



## Orion Substation Automation Platform

The Orion Family of Substation Automation Platforms—OrionLX, Orion5rL, Orion5r and Orion5—are designed to perform a range of automation applications in electrical substations. A single Orion may be configured to replace multiple legacy boxes in a substation—reducing hardware, design, wiring, and panel costs.

### New! Configuration Videos

[Configuring Orion as a Smart RTU for SCADA Applications](#)

[Configuring Orion as a Distribution Automation Controller](#)

[Configuring Bitronics 50 Series IEDs](#)

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Pre-configured "point pick lists" for most vendors' intelligent electronic devices (IEDs), extensive diagnostic LEDs and a built-in communications analyzer reduce integration time and errors. In contrast to other automation processors, Orion software features and configurations are seamlessly transferable from one generation to the next.

Orion's balance of versatility and ease of use have made it the leading flexible substation automation platform\* and the choice of 100 new utility customers in the past five years.

\* Newton Evans, 2008

### Typical Applications

**Orion Smart RTU** The Orion Substation Automation Platform can be configured as a "Smart" electrical substation RTU. Equipped with SCADA and IED communication protocols, modular communication cards and software features, Orion can obtain nearly all of the discrete and analog data from IEDs and present it to one or more SCADA masters. Rugged Orion Distributed I/O modules are available to connect to inputs and outputs not available from IEDs.

**Orion Secure Substation Gateway** The OrionLX and Orion5rL models are equipped with [powerful security features](#), including user password groups with varying privileges, firewall, secure protocols, key management and logging, all engineered to meet or exceed emerging NERC CIP requirements. This secure Orion front end can replace expensive secure routers and firewalls.

**Orion Math and Logic Controller** Orion offers a toolkit to logically and arithmetically manipulate any data point retrieved from any IED, adding intelligence to alarming schemes and reducing the need to process data downstream. The optional Orion LogicPak module provides five preconfigured logic operations: And, Or, Negate, Primary-Secondary, and LocalRemote. Configuration is accomplished using drag-and-drop without any scripting.

### Orion Distribution Automation (DA) Controller

The [Orion DA Logic](#) option enables Orion to function as an independent DA Controller in a single or multi-feeder, single or multi-substation Distribution Automation (DA) System. Orion DA Logic polls substation IEDs and feeder-mounted IEDs for system information, analyzes the data, and initiates trip-close commands to isolate permanent faults and restore service to unfaulted feeder sections.

### Orion Relay Communication Processor

Orion's offers "port switch" and "communication processing" features to enable engineers and asset managers to directly access critical data from protective relays, recorders and monitoring equipment, including: relay settings, fault records, oscillography records, and breaker and transformer health. Orion offers keystroke-by-keystroke emulation of SEL® communication processors.

### Orion Local Substation HMI

[Orion WEBserver](#) provides web-based visualization of substation data via a standard web browser. Users can create custom screens to display animated substation one-line diagrams, alarm summaries, sequence of events records and trends. Password-protected drill-down screens can also be set up to control breakers, view IED data and pass through to IEDs.

### Orion Sequence of Events Recorder and Alarm Annunciator

The Orion Alarm/Archive/Retentive option enables any IED point to be archived in a resident SQL database. Archive and alarm parameters can be configured for each point, creating a flexible Alarm Annunciator and Sequence of Event Recorder (SER). Alarm and SER points can be easily viewed with any browser, or users can directly access using SQL queries.

### Configuration Videos

To learn more about how Orion is configured for various applications, watch these videos:

Configuring Orion as a Smart RTU for SCADA Applications: Part 1 of 2

Configuring Orion as a Smart RTU for SCADA Applications: Part 2 of 2

## Key Design Features

### Rugged Like a Relay

- Meets ANSI C37.90.1 2002 Fast Transient on I/O and power supplies and ANSI C37.90.2 1995 RFI to 35 volts per meter
- Direct fiber optic available on serial communication ports and Ethernet port
- Designed to operate over -40C to 70C, without heaters or fans

### Flexible and Modular Like a PLC

- Complete logic suite for local control and intelligent alarming
- Modular and expandable I/O
- Modular and expandable ports
- Non-volatile memory

### Standard PC Tools

- Large, expandable solid state memory
- SQL-compliant relational database
- Built-in 10/100MB Ethernet
- A variety of communication options such as webpages, sFTP, SSH, telnet and PPP

### Utility-Specific

- Complete Cyber Security package
- Built-in breaker control, counter and accumulator functions
- Momentary-Change-Detect function
- Full suite of utility protocols
- Support for bit synchronous communications

## OrionLX



[\(click to enlarge\)](#)

The OrionLX Substation Automation Platform is the next generation of the Orion product family, designed with more power for an expanded range of substation automation applications, including:

- Cyber Security to meet NERC CIP requirements
- Open-Source SQL-Compliant Database for storing non-operational data
- Cascaded Orions for the larger transmission substations
- Email SEL Event Reports

The OrionLX shares the same 2RU box dimensions and serial communications cards as the Orion5r, but adds:

- Expanded diagnostic LEDs
- Redundant wide-range power supplies
- Front and rear USB ports
- Fiber optic Ethernet port
- Expanded memory options

Configuration of the OrionLX—including the points read from IEDs, the points presented to SCADA, Math and Logic, and special functions for Sequence of Events, Alarm Annunciation and Distribution Automation—is accomplished using NovaTech Communications Director (NCD), the same license-free tool used to configure other Orion models. Below is a list of SCADA Master and IED protocols and devices supported in NCD and by Orion. Security-sensitive parameters, such as IP addresses, firewall settings, VPN, user names and passwords, are configured online through a standard browser. Configurations developed to run on the Orion5r can be run on the OrionLX after running through a conversion utility in NCD 3.0.

#### Orion5r / Orion5rL



[\(click to enlarge\)](#)

The Orion5r is a rugged, modular automation platform designed for harsh utility substation and process plant environments. The 2U 19-inch chassis supports up to seventeen user serial ports, one or two Ethernet TCP/IP ports, internal dial-up modem, IRIG-B, and four discrete inputs and outputs. Sixteen of the user ports can be ordered with RS-232, RS-422/485 or fiber optic connectors. The Orion5r contains no fans, no hard drives, and no moving parts. The Orion5rL is an Orion5r with a retrofitted CPU from the OrionLX, giving the Orion5rL all of the power and software features of the OrionLX - including Cyber Security. Contact your local salesperson or representative to schedule your Orion5-Orion5rL conversion.

#### Orion5 [back to top](#)



[\(click to enlarge\)](#)

The Orion5 provides the same processing power and much of the flexibility of the Orion5r in a transducer-sized form factor, making it ideal for pole-top and kiosk automation and communication applications. The transducer mount chassis supports one standard serial port, maintenance port and four discrete inputs and four discrete outputs. Options include Ethernet TCP/IP port, internal dialup model and expansion serial communication cards - up to eight serial ports; RS-232, RS-485 or fiber optic. The Orion5 contains no fans, no hard drives, and no moving parts.

#### Orion Support Website

An Orion Support Site is available for users of the Orion Substation Automation Platform. This site provides a list of Orions purchased, a file transfer section and software support for updating both the NCD configuration program and your Orions with the latest firmware. A user name and password can be provided by our support group in Lenexa, KS. Please call 888.451.1881 and ask for Sales Support. Orion Support Site located at <http://www.novatech-llc.com/cgi-bin/ntlogin.pl>

#### [Orion Web Demo \(Firefox Browser Required\)](#)

View webpages served from an Orion5r showing three Bitronics 70 Series IEDs and an Orion5r operating in a simulated substation. One-line diagram, bay diagrams, hardware overview, text pages, and alarm/sequence of events pages available to view.

#### IED Protocols [back to top](#)

- ABB DPU
- Areva KITZ
- Basler DFPR
- GE DLP
- IEC60870-5-103
- Modbus - Serial and TCP
- PG&E 2179
- SEL® ASCII
- SEL® Fast Operate
  
- Allen Bradley DF1
- Areva Optimho
- DNP3.0 Serial and TCP

- GridSense PAC
- Modbus Plus
- RFL
- SEL® Fast Meter
- SEL® Fast SER
- SPA
- TransData DTO

#### **SCADA Protocols and other Master Protocols**

- Betac
- CDC Type 1
- Harris 5000
- Modbus- Serial and TCP
- REDAC 70H
  
- Conitel-300, 2020
- DNP3.0 Serial and TCP
- Landis & Gyr 8979
- PG&E 2179
- TejasV

#### **Other Protocols**

- FTP
- NTP
- SNTP
  
- HTTP
- SNMP
- XML

#### **IED Vendors and Devices Supported**[back to top](#)

- ABB
- APT
- Basler
- Bitronics
- Energy Line
- ICMI
- Kelman
- Monaghan
- Power Measurements
- Satec
- Siemens
  
- Ametek
- Areva
- Beckwith
- Cooper
- Electro-Industries
- GE
- InCon
- NxtPhase
- Schweitzer (SEL® )
- Second Wind
- TransData

...and more. Additional device profiles can be easily generated using Microsoft Excel.