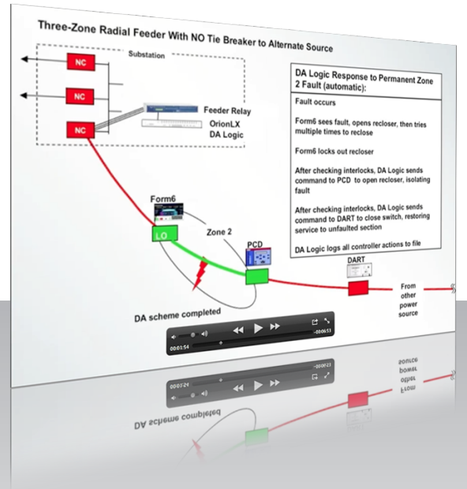


New Videos at www.novatechweb.com/DA

Check out our series of short videos detailing the setup and configuration of the Orion as a Distribution Automation (DA) Controller.

UPCOMING EVENTS

WPDAC
April 13 - 15
The Davenport Hotel
Spokane, WA

IEEE PES T&D Booth #441
April 20 - 22
New Orleans, LA

Kansas Municipal Utilities Annual Conference
May 12-14, Wichita, KS

Illinois Municipal Utility Association Annual Conference
May 18-19, East Peoria, IL

LATEST SOFTWARE

Orion5/5r Firmware Version: 1.4.1
OrionLX Firmware Version: 1.40.1
Orion NCD3 Version: 3.06
Bitronics 70 Series Firmware and Configurator: 3.02
BiView: 2.32

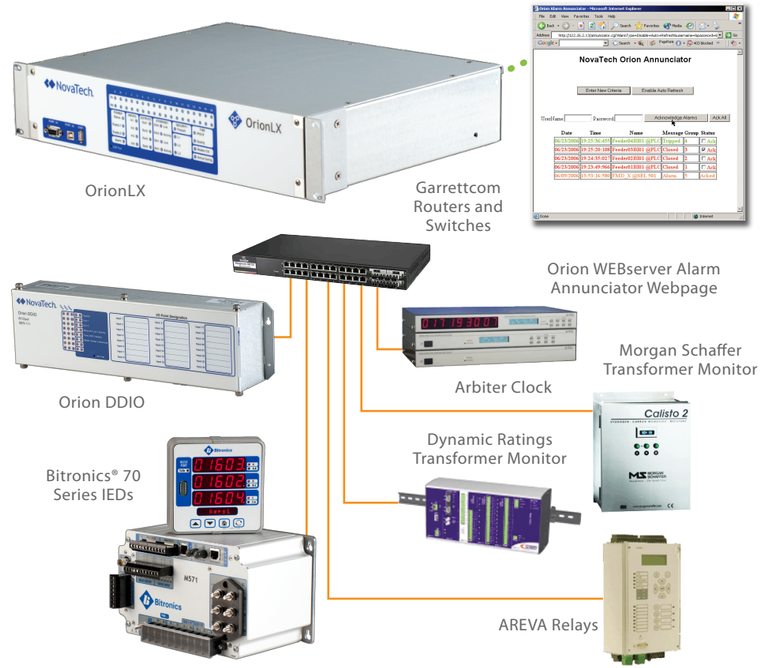
NovaTech®
Corporate Communications
11500 Cronridge Drive, Suite 110
Owings Mills, MD 21117

TECHTALK
NovaTech, LLC
Volume 6
Spring 2010

Peak Measure Technical Symposium Focuses on Orion Connectivity

The Northwest Substation Automation & Utility Symposium hosted by NovaTech sales representative Peak Measure June 15-16 in Seattle, WA will include demonstrations of:

- Orion IRIG-B and NTP interface to Arbiter Systems precision timing products
- Orion DNP3 integration with AREVA protective relays and Morgan Schaffer dissolved gas transformer monitors
- Dynamic Ratings transformer monitors, and Bitronics® 70 Series Disturbance Recorders over Ethernet connections
- Orion integration with Orion DDIO Remote I/O, distributing IRIG-B and supporting dual comms
- Orion monitoring and diagnostics of all connections and communications
- Orion WEBserver Alarm Annunciation webpage for all IEDs
- Telemetric interface to Bitronics 70 Series IEDs
- Garrettcom Magnum switches and routers connecting seven Ethernet IEDs in a secure fiber optic ring



The OrionLX will connect and configure communications to all the IEDs above and present their data via served webpages. The symposium will also include application presentations by local users.

Upcoming Paper Presentations

Graceton Substation Required Disturbance Monitoring Equipment PRC-002-RFC-01
(Winning Project - 2009 SEE Industry Excellence Awards)
by Michael S. Smith, Lead Engineer/Work Leader - Baltimore Gas and Electric
Thursday, June 24, 2010
Southeastern Electric Exchange Engineering & Operation Conference, Miami FL

Summary: Capitalizing on modern communication protocols in today's IEDs allowed BGE to utilize a distributed fault recording design in efforts to meet required PRC monitoring.

Controlled Switching Systems (CSS)
by Tommy Salmon, Dominion Virginia Power & Bryan Gehringer, Bitronics, LLC
Tuesday, May 4, 2010
Georgia Tech Fault and Disturbance Analysis Conference, Atlanta GA

Summary: In Controlled Switching Systems (CSS) used to operate transmission shunt capacitor banks, there is a need for a monitoring tool to gather forensic evidence of capacitor switching misoperations. This tool should integrate data available from the entire system – the controller, the breaker, protective relays, and the capacitor bank itself. This paper describes the development of such a tool, problems that motivated taking action, misoperations that were diagnosed, equipment failures that may have been averted, and new challenges posed by wide deployment.

New Bitronics 50 Series Meter: M350 V3 & A3

In addition to completing first customer deliveries for the M650 multifunction meters, Bitronics is now accepting orders for the M350 family of 3-phase ammeters and voltmeters. The M350 V3 is a 3-phase voltmeter, while the A3 is a 3-phase ammeter with amp demand included. These meters offer most of the same features and options as the M650 including flexible communications for serial, Ethernet or transducer output, and standard web interface and front capacitor sense buttons for easy setup.

Pepco Update

In our Winter issue, we described a major RTU project at Pepco. As of today, the team has successfully installed all nine cabinets in eight substations, the last four installations requiring only 1.5 days each.

View the complete Success Story at:
www.novatechweb.com/pepco

Integrate 100+ IEDs with "Cascading Orions" Feature on OrionLX

Cascaded Orions (options #97 for Master and #98 for Slave) allows creation of configurations for multiple-OrionLX systems without having to define Master and Slave DNP3 transfers between Orions. In Cascaded Orions, a master configuration is created defining all Master ports on Slave and Master OrionLXs, plus Slave ports to SCADA on the Master OrionLX. This master configuration is loaded to the Master OrionLX, which, in turn sends the slave configuration to the Slave OrionLXs. Data transfers do not need to be specifically configured between Orions. One Master and up to six Slaves can be set up, making integration of 100+ IED OrionLX systems not only possible but straightforward. Since Orion polling and data processing are distributed, performance remains high even in very large systems, plus Orions can be physically distributed, reducing IED wiring.

New Bitronics® 50 Series Meters and M870 Family Meet NERC Requirements for Higher Accuracy

The revised (May 2009) NERC BAL-005-0.1b standard states, "Each Balancing Authority shall at least annually check and calibrate its time error and frequency devices against a common reference. The Balancing Authority shall adhere to the minimum values for measuring devices as listed below:

Device Accuracy
- Digital frequency transducer: 0.001 Hz
- MW, MVAR, and voltage transducer: 0.25 % of full scale

The following Bitronics instruments meet these new accuracy requirements:
- The Bitronics 50 Series Meters, including the M650 Family
- The Bitronics M870 Family (Models M871 or M872) with an A10 module made after 9/25/09 with v3.02 host firmware.

Please contact your local representative if you need to schedule a factory upgrade of existing units.

BAL-005-0.1b:
This standard establishes requirements for Balancing Authority Automatic Generation Control (AGC) necessary to calculate Area Control Error (ACE) and to routinely deploy the Regulating Reserve. The standard also ensures that all facilities and load electrically synchronized to the Interconnection are included within the metered boundary of a Balancing Area so that balancing of resources and demand can be achieved.

Ask Bryan:

Q: I have 2 PTs and 3 CTs available to connect to your wattmeter. Is that called a 2½ element configuration?

A: In the context of measuring three-phase power, it all depends on whether your PTs are connected line-line or line-neutral.

Two-element wattmeters are generally used in delta connected systems. They require two line-line voltages and only two phase currents. Three-element wattmeters are used in wye connected systems. They require three line-neutral voltages and three phase currents. When applied that way, either type of meter can measure three-phase power accurately regardless of whether the load is balanced or unbalanced.

Each of the elements in a three-element wattmeter can be used to indicate the power on the corresponding phase. The same is not true of two-element meters, however. Although the total power is the sum of the power indicated on the two individual elements, the power measured by each element has no practical significance by itself. So you can't really measure the per-phase power of a delta connected system.

It is actually fairly common in substations for all three CTs to be available even though only two are required for measuring the power. So this is one case where you might have two PTs and three CTs, but that would be an application for a two element wattmeter, not 2½ element. For the purposes of measuring power on a delta system, you can ignore the third CT without consequence.

A few other types of connections are also used in the power industry and we see these from time to time:

Sometimes a wye connected system will have the PTs connected line-line. That can either be done using two line-line PTs or three line-neutral PTs where the neutral conductor is not routed to the control house. In either case, it results in only three voltage conductors being available to connect to the wattmeter. In this case, a two element wattmeter must be used to indicate the total power, but then it will only be accurate as long as the load is balanced.

Occasionally we see wye connected systems having only two PTs that are connected line-neutral. This is the application that is called 2½ element. A two-element meter will not work for this kind of connection because the phase relationship between the voltage and current vectors is different from the delta application. A three-element meter will not work because there are not enough PTs to calculate the power on the third phase.

Using only two PTs in a delta system makes sense intuitively because the relationships $V_{AB} + V_{BC} + V_{CA} = 0$ and $I_A + I_B + I_C = 0$ must always be true regardless of the state of balance. In a wye system, one missing line potential may be calculated from $V_{AN} + V_{BN} + V_{CN} = 0$ by knowing any two of the vectors, but only when the voltages are balanced. So there are always two restrictions inherent in the 2½ element application:
1. Wye connected system having only two PTs connected line-neutral.
2. System must be in balance.

In HV and EHV systems, conventional wound PTs tend to be very expensive so there may be a financial incentive to save the cost of one third of the PTs on a line. And it is pretty safe to assume the voltage will always be in balance because the source impedance is so low when operating that high in the transmission grid.

So how does it work? In an electromechanical 2½ element wattmeter there is usually a device called a "z-coil". The A-N and C-N potentials are routed internally to windings around a common iron core in such a way that the voltage produced on a secondary winding is equal to their vector-sum. If the voltage is well balanced, the z-coil produces a voltage that should be nearly equal to V_{BN}. Once the meter has three line-neutral voltages (two connected to the terminals, one produced internally) and three phase currents connected normally, it can then measure the total power as if it were a conventional three-element meter. Notice that the load current need not be in balance, only the voltage. In a microprocessor based instrument, the output of a z-coil may be calculated but the voltage-balance requirement of the electromechanical wattmeter remains.