

# Bitronics® 878 HDIO

The Bitronics 878 is a self-powered, high density I/O device that provides combinations of digital inputs, digital outputs, and transducer inputs. All I/O is accessible via IEC 61850, Modbus, or DNP3 protocols for substation equipment monitoring. The 878 with its substation hardened design and flexible distributed communications capability allows it to be installed virtually anywhere in the substation.

Features of the 878 include:

- Three chassis sizes
- A host processor with four serial ports
- A wide-range universal power supply
- Accommodates an optional Ethernet module (standard for IEC 61850) as well as three to six I/O modules depending upon the chassis

Built from the M871 platform, with over ten years field experience, the 878 carries the Bitronics tradition of offering unmatched quality and reliability.

## Key Features

**Flexibility:** Back of panel mounting, three chassis sizes, digital inputs/outputs and transducer inputs, and multiple protocol support.

**International Appeal:** CE marked and supporting IEC 61850 8-1 with GOOSE messaging.

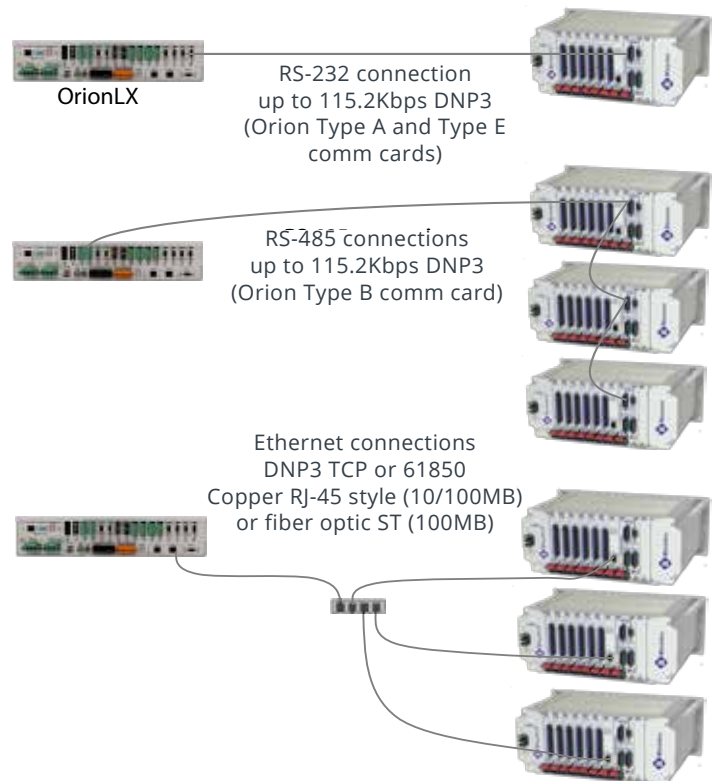
**Rugged Design:** Substation hardened design with proven Bitronics quality and dependability.

**Simplicity:** Easy setup of DNP3 via the 70 Series Configurator, including a simplified view just for the 878.

**Fast Control:** Interfacing with the NovaTech OrionLX enables fast control.

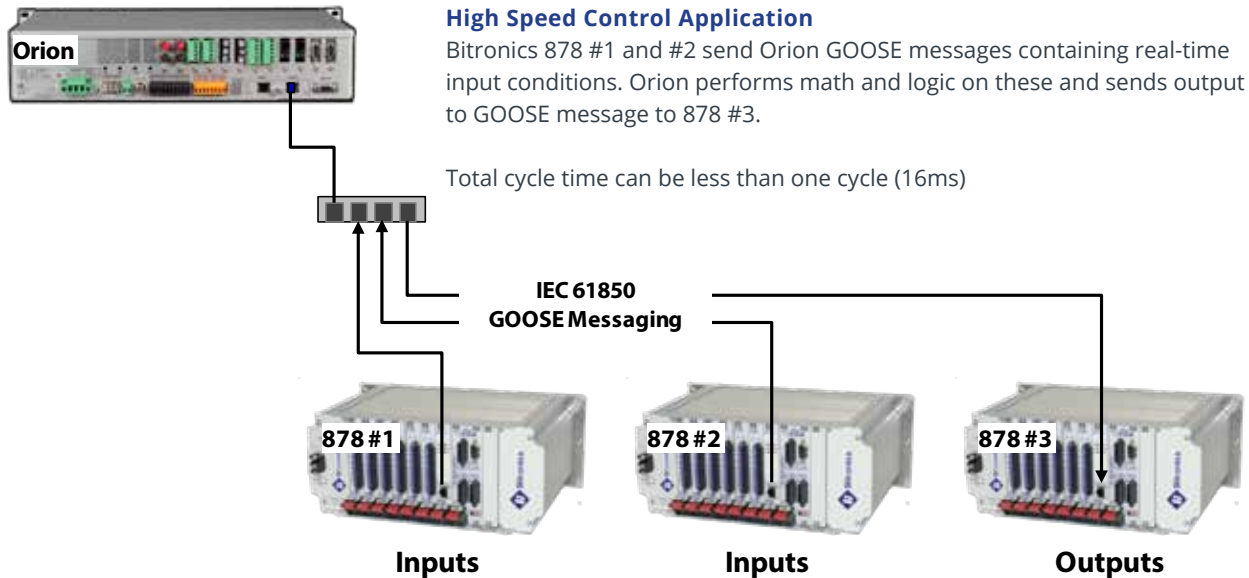


Bitronics 878 HDIO



The OrionLX interfaces to the Bitronics DIOD via Ethernet or serial communications

## Application Examples



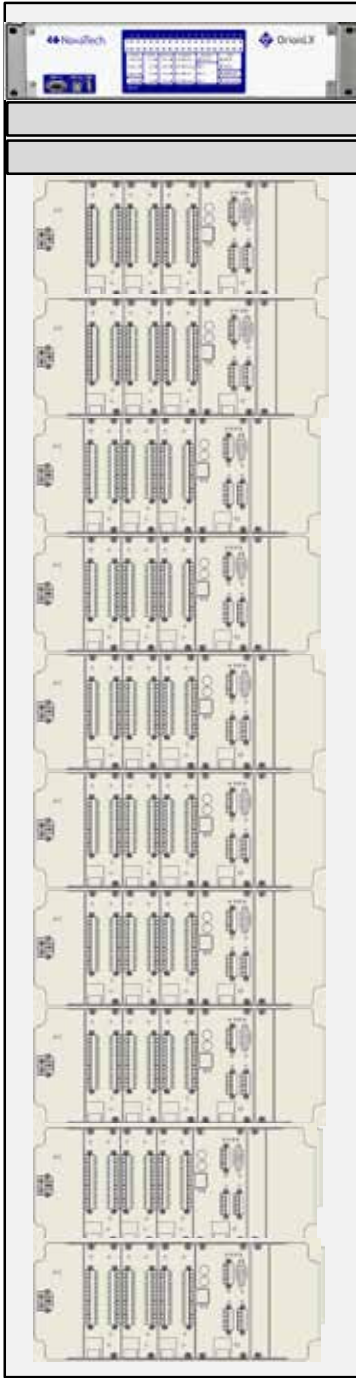
## Details

- The Bitronics® 878 provides digital I/O and transducer input points accessible via IEC 61850, Modbus, and DNP3 protocol. Both serial and DNP3 over Ethernet are supported, and IEC 61850 GOOSE communication is also supported.
- The 878 is built from the M871 Monitoring and Recording IED platform and utilizes the same H12 host, E1 and E3 Ethernet options, V10 Power Supply, P31/P30A/P33 Digital I/O, and P40 transducer input modules.
- The 878 is available in three rugged aluminum chassis sizes that supports up to six (6) optional CompactPCI modules.
- A maximum of 56 binary inputs, 48 binary outputs, or 48 transducer inputs are supported (with no Ethernet).
- The 878 can accept an IRIG-B time synchronization signal via one of its three configurable serial ports, permitting time stamping of events accurate to one millisecond (DNP3 limitation).
- Configuration is via the 70 Series Configurator as well as the IEC 61850 Configurator.
- The digital outputs are controlled via CONTROL RELAY OUTPUT BLOCK objects and support TRIP/CLOSE, LATCH-ON, LATCH-OFF, PULSE-ON, and PULSE-OFF commands. The 878 can report all input changes as DNP3 events. The digital inputs can be assigned to any of the DNP3 classes via the ASSIGN-CLASS function or via the 70 Series Configurator.
- IEC 61850 GOOSE can generally be envisioned as a way to communicate a binary status over an Ethernet medium, exactly analogous to status and control performed by discrete I/O points. GOOSE messages are reliable enough to be used for controlling interlocks and protective relay blocking schemes, and can be propagated even faster than discrete digital contacts because of the time that it takes for moving mechanical parts to operate.
- Individual SOE reports can be generated within each 878. An Orion LX can generate SOE reports by monitoring events from multiple 878 units.



Bitronics 878 shown in wide chassis with standard V10 power supply, H12 host processor with E3 RJ45 plus 100FX Fiber Ethernet port, and six optional P30A digital I/O modules. The E1 Ethernet option with 100 Mbps RJ45 only is also available.

## Application Examples

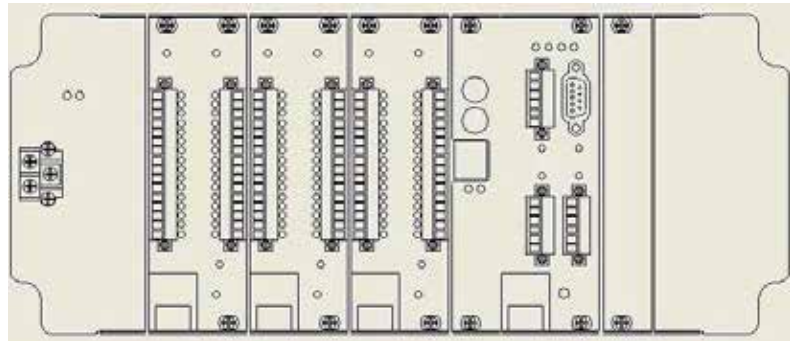


### RTU Application

19" rack shown contains 480 I/O points connected to OrionLX via Ethernet:

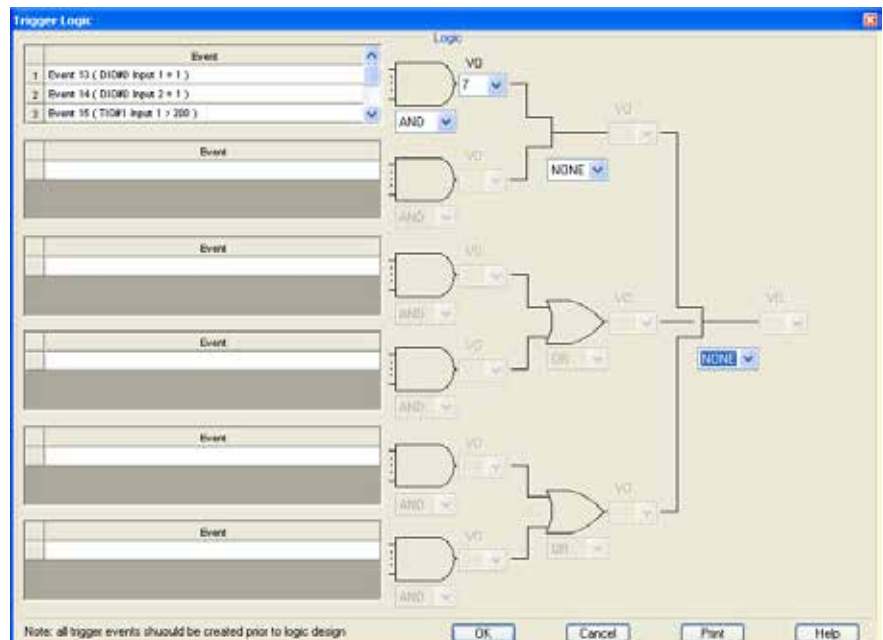
- 878 in long chassis
- 280 digital inputs
- 120 digital outputs
- 80 analog inputs

878 in long chassis with 36 digital inputs, 12 digital outputs and E3 RJ45 and 100FX fiber Ethernet as shown in 70 Series Configurator



### High Speed Logic on Bitronics 878

Boolean logic can be set up on the Bitronics 878. In this example, if both Inputs #1 and #2 are ON, and analog input #1 is greater than 200, then virtual output #7 turns ON



## Specifications

- Three chassis sizes available: 8.5" (216 mm), 10.9" (277 mm) or 13.45" (342 mm) wide. All are 3U (5.2" or 132 mm) high and 8.8" (224 mm) deep.
- Operating temperature range of -40C to +70C.
- V10 Universal power supply has a nominal range of 24-250Vdc and 69-240Vac with 25 – 35W output.
- H12 host processor contains a 486 microprocessor with 256MB of non-volatile memory.
- Digital inputs are jumper selectable for low range (nominal system voltages of up to 100V) or high range (from 100 to 300V) as well as normally open or normally closed. Inputs protected against continuous overload to 300Vdc on low input range. All I/O terminals protected with internal transient limiting devices. Input De-bounce Time is selectable, from 60ns to 260s in 60ns steps (one time for all inputs). Removable Terminal Blocks, accepts #16-28AWG (1,4-0,09mm) wire.
- Digital outputs have protection and control industry standard-type output relays and circuitry to ensure system reliability. All outputs have "wrap-around" inputs to allow confirmation of circuit operation. Rated for 2000Vac, 1min isolation, I/O to I/O, and I/O to case. Removable terminal block for ease of installation. Output Operate Time (time from command by Host, does not include protocol delays): Assert (Close time with "N.O." jumper): 8ms; Release (Open time with "N.O." jumper): 3ms
- Transducer input is available in 0-1 mA, 4-20mA, or 0-10V ranges and are jumper selectable for voltage or current range. The input terminals have internal transorb clamp and 90V spark gap protection.

### 0 – 10V Voltage Range

Overload Range: -12.5V to +12.5Vdc

### 0 – 1mA Current Range

Overload Range: -2.5mA to +2.5mA

### 4 – 20mA Current Range

Overload Range: 0mA to +25mA

- Accuracy 0.25% of Full Scale Input Data Update Rate (poll rate):  
100ms minimum (single P40 Transducer input module)  
500ms minimum (multiple P40 Transducer input modules)



European Community Directive on EMC 2004/108/EC, (replaced former directive 89/336/EEC amended by 92/31/EEC, 93/68/EEC, 98/13/EC), and Directive 91/263/EC [TTE/SES]. European Community Directive on Low Voltage 73/23/EEC 2006/95/EC (replaces former Directive 73/23/EEC)

## Environmental

- Operating Range: -40°C to +70°C
- UL/CSA Recognized, File Number E164178
- UL61010-1 (Edition 3, 2012/05/11)
- CAN/ CSA No. 61010-1-12 (Edition 3, 2012/05/11)

## Product and Generic Standards

The following product and generic standards were used to establish conformity:

Low Voltage (Product Safety): IEC 61010-1 (Edition 3, Revision Date 2013/02/01)

EMC: EN 61326-1: 2006, IEC 60255-26:2008

Surge Withstand Capability Test For Protective Relays and Relay Systems  
ANSI/IEEE C37.90.1: 1989



P31



P30A



P40



P33

