

**Virtual Recorder**

The need for monitoring and recording at any level of the Power Network System has been recognized for a long time. The electric power utility industry requires significant improvement in the

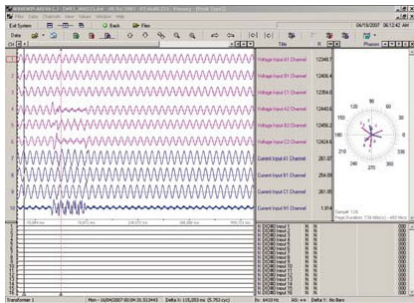
quality of power supply provided to its customers. Customers require stable power in order to maintain expensive equipment and processes without interruption or effect.

The requirement for stability of the power system during fault conditions over a wide area leads to the use of multi-functional IEDs with advanced communications capabilities such as the 70 Series (M87x, M57x).

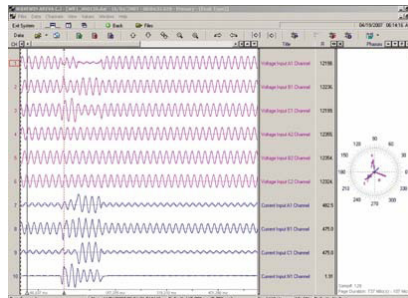
The ability to distribute these IEDs where they are needed to monitor the system is powerful, but combining fault and disturbance information from these distributed IEDs can be difficult and time consuming. A new feature within the Win DR Manager software called "Virtual Recorder" addresses this problem. The Win DR Manager software is able to retrieve files from multiple recording devices creating a combined file in a "Virtual Recorder." It can automatically launch Wavewin Bitronics software for viewing and analysis of the combined file.

This new concept for monitoring and recording provides the tools that help energy management, planning and protection engineers to better understand the power system in order to optimize the operation of the system under different abnormal conditions.

Benefits derived from a "Virtual Recorder" function are key to efficient and results oriented analysis.

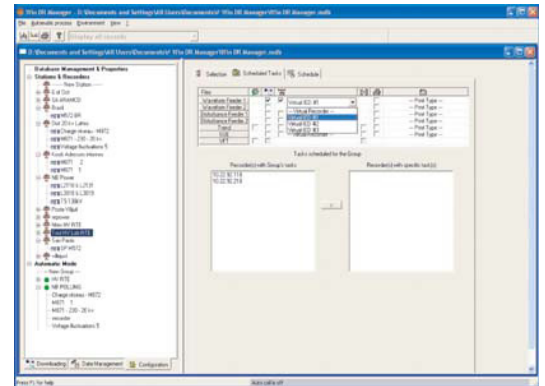


Voltage output on Bus 2 captured by a M871 located at the substation bus level.



Phase-to-phase network fault captured by a M871 located at the power transformer level.

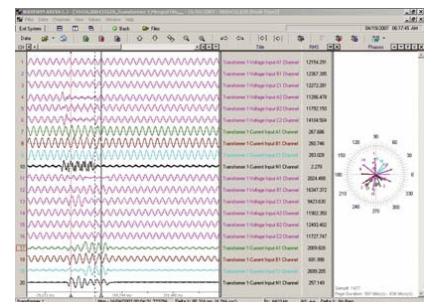
70 Series & Win DR Manager



Win DR Manager provides a suitable Network Database allowing for the creation of a "Virtual Recorder" covering multiple IEDs at the same substation or at different locations.

**The "VIRTUAL RECORDER" Function Provides Several Advantages:**

- Provides a single file/view over a wide area of IEDs for coordinated and simplified analysis
- Gives the flexibility of choosing an automatic or manual process of file retrieval and analysis
- Optimizes the flexibility and scalability of a distributed architecture
- Allows an open architecture (IEDs in same location or from different locations)
- Contributes to reducing time analysis
- Saves wiring cost at sub-station level



"Virtual Recorder" representation combining records at the power transformer level and substation bus level.

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