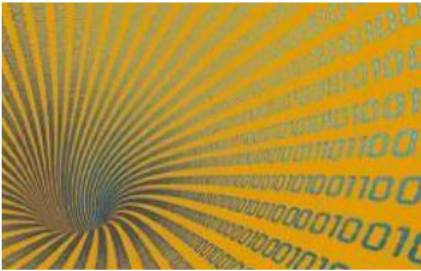


IEC 61850 in BiTRONICS 70 Series

Interoperability for measurement and disturbance recording



Applications using BiTRONICS 70 Series

IEC 61850 is the new international standard for communications in substations. It enables integration for all measurement, monitoring, recording, protection and control functions within the substation. It provides the means for highspeed cross-triggering applications useful in disturbance recording. It combines the convenience of ethernet with the performance and security which is essential in today's substations.

Alstom Grid is now offering the IEC 61850-8-1 interface on the BiTRONICS Alstom 70 Series M87x and M57x. This offering adds to previous Alstom Grid Automation releases of IEC 61850-8-1 in MiCOM Alstom protection and control equipment, demonstrating Alstom Grid's continued commitment to this standard.

This extensive implementation facilitates integration of BiTRONICS 70 Series into IEC 61850-based Substation Automation Systems, including the PACiS system, over the IEC 61850 8-1 substation bus.

Every 70 Series IED that is purchased with an ethernet option will have IEC 61850 communications capability. No additional options, no external bridges and no external converters are required - just standard ethernet network equipment. To save costs and facilitate the upgrade of existing installations, the IEC 61850 communications capability can be added to some 70 Series IEDs via firmware upgrades.

Other 70 Series IEDs can be upgraded with minimal hardware changes. This permits them to be incorporated into IEC 61850 based systems that are migrating from conventional legacy Substation Automation Systems or UCA2 systems.

Customer benefits

- IEC 61850 promises true interoperability leading to seamless operation in multi-vendor environments and faster and easier system integration and commissioning
- Cost effective solution due to reduced wiring
- Flexible programming allows monitoring and recording devices and functions to be added without affecting physical wiring

IEC 61850 offers the following benefits to utilities and industrial users:

High speed data exchange

Ethernet links operating at 100 MBPS exchange polled data and commands between devices at a far faster rate than traditional serial protocols. Clients (master stations) can perform supervisory control with negligible delays. Network Client-Server replaces serial Master-Slave communications, allowing the simultaneous access of several clients to a network of servers.

Peer-to-peer messages (GSE)

Generic Substation Event (GSE) messages can be used for disturbance recording cross-triggering, breaker failure protection tripping, interlocking and many other advanced applications, thus eliminating extensive hardwiring in equipment bays and reducing the cost of implementing advanced distributed protection and control schemes. The BiTRONICS implementation of the IEC GOOSE messaging provides faster end-to-end transfer than hardwiring!

Standard bay schemes

Economies of scale will result where standard equipment bay schemes are engineered. The exact customising of the scheme to suit the application is achieved via software, using GSE logic..

True interoperability

The self-descriptive nature of IEC 61850-compatible IEDs means that system integration and commissioning is easier. Standardised data classes and services mean that the IEC 61850-enabled BiTRONICS 70 Series can operate in multi-vendor environments.

Uniformity

One protocol is all that is needed in the substation. Costly gateway and split path communications are avoided. Peer-to-peer messages, control commands, disturbance files transfer or event driven reports are interleaved on a single substation bus network. Multiple clients can be integrated, allowing authorised operators and engineers to interrogate and control the substation IEDs.

Simplified engineering process

The Substation Configuration Language defined in the standard represents a leap in the engineering process related to any type of substation automation application. It is based on a standardised abstract model that allows the development of substation specification, configuration, analysis and testing tools.

Table 1: IEC 61850 Implementation in the 70 Series

	70 Series	
	M87x	M57x
IEC 61850 functions		
Object model covering IED measurements, control and recording functions	.	.
Buffered and unbuffered reports (on change of state)	.	.
Disturbance record file transfer	.	.
GSE	.	.
SNTP time synchronisation (client only)	.	.
Controls (normal security)	.	.
Support for up to 16 ethernet clients	.	.
UCA2 functions maintained		
UCA2 time synchronisation	.	.
UCA2 GOOSE (GSSE) for cross-triggering (configured via 70 Series configurator)	.	.
Support tools		
IED configurator software per IEC 61850-6	.	.
Recording and other settings over ethernet using 70 Series configurator software	.	.

BiTRONICS 70 Series capability

The IEC 61850 interface of the BiTRONICS 70 Series has been designed to deliver an extensive implementation of the standard. An overview of the capability is outlined in Table 1.

Several UCA2 functions have been preserved in the 61850 implementation. UCA 2 time synchronisation allows one Mx7x IED to serve as a master to other 70 Series IEDs on the network. UCA2 GOOSE messaging (GSSE) is maintained for cross-triggering applications where IEC 61850 is not present.

The 70 Series configurator provides configuration of certain IED functions such as recording and triggering either via serial or ethernet connections, whether or not an IEC 61850-based control system is present.

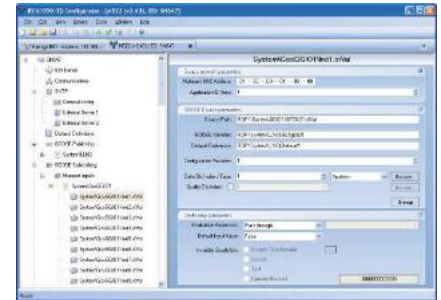
An IED configurator tool is also provided. Its primary purpose is to manipulate configuration based on SCL files produced within the system engineering process of an IEC 61850-based system, then send it to a 70 Series IED. To satisfy the requirements for manual configuration at the pre-commissioning stage, the possibility of creating a blank configuration based on the 70 Series IED's capability (ICD) file is also available. Other features of the IED Configurator allow for the extraction of configuration for viewing or modification and error checking of configuration data for precommissioning validation of the BiTRONICS 70 Series IED configuration.

IEC 61850 support in BiTRONICS 70 series

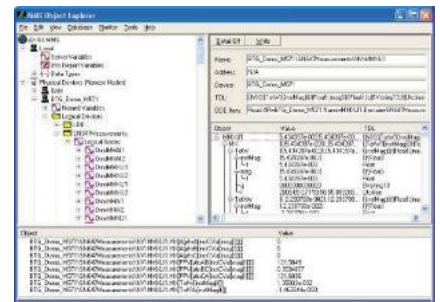
All future versions of BiTRONICS 70 Series equipped with 64Mb DRAM support IEC 61850. An optional flash drive of 64Mb is also recommended. The IEC 61850 implementation in the 70 Series is certified to work within the Alstom Grid PACiS system. The PACiS system has hundreds of existing installations.

Migration

Any M87x, M572, or M571 100A shipped after April 15, 2007 can be upgraded via firmware to be IEC 61850 compatible.



IED configurator tool



Display of 70 Series IED object models

**IEC 61850:
BiTRONICS 70 Series and
PACiS working in harmony**

Device track record - ethernet communication

Over 200 PACiS Substation Automation Systems using UCA2 or IEC 61850

First UCA2 measurement and recording devices delivered in 2000

First UCA2 relays delivered in 2000

Interoperability demonstrations at CIGRE 2004 and other exhibitions

10 years of active participation in IEC and UCA working groups

Alstom Grid Worldwide Contact Centre

www.alstom.com/grid/contactcentre/

Tel: +44 (0) 1785 250 070

www.alstom.com/grid

