TRIANGLE MICROWORKS, INC.

SOLUTIONS FOR COMMUNICATION PROTOCOL DEVELOPMENT

We support the following industry standard protocols:

DNP3	IEC 61850 Edition 1 & 2
Modbus	GOOSE
IEC 60870-5	9-2 (Sampled Values)
IEC 60870-6 (TASE.2 / ICCP)	90-5 (Synchrophasor)
IEC 61400-25 (Wind)	7-410 (Hydro) & 7-420 (DER)

Communication Protocol Software Libraries

Incorporating our time-tested Software Libraries in your products will reduce development effort and free internal resources to work on company proprietary aspects of your products.

Our proven compatibility with existing equipment reduces software development risks.

Available as:

• ANSI Standard C Source Code Libraries
• C++ library is also available for IEC 61850 and IEC 60870-6 (Tase.2/ICCP)
• .NET Communication Protocol Components

Libraries include documentation, examples, training videos, technical support, and a design review of your implementation by our protocol experts

SCADA Data Gateway

Windows™ application that can also be run on small embedded PCs

• OPC Client/Server, Data Concentrator, or Protocol Translator
• Bidirectional data translation for monitor and control tags
• Includes protocol analyzer display and event logging
• Data transformation through expressions/equations
• ODBC driver for Database Management System access such as SQL or Access
• OPC Data Access, Alarm and Events, and XML Data Access for interfacing with PC-Based SCADA Systems
• Data Visualization and Graphical Scripting capability with OPC Viewer and InSight
• Supports DNP3, IEC 61850, IEC 60870-5, IEC 60870-6 (TASE.2/ICCP), Modbus, and OPC

Web Resources

Free Resources Available at TriangleMicroWorks.com:

• Triangle MicroWorks offers a wide array of videos:
  • Free training videos for DNP3, IEC 61850, and IEC 60870-5
  • Product overviews, demonstrations, and how to videos
• SCL Verify Tool:
  • A free tool to verify both syntax and IEC 61850 specific aspects of SCL Files
  • Verifies the Object Model against the IEC 61850 Standard

All of our products include the first year of the Maintenance and Enhancement Plan, which includes access to software updates and resolution of any questions or compatibility issues that may arise in the field.

If your project needs communication protocol expertise beyond the Maintenance and Enhancement Plan for our products, our Contract Engineering Services are available to assist your Development Team.

Our testing applications include InSight functionality*:

- Create custom graphical displays for Data Visualization and Automation
- Simple DC Power Flow Simulation of Electrical Network
- Design/Debug testing scenarios via JavaScript or a flowchart based Graphical Programming Tool

TESTING TOOLS

61850 Test Suite Pro

61850 Test Suite Pro is a Windows™ application with multiple tools for testing IEDs in the lab, performing troubleshooting and assisting with the commissioning process. Tools include:

- Test client
- GOOSE sniffer
- Data miner
- Report viewer
- IED simulator
- GOOSE subscriber
- Data visualizer
- SCL tester

IEC 61850 is presented in a clear way which can assist many different types of tests. Configuration of the tool can be done quickly. Settings are saved in a workspace that can easily be reloaded for a particular test of substation. Custom filters can be configured to accelerate the testing and debugging process.

Communication Protocol Test Harness

Simulate and test DNP3, IEC 60870-5, and Modbus Devices:

- Simulate Master and Outstation Devices or monitor communications between real Masters and Outstations
- Create Custom Functional Tests with any .NET programming language, Python, or Tcl/Tk scripts
- Exercise a Device Under Test as it will be used on the network
- Automatically perform conformance test procedures

Iron

Simulate and test IEC 60870-6 (TASE.2/ICCP) devices:

- Create compliant IEC 60870-6 (TASE.2/ICCP) Clients and Servers for unidirectional and bidirectional applications
- Read, Write, Reporting (via DSTransferSets), Controls, and Dynamic DataSets
- Models can be created via .csv files and .xml files

Distributed Test Manager (DTM)

Simulate the communications of an entire substation or system:

- Test on a single PC or distribute the test across a network of computers
- Supports IEC 61850, DNP3, IEC 60870-5, Modbus, ICCP/TASE.2, and GOOSE
- Simulate hundreds of devices
- Multiple techniques for visualizing and simulating data

SCL Verify

Check IEC 61850 SCL files (built into SCL Navigator and 61850 Test Suite Pro)

- Verify the data model against the standard and that all data type template references can be resolved
- Verify that control blocks, external references, and datasets can be resolved
- Identify missing parameters or non-compliant SCL

CONFIGURATION TOOLS

SCL Navigator

Create, view, edit, and verify IEC 61850 SCL files:

- Display SCL files as either a simplified XML view or an interpreted data model
- Create IED Capability Description (.ICD) files with standard IEC 61850 logical nodes and data objects (Ed. 1 or 2)
- Add logical nodes & data objects from -7-3, -7-4, -7-410 (Hydro), -7-420 (DER), -90-7 (DER), and IEC 61400-25 (Wind)
- Manage data templates with the option to edit, reuse, or clean templates

DNP3 Forge

Create and edit DNP3 XML Device Profiles:

- Map to IEC 61850 Object Models (included in free version)
- Import/Export Point Lists from/to CSV file format
- Compare supported DNP Data Types against another DNP3 XML Device Profile Document or DNP Subset Level 1,2,3,4 requirements
- Use scripts to validate consistency of related fields and create validation tests

DTM and the Test Harness include full InSight functionality.   61850 Test Suite Pro includes JavaScript and custom display functionality.