Modbus TCP/IP to IEC 61850 Gateway
PLX82‑MNET‑61850

The Modbus® TCP/IP to IEC 61850 gateway enables communication between the Intelligent Electronic Devices (IEDs) on an IEC 61850 network and Programmable Logic Controllers (PLCs) or Programmable Automation Controllers (PACs) on a Modbus TCP/IP network.

The configuration utility software provided with the gateway uses IED configuration files to import complex IEC 61850 data structures. The utility creates Variable files and Function Block files for import into Unity Pro projects for Quantum or M340 processors.

IEC 61850 is the international standard that defines the hardware and communication requirements for all devices within substation automation. The standardized naming conventions imposed by the IEC 61850 standard improves interoperability between systems provided by diverse manufactures or created by multiple system integrators.

Features

Configuration Utility Integrates Tightly with Unity Pro	♦ Application-specific Variable and Function Block files are automatically generated. ♦ Users are not required to develop communication logic or tag structures in their PLC or PAC projects.
Configuration Archive and Diagnostics	♦ The gateway configuration file can be stored on an optional removable 1GB industrial SD card. This allows for rapid disaster recovery by moving the SD card from a failed gateway to a replacement gateway. ♦ Extensive diagnostics for the gateway and for both Modbus TCP/IP and IEC-61850 networks are available via the configuration utility.
Import Configured IED files	♦ All IED data attributes are available for convenient mapping to Modbus registers.
Modbus TCP/IP Client/Server support	♦ Enables multiple Modbus TCP/IP devices or SCADA devices to interface with IEC-61850 devices simultaneously.

Configuration

ProSoft 61850 Configuration Manager software, provided with the gateway, is used to develop and manage gateway configuration files, as well as to view communication and network diagnostics.

♦ Import CID and SCD files
♦ Drag and drop IEC 61850 *Data Attributes* for Modbus mapping
♦ PLC or PAC Tag names are automatically created
♦ Print mapped tag list
♦ Tag file export (*.CSV*)
♦ Export *.XSY* (Variable) and *.XFM* (Function Block) files for use with Unity Pro

Specifications

The gateway is enclosed in a sturdy extruded aluminum case with DIN-rail-mounting.

Hardware	♦ Two (2) Ethernet ports for Modbus TCP/IP and IEC 61850 communication.
Software	♦ ProSoft 61850 Configuration Manager for configuration and diagnostic viewing.
	♦ ProSoft 61850 Tag Monitor for viewing live tag data.
	♦ ProSoft Discovery Service to set a temporary IP address.
Configuration Storage	♦ Internally stored, by default. Configuration settings can be saved on an optional removable 1GB Industrial SD Card.
	♦ ProSoft 61850 Configuration Manager saves configuration information to an offline file.

Specifications - Modbus TCP/IP

The Modbus TCP/IP driver allows multiple independent, concurrent Ethernet connections. The connections may be Clients, servers, or a combination of both Clients and servers.

Modbus TCP/IP Client

♦ Actively reads data from and writes data to Modbus TCP/IP devices using MBAP messages on Service Port 502 or Encapsulated Modbus RTU messages on other Service Ports.
♦ Supports up to 10 Client connections (max. 2000 commands) to multiple servers.
♦ Modbus Command optimization - Multiple tags can be combined into one Write command with up to 120 words.
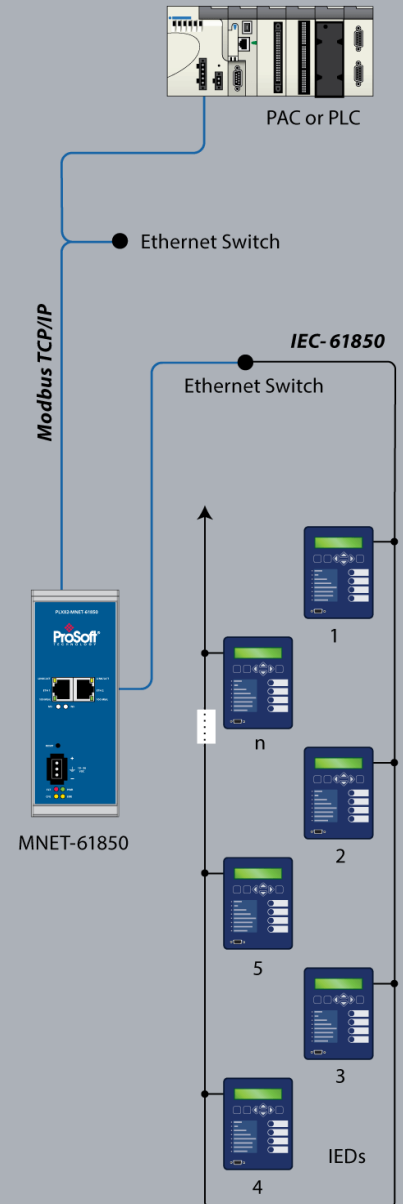
Modbus TCP/IP Server

♦ Accepts incoming connections on Service Port 502 from Clients using Modbus TCP/IP MBAP messages and on Service Port 2000 (or other Service Ports) from Clients using Encapsulated Modbus messages.
♦ Supports up to 20 independent, concurrent server connections for any combination of Service Port 502 MBAP messages and Encapsulated Modbus RTU messages on other Service Points.

Modbus Commands Supported (Client and server)	♦ 3: Read Holding Registers
	♦ 16: Preset (Write) Multiple Holding Registers
Configurable Parameters (Client and server)	♦ Gateway IP Address
	♦ PLC Read Start Register (%MW)
	♦ PLC Write Start Register (%MW)
	♦ Number of MBAP and MNET servers
	♦ Gateway Modbus Read Start Address
	♦ Gateway Modbus Write Start Address
Configurable Parameters (Client Only)	♦ Minimum Command Delay
	♦ Response Timeout
	♦ Retry Count
	♦ Command Error Pointer
Command List	♦ Maximum 2000 Modbus Client commands (one IEC *Data Attribute* per command)
Status Data	♦ Error codes reported individually for each command
	♦ High-level status data available from Modbus TCP/IP Client through MNET server (for example PLC or PAC)
Command List Polling	♦ Each command can be individually enabled or disabled; write-only-on-data-change is available

Example Application

PAC or PLC

Ethernet Switch

Modbus TCP/IP

IEC-61850

Ethernet Switch

MNET-61850

IEDs

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2
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Specifications – IEC-61850 Client

♦ Supports up to 45 IEDs
♦ Send commands from the PLC or PAC to the IED using Control Types
  ○ *Direct-with-Normal-Security*
  ○ *Select Before Operate (SBO)-with-Normal-Security*
  ○ *Direct-with-Enhanced-Security*
  ○ *Select Before Operate (SBO)-with-Enhanced-Security*

ACSI Basic Conformance		
SCSMs supported	♦	SCSM: IEC 61850 8.1 (MMS) used
ACSI Model Conformance		
Reporting	♦	Buffered Report Control Block (BRCB)
	♦	Unbuffered Report Control Block (URCB)
GOOSE	♦	entryID, DataReflnc
Control	♦	Direct-with-Normal-Security
	♦	SBO-with-Normal-Security
	♦	Direct-with-Enhanced-Security
	♦	SBO-with-Enhanced-Security
Logical Nodes	♦	IEC-61850 Logical Nodes, including Logical Nodes for Hydro Power Plants and Logical Nodes for Wind Power Plants
Configurable Parameters	♦	MMS Command Delay
Status Data	♦	Status available per node
	♦	Report and GOOSE status available
	♦	High-level status data available from Modbus TCP/IP Client through the MNET server (for example PLC or PAC)

Specifications – SNTP/NTP Client

The gateway supports a Simple Network Time Protocol (SNTP/NTP) client service that can synchronize the gateway's time by periodic update requests to a Coordinated Universal Time (UTC) system. The user can configure the SNTP/NTP server details in ProSoft 61850 Configuration Manager. The resolution of the time is in milliseconds (ms).

Configurable Parameters	♦	SNTP/NTP server synchronization rate (in minutes)
	♦	SNTP/NTP server Address

Hardware Specifications

Specification	Description
Power Supply	24 VDC nominal
	10 to 36 VDC power input allowed
	Positive, Negative, GND Terminals
	2.5 mm screwdriver blade
Current Load	200 mA max @ 24 VDC
	150 mA max @ 32 VDC
	450 mA max @ 10 VDC
Operating Temperature	0°C to 70°C (32°F to 158°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Relative Humidity	5% to 95%, with no condensation
Dimensions H x W x D	5.52 x 2.06 x 4.37 in
	14.02 x 5.23 x 11.1 cm
Shock	IEC 60068-2-27; 15G @ 11ms (Operational)
	IEC 60068-2-27; 30G @ 18ms (Non-Operational)
Vibration	IEC 60068-2-6; 5G, 10 to 150 Hz
LED Indicators	ERR, CFG, FLT, PWR
Ethernet Ports (E1, E2)	10/100 Base-T full- and half-duplex RJ45 Connector Link and Activity LED indicators
	Electrical Isolation 1500 V rms at 50 to 60 Hz for 60 s, applied as specified in section 5.3.2 of IEC 60950: 1991
	Ethernet Broadcast Storm Resiliency = less than or equal to 5000 [ARP] frames-per-second and less than or equal to 5 minutes duration
Shipped with Each Unit	One - J180 screw terminal plug
	One - HRD250 screwdriver

Agency Approvals & Certifications

Please visit our website: www.prosoft-technology.com

Ordering Information

To order this product, please use the following:

Modbus TCP/IP to IEC 61850 Gateway

PLX82- MNET- 61850

To place an order, please contact your local ProSoft Technology distributor. For a list of ProSoft Technology distributors near you, go to: www.prosoft-technology.com and select *Where to Buy* from the menu.