

# Distributed Fault and Event Recording

## For the BiTRONICS M871 Multifunction Recording Transducer.

- Capture cross-triggered waveforms from multiple monitoring points, creating a comprehensive, detailed overview of an event for quick and correct diagnosis.
- Multiple recording modes allow for capture of event data ranging from transient (less than one cycle) to long-term trends (up to 90 days).
- Scalable route to DFR functionality. Ideal for sub-transmission and distribution substations where the expense of a traditional DFR is not cost-justifiable.
- Distributed architecture saves on wiring costs and liability of CT wires across switchyard.
- Vastly superior event data as compared to records from substation relays that are blind to harmonics and typically have very slow sample rates.
- Satisfies the measurement and recording needs of protection, planning, SCADA, revenue, and power quality departments in a single platform.

### Introduction

Fault and disturbance recording is an essential tool to analyze system reliability and verify the correct operation of switchgear and protection equipment. The traditional means of providing these records, a DFR, is often prohibitively expensive and requires extensive wiring.

The M871, in contrast, provides extensive high-resolution fault and disturbance information in a distributed, scalable architecture that minimizes cost and wiring effort. Whether functioning alone or in a cross-triggering network environment, the M871 provides a complete monitoring and recording solution for the electric utility substation.

### How it works

High-speed network communications coupled with multifunction recording IEDs such as the BiTRONICS M871 allows for a distributed architecture for power monitoring and event recording that has several advantages over traditional centralized monitoring. Each device in a distributed architecture is connected directly to the monitored equipment, saving on the expense and liability of CT cables running from

switchyard equipment to the station house. The only wiring required across the switchyard is that of the Local Area Network (LAN).

The M871 can be set to capture a high-resolution (128 samples/cycle) waveform when any pre-selected threshold (user-configurable through software over the network) is exceeded for a given time period. Multiple M871s can share peer-to-peer communications and cross-trigger via IEC 61850-Compliant GOOSE messaging over the network. When a single M871 detects an event, all units in the substation can be signaled (in less than one cycle) to capture a waveform from their monitoring point. This captured data includes all instantaneous power values, harmonics, and up to eight digital I/O contacts. All waveform and measurement data is time-stamped and synchronized via an IRIG-B signal from a satellite receiver elsewhere on the network.

This wealth of data is then compiled and analyzed on a substation PC, giving an operator a comprehensive, high-resolution picture of the disturbance, allowing quick fault clearance. The data can also be used to verify correct operation of switchgear and protective equipment.

In substations where relay fault records are the existing method of fault analysis, the M871 provides extensive information that most relays miss due to their harmonic filters and slow sample rates. In contrast to traditional DFRs, which require a significant initial investment in equipment and wiring, the M871 is an ideal scalable route to DFR functionality. Its high-resolution event data can be expanded point-by-point throughout a substation as need and budget necessitates.

### Additional Benefits

- In addition to fault data, the M871 records long term trends and satisfies the recording needs of multiple utility departments (protection, planning, power quality, and revenue (0.2% Revenue-class accuracy)) in a single platform.
- Multiple communications ports and protocol processing allows easy integration into different networks.
- ¼ cycle measurement speed is fast enough for backup protection applications.
- Flexible modular design allows for future expansion of features and easily upgradeable functionality.

Application