethernet servers.
- Moxa industrial Ethernet switches support 10/100 Mb, 1 Gb, and 10 Gb speeds with modular mixtures of copper, fiber, and SFP ports for maximum connection flexibility.
- Moxa’s seamless redundant network solutions, Turbo Ring and Turbo Chain redundant technology, enable an integrated, hassle-free network with fast recovery of 20 ms for both control networks and field networks.
- The extended operating temperature range, robust housing, fanless, long-distance and EMI-immune fiber connections, surge protection, and redundant power inputs of Moxa’s products guarantee top performance over a long lifetime.
- Many of Moxa’s products have achieved DNV/GL/ABS/LR/NK and UL/cUL Class I, Division 2 and ATEX Zone 2 certification for use in marine settings or hazardous environments containing volatile flammable liquids and gases.
- Moxa’s wireless Ethernet solutions have become the infrastructure of choice for offshore oil and gas applications due to rugged industrial design, advances in security protection, and innovative dual-RF Turbo Roaming technology that optimizes bandwidth and redundancy.

Products Offerings

The Host Platform

- **EDR-G903 Industrial Gigabit Firewall/VPN Secure Router**
  - Gigabit combo RJ45/SFP port for 1 WAN, 1 LAN, and 1 user-configurable WAN/DMZ interface
  - Dual WLAN for reliable connection redundancy or load sharing
  - Easy-of-use firewall setting functionality

Core Switch Series

- **24G+4 10GbE-port Layer 3 Gigabit Managed Ethernet Switch**
  - Layer 3 routing interconnects multiple LAN segments
  - Turbo Ring, Turbo Chain (recovery < 20 ms) and RSTP/STP for Ethernet redundancy
  - Isolated redundant power with universal 110/220 VAC power inputs

- **EDS-619 16+3G-port Compact Modular Managed Ethernet Switch**
  - Up to 3 Gigabit ports for Gigabit redundant ring and uplink and up to 19 fiber connections
  - Hot-swap media modules for continuous operation
  - Complete management and security features: Turbo Ring, Turbo Chain, Modbus/OPC, LLDP, QoS, VLAN, IGMP snooping, IEEE 802.1X, SSH, and more
  - -40 to 75°C operating temperature range

- **AWK-6222 IEEE 802.11a/b/g Outdoor Dual-RF Wireless AP/Bridge/Client**
  - Redundant dual-RF design for rapid failover
  - Rapid Turbo Roaming under 100 ms
  - Long-distance data transfer up to 10 km
  - Dual DC power inputs and PoE for easy deployment
VPort 354

**Full Motion, 4-ch MJPEG/MPEG4 Industrial Video Encoder**
- Video stream up to 120 FPS at 4CIF resolution
- Modbus/TCP support for SCADA system integration
- SD card for local storage and 2 Ethernet ports for cascade
- -40 to 75°C operating temperature range and fiber support

ioLogik E2260

**Active Ethernet Micro Controllers with 6 RTD and 4 DO**
- Easy-to-use Click&Go™ logic for local control
- SNMPv1/v2c/v3 protocol supported
- Push-based alarm messaging with real-time stamp, including SMS, SNMP Trap with I/O status, TCP, and email

Floating Rigs and Carrier Monitoring

EDS-408A 8-port Managed Ethernet Switch
- Plug-n-play Turbo Ring and Turbo Chain, and RSTP/STP for Ethernet redundancy
- IPv6, Modbus/TCP, LLDP, DHCP Option 82, SNMP Inform, IGMP, QoS, and VLAN
- -40 to 75°C operating temperature range

EDS-P506A-4PoE 6-port PoE+ Managed Ethernet Switch
- 4 IEEE 802.3at/af compliant PoE ports (Up to 30 watts per port)
- 24/48 VDC wide range power input
- Intelligent power consumption detection, PD failure check function
- Fiber support and -40 to 75°C operating temperature range

VPort 461

1-channel H.264/MJPEG Industrial Video Encoder
- Three simultaneous streams, latency under 200 ms, and SD slot
- Video stream up to 30/25 FPS at full D1 (720 x 480/720 x 576) resolution
- 2 Ethernet ports for cascade and Ethernet port redundancy
- -40 to 75°C operating temperature range

VPort 351

1-channel MPEG4/MJPEG Industrial Video Encoder
- Video stream up to 30 FPS at full D1 (720 x 480)
- 2-way audio and pre/post-alarm video recording
- -40 to 75°C operating temperature range
- Fiber optic Ethernet port

NPort IA5150/5250 1 and 2-port Industrial Serial Device Servers
- Cascading Ethernet port for easy wiring (RJ45 ports only)
- -40 to 75°C operating temperature range and fiber support
- Patented ADDC® (automatic data direction control) for 2-wire and 4-wire RS-485

AWK-4121 IEEE 802.11a/b/g Outdoor Single RF Wireless AP/Bridge/Client
- Multi-SSID VLAN, QoS support
- Rapid Turbo Roaming under 100 ms
- Long-distance data transfer up to 10 km
- IP68-rated metal housing, dual DC power and PoE
Secure and Efficient Networking Solutions for Oil Wellhead Automation

Intelligent oil wellhead automation can be achieved with a reliable and cost-effective automated Ethernet-based control and monitoring system that supervises operations from the wellheads and Gas Oil Separation Plant (GOSP) in a SCADA-based control center. This system combines video monitoring, data acquisition, and transmission, and requires a high-bandwidth backbone with non-stop redundant reliability and real-time performance. Since onshore operations are characterized by environmental hazards such as corrosion, temperature extremes, and risk of explosions, the network equipment must be able to withstand these hazards and comply with ATEX standards.

Network Requirements
- A reliable, well-functioned monitor and control network system based on industrial Ethernet is required to remotely manage and immediately access data from wellhead RTUs at the SCADA host, reducing the number of in-person maintenance trips.
- Backbone network with high bandwidth Gigabit performance for video, voice, and data transmission, with fast fault recovery in case the network goes down.
- A secure network that protects the monitoring system and critical oil wellhead assets from malicious attack.
- A software solution that manages a large-scale wellhead network system for easy network troubleshooting and maximum system uptime.
- Fiber optic cable for secure and long-distance transmission to the field monitoring site to deliver superior EMI/noise immunity and high availability.
- ATEX and UL ratings to certify explosion-proofing, dustproofing, weatherproofing, and extreme operating temperature range to ensure safety and reliability in hazardous conditions.

Moxa Solutions
- Moxa’s high-performance Layer 3 switches form reliable Gigabit fiber redundant rings across GOSP LAN network and support additional Gigabit uplinks that provide transparent information from wellheads to the SCADA control center, enabling real-time video, voice, and data transmission.
- Turbo Ring and Turbo Chain self-healing technology (recovery time < 20 ms) with highly flexible and cost-efficient deployment for multiple rings deliver the highest level of network availability and hassle-free expansion.
- Moxa offers a variety of remote monitoring, maintenance, and data acquisition solutions for maximum customer flexibility, including industrial-grade IP surveillance solutions, integrated multi-service gateway for efficient communication interoperability, industrial serial device server, high-grade embedded computer, and industrial wireless Ethernet product for mobile access of onsite maintenance.
- Multiple network management software and OPC-enabled solutions allow engineers to stay in control of the Ethernet networks with easy and seamless integration with SCADA/HMI systems.
- Gigabit secure router to form a trusted industrial network with the highest levels of protection.
- In addition to UL/cUL Class I, Division 2, and ATEX Zone 2 certifications, rugged features for greater system reliability include dual redundant power, and -40 to 75°C operating range.

High-performance Redundant Backbone

**Core Switch**
- **24G+4 10GbE-por Layer 3 Gigabit Managed Ethernet Switch**
  - Layer 3 routing interconnects multiple LAN segments
  - Turbo Ring, Turbo Chain (recovery < 20 ms) and RSTP/STP for Ethernet redundancy
  - Isolated redundant power with universal 110/220 VAC power inputs

**PT-7828**
- **24+4-port Layer 3 Substation Managed Switch**
  - Passed KEMA tests based on IEC 61850-3 and IEEE 1613 standards
  - Various media modules: RJ45, fiber, SFP, and M12 ports
  - Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC inputs
  - Fanless design with -40 to 85°C operating temperature

**EDS-510A**
- **7+3G-port Gigabit Managed Ethernet Switch**
  - 2 GE ports for a redundant ring and 1 GE port for uplink or ring coupling
  - 3 combo Gigabit RJ45/SFP ports and 4 IEEE 802.3at-compliant PoE ports (EDS-P510)
  - Redundancy with Turbo Ring and Turbo Chain (recovery time < 20 ms), and RSTP/STP
  - Intelligent management, security, and PoE management (EDS-P510) functions
  - -40 to 75°C operating temperature range
Wellhead Monitoring and Maintenance

**V2101** x86-based Embedded Computer
- Intel Atom Z510PT 1.1GHz processor, 400 MHz FSB
- Front-end computing, storage, and communication
- Dual independent displays (VGA + LVDS)
- Palm-size form factor with -40 to 85°C operating temperature range

**AWK-4121** IEEE 802.11a/b/g Outdoor Single RF Wireless AP/Bridge/Client
- Multi-SSID, VLAN, QoS support
- Rapid Turbo Roaming under 100 ms
- Long-distance data transfer up to 10 km
- IP68-rated metal housing, dual DC power and PoE

**NPort IA5000A** 1/2/4-port Industrial Serial Device Server
- Enhanced surge protection for the serial, Ethernet, and power lines
- 2 KV isolation for serial signals
- Class I, Div. 2/ATEX Zone 2 certified for harsh industrial environments (Pending)
- Rugged screw-type terminal blocks for power and serial connectors

**VPort 704** Industrial Multi-service Gateway
- 3 Gigabit ports (copper and SFP)
- Supports Turbo Ring, RSTP, and ring coupling
- Supports VLAN, IGMP Snooping, and QoS (TOS, COS, Port-based)
- 4-ch IP video encoder module and 4-ch serial device server module supported

SCADA Control Center

**EDR-G903** Industrial Gigabit Firewall/VPN Secure Router
- Gigabit combo RJ45/SFP port for 1 WAN, 1 LAN, and 1 user-configurable WAN/DMZ interface
- Dual WLAN for reliable connection redundancy or load sharing
- Easy-to-use firewall setting functionality

**MXview** Industrial Network Management Software
- Automatic topology discovery and visualization
- Real-time event management and traffic monitoring
- Central management of configurations and firmware
- Easy integration with SCADA/HMI systems with OPC

**SoftNVR-IA** 32-channel IP Surveillance Software
- Live view with H.264, MPEG4, and MJPEG, from VPort products
- Video recording and playback functions by event
- Built-in OPC server for easy communication with automation systems

**EDS-SNMP OPC Server**
Easily monitor and prevent downtime of control network
The role of oil pipelines is to distribute the crude oil from drilling rigs to oil storage tanks, and then to refineries. Typically, pipelines span several thousand miles over harsh terrain and require a central SCADA system based on Synchronous Digital Hierarchy (SDH) and microwave architecture to measure, monitor, and control the status of field instruments across the entire oil flow. Multiple pumping stations, such as block valve stations and compressor stations, are built to keep the pressure in the pipeline constant. Operators can quickly detect, locate, and prevent or resolve leaks, damages, and breaks by deploying a rugged, extendable fiber-optic Ethernet networks. The networks must be robust, highly available, and encompass integrated remote monitoring service support for pipeline operation, thereby improving safety and reliability and reducing the total cost of the pipeline.

Network Requirements
- SCADA system and network management software at the control center receives and monitors all of the pipeline operational status.
- A reliable wired or wireless communication network that supports the pipeline-wide remote data monitoring system with video surveillance products, device servers, and remote I/O devices, to seamlessly communicate with the central system.
- Network with Gigabit performance and fiber support for real-time long-haul video, voice, and data transmission over vast distances.
- Flexible and extensive network with easy deployment and expansion for large-scale and changeable pipeline applications.
- Industrial-grade devices meeting exacting standards, with extended operating temperature range, and featuring ruggedized construction to build a rock-solid network in harsh operating conditions.

Moxa Solutions
- Moxa offers reliable connectivity, superior network efficiency and performance, and instant remote monitoring and access with our highly integrated network solutions, including industrial Ethernet switches, industrial wireless LAN and cellular products, IP video surveillance solutions, event-response-based Active Ethernet I/O, embedded computers, and advanced serial-to-Ethernet servers.
- Easily troubleshoot the entire network with Moxa’s MXview industrial network management software to maximize system uptime.
- Industrial Ethernet switches with Gigabit performance and single-mode and multi-mode fiber optic interface are available.
- Turbo Chain, an ultra-flexible and the highly resilient technology with fast fault recovery time of under 20 ms and live node expansion capability without system interruptions, can be used to build a cost-efficient redundant network.
- Excellent long-term reliability is ensured by ATEX and UL approvals, structural strength, extended operating temperature, as well as corrosion and electromagnetic resistance.

Products Offerings

Control Center
IKS-6524/6526 24/24+2G-port Rackmount Managed Ethernet Switch
- Turbo Ring and Turbo Chain (recovery < 20 ms), and HSI/H/S1” for Ethernet redundancy
- 2 combo Gigabit RJ45/SFP ports (IKS-6526-2GTXSFP)
- Isolated redundant power inputs (110/220 VAC)

AWK-5222 IEEE 802.11a/b/g Indoor Dual-RF Wireless AP/Bridge/Client
- Dual-RF design for redundant wireless communication
- Rapid Turbo Roaming under 100 ms
- Long-distance data transfer up to 10 km
- Dual DC power inputs and PoE

MXview Industrial Network Management Software

Pump Station and Pipeline Monitoring
EDS-611 8+3G-port Compact Modular Managed Ethernet Switch
- Up to 3 Gigabit ports for Gigabit redundant ring and uplink
- Modular form factor with up to 11 fiber ports
- Turbo Chain and Turbo Ring (recovery < 20 ms) seamlessly interoperate with SDH network
- -40 to 75°C operating temperature range
VPort 354  Full Motion, 4-ch MJPEG/MPEG4 Industrial Video Encoder
- Video stream up to 120 FPS at 4CIF resolution
- -40 to 75˚C operating temperature range and fiber support
- 2-way audio, SD card slot and 2 Ethernet ports supported
- Modbus communication with SCADA

NPort IA5000A 1/2/4-port Serial Device Servers for Industrial Automation
- Enhanced surge protection for the serial, Ethernet, and power lines
- 2 KV isolation for serial signals
- Class I, Div. 2/ATEX Zone 2 certified for harsh industrial environments (Pending)
- Rugged screw-type terminal blocks for power and serial connectors

ioLogik E2214/ E2242 Active Ethernet Micro Controller with 6 DIs and 6 Relays/4 AIs and 12 DIOs
- Active messaging with real-time stamp, including SMS, SNMP Trap with I/O status, TCP, and email
- I/O peer-to-peer function and SNMPv1/v2c/v3 support
- Front-end intelligence supporting 24 Click&Go™ rules

VPort 25 IP66, Fixed Dome IP Camera for Outdoors
- Up to 30 frames/sec at 720 x 480
- Direct-wired power input and PoE for power redundancy
- -40 to 50˚C operating temperature range and fanless

OnCell G3110 Industrial Quad-band GSM/GPRS/EDGE IP Gateway
- Connect Ethernet/serial devices over an integrated VPN
- Centralized private IP management software
- Redundant DC power inputs and DIN-Rail mounting

Tank Farm Management

EDS-408A 8-port DIN-Rail Managed Ethernet Switch
- Turbo Ring/Turbo Chain media redundancy (recovery < 20 ms)
- IPv6, Modus/TCP, LLDP, SNMP Inform, QoS, port-based VLAN, SNMPv1/v2c/v3, and RMON
- -40 to 75˚C operating temperature range

IA3341 RISC-based Embedded Computer
- Front-end communications for remote monitoring, data acquisition, data logging, and protocol conversion
- Support 2 serial ports, 4 DIs, 4 DOs, 2 AIs, 2 thermocouples, dual LANs, SD, Linux
- Modbus/TCP library to retrieve AI and thermocouple data

ioLogik E1200 Series Remote Ethernet I/O
- Built-in 2-port Ethernet switch for daisy-chain topology
- Free support of Moxa’s Active OPC Server Lite for seamlessly connecting to SCADA systems
- User-defined Modbus/TCP addressing
- MXIO programming library for Windows/WinCE VB/VC.NET and Linux C APIs

Turbo Chain Redundant Network
Ensure 24/7 Sustainable Production with Industrial Ethernet

Oil refineries are large-scale plants that process large quantities of crude oil and feature a complicated product process with a great number of intelligent equipment devices. Because of the high capacity, many of the units operate continuously for long periods of time. The distributed control system (DCS) is the main control system connected to the controller elements by Ethernet networks to manage and monitor the plant’s output and performance. Since non-stop 24/7 operation is crucial to the entire process, the Ethernet network system must have reliable redundancy to achieve high data availability and optimal productivity. In addition, an auxiliary system is used to detect and track unsafe events such as leaks to maintain safe operations.

Network Requirements

- Build a highly reliable, flexible, yet cost-effective industrial Ethernet communication network for the entire DCS.
- Dual redundant network for SCADA system, controllers, and field devices to simplify the task of providing maximum uptime for the critical oil refinery DCS process.
- Fiber redundant ring networks over a vast area in the refinery plant to connect the field gas sensors, leak detectors, and other industrial detectors to the SCADA control room.
- IP video surveillance and Ethernet I/O solutions integrated to the network to enable remote monitoring and control of daily operations, especially for emergency situations.
- Cellular solutions to easily connect field devices in the remote site for mobile management.

Moxa Solutions

- High performance modular managed switches supporting 4 Gigabit RJ45/SFP ports, up to 24 fast Ethernet ports, and Turbo Ring/Turbo Chain redundant technology (recovery time < 20 ms) excel in building reliable redundant fiber optic connections for a heavy-load DCS process.
- Moxa offers a vast range of industrial Ethernet switches with DIN-Rail or rack mounting options and fiber support, including high-port-density rackmount switches that are a natural fit for control centers. Gigabit Ethernet switches for video surveillance applications, and PoE+ solutions for cost-effectively connecting high power PoE-based sensors.
- Industrial IP video encoders and event-based Active Ethernet I/O provides a valuable integrated service over one Ethernet platform for real-time data acquisition and remote monitoring.
- Comprehensive device networking solutions, such as cellular IP gateways, serial-to-Ethernet fieldbus gateways, and Ethernet-to-fiber media converters, and more.
- All of Moxa’s solutions feature high MTBF, fanless, high-EMI noise immunity, and industrial design to enable durable operations.

Oil Refinery Process

Core Switch Series

- **24G+4 10GbE-port Layer 3 Gigabit Managed Ethernet Switch**
  - Layer 3 routing interconnects multiple LAN segments
  - Turbo Ring, Turbo Chain (recovery < 20 ms) and RSTP/STP for Ethernet redundancy
  - Isolated redundant power with universal 110/220 VAC power inputs

EDS-728 24+4G-port Modular Gigabit Managed Ethernet Switch

- Rich media modules: copper, fiber, SFP ports
- Gigabit Turbo Ring, Turbo Chain, and RSTP/STP for Ethernet redundancy
- Fully managed switches with powerful security features

OnCell G3110

- Connect Ethernet/serial devices over an integrated VPN
- Centralized private IP management software
- Redundant DC power inputs and DIN-Rail mounting

MGate MB3170

- 1-port Advanced Serial-to-Ethernet Modbus Gateway
  - Slave mode supports 16 TCP masters and up to 62 serial slaves at the same time
  - Master mode supports 52 TCP slaves at the same time
  - Emergency reques tunnels ensure QoS control
  - Redundant dual DC power inputs
Products Offerings

**Auxiliary Control Systems**

- **IKS-6524/6526**
  - 24/24+2G-port Rackmount Managed Ethernet Switch
  - Turbo Ring and Turbo Chain (recovery < 20 ms), and RSTP/STP for Ethernet redundancy
  - 2 combo Gigabit RJ45/SFP ports (IKS-6526-2GTXSFP)
  - Isolated redundant power inputs (110/220 VAC)

- **EDS-P506A-4PoE**
  - 6-port PoE+ Managed Ethernet Switch
  - 4 IEEE 802.3at/af compliant PoE ports (Up to 30 watts per port)
  - 24/48 VDC wide range power input
  - Intelligent power consumption detection, PD failure check function
  - Fiber support and -40 to 75°C operating temperature range

- **EDS-510A**
  - 7+3G-port Gigabit Managed Ethernet Switch
  - 2 GE ports for a redundant ring and 1 GE port for uplink or ring coupling
  - Gigabit fiber Turbo Ring and Turbo Chain (recovery time < 20 ms), and RSTP/STP
  - Long-distance fiber transmission up to 80 km
  - Class I Div. 2/ATEX Zone and -40 to 75°C operating temp. range

- **VPort 461**
  - 1-channel H.264/MJPEG Industrial Video Encoder
  - Video stream up to 30/25 frames/sec at full D1 (NTSC:720 x 480; PAL:720x576) resolution
  - Three simultaneous streams, latency under 200 ms, and SD slot
  - Modbus/TCP and free VPort SDK plus support
  - -40 to 75°C operating temperature range

- **ioLogik E2214**
  - Active Ethernet Micro Controller with 6 DIs and 6 Relays
  - Push-based alarm messaging by CP/UDP/email/SNMP-trap
  - Easy-to-use Click&Go™ logic for local control
  - I/O peer-to-peer function and SNMPv1/v2c/v3 support
  - -40 to 75°C operating temperature range

- **TRC-190**
  - 19-inch Rackmount Chassis Media Converters
  - Chassis design with up to 19 slots for high density applications
  - Hot-swappable slide-in modules: multi-mode/single-mode fiber with SC/ST connector support (CSM-200 series)
  - Fanless design, dual redundant power inputs
Safe from Cyber Attacks and Vulnerabilities with Industrial Network Security

Modern industrial automation networks unify many different applications over an open industrial Ethernet network by using the TCP/IP protocol to simplify development and maintenance efforts and easily integrate with the office network. The move to Ethernet has delivered tremendous benefits in efficiency and interoperability, but has also opened up industrial networks to communications from the outside world. Industrial network security requirements have evolved significantly in recent years and there is a growing recognition that industrial devices can be targets of sabotage. Any intrusion in the industrial control system can lower production quality and even cause significant damage and safety risks. A network system with effective Layer 2 security features, such as IEEE 802.1X, SSH, HTTPS, and port security, and security routers can greatly enhance the security and availability of the process control network infrastructure to achieve safe and efficient production while protecting critical SCADA and DCS systems from unexpected external and internal cyber attacks and vulnerabilities.

The Best Practice:
Safeguard Infrastructure and Cyber Security by Applying Secure Firewall/VPN Solutions

Benefits
- Enable reliable and secure communication among remote corporate networks, SCADA, and DCS networks at oil drilling facilities, pipelines, and refineries.
- Create a secure framework to protect critical field devices facing ever-evolving cyber attacks.
- Minimize security risk and threats and achieve safe 24/7 operations.

PLCs Easily Crashed by Cyber Attack
A survey from CERN (The European Organization for Nuclear Research) revealed that PLCs are often vulnerable when suffering simple attacks from free tools like Netwox or Nessus.

83% of Cyber Storms Originate Internally
AT&T’s report mentions that most network security attacks are initiated by insiders with malicious intent.
Moxa’s EDR-G903 series, the leading Gigabit performance Firewall/VPN secure router, is designed to defend industrial networks. The EDR-G903 protects sensitive process control networks and mission-critical industrial assets by forming a trusted intranet environment. Moxa’s EDR-G903 series supports 3 combo Gigabit ports with built-in RJ45 ports and SFP slots for connecting to a WAN, a LAN, and a WAN or DMZ (Demilitarized Zone) with rapid transfer bandwidth. The dual WAN feature is ideal for establishing a reliable Internet connection backup and for providing a secondary option for load sharing with two Internet service providers. A wide operating temperature range of -40 to 75°C and smart firewall functions, such as Quick Automation Profile for enabling common Fieldbus protocols, make the EDR-G903 well-suited for harsh, industrial applications.
Oil and gas facilities are faced with the constant risk of explosion and leakage that not only jeopardizes business operations, but also puts human lives in danger. For this reason, equipment and systems used in these settings must be held to rigid standards to guarantee the highest level of security and reliability.

Well aware of the importance of meeting security standards for industrial products, Moxa has designed products that are constructed in strict accordance with globally accepted standards for explosion protection in hazardous locations. Certifications approved include DNV/GL/ABS/LR/NK, UL/cUL Class I, Division 2, and ATEX Zone 2.

Environmental Hazards and Ratings

Class I Division 2/ATEX Zone 2

Equipment in a hazardous location where ignitable concentrations of gases, vapors, or liquids are contained (such as a pipeline) must be specially designed and tested to meet Class I Division 2/Zone 2 standards to avoid explosions. Moxa products have been tested for safe and reliable operation in hazardous locations in accordance with strict, internationally recognized UL/cUL Class 1, Division 2, and ATEX Zone 2 standards.

Maritime Certification

Offshore oil rigs and drilling platforms place high demands on their equipment since they are more likely to be exposed to a wide variety of environmental damage, such as salt mist and humidity. For this reason, equipment used in these settings must conform to maritime standards to provide the highest level of onsite security. The maritime standards, which include DNV, GL, ABS, LR, and NK for individual regions, confirm a device’s ability to withstand temperature, humidity, vibration, EMC, and other stresses, as well as its suitability for specific, well-defined classes of marine environments. Moxa’s industrial Ethernet and computing solutions have passed several marine certifications to guarantee the reliable and safe operation of equipment used on ships or offshore sites.
Full Protection for Components with Conformal Coating

Why Conformal Coating?
Off-shore oil drilling platforms, on-shore oil wells, and refineries must cope with moisture, salt, and airborne chemicals that can react with and damage the electronics on printed circuit boards. Conformal coating is a thin and even layer of non-conductive material applied over electronics. This protective coat protects against moisture, contaminants, and corrosion, and resists extreme temperatures, vibration, salt spray, and chemical vapors, ensuring a longer lifecycle.

5 Reasons to Choose Moxa for Conformal Coating
Moxa provides conformal coating services to help customers construct more reliable and rugged systems.
• Uses Dow Corning 1-2577 silicon resin coating, which forms a firm, abrasion-resistant surface after curing.
• Five-year warranty
• All conformal coated products are tested and inspected in accordance with the strict IPC-A-610D 10.5.2.2 Class 1/2/3 standard under black light
• Conforms to IPC-CC-830 SR type thickness requirements (50 to 210 μm)
• Additional full-function testing and quality assurance prior to shipment

Strict Coating and Inspection Processes for Maximum Reliability
Real-time Monitoring, Control, and Management of Assets for Oil Drilling Platform Assets

Company: ONGC (Oil and Natural Gas Corporation), Ltd.
Location: India

System Introduction
ONGC contributes 77% of India’s crude oil production and 81% of the country’s natural gas production. The goal of this project was to manage manufacturing and assets of 45 offshore and onshore drilling stations remotely from the enterprise control center. ONGC entrusted ABB Bangalore to integrate different SCADA systems into an enterprise-wide SCADA network for monitoring oil drilling platforms and to set up the communication network between the enterprise control center and 45 ONGC-owned drilling platforms for remote data collection. The system establishes a TDMA radio access network to link the control level network and enterprise level server. Each drilling platform uses HART instruments connected to redundant RTUs (Remote Terminal Units) to control drilling facilities on the floating platforms. The RTUs supply data over an Ethernet network in real time. The high bandwidth provided by Moxa’s EDS-408A, which is an industrial managed redundant Ethernet switch with DNV and Class I, Div.2/Zone 2 certifications, enables safe communication between field operations and the control station.

Network Requirements
- Remote monitoring, control, and management of drilling platforms from the enterprise control center
- Hazard-rated for safe operation in offshore oil and gas fields
- Hardened features for field operations and redundancy for high network uptime
- Strong tolerance of wide temperature variations

Why Moxa?
- The EDS-408A managed Ethernet switch meets DNV and Class I, Div. 2 /Zone 2 standards
- Industrial design suitable for all tough workplaces
- The EDS-408A can operate over a wide temperature range of -40 to 75°C
- Moxa’s Ethernet switches support redundant and RMON features

Key Products
EDS-408A
Industrial 8-port managed Ethernet switches
NPort IAS150
Serial device servers for industrial automation

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Saudi Aramco Builds Reliable Remote Wellhead Monitoring Networks in Khurais

System Introduction

Saudi Aramco, the state-owned national oil company of Saudi Arabia, is the largest oil corporation in the world and has the world’s largest proven crude oil reserves and production. This project involved 500 distributed oil, gas, and water wells located in the Khurais region. Gas plants and well sites are unique in that they tend to be located in remote, unpopulated areas. Since only a limited number of operators can stay on-site, Aramco needed to build reliable remote monitoring networks to connect RTUs at remote wells to the SCADA host to control field instruments.

Each field site uses Moxa’s VPort 351 industrial video encoder to connect a CCTV camera via a coaxial cable, along with a VoIP system to enable wellhead remote monitoring. The other side links to an Ethernet switch for real-time video streaming. Moxa’s EDS-510A Gigabit Ethernet switch was chosen to form a communication network for the GOSP (Gas Oil Separation process) plant. Each plant uses EDS-510A switches to connect field devices and form a Gigabit fiber ring for reliable transmission of video, data, and voice. High uptime was ensured by using Gigabit Turbo Chain topology to form a redundant connection between sub-networks and the main backbone. In the communication room, the PT-7828 series Layer 3 modular managed Ethernet switches were installed to deliver data from the EDS-510A switches to back-end SCADA systems. The layer 3 switching functionality divides the large network into hierarchical subnets and allows data to communicate across networks, making management much easier and more efficient. The PT-7828 switches with IEC 61850-3, IEEE 1613 approvals are perfectly qualified for the strict demands of GOSP plant. DNV and Class I, Div. 2, Zone 2 and DNV certified for hazardous locations. Layer 3 routing functionality to facilitate the deployment of applications across networks.

System Requirements

- Reliable remote monitoring with high bandwidth
- Hardened devices capable of operating under severe conditions
- Long-haul transmission across vast distances in a desert
- Safe operation under hazardous conditions
- Gigabit redundancy backbone for high data availability
- Seamless integration between networking devices
- Network infrastructure scalability and flexibility for future expansion demands

Why Moxa?

- Moxa Turbo Chain redundancy with recovery time under 20 ms
- Support for a wide operating temperature range of -40 to 75°C
- Gigabit fiber network to ensure real-time video, data, and voice transmission
- Class I, Div. 2, Zone 2 and DNV certified for hazardous locations
- IEC 61850-3 and IEEE 1613 approval for power automation systems of GOSP
- Layer 3 routing functionality to facilitate the deployment of applications across networks

Key Products

- **EDS-510A**
  Industrial 7+3G-port Gigabit Managed Ethernet Switch
- **VPort 351**
  1-channel Industrial MJPEG/MPEG4 Video Encoder
- **PT-7828**
  IEC 61850-3 24+4G-port Layer 3 Gigabit Modular Managed Ethernet Switch
Enhanced Management Efficiency and Security for Russian Oil Pipeline

System Introduction
Managing a 1600 kilometer long oil pipeline is no simple task, even for the leading oil pipeline company in Russia that owns the largest oil pipeline system in the world. The company has built a fiber optic backbone based on SDH multiplexers to transmit standard E1 data streams over long distances. The backbone is connected with a variety of systems, such as the ventilation system, air conditioning system, and fire alarm system. To make sure that all data is transmitted accurately and immediately, a Gigabit Ethernet network consisting of more than 1,000 Moxa EDS-510A industrial Ethernet switches was constructed. At each node along the pipeline, a Moxa ioLogik E2210 Active Ethernet micro controller is installed to allow for communications between the sensors and the Ethernet network so that actions can be taken automatically in case of unexpected events. The Ethernet network was configured in a Ring topology to ensure data availability at all times. In addition, the rugged design and wide operating temperature of Moxa’s switches and I/O products are a perfect fit for the harsh environment.

Network Requirements
- Remote monitoring, control, and management of oil pipelines from the control center
- Long-distance transmission of data across the country
- Gigabit redundant ring for high data availability
- Rugged design capable of operating under harsh environmental conditions

Why Moxa?
- Fiber optic support for up to 80 km long haul transmission
- Wide operating temperature of -40 to 75°C
- Gigabit backbone to ensure real-time data transmission
- Redundant Ethernet ring network integrated with SDH backbone to enhance reliability and security
- Active Ethernet micro controller delivers event-driven reporting with time stamp, providing precise event information and I/O status for real-time alarm management

Key Products
- EDS-510A
  Industrial 7+3G-port Gigabit Managed Ethernet Switch
- ioLogik E2210
  Active Ethernet micro controller with 12 Digital Inputs and 8 Digital Outputs
**System Introduction**

FPCC is one of the largest petrochemical groups in Taiwan. Its "No. 6 Naphtha Cracker" project involved constructing an oil refining plant for crude oil, Naphtha cracking plants for ethylene, a thermal power plant for energy, and other petrochemical plants. To regulate the ethylene output in the cracking process, the No. 6 Naphtha Cracker uses a reliable Ethernet network to transmit significant control and device management signals.

The central IT room contains an HMI/SCADA system, has numerous workstations for data processing, plus a data server for controlling and monitoring I/O controllers located at a remote site. In addition, control panels were deployed in the field to help engineers set parameters on-site. Adopting a reliable Ethernet network as the main communication network for the entire DCS system keeps production running nonstop. Eight Moxa EDS-726 modular Ethernet switches are used to form a doubly redundant fiber network backbone with dual-tree topology for better reliability. The EDS-308-MM-SC 8-port unmanaged Ethernet switch forms the network between system backbone and operation stations. There are two parallel but independent Ethernet networks, with each network device connected to both networks (e.g., each workstation had two network cards). In addition, the entire array of workstations and devices is duplicated to provide an ultra-reliable back-up.

**Network Requirements**

- Use industrial Ethernet as the communication network of the DCS
- Create a redundant infrastructure for high data availability
- Build a Gigabit backbone to ensure real time data transmission
- Use a mixture of fiber optic and copper cables for connection flexibility

**Why Moxa?**

- Support for Turbo Ring redundancy with ultra-fast ring recovery < 20 ms)
- The EDS-726 offers high fiber optic density for remote connections
- The EDS-726 offers up to 2 Gigabit ports and diverse fiber selections over distances up to 80 km
- The EDS-726’s modular flexibility offers a variety of media combinations and future upgrades

**Key Products**

- **EDS-726**
  - 24+2G-port Modular Gigabit Ethernet Switch
- **EDS-308-MM-SC**
  - Industrial 8-port Unmanaged Ethernet Switch
## About Moxa

Founded in 1987, Moxa is one of the leading manufacturers of industrial networking, computing, and automation solutions designed for reliable, efficient, safe, and long-lasting operation for mission-critical systems in harsh industrial settings. Moxa’s integrated network-wide solutions provide customers with one-stop shop service and satisfy various industrial standards, including Class I, Div 2/ATEX Zone 2 products for hazardous locations, DNV/GL/ABS/LR/NK certified solutions for maritime and offshore applications, and more. These approvals guarantee smooth and optimal performance, zero packet loss, and high adaptability to any severe conditions.

### Your One-stop Shop for Oil & Gas Projects

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