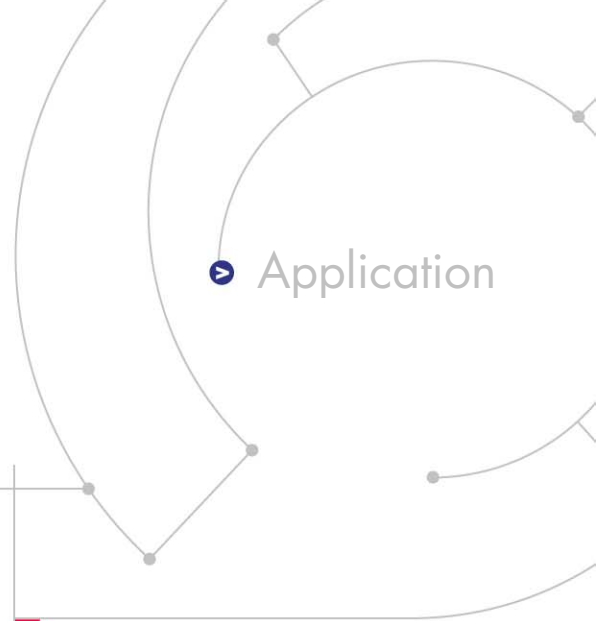


# Interface with Multiple Clients

## For the BiTRONICS M871 Multifunction Recording Transducer.



### Introduction

Electric power utilities are going through a process of significant change, characterized by increased requirements for high quality and reliability of power delivery, while simultaneously needing to reduce capital spending, installation, maintenance, and operating costs.

Intelligent (microprocessor-based) Electronic Devices (IED) have gained widespread acceptance for data acquisition, monitoring, recording, protection, and control. They are recognized as essential to the efficient and cost-effective operation and management of substations and the power system. New system architectures are being designed to meet the requirements for delivery of the ever-increasing amount of information gathered by the various devices.

The BiTRONICS M871 is truly a multifunctional device which can be used in any type of substation or power system integration solution. This is based on the device's 1600+ measured and calculated system parameters and its ability to communicate with different utility clients over different communication ports.

### Utility Needs

Utility functional requirements are divided in several groups depending on who the client is:

The system operations and energy management groups need a continuous stream of real-time measurements and status information in order to take appropriate action for the efficient control of the system.

Maintenance personnel need information on the performance of breakers, location of faults and other event data in order to perform "Event Driven" instead of "Scheduled" maintenance.

Protection engineers may need to have access to waveform records to determine the cause of relay operation and to be able to replay the records to test relays after a change in the relay settings.

Planning engineers need trend records or high- or low-speed disturbance records to perform short or long term load forecasting or to verify the electric power system models used for load flow calculations or dynamic stability studies.

The HMI functions running on the substation computer are also continuously updated by status data and measurements provided by the different IEDs distributed throughout the substation.

Distributed backup protection functions require high-speed communications between the different IEDs and a programmable logic controller (PLC).

Since conventional metering devices are being replaced by multifunctional communications based IEDs located in cabinets in the substation yard, there is a need to support local or remote display of user configurable set of system parameters.

All distributed recording and monitoring functions are based on very accurately synchronized time-stamping. The time synchronization is also based on communications, depending on the methods used for synchronizing the devices in the substation.

### Satisfying Multiple Utility Clients

When considering all of the applications listed above, it is clear that the IEDs in the substation have to satisfy a very wide range of requirements in order to meet the needs of different clients or applications in the electric power system or in a manufacturing facility.

The BiTRONICS M871 has been specifically designed to support simultaneous access by different clients over different physical layers and communication protocols. It supports the following communication interfaces:

- RS 232 port
- 3 configurable RS 232/RS 485 ports
- Ethernet port (optional)
- ModbusPlus port (optional)

The RS 232 service port is used typically for direct interface with a laptop computer or for remote access through a modem to configure the device using the Configuration software, extract records using the Data Acquisition Software (DAS), or viewing measurement data.

One of the ports can be configured as an RS 232 serial interface through a modem providing data to a SCADA client using DNP 3.0 protocol.

Another serial port can be configured as a demodulated IRIG-B port for time synchronization with accuracy better than 10 microseconds.



The third configurable port can be used as an RS 485 port for interface with one or more (up to 16) remote displays located at the breaker panel or on panels in the control house.

Backup protection functions are based on the measurements that are calculated by the BiTRONICS M871 every quarter of a cycle, or once per cycle and provided to a programmable logic controller over a 1 Mbps Modbus Plus interface or over Ethernet using Modbus or DNP protocol.

Since many utilities are installing local area networks (LAN) in substations, Ethernet communications are becoming a very important requirement for multifunctional IEDs such as the BiTRONICS M871.

Communications over fiber offer significant advantages in the substation environment, because the messages are not affected by transients in the substation.

The BiTRONICS M871 can be configured with one of three optional Ethernet modules that are available. They are all provided with an RJ45 port conforming to 10BASE-T/100BASE-TX standards.

A 10 Mbps fiber port, or a 100 Mbps fiber port are also available as options. With any of these modules installed, the BiTRONICS M871 can support Modbus over TCP/IP, DNP3 over TCP/IP and UDP/IP, FTP, UCA 2.0/TCP and UCA 2.0/OSI.

The requirements for multiple client-access over the Ethernet are met by the BiTRONICS M871 to an extent that covers any typical combination of client applications. Users can simultaneously extract records through the built-in FTP server, while up to 16 DNP 3.0 clients, up to 63 Modbus clients, or up to 100 UCA TCP/IP or OSI clients interface with the device over the Ethernet LAN. The total number of clients over the different communication protocols is 100.

As can be seen from the above, the BiTRONICS M871 is a multifunctional IED with simultaneous support of multiple communication interfaces over different physical layers and protocols that can meet the requirements of any stand-alone or integrated system application.

