Master Catalog

2016-2017

# Enabling Connectivity for the Industrial Internet of Things

• Edge Connectivity • Industrial Computing • Network Infrastructure

MOXA®

Reliable Networks ▲ Sincere Service

# Moxa: Your Trusted Partner in Automation

As the Industrial Internet of Things (IoT) interconnects our world faster than ever, we rely more than ever on network infrastructures. Since its establishment in 1987, Moxa has had a proven track record of providing customers with the most reliable networks for a variety of industrial applications.

With over 25 years of industry experience, Moxa has connected more than 40 million devices worldwide. These devices have delivered highly reliable communications between people, systems, and processes to achieve all forms of automation and collaboration.

## Promise for the Future

***Reliable Networks, Sincere Service*** continues to be Moxa's promise to enable connectivity for the Industrial IoT. Moxa stays ahead of the curve with innovative Ethernet-core technology and solutions to help customers tap into the potential of the Industrial IoT market.

## Reliable Networks

Network reliability is the cornerstone of Moxa's commitment to deliver the best value to our customers and partners. Moxa's many solutions share a common set of robust features designed to provide maximum network uptime, especially in harsh environments. Our cutting-edge product portfolio comprises quality and innovative technology to ensure nonstop productivity, operational efficiency, and robust security for complex industrial communications and automation applications.

## Sincere Service

At Moxa, we listen carefully to learn more about our customers' expectations and needs before we develop a solution. With extensive experience and innovative technology, we provide premium customization, expert network consulting, and a broad range of technical support services. Through close collaboration with our worldwide partners, we help customers optimize their applications' performance, adapt to fast-changing technologies, and seize opportunities to achieve the best time-to-market results.

## Product Offerings

### Edge Connectivity

Moxa's edge connectivity products bridge various industrial devices to streamline the acquisition and transmission of data, voice, and video to backbone networks. Customers can enjoy seamless network integration for various cross-system collaborations.

- Serial connectivity
- Industrial Ethernet gateways
- RTU controllers and smart I/O devices
- Industrial IP cameras and video management software

### Industrial Computing

Moxa provides RISC- and x86-based industrial computers to work in the most demanding conditions. The world's first wide-temperature-range 4G LTE computer is a perfect example of a device that delivers reliable 4G performance without requiring a fan or a heater.

- Mission-critical computers
- Displays and panel computers
- Compact and wireless computers
- Embedded CPU modules

### Network Infrastructure

Moxa's network infrastructure solutions provide comprehensive building blocks to develop robust wired and wireless backbones for mission-critical applications with regard to device reliability, connection availability, cybersecurity, and easy management.

- Industrial Ethernet switches
- Industrial wireless AP/bridge/client and cellular routers
- Industrial secure routers
- Ethernet media converters
- Network management software

# Get Connected to Success and Opportunity

Worldwide, Moxa's expert sales team is ready to provide the best quality, support, and services to assist you in all aspects of your projects—from concept to completion—to empower your network operations and applications.


## Global Service Coverage

### Customer-Oriented Service

Moxa has established a global service network to be closer to our customers to better understand their needs and respond faster to their requirements. Leveraging Moxa's industrial experiences and technological intelligence, our service team provides professional solutions and consulting services, backed by our extensive global resources and solution capabilities.

### Extended Teamwork

Through our annual MTSC (Moxa Technical Support Certification) training, Moxa provides the most up-to-date solutions and technologies to our global partners to ensure the best service to customers. Integrating the strengths of our worldwide industry and technology partners, we deliver sincere service and an extended range of innovative solutions to customers.

## Total Quality Management

Our commitment to quality is at the heart of Moxa's promise of *Reliable Networks, Sincere Service.* Moxa employs a corporate-wide Total Quality Management System (TQMS) to achieve customer satisfaction and unbeatable results in the following categories:

### Robust Technology

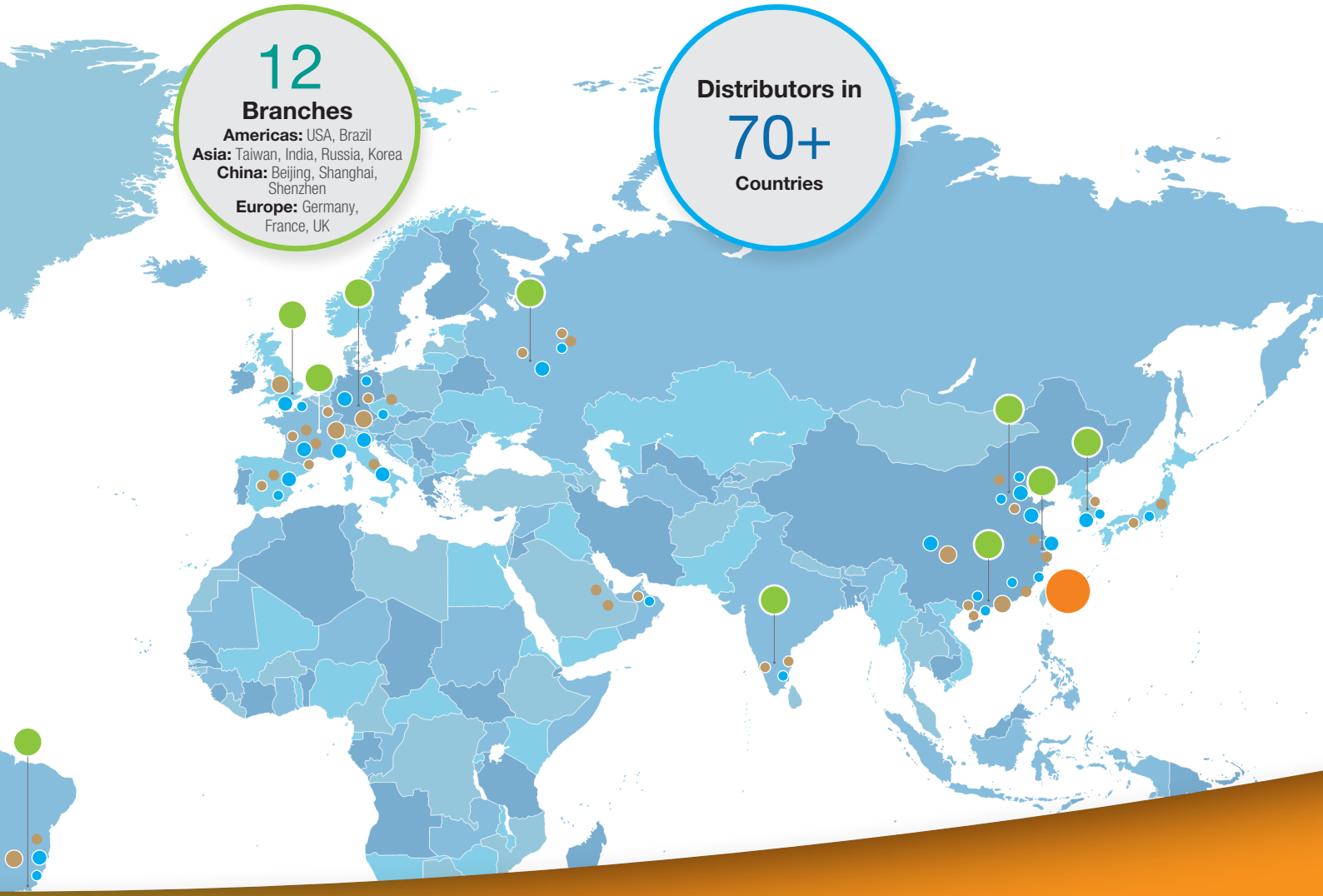
At Moxa, quality starts with concepts that benefit our partners and customers. Moxa attracts a broad spectrum of talent and encourages new ideas to nurture innovation at every level. Following the well-defined New Product Development Process (NPDP), all of Moxa's products must undergo strict tests, verifications, and validations to achieve tangible quality-related benchmarks for various industrial applications.

### Project Life-Cycle Management

Moxa is IRIS-certified and implements a rigorous management process to ensure quality and optimal results for long-term projects. Specific RAMS and LCC management guidelines guarantee reliability, longevity, low life-cycle costs, and easy maintenance throughout a project's lifetime.

### Continuous Improvement

Moxa motivates each employee to work smarter and find ways for continuous improvement. Our Quality Improvement Team (QIT) and Eight Disciplines Problem-Solving (8D) methodology for solving problems and preventing crises promote continuous progress in the quality of our products, service, and technology, to ensure customer satisfaction.




# Technological Innovation

Moxa cultivates continuous technological innovation to meet the constantly changing requirements of industrial environments. To enable the most capable and reliable connectivity required for the Industrial IoT, Moxa strives to achieve application-driven innovations in the following aspects.


■ Performance
High-speed wired/wireless connectivity for future-proof networks

■ Reliability
Proven reliability for continuous productivity

■ Availability
Millisecond-level redundancy for nonstop operations

■ Security
Industrial cybersecurity for critical device protection and secure remote access

■ Manageability
Easy operations in deployment, monitoring, and diagnostics maintenance

■ Interoperability
Leading legacy and versatile fieldbus technologies for seamless automation communication

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# Enabling Connectivity for the Industrial Internet of Things

Moxa's industrial network and automation solutions are ready to take connectivity to new frontiers. With a forecast of more than 50 billion devices connected worldwide by 2020, Moxa focuses on connectivity enablement to expand communication and collaboration between various devices, technologies, and people.

## Edge Connectivity

### Serial/Fieldbus Connectivity

Serial or fieldbus connectivity bridges legacy, fieldbus, and Ethernet devices to reap the benefits of legacy-to-IP communications and operational efficiency.

### I/O Connectivity

Industrial I/Os and controllers enable faster data transfer and SCADA response, as well as programming-free logic control.

### Video Connectivity

Extreme weather IP cameras activate 360-degree HD surveillance for extreme applications.

## Smart Value for Your Applications

Through our fully converged communication solutions, Moxa helps customers build remote control and monitoring networks suited for highly automated industrial operations and demanding public-safety applications.

### Powering Productivity

Our cutting-edge product portfolio delivers superior performance thanks to high bandwidth, reliability, availability, and interoperability in mixed-protocol and legacy environments.

- High-speed transmission
- Maximum uptime and availability
- Video always-on networking
- Reliable mobile communications
- Industry-proven reliability
- Legacy compatibility
- Protocol interoperability

### Optimizing Operational Efficiency

Moxa's extensive software solutions are the key to operational efficiency, including intuitive management software for operations that are faster and less error-prone, as well as an API platform for faster development and ease-of-use.

- Faster deployment
- Visualized management
- Easier troubleshooting
- Preventive maintenance
- APIs for easy application deployment
- Seamless integration with SCADA systems

### Strengthening Security

A convergence of cybersecurity and physical security systems forge a reinforced network to ensure the full protection of control systems and staff safety in industrial applications.

- Device security with authentication, integrity, and firewall protection
- Secure remote access with IPSec, L2TP, or OpenVPN encryption
- IEC 62443 standard compliance *(Available in Q4, 2016)*
- Industrial-grade IP surveillance systems

### Factory Automation

Moxa's factory automation solutions are designed to drive productivity and cost reduction through network convergence from the edge to the core. The solutions deliver optimized process integration and automation-friendly management to improve throughput and performance.

## Industrial Computing

### Industrial Computers

Embedded computers enable seamless data aggregation, analytics, and reporting from the extreme edge to the cloud/core.

## Network Infrastructure

### Industrial Ethernet

### Industrial Wireless

Industrial Ethernet and WLAN solutions offer leading performance, availability, and reliability to achieve maximum uptime and efficiency for wired and wireless connectivity.

### Industrial Routers

Industrial secure and cellular routers enable asset protection and secure access across public networks.

### Management

IA-friendly device management and network management address easy deployment, supervision, troubleshooting, and seamless collaboration with SCADA and third-party platforms.

## Railway Automation

Moxa's IRIS-certified railway solutions come with the top-notch service, quality, and commitment that industrial customers demand. Moxa's railway solutions deliver EN 50155-compliant control and communications between train, ground, and trackside to ensure safety and uninterrupted passenger services.

## Power Automation

Moxa has delivered solutions in more than 300 successful substation networking and computing applications. Moxa's solutions ensure GOOSE compliance and zero-packet-loss performance in compliance with IEC 61850-3 and IEEE 1613 standards.

## Oil and Gas Automation

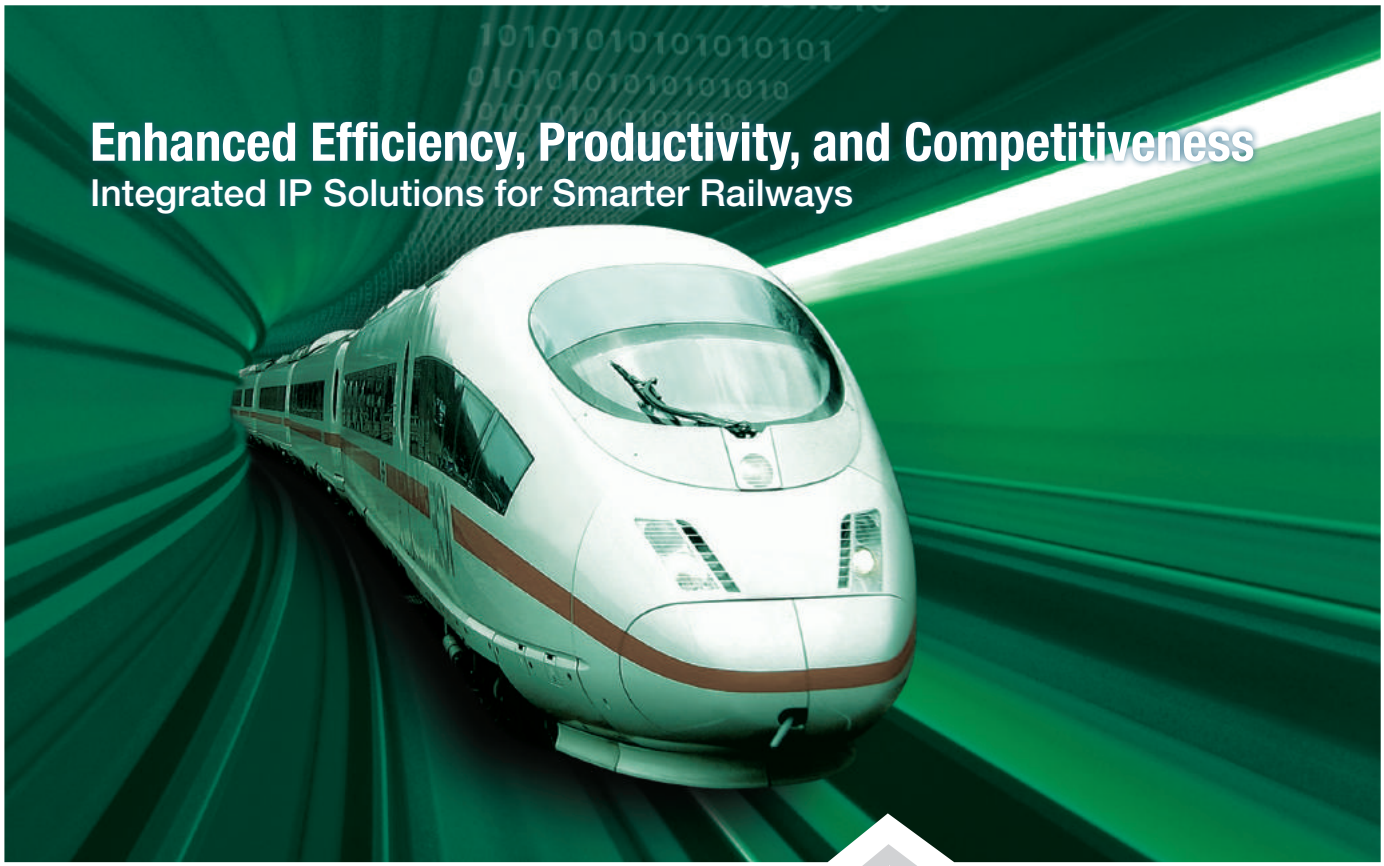
Moxa's oil and gas automation solutions comply with UL Class 1 Division 2, ATEX Zone 2, and IECEx standards, allowing customers to achieve maximum uptime and improved productivity with our oil and gas networking, monitoring, and computing solution portfolio.

## Marine Automation

Moxa's marine solutions, compliant with all major maritime certifications, offer a wide range of marine-grade industrial Ethernet and computer products that ensure long-lasting and reliable operations in the challenging environments experienced by ship, offshore oil and gas, and windmill applications.

## Intelligent Transportation Systems

Moxa's ITS solutions combine high-bandwidth networks and HD IP video solutions to ensure fast information convergence and nonstop operational continuity, allowing traffic control managers to make decisions quickly in the event of road traffic emergencies.




## IRIS-Certified Rail Solutions Verified for Maximum Quality

Moxa is an IRIS-certified global leader in a wide range of IP-based communications solutions. Now, Moxa is contributing its networking expertise to the railway industry through membership in IEC railway committees. Railway operators world-wide have discovered new operational efficiencies by deploying Moxa's unique time and cost-saving railway technologies. By designing for a long MTBF, owning all the core component IPs, and building long-term partnerships, Moxa helps railway integrators create sustainable solutions with low life-cycle costs for passenger comfort and railway operation networks.

**Application Focus**

- Passenger-oriented service (e.g., onboard Wi-Fi, passenger information systems)
- Railway CCTV
- CBTC (Communication-Based Train Control)
- Wayside data communications systems

**Leading Technologies**

- Turbo Ring and Turbo Chain: Advanced Ethernet redundancy solutions
- Turbo Roaming: Fast and secure train-to-ground wireless communications
- ACC: Intelligent wireless inter-carriage links
- FLI: Flexible, location-based, intelligent industrial-grade auto-configuration technology

IRIS Certification

Visit www.moxa.com/rail

ACC Auto Carriage Connection · FLI Industrial Auto Configuration · EN 50155 · EN 50121

ToughNet, EDS Series
Industrial Ethernet Switches
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TAP, AWK-RCC/RTG Series
Industrial Wireless AP/Bridge/Client
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NPort 5000AI-M12 Series
RS-232/422/485 Serial Device Servers
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TC-6000, V2000 Series
Industrial Embedded Computers
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VPort Series
Industrial IP Cameras
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ioPAC Series
Industrial RTU Controllers
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ioLogik E1500 Series
Remote I/Os
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# Connect to the Smart Grid Today

## End-to-End Networking and Computing Solutions for the Power Industry

## Many Successful Deployments in Power Projects Worldwide

Create rock-solid and future-proof power networks by partnering with Moxa. Moxa is a Collective Member of CIGRE and has delivered solutions in over 500 successful substation transmission and distribution networking and computing applications around the world. Moxa is now the leading solar energy monitoring supplier in North America with many diverse projects in advanced metering infrastructures worldwide. You can rely on our expertise of more than 25 years in proven solutions in the following industry applications.

**Application Focus**

- Solar power
- Wind power
- IEC 61850 transmission and distribution substation
- Advanced metering infrastructure

**Leading Technologies**

- Industry's first IEC 61850 switch with MMS data modeling: SNMP/MMS management with integrated network monitoring solutions for power substation SCADA
- Industry's first integrated PRP/HSR redundancy box for zero recovery time
- Turbo Chain: Different redundant networks can be extended without any ring coupling effort
- Patented computing platform for heat dissipation with wide temperature tolerance
- ThingsPro: Asset management for solar energy monitoring

Visit www.moxa.com/SmartGrid

Turbo Chain | PRP HSR | IEC 61850 IEEE 1613 | ThingsPro

**PT-7528 Series**
IEC 61850 28-port IEEE 1613 Class 2 Managed Ethernet Switches
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**PT-7728-PTP Series**
IEC 61850 14-port IEEE 1588v2 Managed PRP/HSR Switches
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**PT-G503-PHR-PTP Series**
IEC 61850 3-port Full Gigabit Managed PRP/HSR Redundancy Boxes
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**NPort S8000 Series**
Combo Switches / Serial Device Servers
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**UC-8100 Series**
RISC Energy Monitoring Computers
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**ioLogik E1200 Series**
Compact Ethernet Remote I/O
▶Page 17-6

**DCU-8620-T Series**
Data Concentration Units
▶Available by request

# Proven Solutions for the Harshest Oil & Gas Environments

## Integrated Networking, Monitoring, and Computing Systems

## Your Trusted Partner in Oil & Gas Automation

Moxa is a leading provider of industrial automation solutions and has proven experience in providing networking equipment and service suitable for the harshest oil & gas environments. Moxa's industrial-grade products and well respected technology enable efficient remote monitoring and easy asset management, delivering business value to customers all over the world. To assure the highest level of safety, the computing, networking, and automation products Moxa develops especially for use in oil & gas facilities meet important global certifications, including ATEX Zone 2, Class 1 Division 2, and IECEx.

**Application Focus**

- Offshore oil drilling control systems
- Onshore drilling / wellhead monitoring
- Pump stations and pipeline monitoring
- Oil refining and gas station operations

**Leading Technologies**

- Turbo Ring and Turbo Chain: Unrivaled network redundancy solutions with 20 ms recovery
- Dual-Radio and Turbo Roaming: Zero packet loss and millisecond-level wireless roaming
- ISA99/IEC 62443 compliant for industrial security: Layered cybersecurity solution with innovative PacketGuard™ for Modbus TCP deep packet inspection
- World-leading panel computer design: 1000-nit LCD, glove-friendly multi-touch, system bootup within 3 minutes, -40 to 70°C operating temperature without heater
- MXview, MXview ToGo, QuickLink, MX-AOPC UA Server: Efficient network management by smart visualization, automated configuration, and seamless integration with SCADA systems

Visit www.moxa.com/Solutions/Oil_and_gas



EDS/IKS/ICS Series

Edge-to-Core Ethernet Switches

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EDR Series

VPN/Firewall Secure Routers

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AWK Series

IEEE 802.11a/b/g/n Wireless AP/Bridge/Client

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MGate and NPort Series

Industrial Gateways and Device Servers

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ICF Series

Industrial Serial/PROFIBUS-to Fiber Converters

▶Page 14-32

ioLogik 2500 Series and ioLogik E1200 Series

Smart Remote I/O and Ethernet Remote I/O

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VPort Series

HD IP Cameras

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EXPC-1519 Series

Zone 2 Panel Computers

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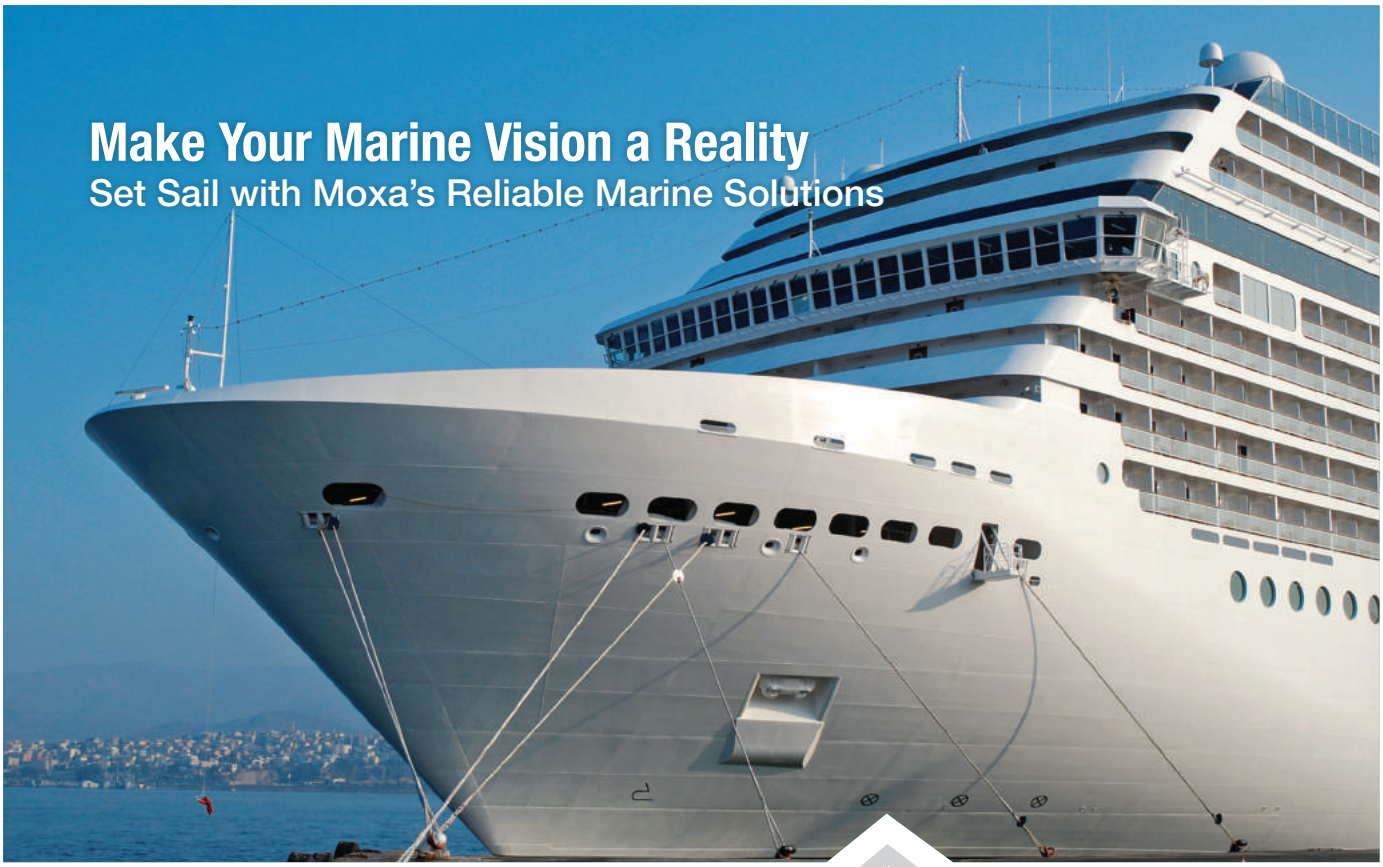

# Make Your Marine Vision a Reality

## Set Sail with Moxa's Reliable Marine Solutions

## Successful Deployment of Integrated Marine Bridge Solutions Worldwide

Moxa provides maritime professionals with industrial-grade marine computers, panel PCs, displays, and Ethernet switches that use leading technologies and reliable designs perfect for applications on docks, marine bridges, open decks, and in control rooms.

Moxa's marine solutions pass strict tests and follow critical industrial standards to ensure compliance with international marine standards, including DNV, ABS, GL, LR, IEC 60945, IEC 61174, IEC 61162, and IACS E10, making Moxa's marine solutions the best option for marine applications.

**Application Focus**

- Electronic Chart Display and Information System (ECDIS)
- Radar System
- Integrated Navigation System (INS)
- Integrated Platform Management System (IPMS)

**Leading Technologies**

- Advanced ECDIS color calibration technology: more consistent color rendering for a longer period of use
- Customer initiated smart OSD design: Off-Screen-Display control allows users to easily control the monitor in low light environments
- High performance computing power in a fanless design enhances computers' reliability and reduces customers' maintenance costs

Visit www.moxa.com/marine



MPC-2150/2190/2240/2260 Series
Marine Panel Computers
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MD-219/224/226 Series
Marine Displays
▶Page 24-3

MC-7200 Series
Marine ECDIS Computers
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MGate 5101-PBM-MN Series
PROFIBUS-to-Modbus TCP Gateways
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ioLogik E1200H Series
Ethernet Remote I/O
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EDS-408A Series
Managed Ethernet Switches
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## Your Trusted Partner for Factory Automation

To help manufacturers maximize the benefits of integrating network and automation technology, Moxa has focused on the factory automation market for over 26 years. Moxa provides leading solutions for industrial communications, including wired and wireless infrastructures, industrial computing, remote monitoring, and video surveillance.

### Application Focus

- SCADA
- Control system networks
- Wireless infrastructures and machine-to-machine communication
- Packaging equipment
- Cybersecurity
- Industrial video surveillance
- Material handling

### Main Benefits

#### Reliability

- Industry leading communication redundancy for < 20 ms recovery time
- Unique thermal design that supports fanless wide temperature operation (-40 to 75°C)
- High level EMI/EMC shielding
- Redundant power supply with isolation protection
- Continual improvement of total quality management
- ISO 9001 quality management standard recognized

#### Ease of Integration

- User-friendly network and device management software
- Serial, Ethernet, I/O, and wireless solutions integrated into a single network
- Quick mass configuration tool for 90% time savings (with up to 100 switches)
- OPC server for cost-effective SCADA integration

#### Global Support

- Access to products and support in over 70 countries
- Customization service


VPort Series
Industrial IP Cameras
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EDS Series
Industrial Ethernet Switches
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MGate Series
Industrial Ethernet Gateways
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NPort Series
Serial-to-Ethernet Device Servers
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ioLogik 2500-WL1 Series
Smart Wireless I/O
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EDR-810 Series
Industrial 8+2G Multiport Secure Routers
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AWK-A Series
Industrial Wireless AP/Bridge/Client
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# Integrated Network Solutions for Intelligent Transportation

## Real-Time Convergence for Non-Stop Safety

Today more than ever before, roadway safety and efficiency depend on real-time information and communication. To increase traffic flow, reduce congestion, and improve incident response times, Moxa's industrial Ethernet solutions facilitate real-time convergence of various sensor data, voice, and video by providing high-speed throughputs and a wide range of network devices. All of these devices emphasize extreme reliability, smart redundancy, easy manageability, and a lower total cost of ownership.

### Application Focus

- Advanced Transportation Management Systems
- Tunnels
- Intelligent E-Bus
- Electronic Toll Collection (ETC)

### Leading Technologies

#### High Bandwidth

- 1GbE/10GbE switching and routing
- Up to 500 Mbps router throughput
- Up to 300 Mbps wireless transmission
- Up to 150 Mbps VPN traffic

#### Extreme Reliability

- Turbo Ring and Turbo Chain self-recovery (< 20 ms @ 250 switches)
- V-ON network redundancy under 50 ms for mission-critical IP surveillance
- Turbo Roaming with millisecond-level handoff times for seamless mobility

#### Efficient Management

- MXstudio network management suite for installation, operation, maintenance, and diagnostics
- OnCell Central Manager for remote cellular device management
- IP surveillance software solutions for easy SCADA surveillance

Visit www.moxa.com/ITS


**ICS Series**
Industrial 10GbE Ethernet Switches
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**AWK-A Series**
Industrial 802.11n AP/Bridge/Client
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**EDS-G512E-8PoE**
8-port PoE+ Full Gigabit Managed Switch
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**VPort Series**
Industrial HD IP Cameras
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**IEX-408E-2VDSL2 Series**
Copper Extender Switches
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**NPort IA5000A Series**
2-Port Industrial Serial Device Servers
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**MXstudio**
Industrial Network Management Suite
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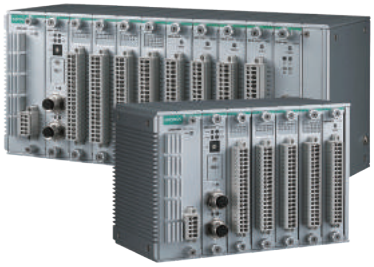

# Programmable RTU Controllers


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Programmable RTU Controllers

# Modular and Compact RTU Controllers

Preliminary




| | ioPAC 8600 series | ioPAC 8500 Series | ioPAC 8020 Series | ioPAC 5542 Series |
|---|---|---|---|---|
| **Inputs/Outputs** | | | | |
| Digital Inputs | – | – | – | 8 |
| Configurable DIOs | – | – | – | 8 |
| Analog Inputs | – | – | – | 8 |
| **Cellular** | | | | |
| HSPA | – | – | – | ✓ (ioPAC 5542-HSPA) |
| **Ethernet** | | | | |
| Ports (Connector) | 2 (M12 or RJ45) | | | 2 (RJ45) |
| Speed | 10/100 Mbps | | | |
| Switch (Daisy Chain) | ✓ | – | ✓ | – |
| 2 MACs | ✓ | ✓ | – | ✓ |
| Protocols | Modbus TCP (master/slave), SNMP, TCP/IP, UDP, DHCP, BOOTP, SNTP, SMTP | | Modbus TCP (master/slave), TCP/IP, UDP, DHCP, BOOTP, SNTP, SMTP | Modbus TCP (master/slave), SNMP, TCP/IP, UDP, DHCP, BOOTP, SNTP, SMTP |
| **Serial** | | | | |
| Ports (Connector) | – | 2 (DB9 male) | 1 (DB9 male) | 2 (DB9 male) |
| Interface | – | RS-232/422/485 | | |
| Protocols | Modbus RTU (master/slave) | | Modbus RTU (master) | Modbus RTU (master/slave) |
| **Physical Characteristics** | | | | |
| I/O Module Slots | 5/9/12 | 2/5/9 | 5/9 | – |
| **Environmental Limits** | | | | |
| Operating Temperature | -40 to 75°C (-40 to 176°F) | | | -40 to 75°C (-40 to 176°F)<br>-30 to 75°C (-22 to 176°F) for HSPA model |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | |
| Ambient Relative Humidity | 5 to 95% RH (non-condensing) | | | |
| Shock | IEC 60068-2-27 | | | |
| Vibration | IEC 60068-2-6 | | | |
| **Software** | | | | |
| Programmability | C/C++, IEC 61131-3 | | C/C++ | C/C++, IEC 61131-3 |
| MX-AOPC UA Server | ✓ | ✓ | ✓ | ✓ |
| Active OPC Server | – | ✓ | ✓ | ✓ |
| DA Center | – | ✓ | ✓ | ✓ |
| RTUxpress | ✓ | | – | ✓ |
| RTUAdmin | – | – | ✓ | – |
| **Standards and Certifications** | | | | |
| Safety | UL 508 | | | |
| EMC | EN 55022, EN 55024 | | | |
| EMI | FCC Part 15 Subpart B Class A, CISPR 22 | | | |
| EMS | IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8 | | | |
| Radio | – | – | – | NCC (ioPAC 5542-HSPA) |
| Rail Traffic | EN 50155 (essential compliance*), EN 50121-3-2, EN 50121-4 | EN 50155**, EN 50121-3-2, EN 50121-4 | | EN 50121-4 |
| Hazardous Location | – | – | – | Class 1 Division 2 |
| **Reliability** | | | | |
| Warranty | 5 years | | | |
| Page | 15-4 | 15-11 | 15-19 | 15-24 |

*Moxa defines “essential compliance” to include those EN 50155 requirements that make products more suitable for rolling stock railway applications.
**Complies with a portion of EN 50155 specifications.

# I/O Modules for the ioPAC 8600 Series

Preliminary

| | Digital Input | | Digital Output | | Analog Output | Communication | |
|---|---|---|---|---|---|---|---|
| | 86M-1620D-T | 86M-1832D-T | 86M-2830D-T | 86M-2604D-T | 86M-4420-T | 86M-5212U-T | 86M-5250-T |
| **Module Properties** | | | | | | | |
| Channels/Ports (Connector) | 16 (terminal block) | 8 (terminal block) | 8 (terminal block) | 6 (terminal block) | 4 (terminal block) | 2 (M12) | 2 (DB9 male) |
| Input/Output Mode | 24 to 110 VDC | 24 VDC ch-to-ch isolation | 24 VDC ch-to-ch isolation | Relay | 0 to 10 V<br>-10 to 10 V<br>0 to 20 mA<br>4 to 20 mA | – | – |
| Type | sink | sink/source | sink | Form A (N.O.) | – | – | – |
| Communication Ports | – | – | – | – | – | 2-wire Ethernet | CAN |
| Standards | – | – | – | – | – | 100BASE-TX IEEE 802.3u<br>10BASE-T IEEE 802.3<br>100 Mbps BroadR-Reach®<br>10 Mbps BroadR-Reach® | CAN 2.0A<br>CAN 2.0B<br>CANopen DS301<br>CANopen DS401 |
| **Enviromental Limits** | | | | | | | |
| Operating Temperature | -40 to 75°C (-40 to 176°F) | | | | | | |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | | | | |
| Ambient Relative Humidity | 5 to 95% RH (non-condensing) | | | | | | |
| **Reliability** | | | | | | | |
| Warranty | 5 years (see www.moxa.com/warranty) | | | | | | |

# I/O Modules for the ioPAC 8500 Series

| | Digital Input | Digital Output | Analog Input | | | | High Speed Analog Input | | Communication |
|---|---|---|---|---|---|---|---|---|---|
| | 85M-1602-T | 85M-2600-T | 85M-3800 | 85M-3801 | 85M-6600-T | 85M-6810-T | 85M-3801-T | 85M-3811-T | 85M-5401-T |
| **Module Properties** | | | | | | | | | |
| Channels/Ports (Connector) | 16 (terminal block) | 16 (terminal block) | 8 (terminal block) | 8 (terminal block) | 6 (terminal block) | 8 (terminal block) | 8 (terminal block) | 8 (terminal block) | 4 (DB44 female) |
| Input/Output Mode | 24 VDC | 24 VDC | 4 to 20 mA | 0 to 10 V | RTD | Thermocouple | 4 to 20 mA | 0 to 10 V | – |
| Type | sink/source | sink | – | – | – | – | – | – | – |
| Sampling Rate | – | – | All channels: 100 samples/ sec<br>Per channel: 12.5 samples/ sec | All channels: 100 samples/ sec<br>Per channel: 12.5 samples/ sec | All channels: 12 samples/sec<br>Per channel: 2 samples/sec | All channels: 12 samples/ sec<br>Per channel: 1.5 samples/sec | All channels: 40k samples/ sec<br>Per channel: 5k samples/sec | All channels: 40k samples/ sec<br>Per channel: 5k samples/sec | – |
| Serial Ports | – | – | – | – | – | – | – | – | RS-232/422/485 |
| **Environmental Limits** | | | | | | | | | |
| Operating Temperature | -40 to 75°C (-40 to 176°F) | | | | | | | | |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | | | | | | |
| Ambient Relative Humidity | 5 to 95% RH (non-condensing) | | | | | | | | |
| **Reliability** | | | | | | | | | |
| Warranty | 5 years (see www.moxa.com/warranty) | | | | | | | | |

Note: 85M modules can also be used with ioPAC 8600 systems.

# I/O Modules for the ioPAC 8020 Series

| | Digital Input | | Digital Output | Analog Input | | Communication |
|---|---|---|---|---|---|---|
| | RM-1050-T | RM-1602-T | RM-2600-T | RM-3802-T | RM-3810-T | KM-2430-T |
| **Module Properties** | | | | | | |
| Channels/Ports (Connector) | 10 (terminal block) | 16 (terminal block) | 16 (terminal block) | 8 (terminal block) | 8 (terminal block) | 4 (M12) |
| Input/Output Mode | 110 VDC ch-to-ch isolation | 24 VDC | 24 VDC | 4 to 20 mA | 0 to 10 VDC | – |
| Type | sink/source | sink/source | sink | – | – | – |
| Communication Ports | – | – | – | – | – | Unmanaged Ethernet switch |
| Standards | – | – | – | – | – | IEEE 802.3 for 10BaseT<br>IEEE 802.3u for 100BaseT(X)<br>IEEE 802.3x for Flow Control |
| **Environmental Limits** | | | | | | |
| Operating Temperature | -40 to 75°C (-40 to 176°F) | | | | | |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | | | |
| Ambient Relative Humidity | 5 to 95% RH (non-condensing) | | | | | |
| **Reliability** | | | | | | |
| Warranty | 5 years (see www.moxa.com/warranty) | | | | | |

# ioPAC 8600 Series

Preliminary

## Rugged modular RTU controllers

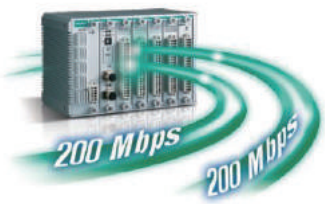
- Modular CPU/Power/Backplane/IO design supporting ioPAC 8500/8600 series I/O modules
- Supports dual power module with dual power inputs
- Supports C/C++ or IEC 61131-3 programming languages with ready-to-run services
- 24 to 110 V power input range and DI/O modules
- Compliant with EN 50121-3, EN 50121-4, and EN 50155 specifications

EN 50155 c UL us LISTED RoHS EN 50121 CE FC

## Overview

The ioPAC 8600 modular RTU controllers are 100% modular, giving users the freedom to choose CPU, power, backplane, communication, and I/O modules. In addition, the ioPAC 8600 enhances the hardware system architecture and key features of the ioPAC 8020 and ioPAC 8500 combined. It also adds an Ethernet bus on the backplane to support Ethernet switch modules. The ioPAC 8600 supports the C/C++ and IEC 61131-3 programming languages and ready-to-run services, including Modbus TCP/RTU, SNMP, data logging, and email alarms to fulfill different customers' requirements. With active tag and MX-AOPC data integration software, the ioPAC 8600 series provides a comprehensive solution for data acquisition and control applications in harsh environments.

### 2-Wire Ethernet Technology



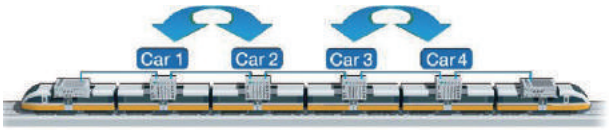

Moxa's 2-wire Ethernet technology offers system integrators an attractive option for upgrading the train's IP network to a 10/100 Mbps* Ethernet backbone with existing 2-wire cable. This innovative 2-wire Ethernet technology supports Ethernet bypass functionality, ensuring that the Ethernet backbone will continue to operate even if one ioPAC is without power. As an added plus, with two 2-wire Ethernet modules in one ioPAC, the network can reach 200 Mbps and provide a redundant architecture.

*Network performance is related to cable quality when using 2-wire technology.

### Ready-to-Run Service

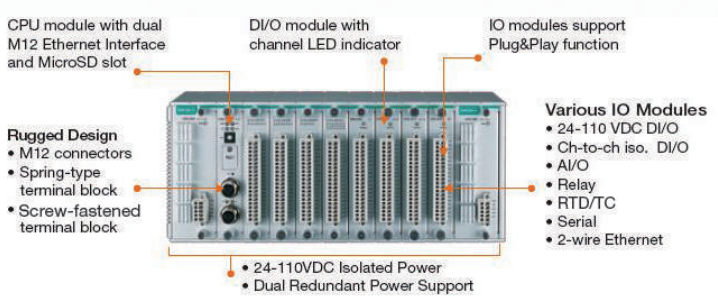

Moxa's ioPAC 8600 programmable controllers allow programmers to rapidly configure services (SNMP, Modbus RTU/TCP, E-mail alarm service, etc.) without writing any programs. The ioPAC can reduce the configuration of massively distributed deployments to a few simple mouse clicks, greatly increasing an engineer's productivity.

### Automatic Carriage Sequencing (ACS)




Moxa's Automatic Carriage Sequencing technology quickly and automatically resets the train car sequence, without disrupting network transmissions within the train. This technology greatly reduces the operation effort required for trains that frequently rearrange consists. Onboard passenger information systems can also adjust immediately when changes are made.

## Compact Integrated Solution




The compact ioPAC 8600 is equipped with universal dual-power inputs that support all railway power voltages, and new channel-to-channel, wide voltage DI/DO modules are available for use in trains that use different power systems. The ioPAC 8600 supports a variety of communication interfaces, including Ethernet, serial, CAN, and MVB*. System integrators can control or monitor sub-systems with the ioPAC 8600, which saves space and has powerful functions to reduce both the system integrator's budget and installation difficulties.

*MVB available by project request.

## Specifications

### Power Requirements

**Input Voltage:** 24 to 110 VDC

### Physical Characteristics

**Housing:** Aluminum

**Dimensions:**

• 5-slot version: 205.65 x 133.35 x 100 mm (8.1 x 5.25 x 3.94 in)
• 9-slot version: 324.8 x 133.35 x 100 mm (12.79 x 5.25 x 3.94 in)

**Weight:**

• 5-slot version: 2560 g (5.64 lb)
• 9-slot version: 3690 g (8.14 lb)

**Mounting:** DIN rail (optional), wall (optional), rack (optional)

### Environmental Limits

**Operating Temperature:** -40 to 75°C (-40 to 176°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

### Standards and Certifications

**Safety:** UL 508
**EMC:** EN 55022/24
**EMI:** FCC Part 15 Subpart B Class A, CISPR 22
**EMS:**
IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
IEC 61000-4-3 RS:
80 MHz to 1000 MHz: 3 V/m
1400 MHz to 2100 MHz: 3 V/m
2100 MHz to 2700 MHz: 1 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge:
Power: 2 kV (L-PE), 1 kV (L-L);
Signal: 2 kV (L-PE), 1 kV (L-L)
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8 PFMF: 3 A/m
**Rail Traffic:** EN 50155 (essential compliance*), EN 50121-3-2, EN 50121-4
*Moxa defines "essential compliance" to include those EN 50155 requirements that make products more suitable for rolling stock railway applications.
Note: Please check Moxa's website for the most up-to-date certification status.

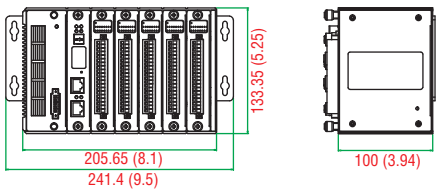
### Warranty

**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

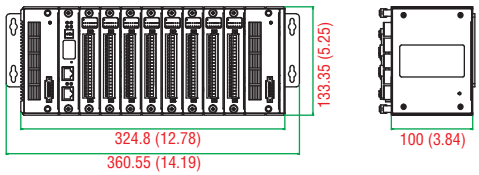
## Dimensions

Unit: mm (inch)

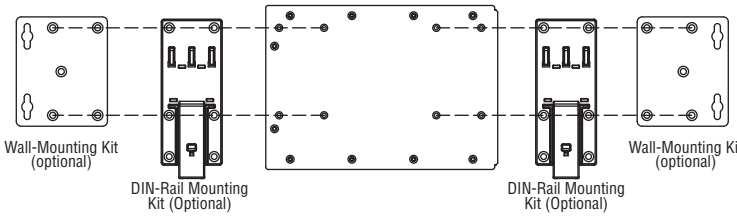
### ioPAC 8600 with 5 I/O slots




### ioPAC 8600 with 9 I/O slots




### Mounting Kits



## Ordering Information

### CPU Modules

**ioPAC 8600-CPU10-M12-C-T:** ioPAC 8600 CPU module, C/C++ programmable controller, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8600-CPU10-RJ45-C-T:** ioPAC 8600 CPU module, C/C++ programmable controller, RJ45 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8600-CPU10-M12-IEC-T:** ioPAC 8600 CPU module, IEC 61131-3 programmable controller, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8600-CPU10-RJ45-IEC-T:** ioPAC 8600 CPU module, IEC 61131-3 programmable controller, RJ45 Ethernet ports, -40 to 75°C operating temperature

### Power Modules

**ioPAC 8600-PW10-15W-T:** ioPAC 8600 power module, dual power input, 24 to 110 VDC, 15W, -40 to 75°C operating temperature

### Backplane Modules

**ioPAC 8600-BM005-T:** ioPAC 8600 backplane module with 5 slots, -40 to 75°C operating temperature
**ioPAC 8600-BM009-T:** ioPAC 8600 backplane module with 9 slots, -40 to 75°C operating temperature

### I/O Modules (can be purchased separately)

**86M-1620D-T:** 16 DIs, sink, 24 to 110 VDC, channel LED, -40 to 75°C operating temperature
**86M-1832D-T:** 8 DIs, sink/source, 24 VDC, ch-to-ch isolation, channel LED, -40 to 75°C operating temperature
**86M-2604D-T:** 6 relays, form A (N.O.), channel LED, -40 to 75°C operating temperature
**86M-2830D-T:** 8 DOs, sink, 24 VDC, ch-to-ch isolation, channel LED, -40 to 75°C operating temperature
**86M-4420-T:** 4 AOs, 0 to 10 V, -10 to 10 V, 0 to 20 mA, or 4 to 20 mA, -40 to 75°C operating temperature
**86M-5212U-T:** 2-port 2-wire Ethernet switch, -40 to 75°C operating temperature
**86M-5250-T:** 2 CAN ports, -40 to 75°C operating temperature
**85M-1602-T:** 16 DIs, sink/source, 24 VDC, dry contact, -40 to 75°C operating temperature
**85M-2600-T:** 16 DOs, sink, 24 VDC, -40 to 75°C operating temperature
**85M-3800-T:** 8 AIs, 4 to 20 mA, 16 bits, -40 to 75°C operating temperature
**85M-3810-T:** 8 AIs, 4 to 20 mA, 16 bits, 40 kHz, -40 to 75°C operating temperature
**85M-3801-T:** 8 AIs, 0 to 10 VDC, 16 bits, -40 to 75°C operating temperature
**85M-3811-T:** 8 AIs, 0 to 10 VDC, 16 bits, 40 kHz, -40 to 75°C operating temperature
**85M-5401-T:** 4 serial ports (RS-232/422/485 3-in-1), -40 to 75°C operating temperature
**85M-6600-T:** 6 RTDs, -40 to 75°C operating temperature
**85M-6810-T:** 8 TCs, -40 to 75°C operating temperature
Note: Both 86M modules and 85M modules can be used with the ioPAC 8600 series.
Note: Conformal coating available on request.

### Optional Accessories (can be purchased separately)

**DK-DC50131-01:** DIN-rail mounting kit, 50 x 131 mm
**WK-75:** Wall-mounting kit, 2 plates with 8 screws
**CBL-M12D(MM4P)/RJ45-100 IP67:** 4-pin D-code M12-to-RJ45 CAT5E UTP Ethernet cable, 100 cm, IP67 waterproof
**CBL-RJ458P-100:** 8-pin RJ45 CAT5 Ethernet cable, 100 cm
**CBL-F9DPF1x4-BK-100:** Serial console cable
**CBL-M44M9x4-50:** DB44 to 4-port DB9 female serial cable
**85M-BKTES:** Empty slot covers (3 per order)

**Package Checklist (CPU Module)**
- ioPAC 8600 CPU module
- Serial console cable (C/C++ version only)
- Documentation and software CD

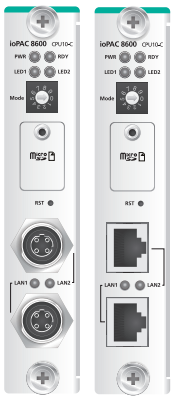
**Package Checklist (Power Module)**
- ioPAC 8600 power module

**Package Checklist (Backplane Module)**
- ioPAC 8600 backplane module

**Package Checklist (I/O Module)**
- 85M/86M module
- Serial cable: CBL-M44M9x4-50 (85M-5401-T only)

# ioPAC 8600 Series Modules Preliminary

## ioPAC 8600-CPU10 Series: 32-bit ARM9 192 MHz CPU



### Computer
**CPU Type:** 32-bit ARM9 192 MHz CPU
**OS:** Linux
**Clock:** Real-time clock with super capacitor (retains charge for 7 days)

### Memory
**SDRAM:** 64 MB
**Flash:** 32 MB (10 MB reserved for user)
**FRAM:** 128 KB
**microSD™ Slot:** Up to 32 GB (SD 2.0 compatible)
Note: For units operating in extreme temperatures, industrial-grade, wide-temperature microSD cards are required.

### Switches & Buttons
**Rotary Switch:** 0 to 9
**Button:** Reset to factory defaults

### Ethernet Interface
**LAN:** 2 x 10/100 Mbps, Ethernet bypass or 2 MACs (IPs), jumper selectable, RJ45 or M12
**Protection:** 1.5 kV magnetic isolation
**Automation Languages:** C/C++ or IEC 61131-3
**Protocols:** Modbus TCP/RTU (master/slave), SNMP, TCP/IP, UDP, DHCP, BOOTP, SNTP, SMTP

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current :** 200 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 1,032,466 hrs
**Standard:** Telcordia SR332

EN 50155 c UL us LISTED RoHS EN 50121 CE FC

## ioPAC 8600-PW10-15W-T: Dual-power inputs, 24 to 110 VDC, 15 W

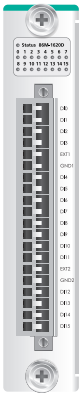
### Power
**Input Voltage:** 24 to 110 VDC (16.8 to 154 VDC)
Note: Compliant with EN 50155 at 24/48/60/72/110 VDC
**Wattage:** 15 W
**Galvanic Isolation:** 3k VDC
**Dual-Power Input:** Yes

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### MTBF (mean time between failures)
**Time:** 1,579,517 hrs
**Standard:** Telcordia SR332

EN 50155 c UL us LISTED RoHS EN 50121 CE FC

## 86M-1620D-T: 16 digital inputs, 24 to 110 VDC, channel LED, sink type



### Inputs and Outputs
**Digital Inputs:** 16 channels
**Isolation:**
To system:
3k VDC or 2k Vrms

### Digital Input
**Type:** PNP
**I/O mode:** DI
**Logic Definition:**
• On: channel voltage > 0.3 x (external power voltage)
• Off: channel voltage < 0.15 x (external power voltage)
**Scan Period:** 8 ms (typ.)
**Scan on Time:** 0.5 ms
**Debouncing Function:** Software disable/enable
**Debouncing Time:** 1 to 15 ms (software-selectable)
**Common Type:** 8 points per COM

### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block
**Channel LED:** Yes

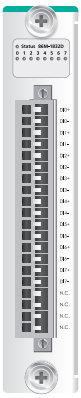
### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 12.6 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 1,115,244 hrs
**Standard:** Telcordia SR332

EN 50155 c UL us LISTED RoHS EN 50121 CE FC

## 86M-1832D-T: 8 channel-to-channel isolated DIs, 24 VDC, channel LED, sink/source type



### Inputs and Outputs
**Digital Inputs:** 8 channels
**Isolation:**
To system: 3k VDC or 2k Vrms
Channel-to-channel: 1k VDC

### Digital Input
**Sensor Type:** Wet contact (NPN or PNP)
**I/O Mode:** DI, counter, or frequency
**Wet Contact (DI+ to DI-):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Counter Frequency:** 5 kHz
**Digital Filtering Time Interval:** Software selectable (by 0.1 ms)

### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

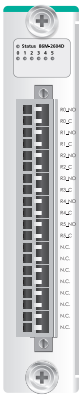
### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 12.6 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 1,149,108 hrs
**Standard:** Telcordia SR332

EN 50155 c UL us LISTED RoHS EN 50121 CE FC

## 86M-2604D-T: 6 relays, channel LED, form A (N.O.) type



### Inputs and Outputs
**Relays:** 6 channels
**Isolation:**
To System: 3k VDC or 2k Vrms

### Relay
**Type:** Form A (N.O.)
**I/O mode:** DO or PWM
**Pulse Output Frequency:** 0.33 Hz
**Contact Current Rating:**
Resistive Load: 5 A @ 30 VDC, 250 VAC
**Relay On/Off Time:** 10 ms (max.)
**Initial Insulation Resistance:** 1000 mega-ohms (min.) @ 500 VDC
**Mechanical Endurance:** 5,000,000 operations
**Electrical Endurance:** 60,000 operations @ 5 A resistive load
**Contact Resistance:** 100 milli-ohms (max.)

### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

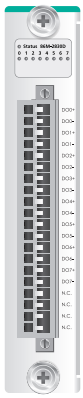
### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 127 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 4,173,843 hrs
**Standard:** Telcordia SR332

EN 50155 c UL us LISTED RoHS EN 50121 CE FC

## 86M-2830D-T: 8 channel-to-channel isolated DOs, 24 VDC, channel LED, sink-type



### Inputs and Outputs
**Digital Outputs:** 8 channels
**Isolation:**
To system: 3k VDC or 2k Vrms
Channel-to-channel: 1k VDC

### Digital Output
**Type:** Sink
**I/O Mode:** DO or PWM
**Pulse Output Frequency:** 1 kHz
**Short Circuit Protection:** 750 mA @ 25°C
**Over-Voltage Protection:** 41 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

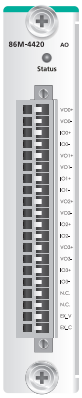
### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 76.7 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 1,766,037 hrs
**Standard:** Telcordia SR332

EN 50155 cULus LISTED RoHS EN 50121 CE FC

## 86M-4420-T: 4 analog outputs, 0 to 10 V or -10 to 10 V or 0 to 20 mA or 4 to 20 mA



### Inputs and Outputs
**Analog Outputs:** 4 channels
**Isolation:**
To system: 3k VDC or 2k Vrms

### Analog Output
**Resolution:** 12 bits
**Output range:** 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA
**I/O mode:** Static or Waveform mode
**Voltage Output:** 10 mA (max.)
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Current Load Resistance:**
Internal Power: 400 ohms
External 24 VDC Power: 1000 ohms
**Update Rate:** Software polling or waveform mode
**Waveform Type:** Sine, Triangle, Square
**Wavemode Frequency:** 125 Hz

### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:**
94.2 mA @ 24 VDC (voltage)
143.8 mA @ 24 VDC (current)

### MTBF (mean time between failures)
**Time:** 2,409,345 hrs
**Standard:** Telcordia SR332

EN 50155 cULus LISTED RoHS EN 50121 CE FC

## 86M-5212U-T: 2-port 2-wire Ethernet switch

### Ethernet Communication
**Interface:** Two 2-wire Ethernet ports
**Isolation:**
To system: 3k VDC or 2k Vrms

### Standards
**Supported Standards:**
100BASE-TX IEEE 802.3u
10BASE-T IEEE 802.3
100 Mbps BroadR-Reach®
10 Mbps BroadR-Reach®

### Physical Characteristics
**Wiring:** CAT 5 standard cable with M12 D-code male connection
**Connector:** M12 (D-code, female) x 2
**Channel LED:** Yes

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 578 mA @ 3.3 VDC

### MTBF (mean time between failures)
**Time:** 2,498,942 hrs
**Standard:** Telcordia SR332

EN 50155 cULus LISTED RoHS EN 50121 CE FC

## 86M-5250-T: 2 CAN ports, channel LED


### Serial Communication
**Interface:** 2 CAN ports
**Isolation:**
To system: 3k VDC or 2k Vrms

### CAN Bus Communication
**Protocols:**
CAN 2.0A
CAN 2.0B
CANopen DS301, V4.02
CANopen DS401
**Speed:** 10/20/50/125/250/500/800 kbps, 1 Mbps
**Termination Resistor:** N/A, 120 ohms (by DIP)

### Physical Characteristics
**Connector:** DB9 male
**Channel LED:** Yes

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 60 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 3,306,609 hrs
**Standard:** Telcordia SR332

EN 50155 EN 50121

## Common Specifications

### Power Requirements
**Input Voltage:** 24 to 110 VDC (16.8 to 154 VDC)

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6

### Standards and Certifications
**Safety:** UL 508
**EMC:** EN 55022/24
**EMI:** FCC Part 15 Subpart B Class A, CISPR 22
**EMS:**
IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
IEC 61000-4-3 RS:
80 MHz to 1000 MHz: 3 V/m
1400 MHz to 2100 MHz: 3 V/m
2100 MHz to 2700 MHz: 1 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: Power: 2 kV (L-PE), 1 kV (L-L); Signal: 1 kV (L-L), 2 kV (L-PE)
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8 PFMF: 3 A/m
**Rail Traffic:** EN 50155 (essential compliance*), EN 50121-3-2, EN 50121-4
*Moxa defines "essential compliance" to include those EN 50155 requirements that make products more suitable for rolling stock railway applications.

### Warranty
**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

# ioPAC 8500 Series

Award-winning Product
TAIWAN EXCELLENCE 2014

## Rugged modular RTU controllers

- Dedicated ARM (RISC) CPUs for the main system and each I/O module
- Millisecond timestamp granularity for digital input and analog input
- Supports 5 kHz sampling rate for analog input
- Pre-recording for analog input data logging
- Supports C/C++ or IEC 61131-3 programming languages
- Compliant with EN 50121-3-2, EN 50121-4, and EN 50155 specifications
- Robust and compact design for harsh environments
- Modular I/O for versatility, flexibility, and scalability

RoHS EN 50121 CE FC

## Overview

The ioPAC 8500 modular RTU controllers use an ARM9 industrial-grade CPU for the system, and ARM Cortex™ M4 CPUs for the modules. The controllers have 2, 5, or 9 I/O slots for 85M series modules and the dual CPU architecture supports a 5 kHz (per channel) analog input sampling rate, pre-recording of analog input data, and timestamping with millisecond granularity. Moreover, the ioPAC 8500 supports C/C++ or IEC 61131-3 programming, rail-level surge and ESD protection, a -40 to 75°C operating temperature range, vibration protection, hot-swappable modules, two 10/100 Mbps Ethernet ports with two MACs (with port trunking capability), and two 3-in-1 serial ports. Accompanied by Moxa's Active OPC Server and DA-Center data integration software, the ioPAC 8500 series provides a comprehensive solution for data acquisition and control applications in harsh environments.

### High Sampling Rate

High sampling rate AI

Moxa's ioPAC 8500 RTUs use an ARM9 industrial-grade CPU, and the dual CPU architecture supports up to a 5 kHz (per channel) analog input sampling rate, giving engineers the analog data precision they need to correctly analyze events after they have occurred.

### Analog Input Prerecord Feature

Prerecording

The ioPAC 8500 RTU's prerecord feature allows the RTU controller to continuously record analog input data before an event is triggered. The prerecord feature is a major improvement over products that only start logging data after an event has occurred, because these conventional approaches can often lead to the loss of critical data due to network latency during the event.

### Millisecond Timestamp Granularity

Timestamp

Millisecond timestamp granularity is a powerful aid in post-event analysis and troubleshooting. For example, if an emergency triggers 10 separate I/O events within a 10-millisecond time interval, you will still be able to clearly identify the sequence in which the events occurred, even if the I/O events are recorded by different modules.

### I/O Module Hot-Swapping


Hot-swap

The ioPAC 8500 RTU controller lets you hot-swap I/O modules, allowing engineers to quickly and easily install and replace modules in the field, reducing maintenance costs and streamlining maintenance procedures.

## Specifications

### Computer
**Main CPU:** 32-bit ARM9 192 MHz CPU
**I/O CPU:** 32-bit ARM Cortex M4 80 MHz CPU
**OS:** Linux
**Clock:** Real-time clock with battery backup
**Memory:**
• SDRAM: 64 MB
• Flash: 32 MB
• SRAM: 256 KB (battery backup lasts for 1 week)
• microSD™ Slot: Up to 32 GB (SD 2.0 compatible)
Note: For units operating in extreme temperatures, industrial-grade, wide-temperature microSD cards are required.

### Ethernet Interface
**LAN:** 2 x 10/100 Mbps, 2 MACs (IPs), RJ45 or M12
**Protection:** 1.5 kV magnetic isolation

### Serial Interface
**Interface:**
• 2 RS-232/422/485 ports, software selectable (DB9 male)
• 1 RS-232 debug port (4-pin connector)
**Serial Line Protection:** 8 kV ESD for all signals

### Serial Communication Parameters
**Parity:** None, Even, Odd
**Data Bits:** 7, 8
**Stop Bits:** 1, 2
**Flow Control:** RTS/CTS, XON/XOFF
**Baudrate:** 300 bps to 921.6 kbps

### Serial Signals
**RS-232:** TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND, RI
**RS-422:** Tx+, Tx-, Rx+, Rx-, GND
**RS-485-4w:** Tx+, Tx-, Rx+, Rx-, GND
**RS-485-2w:** Data+, Data-, GND

### Software Characteristics
**Automation Languages:** C/C++ or IEC 61131-3
**Protocols:** Modbus TCP/RTU (master/slave), SNMP, TCP/IP, UDP, DHCP, BOOTP, SNTP, SMTP

### Power Requirements
**Input Voltage:** 24 VDC (9 to 48 VDC)
**Input Current:** 152 mA @ 24 VDC

### Physical Characteristics
**Housing:** Aluminum
**Dimensions:**
• 2-slot version: 114.7 x 135 x 100 mm (4.52 x 5.31 x 3.94 in)
• 5-slot version: 190.9 x 135 x 100 mm (7.52 x 5.31 x 3.94 in)
• 9-slot version: 292.5 x 135 x 100 mm (11.52 x 5.31 x 3.94 in)
**Weight:**
• 2-slot version: 1300 g (2.87 lb)
• 5-slot version: 2000 g (4.41 lb)
• 9-slot version: 2575 g (5.68 lb)
**Mounting:** DIN rail (standard), wall (optional)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

### Standards and Certifications
**Safety:** UL 508
**EMC:** EN 55022, EN 55024
**EMI:** FCC Part 15 Subpart B Class A, CISPR 22
**EMS:**
IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
IEC 61000-4-3 RS:
80 MHz to 1000 MHz: 3 V/m
1400 MHz to 2100 MHz: 3 V/m
2100 MHz to 2700 MHz: 1 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: Power: 2 kV (L-PE), 1 kV (L-L); Signal: 1 kV (L-L), 2 kV (L-PE)
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8 PFMF: 3 A/m
**Rail Traffic:** EN 50155*, EN 50121-3-2, EN 50121-4
*Complies with a portion of EN 50155 specifications.
Note: Please check Moxa's website for the most up-to-date certification status.

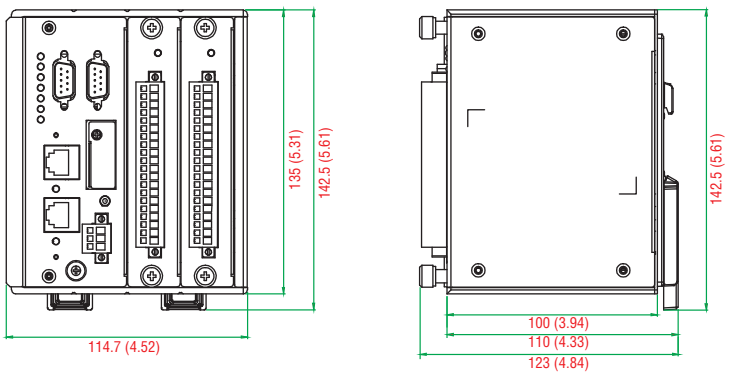
### MTBF (mean time between failures)
**Time:** 859,979 hrs
**Standard:** Telcordia SR332

### Warranty
**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

## Dimensions

Unit: mm (inch)

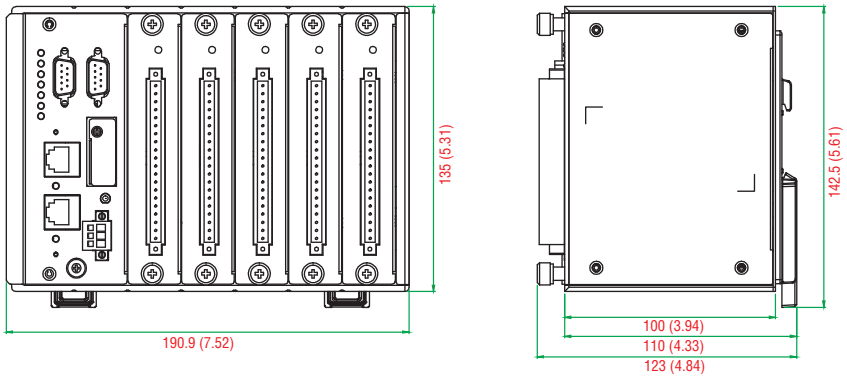
### ioPAC 8500-2



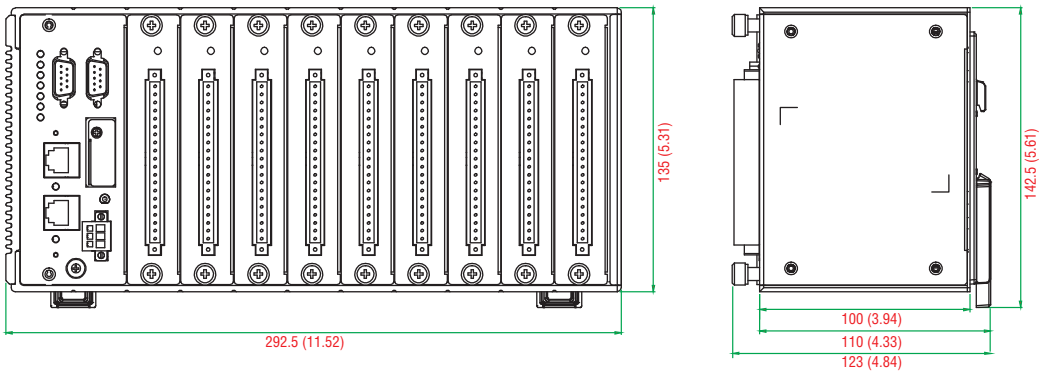
## Dimensions

Unit: mm (inch)

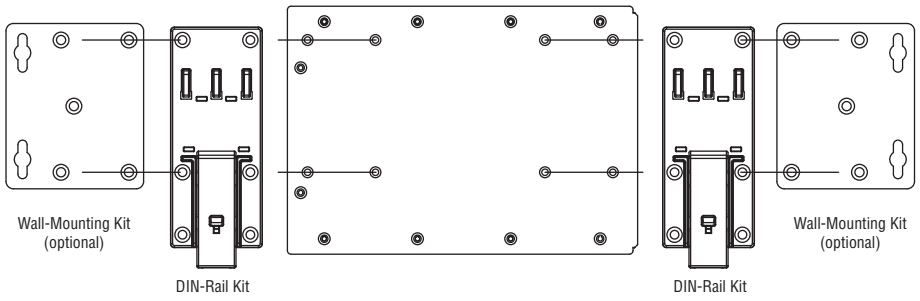
### ioPAC 8500-5




### ioPAC 8500-9




### Mounting Kits



## Ordering Information

### System Modules

**ioPAC 8500-2-M12-C-T:** Modular C/C++ programmable controller with 2 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-2-M12-IEC-T:** Modular IEC 61131-3 programmable controller with 2 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-2-RJ45-C-T:** Modular C/C++ programmable controller with 2 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-2-RJ45-IEC-T:** Modular IEC 61131-3 programmable controller with 2 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-5-M12-C-T:** Modular C/C++ programmable controller with 5 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-5-M12-IEC-T:** Modular IEC 61131-3 programmable controller with 5 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-5-RJ45-C-T:** Modular C/C++ programmable controller with 5 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-5-RJ45-IEC-T:** Modular IEC 61131-3 programmable controller with 5 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-9-M12-C-T:** Modular C/C++ programmable controller with 9 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-9-M12-IEC-T:** Modular IEC 61131-3 programmable controller with 9 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-9-RJ45-C-T:** Modular C/C++ programmable controller with 9 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8500-9-RJ45-IEC-T:** Modular IEC 61131-3 programmable controller with 9 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature

**Package Checklist** (ioPAC 8500)

- ioPAC 8500 system module
- Serial console cable (C/C++ version only)
- Documentation and software CD

### I/O Modules (can be purchased separately)

**85M-1602-T:** 16 DIs, sink/source, 24 VDC, dry contact, -40 to 75°C operating temperature
**85M-2600-T:** 16 DOs, sink, 24 VDC, -40 to 75°C operating temperature
**85M-3800-T:** 8 AIs, 4 to 20 mA, 16 bits, -40 to 75°C operating temperature
**85M-3810-T:** 8 AIs, 4 to 20 mA, 16 bits, 40 kHz, -40 to 75°C operating temperature
**85M-3801-T:** 8 AIs, 0 to 10 VDC, 16 bits, -40 to 75°C operating temperature
**85M-3811-T:** 8 AIs, 0 to 10 VDC, 16 bits, 40 kHz, -40 to 75°C operating temperature
**85M-5401-T:** 4 serial ports (RS-232/422/485 3-in-1), -40 to 75°C operating temperature
**85M-6600-T:** 6 RTDs, -40 to 75°C operating temperature
**85M-6810-T:** 8 TCs, -40 to 75°C operating temperature
Note: Conformal coating available on request

**Package Checklist** (85M modules)

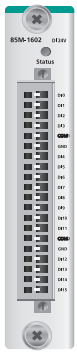
- 85M module
- Serial cable: CBL-M44M9x4-50 (85M-5401-T only)

### Optional Accessories (can be purchased separately)

**DK-DC50131-01:** DIN-rail mounting kit, 50 x 131 mm
**WK-75:** Wall-mounting kit, 2 plates with 8 screws
**CBL-M12D(MM4P)/RJ45-100 IP67:** 4-pin D-code M12-to-RJ45 CAT5E UTP Ethernet cable, 100 cm, IP67 waterproof
**CBL-RJ458P-100:** 8-pin RJ45 CAT5 Ethernet cable, 100 cm
**CBL-F9DPF1x4-BK-100:** Serial console cable
**CBL-M44M9x4-50:** DB44 to 4-port DB9 female serial cable
**85M-BKTES:** Empty slot covers (3 per order)

# ioPAC 8500 Series Modules

## 85M-1602-T: 16 digital inputs, 24 VDC, sink/source type



### Inputs and Outputs
**Digital Inputs:** 16 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet contact (NPN or PNP), dry contact
**I/O Mode:** DI, Counter or Frequncy
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• Off: 0 to 3 VDC
• On: 10 to 30 VDC
**Common Type:** 8 points per COM
**Counter Frequency:** 5 kHz
**Digital Filtering Time Interval:** Software selectable (by 0.1 ms)

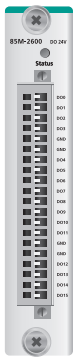
### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 363.6 mA @ 3.3 VDC

### MTBF (mean time between failures)
**Time:** 1,132,561 hrs
**Standard:** Telcordia SR332

## 85M-2600-T: 16 digital outputs, 24 VDC, sink-type



### Inputs and Outputs
**Digital Outputs:** 16 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Output
**Type:** Sink
**I/O Mode:** DO or PWM
**Pulse Output Frequency:** 5 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

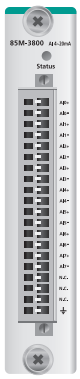
### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 257.6 mA @ 3.3 VDC

### MTBF (mean time between failures)
**Time:** 792,571 hrs
**Standard:** Telcordia SR332

## 85M-3800-T: 8 analog inputs, 4 to 20 mA



### Inputs and Outputs
**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Input
**Type:** Differential
**Resolution:** 16 bits
**I/O Mode:** 4 to 20 mA (wire off)
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 100 samples/sec
• Per channel: 12.5 samples/sec
**Input Impedance:** 125 ohms (min.)

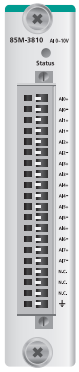
### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 318.2 mA @ 3.3 VDC

### MTBF (mean time between failures)
**Time:** 1,512,906 hrs
**Standard:** Telcordia SR332

## 85M-3810-T: 8 analog inputs, 0 to 10 VDC



### Inputs and Outputs
**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Inputs
**Type:** Differential
**Resolution:** 16 bits
**I/O Mode:** 0 to 10 VDC
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 100 samples/sec
• Per channel: 12.5 samples/sec
**Input Impedance:** 200 kilo-ohms (min.)

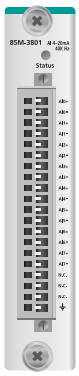
### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 315.2 mA @ 3.3 VDC

### MTBF (mean time between failures)
**Time:** 1,530,690 hrs
**Standard:** Telcordia SR332

## 85M-3801-T: 8 analog inputs, 4 to 20 mA, 40 kHz



### Inputs and Outputs
**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Input
**Type:** Differential
**Resolution:** 16 bits
**I/O Mode:** 4 to 20 mA (wire off)
**Historical Data Buffering:** 60 KB per channel, 6-second data buffer at 5 kHz
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 40k samples/sec
• Per channel: 5k samples/sec
**Input Impedance:** 125 ohms (min.)

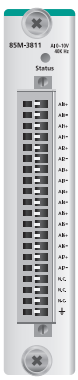
### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 378.8 mA @ 3.3 VDC

### MTBF (mean time between failures)
**Time:** 1,426,112 hrs
**Standard:** Telcordia SR332

## 85M-3811-T: 8 analog inputs, 0 to 10 VDC, 40 kHz



### Inputs and Outputs
**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Inputs
**Type:** Differential
**Resolution:** 16 bits
**I/O Mode:** 0 to 10 VDC
**Historical Data Buffering:** 60 KB per channel, 6-second data buffer at 5 kHz
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 40k samples/sec
• Per channel: 5k samples/sec
**Input Impedance:** 20 mega-ohms (min.)

### Physical Characteristics
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements
**Input Current:** 378.8 mA @ 3.3 VDC

### MTBF (mean time between failures)
**Time:** 1,426,112 hrs
**Standard:** Telcordia SR332

## 85M-5401-T: 4 serial ports (RS-232/422/485)

### Serial Communication

**Interface:** 4 RS-232/422/485 ports, software selectable (DB44 female)
**Isolation:** 3k VDC or 2k Vrms
Note: DB44 to 4-port DB9 cable included in the package.

### Serial Communication Parameters

**Parity:** None, Even, Odd
**Data Bits:** 7, 8
**Stop Bits:** 1, 2
**Flow Control:** RTS/CTS, XON/XOFF
**Baudrate:** 300 bps to 921.6 kbps

### Serial Signals

**RS-232:** TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
**RS-422:** Tx+, Tx-, Rx+, Rx-, GND
**RS-485-4w:** Tx+, Tx-, Rx+, Rx-, GND
**RS-485-2w:** Data+, Data-, GND

### Physical Characteristics

**Connector:** DB44 female

### Environmental Limits

**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements

**Input Current:** 375.8 mA @ 3.3 VDC

### MTBF (mean time between failures)

**Time:** 596,611 hrs
**Standard:** Telcordia SR332

## 85M-6600-T: 6 RTDs

### Inputs and Outputs

**RTD Inputs:** 6 channels
**Isolation:** 3k VDC or 2k Vrms

### RTDs

**Input Type:**
• PT50, PT100, PT200, PT500 (-200 to 850°C)
• PT1000 (-200 to 350°C)
• JPT100, JPT200, JPT500 (-200 to 640°C)
• JPT1000 (-200 to 350°C)
• NI100, NI200, NI500 (-60 to 250°C)
• NI1000 (-60 to 150°C)
• NI120 (-80 to 260°C)
• Resistance of 310, 620, 1250, and 2200 ohms
**Sampling Rate (single channel):**
• All channels: 12 samples/sec
• Per channel: 2 samples/sec

**Resolution:** 0.1°C or 0.1 ohms
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Input Impedance:** 625 kilo-ohms (min.)
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits

**Operating Temperature:** -40 to 75°C (-40 to 176°F)

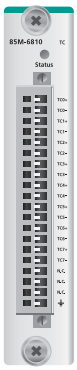
### Power Requirements

**Input Current:** 201.5 mA @ 3.3 VDC

### MTBF (mean time between failures)

**Time:** 571,446 hrs
**Standard:** Telcordia SR332

## 85M-6810-T: 8 thermocouples



### Inputs and Outputs

**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Thermocouples

**Sensor Type:** J (0 to 750°C), K (-200 to 1250°C), T (-200 to 350°C), E (-200 to 900°C), R (-50 to 1600°C), S (-50 to 1760°C), B (600 to 1700°C), N (-200 to 1300°C)
**Millivolt Type:**
- Mode: ±78.126 mV, ±39.062 mV, ±19.532 mV
- Fault and over-voltage protection: -35 to +35 VDC (power off); -25 to +30 VDC (power on)

**Sampling Rate (single channel):**
- All channels: 12 samples/sec
- Per channel: 1.5 samples/sec

**Resolution:** 16 bits

**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Input Impedance:** 1 mega-ohm (min.)
**Wiring:** I/O cable, 16 AWG (max.)
**Connector:** Spring-type terminal block

### Environmental Limits

**Operating Temperature:** -40 to 75°C (-40 to 176°F)

### Power Requirements

**Input Current:** 175.5 mA @ 3.3 VDC

### MTBF (mean time between failures)

**Time:** 2,324,891 hrs
**Standard:** Telcordia SR332

## Common Specifications

### Power Requirements

**Input Voltage:** 24 VDC (9 to 48 VDC)

### Environmental Limits

**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6

### Standards and Certifications

**Safety:** UL 508
**EMC:** EN 55022/24
**EMI:** FCC Part 15 Subpart B Class A, CISPR 22
**EMS:**
IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
IEC 61000-4-3 RS:
80 MHz to 1000 MHz: 3 V/m
1400 MHz to 2100 MHz: 3 V/m
2100 MHz to 2700 MHz: 1 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal 0.5 kV
IEC 61000-4-5 Surge: Power: 2 kV (L-PE), 1 kV (L-L); Signal: 1 kV (L-L), 2 kV (L-PE)
IEC 61000-4-6 CS: 3V
IEC 61000-4-8 PFMF: 3 A/m

**Rail Traffic:** EN 50155*, EN 50121-3-2, EN 50121-4
*Complies with a portion of EN 50155 specifications.

### Warranty

**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

# ioPAC 8020 Series

## *Rugged modular RTU controllers*

- Compliant with EN 50121-3-2, EN 50121-4, and a portion of EN 50155 specifications
- Supports C/C++ programming languages
- 2-port Ethernet switch for daisy-chain topologies with bypass function
- Modular I/O for versatility, flexibility, and scalability
- Rugged and compact design for harsh environments
- Wide operating temperature: -40 to 75°C (-40 to 167°F)
- 3-in-1 RS-232/422/485 serial port
- Up to 32 GB SDHC data logging function

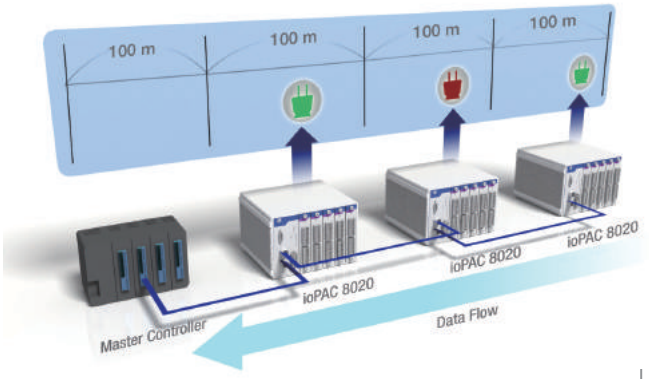
## Overview

Sturdy and dependable, ioPAC 8020-C modular RTU controllers are an ideal solution for rolling stock and trackside applications. This series tolerates temperature extremes from -40 to 75°C, is enclosed in a sealed metal casing, and is compliant with EN 50121-3-2, EN 50121-4, and relevant sections of the EN 50155 anti-vibration standard. The ioPAC 8020-C further features a Linux/GNU platform adapted to data acquisition and condition monitoring. The main advantage of this open C platform is its user-friendly SDK, which helps economize on installation and configuration overhead by reducing your programming workload for key areas, including I/O control and condition monitoring, SCADA/DB interoperability, and improving smart communication controls.

The ioPAC-8020-C has a 2-port Ethernet switch that allows system integrators to easily build control networks with open Ethernet standards and daisy-chain topologies. Built-in dual power inputs ensure non-stop data transfer to the controller and uninterrupted communications management on the control network. For train-related applications, spring-type terminal blocks and optional M12 Ethernet connectors deliver reliable operations in high vibration environments. In addition, a rich selection of hot-swap I/O and communication modules is available for any combination of device applications.

### Ethernet bypass feature for seamless data transmission

ioPAC RTU controllers also come with an integrated, independent, 2-port Ethernet switch for the convenient daisy-chaining of ioPAC RTU controllers. In distributed Ethernet data acquisition applications, panels, units, and cabinets are often located at remote sites where space is limited. The daisy-chain capability of ioPAC controllers allows ioPAC RTUs to connect in series either to each other or to other nearby Ethernet devices, drastically saving on both space and wiring costs. Because the Ethernet switch is independent of the main RTU and includes the power-off bypass mechanism, ioPAC RTU controllers are able to maintain continuous and seamless data transmissions even when a linked device fails.




### Hot-swappable modular I/O


Hot-swap

ioPAC RTU controllers offer a modular design in a compact size to save space in installation cabinets. For modular ioPAC RTU controllers, the hot-swap capability allows users to unplug and then re-plug a module without shutting down the system, so that maintenance engineers can easily complete replacement tasks and reduce system downtime.

## Specifications

### Computer
**CPU:** 32-bit ARM9 160 MHz CPU
**OS:** Linux
**Clock:** Real-time clock with battery backup
**SDRAM:** 64 MB
**Flash:** 32 MB
**SD™ Slot:** Up to 32 GB (SD 2.0 compatible)
Note: For units operating in extreme temperatures, industrial-grade, wide-temperature SD cards are required.

### Ethernet Interface
**LAN:** 2 x 10/100 Mbps, Ethernet bypass, RJ45 or M12
**Protection:** 1.5 kV magnetic isolation

### Serial Interface
**Serial Ports:** RS-232/422/485 (DB9 male)
**Serial Debug Port:** RS-232 (4-pin connector)

### Serial Ports
**RS-232:** TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
**RS-422:** TxD+, TxD-, RxD+, RxD-, GND
**RS-485-4w:** TxD+, TxD-, RxD+, RxD-, GND
**RS-485-2w:** Data+, Data-, GND

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 184 mA @ 24 VDC (without I/O modules)
Note: Compliant with EN 50155 at 24 VDC

### Physical Characteristics
**Housing:** Aluminum
**Dimensions:**
5-slot version: 190.9 x 135 x 100 mm (7.52 x 5.31 x 3.94 in)
9-slot version: 292.5 x 135 x 100 mm (11.52 x 5.31 x 3.94 in)
**Weight:**
5-slot version: 2,000 g (4.41 lb)
9-slot version: 2,575 g (5.68 lb)
**Mounting:** DIN rail (standard), wall (optional)
**I/O Module Slots:** 5 or 9 slots (the 9th slot is reserved)

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 167°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

### Standards and Certifications
**Safety:** UL 508
**EMC:** EN 55022/24
**EMI:** FCC Part 15 Subpart B Class A, CISPR 22
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS:
80 MHz to 1000 MHz: 10 V/m
1400 MHz to 2100 MHz: 3 V/m
2100 MHz to 2700 MHz: 1 V/m
IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV
IEC 61000-4-5 Surge: Power: 2 kV (L-PE), 1 kV (L-L); Signal: 1 kV (9-slot version)
IEC 61000-4-6 CS: 10 V
IEC 61000-4-8 PFMF: 30 A/m
**Rail Traffic:** EN 50155*, EN 50121-3-2, EN 50121-4
*Complies with a portion of EN 50155 specifications.
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

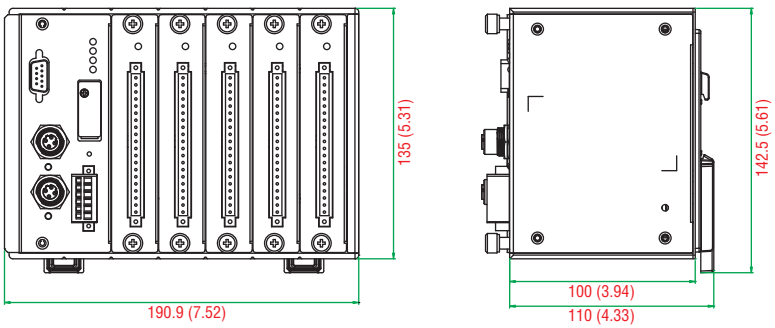
### MTBF (mean time between failures)
**Time:** 690,214 hrs
**Standard:** Telcordia SR332

### Warranty
**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

## Dimensions

Unit: mm (inch)

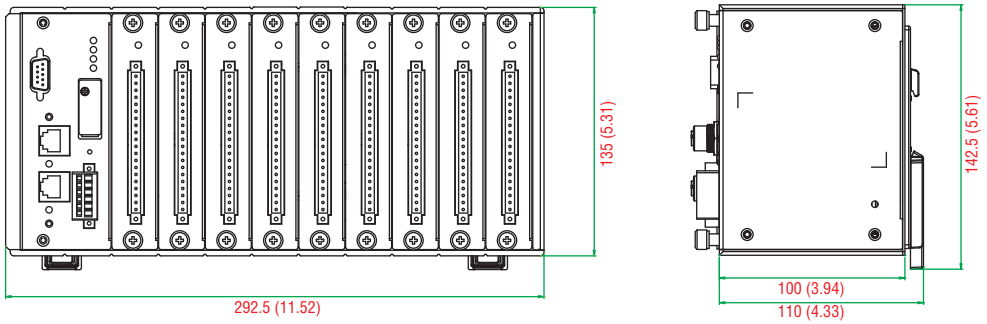
### ioPAC 8020-5



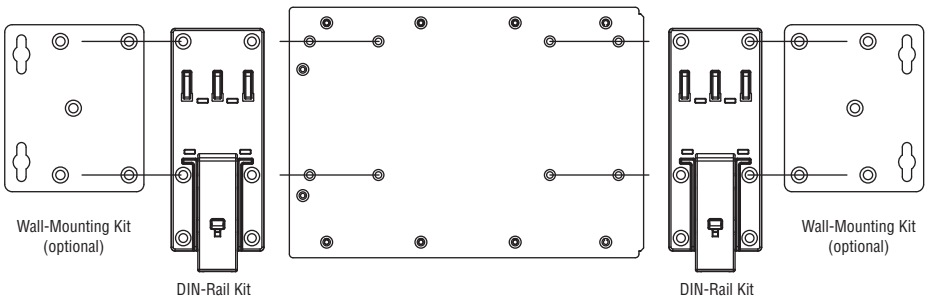
## Dimensions

Unit: mm (inch)

### ioPAC 8020-9




### Mounting Kits




## Ordering Information

### System Modules

**ioPAC 8020-5-M12-C-T:** Modular programmable controller with 5 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8020-5-RJ45-C-T:** Modular programmable controller with 5 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8020-9-M12-C-T:** Modular programmable controller with 9 slots, M12 Ethernet ports, -40 to 75°C operating temperature
**ioPAC 8020-9-RJ45-C-T:** Modular programmable controller with 9 slots, RJ45 Ethernet ports, -40 to 75°C operating temperature

### Package Checklist

- ioPAC 8020-C
- Ethernet cable: CBL-M12D(MM4P)/RJ45-100 IP67
- Serial cable: CBL-F9DPF1x4-BK-100
- Documentation and software CD

### I/O Modules (can be purchased separately)

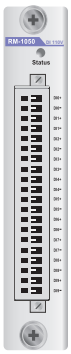
**RM-1050-T:** 10 DIs, 110 VDC, ch-to-ch isolation, -40 to 75°C operating temperature
**RM-1602-T:** 16 DIs, sink/source, 24 VDC, -40 to 75°C operating temperature
**RM-2600-T:** 16 DOs, sink, 24 VDC, -40 to 75°C operating temperature
**RM-3802-T:** 8 AIs, 4 to 20 mA, 16 bits, -40 to 75°C operating temperature
**RM-3810-T:** 8 AIs, 0 to 10 V, 16 bits, -40 to 75°C operating temperature
**KM-2430-T:** 4-port unmanaged Ethernet switch, M12, -40 to 75°C operating temperature
Note: Conformal coating available on request

### Optional Accessories (can be purchased separately)

**DK-DC50131-01:** DIN-rail mounting kit, 50 x 131 mm
**WK-75:** Wall-mounting kit, 2 plates with 8 screws
**CBL-M12D(MM4P)/RJ45-100 IP67:** 4-pin D-code M12-to-RJ45 CAT5E UTP Ethernet cable, 100 cm, IP67 waterproof
**CBL-RJ458P-100:** 8-pin RJ45 CAT5 Ethernet cable, 100 cm
**CBL-F9DPF1x4-BK-100:** Serial console cable

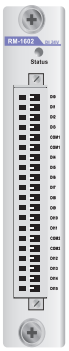
# ioPAC 8020 Series Modules

## RM-1050-T: 10 channel-to-channel isolated DIs, 110 VDC, sink/source type



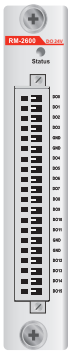
**Digital Inputs:** 10 channels, 110 VDC, channel-to-channel isolation
**On:** 50 to 175 VDC
**Off:** 0 to 15 VDC
**Input Impedance:** 120 kilo-ohms (typical)
**Response Time:** 10 ms
**Isolation:** 3k VDC or 2k Vrms
**Channel-to-Channel Isolation:** 2.5k VDC
**Operating Temperature:** -40 to 75°C (-40 to 176°F)
**Input Current:** 7 mA @ 24 VDC
**Wiring:** I/O cable, 14 AWG (max.)
**MTBF:** 3,993,435 hrs (Standard: Telcordia SR332)

## RM-1602-T: 16 digital inputs, 24 VDC, sink/source type



**Digital Inputs:** 16 channels, 24 VDC, sink/source type
**On:** 10 to 30 VDC
**Off:** 0 to 3 VDC
**Input Impedance:** 3 kilo-ohms (typical)
**Common Type:** 8 points per 2 COMs
**Response Time:** 10 ms
**Isolation:** 3k VDC or 2k Vrms
**Operating Temperature:** -40 to 75°C (-40 to 176°F)
**Input Current:** 7 mA @ 24 VDC
**Wiring:** I/O cable, 14 AWG (max.)
**MTBF:** 4,132,863 hrs (Standard: Telcordia SR332)

## RM-2600-T: 16 digital outputs, 24 VDC, sink-type



**Digital Outputs:** 16 channels, 24 VDC, sink-type
**Output Impedance:** 120 milli-ohms (typical)
**Current Rating:** 200 mA per channel
**Off-state Resistance:** 500 kilo-ohms (typical)
**Response Time:** 10 ms
**Over Current Protection:** 2.6 A (4 channels @ 650 mA)
**Isolation:** 3k VDC or 2k Vrms
**Operating Temperature:** -40 to 75°C (-40 to 176°F)
**Input Current:** 10 mA @ 24 VDC
**Wiring:** I/O cable, 14 AWG (max.)
**MTBF:** 4,440,241 hrs (Standard: Telcordia SR332)

## RM-3802-T: 8 analog inputs, 4 to 20 mA

**Analog Inputs:** 8 channels, differential
**Input Range:** 4 to 20 mA
**Input Impendence:** 120 ohms
**Resolution:** 16 bits, 0.24 μA/bit
**Accuracy:**
±0.1%, FSR @ 25°C
±0.3%, FSR @ -40°C and 75°C
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 1.5 samples/sec
**Isolation:** 3k VDC or 2k Vrms
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

**Input Current:** 78 mA @ 24 VDC
**Wiring:** I/O cable, 14 AWG (max.)
**MTBF:** 1,222,361 hrs (Standard: Telcordia SR332)

## RM-3810-T: 8 analog inputs, 0 to 10 V

**Analog Inputs:** 8 channels, differential
**Input Range:** 0 to 10 VDC
**Input Impendence:** 10 mega-ohms (min.)
**Resolution:** 16 bits, 0.15 μA/bit
**Data Format:** 16-bit integer (2's complement)
**Accuracy:**
±0.1%, FSR @ 25°C
±0.3%, FSR @ -40°C, 75°C
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 1.5 samples/sec
**Isolation:** 3k VDC or 2k Vrms
**Operating Temperature:** -40 to 75°C (-40 to 176°F)

**Input Current:** 78 mA @ 24 VDC
**Wiring:** I/O cable, 14 AWG (max.)
**MTBF:** 1,225,957 hrs (Standard: Telcordia SR332)

## KM-2430-T: 4-port unmanaged Ethernet switch module

**Standards:**
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control
**Processing Type:** Store and Forward
**Interface:** Front cabling, M12 connector, 10/100BaseT(X) auto negotiation speed
**Operating Temperature:** -40 to 75°C (-40 to 176°F)
**Input Current:** 20 mA @ 24 VDC
**MTBF:** 3,873,592 hrs (Standard: Telcordia SR332)

# ioPAC 5542 Series

## *Rugged, compact RTU controllers*

- Dedicated ARM CPUs for both the main system and I/O channels
- Millisecond timestamp granularity on both digital input and analog input
- Up to 250 Hz sampling rate per analog input channel
- Prerecord feature for analog input data logging
- Supports C/C++ or IEC 61131-3 programming languages
- Compliant with EN 50121-4, UL/cUL Class 1 Division 2
- Robust and compact design for harsh environments

RoHS EN 50121 CE FC c UL us LISTED



## Overview

The ioPAC 5500 standalone controllers use an ARM9 industrial-grade CPU for the main system, with ARM Cortex™ M4 based CPUs used for I/O channels. The dual CPU architecture supports up to a 250 Hz per channel analog input sampling rate with millisecond timestamp granularity. The ioPAC 5500 supports C/C++ or IEC 61131-3 programming langauges, rail-level surge and ESD protection, a -40 to 75°C (-30 to 75°C for HSPA models) operating temperature range, UL/cUL Class 1 Division 2 certifications, two 10/100 Mbps Ethernet ports with two MACs (Port Trunking ready), and two 3-in-1 serial ports. With Moxa's Active OPC Server and DA-Center, the ioPAC 5500 series provides a comprehensive solution for data acquisition and control applications in harsh environments.

### High Sampling Rate

High sampling rate AI

Moxa's ioPAC 5542 RTUs use an ARM9 industrial-grade CPU, and the dual CPU architecture supports up to a 2000 Hz analog input sampling rate (all channels), giving engineers the analog data precision they need to correctly analyze events, and then formulate the best response.

### Prerecorded Analog Input

Prerecording

The ioPAC 5542's prerecord function allows the RTU controller to continuously record analog input data before an event trigger point. The prerecording function is a major improvement over products that only start data logging after an event has occurred, which can lead to the loss of critical data due to the latency between the event and when the data logging actually begins.

## Specifications

### Computer

**Main CPU:** 32-bit ARM9 192 MHz CPU
**I/O CPU:** 32-bit ARM Cortex M4 80 MHz CPU
**OS:** Linux
**Clock:** Real-time clock with battery backup
**Memory:**
• SDRAM: 64 MB
• Flash: 32 MB
• SRAM: 256 KB (battery backup lasts for 1 week)
• microSD™ Slot: Up to 32 GB (SD 2.0 compatible)
Note: For units operating in extreme temperatures, industrial-grade, wide-temperature microSD cards are required.

### Cellular (for the ioPAC 5542-HSPA Series)

**Network:**
• Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
• Five-band UMTS/HSPA+ 800/850/AWS/1900/2100 MHz
**Internet:**
HSPA:
• Up to 5.76 Mbps upload speed
• Up to 14.4 Mbps download speed
UMTS: Up to 384 kbps upload/download speed
EDGE Class 12: Up to 237 kbps upload/download speed
GPRS Class 12: Up to 85.6 kbps upload/download speed
**SMS:** Point-to-Point Text/PDU mode
**SIM Control Voltage:** 3/1.8 V

### Ethernet Interface

**LAN:** 2 x 10/100 Mbps, 2 MACs (IPs), RJ45
**Protection:** 1.5 kV magnetic isolation

### Serial Interface

**Interface:**
• 2 RS-232/422/485 ports, software selectable (DB9 male)
• 1 RS-232 debug port (4-pin connector)
**Serial Line Protection:** 15 kV ESD for all signals

### Serial Communication Parameters

**Parity:** None, Even, Odd
**Data Bits:** 7, 8
**Stop Bits:** 1, 2
**Flow Control:** RTS/CTS, XON/XOFF
**Baudrate:** 300 bps to 921.6 kbps

## Serial Signals

**RS-232:** TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND, RI
**RS-422:** Tx+, Tx-, Rx+, Rx-, GND
**RS-485-4w:** Tx+, Tx-, Rx+, Rx-, GND
**RS-485-2w:** Data+, Data-, GND

## Inputs and Outputs

**Digital Inputs:** 8 channels
**Configurable DIOs:** 8 channels
**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

## Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI Counter or Frequency
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact:**
NPN (DI to GND):
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
PNP (DI to GND):
• Off: 0 to 3 VDC
• On: 10 to 30 VDC
**Common Type:** 4 points per COM
**Counter Frequency:** 1 kHz
**Digital Filtering Time Interval:** Software selectable (by 0.5 ms)

## Digital Output

**Type:** Sink
**I/O Mode:** DO or PWM
**Pulse Output Frequency:** 1 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

## Analog Input

**Type:** Differential Input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current
**Input Range:** 0 to 10 VDC, -10 to 10 VDC, 0 to 20 mA, 4 to 20 mA (wire off)
**Historical Data Buffering:** 60 KB per channel, 120-second data buffer at 250 Hz
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 2000 samples/sec
• Per channel: 250 samples/sec
**Input Impedance:** 2 mega-ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms (min.)

## Software Characteristics

**Automation Languages:** C/C++ or IEC 61131-3
**Protocols:** Modbus TCP/RTU (master/slave), SNMP TCP/IP, UDP, DHCP, BOOTP, SNTP, SMTP

## Power Requirements

**Input Voltage:** 24 VDC (9 to 48 VDC)
**Input Current:**
• ioPAC 5542-HSPA series: 305 mA @ 24 VDC
• ioPAC 5542 series: 264 mA @ 24 VDC

## Physical Characteristics

**Housing:** Aluminum
**Dimensions:** 90.05 x 135 x 105.4 mm (3.55 x 5.32 x 4.15 in)
**Weight:**
• ioPAC 5542-HSPA Series: 1100 g (2.43 lb)
• ioPAC 5542 Series: 1000 g (2.20 lb)
**Mounting:** DIN rail (standard), wall (optional)
**Connector:** Spring-type terminal block

## Environmental Limits

**Operating Temperature:**
• ioPAC 5542 Series: -40 to 75°C (-40 to 176°F)
• ioPAC 5542-HSPA Series: -30 to 75°C (-22 to 176°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

## Standards and Certifications

**Safety:** UL 508
**EMC:** EN 55022/24
**EMI:** FCC Part 15 Subpart B Class A, CISPR 22
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1000 MHz: 3 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: Power: 2 kV (L-PE), 1 kV (L-L); Signal: 1 kV
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8 PFMF: 1 A/m
**Radio:** NCC
**Rail Traffic:** EN 50121-4
**Hazardous Location:** Class 1 Division 2
Note: Please check Moxa's website for the most up-to-date certification status.

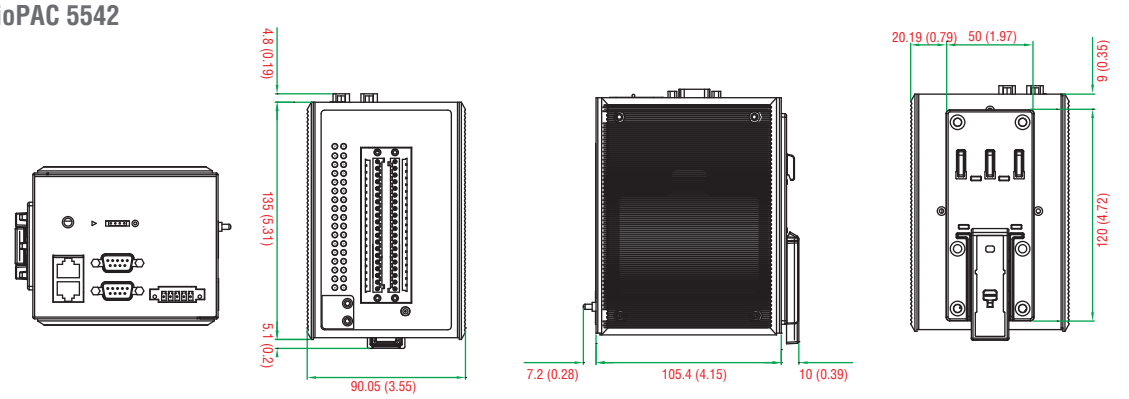
## Warranty

**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

## Dimensions

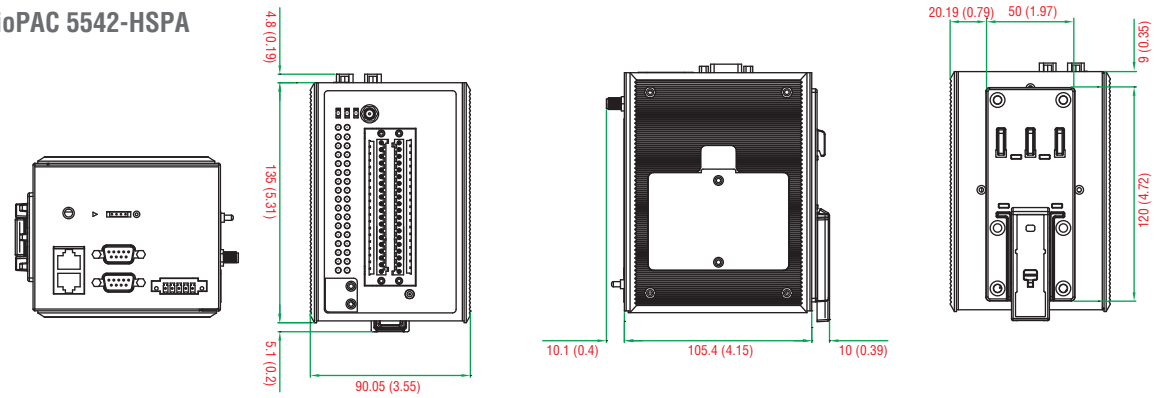
Unit: mm (inch)

### ioPAC 5542




Top View | Front View | Side View | Rear View

### ioPAC 5542-HSPA




Top View | Front View | Side View | Rear View

## Ordering Information

### Available Models

**ioPAC 5542-C-T:** Rugged, compact, Ethernet, C/C++ programmable controller with 8 DIs, 8 DIOs, 8 AIs, -40 to 75°C operating temperature
**ioPAC 5542-IEC-T:** Rugged, compact, Ethernet, IEC 61131-3 programmable controller with 8 DIs, 8 DIOs, 8 AIs, -40 to 75°C operating temperature
**ioPAC 5542-HSPA-C-T:** Rugged, compact, HSPA, C/C++ programmable controller with 8 DIs, 8 DIOs, 8 AIs, -30 to 75°C operating temperature
**ioPAC 5542-HSPA-IEC-T:** Rugged, compact, HSPA, IEC 61131-3 programmable controller with 8 DIs, 8 DIOs, 8 AIs, -30 to 75°C operating temperature

### Optional Accessories (can be purchased separately)

**DK-DC50131:** DIN-rail mounting kit, 50 x 131 mm
**CBL-RJ458P-100:** 8-pin RJ45 CAT5 Ethernet cable, 100 cm
**CBL-F9DPF1x4-BK-100:** Serial console cable
**WK-51-01:** Wall-mounting kit, 2 plates with 6 screws
**ANT-WCDMA-AHSM-04-2.5m Black:** 3G cellular antenna

### Package Checklist

- ioPAC 5500 controller
- Serial cable: CBL-F9DPF1x4-BK-100
- Cellular 3G antenna: ANT-WCDMA-AHSM-04-2.5m black
- Documentation and software CD

# Smart Remote I/O


## Product Selection Guide

Smart Remote I/O with Click&Go Plus Logic . . . . . 16-2
Smart Remote I/O with Click&Go Logic . . . . . 16-3

## Smart Wireless I/O

ioLogik 2500 HSPA/GPRS/WLAN Series: Smart wireless remote I/O with Click&Go Plus Logic. . . . . 16-4
ioLogik W5340-HSPA: Smart HSPA remote I/O with Click&Go Logic . . . . . 16-9

## Smart Ethernet I/O

ioLogik 2500 Ethernet Series: Smart Ethernet remote I/O with Click&Go Plus Logic . . . . . 16-13
ioLogik E2200 Series: Smart Ethernet remote I/O with Click&Go Logic. . . . . 16-17




# Smart Remote I/O with Click&Go Plus Logic

| | ioLogik 2542-HSPA | ioLogik 2542-GPRS | ioLogik 2542-WL1 | ioLogik 2542 | ioLogik 2512-HSPA | ioLogik 2512-GPRS | ioLogik 2512-WL1 | ioLogik 2512 |
|---|---|---|---|---|---|---|---|---|
| **Inputs/Outputs** | | | | | | | | |
| Digital Inputs | – | – | – | – | 8 | 8 | 8 | 8 |
| Configurable DIOs | 12 | 12 | 12 | 12 | 8 | 8 | 8 | 8 |
| Analog Inputs | 4 | 4 | 4 | 4 | – | – | – | – |
| **Cellular** | | | | | | | | |
| Band Options | UMTS/HSPA+: five-band 800/850/900/1900/2100 MHz GSM/GPRS/EDGE: quad-band 850/900/1800/1900 MHz | GSM/GPRS/EDGE: quad-band 850/900/1800/1900 MHz | – | – | UMTS/HSPA+: five-band 800/850/900/1900/2100 MHz GSM/GPRS/EDGE: quad-band 850/900/1800/1900 MHz | GSM/GPRS/EDGE: quad-band 850/900/1800/1900 MHz | – | – |
| **WLAN** | | | | | | | | |
| Standard | – | – | IEEE 802.11a/b/g for Wireless LAN IEEE 802.11i for Wireless Security | – | – | – | IEEE 802.11a/b/g for Wireless LAN IEEE 802.11i for Wireless Security | – |
| **Ethernet** | | | | | | | | |
| Ports (Connector) | 4 switched ports, with 1 optimized port for faster downstream communications with up to 8 daisy-chained ioLogik E1200 units (RJ45) | | | | | | | |
| Speed | 10/100 Mbps | | | | | | | |
| Protocols | Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, HTTP, CGI, SNTP, SMTP | | | | | | | |
| **Serial** | | | | | | | | |
| Ports (Connector) | 2 (RJ45) | | | | | | | |
| Interface | RS-232/422/485 software-selectable | | | | | | | |
| Protocols | Modbus/RTU (master/gateway), serial tunnel mode (client/server) | | | | | | | |
| **Environmental Limits** | | | | | | | | |
| Standard Operating Temp. | -10 to 60°C (14 to 140°F) | | | | | | | |
| Wide Operating Temp. | -30 to 70°C (-22 to 158°F) | | | -40 to 75°C (-40 to 167°F) | -30 to 70°C (-22 to 158°F) | | | -40 to 75°C (-40 to 167°F) |
| Storage Temp. | -40 to 85°C (-40 to 185°F) | | | | | | | |
| Ambient Relative Humidity | 5 to 95% (non-condensing) | | | | | | | |
| **Software** | | | | | | | | |
| Click&Go Plus | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MX-AOPC UA Server | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MX-AOPC UA Logger (Data Complement) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MXIO | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| IOxpress | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Standards and Certifications** | | | | | | | | |
| Safety | UL 508 | | | | | | | |
| EMC | EN 55022; EN 55024; EN 61000-6-2; EN 61000-6-4 | | | | | | | |
| EMI | CISPR 22, FCC Part 15B Class A | | | | | | | |
| EMS | EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8 | | | | | | | |
| Shock | IEC 60068-2-27 | | | | | | | |
| Vibration | IEC 60068-2-6 | | | | | | | |
| Radio | R&TTE; NCC | | R&TTE; NCC; VCCI | – | R&TTE; NCC | | R&TTE; NCC; VCCI | – |
| Hazardous Location | Class I Division 2, ATEX Zone 2 | | | | | | | |
| Green Product | RoHS, CRoHS, WEEE | | | | | | | |
| **Reliability** | | | | | | | | |
| Warranty | 5 years | | | | | | | |
| Page | 16-4 | 16-4 | 16-4 | 16-13 | 16-4 | 16-4 | 16-4 | 16-13 |

# Smart Remote I/O with Click&Go Logic

| | ioLogik E2210 | ioLogik E2212 | ioLogik E2214 | ioLogik E2240 | ioLogik E2242 | ioLogik E2260 | ioLogik E2262 | ioLogik W5340-HSPA |
|---|---|---|---|---|---|---|---|---|
| **Inputs/Outputs** | | | | | | | | |
| Digital Inputs | 12 | 8 | 6 | – | – | – | – | – |
| Digital Outputs | 8 | 8 | – | – | – | 4 | 4 | – |
| Relays | – | – | 6 | – | – | – | – | 2 |
| Configurable DIOs | – | 4 | – | – | 12 | – | – | 8 |
| Analog Inputs | – | – | – | 8 | 4 | – | – | 4 |
| Analog Outputs | – | – | – | 2 | – | – | – | – |
| RTDs | – | – | – | – | – | 6 | – | – |
| Thermocouples | – | – | – | – | – | – | 8 | – |
| **Ethernet** | | | | | | | | |
| Ports (Connector) | 1 (RJ45) | | | | | | | 1, with up to 3 ioLogik E1200 units daisy-chained (RJ45) |
| Speed | 10/100 Mbps | | | | | | | |
| Protocols | Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, HTTP, CGI, SNTP, SMTP | | | | | | | Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, SNTP, SMTP |
| **Serial** | | | | | | | | |
| Ports (Connector) | 1 (Euroblock terminal) | | | | | | | 1 (DB9 male or Euroblock terminal) |
| Interface | RS-485 | | | | | | | RS-232/422/485 software-selectable |
| Protocols | Modbus/RTU (gateway) | | | | | | | Modbus/RTU (master/gateway), serial tunnel mode (client/server) |
| **Environmental Limits** | | | | | | | | |
| Standard Operating Temp. | -10 to 60°C (14 to 140°F) | | | | | | | -10 to 55°C (14 to 131°F) |
| Wide Operating Temp. | -40 to 75°C (-40 to 167°F) | | | | | | | -30 to 70°C (-22 to 158°F) |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | | | | | |
| Ambient Relative Humidity | 5 to 95% RH (non-condensing) | | | | | | | |
| **Software** | | | | | | | | |
| Click&Go | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Active OPC Server | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MX-AOPC UA Server | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DA-Center (Data Complement) | – | – | – | – | – | – | – | ✓ |
| MXIO | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ioAdmin | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Standards and Certifications** | | | | | | | | |
| Safety | UL 508 | | | | | | | |
| EMC | EN 61000-6-2; EN 61000-6-4 | | | | | | | |
| EMI | CISPR 22, FCC Part 15B Class A | | | | | | | |
| EMS | EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-4-8 | | | | | | | |
| Shock | IEC 60068-2-27 | | | | | | | |
| Vibration | IEC 60068-2-6 | | | | | | | |
| Radio | – | – | – | – | – | – | – | R&TTE; NCC |
| Green Product | RoHS, CRoHS, WEEE | | | | | | | |
| **Reliability** | | | | | | | | |
| Warranty | 5 years | 5 years | 2 years* | 5 years | 5 years | 5 years | 5 years | 2 years* |
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*Because of the limited lifetime of power relays, products using that component are covered by a 2-year warranty.

# ioLogik 2500 HSPA/GPRS/WLAN Series

## *Smart wireless remote I/O with Click&Go Plus Logic*

- Front-end intelligence with Click&Go Plus control logic, up to 48 rules
- Using Cellular Data Access software, SCADA systems can directly communicate with cellular devices hidden behind private IP addresses
- Active communication with MX-AOPC UA Server
- Automatically complement disconnection period data with MX-AOPC UA Logger software
- 4-port unmanaged switch built in for linking to Ethernet devices
- I/O expansion port for daisy chaining up to 8 ioLogik E1200 units
- 3-in-1 RS-232/422/485 serial port for connecting to serial devices in the field
- Simplify I/O management with MXIO library for Windows or Linux
- Wide operating temperature range of -30 to 70°C (-22 to 158°F)

CLICK&GO LOGIC

## Introduction

The ioLogik 2500 is a smart remote I/O product with unique hardware and software designs, making it an ideal solution for a variety of industrial data acquisition applications.

The ioLogik 2500 HSPA/GPRS series features dual SIM failover, 3-step cellular reconnection, and dynamic IP access. The WLAN series features 802.11a/b/g reliable wireless communication.

The ioLogik 2500's hardware design includes a 4-port unmanaged Ethernet switch and 2 serial ports, enabling the ioLogik 2500 to seamlessly connect to a variety of field devices. One of the Ethernet ports can be used to link to 8 daisy-chained ioLogik E1200 expansion modules to provide more than 100 channels. The ioLogik 2500 acts as the "head" unit, with Click&Go Plus logic used to control the entire I/O array. Most importantly, the ioLogik 2500's single IP is all that's required to connect the entire I/O array to your network, providing the perfect solution for industrial field sites that have an insufficient number of IP addresses.

### Dual SIM Failover

The ioLogik 2500 HSPA/GPRS series has dual SIM slots for inserting SIM cards from different carriers. It can switch over to a different carrier automatically when one of the cellular networks gets disconnected, ensuring that your device will always be online.

## 3-step Cellular Reconnection

If the cellular network is still disconnected after dual SIM failover, the ioLogik 2500 series will first try to reset the cellular modem, then reset the system software if it is still not working, and lastly reboot the entire system after being disconnected for a user-defined period of time.

Based on Moxa's experience, 90% of cellular connection issues can be solved by resetting the cellular modem. 3-step cellular reconnection not only helps prevent data and control loss, but also reduces your cost since your engineers won't need to make as many service calls to reboot devices located at remote sites.

## Dynamic IP Access

Most carriers provide dynamic and private IP address SIM cards, and although private IP cards are cheaper, they cannot be used to provide direct access to the cloud. Moxa's Cellular Data Access software enables this type of connection by establishing a special data route between the ioLogik 2500 HSPA/GPRS series and the cloud. Only one public IP address is needed to use Moxa's Cellular Data Access software, allowing you to easily update internal register values, change output channel status, and modify the configurations of devices connected to an ioLogik 2500, all through the cloud.

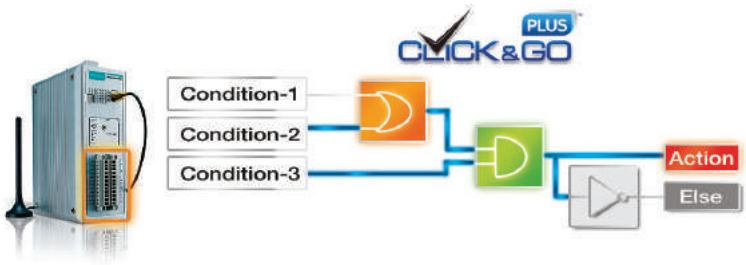

## VPN—Build a Reliable and Secure Cellular Communication Network

For security purposes, the ioLogik 2500-GPRS/HSPA also supports IPSec for building a secure VPN tunnel to the host station. With the help of VPNs, cellular devices acting as a VPN client can initiate a connection with a VPN server. Once the connection is established, cellular devices can communicate with other network devices on the same private network.

## Powerful Control Logic from the New Click&Go Plus™

The new Click&Go Plus™ control logic now supports up to 48 rules with further upgrades to 8 conditions/actions. In addition, its graphical user interface provides 3 logic gates and 3 multi-layers, helping you build more powerful and efficient IO solutions.

Once you finish setting up your Click&Go Plus™ logic rules, IOxpress's easy-to-use simulation function can be used to find potential errors in your Click&Go Plus™ rules before uploading them to your online devices.




## One IP for Multiple Expansion I/Os Gives You a Smarter Data Acquisition Solution

The ioLogik 2500's unique IO expansion hardware design lets you link up to 8 ioLogik E1200 modules into a versatile I/O array with 100+ different I/O channels. The ioLogik 2500 acts as the perfect "head" unit, using Click&Go Plus logic to control the entire I/O array, and providing a single IP to connect the entire I/O array to your network.

## ioLogik 2512 Specifications

### Inputs and Outputs
**Digital Inputs:** 8 channels
**Configurable DIOs (by software):** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP) and Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 8 points per COM
**Counter Frequency:** 2.5 kHz
**Digital Filtering Time Interval:** Software configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 5 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 1.5 A per channel @ 25°C
**Over-Temperature Shutdown:** 175°C (min.)
**Current Rating:** 500 mA per channel @ 25°C
**DIO Output Leakage Current:** < 1 mA @ 30 VDC

### Power Requirements
**Input Voltage:** 9 to 48 VDC
**Input Current:**
• HSPA Model: 390 mA @ 24 VDC
• GPRS Model: 416 mA @ 24 VDC
• WL1 Model: 328 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:**
• HSPA model: 378,154 hrs
• GPRS model: 403,452 hrs
• WL1 model: 400,469 hrs
**Standard:** Telcordia SR332

## ioLogik 2542 Specifications

### Inputs and Outputs
**Configurable DIOs (by software):** 12 channels
**Analog Inputs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP) and Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 6 points per COM
**Counter Frequency:** 2.5 kHz
**Digital Filtering Time Interval:** Software configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 5 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 1.5 A per channel @ 25°C
**Over-Temperature Shutdown:** 175°C (min.)
**Current Rating:** 500 mA per channel @ 25°C
**DIO Output Leakage Current:** < 1 mA @ 30 VDC

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (software selectable)
**Input Range:** ±10 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)
**Accuracy:**
• ±0.1% FSR @ 25°C
• ±0.3% FSR @ -10 and 60°C
• ±0.5% FSR @ -30 and 70°C
**Sampling Rate:**
• All channels: 400 samples/sec
• Per channel: 100 samples/sec
**Input Impedance:** 1M ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Power Requirements
**Input Voltage:** 9 to 48 VDC
**Input Current:**
• HSPA Model: 442 mA @ 24 VDC
• GPRS Model: 494 mA @ 24 VDC
• WL1 Model: 406 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:**
• HSPA model: 378,154 hrs
• GPRS model: 403,087 hrs
• WL1 model: 331,222 hrs
**Standard:** Telcordia SR332

## Common Specifications

### Cellular
**Standards:** GSM/GPRS/EDGE/UMTS/HSPA+
**HSPA Model Band Options:**
• UMTS/HSPA+: five-band 800/850/900/1900/2100 MHz
• GSM/GPRS/EDGE: quad-band 850/900/1800/1900 MHz
**GPRS Model Band Options:** GSM/GPRS/EDGE: quad-band 850/900/1800/1900 MHz
**SIM Control Voltage:** 3/1.8 V
**SIM Format:** Full size

### WLAN
**Standards:**
• IEEE 802.11a/b/g for wireless LAN
• IEEE 802.11i for wireless security
**Spread Spectrum and Modulation (typical):**
• DSSS with DBPSK, DQPSK, CCK
• OFDM with BPSK, QPSK, 16QAM, 64QAM
• 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps
• 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

**Operating Channels (central frequency):**
• US: 2.412 to 2.462 GHz (11 channels), 5.18 to 5.24 GHz (4 channels)
• EU: 2.412 to 2.472 GHz (13 channels), 5.18 to 5.24 GHz (4 channels)
**Security:**
• 64-bit and 128-bit WEP encryption
• Full WPA/WPA2 Personal
**Transmission Rates:**
• 802.11b: 1, 2, 5.5, 11 Mbps
• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
**TX Transmit Power:**
• 802.11b: Typ. 18±1.5 dBm @ 1 to 11 Mbps
• 802.11g: Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 17±1.5 dBm @ 36 Mbps, Typ. 16±1.5 dBm @ 48 Mbps, Typ. 16±1.5 dBm @ 54 Mbps
• 802.11a: Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 Mbps, Typ. 15±1.5 dBm @ 48 Mbps, Typ. 14±1.5 dBm @ 54 Mbps
**RX Sensitivity:**
• 802.11b: -97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps
• 802.11g: -88 dBm @ 6 to 24 Mbps, -85 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
• 802.11a: -88 dBm @ 6 to 24 Mbps, -85 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -70 dBm @ 54 Mbps

## LAN

**Ethernet:**
• 4 switched 10/100 Mbps RJ45 ports
• 1 optimized port for faster downstream communications with daisy-chained ioLogik E1200 units
Note: The optimized daisy-chain port is not supported by the ioLogik E1261W-T, E1261H-T, or E1263H-T.
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, HTTP, CGI, SNTP, SMTP

## Serial

**Interface:** 2 RS-232/422/485 (software selectable) RJ45 ports
**Parity:** None, Odd, Even
**Data Bits:** 5, 6, 7, 8
**Stop Bits:** 1, 2
**Flow Control:** None, RTS/CTS, XON/XOFF
**Baudrate:** 300 to 115200 bps
**Protocols:** Modbus/RTU (master/gateway), serial tunnel mode (client/server)

## Physical Characteristics

**Wiring:** I/O cable, 14 AWG (max.)
**Dimensions:** 61 x 157 x 115 mm (2.4 x 6.18 x 4.53 in)
**Weight:** Under 1265 g (2.79 lb)
**Mounting:** DIN rail (standard), wall (optional)

## Storage

**Expansion Slot:** Up to 32 GB microSD™ memory card (SDHC compatible)
Note: For units operating in extreme temperatures, industrial-grade, wide-temperature SD cards are required.

## Environmental Limits

**Operating Temperature:**
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -30 to 70°C (-22 to 158°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

## Standards and Certifications

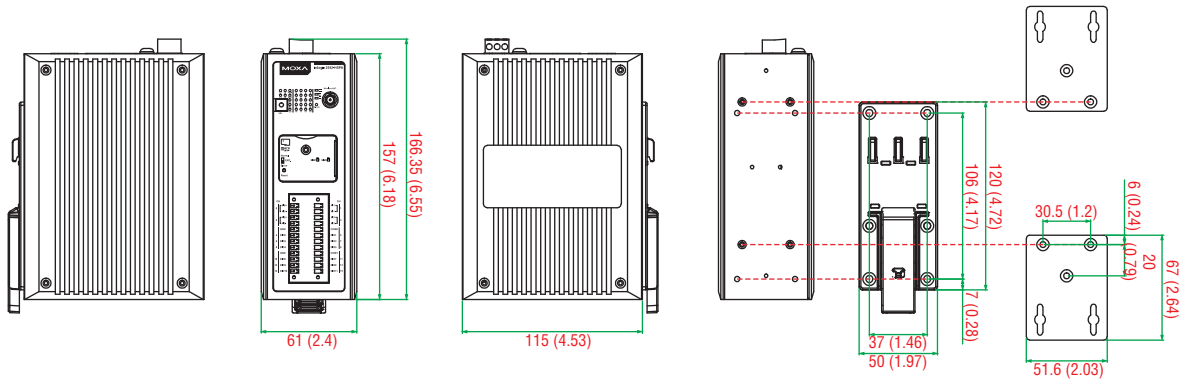
**Safety:** UL 508
**EMC:** EN 55022/24, EN 61000-6-2/6-4
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: Power 2 kV
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8
**Radio:** R&TTE: EN 62311, EN 300 328, EN 301 489-1, EN 301 489-17, EN 301 893; NCC; VCCI
**Hazardous Location:** Class 1 Division 2; ATEX Zone 2
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

## Warranty

**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

## Dimensions

Unit: mm (inch)




## Ordering Information

### Available Models

**ioLogik 2512-GPRS:** Smart GPRS remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -10 to 60°C operating temperature
**ioLogik 2512-GPRS-T:** Smart GPRS remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -30 to 70°C operating temperature
**ioLogik 2512-HSPA:** Smart HSPA remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -10 to 60°C operating temperature
**ioLogik 2512-HSPA-T:** Smart HSPA remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -30 to 70°C operating temperature
**ioLogik 2512-WL1:** Smart WLAN remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -10 to 60°C operating temperature
**ioLogik 2512-WL1-T:** Smart WLAN remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -30 to 70°C operating temperature
**ioLogik 2542-GPRS:** Smart GPRS remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -10 to 60°C operating temperature
**ioLogik 2542-GPRS-T:** Smart GPRS remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -30 to 70°C operating temperature
**ioLogik 2542-HSPA:** Smart HSPA remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -10 to 60°C operating temperature
**ioLogik 2542-HSPA-T:** Smart HSPA remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -30 to 70°C operating temperature
**ioLogik 2542-WL1:** Smart WLAN remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -10 to 60°C operating temperature
**ioLogik 2542-WL1-T:** Smart WLAN remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -30 to 70°C operating temperature

### Optional Accessories (can be purchased separately)

**WK-51-01:** DIN-rail/wall-mounting kit, 2 plates with 6 screws

### Package Checklist

- ioLogik 2500
- RJ45-to-DB9 connection cables x 2
- Documentation and software CD
- Antennas x 1
- Hardware installation guide

# ioLogik W5340-HSPA

## *Smart HSPA remote I/O with Click&Go Logic*

- Front-end intelligence with patented Click&Go control logic, up to 24 rules
- Using Active OPC Server software, SCADA systems can directly communicate with cellular devices hidden behind private IP addresses
- Active communication with Active OPC Server
- Automatically complement disconnection period data with DA-Center software
- Daisy chain up to 3 ioLogik E1200 units
- 3-in-1 RS-232/422/485 serial port for connecting to serial devices in the field
- Supports SNMPv1/v2c
- Simplify I/O management with MXIO library for Windows or Linux platforms
- Wide operating temperature range of -30 to 70°C (-22 to 158°F)

CLICK&GO LOGIC

RoHS c UL us LISTED CE FC

## Introduction

The ioLogik W5340-HSPA is a hardy, metal-encased remote I/O unit that combines an HSPA cellular modem, a remote I/O module, and a data logger for use in a wide variety of innovative I/O applications. The ioLogik W5340-HSPA also supports Moxa's patented Click&Go programming interface, giving engineers a powerful, simple tool that streamlines installation and setup into a nearly effortless process.

The ioLogik W5340-HSPA delivers local data logging in a storage space expandable up to 32 GB, and comes with Moxa's innovative, patented MX-AOPC UA Server or Active OPC Server software to transform network communications from centralized polling by the control system to event-based notifications that originate at the edge.

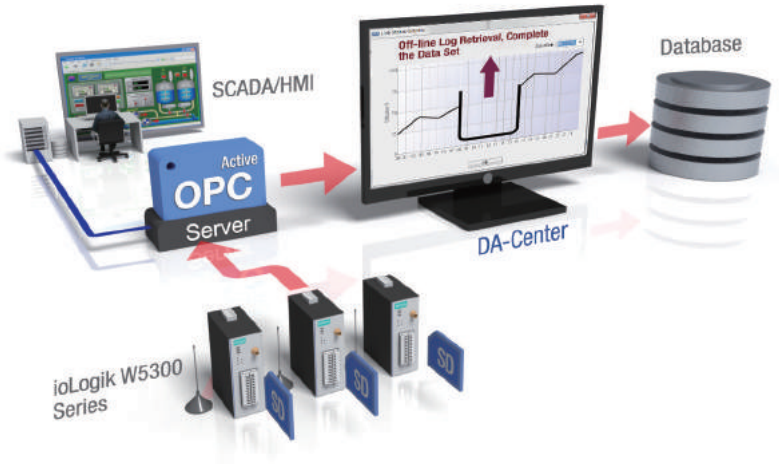
By eliminating constant polling, communications can be brought up to real-time speeds while reducing hardware costs and overall network overhead.

The ioLogik W5340-HSPA provides benefits beyond mere cellular connectivity and remote input/output management; it is an ideal solution for any number of industrial applications, including:

- Pipeline monitoring for water, oil, and gas facilities
- Pump station and lift station monitoring
- Environmental monitoring
- Security and surveillance

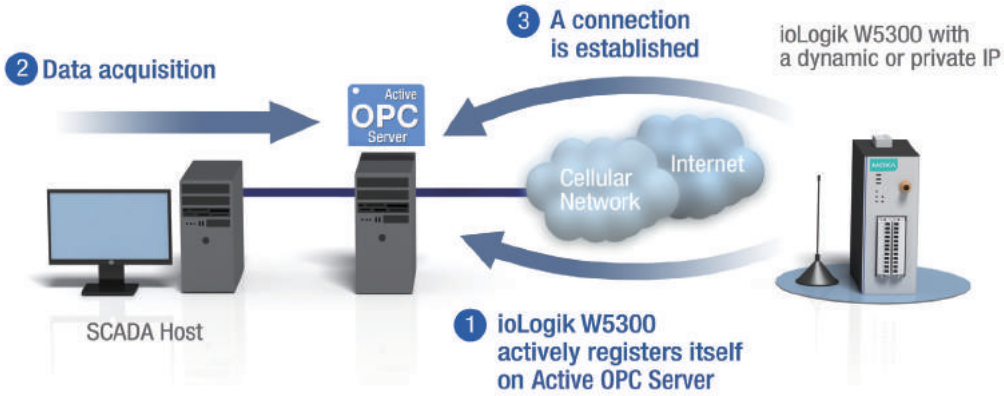
### Automatic Data Updates from SD Cards Following Network Failures

When Active OPC Server is used in combination with DA-Center, then following any network failure an ioLogik W5340-HSPA remote client will, upon reconnecting, restore to the central database any data that was accumulated during the downtime. Following a network failure, DA-Center will compare received data stored in the database with the historical data stored locally on the ioLogik W5340-HSPA. If there are any gaps in the database record, DA-Center will restore the missing data by requesting re-transmission from the remote ioLogik client.



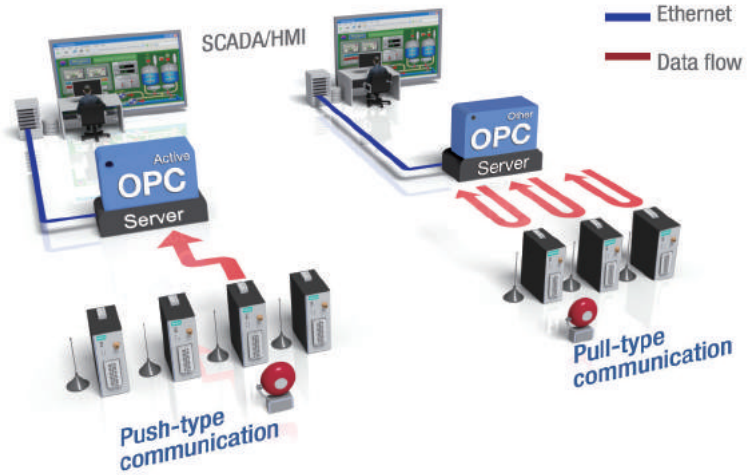
## Dynamic IP Assignments

For most cellular solutions, each remote modem is assigned a static public IP when it first associates with a network, and this often causes big headaches when automating devices over cellular connections. Cellular network carriers charge higher monthly fees for static, public IPs than they do for dynamic, private IPs. Moxa's ioLogik W5340-HSPA and patented Active OPC Server allow users to implement dynamic IP assignments for the ioLogik W5340-HSPA. The ioLogik W5340-HSPA can automatically establish communications with the ioLogik W5340-HSPA Server using a fixed IP, and the Active OPC Server will receive and register the ioLogik W5300's IP address and receive or record tag updates accordingly.



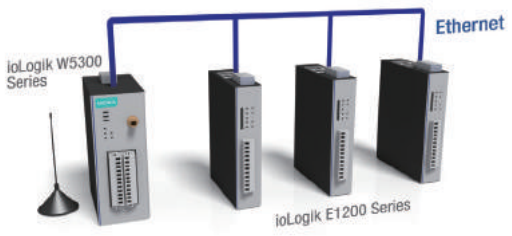

## Faster, More Accurate Serial Data Collection than Traditional Polling Architectures

The ioLogik W5340-HSPA is equipped with a 3-in-1 serial port that supports RS-232, RS-422, and RS-485, making it more convenient than ever (and saving users money) when connecting field serial devices. ioLogik W5340-HSPA remote I/O units can also create user-defined Modbus tags for conveniently ordering and storing data from remote meters and flow sensors, and then take the initiative to actively update the central MX-AOPC UA Server with the latest tagged data. This results in faster I/O response times and more accurate data collection. Finally, the ioLogik W5340-HSPA uses remote I/O methodology to build transparent serial tunnels for Modbus RTU communications over TCP/IP, allowing for direct connectivity between field devices and central control systems over either cellular wireless or wired Ethernet interfaces.




## I/O Expandability

The ioLogik W5340-HSPA comes with a single RJ45 Ethernet port so that it can be linked together with Moxa's ioLogik E1200 units in a daisy-chain network, giving engineers a simple, cost-effective means of extending their I/O capabilities with full peer-to-peer communications. The ioLogik W5340-HSPA can support up to three ioLogik E1200 series I/O devices, which can then be installed to whichever locations are most convenient and effective for the needs of the local station.



## Specifications

### LAN
**Ethernet:** 1 10/100 Mbps RJ45 port, with up to 3 ioLogik E1200 units daisy-chained
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, SNTP

### Serial
**Interface:** 1 RS-232/422/485 (software selectable) DB9 male or terminal block port
**Parity:** None, Odd, Even, Space, Mark
**Data Bits:** 5, 6, 7, 8
**Stop Bits:** 1, 2
**Flow Control:** None, Hardware, XON/XOFF
**Baudrate:** 300 to 115200 bps
**Protocols:** Modbus/RTU (master/gateway), serial tunnel mode (client/server)

### Inputs and Outputs
**Configurable DIOs (by software):** 8 channels
**Relays:** 2 channels
**Analog Inputs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 4 points per COM
**Counter Frequency:** 900 Hz
**Digital Filtering Time Interval:** Software configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 1 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 160°C (min.)
**Current Rating:** 200 mA per channel
**DIO Output Leakage Current:** 3.6 mA @ 24 VDC

### Relay
**Type:** Form A (N.O.) power relay
**Contact Current Rating:** Resistive Load: 1 A @ 30 VDC, 250 VAC, 110 VAC
**Initial Insulation Resistance:** 1000 micro-ohms (min.) @ 500 VDC
**Mechanical Endurance:** 5,000,000 operations
**Electrical Endurance:** 600,000 operations @ 1 A resistive load
**Contact Resistance:** 100 milli-ohms (max.)
**Pulse Output:** 0.3 Hz at rated load
Note: Ambient humidity must be non-condensing and remain between 5 and 95%. The relays of the ioLogik W5340-HSPA may malfunction when operating in high condensation environments below 0° Celsius.

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (software selectable)
**Input Range:** 0 to 10 V, ±10 V, ±5 V, 0 to 20 mA, 4 to 20 mA
**Accuracy:**
• ±0.1% FSR @ 25°C
• ±0.3% FSR @ -30 and 70°C
**Sampling Rate:**
All channels: 32 samples/sec
Per channel: 8 samples/sec
Single channel: 100 samples/sec
**Input Impedance:** 200k ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 196 mA @ 24 VDC

### Physical Characteristics
**Wiring:** I/O cable, 14 AWG (max.)
**Dimensions:** 46.8 x 135 x 105 mm (1.84 x 5.31 x 4.13 in)
**Weight:** 495 g (1.09 lb)
**Mounting:** DIN rail (standard), wall (optional)

### Storage
**Expansion Slot:** Up to 32 GB SD™ memory card (SD 2.0 compatible)
Note: For units operating in extreme temperatures, industrial-grade, wide temperature SD cards are required.

### Environmental Limits
**Operating Temperature:**
Standard Models: -10 to 55°C (14 to 131°F)
Wide Temp. Models: -30 to 70°C (-22 to 158°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

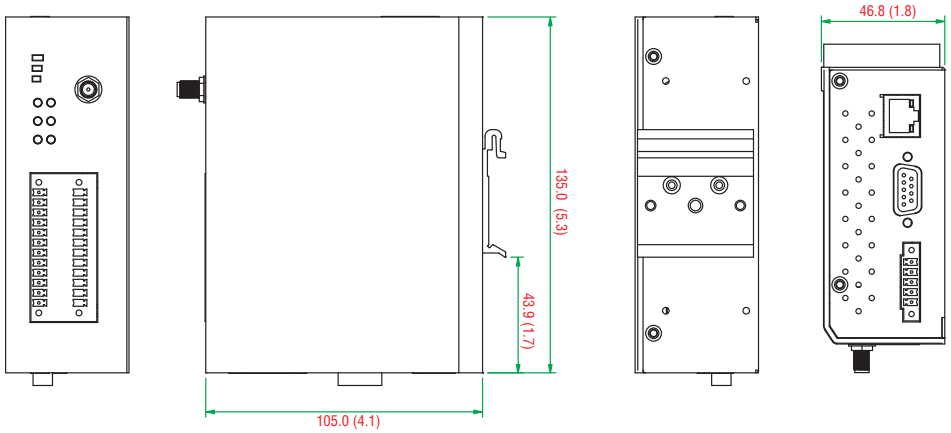
### Standards and Certifications
**Safety:** UL 508, EN 60950-1
**EMC:** EN 55022/24
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: Power: 2 kV
IEC 61000-4-6 CS: Signal: 3 V/m
IEC 61000-4-8 Magnetic Field: 1 A/m
**Radio:** R&TTE: EN 301 489-1, EN 301 489-7, EN 301 489-24, EN 301 511, EN 301 908-1; NCC
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

### MTBF (mean time between failures)
**Time:** 280,739 hrs
**Standard:** Telcordia SR332

### Warranty
**Warranty Period:** 2 years*
**Details:** See www.moxa.com/warranty
*Because of the limited lifetime of power relays, products that use that component are covered by a 2-year warranty.

## Dimensions

Unit: mm (inch)




## Ordering Information

### Available Models

**ioLogik W5340-HSPA:** Smart HSPA remote I/O with 8 DIOs, 2 relays, 4 AIs, -10 to 55°C operating temperature

**ioLogik W5340-HSPA-T:** Smart HSPA remote I/O with 8 DIOs, 2 relays, 4 AIs, -30 to 70°C operating temperature

### Optional Accessories (can be purchased separately)

**WK-46:** DIN-rail/wall-mounting kit, 2 plates with 6 screws

### Package Checklist

- ioLogik W5340-HSPA
- Five-band omnidirectional antenna for GSM/GPRS/UMTS/ HSPA/HSPA+, 4 dBi, magnetic SMA, 2.5 meters
- Documentation and software CD

# ioLogik 2500 Ethernet Series

## *Smart Ethernet remote I/O with Click&Go Plus Logic*

- Front-end intelligence with Click&Go Plus control logic, up to 48 rules
- Active communication with MX-AOPC UA Server
- Automatically complement disconnection period data with MX-AOPC UA Logger software
- 4-port unmanaged switch built in for linking to Ethernet devices
- I/O expansion port for daisy chaining up to 8 ioLogik E1200 units
- 3-in-1 RS-232/422/485 serial port for connecting to serial devices in the field
- Supports SNMPv1/v2c/v3
- Simplify I/O management with MXIO library for Windows or Linux platforms
- Wide operating temperature range of -40 to 75°C (-40 to 167°F)

CLICK&GO LOGIC

## Introduction

The ioLogik 2500 is a smart remote I/O product with unique hardware and software designs, making it an ideal solution for a variety of industrial data acquisition applications.

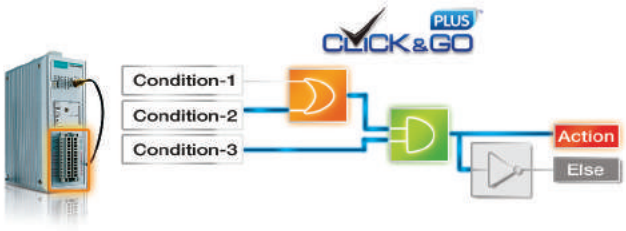
The ioLogik 2500's hardware design includes a 4-port unmanaged Ethernet switch and 2 serial ports, enabling the ioLogik 2500 to seamlessly connect to a variety of field devices. One of the Ethernet ports can be used to link to 8 daisy-chained ioLogik E1200 expansion modules to provide more than 100 channels. The ioLogik 2500 acts as the "head" unit, with Click&Go Plus logic used to control the entire I/O array. Most importantly, the ioLogik 2500's single IP is all that's required to connect the entire I/O array to your network, providing the perfect solution for industrial field sites that have an insufficient number of IP addresses.

### Powerful Control Logic from the New Click&Go Plus™

The new Click&Go Plus™ control logic now supports up to 48 rules with further upgrades to 8 conditions/actions. In addition, its graphical user interface provides 3 logic gates and 3 multi-layers, helping you build more powerful and efficient IO solutions.

Once you finish setting up your Click&Go Plus™ logic rules, IOxpress's easy-to-use simulation function can be used to find potential errors in your Click&Go Plus™ rules before uploading them to your online devices.

Peer-to-peer (P2P) mode is widely used for industrial applications. Traditionally, you would need to use P2P devices on both sides of the connection. However, if a configuration mismatch occurred between the P2P devices, the P2P connection would fail, after which you would need to spend extra time and effort to check the P2P settings. With IOxpress, all you need to do is set up the output device, and the P2P connection will be established automatically.



## One IP for Multiple Expansion I/Os Gives You a Smarter Data Acquisition Solution

The ioLogik 2500's unique IO expansion hardware design lets you link up to 8 ioLogik E1200 modules into a versatile I/O array with 100+ different I/O channels. The ioLogik 2500 acts as the perfect "head" unit, using Click&Go Plus logic to control the entire I/O array, and providing a single IP to connect the entire I/O array to your network.

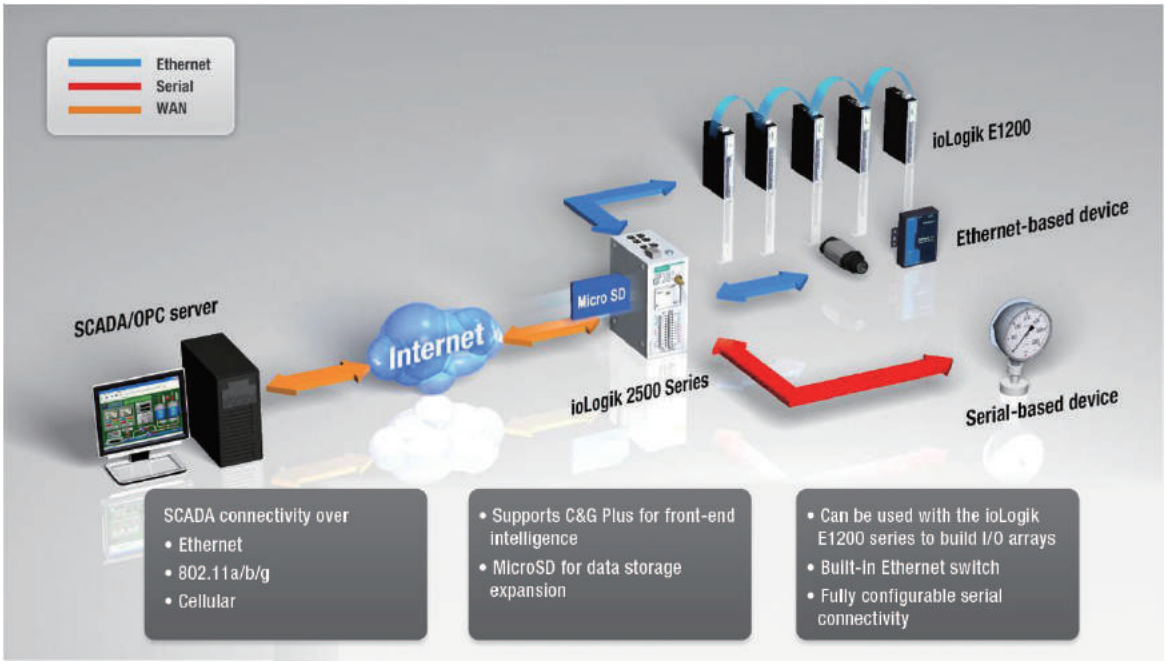
## Powerful Datalogger and Value-added MODBUS Gateway

The ioLogik 2500 Series supports micro SD cards with up to 32 GB of memory, turning the ioLogik into a powerful datalogger for storing valuable data. And with a built-in FTP server, important data from field sites can be accessed remotely by different systems. In addition, the 2 serial communication ports can be used to input data from devices using the Modbus RTU protocol, and then transform the data into Modbus TCP or AOPC tag format before sending it out over the Ethernet network.


## New MX-AOPC UA Server Efficiently Reduces System Response Time

The new MX-AOPC UA supports both UA server and DA server types. MX-AOPC UA server has a number of strengths. UA server provides a standard, state of the art security model, assuring your system's security, and supports communication channels via the standard UA TCP port. This means that messages can be relayed through third party proxies. In addition, configuring the firewall is be easier, since you won't need to worry about DCOM settings.

In addition, MX-AOPC supports both the traditional Modbus protocol and Moxa's patented Push type communication. Unlike the traditional passive "pull" method, "active" messages are automatically "pushed" from the ioLogik 2500 to the SCADA system when the I/O state changes or pre-configured events occur. In this way, information can be accurately and efficiently pushed to the SCADA system as it becomes available.



## ioLogik 2512 Specifications

### Inputs and Outputs
**Digital Inputs:** 8 channels
**Configurable DIOs (by software):** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP) and Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 8 points per COM
**Counter Frequency:** 2.5 kHz
**Digital Filtering Time Interval:** Software configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 5 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 1.5 A per channel @ 25°C
**Over-Temperature Shutdown:** 175°C (min.)
**Current Rating:** 500 mA per channel @ 25°C
**DIO Output Leakage Current:** < 1 mA @ 30 VDC

### Power Requirements
**Input Voltage:** 9 to 48 VDC
**Input Current:** 274 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 467,032 hrs
**Standard:** Telcordia SR332

## ioLogik 2542 Specifications

### Inputs and Outputs
**Configurable DIOs (by software):** 12 channels
**Analog Inputs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP) and Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 6 points per COM
**Counter Frequency:** 2.5 kHz
**Digital Filtering Time Interval:** Software configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 5 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 1.5 A per channel @ 25°C
**Over-Temperature Shutdown:** 175°C (min.)
**Current Rating:** 500 mA per channel @ 25°C
**DIO Output Leakage Current:** < 1 mA @ 30 VDC

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (software selectable)
**Input Range:** ±10 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)
**Accuracy:**
• ±0.1% FSR @ 25°C
• ±0.3% FSR @ -10 and 60°C
• ±0.5% FSR @ -30 and 70°C
**Sampling Rate:**
• All channels: 400 samples/sec
• Per channel: 100 samples/sec
**Input Impedance:** 1 mega-ohm (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Power Requirements
**Input Voltage:** 9 to 48 VDC
**Input Current:** 358 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 375,439 hrs
**Standard:** Telcordia SR332

## Common Specifications

### LAN
**Ethernet:**
• 4 switched 10/100 Mbps RJ45 ports
• 1 optimized port for faster downstream communications with daisy-chained ioLogik E1200 units
Note: The optimized daisy-chain port is not supported by the ioLogik E1261W-T, E1261H-T, or E1263H-T.
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, HTTP, CGI, SNTP, SMTP

### Serial
**Interface:** 2 RS-232/422/485 (software selectable) RJ45 ports
**Parity:** None, Odd, Even
**Data Bits:** 5, 6, 7, 8
**Stop Bits:** 1, 2
**Flow Control:** None, RTS/CTS, XON/XOFF
**Baudrate:** 300 to 115200 bps
**Protocols:** Modbus/RTU (master/gateway), serial tunnel mode (client/server)

### Physical Characteristics
**Wiring:** I/O cable max. 14 AWG
**Dimensions:** 61 x 157 x 115 mm (2.4 x 6.18 x 4.53 in)
**Weight:** Under 1265 g (2.79 lb)
**Mounting:** DIN-rail (standard), wall (with optional kit)

### Storage
**Expansion Slot:** Up to 32 GB microSD™ memory card (SDHC compatible)
Note: For units operating in extreme temperatures, industrial-grade, wide-temperature SD cards are required.

## Environmental Limits

**Operating Temperature:**
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

## Standards and Certifications

**Safety:** UL 508
**EMC:** EN 55022/24, EN 61000-6-2/6-4
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: Power: 1 kV
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8

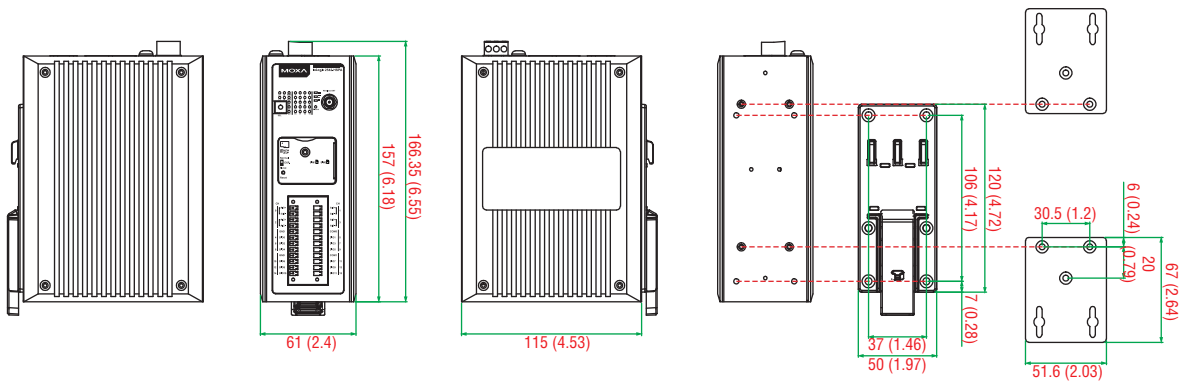
**Hazardous Location:** Class 1 Division 2; ATEX Zone 2
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

## Warranty

**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

## Dimensions

Unit: mm (inch)




# Ordering Information

## Available Models

**ioLogik 2512:** Smart Ethernet remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -10 to 60°C operating temperature
**ioLogik 2512-T:** Smart Ethernet remote I/O with Click&Go Plus, 8 DIs, 8 DIOs, -40 to 75°C operating temperature
**ioLogik 2542:** Smart Ethernet remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -10 to 60°C operating temperature
**ioLogik 2542-T:** Smart Ethernet remote I/O with Click&Go Plus, 12 DIOs, 4 AIs, -40 to 75°C operating temperature

## Optional Accessories (can be purchased separately)

**WK-51-01:** DIN-rail/wall-mounting kit, 2 plates with 6 screws

## Package Checklist

- ioLogik 2500
- RJ45-to-DB9 connection cables x 2
- Documentation and software CD
- Hardware installation guide

# ioLogik E2200 Series

## *Smart Ethernet remote I/O with Click&GO Logic*

- Front-end intelligence with patented Click&Go control logic, up to 24 rules
- Active communication with MX-AOPC UA Server
- Save time and wiring cost with peer-to-peer communication
- Supports SNMPv1/v2c/v3
- Friendly configuration via web browser
- Simplify I/O management with MXIO library for Windows or Linux platforms
- Wide operating temperature range of -40 to 75°C (-40 to 167°F)

CLICK&GO™ LOGIC

RoHS c UL us LISTED CE FC



## Introduction

Moxa's ioLogik E2200 Ethernet Remote I/O features the Click&Go programming interface. The ioLogik E2200 is a PC-based data acquisition and control device that uses proactive, event-based reporting to control I/O devices. Unlike traditional PLCs, which are passive and must poll for data, Moxa's ioLogik E2200 series will, when paired with our MX-AOPC UA Server, communicate with SCADA systems using active messaging that is pushed to the server only when state changes or configured events occur. Additionally, the ioLogik E2200 features SNMP for communications and control using an NMS (Network Management System), allowing IT professionals to configure the device to push I/O status reports according to configured specifications. This report-by-exception approach, which is new to PC-based monitoring, requires far less bandwidth than traditional polling methods.

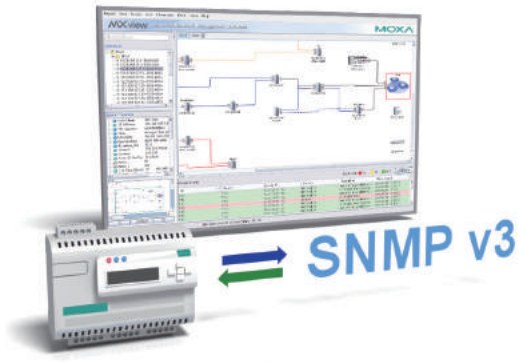
### PC-Free Alarm and Control Intelligence

The ioLogik E2200 supports simple and powerful Click&Go™ technology to configure event-driven reports and alarms delivered over email, TCP/UDP, or SNMP traps, giving you a powerful effective, tool for delivering time-stamped status updates in real time.

With built-in Click&Go™ intelligence, the ioLogik E2200 can be configured for simple outputs paired up with simple input triggers without the need for a PC controller. This allows the ioLogik E2200 to be configured to automatically report I/O events according to user-specified conditions.


### SNMP Protocol for Ethernet Device Management

In addition to Modbus/TCP, the ioLogik E2200 supports both SNMP and CGI scripting, giving IT engineers familiar tools for controlling and monitoring I/O systems. By using SNMP, IT engineers can configure the ioLogik E2200 to deliver alarms (traps) for specific I/O events, or use it to read or write directly to the I/O registers. For the strongest security, the ioLogik E2200 features SNMP v3, with authentication and encryption. With Moxa's SNMP-capable ioLogik E2200, even IT professionals can easily integrate industrial sensors and servos over an Ethernet backbone, and with its strong network management tools the ioLogik E2200 is ideal for a wide variety of industrial applications, whether in environmental monitoring, telecommunications, power production and delivery, or transportation.



## Push Technology for Events and Alarms

The ioLogik E2200 series is designed for use with the Moxa's MX-AOPC UA server. When used with MX-AOPC UA Server, the E2200 is upgraded to use active push communications when communicating state changes and/or events to the SCADA system. Unlike a polling system, when using a push architecture for communications with the SCADA messages will only be delivered when state changes or configured events occur. Active messaging thus allows for big increases in data acquisition and control throughput while also delivering big reductions in network overhead.




## ioLogik E2210 Specifications

### Inputs and Outputs
**Digital Inputs:** 12 channels
**Digital Outputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 12 points per COM
**Counter Frequency:** 900 Hz
**Digital Filtering Time Interval:** Software Configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 1 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (min.)
**Current Rating:** 200 mA per channel

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 190 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 213,673 hrs
**Database:** Telcordia SR332

## ioLogik E2212 Specifications

### Inputs and Outputs
**Digital Inputs:** 8 channels
**Digital Outputs:** 8 channels
**Configurable DIOs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP) and Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• OFF: 10 to 30 VDC
**Common Type:** 6 points per COM
**Counter Frequency:** 900 Hz
**Digital Filtering Time Interval:** Software Configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 1 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (min.)
**Current Rating:** 200 mA per channel

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 136 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 217,722 hrs
**Database:** Telcordia SR332

## ioLogik E2214 Specifications

### Inputs and Outputs
**Digital Inputs:** 6 channels
**Relay Outputs:** 6 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP) and Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 3 points per COM
**Counter Frequency:** 900 Hz
**Digital Filtering Time Interval:** Software Configurable

### Relay Output
**Type:** Form A (N.O.) power relay
**Contact Current Rating:**
• Inductive Load: 2 A @ 30 VDC, 250 VAC, 110 VAC
• Resistive Load: 5 A @ 30 VDC, 250 VAC, 110 VAC
**Minimum permitted load:** 1 A @ 5 VDC
**Initial Insulation Resistance:** 1000 mega-ohms (min.) @ 500 VDC
**Mechanical Endurance:** 1,000,000 operations
**Electrical Endurance:** 100,000 operations @ 5 A resistive load
**Contact Resistance:** 100 milli-ohms (max.)
**Pulse Output:** 0.3 Hz at rated load
Note: Ambient humidity must be non-condensing and remain between 5 and 95%. The relays of the ioLogik E2214 may malfunction when operating in high condensation environments below 0° Celsius.

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 170 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 307,239 hrs
**Database:** Telcordia SR332

## ioLogik E2240 Specifications

### Inputs and Outputs
**Analog Inputs:** 8 channels
**Analog Outputs:** 2 channels

### Analog Input
**Isolation:** 3k VDC or 2k Vrms
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage/Current (software selectable)
**Input Range:** ±150 mV, ±500 mV, ±5 V, ±10 V, 0 to 20 mA, 4 to 20 mA
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Sampling Rate:**
All channels:
• 10 samples/sec for voltage
• 6 samples/sec for current
Per channel:
• 1.25 samples/sec for voltage
• 0.75 samples/sec for current
Single channel:
• 1.25 samples/sec for voltage
• 0.75 samples/sec for current
**Input Impedance:** 900 kilo-ohms ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Analog Output
**Resolution:** 12 bits
**Output Range:** 0 to 10 V, 4 to 20 mA
**Drive Voltage:** 15 VDC for current output
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Load Resistor:** Less than 250 ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 190 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 155,941 hrs
**Standard:** Telcordia SR332

## ioLogik E2242 Specifications

### Inputs and Outputs
**Configurable DIOs (by software):** 12 channels
**Analog Inputs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP) and Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: Open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 6 points per COM
**Isolation:** 3k VDC or 2k Vrms
**Counter Frequency:** 900 Hz
**Digital Filtering Time Interval:** Software selectable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 1 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (min.)
**Current Rating:** 200 mA per channel

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (software selectable)
**Input Range:** ±150 mV, 0 to 150 mV, ±500 mV, 0 to 500 mV, ±5 V, 0 to 5 V, ±10 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA

**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Sampling Rate:**
All channels: 32 samples/sec
Per channel: 8 samples/sec
Single channel: 100 samples/sec
**Input Impedance:** 200 kilo-ohms ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 178 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 204,391 hrs
**Database:** Telcordia SR332

## ioLogik E2260 Specifications

### Inputs and Outputs
**Digital Outputs:** 4 channels
**RTDs:** 6 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 100 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C
**Current Rating:** 200 mA per channel

### RTD
**Sensor Type:** PT50, PT100, PT200, PT500, PT1000; JPT100, JPT200, JPT500, JPT1000; NI100, NI120, NI200, NI500, NI1000; Resistance of 310, 620, 1250, and 2200 ohms
**Input Connection:** 2- or 3-wire
**Sampling Rate:**
All channels: 12 samples/sec
Per channel: 2 samples/sec
**Resolution:** 0.1°C or 0.1 ohm
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Input Impedance:** 625 kilo-ohms ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 95 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 327,282 hrs
**Standard:** Telcordia SR332

## ioLogik E2262 Specifications

### Inputs and Outputs
**Digital Outputs:** 4 channels
**Thermocouples:** 8 channels

### Digital Output
**Isolation:** 3k VDC or 2k Vrms
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 100 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C
**Current Rating:** 200 mA per channel

### Thermocouple
**Sensor Type:** J (0 to 750°C), K (-200 to 1250°C), T (-200 to 350°C), E (-200 to 900°C), R (-50 to 1600°C), S (-50 to 1760°C), B (600 to 1700°C), N (-200 to 1300°C)
**Millivolt Type:**
• Mode: ±78.126 mV, ±39.062 mV, ±19.532 mV
• Fault and over-voltage protection: -35 to +35 VDC (power off); -25 to +30 VDC (power on)
**Sampling Rate:**
All channels: 12 samples/sec
Per channel: 1.5 samples/sec
**Resolution:** 16 bits
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Input Impedance:** 1 mega-ohm ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 160 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 341,063 hrs
**Database:** Telcordia SR332

## Common Specifications

### LAN
**Ethernet:** 1 10/100 Mbps RJ45 port
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, HTTP, CGI, SNTP, SMTP

### Serial
**Interface:** 1 RS-485-2w terminal block port
**Parity:** None
**Data Bits:** 8
**Stop Bits:** 1
**Flow Control:** None
**Baudrate:** 1200 to 115200 bps
**Protocols:** Modbus RTU (gateway)

### Physical Characteristics
**Wiring:** I/O cable max. 14 AWG
**Dimensions:** 115 x 79 x 45.6 mm (4.53 x 3.11 x 1.80 in)
**Weight:** under 250 g (0.55 lb)
**Mounting:** DIN-rail or wall

## Environmental Limits

**Operating Temperature:**
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

## Standards and Certifications

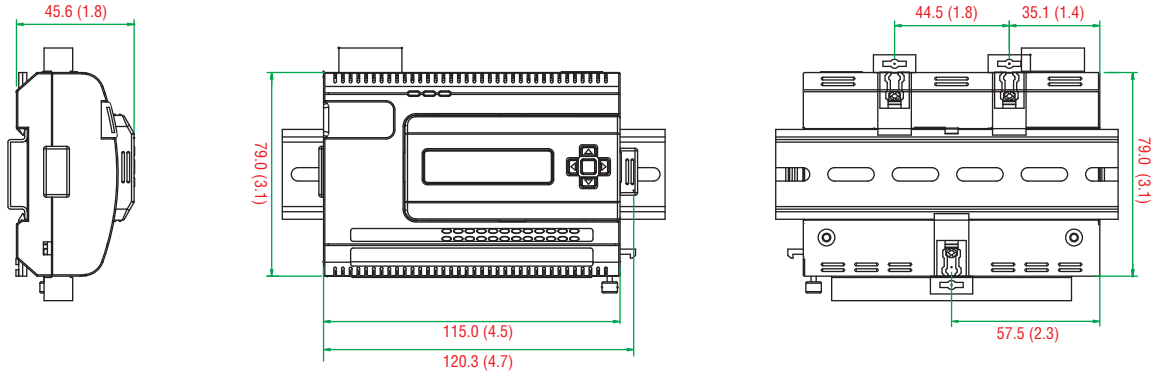
**Safety:** UL 508
**EMC:** EN 61000-6-2/6-4
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS:
80 MHz to 1 GHz: 10 V/m
1.4 GHz to 2 GHz: 3 V/m
2 GHz to 2.7 GHz: 1 V/m
IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV
IEC 61000-4-5 Surge: Power: 1 kV
IEC 61000-4-6 CS: 10 V
IEC 61000-4-8
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

## Warranty

**Warranty Period:** 5 years (excluding ioLogik E2214*)
**Details:** See www.moxa.com/warranty
*Because of the limited lifetime of power relays, products that use that component are covered by a 2-year warranty.

## Dimensions

Unit: mm (inch)




Side View | Front View | Rear View

# Ordering Information

## Available Models

**ioLogik E2210:** Smart Ethernet Remote I/O with 12 DIs, 8 DOs, -10 to 60°C operating temperature
**ioLogik E2210-T:** Smart Ethernet Remote I/O with 12 DIs, 8 DOs, -40 to 75°C operating temperature
**ioLogik E2212:** Smart Ethernet Remote I/O with 8 DIs, 8 DOs, 4 DIOs, -10 to 60°C operating temperature
**ioLogik E2212-T:** Smart Ethernet Remote I/O with 8 DIs, 8 DOs, 4 DIOs, -40 to 75°C operating temperature
**ioLogik E2214:** Smart Ethernet Remote I/O with 6 DIs, 6 relays, -10 to 60°C operating temperature
**ioLogik E2214-T:** Smart Ethernet Remote I/O with 6 DIs, 6 relays, -40 to 75°C operating temperature
**ioLogik E2240:** Smart Ethernet Remote I/O with 8 AIs, 2 AOs, -10 to 60°C operating temperature
**ioLogik E2240-T:** Smart Ethernet Remote I/O with 8 AIs, 2 AOs, -40 to 75°C operating temperature
**ioLogik E2242:** Smart Ethernet Remote I/O with 12 DIOs, 4 AIs, -10 to 60°C operating temperature
**ioLogik E2242-T:** Smart Ethernet Remote I/O with 12 DIOs, 4 AIs, -40 to 75°C operating temperature
**ioLogik E2260:** Smart Ethernet Remote I/O with 4 DOs, 6 RTDs, -10 to 60°C operating temperature
**ioLogik E2260-T:** Smart Ethernet Remote I/O with 4 DOs, 6 RTDs, -40 to 75°C operating temperature
**ioLogik E2262:** Smart Ethernet Remote I/O with 4 DOs, 8 TCs, and -10 to 60°C operating temperature
**ioLogik E2262-T:** Smart Ethernet Remote I/O with 4 DOs, 8 TCs, and -40 to 75°C operating temperature

## Optional Accessories (can be purchased separately)

**LDP1602:** LCD module with 16 x 2 text and 5 buttons, 0 to 55°C operating temperature

## Package Checklist

- ioLogik E2200
- Documentation and software CD

# Remote I/O


## Product Selection Guide

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## Ethernet I/O

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## RS-485 I/O

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## Modular I/O

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# Ethernet I/O

| | ioLogik E1210 | ioLogik E1211 | ioLogik E1212 | ioLogik E1214 | ioLogik E1213** | ioLogik E1240 | ioLogik E1241 | ioLogik E1242 | ioLogik E1260 | ioLogik E1262 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Input/Output** | | | | | | | | | | |
| Digital Inputs | 16 | – | 8 | 6 | 4 | – | – | 4 | – | – |
| Digital Outputs | – | 16 | – | – | 4 | – | – | – | – | – |
| Relays | – | – | – | 6 | – | – | – | – | – | – |
| Configurable DIOs | – | – | 8 | – | 4 | – | – | 4 | – | – |
| Analog Inputs | – | – | – | – | – | 8 | – | 4 | – | – |
| Analog Outputs | – | – | – | – | – | – | 4 | – | – | – |
| RTDs | – | – | – | – | – | – | – | – | 6 | – |
| Thermocouples | – | – | – | – | – | – | – | – | – | 8 |
| **Ethernet** | | | | | | | | | | |
| Ports (Connector) | 2 (RJ45) | | | | | | | | | |
| Speed | 10/100 Mbps | | | | | | | | | |
| Switch (Daisy Chain) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Protocols | Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, HTTP, SNMP | | | | | | | | | |
| **Environmental Limits** | | | | | | | | | | |
| Standard Models | -10 to 60°C (14 to 140°F) | | | | | | | | | |
| Wide Temp. Models | -40 to 75°C (-40 to 167°F) | | | | | | | | | |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | | | | | | | |
| Operating Humidity | 5 to 95% RH (non-condensing) | | | | | | | | | |
| **Software** | | | | | | | | | | |
| Active OPC Server | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MX-AOPC UA Server | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MXIO | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ioSearch | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Peer-to-Peer | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | – | – |
| **Standards and Certifications** | | | | | | | | | | |
| Safety | UL 508 | | | | | | | | | |
| EMC | EN 55022, EN 55024 | | | | | | | | | |
| EMI | CISPR 22, FCC Part 15B Class A | | | | | | | | | |
| EMS | EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-4-8 | | | | | | | | | |
| Shock | IEC 60068-2-27 | | | | | | | | | |
| Vibration | IEC 60068-2-6 | | | | | | | | | |
| Hazardous Locations | Class 1 Division 2; ATEX Zone 2 | | | | | | | | | |
| Green Product | RoHS, CRoHS, WEEE | | | | | | | | | |
| **Reliability** | | | | | | | | | | |
| Warranty | 5 years | 5 years | 5 years | 2 years* | 5 years | 5 years | 5 years | 5 years | 5 years | 5 years |

*Because of the limited lifetime of power relays, products using that component are covered by a 2-year warranty.

**DO of ioLogik E1213 is source type

# Ethernet I/O





| | ioLogik E1261W-T | ioLogik E1263H-T | ioLogik E1261H-T | ioLogik E1510-M12-T | ioLogik E1512-M12-T |
|---|---|---|---|---|---|
| **Input/Output** | | | | | |
| Digital Inputs | – | – | – | 12 | 4 |
| Configurable DIOs | 12 | 24 | 12 | – | 4 |
| Analog Inputs | 5 | 10 | 5 | – | – |
| RTDs | 3 | 3 | 3 | – | – |
| **Ethernet** | | | | | |
| Ports (Connector) | 1 (RJ45) | 2 (RJ45) | | 1 (M12) | |
| Speed | 10/100 Mbps | | | | |
| Switch (Daisy Chain) | – | ✓ | ✓ | – | – |
| Protocols | Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, HTTP | | | | |
| **Environmental Limits** | | | | | |
| Operating Temperature | -40 to 75°C (-40 to 167°F) | | | -40 to 85°C (-40 to 185°F) | |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | | |
| Operating Humidity | 5 to 95% RH (non-condensing) | | | | |
| **Software** | | | | | |
| Active OPC Server | ✓ | ✓ | ✓ | ✓ | ✓ |
| MX-AOPC UA Server | ✓ | ✓ | ✓ | ✓ | ✓ |
| MXIO | ✓ | ✓ | ✓ | ✓ | ✓ |
| ioSearch | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Standards and Certifications** | | | | | |
| Safety | UL 508 | | | | |
| EMC | EN 55022, EN 55024 | | | EN 61000-6-2, EN 61000-6-4 | |
| EMI | CISPR 22, FCC Part 15B Class A | | | | |
| EMS | EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-4-8 | | | | |
| Shock | IEC 60068-2-27 | | | | |
| Vibration | IEC 60068-2-6 | | | | |
| Rail Traffic | – | – | – | EN 50155; EN 50121-3-2; EN 50121-4 | |
| Marine Communications | – | IEC 60945 | | – | – |
| Green Product | RoHS, CRoHS, WEEE | | | | |
| **Reliability** | | | | | |
| Warranty | 5 years | | | | |

# RS-485 I/O

| | ioLogik R1210 | ioLogik R1212 | ioLogik R1214 | ioLogik R1240 | ioLogik R1241 |
|---|---|---|---|---|---|
| **Input/Output** | | | | | |
| Digital Inputs | 16 | 8 | 6 | – | – |
| Relays | – | – | 6 | – | – |
| Configurable DIOs | – | 8 | – | – | – |
| Analog Inputs | – | – | – | 8 | – |
| Analog Outputs | – | – | – | – | 4 |
| **Serial** | | | | | |
| Ports (Connector) | 2 (5-wire Euroblock terminal) | | | | |
| Interface | Dual RS-485 | | | | |
| Protocols | Modbus/RTU (slave) | | | | |
| **Environmental Limits** | | | | | |
| Standard Models | -10 to 75°C (14 to 167°F) | | | | |
| Wide Temp. Models | -40 to 85°C (-40 to 185°F) | | | | |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | | |
| Operating Humidity | 5 to 95% RH (non-condensing) | | | | |
| **Software** | | | | | |
| MXIO | ✓ | ✓ | ✓ | ✓ | ✓ |
| ioSearch | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Standards and Certifications** | | | | | |
| Safety | UL 508 | | | | |
| EMC | EN 55022, EN 55024 | | | | |
| EMI | CISPR 22, FCC Part 15B Class A | | | | |
| EMS | EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-4-8 | | | | |
| Shock | IEC 60068-2-27 | | | | |
| Vibration | IEC 60068-2-6 | | | | |
| Green Product | RoHS, CRoHS, WEEE | | | | |
| **Reliability** | | | | | |
| Warranty | 5 years | 5 years | 2 years* | 5 years | 5 years |

*Because of the limited lifetime of power relays, products using that component are covered by a 2-year warranty.

# Modular I/O




| | NA-4010 | NA-4020 | NA-4021 | ioLogik E4200 |
|---|---|---|---|---|
| **Inputs/Outputs** | | | | |
| Digital Inputs | – | – | – | – |
| Digital Outputs | – | – | – | – |
| Analog Inputs | – | – | – | – |
| Analog Outputs | – | – | – | – |
| **Ethernet** | | | | |
| Ports (connector) | 1 (RJ45) | – | – | 2 MACs (RJ45) |
| Speed | 10/100 Mbps | – | – | 10/100 Mbps |
| Protocols | Modbus/TCP (slave), BOOTP, HTTP | – | – | Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, HTTP, SNTP |
| **Serial** | | | | |
| Ports (connector) | – | 1 (terminal block) | 1 (DB9 female) | 1 (DB9 male) |
| Interface | – | RS-485 | RS-232 | RS-232 |
| Protocols | – | Modbus/RTU (slave), Modbus/ASCII (slave) | | For Moxa OnCell only |
| **Physical Characteristics** | | | | |
| I/O Module Slots | 32 | 32 | 32 | 16 |
| **Environmental Limits** | | | | |
| Operating Temperature | -10 to 60°C (14 to 140°F) | | | |
| Storage Temperature | -40 to 85°C (-40 to 185°F) | | | |
| Ambient Relative Humidity | 5 to 95% RH (non-condensing) | | | |
| **Software** | | | | |
| Click&Go | – | – | – | ✓ |
| Active OPC Server | – | – | – | ✓ |
| MXIO | ✓ | ✓ | ✓ | ✓ |
| ioAdmin | ✓ | ✓ | ✓ | – |
| Modular ioAdmin | – | – | – | ✓ |
| **Standards and Certifications** | | | | |
| Safety | UL 508 | | | |
| EMC | EN 61000-6-2, EN 61000-6-4 | | | |
| EMI | CISPR 22, FCC Part 15B Class A | | | |
| EMS | EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-4-8 | | | |
| Shock | IEC 60068-2-27 | | | |
| Vibration | IEC 60068-2-6 | | | |
| **Reliability** | | | | |
| Warranty | 2 years | 2 years | 2 years | 2 years |

# Digital I/O Modules

| | M-1450 | M-1451 | M-1600 | M-1601 | M-1800 | M-1801 | M-2450 | M-2600 | M-2601 | M-2800 | M-2801 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inputs/Outputs | | | | | | | | | | | |
| Digital Inputs | 4 (110 VAC) | 4 (220 VAC) | 16 (Sink) | 16 (Source) | 8 (Sink) | 8 (Source) | – | – | – | – | – |
| Digital Outputs | – | – | – | – | – | – | – | 16 (Sink) | 16 (Source) | 8 (Sink) | 8 (Source) |
| Relays | – | – | – | – | – | – | 4 | – | – | – | – |
| Warranty | 2 years | | | | | | | | | | |

# Analog I/O Modules

| | M-3802 | M-3810 | M-4402 | M-4410 | M-6200 | M-6201 |
|---|---|---|---|---|---|---|
| Inputs/Outputs | | | | | | |
| Analog Inputs | 8 (4 to 20 mA) | 8 (00 to 10 V) | – | – | – | – |
| Analog Outputs | – | – | 4 (4 to 20 mA) | 4 (0 to 10 V) | – | – |
| RTDs | – | – | – | – | 2 | – |
| Thermocouples | – | – | – | – | – | 2 |
| Warranty | 2 years | | | | | |

# Power Modules

| | M-7001 | M-7002 | M-7804 | M-7805 |
|---|---|---|---|---|
| Power | | | | |
| VDC | 24 | 5/24/48 | 0 | 24 |
| VAC | – | 110/220 | – | – |
| Purpose | System | Field | Field | Field |
| Warranty | 2 years | | | |

# ioLogik E1200 Series

## *Ethernet remote I/O with 2-port Ethernet switch*

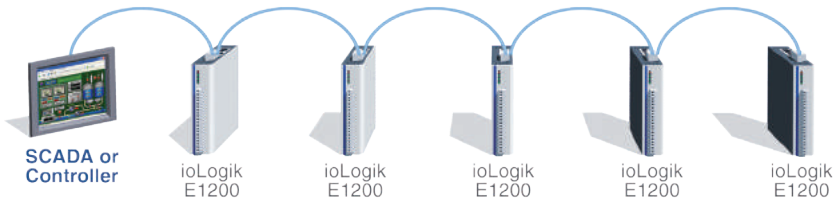
- User-definable Modbus/TCP Slave addressing
- 2-port Ethernet switch for daisy-chain topologies
- Save time and wiring cost with peer-to-peer communications
- Active communications with MX-AOPC UA Server
- Supports SNMPv1/v2c
- Easy mass deployment and configuration with ioSearch utility
- Friendly configuration via web browser
- Simplify I/O management with MXIO library on either a Windows or Linux platform
- Class I Division 2, ATEX Zone 2 certification
- Wide operating temperature range: -40 to 75°C (-40 to 167°F)



## Introduction

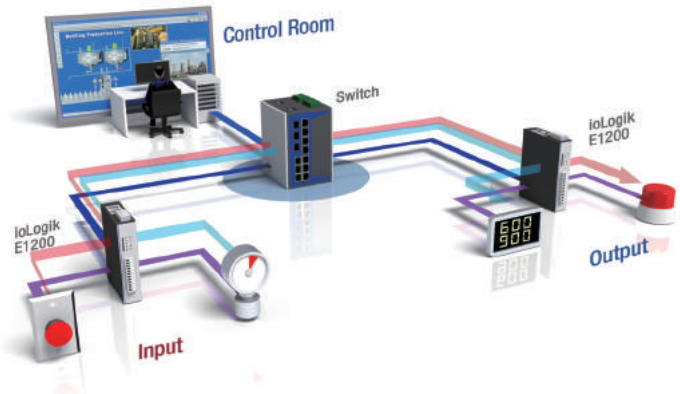
### Daisy-Chained Ethernet I/O Connection

A new era of extensible Ethernet I/O arrays is here. The ioLogik E1200 industrial Ethernet remote I/O comes with two switched Ethernet ports to allow for the free flow of information downstream, to another local Ethernet device, or upstream, to a control server. Applications such as factory automation, security and surveillance systems, and tunnelled connections can make use of daisy-chained Ethernet for building multidrop I/O networks over standard Ethernet cables. Many industrial automation users are familiar with multidrop as the configuration most typically used in fieldbus solutions. The daisy-chain capabilities supported by ioLogik E1200 Ethernet remote I/O units not only increase the extensibility and installation possibilities for your remote I/O applications, but also lower overall costs by reducing the need for separate Ethernet switches. Daisy-chaining devices in this way will also reduce overall labor and cabling expenses. For example, if a production facility contains 700 stations with 20 I/O points per station, the savings on wiring costs can reach as much as 15% of the total expense.




### Saving Time and Wiring Costs with Peer-to-Peer Communications

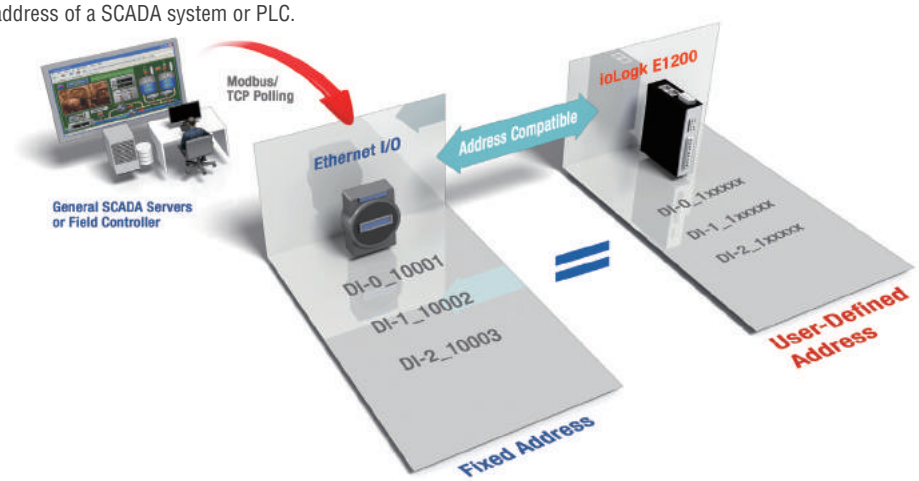
In remote automation applications, the control room and sensors are often far removed, making wiring over long distances a constant challenge. With peer-to-peer networking, users may now map a pair of ioLogik E1200 series modules so that input values will be directly transferred to output channels, greatly simplifying the wiring process and reducing wiring costs.



## User-Definable Modbus/TCP Addressing for Painless Upgrading of Existing Systems

For Modbus devices that are controlled and detected by fixed addresses, users need to spend a vast amount of time researching and verifying initial configurations. Users need to locate each device's networking details, such as I/O channels or vendor-defined addresses, to enable the initial or start address of a SCADA system or PLC.

The ioLogik E1200, with user-definable Modbus/TCP addressing, offers greater flexibility, and setup is easy. Instead of worrying about individual devices, users simply configure the function and address map to fit their needs.




## ioLogik E1210 Specifications

### Inputs and Outputs

**Digital Inputs:** 16 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 8 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software configurable

### Power Requirements

**Input Voltage:** 12 to 36 VDC
**Input Current:** 110 mA @ 24 VDC

### MTBF (mean time between failures)

**Time:** 671,345 hrs
**Standard:** Telcordia SR332

## ioLogik E1211 Specifications

### Inputs and Outputs

**Digital Outputs:** 16 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Output

**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### Power Requirements

**Input Voltage:** 12 to 36 VDC
**Input Current:** 200 mA @ 24 VDC

### MTBF (mean time between failures)

**Time:** 923,027 hrs
**Standard:** Telcordia SR332

## ioLogik E1212 Specifications

### Inputs and Outputs

**Digital Inputs:** 8 channels
**Configurable DIOs (by jumper):** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 8 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software Configurable

### Digital Output

**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### Power Requirements

**Input Voltage:** 12 to 36 VDC
**Input Current:** 155 mA @ 24 VDC

### MTBF (mean time between failures)

**Time:** 561,930 hrs
**Standard:** Telcordia SR332

## ioLogik E1213 Specifications

### Inputs and Outputs
**Digital Inputs:** 8 channels
**Digital Outputs:** 4 channels
**Configurable DIOs (by jumper):** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 12 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software configurable

### Digital Output
**Type:** Source
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 41 VDC
**Over-current Protection:** 1.5 A per channel @ 25°C
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 500 mA per channel

### Power Requirements
**Output Voltage Rating:** 15 to 30 VDC (12 or 9 VDC configurable by jumper on the 4 DO channels)
**Input Voltage:** 12 to 36 VDC
**Input Current:** 130 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 715,256 hrs
**Standard:** Telcordia SR332

## ioLogik E1214 Specifications

### Inputs and Outputs
**Digital Inputs:** 6 channels
**Relays:** 6 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 6 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software configurable

### Relay
**Type:** Form A (N.O.) power relay
**Contact Current Rating:**
Resistive Load: 5 A @ 30 VDC, 250 VAC, 110 VAC
**Breakdown Voltage:** 500 VAC
**Relay On/Off Time:** 1500 ms (max.)
**Initial Insulation Resistance:** 1000 mega-ohms (min.) @ 500 VDC
**Mechanical Endurance:** 5,000,000 operations
**Electrical Endurance:** 100,000 operations @ 5 A resistive load
**Contact Resistance:** 100 milli-ohms (max.)
**Pulse Output:** 0.3 Hz at rated load
Note: Ambient humidity must be non-condensing and remain between 5 and 95%. The relays of the ioLogik E1214 may malfunction when operating in high condensation environments below 0°C.

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 188 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 808,744 hrs
**Standard:** Telcordia SR332

## ioLogik E1240 Specifications

### Inputs and Outputs
**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (jumper selectable)
**Input Range:** 0 to 10 VDC, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 1.5 samples/sec
• Only one channel enabled: 12 samples/sec
**Input Impedance:** 10 mega-ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 121 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 474,053 hrs
**Standard:** Telcordia SR332

## ioLogik E1241 Specifications

### Inputs and Outputs
**Analog Outputs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Output
**Resolution:** 12 bits
**Output Range:** 0 to 10 VDC, 4 to 20 mA
**Drive Voltage:** 10 mA (max.)
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Load Resistor:** Internal register, 400 ohms
Note: 24 V of external power required when loading exceeds 1000 ohms.

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 194 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 888,656 hrs
**Standard:** Telcordia SR332

## ioLogik E1242 Specifications

### Inputs and Outputs
**Digital Inputs:** 4 channels
**Configurable DIOs (by jumper):** 4 channels
**Analog Inputs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 4 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software Configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (jumper selectable)
**Input Range:** 0 to 10 VDC, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 3 samples/sec
• Only one channel enabled: 12 samples/sec
**Input Impedance:** 10 mega-ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 139 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 502,210 hrs
**Standard:** Telcordia SR332

## ioLogik E1260 Specifications

### Inputs and Outputs
**RTDs:** 6 channels
**Isolation:** 3k VDC or 2k Vrms

### RTD
**Sensor Type:**
• PT50, PT100, PT200, PT500 (-200 to 850°C)
• PT1000 (-200 to 350°C)
• Resistance of 310, 620, 1250, and 2200 ohms
**Input Connection:** 2- or 3-wire
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 2 samples/sec
• Only one channel enabled: 12 samples/sec
**Resolution:** 0.1°C or 0.1 ohm
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Input Impedance:** 625 kilo-ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 110 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 660,260 hrs
**Standard:** Telcordia SR332

## ioLogik E1262 Specifications

### Inputs and Outputs
**Thermocouples:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Thermocouple
**Sensor Type:** J (0 to 750°C), K (-200 to 1250°C), T (-200 to 350°C), E (-200 to 900°C), R (-50 to 1600°C), S (-50 to 1760°C), B (600 to 1700°C), N (-200 to 1300°C)
**Millivolt Type:**
• Mode: ±78.126 mV, ±39.062 mV, ±19.532 mV
• Fault and over-voltage protection:
-35 to +35 VDC (power off)
-25 to +30 VDC (power on)
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 1.5 samples/sec
• Only one channel enabled: 12 samples/sec
**Resolution:** 16 bits
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Input Impedance:** 10 mega-ohms

### Power Requirements
**Input Voltage:** 12 to 36 VDC
**Input Current:** 118 mA @ 24 VDC

### MTBF (mean time between failures)
**Time:** 631,418 hrs
**Standard:** Telcordia SR332

## Common Specifications

### LAN
**Ethernet:** 2 switched 10/100 Mbps RJ45 ports
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, HTTP

### Physical Characteristics
**Wiring:** I/O cable max. 14 AWG
**Dimensions:** 27.8 x 124 x 84 mm (1.09 x 4.88 x 3.31 in)
**Weight:** Under 200 g (0.44 lb)
**Mounting:** DIN rail or wall

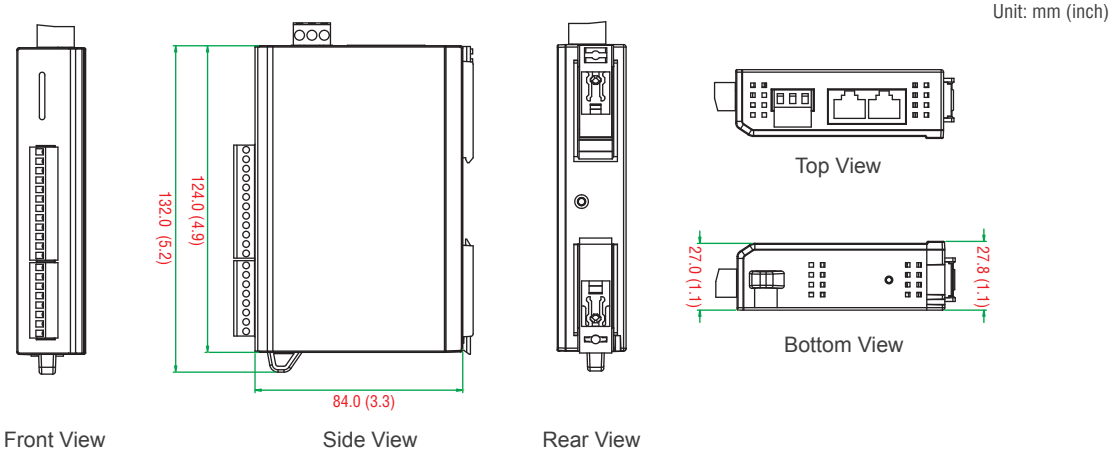
### Environmental Limits
**Operating Temperature:**
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

### Standards and Certifications
**Safety:** UL 508
**EMC:** EN 55022, EN 55024
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m
IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV
IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV
IEC 61000-4-6 CS: 10 V
IEC 61000-4-8
**Hazardous Location:** Class 1 Division 2, ATEX Zone 2
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

### Warranty
**Warranty Period:** 5 years (excluding the ioLogik E1214)
**Details:** See www.moxa.com/warranty
Note: Because of the limited lifetime of power relays, products that use this component are covered by a 2-year warranty.

### Dimensions

Unit: mm (inch)




## Ordering Information

### Available Models
**ioLogik E1210:** Ethernet remote I/O with 2-port Ethernet switch, 16 DIs, -10 to 60°C operating temperature
**ioLogik E1210-T:** Ethernet remote I/O with 2-port Ethernet switch, 16 DIs, -40 to 75°C operating temperature
**ioLogik E1211:** Ethernet remote I/O with 2-port Ethernet switch, 16 DOs, -10 to 60°C operating temperature
**ioLogik E1211-T:** Ethernet remote I/O with 2-port Ethernet switch, 16 DOs, -40 to 75°C operating temperature
**ioLogik E1212:** Ethernet remote I/O with 2-port Ethernet switch, 8 DIs, 8 DIOs, -10 to 60°C operating temperature
**ioLogik E1212-T:** Ethernet remote I/O with 2-port Ethernet switch, 8 DIs, 8 DIOs, -40 to 75°C operating temperature
**ioLogik E1213:** Ethernet remote I/O with 2-port Ethernet switch, 8 DIs, 4 DOs, 4 DIOs, source-type DO, -10 to 60°C operating temperature
**ioLogik E1213-T:** Ethernet remote I/O with 2-port ethernet switch, 8 DIs, 4 DOs, 4 DIOs, source-type DO, -40 to 75°C operating temperature
**ioLogik E1214:** Ethernet remote I/O with 2-port Ethernet switch, 6 DIs, 6 relays, -10 to 60°C operating temperature
**ioLogik E1214-T:** Ethernet remote I/O with 2-port Ethernet switch, 6 DIs, 6 relays, -40 to 75°C operating temperature
**ioLogik E1240:** Ethernet remote I/O with 2-port Ethernet switch, 8 AIs, -10 to 60°C operating temperature
**ioLogik E1240-T:** Ethernet remote I/O with 2-port Ethernet switch, 8 AIs, -40 to 75°C operating temperature
**ioLogik E1241:** Ethernet remote I/O with 2-port Ethernet switch, 4 AOs, -10 to 60°C operating temperature
**ioLogik E1241-T:** Ethernet remote I/O with 2-port Ethernet switch, 4 AOs , -40 to 75°C operating temperature
**ioLogik E1242:** Ethernet remote I/O with 2-port Ethernet switch, 4 DIs, 4 DIOs, 4 AIs, -10 to 60°C operating temperature
**ioLogik E1242-T:** Ethernet remote I/O with 2-port Ethernet switch, 4 DIs, 4 DIOs, 4 AIs, -40 to 75°C operating temperature
**ioLogik E1260:** Ethernet remote I/O with 2-port Ethernet switch, 6 RTDs, -10 to 60°C operating temperature
**ioLogik E1260-T:** Ethernet remote I/O with 2-port Ethernet switch, 6 RTDs, -40 to 75°C operating temperature
**ioLogik E1262:** Ethernet remote I/O with 2-port Ethernet switch, 8 TCs, -10 to 60°C operating temperature
**ioLogik E1262-T:** Ethernet remote I/O with 2-port Ethernet switch, 8 TCs, -40 to 75°C operating temperature

### Package Checklist
- ioLogik E1200
- Documentation and software CD
- Quick installation guide (printed)

# ioLogik E1261W-T

## *Ethernet remote I/O for wind power applications*

- **User-definable Modbus/TCP Slave addressing**
- **Active communications with MX-AOPC UA Server**
- **Easy mass deployment and configuration with ioSearch utility**
- **Friendly configuration via web browser**
- **Simplify I/O management with MXIO library on either Windows or Linux platform**
- **Wide operating temperature range: -40 to 75°C (-40 to 167°F)**

## Introduction

Moxa's ioLogik E1261W-T is designed for Ethernet-based remote condition monitoring systems. With 3 RTD, 5 AI, and 12 DIO channels, the ioLogik E1261W-T's I/O combination is ideal for monitoring wind turbines and environmental conditions. Unlike other remote I/O products, which are passive and must poll for data, the ioLogik E1261W-T supports active communication with Moxa's MX-AOPC UA Server to enable real time communications capabilities with remote monitoring and control systems.

## Specifications

### LAN

**Ethernet:** 1 10/100 Mbps RJ45 port
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, HTTP

### Serial

**Interface:** 1 RS-485-2w terminal block port
**Parity:** None
**Data Bits:** 8
**Stop Bits:** 1
**Flow Control:** None
**Baudrate:** 1200 to 115200 bps
**Protocols:** Modbus RTU (slave)

### Inputs and Outputs

**Configurable DIOs (by software):** 12 channels
**Analog Inputs:** 5 channels
**RTDs:** 3 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 12 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software Configurable

### Digital Output

**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channe

### Analog Input

**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (software selectable)
**Input Range:** 0 to 10 VDC, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)
**Accuracy:**
• ±0.1% FSR @ 25°C
• ±1.0% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 2.4 samples/sec
**Input Impedance:** 10 mega-ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### RTD

**Sensor Type:** PT100 (-200 to 850°C)
**Input connection:** 2- or 3-wire
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 4 samples/sec
**Resolution:** 16 bits
**Accuracy:**
• ±0.1% FSR @ 25°C
• ±1.0% FSR @ -40 and 75°C
**Input Impedance:** 625 kilo-ohms (min.)

### Power Requirements

**Input Voltage:** 12 to 36 VDC
**Input Current:** 143 mA @ 24 VDC

## Physical Characteristics

**Wiring:** I/O cable, 14 AWG (max.)
**Dimensions:** 115 x 79 x 40.4 mm (4.53 x 3.11 x 1.59 in)
**Weight:** Under 250 g (0.55 lb)
**Mounting:** DIN-rail or wall

## Environmental Limits

**Operating Temperature:** -40 to 75°C (-40 to 167°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

## Standards and Certifications

**Safety:** UL 508
**EMC:** EN 55022/24
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m
IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV
IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV
IEC 61000-4-6 CS: 10 V
IEC 61000-4-8
**Green Product:** RoHS, CRoHS, WEEE
Please check Moxa's website for the most up-to-date certification status.

## MTBF (mean time between failures)

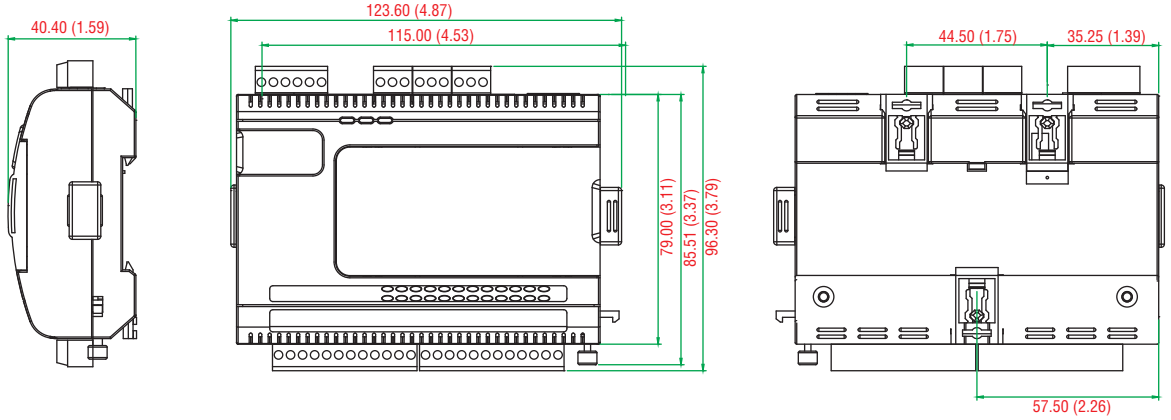
**Time:** 367,508 hrs
**Standard:** Telcordia SR332

## Warranty

**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

## Dimensions

Unit: mm (inch)




Side View | Front View | Rear View

# Ordering Information

## Available Models

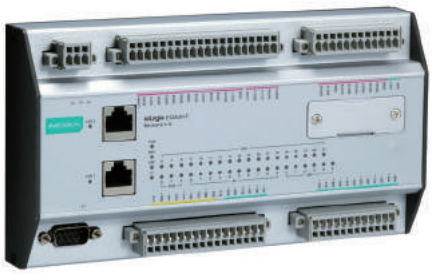
**ioLogik E1261W-T:** Ethernet remote I/O with 12 DIOs, 5 AIs, 3 RTDs, -40 to 75°C operating temperature

## Package Checklist

- ioLogik E1261W-T
- Documentation and software CD
- Quick installation guide (printed)

# ioLogik E1200H Series

## *Ethernet remote I/O for offshore wind power applications*



- User-definable Modbus/TCP Slave addressing
- 2-port Ethernet switch for daisy-chain topologies
- Active communications with MX-AOPC UA Server
- Easy mass deployment and configuration with ioSearch utility
- Friendly configuration via web browser
- Simplify I/O management with MXIO library on either Windows or Linux platform
- IEC 60945 approval for harsh offshore environments
- Wide operating temperature range: -40 to 75°C (-40 to 167°F)



## Introduction

### Industry-Proven Rugged Design

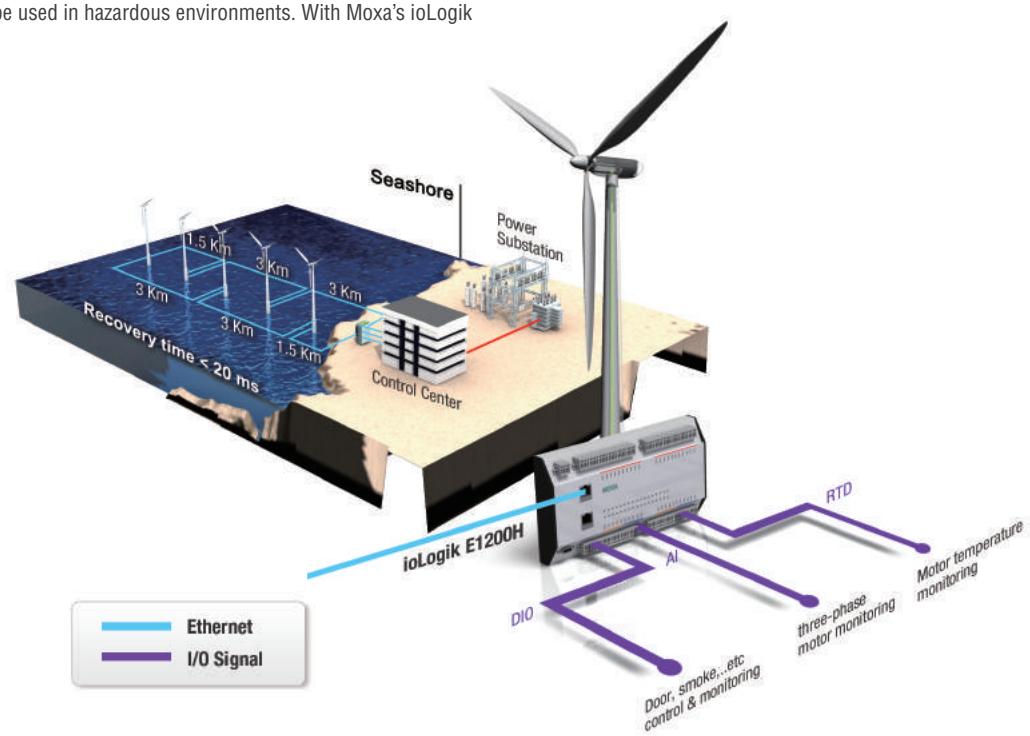
Installation of remote Ethernet I/O in offshore environments is a real challenge. It is critical to find devices properly designed for protected, safe use in these environments. Moxa's ioLogik E1200H series with IEC 60945 certifications fulfills the need for devices suitable for such demanding industrial applications. Compactly packaged in a metal housing, this rugged hardware supports operating temperatures ranging from -40 to 75°C, meeting the stringent demands of IEC 60945 for harsh offshore applications.

### Daisy-Chain Topology Reduces Deployment Costs

Thanks to its two embedded Ethernet switch ports, the ioLogik E1200H remote Ethernet I/O allows you to create daisy-chain topologies for easy cabling. In distributed Ethernet data acquisition applications, panels, units, and cabinets are often located at remote sites where space is limited. The daisy-chain capability of the ioLogik E1200H series allows ioLogik E1200H units to connect in series either to each other or to other nearby Ethernet devices, drastically saving on both space and wiring costs.

## Application: Offshore Remote Monitoring

Have you ever wondered where to find a rugged remote Ethernet I/O device for offshore facilities? You need something with the ability to withstand extreme weather conditions, wide temperature changes, and that can be used in hazardous environments. With Moxa's ioLogik E1200H, you get a robust design that will meet your most stringent demands, ensuring your remote data acquisition applications are reliable, consistent, and safe.




## ioLogik E1261H Specifications

### Inputs and Outputs

**Configurable DIOs (by software):** 12 channels
**Analog Inputs:** 5 channels
**RTDs:** 3 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter (channels 0 to 3)
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 12 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software Configurable

### Digital Output

**Type:** Sink
**I/O Mode:** DO or Pulse Output (channels 0 to 3)
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### Analog Input

**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (software selectable)
**Input Range:** 0 to 10 V, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)
**Accuracy:**
• ±0.5% FSR @ 25°C
• ±1.0% FSR @ -40 and 75°
**Sampling Rate (all channels):**
• All channels: 12 samples/sec
• Per channel: 1.5 samples/sec
**Input Impedance:** 10 mega-ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### RTDs

**Sensor Type:**
PT100 ( -200 to 850°C)
**Input Connection:** 2- or 3-wire
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 1.5 samples/sec
**Resolution:** 0.5°C
**Accuracy:**
• ±0.5% FSR @ 25°C
• ±1.0% FSR @ -40 and 75°C
**Input Impedance:** 625 kilo-ohms

### Power Requirements

**Input Voltage:** 12 to 48 VDC
**Input Current:** 235 mA @ 24 VDC

### Physical Characteristics

**Dimensions:** 140 x 113 x 36.3 mm (5.51 x 4.45 x 1.43 in)
**Weight:** 825 g (1.82 lb)

### MTBF (mean time between failures)

**Time:** 296,094 hrs
**Standard:** Telcordia SR332

## ioLogik E1263H Specifications

### Inputs and Outputs
**Configurable DIOs (by software):** 24 channels
**Analog Inputs:** 10 channels
**RTDs:** 3 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter (channels 0 to 7)
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 12 points per COM
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output (channels 0 to 7)
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (software selectable)
**Input Range:** 0 to 10 V, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)
**Accuracy:**
• ±0.5% FSR @ 25°C
• ±1.0% FSR @ -40 and 75°
**Sampling Rate (all channels):**
• All channels: 12 samples/sec
• Per channel: 0.9 samples/sec
**Input Impedance:** 10 mega-ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### RTDs
**Sensor Type:**
• PT100 ( -200 to 850°C)
**Input connection:** 2- or 3-wire
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 0.9 samples/sec
**Resolution:** 0.5°C
**Accuracy:**
• ±0.5% FSR @ 25°C
• ±1.0% FSR @ -40 and 75°C
**Input Impedance:** 625 kilo-ohms

### Power Requirements
**Input Voltage:** 12 to 48 VDC
**Input Current:** 343 mA @ 24 VDC

### Physical Characteristics
**Dimensions:** 204 x 113 x 36.3 mm ( 8.03 x 4.45 x 1.43 in)
**Weight:** 945 g (2.08 lb)

### MTBF (mean time between failures)
**Time:** 180,390 hrs
**Standard:** Telcordia SR332

## Common Specifications

### LAN
**Ethernet:** 2 switched 10/100 Mbps RJ45 ports
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, HTTP

### Serial
**Interface:** 1 RS-232/422/485 (software selectable) DB9 male port
**Parity:** None
**Data Bits:** 8
**Stop Bits:** 1
**Flow Control:** None
**Baudrate:** 300 to 115200 bps
**Protocols:** Modbus RTU (slave)

### Physical Characteristics
**Wiring:** I/O cable max. 14 AWG
**Mounting:** DIN rail (standard), wall (with optional kit)

### Environmental Limits
**Operating Temperature:** -40 to 75°C (-40 to 167°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

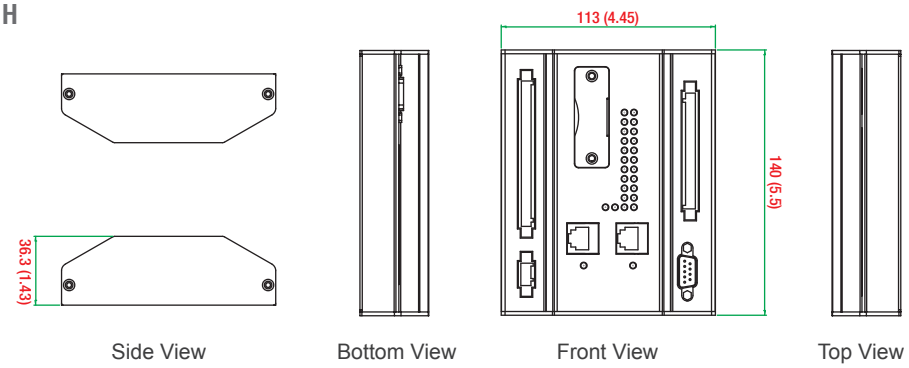
### Standards and Certifications
**Safety:** UL 508
**EMC:** EN 55022/24, EN 61000-6-2/6-4
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m
IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV
IEC 61000-4-5 Surge: Power: 2 kV
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8
**Maritime:** IEC 60945
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

### Warranty
**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

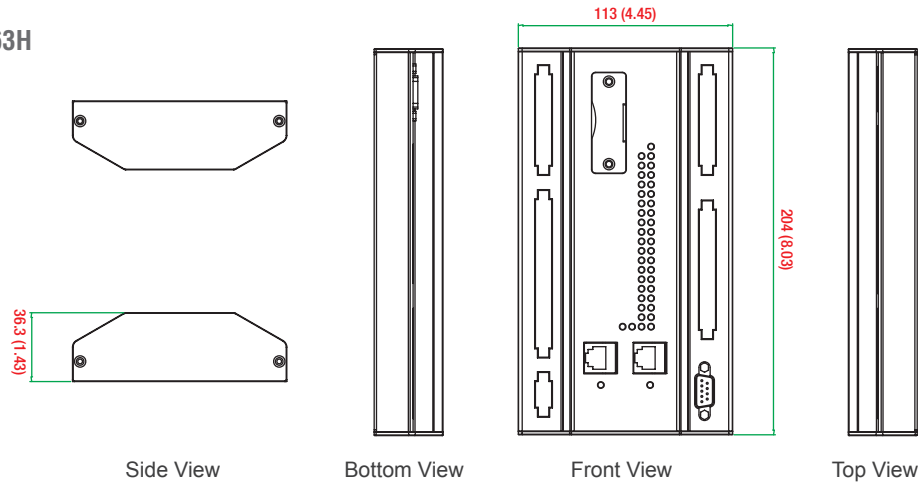
## Dimensions

Unit: mm (inch)

### ioLogik E1261H




### ioLogik E1263H




## Ordering Information

### Available Models

**ioLogik E1261H-T:** Ethernet remote I/O with 2-port Ethernet switch, 12 DIOs, 5 AIs and 3 RTDs, -40 to 75°C operating temperature.

**ioLogik E1263H-T:** Ethernet remote I/O with 2-port Ethernet switch, 24 DIOs, 10 AIs and 3 RTDs, -40 to 75°C operating temperature.

### Optional Accessories (can be purchased separately)

**WK-90:** Wall-mounting kit, BKTx2 FMSx6 NI Nylok M3x6

### Package Checklist

- ioLogik E1200H-T
- Documentation and software CD
- Quick installation guide (printed)

# ioLogik E1500 Series

## *Ethernet remote I/O for railway applications*

- User-definable Modbus/TCP Slave addressing
- Active communications with MX-AOPC UA Server
- Easy mass deployment and configuration with ioSearch utility
- Friendly configuration via web browser
- Simplify I/O management with MXIO library on either Windows or Linux platform
- EN 50121-3-2, EN 50121-4, and EN 50155* approval for harsh railway environments
- Wide operating temperature range: -40 to 85°C (-40 to 185°F)

*Complies with a portion of EN 50155 specifications

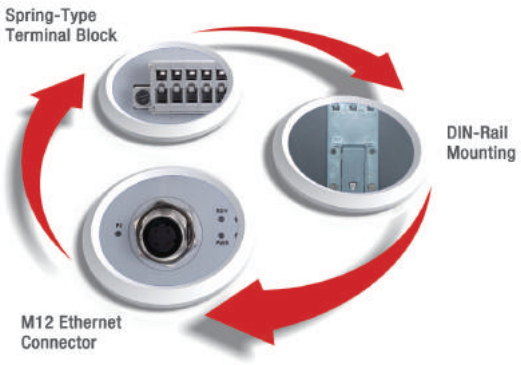
EN 50121 RoHS c UL us LISTED CE FC

## Introduction

The ioLogik E1500 series is designed to withstand the severe vibrations experienced in rolling stock and wayside applications. These products come with a threaded M12 Ethernet port to ensure wired connectivity, a spring-type terminal block for vibration-resistant cabling, and a convenient DIN-rail mounting assembly. Carefully engineered DI channel-to-channel isolation helps maintain stable data communications by providing protection against cross-line power surges and crosstalk. In addition, this remote I/O product is compliant with EN 50121-3-2, EN 50121-4, and a portion of EN 50155 specifications, covering operating temperature, power input voltage, surge, ESD, and vibration, making the products suitable for a variety of industrial applications, including electronic equipment used on or around railway vehicles.

### Ruggedly Designed for Monitoring Rolling Stock

The ioLogik E1500 Ethernet remote I/O devices have a durable aluminum housing and are compliant with EN 50121-3-2, EN 50121-4, and essential sections of EN 50155, all of which are essential for electronic equipment used in railway applications. The ioLogik E1500 design strictly conforms to EN standards, including not only EMC requirements but also with regards to shock, vibration, extended temperature range, humidity, and power supply variations.

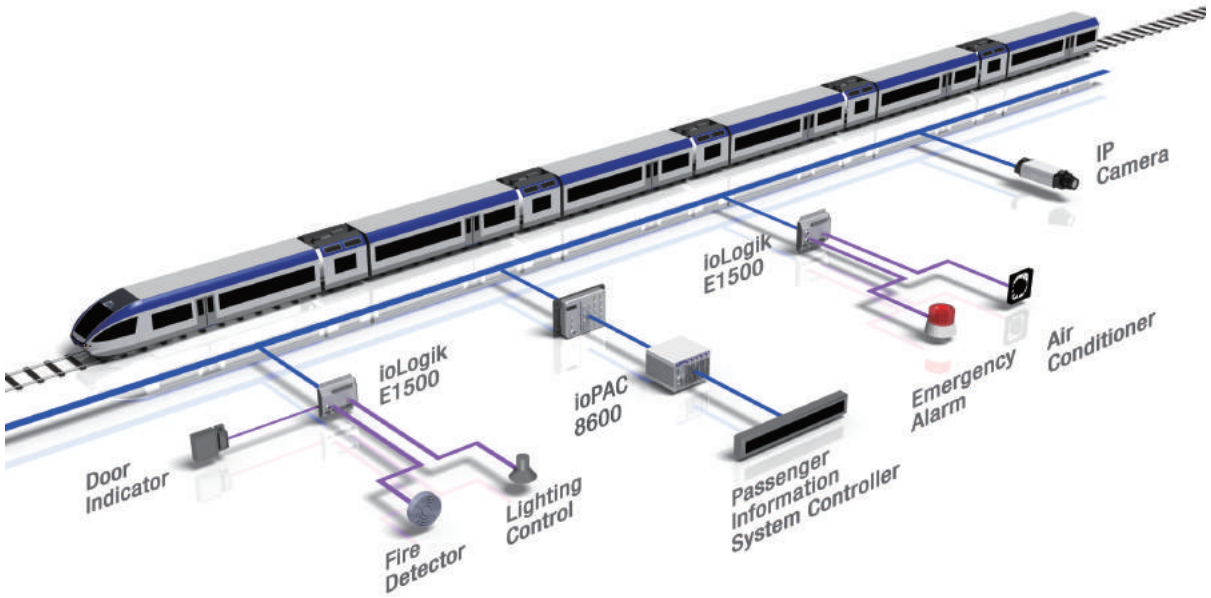



### Channel-to-Channel Isolation

With this topology, I/O channels on the ioLogik E1500 are individually isolated from one another to ensure that data communication is highly stable. For example, a lightning strike that affects one channel will not affect devices connected to other channels on the same ioLogik E1500.

## Application: Enhanced Efficiency for Remote Monitoring on Rolling Stock

Do you need an EN 50155/50121 compliant remote Ethernet I/O device for use on rolling stock? The ioLogik E1500 railway I/O module features an anti-vibration design, channel isolation, and operates reliably in temperatures ranging from -40 to 85°C, making it the ideal solution for data acquisition on rolling stock. Capable of both monitoring system status and triggering I/O events, the ioLogik E1500 is your best choice when you want to simultaneously enhance system reliability and maintenance efficiency in rolling stock environments.




## ioLogik E1510-T Specifications

### Inputs and Outputs

**Digital Inputs:** 12 channels (channel-to-channel isolation)
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software configurable

### MTBF (mean time between failures)

**Time:** 507,064 hrs
**Standard:** Telcordia SR332

## ioLogik E1512-T Specifications

### Inputs and Outputs

**Digital Inputs:** 4 channels (channel-to-channel isolation)
**Configurable DIOs (by software):** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to GND):**
• On: 0 to 3 VDC
• Off: 10 to 30 VDC
**Common Type:** 2 points per COM (Configurable DIOs)
**Counter Frequency:** 250 Hz
**Digital Filtering Time Interval:** Software configurable

### Digital Output

**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 500 Hz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### MTBF (mean time between failures)

**Time:** 554,122 hrs
**Standard:** Telcordia SR332

## Common Specifications

### LAN
**Ethernet:** 1 10/100 Mbps, M12
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, HTTP

### Power Requirements
**Input Voltage:** 12 to 48 VDC
**Input Current:** 150 mA @ 24 VDC
Note: Compliant with EN 50155 at 24 VDC

### Physical Characteristics
**Wiring:** I/O cable max. 14 AWG
**Dimensions:** 144 x 124 x 30 mm (5.67 x 4.88 x 1.18 in)
**Weight:** Under 825 g (1.82 lb)
**Mounting:** DIN-rail (standard), wall (with optional kit)

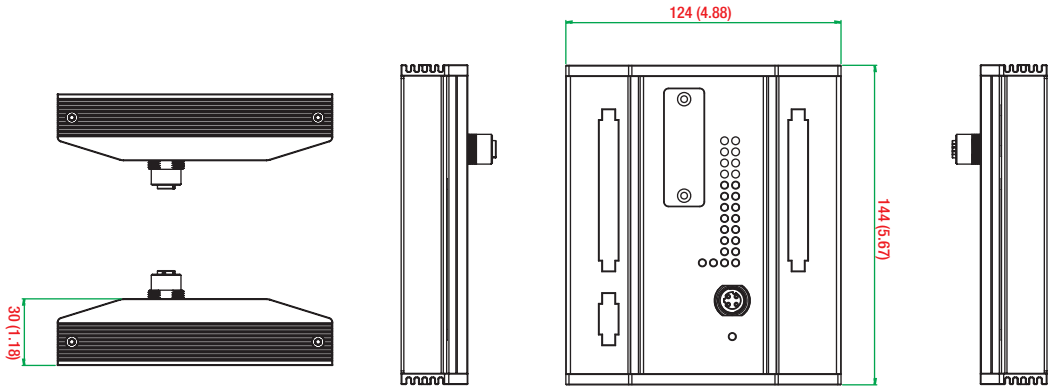
### Environmental Limits
**Operating Temperature:** -40 to 85°C (-40 to 185°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.
**Conformal Coating:** Applies only to -CT models

### Standards and Certifications
**Safety:** UL 508
**EMC:** EN 61000-6-2/6-4
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV
IEC 61000-4-3 RS:
80 MHz to 1 GHz: 10 V/m
1.4 GHz to 2 GHz: 3 V/m
2 GHz to 2.7 GHz: 1 V/m
IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV
IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV
IEC 61000-4-6 CS: 10 V
IEC 61000-4-8
**Rail Traffic:** EN 50155*, EN 50121-3-2, EN 50121-4
*Complies with a portion of EN 50155 specifications.
**Green Product:** RoHS, CRoHS, WEEE
Note: Please check Moxa's website for the most up-to-date certification status.

### Warranty
**Warranty Period:** 5 years
**Details:** See www.moxa.com/warranty

### Dimensions

Unit: mm (inch)




Side View | Bottom View | Front View | Top View

## Ordering Information

### Available Models
**ioLogik E1510-M12-T:** Ethernet remote I/O with M12 connector, 12 DIs, -40 to 85°C operating temperature
**ioLogik E1510-M12-CT-T:** Ethernet remote I/O with M12 connector, 12 DIs, coating, -40 to 85°C operating temperature
**ioLogik E1512-M12-T:** Ethernet remote I/O with M12 connector, 4 DIs, 4 DIOs, -40 to 85°C operating temperature
**ioLogik E1512-M12-CT-T:** Ethernet remote I/O with M12 connector, 4 DIs, 4 DIOs, coating, -40 to 85°C operating temperature

### Package Checklist
- ioLogik E1500
- Documentation and software CD
- Quick installation guide (printed)

### Optional Accessories (can be purchased separately)
**WK-90:** Wall-mounting kit, BKTx2 FMSx6 NI Nylok M3x6

# ioLogik R1200 Series

## *RS-485 remote I/O*

- Dual RS-485 remote I/O with built-in repeater
- Supports the installation of multidrop communications parameters
- Install communications parameters and upgrade firmware via USB
- Upgrade firmware through an RS-485 connection
- Wide operating temperature range: -40 to 85°C (-40 to 185°F)



## Introduction

The ioLogik R1200 RS-485 serial remote I/O devices are perfect for establishing a cost-effective, dependable, and easy-to-maintain remote process control I/O system. Remote serial I/O products offer process engineers the benefit of simple wiring, as they only require two wires to communicate with the controller and other RS-485 devices while adopting the EIA/TIA RS-485 communication protocol to transmit and receive data at high speed over long distances. In addition to communication configuration by software or USB and dual RS-485 port design, Moxa's remote I/O devices eliminate the nightmare of extensive labor associated with the setup and maintenance of data acquisition and automation systems. Moxa also offers different I/O combinations, which provide greater flexibility and are compatible with many different applications.

### ioLogik R1200 Series Selection Table

| Models | I/O Combinations | | | | |
|---|---|---|---|---|---|
| | Digital Inputs | Configurable DIOs | Relays | Analog Inputs | Analog Outputs |
| ioLogik R1210 | 16 | – | – | – | – |
| ioLogik R1212 | 8 | 8 | – | – | – |
| ioLogik R1214 | 6 | – | 6 | – | – |
| ioLogik R1240 | – | – | – | 8 | – |
| ioLogik R1241 | – | – | – | – | 4 |

## ioLogik R1210 Specifications

### Inputs and Outputs

**Digital Inputs:** 16 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 8 points per COM
**Counter Frequency:** 2.5 kHz
**Digital Filtering Time Interval:** Software Configurable

### Power Requirements

**Input Voltage:** 12 to 48 VDC
**Input Current:** 154 mA @ 24 VDC

## ioLogik R1212 Specifications

### Inputs and Outputs

**Digital Inputs:** 8 channels
**Configurable DIOs (by jumper):** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input

**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open

**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 8 points per COM
**Counter Frequency:** 2.5 kHz
**Digital Filtering Time Interval:** Software Configurable

### Digital Output
**Type:** Sink
**I/O Mode:** DO or Pulse Output
**Pulse Output Frequency:** 5 kHz
**Over-Voltage Protection:** 45 VDC
**Over-Current Protection:** 2.6 A (4 channels @ 650 mA)
**Over-Temperature Shutdown:** 175°C (typical), 150°C (min.)
**Current Rating:** 200 mA per channel

### Power Requirements
**Input Voltage:** 12 to 48 VDC
**Input Current:** 187 mA @ 24 VDC

## ioLogik R1214 Specifications

### Inputs and Outputs
**Digital Inputs:** 6 channels
**Relays:** 6 channels
**Isolation:** 3k VDC or 2k Vrms

### Digital Input
**Sensor Type:** Wet Contact (NPN or PNP), Dry Contact
**I/O Mode:** DI or Event Counter
**Dry Contact:**
• On: short to GND
• Off: open
**Wet Contact (DI to COM):**
• On: 10 to 30 VDC
• Off: 0 to 3 VDC
**Common Type:** 6 points per COM
**Counter Frequency:** 2.5 kHz
**Digital Filtering Time Interval:** Software Configurable

### Relay
**Type:** Form A (N.O.) power relay
**Contact Current Rating:** Resistive load: 5 A @ 30 VDC, 250 VAC, 110 VAC
**Breakdown Voltage:** 500 VAC
**Relay On/Off Time:** 1500 ms (max.)
**Initial Insulation Resistance:** 1000 mega-ohms (min.) @ 500 VDC
**Mechanical Endurance:** 5,000,000 operations
**Electrical Endurance:** 100,000 operations @ 5 A resistive load
**Contact Resistance:** 100 milli-ohms (max.)
**Pulse Output:** 0.3 Hz at rated load
Note: Ambient humidity must be non-condensing and remain between 5 and 95%. The relays of the ioLogik R1214 may malfunction when operating in high condensation environments below 0°C.

### Power Requirements
**Input Voltage:** 12 to 48 VDC
**Input Current:** 207 mA @ 24 VDC

## ioLogik R1240 Specifications

### Inputs and Outputs
**Analog Inputs:** 8 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Input
**Type:** Differential input
**Resolution:** 16 bits
**I/O Mode:** Voltage / Current (jumper selectable)
**Input Range:** 0 to 10 VDC, 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burn-out mode)
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
±0.5% FSR @ -40 and 75°C
**Sampling Rate:**
• All channels: 12 samples/sec
• Per channel: 1.5 samples/sec
• Only one channel enabled: 12 samples/sec
**Input Impedance:** 10 mega-ohms (min.)
**Built-in Resistor for Current Input:** 120 ohms

### Power Requirements
**Input Voltage:** 12 to 48 VDC
**Input Current:** 216 mA @ 24 VDC

## ioLogik R1241 Specifications

### Inputs and Outputs
**Analog Outputs:** 4 channels
**Isolation:** 3k VDC or 2k Vrms

### Analog Output
**Resolution:** 12 bits
**Output Range:** 0 to 10 VDC, 0 to 20 mA, 4 to 20 mA
**Voltage Output:** 10 mA (max.)
**Accuracy:**
±0.1% FSR @ 25°C
±0.3% FSR @ -40 and 75°C
**Load Resistor:** Internal register: 400 ohms
Note: 24 V of external power required when loading exceeds 1000 ohms.

### Power Requirements
**Input Voltage:** 12 to 48 VDC
**Input Current:** 343 ma @ 24 VDC

## Common Specifications

### Serial
**Interface:** 2 RS-485-2w terminal block ports
**Serial Line Protection:**
• ESD Protection: 15 kV
• Surge Protection: 1 kV
• High/Low Resistor for RS-485: 1 kΩ, 150 kΩ
**Parity:** None, Even, Odd
**Data Bits:** 8
**Stop Bits:** 1, 2
**Baudrate:** 1200 to 921600 bps
**Protocols:** Modbus RTU (slave)

### Physical Characteristics
**Wiring:** I/O cable max. 16 AWG
**Dimensions:** 27.8 x 124 x 84 mm (1.09 x 4.88 x 3.31 in)
**Weight:** Under 200 g (0.44 lb)
**Mounting:** DIN-rail or wall

### Environmental Limits
**Operating Temperature:**
Standard Models: -10 to 75°C (14 to 167°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)

**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

### Standards and Certifications

**Safety:** UL 508
**EMC:** EN 55022/24
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m
IEC 61000-4-4 EFT: Power: 0.5 kV
IEC 61000-4-5 Surge: Power: 2 kV
IEC 61000-4-6 CS: 3 V
IEC 61000-4-8

**Green Product:** RoHS, CRoHS, WEEE
Please check Moxa's website for the most up-to-date certification status.

### MTBF (mean time between failures)

**Time:** 1,239,293 hrs
**Standard:** Telcordia SR332

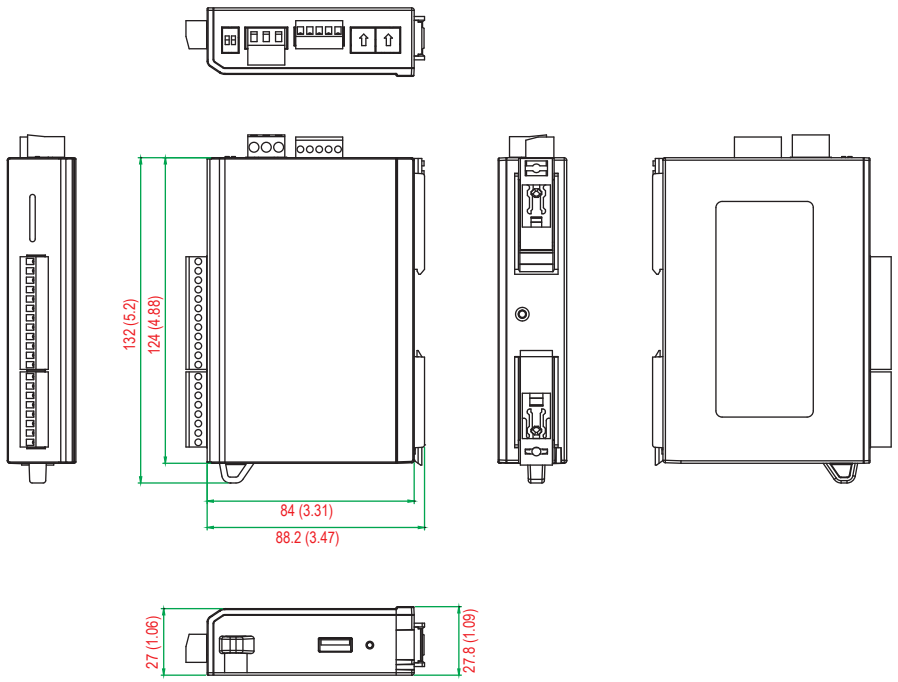
### Warranty

**Warranty Period:** 5 years (excluding the ioLogik R1214)
**Details:** See www.moxa.com/warranty
Note: Because of the limited lifetime of power relays, products that use this component are covered by a 2-year warranty.



### Dimensions

Unit: mm (inch)




## Ordering Information

### Available Models

**ioLogik R1210:** RS-485 remote I/O with 16 DIs, -10 to 75°C operating temperature
**ioLogik R1210-T:** RS-485 remote I/O with 16 DIs, -40 to 85°C operating temperature
**ioLogik R1212:** RS-485 remote I/O with 8 DIs, 8 DIOs, -10 to 75°C operating temperature
**ioLogik R1212-T:** RS-485 remote I/O with 8 DIs, 8 DIOs, -40 to 85°C operating temperature
**ioLogik R1214:** RS-485 remote I/O with 6 DIs, 6 relays, -10 to 75°C operating temperature
**ioLogik R1214-T:** RS-485 remote I/O with 6 DIs, 6 relays, -40 to 85°C operating temperature
**ioLogik R1240:** RS-485 remote I/O with 8 AIs, -10 to 75°C operating temperature
**ioLogik R1240-T:** RS-485 remote I/O with 8 AIs, -40 to 85°C operating temperature
**ioLogik R1241:** RS-485 remote I/O with 4 AOs, -10 to 75°C operating temperature
**ioLogik R1241-T:** RS-485 remote I/O with 4 AOs, -40 to 85°C operating temperature

### Package Checklist

- ioLogik R1200
- Documentation and software CD
- Quick installation guide (printed)

# ioLogik 4000 Series

## *Modular remote I/O*

- I/O expansion without a backplane
- Active communications with MX-AOPC UA Server
- Supports SNMPv1/v2c
- Easy configuration with Modular ioAdmin utility
- Friendly configuration via web browser
- Simplify I/O management with MXIO library on either a Windows or Linux platform



## Introduction

The ioLogik 4000 series is suitable for remote monitoring and alarm systems, such as those used for water treatment systems, water supply systems, wastewater treatment systems, and power monitoring systems. These kinds of applications need more I/O points and a variety of I/O types, including temperature sensors, gas detectors, and water quality detectors, all of which can benefit from the versatile mixture of I/O features supported by the ioLogik 4000 series.

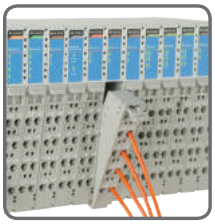
### Slice Form Factor and Flexible I/O Variety

The unique modular construction of the ioLogik 4000 series allows the mixing and matching of modules to achieve the best combination of I/O modules to meet the needs of a wide range of remote automation applications. The ioLogik 4000 series features an industrial modular housing that allows I/O modules to be added to the base unit without a backplane. The width of each module is only 12 mm, perfect for space-limited applications. The ioLogik 4000 series provides high density I/O points for greater flexibility and expandability. The modules can connect to virtually any type of sensor, including but not limited to those for temperature, pressure, flow, voltage, current, and contact closure.

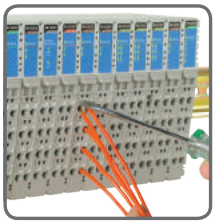
### Easy Maintenance

The ioLogik 4000 series comes with removable spring-type terminal blocks (RTBs) that allow you to conserve field wiring for future use. Each I/O expansion module can be quickly and easily replaced.

Slice-Type I/O Modules



Removable Terminal Block



Spring-Type Terminal Block

Module Coding Tag

## ioLogik E4200 Specifications

### LAN

**Ethernet:** 2 MACs, 10/100 Mbps RJ45 ports
**Protection:** 1.5 kV magnetic isolation
**Protocols:** Modbus/TCP (slave), TCP/IP, UDP, DHCP, BOOTP, SNMP, HTTP, SNTP, SMTP

### Serial

**Interface:** 1 RS-232 DB9 male port
**Parity:** None
**Stop Bits:** 1
**Flow Control:** 115200 bps
**Protocols:** For Moxa OnCell only

### Power Requirements

**Input Voltage:** 11 to 28.8 VDC
**Input Current:** 175 mA @ 24 VDC
**Current for I/O Modules:** 1.5 A (max.) @ 5 VDC

### Physical Characteristics

**Weight:** 180 g (0.40 lb)

### MTBF (mean time between failures)

**Time:** 357,000 hrs
**Standard:** Telcordia SR332

## NA-4010 Specifications

### LAN
**Ethernet:** 1 10/100 Mbps RJ45 port
**Protocols:** Modbus/TCP (slave), HTTP, BOOTP
**IP Settings:** ARP, BOOTP, static IP

### Power Requirements
**Input Voltage:** 11 to 28.8 VDC
**Input Current:** 60 mA @ 24 VDC
**Current for I/O Modules:** 1.5 A (max.) @ 5 VDC

### Physical Characteristics
**Weight:** 150 g (0.33 lb)

### MTBF (mean time before failures)
**Time:** 4,739,300 hrs
**Standard:** Telcordia SR332

## NA-4020/4021 Specifications

### Serial
**Interface:**
• NA-4020: 1 RS-485-2w terminal block port
• NA-4021: 1 RS-232 DB9 female port
**Parity:** None, Even, Odd
**Data Bits:** 7, 8
**Stop Bits:** 1, 2
**Baudrate:** 1200 to 115200 bps
**Protocols:** Modbus/RTU (slave), Modbus/ASCII (slave)

### Power Requirements
**Input Voltage:** 11 to 28.8 VDC
**Input Current:** 70 mA @ 24 VDC
**Current for I/O Modules:** 1.5 A (max.) @ 5 VDC

### Physical Characteristics
**Weight:** 150 g (0.33 lb)

### MTBF (mean time between failures)
**NA-4020 Time:** 4,694,800 hrs
**NA-4021 Time:** 5,208,300 hrs
**Standard:** Telcordia SR332

## Common Specifications

### Field Power
**Rated Voltage:** 11 to 28.8 VDC
**Current in Field Power Contact:** 10 A (max.)

### Physical Characteristics
**Wiring:** I/O cable max. 14 AWG
**Dimensions:** 45 x 99 x 70 mm (1.77 x 3.90 x 2.76 in)
**Mounting:** DIN rail

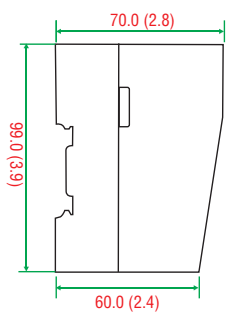
### Environmental Limits
**Operating Temperature:** -10 to 60°C (14 to 140°F)
**Storage Temperature:** -40 to 85°C (-40 to 185°F)
**Ambient Relative Humidity:** 5 to 95% (non-condensing)
**Shock:** IEC 60068-2-27
**Vibration:** IEC 60068-2-6
**Altitude:** Up to 2000 m
Note: Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

### Standards and Certifications
**Safety:** UL 508
**EMC:** EN 61000-6-2/6-4
**EMI:** CISPR 22, FCC Part 15B Class A
**EMS:**
IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
IEC 61000-4-3 RS:
80 MHz to 1 GHz: 10 V/m
1.4 GHz to 2 GHz: 3 V/m
2 GHz to 2.7 GH: 1 V/m
IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV
IEC 61000-4-5 Surge: Power: 1 kV
IEC 61000-4-6 CS: 10 V
IEC 61000-4-8

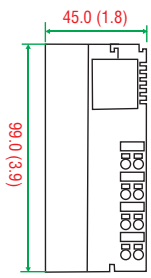
## Dimensions

Unit: mm (inch)

**I/O Network Adapter**

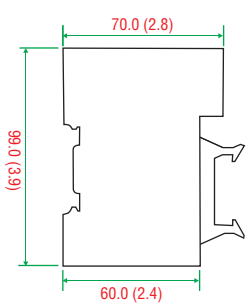



Side View

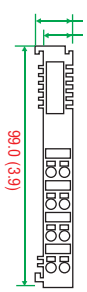



Front View

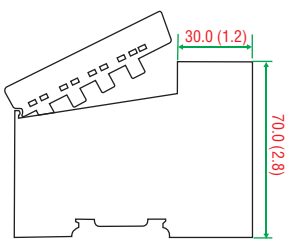
**I/O Module**




Side View




Front View




Removable View

## Ordering Information

**Step 1: Select a network adapter module**

ioLogik E4200 or NA-4000 series

**Step 2: Select I/O modules**

M-1000/2000/3000/4000/6000 series

**Step 3: Select power modules (optional)**

M-7000 series

### Available Models

**ioLogik E4200:** Modular Ethernet remote I/O adapter with Click&Go, up to 16 I/O modules, -10 to 60°C operating temperature
**NA-4010:** Modular Ethernet remote I/O adapter with up to 32 I/O modules, -10 to 60°C operating temperature
**NA-4020:** Modular RS-485 remote I/O adapter with up to 32 I/O modules, -10 to 60°C operating temperature
**NA-4021:** Modular RS-232 remote I/O adapter with up to 32 I/O modules, -10 to 60°C operating temperature
Note: The ioLogik E4200 Modular Ethernet remote I/O adapter can be expanded with up to 16 I/O modules. The NA-4010 and NA-4020/4021 network adapters can be expanded with up to 32 I/O modules.

### Package Checklist

- ioLogik 4000 series
- I/O modules (sold separately)
- Power modules (sold separately)
- Documentation and software CD
- Quick installation guide (printed)

# ioLogik 4000 Expansion Modules

## Digital Input Modules

### M-1800: 8 digital inputs, sink type, 24 VDC

**Digital Inputs:** 8 channels
**Type:** sink
**On-state Voltage:** 24 VDC nominal, 11 to 28.8 VDC
**Off-state Voltage:** 0 to 5 VDC
**On-state Current:** 6 mA/point @ 28.8 VDC (max.)
**Input Impedance:** 5.1 kilo-ohms (typical)
**Filtering Time:** 1.5 ms (typical)
**Common Type:** External common (single common)
**Input Current:** 35 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 15,759,240 hrs (Standard: Telcordia SR332)

### M-1801: 8 digital inputs, source type, 24 VDC

**Digital Inputs:** 8 channels
**Type:** source
**On-state Voltage:** 24 VDC nominal, 11 to 28.8 VDC
**Off-state Voltage:** 0 to 5 VDC
**On-state Current:** 6 mA/point @ 28.8 VDC (max.)
**Input Impedance:** 5.1 kilo-ohms (typical)
**Filtering Time:** 1.5 ms (typical)
**Common Type:** External common (single common)
**Input Current:** 35 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 15,811,800 hrs (Standard: Telcordia SR332)

### M-1600: 16 digital inputs, sink type, 24 VDC

**Digital Inputs:** 16 channels
**Type:** sink
**On-state Voltage:** 24 VDC nominal, 11 to 28.8 VDC
**Off-state Voltage:** 0 to 5 VDC
**On-state Current:** 6 mA/point @ 28.8 VDC (max.)
**Input Impedance:** 5.1 kilo-ohms (typical)
**Filtering Time:** 1.5 ms (typical)
**Common Type:** 16 channels for 2 COMs (single common)
**Input Current:** 40 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O flat cable 20-pin
**MTBF:** 11,659,560 hrs (Standard: Telcordia SR332)

### M-1601: 16 digital inputs, source type, 24 VDC

**Digital Inputs:** 16 channels
**Type:** source
**On-state Voltage:** 24 VDC nominal, 11 to 28.8 VDC
**Off-state Voltage:** 0 to 5 VDC
**On-state Current:** 6 mA/point @ 28.8 VDC (max.)
**Input Impedance:** 5.1 kilo-ohms (typical)
**Filtering Time:** 1.5 ms (typical)
**Common Type:** 16 channels for 2 COMs (single common)
**Input Current:** 40 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O flat cable 20-pin
**MTBF:** 11,694,600 hrs (Standard: Telcordia SR332)

### M-1450: 4 digital inputs, 110 VAC

**Digital Inputs:** 4 channels, 110 VAC
**On-state Voltage:** 120 VAC nominal, 85 to 132 VAC
**Off-state Voltage:** 0 to 45 VAC
**On-state Current:** 8 mA/point @ 132 VAC (max.)
**Input Impedance:** 11 kilo-ohms (typical)
**Common Type:** 4 channels for 2 COMs (single common)
**Input Current:** 35 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 19,482,240 hrs (Standard: Telcordia SR332)

### M-1451: 4 digital inputs, 220 VAC

**Digital Inputs:** 4 channels, 220 VAC
**On-state Voltage:** 240 VAC nominal, 170 to 264 VAC
**Off-state Voltage:** 0 to 45 VAC
**On-state Current:** 12 mA/point @ 264 VAC (max.)
**Input Impedance:** 22 kilo-ohms (typical)
**Common Type:** 4 channels for 2 COMs (single common)
**Input Current:** 35 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 19,727,520 hrs (Standard: Telcordia SR332)

## Digital Output Modules

### M-2800: 8 digital outputs, sink type, 24 VDC, 0.5 A

**Digital Outputs:** 8 channels
**Type:** sink
**Output Range:** 24 VDC nominal
**On-state Voltage Drop:** 0.3 VDC @ 25°C (max.)
**On-state Current:** 1 mA per channel (min.)
**Off Leakage Current:** 50 μA (max.)
**Current Rating:** 0.5 A per channel
**Common Type:** 8 channels per external common (single common)
**Input Current:** 60 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 13,884,600 hrs (Standard: Telcordia SR332)

### M-2801: 8 digital outputs, source type, 24 VDC, 0.5 A

**Digital Outputs:** 8 channels
**Type:** source
**Output Range:** 24 VDC nominal
**On-state Voltage Drop:** 0.3 VDC @ 25°C (max.)
**On-state Current:** 1 mA per channel (min.)
**Off Leakage Current:** 50 μA (max.)
**Current Rating:** 0.5 A per channel
**Common Type:** 8 channels per external common (single common)
**Input Current:** 60 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 14,340,120 hrs (Standard: Telcordia SR332)

### M-2600: 16 digital outputs, sink type, 24 VDC, 0.3 A

**Digital Outputs:** 16 channels
**Type:** sink
**Output Range:** 24 VDC nominal
**On-state Voltage Drop:** 0.3 VDC @ 25°C (max.)
**On-state Current:** 1 mA per channel (min.)
**Off Leakage Current:** 50 µA (max.)
**Current Rating:** 0.5 A per channel
**Common Type:** 8 channels per external common (single common)
**Input Current:** 60 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O flat cable 20-pin
**MTBF:** 9,732,360 hrs (Standard: Telcordia SR332)

### M-2601: 16 digital outputs, source type, 24 VDC, 0.3 A

**Digital Outputs:** 16 channels
**Type:** source
**Output Range:** 24 VDC nominal
**On-state Voltage Drop:** 0.3 VDC @ 25°C (max.)
**On-state Current:** 1 mA per channel (min.)
**Off Leakage Current:** 50 µA (max.)
**Current Rating:** 0.5 A per channel
**Common Type:** 8 channels per external common (single common)
**Input Current:** 60 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O flat cable 20-pin
**MTBF:** 9,749,880 hrs (Standard: Telcordia SR332)

## Analog Input Modules

### M-3802: 8 analog inputs, 4 to 20 mA, 12 bits

**Analog Inputs:** 8 channels
**Resolution in Ranges:** 12 bits, 3.91 µA/bit
**Input Current Range:** 4 to 20 mA (single-ended)
**Data Format:** 16-bit integer (2's complement)
**Accuracy:**
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
**Input Impedance:** 120 ohms
**Conversion Time:** 4 ms for all channels
**Input Current:** 80 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 7,375,920 hrs (Standard: Telcordia SR332)

### M-3810: 8 analog inputs, 0 to 10 V, 12 bits

**Analog Inputs:** 8 channels
**Resolution in Ranges:** 12 bits, 2.44 mV/bit
**Input Current Range:** 0 to 10 VDC (single-ended)
**Data Format:** 16-bit integer (2's complement)
**Accuracy:**
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
**Input Impedance:** 500 kilo-ohms
**Conversion Time:** 4 ms for all channels
**Input Current:** 60 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 7,288,320 hrs (Standard: Telcordia SR332)

## Analog Output Modules

### M-4402: 4 analog outputs, 4 to 20 mA, 12 bits

**Analog Outputs:** 4 channels
**Resolution in Ranges:** 12 bits, 3.91 µA/bit
**Output Current Range:** 4 to 20 mA (single-ended)
**Data Format:** 16-bit integer (2's complement)
**Accuracy:**
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
**Output Impedance:** 500 ohms (max.)
**Conversion Time:** 2 ms for all channels
**Input Current:** 60 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 7,840,200 hrs (Standard: Telcordia SR332)

### M-4410: 4 analog outputs, 0 to 10 V, 12 bits

**Analog Outputs:** 4 channels
**Resolution in Ranges:** 12 bits, 2.44 mV/bit
**Output Current Range:** 0 to 10 VDC (single-ended)
**Data Format:** 16-bit integer (2's complement)
**Accuracy:**
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
**Output Impedance:** 5 kilo-ohms (max.)
**Conversion Time:** 2 ms for all channels
**Input Current:** 60 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 6,219,600 hrs (Standard: Telcordia SR332)

## Temperature Input Modules

### M-6200: 2 analog inputs, RTD: PT100, JPT100

**RTDs:** 2 channels
**Sensor Types:**
• PT50, PT100, PT200, PT500, PT1000 (resistance 100 milli-ohms/bit)
• JPT100, JPT200, JPT500, JPT1000 (resistance 10 milli-ohms/bit)
• NI100, NI200, NI500, NI1000, NI120, CU10 (resistance 20 milli-ohms/bit)
**Resolution:** 0.1°C per 10 milli-ohms
**Data Format:** 16-bit integer (2's complement)
**Accuracy:**
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
**Input Impedance:** 500 kilo-ohms
**Conversion Time:** 200 ms for all channels
**Diagnostics:** Range over (if range over, data=Dx8000)
**Input Current:** 80 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 3,644,160 hrs (Standard: Telcordia SR332)

### M-6201: 2 analog inputs, thermocouple

**Thermocouples:** 2 channels
**Sensor Types:** Type J/K/T/E/R/S/B/N/L/U/C/D (mV input 10 µV/bit, 2 µV/bit)
**Resolution:** 0.1°C/10 µV
**Data Format:** 16-bit integer (2's complement)
**Accuracy:**
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
**Input Impedance:** 500 kilo-ohms
**Conversion Time:** 200 ms for all channels
**Diagnostics:** Range over (if range over, data=Dx8000)
**Input Current:** 80 mA @ 5 VDC
**Isolation:** I/O to logic (photocoupler isolation)
**Wiring:** I/O cable max. 14 AWG
**MTBF:** 3,828,120 hrs (Standard: Telcordia SR332)

## Power Modules

### M-7001: System power module

**System Input Voltage:** 24 VDC, 11 to 28.8 VDC
**Field Power Input Voltage:** 24 VDC (±20%)
**Current for I/O Modules:** 1.5 A @ 5 VDC (max.)
**System Bus Output Voltage:** 5 VDC (max.)
**Field Power Contacts Current:** 10 A (max.)
**MTBF:** 19,569,840 hrs (Standard: Telcordia SR332)

### M-7002: Field power module

**Field Power Input Voltage:**
• DC: 5 VDC, 24 VDC, 48 VDC
• AC: 110 VAC, 220 VAC
**Current for Field Power Contacts:** 10 A (max.)
**MTBF:** 75,528,720 hrs (Standard: Telcordia SR332)

### M-7804: 0 VDC

**Channels:** 8
**Mode:** 0 VDC
**MTBF:** 73,750,440 hrs (Standard: Telcordia SR332)

### M-7805: 24 VDC

**Channels:** 8
**Mode:** 24 VDC
**MTBF:** 73,750,440 hrs (Standard: Telcordia SR332)

## Modular I/O Accessories

### TB 1600: Screw-locking terminal block with 20-pin connector for DIN-rail mounts

**Pins:** 20 pins, one-to-one assignment
**Connector Pitch:** 3.81 mm
**Mounting Type:** DIN-rail
**Dimensions:** 77.5 x 67.5 x 51 mm (3.05 x 2.66 x 2.01 in)
**Compliance:** RoHS compliant

### Cable: 20-to-20-pin flat cable

**Usage:** Connects between the TB 1600 and ioLogik 4000 series
**Length:** 500 mm
**Number of Pins:** 20

### M-8001-PK: Removable terminal block

**Usage:** Terminal block for the ioLogik 4000 series
**Packaging:** 9 pcs in one box

### Markers: For the ioLogik 4000 series

**M-8003-PK:** Markers with 0 to 9 numbering; 100 pcs per box
**M-8004-PK:** Blank markers; 100 pcs per box

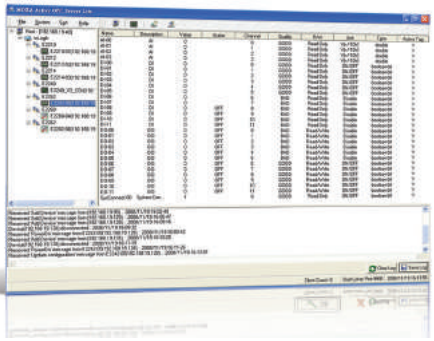
## Ordering Information

### Available Models

**M-1800:** Modular remote I/O module with 8 DIs, sink type, 24 VDC, RTB, -10 to 60°C operating temperature
**M-1801:** Modular remote I/O module with 8 DIs, source type, 24 VDC, RTB, -10 to 60°C operating temperature
**M-1600:** Modular remote I/O module with 16 DIs, sink type, 24 VDC, 20-pin, -10 to 60°C operating temperature
**M-1601:** Modular remote I/O module with 16 DIs, source type, 24 VDC, 20-pin, -10 to 60°C operating temperature
**M-1450:** Modular remote I/O module with 4 DIs, 110 VAC, RTB, -10 to 60°C operating temperature
**M-1451:** Modular remote I/O module with 4 DIs, 220 VAC, RTB, -10 to 60°C operating temperature
**M-2800:** Modular remote I/O module with 8 DOs, sink type, 24 VDC, RTB, -10 to 60°C operating temperature
**M-2801:** Modular remote I/O module with 8 DOs, source type, 24 VDC, RTB, -10 to 60°C operating temperature
**M-2600:** Modular remote I/O module with 16 DOs, sink type, 24 VDC, 20-pin, -10 to 60°C operating temperature
**M-2601:** Modular remote I/O module with 16 DOs, source type, 24 VDC, 20-pin, -10 to 60°C operating temperature
**M-2450:** Modular remote I/O module with 4 relays, 230 VAC/24 VDC, RTB, -10 to 60°C operating temperature
**M-3802:** Modular remote I/O module with 8 AIs, 4 to 20 mA, RTB, -10 to 60°C operating temperature
**M-3810:** Modular remote I/O module with 8 AIs, 0 to 10 VDC, RTB, -10 to 60°C operating temperature
**M-4402:** Modular remote I/O module with 4 AOs, 4 to 20 mA, RTB, -10 to 60°C operating temperature
**M-4410:** Modular remote I/O module with 4 AOs, 0 to 10 VDC, RTB, -10 to 60°C operating temperature
**M-6200:** Modular remote I/O module with 2 RTDs, RTB, -10 to 60°C operating temperature
**M-6201:** Modular remote I/O module with 2 TCs, RTB, -10 to 60°C operating temperature
**M-7001:** Modular remote I/O module with 24 VDC system power input, RTB, -10 to 60°C operating temperature
**M-7002:** Modular remote I/O module with 5/24/48 VDC or 110/220 VAC field power input, RTB, -10 to 60°C operating temperature
**M-7804:** Modular remote I/O module with 8 channels 0 VDC output, RTB, -10 to 60°C operating temperature
**M-7805:** Modular remote I/O module with 8 channels 24 VDC output, RTB, -10 to 60°C operating temperature

### Optional Accessories

**TB 1600:** Screw-locking terminal block with 20-pin connector for DIN-rail mounting
**20-to-20-pin flat cable:** 20-pin to 20-pin flat cable, 500 mm
**M-8001-PK:** Removable terminal block, 9 pcs per pack
**M-8003-PK:** Marker with 0 to 9 numbering, white color, 100 pcs
**M-8004-PK:** Black marker, 100 pcs



# Automation Software


## Automation Software

Introduction to Automation Software . . . . . 18-2

## OPC UA/DA Suite

MX-AOPC UA Suite: Cohesive, secure, and reliable connection between device, database, and SCADA . . . . . 18-3

## I/O Library

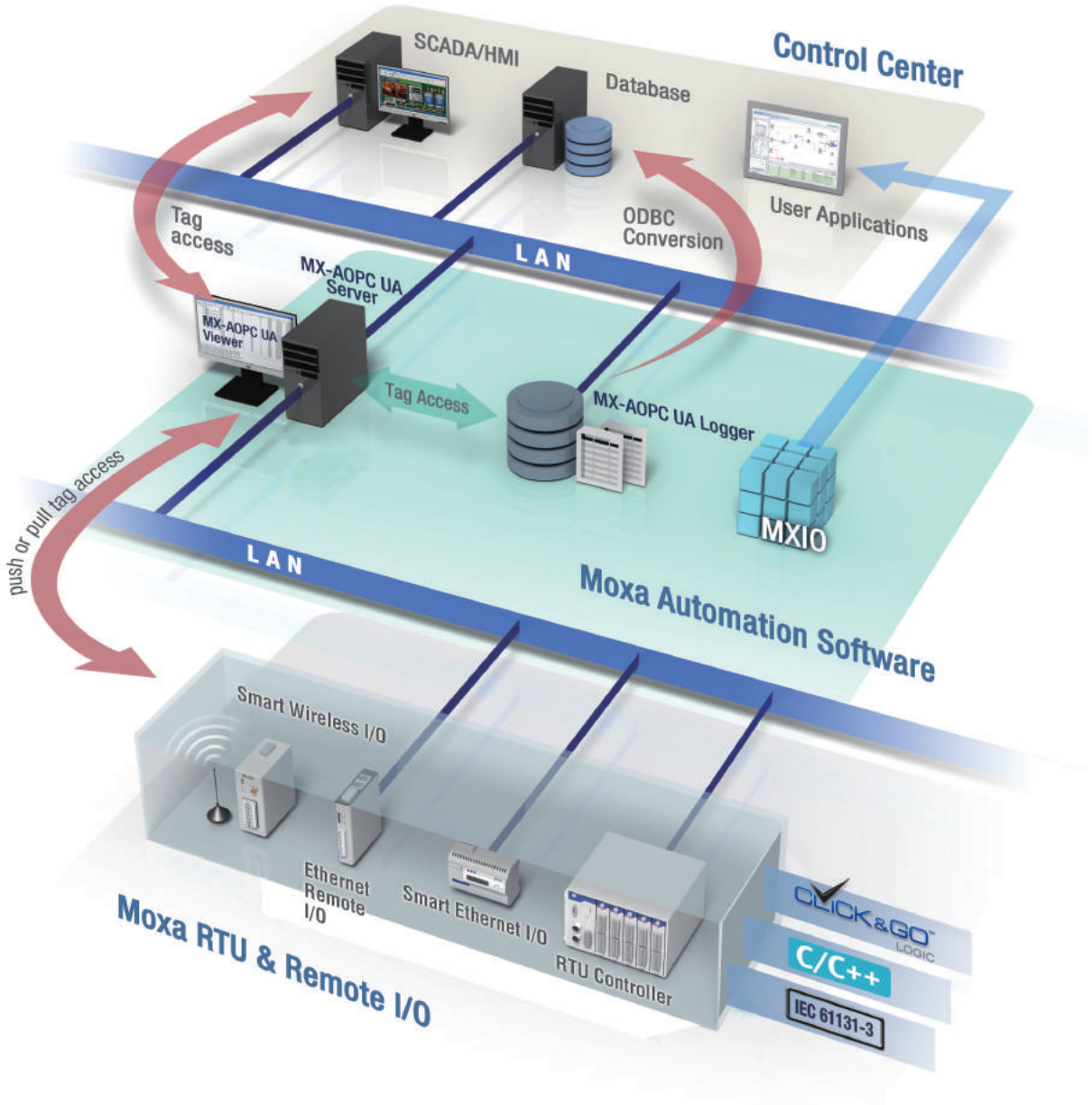
MXIO Programming Library: For handy management of I/O devices . . . . . 18-6




# Introduction to Automation Software

Moxa's automation software includes the MX-AOPC UA Suite and the MXIO programming library. The MX-AOPC UA Suite consists of MX-AOPC UA Server, MX-AOPC UA Viewer, and MX-AOPC UA Logger; it is a unified architecture that brings together remote industrial control systems from discrete stations and unifies them under a single, centralized monitoring and control system. MX-AOPC UA Server expands upon Moxa's patented Active OPC monitoring technology, bringing Modbus protocol support, and providing a secure and reliable gateway between local devices and a remote SCADA system. MX-AOPC UA Viewer is an OPC client that allows users to easily view tag values and MX-AOPC UA Server status. MX-AOPC UA Logger is another handy client, which allows users to convert and upload data logs into a database. The MXIO Library offers a large repository of code for users to easily manage Moxa's RTU or remote I/O devices over an Ethernet network.





# MX-AOPC UA Suite

## *Cohesive, secure, and reliable connection between device, database, and SCADA*

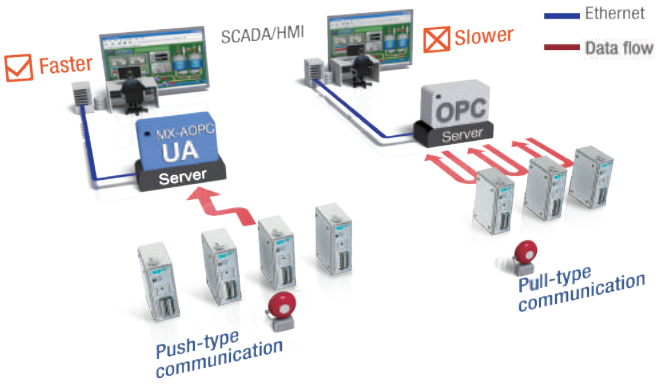

- First OPC UA server for industrial automation supporting both push and pull communication
- One-click active tag creation
- Efficient database uploads
- Automatic data updates from SD cards following network failures
- Simple and easy viewing of tag values and UA server status
- OPC UA: The next generation of interoperability, reliability, and security

## Introduction

The MX-AOPC UA Suite includes MX-AOPC UA Server, Viewer, and Logger, which are all based on the OPC UA (Unified Architecture) standard. OPC UA is the next generation OPC standard (IEC 62541), which provides a cohesive, secure, and reliable framework for accessing real-time and historical data. MX-AOPC UA Server not only inherits Moxa's patented active monitoring technology, but also supports Modbus protocol for polling data, to provide a secure and reliable gateway bridging edge devices to the SCADA system. MX-AOPC UA Viewer is an OPC UA client that allows users to easily view tag values and server statuses. MX-AOPC UA Logger is another handy client for converting and uploading data logs to the central database. With Moxa's MX-AOPC UA Suite, users can now instantly receive alarms, real-time updates, and save historical data, allowing for both timely risk prevention and solid maintenance response.

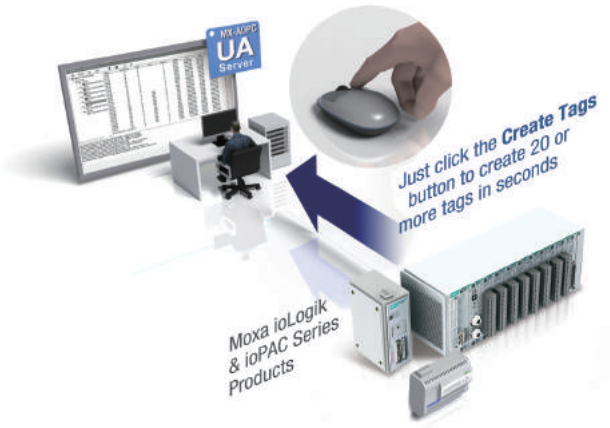
### First OPC UA Server for Industrial Automation Supporting both Push and Pull Communication

Moxa has pioneered the concept of "active type" OPC software in the automation industry. The patented MX-AOPC UA Server offers both polling and non-polling architectures alongside the standard OPC UA protocol, giving users the alternative of pull- or push-based communication from Moxa's devices. With push technology, I/O status is updated to MX-AOPC UA Server only when there is an I/O status change, a pre-configured interval is reached, or when a request is issued by a user. This application of push technology cuts metadata overhead, resulting in faster I/O response times and more accurate data collection than traditional pull-based architectures. With Moxa's "active technology" advantage, users can now instantly receive alarms and real time updates, allowing for timely risk response.



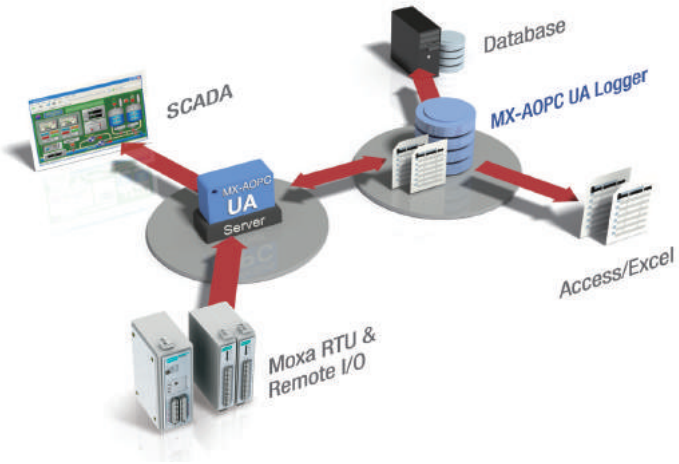

### One-Click Active Tag Creation

MX-AOPC UA Server supports automatic tag generation, which eliminates the headache of specifying individual target IP addresses, I/O channels, and data formats, and does away with the need to edit and import configuration files. Working from Moxa's utilities, users only need to select specific tags, set the update criteria, and then click a single button for their active tags to be automatically generated and configured.



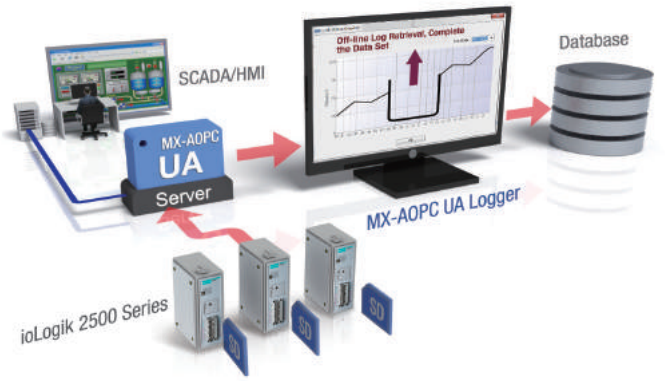
## Efficient Database Uploads

With most remote data acquisition systems, during daily operations additional human resources are needed to collect data manually from remote storage devices for loading into a database. Even with RTUs remotely collecting data over the network, software must be developed to handle the task of converting and uploading these data logs. Moxa's MX-AOPC UA Logger not only makes real-time data collection much easier, it also simplifies the conversion of historical data into database-ready formats. MX-AOPC UA Logger interacts directly with our MX-AOPC UA Server, working as a bridge between field data and stored databases or spreadsheets. Furthermore, the MX-AOPC client converts and uploads data logs to the central database. The MX-AOPC UA Logger can collate tags from individual Moxa RTUs or remote I/O devices into the same database or spreadsheet, freeing users from the need to manipulate data after processing.




## Automatic Data Updates from SD Cards Following Network Failures

One of the benefits of using RTUs is that data can be collected over a network from a central site. In an ideal operation, following a network failure RTUs should be able to transmit data logs that were collected while the network was offline. Moxa's MX-AOPC UA Logger makes this not only possible, but easy. MX-AOPC UA Logger provides a standard OPC interface that interacts with MX-AOPC UA Server for real-time data collection. After each network connection, MX-AOPC UA Logger will compare historical data stored on the SD cards located in individual devices with the real time data it has already stored locally, and then supplement any missing data by requesting that the RTU retransmit the lost data.




## Simple and Easy Viewing of Tag Values and UA Server Status

MX-AOPC UA Viewer is an OPC UA client that allows developers, testers, and integrators to easily view tag values and test MX-AOPC UA Server and connections. The viewer's intuitive user interface makes it easy to read data and server status. With this handy client tool, users can complete OPC server settings sooner than ever.

## OPC UA: The Next Generation of Interoperability, Reliability, and Security

Moxa's MX-AOPC UA Suite is designed based on the OPC Foundation's UA (Unified Architecture) specification. OPC UA is a new technology that features more secure and reliable data communication between OPC servers and clients. It ensures protection against unauthorized access or sabotage of process data, as well as against errors due to careless operation. In addition, OPC UA defines a robust architecture with reliable communication mechanisms, configurable timeouts, and automatic error detection/recovery mechanisms. By using Moxa's MX-AOPC UA Suite, users can enjoy more secure and reliable data exchange and control.

## Specifications

### Hardware Requirements

**CPU:** Intel Pentium 4 or above
**RAM:** 512 MB (1024 MB recommended)
**Communication Interface:** Ethernet or serial

### Software Requirements

**Operating System:** Microsoft Windows 7/8/10, Microsoft Windows Server 2003/2008/2012
**Editor (optional):** Microsoft Office 2003 (Access or Excel) or later
**Database (optional):** Oracle database, Microsoft SQL Server

### OPC UA Server Specifications

**OPC Unified Architecture:** 1.01
**OPC Data Access:** 1.0a, 2.0, 2.05a, 3.0
**Device Protocols:** Moxa AOPC, Modbus/TCP (master), Modbus/RTU (master)

### OPC UA Logger Specifications

**OPC Unified Architecture:** 1.01

### Products that Support the AOPC Protocol

**Series Names:** ioLogik 2500 series, ioLogik E1200 series, ioLogik E1500 series, ioLogik E2200 series, ioLogik E4200, ioLogik W5300 series
Note: Please check Moxa's website for the most up-to-date list of supported products.

## Ordering Information

### Available Versions

**MX-AOPC UA Server (trial version):** 30-day trial version that supports up to 30 device connections (now available for download from Moxa's website)
**MX-AOPC UA Server (free version):** Free version that supports up to 30 device connections, with unlimited runtime operations (download trial version first; requires registering your PC User Code* on Moxa's website at http://license.moxa.com/)
**MX-AOPC UA Server (paid version):** Unlimited device connections and runtime operations (requires purchasing a registration code from Moxa)
**MX-AOPC UA Logger (trial version):** 30-day trial version that supports up to 1 MX-AOPC UA Server connection and up to 1 data logger (now available for download from Moxa's website)
**MX-AOPC UA Logger (free version):** Free version that supports up to 1 MX-AOPC UA Server connection and up to 1 data logger, with unlimited runtime operations (download trial version first; requires registering your PC User Code* on Moxa's website at http://license.moxa.com/)
**MX-AOPC UA Logger (paid version):** Up to 2 MX-AOPC UA Server connections and up to 10 data loggers and runtime operations (requires purchasing a registration code from Moxa)

***How to Obtain a PC User Code:**

1. Select the Help menu from MX-AOPC UA Server or Logger, and then click Licensing > License Info
2. After registering, save the license file to your PC.
3. Unzip the file and then import it into MX-AOPC UA Server or Logger from Help > Licensing > Add License File

# MXIO Programming Library

## *For handy management of I/O devices*

### An Intuitive Method for Obtaining Remote I/O Data

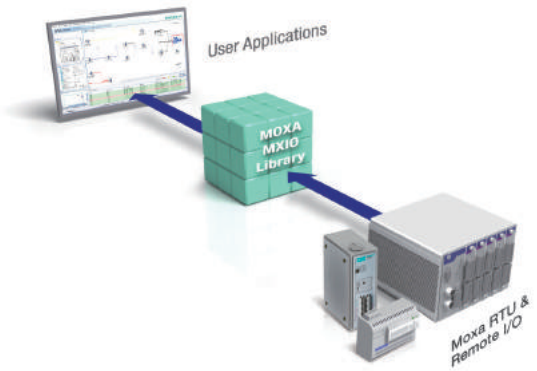
The MXIO Library is a set of programming tools for developing data management applications for use on Ethernet or RS-485 networks linking Moxa's RTUs and remote I/O devices. It includes direct I/O command sets that provide a more intuitive method for obtaining I/O data. Software developers no longer need to study the complex Modbus protocol to manage I/O monitoring and control functions, and engineers can obtain I/O data by using MXIO's direct I/O commands to access any I/O point or channel with ease.

### Reduce Development Times with a Large Code Repository

The MXIO library includes many examples of sample code to help programmers reduce software development time and quickly get familiar with the API. Developers can call MXIO functions and demo programs as soon as they have installed the library.

### Fully Exploit Active Communications

The MXIO Library provides active functions for receiving I/O configurations and status updates from Moxa's RTU and remote I/O products. With revolutionary push technology, users can benefit from faster and more accurate data collection than traditional polling servers.




## Specifications

### Hardware Requirements

**CPU:** Intel Pentium 4 or above
**RAM:** 512 MB (1024 MB recommended)
**Network Interface:** 10/100M Ethernet

### Software Requirements

**Operating System:** Microsoft Windows 7/8/10, Microsoft Windows Server 2003/2008/2012, Linux Debian 7.8
Note: Please check Moxa's website for the most up-to-date supported operating systems.

### Supported Products

**Series Names:** ioLogik 2500 series, ioLogik E1200 series, ioLogik R1200 series, ioLogik E1500 series, ioLogik E2200 series, ioLogik R2140, ioLogik E4200, ioLogik W5300 series
Note: Please check Moxa's website for the most up-to-date supported products.

## 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 25 years of industry experience, Moxa has connected more than 40 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.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