Unlock the full potential of your automation architecture.

PlantStruxure™
Automation control solutions based on Modicon Quantum Ethernet I/O

Make the most of your energy™

Schneider Electric™
Quality at the heart of your system

Modicon Quantum™ Ethernet I/O (QEIO) is an automation control solution designed specifically for industrial automation and process applications.

It supports remote I/O architectures and adapts to your current system requirements, remaining open to future modifications as your installation evolves.

The Modicon X80 drop is a cost-effective solution based on the Modicon M340™ form factor, enabling you to develop a compact and robust architecture.
QEIO is an integral part of the PlantStruxure™ solution, a collaborative architecture that allows industrial and infrastructure companies to meet their automation needs and, at the same time, deliver on growing energy management requirements.

In a single environment, measured energy and process data can be analyzed and used to yield a holistically optimized plant. The PlantStruxure architecture is easy to engineer and maintain, delivering a clear picture of what is happening in your process and helping you drive increased return on assets.

RIO: Remote I/O (based on EtherNet/IP™)
DIO: Distributed I/O (based on Modbus TCP)
QEIO: Quantum Ethernet I/O (including Ethernet DIO and RIO)
QERIO: Quantum Ethernet Remote I/O
PAC: Programmable Automation Controller
DRS: Dual Ring Switch
SCADA: Supervisory Control and Data Acquisition
Modicon X80 is modern, compact, and robust. By offering an extensive catalog of I/O and communication modules, it helps you achieve and maintain long-term system optimization.

**Standard**

QEIO is based on EtherNet/IP which is promoted by Open DeviceNet™ Vendor Association (ODVA). Standard network infrastructure devices, tools, and network analyzers help simplify maintenance and training.

**Available**

High process availability is a key requirement for many systems. If a connection is lost at a single device, QEIO keeps your process running with minimal disruption.

**Scalable**

As your application evolves, our solution can be adapted without making extensive modifications. The versatility of QEIO makes it easier to add sensors/actuators and other devices.

**Simple**

QEIO simplifies management of your I/O. They can be accessed and adjusted through a single configuration software, Unity™ Pro.

**Long-term**

Modicon X80 uses the same standard I/O modules as the existing Quantum S908 architecture. To simplify the upgrade of your installation and reduce the cost, you can mix the new Ethernet RIO with your Quantum S908 bus on the same controller.

**Modicon Quantum Ethernet RIO**

- Front display for diagnostics in compliance with the ODVA standard
- Port linking to Ethernet module allowing mix of DIO and RIO on the same cable
- Service port to connect PC, local HMI, or DIO devices
- Two ports support self-healing daisy chain loop

**Dual ring switch**

- Supports managed and unmanaged network devices
- Draws a topology map showing interconnections between devices
- Developed for configuration and supervision of industrial networks
- Can be used to supervise devices from any manufacturer
- Provides interfaces to SCADA system

**Head-end adaptor**

140 CRP 31200

**ConneXium™ extended manageable ConneXium Network Manager**

**Drop adaptor**

140 CRA 31200

**Drop adaptor**

BMX CRA 31200 or 31210

- Rotary switches to configure drop address
- Service port* to connect a PC, local HMI, or DIO cloud
- Two ports support self-healing daisy chain loop

*Not available on BMX CRA 31200

**Extend your existing installed base**

QEIO uses the same standard I/O modules as the existing Quantum S908 architecture. To simplify the upgrade of your installation and reduce the cost, you can mix the new Ethernet RIO with your Quantum S908 bus on the same controller.
More flexibility and higher performance for your architecture

The QEIO solution is based on our current Modicon Quantum offer, using the same I/O modules. This flexible system enables the design of efficient I/O architectures that meet the requirements of many control applications.

Choose an I/O bus architecture based on Ethernet to remove the limitations of traditional, proprietary network topologies and access increased network flexibility and high-level performance.

Flexible

> You didn’t plan a future extension of DIO?
No need to add cables! Just connect your new DIO island to the existing QEIO network via a service port or switch. It is possible to mix DIO and RIO on the same media.

> Expand your architecture
Up to 31 drops of QEIO. Each drop can be one or two racks, each rack four to 16 slots. This evolution of QEIO allows Modicon X80 to be used as I/O drops for more flexibility.

> For connecting your devices
Easy addition of instrumentation using FDT/DTM technology.

> For the online modification of your installation
Add an I/O module or a new Ethernet drop without stopping your process using the Change Configuration on the Fly (CCOTF) function of Unity Pro software. Benefit from the continuity of communication with your SCADA system due to the OPC Factory Server during the online changes. Adding a drop in RUN is only available on 140CPU6x2xx processors.
Performance

- The Quality of Service (QoS) function allows deterministic operation of QEIO
- For large I/O configurations, performance level is higher than many proprietary RIO buses
- The OPC Factory Server improves communication between SCADA systems and Modicon Quantum PAC

More Freedom

- Stay connected everywhere via the embedded service ports on the CRA/CRP modules
- Unity Pro software: maintenance or modification of application
- HMI: no extra design cost to add an HMI
- DIO cloud: connect your I/O devices without additional hardware

Efficiency

- With the new Modicon X80 time-stamping module, you can easily manage your sequence of events from I/O to SCADA without any specific development

More I/O capacity

- 400 words IN
- 400 words OUT per RIO drop

Increased bandwidth

- x12 for a solution on OPC
High availability

> With hot-standby CPU
Choose the Modicon Quantum HSBY CPU compatible with the QEIO solution

> With RIO self-healing daisy chain loop
RIO communication modules include a dual Ethernet port. These two copper ports provide RIO communications with the capability to recover rapidly from a break in the communication cable

> With redundant DRS switch
Improve the availability of your Ethernet RIO sub loop

Loop recovery in 50 ms or less with 31 RIO drops

Long-term benefits

- Integrated with PlantStruxure architecture
- Modicon solution
- Based on Ethernet
- Compatible with the existing Modicon X80 solution (RIO or DIO)

Easy access

- Web page view of RIO network
- Program viewer via FactoryCast

Up to 1.5 MB of data can be exchanged between HSBY Modicon Quantum CPUs during every program scan

> Quantum ERIO statistics available
- Easy to monitor health of Quantum Ethernet RIO via browser
- Both CRA and CRP statistics available
- Rack viewer function for Quantum available on Ethernet module
See what your automation architecture can do!

With PlantStruxure Quantum Ethernet solutions, you improve the productivity of your process and build a balanced automation control application.

- Cost-effective solution with copper to fiber transceiver in rack
- Ethernet topology: daisy chain loop, ring, star, bus
- Copper or fiber optic: EMC and distance
- ConneXium dual ring switch, up to two levels of rings and up to 15 independent subrings
- Unity Pro software
  - 5 IEC languages (Ladder Logic, Derived Function Block, Structured Text, Sequential Function Chart, and Instruction List)
  - LL984 language (classic 984 Ladder Logic editor)
  - Simulation
- Continuity of communication with SCADA (OFS)
- Transparent access: Web view of RIO in Ethernet modules and web pages through in-rack router module
- Services port: access from anywhere or on CRA/CRP for local HMI*, Unity Pro software*, ConneXium
- High-availability solutions
  *Via Ethernet module
- Optimally sized modular drops
- Greater number of analog modules per Quantum drop: I/O drop increased (400 words in, 400 words out)
- Data exchange 1.5 MB HSBY CPU
- Predictable ART (application response time)
- SCADA and embedded routing functionality in the controller
- Data exchange 12x bandwidth SCADA
- Monitor your network using ConneXium Network Manager software
- Web RIO vision via the rack viewer function in Ethernet module
- Program viewer
- Access to standard Unity Pro software maintenance key values (for example, diagnostics)
- Standard Ethernet tools for maintenance: Wireshark
- Continuity of communication with SCADA (OFS)
- Transparent access: Web view of RIO in Ethernet modules and web pages through in-rack router module
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- Access to standard Unity Pro software maintenance key values (for example, diagnostics)
- Standard Ethernet tools for maintenance: Wireshark
- With CCOTF (change configuration on the fly), you can add a complete drop online without stopping the process*
- Flexible architecture — you can extend new Ethernet RIO on existing Quantum PAC with S908 RIO by adding Ethernet CRA/CRP
- QEIO uses the same I/O modules as Quantum S908, so your existing systems can be upgraded by changing only CRA/CRP modules and wiring CRA/CRP

*Only available on 140CPU6x2xx
Unlock the potential of your automation control system.

Discover the new Modicon Quantum Ethernet I/O.
PlantStruxure, the optimized and scalable architecture

Ethernet everywhere
- Deterministic
- Mixing RIO and DIO
- High availability:
  - Dual port
  - Provides interfaces to SCADA system
  - Rings, subrings with 50 ms recovery time
  - Hot-standby PAC

Fieldbus connectivity
- Based on remote masters and FDT/DTM

Modicon X80, the new RIO solution

Latest I/O technology
- Innovative I/O
- International certifications (including marine)
- Hot swap
- Large I/O catalog: existing modules are supported, except AS-I, NOR, SSI
- One drop can support two racks along 30 m
- Maximum number of supported X80 drops: 16 for 140CPU6x1xx and 31 for 140CPU6x2xx

New functionalities
- Modbus serial link in your drop
- Sequence of event time-stamped at source in a solution mode

High-level services
- Through Unity Pro software
- With structured data (Device DDT), simplifying diagnostics
- Bit forcing to simplify simulation

<table>
<thead>
<tr>
<th>Modicon X80</th>
<th>vs</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical resistance</td>
<td></td>
<td>IEC 60068-2</td>
</tr>
<tr>
<td>Shock [27 Ea]</td>
<td>30G</td>
<td>x2</td>
</tr>
<tr>
<td>Vibration [6 Fc]</td>
<td>3G</td>
<td>x3</td>
</tr>
<tr>
<td>Electrical resistance</td>
<td></td>
<td>IEC 61000-4</td>
</tr>
<tr>
<td>Radiated field</td>
<td>15V/m</td>
<td>+50%</td>
</tr>
<tr>
<td>Electrostatic discharge</td>
<td>8 kV</td>
<td>+30%</td>
</tr>
<tr>
<td>Environmental resistance</td>
<td></td>
<td>IEC 61000-4</td>
</tr>
<tr>
<td>Temperature</td>
<td>0 ... 55 °C</td>
<td>+5 °C</td>
</tr>
<tr>
<td>Robust offer M34OH</td>
<td>-25 ... 70 °C</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>4,000 m</td>
<td>x2</td>
</tr>
</tbody>
</table>

Mechanical resistance
- Shock: 30G x2
- Vibration: 3G x3

Electrical resistance
- Radiated field: 15V/m +50%
- Electrostatic discharge: 8 kV +30%

Environmental resistance
- Temperature: 0 ... 55 °C +5 °C
- Altitude: 4,000 m x2
## Selection guide

<table>
<thead>
<tr>
<th></th>
<th>Modicon X80 drop</th>
<th>QERIO drop</th>
<th>Q5908 drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Certification</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Robustness</td>
<td>✔ ✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Modbus serial module</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Time stamping 1 ms (ERT)</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Time stamping 10 ms (CRA)</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Time stamping solution mode</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Redundant/summable power supply</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Dual port**</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Embedded optical converter</td>
<td></td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>I/O services (DDT, forcing)</td>
<td></td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Easy wiring for remote I/O bus</td>
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<td>✔</td>
<td>✔</td>
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<tr>
<td>Openness to partner’s modules (CAPP)</td>
<td></td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Broken wire detection</td>
<td></td>
<td>✔</td>
<td>✔</td>
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</tbody>
</table>

*More than standard  
**X80 and QERIO support self-healing daisy chain loop

### Change configuration on the fly

<table>
<thead>
<tr>
<th></th>
<th>Modicon X80 drop standard</th>
<th>Modicon X80 drop performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert modules</td>
<td>Nom*, ERT, EHC (up to 36 expert channels)</td>
<td>X</td>
</tr>
<tr>
<td>Maximum analog I/O</td>
<td>16</td>
<td>256</td>
</tr>
<tr>
<td>Maximum digital I/O</td>
<td>128</td>
<td>1,024</td>
</tr>
<tr>
<td>Service port</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*Max number of Nom per drop: two

QERIO drop: Less limit for the number of I/O per drop  
Nom: Module including two serial ports  
ERT: Time-stamping module  
EHC: Counting module  
CAPP: Collaborative Automation Partner Program

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For more information, visit [www.schneider-electric.com/us](http://www.schneider-electric.com/us) and enter key code t978v.