Introduction to Remote I/O

Moxa’s remote I/O modules are compact and highly reliable, and can be easily connected to a broad array of analog and digital I/O devices. Moxa’s remote I/O solutions support the standard Modbus/TCP protocol, which is compliant with most SCADA software, to facilitate integration with existing systems. For real-time communication with the remote control center, the patented Active OPC Server’s push-based technology allows instant reports from the remote I/O to the HMI/SCADA systems via “active” tags. With the built-in web console, setup is quick and easy; a web browser is the only software you will need to set the monitoring and control parameters. Moxa offers three different types of remote I/O products: Ethernet remote I/Os, serial remote I/Os, and modular remote I/Os.

Remote Data Acquisition Solution

Visits to remote control and monitoring sites are not only time-consuming and inefficient, but also costly. With Moxa’s remote I/O solutions, visits to the remote sites are no longer necessary, and if your equipment is down you will be immediately notified—even if you are miles away from the remote site. For the majority of distributed systems, cable deployment can be a nightmare; with Moxa’s ioLogik E1200 series, wiring has never been easier thanks to its daisy-chain topology ability. ioLogik 4200 products support up to 256 DI/DO points or 64 AI/AO points and are perfect for applications that require flexible I/O combinations.

**Ethernet Remote I/O—E1200 Series**
- Daisy-chain topology
- Peer-to-peer communication
- User definable Modbus/TCP addressing
- Push-based Active OPC

**Modular Remote I/O—E4200**
- Slice-type form factor
- Flexible I/O combinations, up to 256 I/O channels
- Click&Go local intelligent control
- Dual-LAN redundancy
- Push-based Active OPC
The ioLogik E1200 remote Ethernet I/O allows you to create daisy-chain topologies for flexible device cabling. In a distributed Ethernet data acquisition application, panels, units, and cabinets are often located at remote sites where space is limited. Daisy-chaining ioLogik E1200 units to each other or other nearby Ethernet devices not only saves space, but also drastically reduces cabling and deployment time.

For some remote automation applications, the control room and sensors are located far away from each other, and often a single remote I/O module is deployed to collect data from all the sensors. Peer-to-peer communication has little or no limitations as it replaces cables by integrating multiple I/O signals over a single network cable to transmit input-to-output controls without the aid of PLCs or controllers. With the peer-to-peer communication feature, which supports channel-to-channel mapping, the ioLogik E1200 allows simultaneous multiple target transmissions. In addition, the ioLogik E1200 supports up to 16 channels for transmission over Ethernet (based on an emitter and receiver I/O pair).

For Modbus devices that are controlled and detected by fixed addresses, users need to spend a vast amount of time researching and verifying the configurations. Users need to locate each device’s detailed information, such as the I/O channel and the addresses as defined by the vendors to enable the initial address or the 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 the definitions, users simply configure the function and address map to fit their needs.
Active OPC Server Lite™ is Moxa’s free software package that operates as an OPC driver for HMI/SCADA systems to achieve faster response time with low network bandwidth consumption. Conventional OPC servers typically use a polling method to connect to Ethernet I/O devices, which continuously send commands to collect relevant data. Moxa’s Active OPC Server Lite offers active, or “push” communications, which enables Moxa’s remote I/O products to provide HMI/SCADA systems with instant I/O status reports by using “Active Tags,” and use less bandwidth compared to the polling method.

**Push-based Active OPC Server for Seamless Connections to SCADA Systems**

Conventional OPC servers use a polling method to connect to Ethernet I/O devices, which continuously send commands. Moxa’s Active OPC Server Lite™ offers active, or “push” communications, which enables Moxa’s remote I/O products to provide HMI/SCADA systems with instant I/O status reports by using “Active Tags,” and use less bandwidth compared to the polling method.

**Active MXIO Library for Effortless Programming**

Moxa’s MXIO library supports the Windows, WinCE and Linux operating systems, as well as the C++, VB/VC, and .NET development platforms. The library’s large repository of C# and Visual Basic sample code makes it easy to use high-level computer languages to manage I/O devices and data transfer operations over an Ethernet network. In addition, the MXIO library’s active communication feature allows customized software developers to enjoy the benefit of push technology to receive I/O tags actively and reduce network traffic up to 80%.

**Easy Maintenance**

The ioLogik E1200 is designed with a vertical form factor, and can be either DIN-Rail or wall mounted. A stress-relief connector at the bottom of the ioLogik E1200 prevents the wiring from being inadvertently pulled out.

**Applications—Wind Power Transformer Room Monitoring**

In recent years, renewable energy such as wind power has become more ubiquitous than ever. However, electricity from wind turbines is erratic, and such fluctuations and interruptions can cause instability of the power grid. The reason is that a drop in power at one point can cause power surges elsewhere, which causes switches to short circuit to counterbalance for the surges, which can result in blackouts. To neutralize these fluctuations, wind-generated electricity must first go through a transformer to even out the power voltage prior to transmission. Transformers are indispensable to power systems since they ensure reliable operations. To avoid power failures, it is imperative to monitor the status of the transformers; Moxa’s ioLogik E1200 series is perfect for monitoring transformers, oil temperature, and gas pressure release and leaks thanks to its mixed I/O combination. The ioLogik E1200 series comes in a compact form factor, enjoys a wide operating temperature to ensure reliable performance in harsh environments, and has a unique active tag function that reduces the PC’s workload.
The unique modular construction of the ioLogik E4200 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 E4200 features an industrial modular housing that allows up to 16 I/O modules to be added to the base unit without a backplane. The size of each module is merely 12 mm, and at a full load of 16 modules, the total size is less than 25 cm—perfect for space-limited applications. The ioLogik E4200 provides up to 256 DI/DO points or 64 AI/AO points for greater flexibility and expandability. The modules can connect to virtually any type of sensor, including temperature, pressure, flow, voltage, current, and contact closure sensors.

The patented Click&Go event-based control logic offers local control without the need to communicate with the remote host. Click&Go’s intuitive, graphical interface and simple IF-THEN-ELSE control logic, which defines how the ioLogik E4200 will respond to different events, is easy and straightforward to set up. Click&Go supports active communication methods, including TCP, UDP, SNMP Trap, email, and CGI commands, making it extremely easy to integrate Click&Go with any monitoring system.

Can add up to 16 modules, total size less than 25cm

Reliable Dual-LAN Redundancy

The ioLogik E4200 modular remote I/O comes with dual network interfaces, which have separate MAC and IP addresses for connecting to different network segments. Redundancy to improve system reliability can be easily implemented by allowing hosts located on different networks to control or monitor the systems.

Click&Go™ Code-free Local Intelligent Control

The patented Click&Go event-based control logic offers local control without the need to communicate with the remote host. Click&Go’s intuitive, graphical interface and simple IF-THEN-ELSE control logic, which defines how the ioLogik E4200 will respond to different events,
Remote I/O

Easy Maintenance

The ioLogik E4200 and ioLogik 4000 series come 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.

Applications: Unmanned Server Room Monitoring

Unmanned server room monitoring, which helps to reduce downtime and operational expenses, is typically a top priority for most businesses. Using proper remote monitoring devices will not only protect your servers but also ensure immediate notification when there is a threat. In a server room, there are many critical environmental parameters such as, temperature, humidity, leakage, and smoke that need to be monitored to prevent damage to equipment and to avoid downtime. The ioLogik E4200 modular I/O offers superb flexibility with features such as the analog and digital I/O combination for connecting various sensors and the exclusive free SMS alarm notification. The ioLogik E4200 has built-in SMS capability that is simple to configure using the intelligent Click&Go control logic. In addition, the ioLogik E4200 supports most commonly used SNMP protocols to allow the use of user-definable SNMP traps.