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MVI56E-61850C

IEC 61850 Client Communication Module ControlLogix® Platform

August 13, 2025



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ProSoft Technology, Inc. +1 (661) 716-5100 +1 (661) 716-5101 (Fax) www.prosoft-technology.com support@prosoft-technology.com

MVI56E-61850C User Manual For Public Use.

August 13, 2025

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1 Start Here

1.1 Overview

This user manual explains the features of the MVI56E-61850C module and guides you through the installation and configuration of the module. This includes using the ProSoft MVI56E-61850C Configuration Manager software to map data for Intelligent Electronic Devices (IEDs) on the IEC 61850 network for use with a Rockwell Automation[®] ControlLogix[®] processor. The configuration software creates files to import into Studio 5000 Logix Designer programming software, simplifying the integration of the module into your system.

The high-level steps for the process of configuring the IEC 61850 network are as follows:

- 1 Add the MVI56E-61850C to your Studio 5000 Logix Designer project. See Adding the Module to Studio 5000 Logix Designer[®] on page 11.
- 2 Configure the module Ethernet settings through the Add-On Profile. See *Configure the IP Address* on page 15.
- **3** Launch the ProSoft MVI56E-61850C Configuration Manager and take the following steps to configure client functionality:
 - **a** Import the IED configuration files (CID or SCD files). See *Import IED Configuration Files* on page 24.
 - **b** Add the IEDs to the IEC 61850 network. See *Configure the IED Network* on page 27.
 - c Map the desired data attributes for each IED. See *IED Data Mapping* on page 29.
- 4 Configure GOOSE Publish (server) functionality (if applicable). See *Configure GOOSE Publish* on page 48.
- 5 Export the configuration to the MVI56E-61850C Add-On Profile. See *Export the Configuration to the Add-On Profile* on page 58.
- 6 Import the MVI56E-61850C Program into Studio 5000 Logix Designer. See Import the MVI56E-61850C Program into Studio 5000 Logix Designer on page 67.

1.2 System Requirements

The MVI56E-61850C module requires the following minimum hardware and software components:

- Rockwell Automation Studio 5000 Logix Designer software version 32 or higher
- Rockwell Automation ControlLogix 5580 controller (catalog numbers starting with 1756-L8X) running firmware with the same major revision as Logix Designer, with compatible power supply and one free slot in the rack, for the MVI56E-61850C module. The module requires 1.4 A of backplane current (@5.1VDC).
- For remote rack applications, the MVI56E-61850C at the remote rack must be connected to the ControlLogix processor through a 1756-EN4TR module.
- MVI56E-61850C Add-On Profile (AOP)
- ProSoft MVI56E-61850C Configuration Manager configuration software
- Supported operating systems:
 - Microsoft Windows 10

1.3 Installing the Module in the Rack

If you have not already installed and configured your ControlLogix processor and power supply, please do so before installing the MVI56E-61850C module. Refer to your Rockwell Automation product documentation for installation instructions.

Warning: You must follow all safety instructions when installing this or any other electronic devices. Failure to follow safety procedures could result in damage to hardware or data, or even serious injury or death to personnel. Refer to the documentation for each device you plan to connect to verify that suitable safety procedures are in place before installing or servicing the device.

Insert the MVI56E-61850C into the ControlLogix chassis using the same technique recommended by Rockwell Automation to remove and install the Rockwell Automation modules.

Note: You can install up to four MVI56E-61850C modules in the same ControlLogix rack.

Note: If you are using the module in a ControlLogix Redundancy System, the module must be located in a remote rack. For more information, see <u>"Parallel Redundancy Protocol (PRP)"</u> on page 80.

You can install or remove ControlLogix system components while chassis power is applied and the system is operating. However, please note the following warning.

Warning: When you insert or remove the module while backplane power is on, an electrical arc can occur. An electrical arc can cause personal injury or property damage by sending an erroneous signal to your system's actuators. This can cause unintended machine motion or loss of process control. Electrical arcs may also cause an explosion when they happen in a hazardous environment. Verify that power is removed or the area is non-hazardous before proceeding.

Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

1 Align the module with the top and bottom guides, and then slide it into the rack until the module is firmly against the backplane connector.



- 2 With a firm, steady push, snap the module into place.
- 3 Check that the holding clips on the top and bottom of the module are securely in the locking holes of the rack.
- 4 Make a note of the slot location. You must identify the slot in which the module is installed in order for the sample program to work correctly. Slot numbers are identified on the green circuit board (backplane) of the ControlLogix rack.
- **5** Turn power ON.

Note: If you insert the module improperly, the system may stop working or may behave unpredictably.

1.4 Installing the Software

Install the MVI56E-61850C required software, which is available in the *Downloads* section of the MVI56E-61850C product page on the ProSoft Technology website <u>www.prosoft-technology.com</u>:

- MVI56E-61850C Add-On Profile (AOP): This program includes the IEC 61850 communication module profile and associated files.
- ProSoft MVI56E-61850C Configuration Manager: This program is used to configure all aspects associated with data communication between the MVI56E-61850C module and remote Intelligent Electronic Devices (IEDs) according to the IEC 61850 communication protocol.
- ProSoft MVI56E-61850C Diagnostics Tool: This application allows you to monitor diagnostics and configuration data for the module.

Note: The same install will set up both Configuration Manager and Diagnostics Tool.

2 Module Overview

2.1 Overview

The ProSoft Technology[®] IEC 61850 communication module allows Rockwell Automation® ControlLogix[®] PACs to interface with IEC 61850 Intelligent Electronic Devices (IEDs) such as substation power monitors and protective relays. The module operates as an IEC 61850 Client supporting the polling of devices using MMS messaging and reports. Additionally, support for GOOSE messaging as both a publisher and subscriber allows for fast data transfer between devices on an IEC 61850 network. The dual Ethernet ports on the module provide support for Parallel Redundancy Protocol (PRP), and the module fully supports C37.238 Ed 2017 for precision time synchronization of field devices.



2.2 Ethernet Ports

Port	Description	
Ports	2 GbE	
Ethernet Port 1	Application port	
Ethernet Port 2	Redundant port (if redundancy is enabled)	

2.3 IEC 61850 Specifications

Specification	Value
Supported Standard	IEC 61850 Ed 2.0
Maximum Number of IEDs	40
Supported Reports	Buffered Report Control Block (BRCB) Unbuffered Report Control Block (URCB)
Control	Direct-with-Normal-Security SBO-with-Normal-Security Direct-with-Enhanced-Security SBO-with-Enhanced-Security
Maximum Number of Reports per IED	10
GOOSE	GOOSE Subscription GOOSE Publish
Maximum Number of GOOSE Subscription per IED	4
Maximum Number of GOOSE Publish	8
Maximum Number of Tags per IED	500
Maximum Number of Tags	20,000
Status	Status available per node Report and GOOSE status available High-level status data available within Studio 5000

2.4 Backplane Specifications

Specification	Value
Maximum Number of Class 1 Connections	225
Maximum Number of Class 1 High Priority Connections	50
High Priority Connection RPI Range	4 to 9999 ms
Normal Priority Connection RPI Range	100 to 9999 ms
Maximum Class 1 Connection Input Size	500 bytes
Maximum Class 1 Connection Output Size	496 bytes

2.5 Time Synchronization Specifications

Specification	Value
Time Synchronization Standard	C37.238-2017
Supported Modes	Ordinary Clock, Boundary Clock

2.6 LEDs

The module provides four diagnostic LEDs. These LEDs are used to provide information regarding link status, parallel redundancy protocol (PRP) mode, configuration error detection, and module operation. More information about these LEDs is in Chapter 8, <u>"Diagnostics and Troubleshooting."</u>

3 Configuring the MVI56E-61850C Add-On Profile

3.1 Adding the Module to Studio 5000 Logix Designer[®]

3.1.1 Open the Studio 5000 Logix Designer Project

The first step in setting up the IEC 61850 network is opening the Studio 5000 Logix Designer project to which you will be adding the MVI56E-61850C module.

Note: The MVI56E-61850C module requires Studio 5000 Logix Designer version 32 or higher and a ControlLogix 5580 processor, firmware with the same major revision as Logix Designer. To check the firmware version, right-click the controller in the *Controller Organizer* and select **PROPERTIES**.

💰 Contro	oller Prope	erties - Dem	no_202012	14_2						×	<
Nonvol	atile Memor	y Ca	pacity	Internet	Protocol	Port Cor	nfiguration	S	ecurity	Alarm Log	
Genera	Ma	jor Faults	Minor	Faults	Date/Time	Ad	vanced	SFC	Execution	Project	
Vendor:	F	Rockwell Aut	omation/A	len-Bradley							
Type:	1	756-L85E C	ontrolLogix	® 5580 Con	troller				Change C	Controller	
Revision	: 3	2.011								100	
Name:	l	Demo_2020	1214_2								
Descripti	ion:							\sim			
								~			
Chassis	Type:	1756-A10	10-Slot Co	ntrolLogix C	hassis			~			
Slot:	0										
					C	К	Cancel		Apply	Help	

3.1.2 Add the MVI56E-61850C to the Studio 5000 Project

1 In the *I/O Configuration* section of the *Controller Organizer*, right-click the backplane and select **New MODULE**.



2 Select the **MVI56E-61850C** module type and click **CREATE** (or double-click the module type).

Tip: To locate the module in the list, clear the **MODULE TYPE VENDOR FILTERS** check box and then select the **PROSOFT TECHNOLOGY** filter.

Ente	r Search Text for Modul	le Type	Clea	r Filte	ers		Hide Filters	\$
Module Type Category Filters Analog Communication Controller Dictal		,	Module Type Vendor Filters Phoenix Digital Corporation Proseth Technology Rockwell Automation/Allen-Bradley Sectors Orcoring Inco					
<			>	<				>
-	Catalog Number	Description				Vendor	Category	
	MVI56E-61850C	IEC 61850 Client Co	mmunicatio	n Mod	ule	Prosoft Technol	Communication	
	MVI56E-GSC MVI56E-MCM MVI56-PDPMV1	Generic ASCII Seria Modbus Master/Sla PROFIBUS DPV1 N	Communic ve Commun laster Comn	ation li ication nunical	nterface Interface tion Interface	Prosoft Technol Prosoft Technol Prosoft Technol	Communication Communication Communication	
<								3

Note: If you do not see the MVI56E-61850C in the list of modules, this means that the MVI56E-61850C AOP may not have been installed properly.

The New Module dialog box displays.

3 Enter a name for the module and a description if desired.

General*	General				
Connection - Connection - Module Info - Time Sync - Ethernet Configuration - PRP Network Redundancy - IED Status - Vendor	Type: Vendor: Parent: Name: Description:	MVI56E-61850C IEC 61850 Client C Prosoft Technology Local MVI56E61850C	ommunication Module	: [1 ~
	Module Defin Series: Revision: Electronic K	ition 1.001 eying: Compatible Module	~		
	Connection Number of	Data Conne 1	Change		

4 Make sure the correct slot number is selected. If the module is installed in slot 1, you can keep the default value 1. If the module is installed in a different slot, change this value to the appropriate slot number.

Name:	MVI56E61850C	Slot:	5 ~
Description:			1 2 3 4 5 6 7 8 9
]	

5 In the *New Module* window, click **OK**. The *New Module* window closes. 6 In the Select Module Type window, click CLOSE.

Ente	er Search Text for Module	Type	Clear	Filters		Hide Filters	*
	Module Type Category Analog Communication Controller Digital	Filters	< ×	Module Typ Phoenix Digit Prosoft Tech Rockwell Aut Spectrum Co	e Vendor Filters tal Corporation nology tomation/Allen-Bradley ntrols, Inc.		<
<		1	•	<		>	2
•	Catalog Number	Description			Vendor	Category	
	MVI56E-61850C	IEC 61850 Client Communic	ation	Module	Prosoft Technol	Communication	
	MVI56E-GSC MVI56E-MCM MVI56-PDPMV1	Generic ASCII Serial Commu Modbus Master/Slave Comm PROFIBUS DPV1 Master Co	nunic nunic	ion Interface ation Interface inication Interface	Prosoft Technol Prosoft Technol Prosoft Technol	Communication Communication Communication	
<							>

The new module appears under the backplane in the *Controller Organizer* panel in Logix Designer.



3.2 Configure the IP Address

Take the following steps to configure the IP address of the MVI56E-61850C.

1 In the *I/O Configuration* section of the *Controller Organizer*, right-click the MVI56E-61850C module and select **PROPERTIES**. (Or double-click the module icon.)



The Module Properties dialog box displays.

2 Select ETHERNET CONFIGURATION.

Module Properties: Local:1 (MV	156E-61850C 1.001) ×				•
General Connection	Ethernet Configuration				^
Module Info Time Sync Ethemet Configuration PRP Network Redundancy IED Status Vendor	O Manually configure IF	^o address ing DHCP			
	Module IP Address:	192 . 168 . 0 . 250	Subnet Mask:	255 . 255 . 255 . 0	
			Gateway Address:	192 . 168 . 0 . 1	
	PRP Mode	Security			
	Simplex	Disabled			
	○ Redundant	○ Enabled			
	Time Synchronization	Firmware Lock —			
	Disabled	◯ Unlocked			
	◯ Enabled	Locked			
					Ý

- **3** Select one of the following options:
 - **MANUALLY CONFIGURE IP ADDRESS:** If you select this option, you must manually enter values for *Module IP Address*, *Subnet Mask*, and *Gateway Address*.
 - **OBTAIN IP SETTINGS USING DHCP:** IP settings are configured automatically via Dynamic Host Configuration Protocol (DHCP).
- 4 Click OK.

3.3 Configure Parallel Redundancy Protocol (PRP)

Parallel Redundancy Protocol (PRP) allows failover protection against failure of network components. The MVI56E-61850C provides the following two PRP modes:

- Simplex: In simplex mode, only Ethernet port 1 is used for data communication.
- *Redundant*: In redundant mode, both Ethernet ports 1 and 2 are used for data communication with redundancy.

Jogix Designer - Demo_20210325_1 [1756-L81E 32.11]								
Module Properties: Local:1 (MVI56E)	-61850C 1.001) ×							
General Connection Module Info Time Sync Ethemet Configuration PRP Network Redundancy IED Status Vendor	thernet Configuration Manually configure IP address Obtain IP Settings using DHCP Module IP Address: 192 . 168	. 0 . 250						
	PRP Mode © Simplex O Redundant Time Synchronization © Disabled	Security Disabled Enabled Firmware Lock Unlocked						

When redundant mode is enabled, you can the monitor the status of LAN A (Ethernet port 1) and LAN B (Ethernet port 2) on the *PRP Network Redundancy* tab of the *Module Properties* dialog box, as explained in <u>"PRP Diagnostics"</u> on page 112. For more information on PRP, see <u>"Parallel Redundancy Protocol (PRP)</u>" on page 80.

3.4 Enable Time Synchronization (Ethernet)

The module supports time synchronization over three different ports: the backplane, Ethernet Port 1, and Ethernet Port 2 (if redundancy is enabled). Time synchronization over the backplane is always enabled. The following procedure explains how to enable time synchronization over the Ethernet ports. If time synchronization over Ethernet is disabled, the module operates as an ordinary clock. If time synchronization over Ethernet is enabled, the module operates as boundary clock. For more information regarding this feature, see <u>"Time Synchronization</u>" on page 82.

- 1 In the *Module Properties* dialog box, select **ETHERNET CONFIGURATION**.
- 2 Under *Time Synchronization*, select **ENABLED**.

Logix Designer - Demo_2021052	12_1 [1756-L81E 32.11]	-		×
Module Properties: Local:1 (MV	156E-61850C 1.001) ×			-
General	Ethernet Configuration			1
- Connection Module Info Time Sync - Ethemet Configuration" - PRP Network Redundancy - IED Status - Vendor	Manually configure IP address			
Status: Offline	OK Cancel Apply		Help	

3 Click OK.

3.5 Firmware Lock

The module firmware is locked by default for security purposes to prevent the firmware upgrade. In case a firmware upgrade is required, you will have to unlock the firmware through the *Firmware Lock* parameter.

For more information about firmware upgrades, see the *Downloads* section of the MVI56E-61850C product page on the ProSoft Technology website <u>www.prosoft-technology.com</u>.

- 1 In the *Module Properties* dialog box, select **ETHERNET CONFIGURATION**.
- 2 Under *Firmware Lock*, select **UNLOCKED**.

June 2021061	1_1 [1756-L81E 32.11]	
Module Properties: Local:1 (MV	156E-61850C 1.001) ×	
General	Ethernet Configuration	
Connection Module Info Time Sync Ethemet Configuration* PRP Network Redundancy IED Status Vendor	Manually configure IP address Obtain IP Settings using DHCP	VLAN ID:
	Module IP Address: 192 . 168	3 . 0 . 250 Subnet Mask:
		Gateway Address:
	PRP Mode	Security
	 Simplex 	○ Disabled
	○ Redundant	Enabled
	Time Synchronization ———	Firmware Lock ———
	Disabled	Unlocked
	◯ Enabled	

- 3 Click OK.
- **4** Before upgrading the firmware, set the ControlLogix processor to PROGRAM mode.
- **5** Once you are finished with the Ethernet configuration, you are ready to launch the ProSoft MVI56E-61850C Configuration Manager software. Refer to the following section for details.

3.6 Disabling Backplane Communication

To disable backplane communication between the ControlLogix processor and the MVI56E-61850C module, open the *Connection* tab of the *Module Properties* dialog box, select **INHIBIT MODULE**, and click **OK**.

3.7 Generating a Major Fault on the Controller

To generate a ControlLogix major fault when a backplane communication failure is detected, open the *Connection* tab of the *Module Properties* dialog box, select **MAJOR FAULT ON CONTROLLER IF CONNECTION FAILS WHILE IN RUN MODE**, and click OK.

If a module fault has occurred, this will be noted in the *Module Fault* area of the *Connection* tab.

ć	Logix Designer - Demo_20210324	,1 (1756-L81E 32.11)	-		×
Γ	Module Properties: Local:1 (MVI5	6E-61850C 1.001) ×			-
	Module Properties: Local:1 (MVIS General - Connection - Module Info - Time Sync - Ethemet Configuration - PRP Network Redundancy - IED Status - Vendor	6E-61850C 1.001) × Connection Name Requested Packet Interval (RPI) (ms) Output0000 4.0 ÷ 2.0 - 750.0 Output0001 100.0 ÷ 2.0 - 750.0 Output0002 750.0 ÷ 2.0 - 750.0 Output0003 750.0 ÷ 2.0 - 750.0			
		Module Fault			
	, Status: Offline	OK Cancel Apply		Help	

4 Configuring the MVI56E-61850C Module

4.1 Configuration in the ProSoft MVI56E-61850C Configuration Manager

4.1.1 Launch the ProSoft MVI56E-61850C Configuration Manager

1 In the *I/O Configuration* section of the *Controller Organizer*, right-click the MVI56E-61850C module and select **PROPERTIES**. (Or just double-click the module.)

🔺 <u> </u>			
🔺 📟 1756 Backplane, 1756-A10			
📴 [0] 1756-L85E Demo_20201209_3			
[1] MVI56E-61850C MVI56E618500	-		
▲ 윪 Ethernet		New Module	
📴 1756-L85E Demo_20201209_3		Discover Modules	
	ж	Cut	Ctrl+X
	Ū]	Сору	Ctrl+C
	Ô	Paste	Ctrl+V
		Delete	Delete
		Cross Reference	Ctrl+E
		Export Module	
		Properties A	Alt+Enter
院 Logical Organizer		Print	Þ

The General tab of the Module Properties dialog box displays.

2 In the *Module Definition* area, click Change.

Series:		
Revision:	1.001	
Electronic Keying:	Compatible Module	
Connection:	Data	
Number of Conne.	1	

The *Module Definition* window displays.

3 Select LAUNCH CONFIGURATION MANAGER.

Module Definition		×
Revision:	1 ~ 001 •	
Electronic Keying:	Compatible Module \checkmark	
Configuration Manager Project:	Project name unavailable	
	Launch Configuration Manager	
)		
	OK Cancel He	lp .

After a brief pause, the ProSoft MVI56E-61850C Configuration Manager launches.

ProSoft MVI56E-61850C Configur	ration Manager				-		\times
File Edit View Help							
🗋 💕 📕 🖻 🖳 🎯							
Device View a Devices & Configurations ControlLogix 5580 Control 1756-L85E BIEC 61850 Configurations	ProSoft Mythele-sensed Project 1	ControlLogix ControlLogix 5580 Controller					
	Device Dath	Tag Magae	Type	Access	Conn	Ma	
	Device Fath	Tag ivame	type	10000	Conn	140.	
	Device Path	lag ivame	type		Com	NO.	
	Device Fatt	Tag Ivame	- type		Com	140.	

4.1.2 Overview of the ProSoft MVI56E-61850C Configuration Manager Interface



The ProSoft MVI56E-61850C Configuration Manager window consists of three panes:

1	The <i>Device View</i> tree shows the IEC 61850 configurations, including the imported IEDs. The <i>IEC 61850 Configurations</i> folder is a list of IED configuration files. This folder is empty until you import the CID/SCD files associated with the IEDs.
2	The Network View pane shows a graphic representation of the devices connected to the IEC 61850 network. Each device appears as a "bubble". The ControlLogix bubble represents the ControlLogix processor. The project bubble (ProSoft MVI56E-61850C) represents the module itself. The IEC61850 bubbles represent the IEDs connected to the network.
3	The <i>Configured Tags</i> pane shows the configured tags associated with the currently selected IED in the <i>Network View</i> pane.

4.1.3 Import IED Configuration Files

Note: Only configured ICD, CID, and SCD files can be imported. These files must be fully configured and saved in the software used to configure the IEDs. The configured file includes all required information to access the IED such as IP address and device name. It also includes the data supported by the IED such as the supported data attributes, data sets, GOOSE, reports and controls.

If the IED is set with a valid IP address, the MVI56E-61850C module will attempt to establish a TCP connection with the IED before exchanging data with the IED. If the TCP connection attempt fails, the MVI56E-61850C will not exchange any data with the IED (MMS read, control, reports or GOOSE published by the IED).

In case the IED only supports GOOSE publishing, but it does not support MMS communication (MMS read, control or reports), the IED IP address must be set as **0.0.0.0** through its configured file. The module will consume the subscribed GOOSE data published by the IED without attempting to establish a TCP connection.

1 In the *Device View* pane of the ProSoft MVI56E-61850C Configuration Manager, right-click **IEC 61850 CONFIGURATIONS** and select **ADD IED**.



2 In the Open dialog box, browse to the directory containing the ICD, CID, or SCD file.

S Open	×
\leftrightarrow \rightarrow \checkmark \uparrow \bigcirc \checkmark \land Documents \rightarrow CidFiles \rightarrow CidFiles	✓ Ŏ Search CidFiles
Organize 🔻 New folder	III 🕶 🔳 🔇
GidFiles ^ 🗌 Name	Date modified Type 5
Data Description	7/13/2020 1:50 AM CID File
This PC	7/12/2020 4:09 AM CID File
 Desktop Documents Downloads Music Pictures Videos Local Disk (C:) 	
- Notwork V <	
File name: SEL700G.CID" "GE_850.CID"	 ✓ IED Configuration Files (*.scd, * ∨ Open Cancel

- 3 Make sure the selected file type is IED CONFIGURATION FILES (*.SCD, *.ICD, *.CID).
- 4 Each IED has its own CID/ICD file, except for SCD files which can contain more than one IED. Select one or more configuration files to import and click **OPEN**. The imported IED files appear in the *Device View* tree under **IEC 61850 CONFIGURATION**.

ProSoft MVI56E-61850C Configuration Manager
File Edit View Help
Device View 📮 🗵
E- 🗁 Devices & Configurations
😑 🦢 ControlLogix 5580 Controllers
1756-L85E
🖻 🗁 IEC 61850 Configurations
C:\Users\Sysadmin\Documents\CidFiles\CidFiles\GE_850.CID
C:\Users\Sysadmin\Documents\CidFiles\CidFiles\SEL700G.CID

5 Repeat the steps above to import the rest of your IED files.

6 If you are familiar with the contents of CID, SCD, and ICD files, you can right-click the file name and then choose **DISPLAY** to see the contents of the file in the default text editor.

Note: Normally you only view the configuration files in the text editor for reference if you are familiar with these files. If you want to change the IED configuration, use the configuration software for the IED.

ProSoft MVI56E-61850C Configuration Manager						
File Edit View Help						
🗋 💕 📕 📝 🗖 🎯						
Device View	д X					
			ControlLogix			
🖃 🦢 Devices & Configurations			ControlLogix			
ControlLogix 5580 Contro	ollers		5580 Controller			
IC 61850 Configurations			а. 1			
C:\Users\Sysadmin\D	ocumer					
PlantPAx700G						
C:\Users\Sysadmin\D	ocumer					
GE_850_Feeder	Display	ProSoft MVI56E-61850C				
	Edit Path	Project 1.prj				
	Remove					
_						

4.1.4 Configure the IED Network

After you have imported the IED configuration files, you can add these IEDs to the IEC 61850 network in the ProSoft MVI56E-61850C Configuration Manager.

To configure the IED network:

1 In the *Device View* pane of the Configuration Manager, expand the IED file name by clicking the [+] sign next to the file name.



2 Click and drag the IED name from the *Device View* pane into the *Network View*. When you release the mouse button, the IED is added to the view in an *IEC61850* bubble. The bubble shows the IED Device Name and IP address. These values are from the IED file and cannot be changed in the Configuration Manager.



3 Repeat the steps above to add more IEDs to the *Network View* pane.

Note: The MVI56E-61850C module supports a maximum of 40 IEDs.

To delete an IED from the Network View:

1 Right-click the IED bubble in the *Network View* and select **DELETE**.



2 In the confirmation dialog that displays, select **YES**.

4.1.5 IED Data Mapping

For each IED added to the network, you must select the data to be mapped between the IED and ControlLogix processor.

1 In the *Network View* pane in the ProSoft MVI56E-61850C Configuration Manager, right-click the *IED* that you want to map, and select **CONFIGURE**. (Or just double-click the IED.)

ProSoft MVI56E-61850C Configuration	Manager			-		×
File Edit View Help						
						-
Device View Devices & Configurations ControlLogix 5580 Controllers ControlLogix 5580 Controllers ControlLogix 5580 Controllers Configurations Configura	ProSoft Project	ControlLogix ControlLogix 5580 Controller	ete perties			<
	Device Path	lag Name	Type	ACC	ess	
< >	<					>
Ready				CA	P NUM S	CRL .::

Note: If you have not yet saved the Configuration Manager project, a dialog will inform you that you must do so before assigning tags. Click **OK** and in the *Save As* dialog, enter a project name and save the project in the desired location.

ProSoft 61850 Configuration Manager	×
You must create a project name and select a storage location before assigning tags. Click 'OK' to do that now.	
ОК	

The IEC 61850 Mapping Tool window displays. The window contains the tree view on the left, and the mapping table on the right.

2 In the tree view on the left, expand the root folder (click the [+] sign). This shows the Logical Devices in the IED (notice the *LD* on the folder icon).

🔎 IEC 61850 Mapping Tool		×
Mapping Edit		
PlantPAx700G PlantPAx700G Procession PRO: Protection PRO: Protection Procession CON: Control Procession ANN: Annunciators	61850 Path	Tag Name -<
Ready		

3 Expand one of the logical devices in the IED (click the [+] sign) to see the logical nodes within it (notice the *LN* on the folder icons).

IEC 61850 Mapping Tool					
Mapping Edit					
⊡ 🔁 PlantPAx700G					
🖃 🛅 CFG: Data Sets, BRCBs, URCBs					
⊕ <mark>⊡a</mark> Health					
🕀 🔤 Reports					
⊕ Goose					
PRO: Protection					
🗄 🛅 MET: Measurement					
E-CON: Control					
🗄 🛅 ANN: Annunciators					

- 4 Expand a logical node to display data objects (*DO*), reports (*RPT*), GOOSE messages (*GSE*), and control data (functional constraint = *CO*). You may have to drill down a few layers to find the data you are seeking.
- 5 Click and drag a data object, dataset, or data attribute from the tree and drop it into the mapping table on the right. You can select the following four types of data:

Data Type	Description				
Reports	Reports are located under the LLN0 logical node. When selecting				
-	a report, you must select the entire report (yellow folder labeled				
	<i>RPT</i>) and not the individual data attributes.				
	E Reports				
	Heasurands : Predefined Buffered Report 01				
	Alarms : Predefined Buffered Report 02				
	EDs: Predefined Buffered Report 03				
	BRep04 : Predefined Buffered Report 04				
	BRep05 : Predefined Buffered Report 05				
	⊞				
	URep01 : Predefined Unbuffered Report 01				
	🕀 💀 URep02 : Predefined Unbuffered Report 02				
	URep03 : Predefined Unbuffered Report 03				
	You may select up to 10 reports per IED. You may select either				
	buffered or unbuffered reports.				
MMS Read messages	When selecting any data object or data attribute (except for				
	functional constraint as CO) will set the module to read the tag				
	over periodic MMS Read command. You cannot select the entire				
	within a data object				
	You must coloct the entire Oper structure for the controllable				
Control	object (functional constraint = CO)				
	stVal				
	1				
	<u>S</u> t				
	ctlModel				
GOOSE messages	GOOSE data is located under the LLN0 logical node. You must				
	select the entire data structure and not the individual data				
	attributes.				
	CFG: Data Sets, BRCBs, URCBs				
	a.log NamPlt				
	⊕ - Reports				
	Goose				
	GPub01 : Predefined GOOSE Control Publication				
	PRO: Protection				
You may select up to 4 GOOSEs per IED.					

The Configuration Manager populates the table with one row for each data attribute included in your selection.

Tip: To delete tags, select the tag or tags in the table, then right-click the selected tags and choose **DELETE**.

6 Repeat these steps until you have completed the mapping for the IED.

ping Edit			
PlantPAx700G	^	61850 Path	Tag Name
CFG: Data Sets, BRCBs, URCBs		GSE/GPub01:PlantPAx700GPRO/BXXCBR1\$ST\$	PlantPAx700G\$PRO\$BXXCBR1\$ST\$Pos\$stVal
		GSE/GPub01:PlantPAx700GPRO/BXXCBR1\$ST\$	PlantPAx700G\$PRO\$BXXCBR1\$ST\$Pos\$q
🕀 🔟 Mod		GSE/GPub01:PlantPAx700GPRO/BYXCBR2\$ST\$	PlantPAx700G\$PRO\$BYXCBR2\$ST\$Pos\$stVal
😟 🔟 Beh		GSE/GPub01:PlantPAx700GPRO/BYXCBR2\$ST\$	PlantPAx700G\$PRO\$BYXCBR2\$ST\$Pos\$q
Health		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO01\$stVal
		GSE/GPub01:PlantPAx700GCON/RBGGIO1\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO01\$g
E-Reports		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO02\$stVa
Measurands : Predefined Buffered Report 01		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO02\$g
Alarms : Predefined Buffered Report 02		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO03\$stVa
Predefined Buffered Report 05		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO03\$g
BRENDS : Predefined Buffered Report 05		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO04\$stVa
BREDOS: Predefined Buffered Report 05		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO04\$g
IRep01 : Predefined Unbuffered Report 01		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCS005\$stVa
URep02 : Predefined Unbuffered Report 02		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCS005\$g
URep03 : Predefined Unbuffered Report 03		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO06\$stVa
URep04 : Predefined Unbuffered Report 04		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO06\$g
URep05 : Predefined Unbuffered Report 05		GSE/GPub01:PlantPAx700GCON/RBGGIO1\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCS007\$stVa
URep06 : Predefined Unbuffered Report 06	-	GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCS007\$g
🖻 🏧 Goose		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGIO1\$ST\$SPCSO08\$stVa
GPub01 : Predefined GOOSE Control Publication		GSE/GPub01:PlantPAx700GCON/RBGGI01\$ST	PlantPAx700G\$CON\$RBGGI01\$ST\$SPCS008\$g
DevIDLPHD1	~	RPT/Measurands:PlantPAx700GMET/METXM	PlantPAx700G\$MET\$MET\$MMXU1\$MX\$TotW\$m
· · · · · · · · · · · · · · · · · · ·		<	3

7 Once your mapping is complete, from the **MAPPING** menu, select **SAVE**.

🔊 IEC 61850 Mapping Tool						
Mapping	Edit		_			
Save	Ctrl+S	1	^	61850 Path		
Canc	el ^{1/3} Ctrl+Q			🚾 RPT/Measu		
	in the second	1		🚾 RPT/Measu		
	🖻 🔤 Goose		_	RPT/Measu		
	🖻 📴 GPub01	: Predefined GOOSE Co		RPT/Measu		
	- 🛐 BXX	CBR1\$ST\$Pos\$stVal		RDT/Measu		
	- 🛅 BXX	CBR1\$ST\$Pos\$q				
		CODOCCTOD C VI I		MY KP I/Measi		

8 In the confirmation message that displays, click **YES**.

ProSoft 61850 Configuration Manager					
Save changes to the tag mappings?					
Yes	No	Cancel			

The *IEC 61850 Mapping Tool* window closes, and the *ProSoft MVI56E-61850C Configuration Manager* window redisplays with the tags selected for the IED appearing in the *Configured Tags* pane.



9 To create a data mapping for another IED, double-click it in the *Network View* pane diagram. Repeat these steps for all IEDs requiring a mapping.

Note: You may select up to 20,000 data attributes for all IEDs in the project.

4.1.6 IED Group Feature

For applications with similar IED models and identical mapped tags, the *IED Group* feature allows the grouping of similar IEDs to expedite the configuration process and reduce the number of UDTs generated in the .L5X export file.

The IEDs in the same group will be automatically configured with the same mapped tags and will share the same UDTs. The IEDs in the same group must have the same vendor and type, and the CID files must define the same logical devices, logical nodes, data objects, datasets, reports, control blocks, and GOOSE control blocks.

Note: A maximum of 20 groups can be created per project.

Note: A maximum of 40 IED's (individual or within groups) can be created per project.

Note: When using the Rockwell Automation Library of Electrical Protection Devices with 2 or more of the same IED types (Example: Two SEL 700G protection relays), the group must be configured such that the same UDT is used for both relays. It must match the group name as defined in the supported Rockwell Automation Add-On Instructions and Faceplates.

 In the Device View of the MVI56E-61850C Configuration Manager, right-click on IEC 61850 CONFIGURATIONS folder and select the ADD GROUP option.



2 A new group folder is created.



3 If needed, rename the group folder – it must be alphanumeric (letters, digits, underscore; first character a letter).

Device View			
Devices & Configurations			
🗄 🦾 ControlLogix 5580 Controllers			
🛄 1756-L85E			
🗄 🦢 IEC 61850 Configurations			
PAx700G			

4 Right-click on the group folder and select **ADD IED** to add an IED to the group.



5 Browse and open the CID file to be used for the group.

🔎 Open				×
\leftarrow \rightarrow \checkmark \uparrow \square \rightarrow This	s PC > Windows (C:) > temp	~	ට 🔎 Search temp	
Organize 🔻 New folde	r		•== •==	• 🔳 🕐
OneDrive	Name		Date modified	Туре
This DC	(RA-LIB) AB857		8/25/2017 10:48 AM	CID File
	(RA-LIB) AB865		8/25/2017 10:48 AM	CID File
3D Objects	(RA-LIB) ABB Emax2		4/18/2017 2:58 PM	CID File
E Desktop	(RA-LIB) GE_845_Xfmr		5/1/2018 1:13 PM	CID File
🔮 Documents	🥮 (RA-LIB) GE_850_Feeder		4/16/2018 5:06 PM	CID File
🖶 Downloads	(RA-LIB) GE_869_Motor		4/18/2018 3:37 PM	CID File
h Music	🥅 (RA-LIB) GE_889_Gen		5/10/2018 3:14 PM	CID File
Pictures	(RA-LIB) SEL351		4/16/2020 12:44 PM	CID File
Videor	(RA-LIB) SEL411L		4/16/2020 12:44 PM	CID File
Videos	(RA-LIB) SEL421		4/16/2020 12:44 PM	CID File
Windows (C:)	(RA-LIB) SEL451		4/16/2020 12:44 PM	CID File
🛖 Home (H:)	(RA-LIB) SEL487B		4/16/2020 12:44 PM	CID File
🗙 DriveK (K:)	(RA-LIB) SEL700G		2/2/2017 12:11 PM	CID File
🛖 Global Drive (V:)	(RA-LIB) SEL710		2/2/2017 12:11 PM	CID File
() N	/ / / / / / / / / / / / / / / / / / /		A/16/0000 10.44 DMA	
Network *				
File na	me:		 IED Configuration 	Files (*.scd, * ∨
			Open	Cancel:

6 The IED is displayed under the group folder.

Device View			
Devices & Configurations			
🚊 🦢 ControlLogix 5580 Controllers			
1756-L85E			
🗄 🗁 IEC 61850 Configurations			
– PAx 700G			
🗄 📄 C:\temp\(RA-LIB) SEL700G_100.CID			
PAx700G_100			

7 Drag and drop the IED from the *Device View* pane to the network area:


8 Double-click on the IED icon to open the *Mapping Tool* window. Drag and drop to map the data tags:

PAx700G_100	61850 Path	Tag Name	Type	Access	CtlMo
🖶 🤖 CFG: Data Sets, BRCBs, URCBs	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$TotW\$maq\$f	FLOAT32	PA	
E-LINO	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$TotVAr\$mag\$f	FLOAT32	PA	
🗈 🛅 Mod	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$TotVA\$maq\$f	FLOAT32	PA	
i ⊡o Beh	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$TotPF\$mag\$f	FLOAT32	PA	
i Health	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$Hz\$maq\$f	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$Fs\$mag\$f	FLOAT32	PA	
E-Reports	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PPV\$phsAB	FLOAT32	PA	
🕦 🐖 Measurands :	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PPV\$phsBC	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PPV\$phsCA	FLOAT32	PA	
BRan(M)	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PhV\$phsA\$	FLOAT32	PA	
Bincher.	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PhV\$phsB\$	FLOAT32	PA	
BRen06:	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PhV\$phsC\$	FLOAT32	PA	
H Rep 01 :	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PhV\$neut\$	FLOAT32	PA	
🕀 💀 URep 02 :	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$PhV\$res\$cV	FLOAT32	PA	
🖽 📾 URep03 :	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$A\$phsA\$cV	FLOAT32	PA	
🕀 🚈 URep04 :	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$A\$phsB\$cV	FLOAT32	PA	
🕀 💀 URep05 :	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$A\$phsC\$cV	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$A\$neut\$cV	FLOAT32	PA	
🗄 🔤 Goose	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$A\$res\$cVal	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$Vhz\$mag\$f	FLOAT32	PA	
🖶 🛅 PRO: Protection	RPT/Measurands:PAx700G_100MET/METXMM	PAx700G_100\$MET\$METXMMXU1\$MX\$Rf\$mag\$f	FLOAT32	PA	
🗈 🧰 MET: Measurement	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$TotW\$mag\$f	FLOAT32	PA	
E-CON: Control	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$TotVAr\$mag\$f	FLOAT32	PA	
→ Image ANN: Annunciators	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$TotVA\$mag\$f	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$TotPF\$mag\$f	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$Hz\$mag\$f	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$PPV\$phsAB	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$PPV\$phsBC	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$PPV\$phsCA	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$PhV\$phsA\$	FLOAT32	PA	
	RPT/Measurands:PAx700G_100MET/METYMM	PAx700G_100\$MET\$METYMMXU2\$MX\$PhV\$phsB\$	FLOAT32	PA	

- **9** Save and close the *Mapping Tool* window.
- **10** To add another IED to the same group, repeat steps **4** to **7**.

Note: Tags will be automatically mapped for all subsequent IED's with the same mapping as defined for the first device.





Caution: Ensure that all CID files for the same group define the same logical devices, logical nodes, data objects and data attributes. Otherwise, it can result in communication errors between the module and the IEDs.

• In the example above, the **PAx700G_101** IED is automatically configured with the same tags that were configured for the **PAx700G_100** IED.

a ice oroso mapping loor						~
Mapping Edit			-			
	61850 Path	Tag Name	Туре	Access	CtlMo	^
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$TotW\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$TotVAr\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$TotVA\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$TotPF\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$Hz\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$Fs\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PPV\$phsAB	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PPV\$phsBC	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PPV\$phsCA	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PhV\$phsA\$	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PhV\$phsB\$	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PhV\$phsC\$	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PhV\$neut\$	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$PhV\$res\$cV	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$A\$phsA\$cV	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$A\$phsB\$cV	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$A\$phsC\$cV	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$A\$neut\$cV	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$A\$res\$cVal	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$Vhz\$maq\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METXMM	PAx700G_101\$MET\$METXMMXU1\$MX\$Rf\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METYMM	PAx700G_101\$MET\$METYMMXU2\$MX\$TotW\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METYMM	PAx700G_101\$MET\$METYMMXU2\$MX\$TotVAr\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METYMM	PAx700G_101\$MET\$METYMMXU2\$MX\$TotVA\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G 101MET/METYMM	PAx700G 101\$MET\$METYMMXU2\$MX\$TotPF\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METYMM	PAx700G_101\$MET\$METYMMXU2\$MX\$Hz\$mag\$f	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METYMM	PAx700G_101\$MET\$METYMMXU2\$MX\$PPV\$phsAB	FLOAT32	PA		
	RPT/Measurands:PAx 700G_101MET/METYMM	PAx700G_101\$MET\$METYMMXU2\$MX\$PPV\$phsBC	FLOAT32	PA		
	RPT/Measurands:PAx700G_101MET/METYMM	PAx700G_101\$MET\$METYMMXU2\$MX\$PPV\$phsCA	FLOAT32	PA		
	RPT/Measurands:PAx700G 101MET/METYMM	PAx700G 101\$MET\$METYMMXU2\$MX\$PhV\$phsA\$	FLOAT32	PA		
	BPT/Measurands/PAy 700G_101MET/METVMM	PAy 700G 101\$MET\$METYMMXU2\$MX\$PhV\$phs8\$	EL OAT32	PΔ		—

- If a tag is added or deleted for one IED in the group, then all other configured IEDs for the same group will be automatically updated accordingly. All IEDs in the group will always have the same tags configured.
- All IEDs for this group will use the same UDTs for the .L5X export. The L5X UDT names for this group will use the same prefix matching the assigned group name.

4.1.7 Deleting one or more IEC 61850 mappings

You can delete one or more MMS messages, Report, and GOOSE mappings from an IED's configuration.

1 In the *Network View* pane in the MVI56E-61850C Configuration Manager, right-click the *IED* bubble, and choose **CONFIGURE**.



The IEC 61850 Mapping Tool window displays. The mappings are listed in the table on the right side of the window.

2 To delete only some of the mappings, select them from the table on the right, then right-click the selected mappings and choose **DELETE**.

⊕-🧾 GE_850_Feeder	61850 Path	Tag Name
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$A\$phsA\$cVal\$
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$A\$phsB\$cVal\$
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$A\$phsC\$cVal\$
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_FeederSMeterSMMXU1SMXSASnetScValSm
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$A\$neut\$cVal\$
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$AuxV\$cVal\$m
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_FeederSMeterSMMXU1SMXSHzSmagSf
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$HzRte\$mag\$f
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$Hz3VT\$mag\$f
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_FeederSMeterSMMXU1SMXSHz3VTRteSmag
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_Feeder\$Meter\$MMXU1\$MX\$HzVxRte\$mag\$f
	RPT/brcb00_MEASURANDS01:GE_850_Feeder	GE_850_FeederSMeterSMMXU1SMXSHzVxSmagSf
	GSE/gcb01:GE_850_FeederCtrl/XCDD15CTEO+C++	CF_850_FeederSCtrl\$XCBR1\$ST\$OpCnt
	GSE/gcb01:GE_850_FeederCtrl/> Delete	350_Feeder\$Ctrl\$XCBR1\$ST\$Pos
	GSE/gcb01:GE_850_FeederCtrl/TVTR1\$ST\$FuFail	GE_850_Feeder\$Ctrl\$TVTR1\$ST\$FuFail

3 To delete all the mappings, select **EDIT > CLEAR ALL**.



4 From the **MAPPING** menu, select **SAVE**.

4.1.8 Set the MMS Scan Delay and MMS Ping for an IED

You can change the MMS Scan Delay and MMS Ping for any IED.

MMS Scan Delay value determines how often the MVI56E-61850C module will issue an MMS read command.

MMS Ping value configures the frequency of the keepAlive message issued by the module to confirm that the IED is still connected. These are the only properties you can change for an IED, as everything else is set in the IED configuration file.

IEC 61850 Reports and GOOSE messages are generated by the IED and are not affected by the *MMS Scan Delay*. The *MMS Scan Delay* parameter also has no impact on MMS writes. The lower you set the *MMS Scan Delay* value, the more network capacity is consumed by MMS Read network traffic. If you do not configure an IED to read any data attributes using MMS messages, then this parameter has no effect.

1 Right-click an IED and select **PROPERTIES**.

Device View Devices & Configurations ControlLogix 5580 Controllers ControlLogix 5580 Controllers ControlLogix 5580 Controllers Configurations C:Users/Sysadmin/Documer		ControlLogix ControlLogix 5580 Controller	
GE_850_Feeder □ C:Users\Sysadmin\Documer □ PlantPAx700G	ProSoft writece-sees Project 1.prj	©	Configure
		192 168 0 7C	Delete

The 61850 Properties dialog displays.

Name:	PlantP	Ax700	G				
IP Address:	192	. 168		0	<u>.</u>	70	MMS Scan Delay (2 to 10000) ms: 1000
Subnet Mask:	255	. 255	•	255	•	0	MMS Ping (0 to 600) seconds: 12
Gateway:	192	. 168	4	0	•	1	Edit Network Settings
Comment:				-		_	

The **EDIT NETWORK SETTINGS** button is for troubleshooting under the direction of ProSoft Technical Support.

- 2 The network settings (*IP Address, Subnet Mask*, and *Gateway*) should already be filled in, because ProSoft 61850 Configuration Manager reads this from the CID file. You should not need to edit these settings.
- **3** By default, the *MMS SCAN DELAY* is set to 1000 milliseconds. You can change this value if necessary.
- 4 Click OK.

4.1.9 Module Properties in Configuration Manager

From within MVI56E-61850C Configuration Manager, you can view and edit various properties of the MVI56E-61850C module. To do so, right-click the module and select **PROPERTIES**.



<u>General</u>

On the *General* tab of the *Properties* dialog, you can view and edit the name of the MVI56E-61850C Configuration Manager project and add notes as appropriate.

Properties	×
General Connections Time Synch Security (CA) Security (TLS) Security (IEC 61850)	1
Project Name: Project 1	
Notes:	
OK Cancel	

Connections

The *Connections* tab of the *Properties* dialog displays the backplane connection RPI settings. The backplane connections are used to exchange data between the ControlLogix processor and the MVI56E-61850C module. Each connection is limited to 500 input bytes and 496 output bytes.

The IEC 61850 data selected by the user is automatically mapped to the backplane connections (max 225 connections) for data transfer between the ControlLogix processor and MVI56E-61850C module.

There are two categories of backplane connections: high priority and normal priority. The high priority connections support faster transfer rates. The selected IEC 61850 data is automatically mapped to a backplane category depending on the IEC 61850 communication method as follows:

High Priority	Input	GOOSE Subscribe
Connections	Output	Control, GOOSE Publish
Normal Priority	Input	Report, MMS Read
Connections	Output	N/A

This information is also found on the *Connection* tab of the MVI56E-61850C Add-On Profile.

Properties		×
General Connections Time Synch	Security (CA)	Security (TLS) Security (IEC 61850)
High Priority Connection RPI		[4ms - 9,999ms]
Normal Priority Connection RPI	250	[100ms - 9,999ms]
		OK Cancel

Note: The module supports up to 225 connections. From this total a maximum of 55 high priority connections are supported.

<u>Time Synch</u>

The *Time Synch* tab of the *Properties* dialog displays properties of the module's Time Synchronization feature.

This feature is always enabled over the backplane (between the ControlLogix processor and the MVI56E-61850C module). You can also enable time synchronization over Ethernet through the *Ethernet Configuration* tab of the MVI56E-61850C Add-On Profile.

Properties		×
General Connections	Time Synch Security (CA) Security (TLS) Security (IEC 61850)	
Enable VLAN		
VLAN ID	1 1-4094 VLAN Priority 0 0-7	
Domain Number	0-255	
TLV Include Alternate 7	CLV V OrganizationSubType 1	
UTC Offset	UTC+00:00 -	
		1
	OK Cance	1

The following are the parameters on the *Time Synch* tab.

Parameter	Description
Enable VLAN	This parameter allows the configuration of the VLAN header for PTP data communication. If enabled, the MVI56E-61850C module will add the VLAN header to the outgoing PTP data communication over Ethernet. Additionally, the module will also process incoming PTP data with the VLAN header. If disabled, the VLAN header will not be included in the PTP frames, nor will PTP data with the VLAN header be accepted.
VLAN ID	VLAN Identification. Valid values are between 1 and 4094.
VLAN Priority	VLAN priority number. Valid values are between 0 and 7.
	Note: IEDs supporting the Power Profile standard C37.238 Ed 2011 may require the VLAN header and parameters to accept time synchronization communication.
Domain Number	Domain identification. The domain consists of one or more PTP devices communicating with each other as defined by the protocol. Valid values are between 0 and 255.

Parameter	Description					
Include Alternate TLV	This option configures the inclusion of the Alternate Time Offset Indicator TLV to the announce frames if missing from the announce frames received by the grandmaster clock.					
	Note: IEDs supporting the Power Profile standard C37.238 Ed 2011 require the Alternate Time Offset Indicator TLV to accept time synchronization communication. However, according to standard C37.238 Ed 2017, the Alternate Time Offset Indicator TLV is no longer required. If you configure the module in boundary clock mode (AOP Time Synch Ethernet enabled), with the ControlLogix processor as the time Grandmaster and the IED supporting standard C37.238 Ed 2011 Edition, then you should enable this feature, so the module will insert the TLV section to the Announce frame received from the ControlLogix processor before it gets sent to the IED.					
OrganizationSubType	Defines a subtype within the scope of the organizationID field. Depending on the C37.238 standard edition supported by the IEDs, the parameter value must be set as follows:					
	Standard C37.238 Edition OrganizationSubType Value					
	_20111					
	2017 2					
UTC Offset	The difference between Coordinated Universal Time and local time.					

For more information on the Time Synch feature, see <u>"Time Synchronization"</u> on page 82.

Security (CA)

Note: The Security feature is not currently supported.

The Security (CA) tab of the Properties dialog allows you to manage security certificates issued by certificate authorities.

Properties						×
General Conne	ections Time Synch	Security (CA)	Security (TLS)) Security (I	EC 61850)	1
Cert No	Certificate Name					
1				Add Ce	rtificates	
				ОК	Cancel	

Security (TLS)

Note: The Security feature is not currently supported.

The *Security (TLS)* tab of the *Properties* dialog allows you to manage project security certificates and other related settings.

	Connections Time Sunch	Security (TI 4	S) Contributing (TEC 61850)]	
eneral	Connections Time Synch	Seconcy (re.	57 Security (IEC 61650)	
	SSI Cert			
	Cert No Certificate N	ame		
		unc		
	I		1	
		Move Down	Move Up Add C	ert
	Max Transaction Per Key		Max Time Per Key	
	5000		1800	sec
	CRL Check Interval		Rekey Time Per Key	
	0	mins	60	sec
	1 -		1	

Security (IEC 61850)

Note: The Security feature is not currently supported.

The *Security (IEC 61850)* tab of the *Properties* dialog allows you to manage security certificates for IEDs on the IEC 61850 network.

Properties		×
General Conn	ections Time Synch Security (TLS) Security (IEC 61850)	
Cert No	Certificate Name	1
		l
	Move Up Move Down Add Certificates	
	OK Cancel	

4.1.10 Configure GOOSE Publish

<u>Overview</u>

The ProSoft MVI56E-61850C Configuration Manager allows for the configuration of GOOSE messages published out to the network from the MVI56E-61850C module. When you export the project to the MVI56E Add-On Profile, (see <u>"Export the Configuration to the Add-On Profile"</u> on page 58), the Configuration Manager creates a .CID file that contains the GOOSE configuration. You can import that .CID file into the application you are using to configure your IEDs so that you can set up those devices to consume the GOOSE messages.

The tags associated with the GOOSE message configuration will be automatically mapped as part of the high priority output connections.

Configure the IED Name

The first step in configuring GOOSE Publish is to set the name that the module will assume for the IED on the IEC 61850 network.

1 In Configuration Manager, right-click the MVI56E-61850C module and select **GOOSE PUBLISHING**.

Note: If you have not yet saved the Configuration Manager project, the system will prompt you to do so.



The GOOSE Form window displays.

2 Edit the IED Name field as appropriate.

IED Name PSFT 61850C	
1	Update
Summary	
GOOSE Publish Object Count	3
Dataset Count	3
Total Data Objects Count	78
Total Number of Backplane Connections Required (including padding)	1

Create GOOSE Datasets

The next step in configuring GOOSE messages is to create the datasets that will contain the messages. Each dataset comprises a series of data groups, each of which can contain multiple data objects. You can configure up to 8 datasets.

1 From the GOOSE Form window, select the **DATASET** tab.

Name	FCDA Objects (count)	Bytes (count)	Description	
Dataset_0	0	0		
Dataset_1	0	0		
Dataset_2	0	0		
Dataset_3	0	0		
Dataset_4	0	0		
Dataset_5	0	0		
Dataset_6	0	0		
Dataset_/	0	0		

2 Select a dataset and click EDIT.

The *Edit Dataset* window displays.

Name Dataset_0 Description	Data Type Data Attribute IEC 61850 FCDA ControlLogix UDT Start Offset G stVal G stVal G stVal
Data Object Groups 61850 Path DO Count Byte Count	Data Objects Count Data Objects Count Data Preview IEC 61850 Data Object Path Range ControlLogix Tag Range
Fotal Byte Utilized : 0 Of Max (1260)	Apply New

- 3 If necessary, edit the name and description of the dataset as you see fit.
- 4 In the *Data Object Group* area, select a data type and enter the start offset and number of data objects.

The *Data Preview* area updates to show how the data will look when published out to the 61850 network (*IEC 61850 Data Object Path Range*) and how it will be stored in the module (*ControlLogix Tag Range*).

BOOL	IEC 61850 FCDA	ControlLogix UDT
Start Offset	stVal	stVal
	🔿 stVal, q, t	$m{C}$ stVal, q
Data Objects Count		
10 — Data Preview IEC 61850 Data Obie	ect Path Range	
10 — Data Preview IEC 6 1850 Data Obje PSFT_6 1850C\$GGI	ect Path Range O\$ST\$Ind0500	\$GGIO\$ST\$Ind0509
10 Data Preview IEC 61850 Data Obje PSFT_61850C\$GGI ControlLogix Tag Rar	ect Path Range O\$ST\$Ind0500 PSFT_618500	\$GGIO\$ST\$Ind0509
10 Data Preview IEC 61850 Data Obje PSFT_61850C\$GGI ControlLogix Tag Rar B0500 - B0509	ect Path Range O\$ST\$Ind0500 PSFT_61850C nge data objects	\$GGIO\$ST\$Ind0509

For this example	, the GOOSE Publish	data will be access	ed as follows:
------------------	---------------------	---------------------	----------------

ControlLogix Tag	IEC 61850 Data Object
B0500	PSFT_61850\$GGIO\$ST\$Ind0500
B0501	PSFT_61850\$GGIO\$ST\$Ind0501
B0502	PSFT_61850\$GGIO\$ST\$Ind0502
B0503	PSFT_61850\$GGIO\$ST\$Ind0503
B0504	PSFT_61850\$GGIO\$ST\$Ind0504
B0505	PSFT_61850\$GGIO\$ST\$Ind0505
B0506	PSFT_61850\$GGIO\$ST\$Ind0506
B0507	PSFT_61850\$GGIO\$ST\$Ind0507
B0508	PSFT_61850\$GGIO\$ST\$Ind0508
B0509	PSFT_61850\$GGIO\$ST\$Ind0509

Therefore, updating the *B0500.stVal* value will also send the *PSFT_61850\$GGIO\$ST\$Ind0500.stVal* value out to the IEC 61850 network.

- 5 In the *Data Attribute* area, select the appropriate attribute for *IEC 61850 FCDA* (*stVal* or *stVal*, *q*, *t*). Your selection determines whether the data objects will contain only the status value (*stVal*) or the status value plus the quality (*q*) and time (*t*) attributes when the MVI56E-61850C sends the GOOSE message out to the IEC 61850 network. The attributes *q* and *t* are defined as follows:
 - q: The 61850 quality, which is a 13-bit variable-length bit array, stored as 13 bits of a 16-bit (two-byte) object. This value is optionally delivered over the backplane from the ControlLogix processor to the module. Even when *stVal* is delivered alone from the ControlLogix processor, the processor still maintains *q* with valid settings out to the IEC 61850 network.
 - *t*: The timestamp of the last change to either stVal or q, having the type of 61850 "Timestamp," an 8-byte quantity. This value is updated from the module's system clock whenever either stVal or q is changed, either from delivery over the backplane or from recalculation of q.
- 6 In the *Data Attribute* area, select the appropriate attribute for *ControlLogix UDT* (*stVal* or *stVal*, *q*). Your selection determines how the data will be stored in the ControlLogix processor. Note that if you select *stVal* under *IEC 61850 FCDA*, the only option available for *ControlLogix UDT* is *stVal*. For more information on how the quality value is set, see <u>"GOOSE Publish Quality Value"</u> on page 53.
- 7 Select APPLY.

The data objects are added to the *Data Object Groups* list. Each item in this list represents a single group of data made up of one or more data objects.

61850 Path	DO Count	Byte Count
PSFT_61850C\$GGIO\$ST\$Ind500\$stVal	10	10

8 Repeat steps 5 to 8 to add additional data object groups to the dataset.

61850 Path			DO Count	Byte Count
PSFT_61850C\$GGI	D\$ST\$Ir	nd500\$stVal	10	10
PSFT_61850C\$GGI	D\$ST\$In	nd200\$stVal	8	8
PSFT_61850C\$GGI	D\$ST\$In	ntIn600\$stVal	12	24

9 Click OK.

The *DataSet* tab redisplays with updated data based on your edits.

Name	FCDA Objects (count)	Bytes (count)	Description	
Dataset_0	3	42		
Dataset_1	0	0		
Dataset_2	0	0		
Dataset_3	0	0		
Dataset_4	0	0		
Dataset_5	0	0		
Dataset_6	0	0		
Dataset_/	0	0		

10 Repeat steps 3 to 10 to configure additional datasets.

GOOSE Publish Quality Value

If you select *stVal* for *ControlLogix UDT*, the quality value (q) will not be included in the GOOSE Publish tags in Logix Designer.

Data Object Group		
Data Type	Data Attribute	
BOOL Start Offset 1 Data Objects Count	IEC 61850 FCDA	ControlLogix UDT
3		

In this example, the GOOSE Publish tags will be generated as B0001, B0002, and B0003 (status value only), as illustrated in the following screen capture of the *Controller Tags* editor:

▲ Local:1:0001	{}
Local:1:0001.GE_850_Feeder_Ctrl_XCBR1_CO_Pos_Oper	{}
Local:1:0001.PlantPAx700G_CON_RBGGI01_CO_SPCS001_Oper	{}
Local:1:0001.B0001	1
Local:1:0001.B0002	1
Local:1:0001.B0003	1

If you select *stVal, q* for *ControlLogix UDT*, the quality will be delivered with the status value.

Data Object Group		
Data Type	Data Attribute	
BOOL	IEC 61850 FCDA	ControlLogix UDT
Start Offset	⊂ stVal	C stVal
, Data Objects Count		ᅊ stVal, q
3		
Data Province		

In this example, the GOOSE Publish tags will be generated as structures of status value (stVal) and quality (Q).

▲ Local:1:0001	{}
Local:1:0001.B0001	{}
Local:1:O001.B0001.stVal	0
Local:1:0001.B0001.Q	0
Local:1:0001.B0002	{}
Local:1:O001.B0002.stVal	0
Local:1:0001.B0002.Q	0
Local:1:0001.B0003	{}
Local:1:0001.B0003.stVal	0
Local:1:0001.B0003.Q	0

The data type of Q is a byte (Logix datatype USINT, TagDB datatype UBYTE) whose two low-order bits have been assigned as follows:

- Bit 0: Source is off-line (for example, input card failure, rendering latest data "stale").
- Bit 1: Source is chattering (therefore status value might not be reliable).

When the value of Q is set in Logix Designer, the ControlLogix processor passes the value to the MVI56E-61850C module and updates the quality (q) accordingly as follows:

- If Q bit 0 is set as 1 (offline), then q is set as c100 (old data).
- If *Q* bit 1 is set as 1 (chattering), then *q* is set as 4400 (oscillatory).

Configure the GOOSE Control Block

After configuring the datasets, the next step is to set the parameters for the GOOSE control block.

- 1 Select the **GOOSE PUBLISH** tab.
- 2 Click New.

oose Form	
General DataSet	ise Publish
Name	Description
	New Edit Delete

The GOOSE Form (New) window displays.

DOSE Form (New)	- 0	Х
Name		_
Description		
		_
Dataset		_
Dataset_0	-	•
GOOSE ID		_
GseId1		
MAC Address	APP ID	
01-0C-CD-01-00-01	0001	
VLAN ID	VLAN Priority	
001	0	•
Min Time	Time Allowed To Live	
10	1000	
Config Rev		
1		
	OK Cancel	1

- **3** Enter a name and description.
- 4 Select a dataset. This list contains all the datasets that you configured on the *DataSet* tab.
- **5** Enter values for the remaining parameters using the following table as a guide.

Parameter	Description
GOOSE ID	Identification string for the GOOSE control block
MAC Address	The destination multicast address to which the GOOSE message will be propagating
APP ID	Integer value that identifies the sender of the GOOSE message
VLAN ID	Value used to broadcast the GOOSE message only to a particular closed network
VLAN Priority	Priority of the GOOSE message broadcast to the VLAN
Min Time	GOOSE message frequency (in milliseconds) when a change occurs in the data
Time Allowed to Live	Sets how long the remote IED should wait for the next message before determining there was a communication issue (in milliseconds). The GOOSE message frequency when there is no new event (Max Time) is calculated as Time Allowed to Live divided by 2.
Config Rev	Configuration revision

6 Click OK.

The form closes, and the *GOOSE Publish* tab redisplays with the new GOOSE control block appearing in the list.

Goose	Form		\times
Gene	eral DataSet Goose Pu	blish	
	Name	Description	
	GOOSE0	Description	
	1	New Edit Delete	

7 Repeat steps 2 to 6 to add additional GOOSE control blocks.

4.1.11 Export the Configuration to the Add-On Profile

After you have created the tag mappings, you are ready to export the configuration to the Add-On Profile, thereby passing the configuration to the ControlLogix processor.

1 Select the **EXPORT CONFIGURATION** icon from the ProSoft MVI56E-61850C Configuration Manager menu bar.



2 In the *Save As* dialog, navigate to the location where you want to save the project files and select **SAVE**.

⇒ * ↑	« Con	figuration Manager Pr >	20201204 > ∨ ඊ		0201204
)rganize 👻 N	ew folder				
This PC This PC Desktop Couments Documents Downloads Music Pictures Videos Local Disk (C	· · · · · · · · · · · · · · · · · · ·	Name New folder Project 1.prj Project 2.prj Project 3.prj	Date modified 12/4/2020 7:19 AM 12/4/2020 7:11 AM 12/4/2020 9:03 AM 12/4/2020 9:35 AM	Type File folder PRJ File PRJ File PRJ File	Size 29 KB 29 KB
File name:	Project	3			

A second *Save As* dialog displays.

3 Navigate to the location where you want to save the configuration files and select **SAVE**.

→ · · · ↑ - · · · · · · · · · · · · · · ·	20201204 > ∨ ඊ		0201204
Organize 🔻 New folder			8== -
 This PC 3 D Objects Desktop Documents Downloads Music Pictures Videos 	Date modified 12/4/2020 7:19 AM 12/4/2020 7:11 AM 12/4/2020 9:04 AM	Type File folder CFG File CFG File	Size 15 KB 18 KB
Local Disk (L:) Vetwork File name: Project 3 Save as type: ProSoft Gateway Configuration file	•s (*.cfg)		

The Configuration Manager saves the following configuration files:

- Project backup (.cfg, .tlz, .xml, .prj, .prx, .db)
- MVI56E-61850C program for Studio 5000 Logix Designer (.L5X)
- IED configuration file (.CID) (only if you configure the GOOSE Publish feature)

Once the project export is successfully concluded, you should see a message similar to the following:



- 4 Click **OK** in the two confirmation dialogs that display.
- 5 Close the Configuration Manager window.

6 In the *Module Definition* window of the Add-On Profile, click **OK**.

Module Definition	×
Revision: Electronic Keying:	1 V 001 V Compatible Module V
	Launch Configuration Manager
	OK Cancel Help

7 Click **YES** to confirm that you want to change the module definition.

Logix D	esigner ×
	These changes will cause module data types and properties to change. Data will be set to default values unless it can be recovered from the existing module properties. Verify module properties before Applying changes.
	Yes No

Note: In some cases, it may take some time for the AOP to process the changes made to the module definition.

The *General* tab of the *Module Properties* dialog box displays again. Note that the *Number of Connections* field has been updated to the number of connections set by the Configuration Manager.

Note: Configuration Manager automatically calculates the number of connections required by the mapping you created.

💰 Logix Designer - Demo_20210324	4_1 [1756-L81E 32.11]	- 🗆 ×
Module Properties: Local:1 (MVI	156E-61850C 1.001) ×	-
General	General	
Connection Module Info Time Sync Ethernet Configuration PFR Network Redundancy IED Status Vendor	Type: MVI56E-61850C IEC 61850 Client Communication Module Vendor: Prosoft Technology Parent: Local Name: MVI56E61850C Slot: 1 Description: Module Definition Series: Revision: 1.001 Electronic Keying: Compatible Module Connection: Data Number of Conne 5 Change	Y
Status: Offline	OK Cancel Apply	Help

8 Click **OK** to close the *Module Properties* dialog box.

4.1.12 Files Generated by the MVI56E-61850C Configuration Manager

When you save a configuration project, the MVI56E-61850C Configuration Manager generates the following files in the directory that you specify.

Project backup files (.cfg, .tlz, .xml, .prj, .prx, .db, .cid)

These files are required if you need to contact ProSoft Technical Support. The support engineer may request these files to evaluate your application configuration. If you want to move the project to another computer, you will need the PRJ file as well as the IED CID files.

The .cid file will be exported by Configuration Manager only if GOOSE Publish is configured.

MVI56E-61850C Program (.L5X)

The MVI56E-61850C Program is the .L5X file generated by the ProSoft MVI56E-61850C Configuration Manager. This file is required by Studio 5000 to copy the user-defined tags that store the report data received by the IEDs.

The MVI56E-61850C Program contains the following:

• An Add-On Instruction is included for each IED. Following is one example of an Add-On Instruction associated with a configured IED:



The Add-On instruction includes the logic used by Studio 5000 to copy the report data from the normal priority connections to the IED's user-defined tag.

 For each configured IED, the MVI56E-61850C Program also contains a single userdefined tag that stores all report and MMS data for that IED. The IED tag follows the following syntax:

[IED].[LD].[LN].[FC]_[DO].[DA]

LD – Logical Device LN – Logical Node FC – Functional Constraint DO – Data Object DA – Data Attribute

For example, if the phase A current value is selected from the IED PlantPAx751A, the controller tag will have the following syntax: *PlantPAx751A.MET.METMMXU1.MX_A.phsA.cVal_mag_f* The following is an example of an IED tag:



• The MVI56E-61850C Program file also contains the Diagnostics Add-On Instruction, which includes the diagnostics tags used to monitor module operation. See section 8.3, <u>"Diagnostics Controller Tags,"</u> on page 106 for descriptions of these tags.

Configured IED Description (CID) file (.CID)

This file is generated only if you configured the GOOSE Publish feature. The CID file can be imported into the IED vendor configuration software to allow the remote device to subscribe to the GOOSE messages published by the MVI56E-61850C module.

4.2 Configuration in Studio 5000 Logix Designer

The following subsections explain module configuration that takes place in Studio 5000 Logix Designer.

4.2.1 Data Mapping Over the Backplane Connections

Data is transferred between the ControlLogix processor and the MVI56E-61850C module through the backplane connections. Each backplane connection supports up to 500 input bytes and 496 output bytes. The module supports up to 225 backplane connections.

The selected IEC 61850 data is automatically mapped over the backplane connections. Once you export the configuration to the MVI56E-61850C Add-On Profile, you can open the *Module Properties* dialog box and look in the *Module Definition* section of the *General* tab to see the number of backplane connections automatically created for your application:

Module Definition		
Series:		
Revision:	1.001	
Electronic Keying:	Compatible Module	
Connection:	Data	
Number of Conne.	. 5	
		Change

The selected data is mapped into two types of connections—normal priority data and high priority data, as follows:

IEC 61850 Data	I/O	Backplane Connection Priority	Default RPI Time
Report	Input	Normal priority connection	250 ms
MMS Read Command	Input	Normal priority connection	250 ms
GOOSE Subscribe	Input	High priority connection	4 ms
Control (MMS Write Command)	Output	High priority connection	4 ms
GOOSE Publish	Output	High priority connection	4 ms

All high priority connections are set by default with the RPI time as 4 ms, while the normal priority connections are set with the RPI time as 250 ms by default.

You can refer to the backplane connections in the *Controller Tags* editor in Studio 5000 Logix Designer:

Name	-8 🔺	'
▶ Local:1:C		
▶ Local:1:1001		
▶ Local:1:1002		
▶ Local:1:1003		
▶ Local:1:1004		
▶ Local:1:1005		

Each backplane connection name uses the following syntax: [Local/Remote]:[Slot Number]:[Connection Number]

The backplane connections are grouped based on priority category. The first backplane connections are always set as high priority connections, while the remaining backplane connections are set as low priority connections.

You may refer to the Add-On Profile (*Module Properties > Connection*) to view the backplane connections created for your application. You can recognize the backplane priority category based on the requested packet interval (RPI) timing.

Note: The RPIs are managed by the Configuration Manager software and should not be changed on the *Connection* tab.

For the example below, the first connection is a high (only) priority connection (RPI time = 4 ms), while the subsequent connections are normal priority connections (RPI time = 100 ms).

3	J Logix Designer - Demo_20210503_1 [1756-L81E 32.11]								
ľ	Module Properties: Local: 1 (MVI56E-61850C 1.001) ×								
Г		0	- dia -						
	General	Conn	ection						
	- Connection								
	Time Supc								
	- Bhemet Configuration				^				
	- PRP Network Redundancy			Requested Packet Interval (RPI)					
	- IED Status		Name	(ms)					
	Vendor								
			0-49-40000	40 1 20 7500	4				
			Culpationo	4.0 2.0 - 750.0	-				
			Output0001	100.0 😳 2.0 - 750.0					
			Output0002	100.0 ≑ 2.0 - 750.0					
			Output0003	100.0 2.0 - 750.0	\v				

After the normal priority connections, there may be spare connections set with an RPI timing of 750 ms. The spare connections are not used for data communication.

General Connection	Connection		
Imodule #10 Time Sync Ethemet Configuration PRP Network Redundancy IED Status Vendor	Name	Requested Packet Interval (RPI) (ms)	
	Output0006	100.0 ≑ 2.0 - 750.0	
	Output0007	750.0 🜩 2.0 - 750.0	
	Output0008	750.0 🗘 2.0 - 750.0	
	Output0009	750.0 🛨 2.0 - 750.0 💙	

4.2.2 Accessing GOOSE and Control Data

The GOOSE and control data tags can be monitored directly at the high priority connections:

Scope: 📴 L85E535523 🗸 Show: All Tags				~	🔨 Enter Name Filter	
Name	-8	Value 🗧 🗧	Force 🗧	Style	Data Type	^
▶ Local:1:C		{}	{}		PS:1756_61850:C:0	
▲ Local:1:1001		{}	{}		PS:61850_859CC503:I001:0	
Local: 1:1001.ConnectionFaulted		0		Decimal	BOOL	
Local:1:1001.PlantPAx700G_PRO_BXXCBR1_ST_Pos_stVal		1		Decimal	USINT	
Local:1:1001.PlantPAx700G_PRO_BXXCBR1_ST_Pos_q		0		Decimal	UINT	
Local:1:1001.PlantPAx700G_PRO_BYXCBR2_ST_Pos_stVal		1		Decimal	USINT	
Local:1:1001.PlantPAx700G_PRO_BYXCBR2_ST_Pos_q		1		Decimal	UINT	
Local:1:1001.PlantPAx700G_CON_RBGGIO1_ST_SPCSO01_s	stVa	1		Decimal	BOOL	
Local:1:1001.PlantPAx700G_CON_RBGGIO1_ST_SPCS001_0	9	0		Decimal	UINT	
Local:1:1001.PlantPAx700G_CON_RBGGIO1_ST_SPCSO02_s	stVa	1		Decimal	BOOL	
Local:1:1001.PlantPAx700G_CON_RBGGIO1_ST_SPCS002_0	9	1		Decimal	UINT	
Local:1:1001.PlantPAx700G_CON_RBGGIO1_ST_SPCSO03_s	stVa	0		Decimal	BOOL	
Local:1:1001.PlantPAx700G_CON_RBGGI01_ST_SPCS003_c	9	0		Decimal	UINT	

The report and MMS read command data tags are copied from normal priority connections to controller tags defined by the MVI56E-6180C program exported by the Configuration Manager software. The process of importing the MVI56E-61850C program into Studio 5000 is described in the following section.

- 4.2.3 Import the MVI56E-61850C Program into Studio 5000 Logix Designer
- 1 In the *Tasks* section of the *Controller Organizer*, right-click **MAIN TASK** and select **IMPORT PROGRAM**.

💰 Logix Designer - Dem	02 [17	56-L85E 32.1	1]*									
FILE EDIT VIEW	EARCH	LOGIC	col	MMUNIC	ATIONS	TO	OLS	WIND	ow	HELP		
🗄 🏠 🔛 🖨 🕹	O á	2 2 6				_		~ 5	• *	7	T2=	b. [6]
RUN CK Energy Storage	` ′	Path: <r< td=""><td>none</td><td>></td><td></td><td></td><td>No Co</td><td>ta.</td><td></td><td>а</td><td></td><td>₹ ₹</td></r<>	none	>			No Co	ta.		а		₹ ₹
Controller Organizer	mme	- 1 -		Canta Canta		P	NO EC	JILS	1	1		
		* * ^		Control	oller lag	s · D	emoz(control	ier)	~		
			÷.	Scope:	Dem	02		~ S	how:	All Tag	JS	
Controller Demo			Г	Nam	e		-8	Value			٠	Force Ma
Controller Fau	ılt Han	dler	L.	▶ Lo	cal:1:C			1			{}	
Power-Up Ha	ndler		E	▶ Lo	cal:1:100	01					{}	
🔺 📹 Tasks			Ŀ	Þ Lo	cal:1:10	12					()	
▲ 🔂 MainTask ♦ 🔓 MainProg	rai	Add			•		New	Progra	m		()	
Unscheduled	Ж	Cut		9	Ctrl+X		New	Equipn	nent i	Phase		
General Motion Groups General Motion Groups General Motion Groups	ر د د	Copy Paste			Ctrl+C Ctrl+V		Impo	ort Prog	ram pmen	it Phas	e	
Alarm Manager		Paste Spec	ial		+	02					{}	
Logical Model		Delete		1	Delete	03					{}	
 I/O Configuration I/O Eackplan 	n Ie	Cross Refe	renc	e	Ctrl+E	04					{}	
[0 [0] 1756-L	85	Print			•	05					{}	
] [1] MVI568 ▲ 뫎 Ethernet	-6	Properties		Alt	Enter							
📴 1756-L85E	Demo	2										

2 In the *Import Program* dialog, select the Logix5000 XML (.L5X) file that you exported from the Configuration Manager and click **OPEN**.

💰 Import Progr	am					×
Look in:	Export Confi	guration ~	G 🕻) 📂 🛄	•	
3	Name	^	Date	modified		Туре
Quick access	🗹 🗋 Demo P	roject1.L5X	11/24	/2020 8:47	AM	Logix
Desktop Libraries This PC						
	<					>
Network	File name:	Demo Project 1		~	Ope	en
	Files of type:	Logix Designer XML Files (*.L5X)		~	Can	cel
					He	lp

Logix Designer begins importing the program, and the *Import Configuration* window displays.

Find: Find Within: Final Name	~ <u>A</u> A AA	Find/Replace				
port Content:						
Construction	Configure Progra	m Properties				
MVI56E61850C_Program Parameters and Local Tag	Import Name:	MVI56E61850C_Program				
Routines	Operation:	Create	~	Di la constante da c		
Programs		(i) References will be imported configured in the References	as s folders			
Tags	Final Name:	MVI56E61850C_Program	~	Properties		
111 Data Types	Description:		~			
Connections						
-Lo Errors/warnings						
			~			
	Schedule In:	MainTask	~			
		Preserve scheduling for child programs that already exist				
	Parent:	<none></none>	~			
	Inhibit Program	n				
	Assigned Routi	nes				
	Main:	MainRoutine				
	Fault:	<none></none>				
Preserve existing tag values in offline p	roject				1	

3 Click OK.

Logix Designer completes the import of the program. This may take a few moments.

Perform	ning Import	
	Creating routine: 'MainRoutine'	
_		
	Cancel	

Note: If any errors or issues occur during the import, they will display in the pane at the bottom of the Logix Designer window.

The imported program displays under the Main Task in the Controller Organizer.



4.2.4 Updating and Reimporting a Project

If you need to modify the configuration of the IEDs in the 61850 network, take the following steps to update and reimport the project.

1 In the *I/O Configuration* section of the *Controller Organizer*, right-click the MVI56E-61850C module and select **PROPERTIES**. (Or just double-click the module.)



The General tab of the Module Properties dialog box displays.

2 In the *Module Definition* area, click **CHANGE**.

📕 MVI56E61850C_Program - MainR	outine 🛛 🥏 Contr	oller Tags - UM1(controller)	Module Properties: Loo	cal:1 (MVI56E-61850C	1.001) ×		•
General*	General						^
Connection Module Info Time Sync Ethemet Configuration PRP Network Redundancy IED Status Vendor	Type: Vendor: Parent: Name: Description:	MVI56E-61850C IEC 61850 C Prosoft Technology Local MVI56E61850C	ient Communication Module	Slot:	1	×	
	Module Defin Series: Revision: Electronic K Connection: Number of C	ition 1.001 eying: Compatible Module Data conne 5	~				1
Status: Offline			Change O	K Cancel	Apply	Help	•

The *Module Definition* window displays.

3 Select LAUNCH CONFIGURATION MANAGER.

Module Definition*		×
Revision:	1 ~ 001	
Electronic Kevina:	Compatible Module	
Lieco on incrycynig.	Compauble Module V	
Configuration Manager Project:	Project 1.prj	
	Launch Configuration Manager	
	OK Cancel	Help

After a brief pause, the Configuration Manager displays.

4 Click the **OPEN PROJECT** icon.



5 In the *Open* dialog box, select the Configuration Manager project you wish to update and click **OPEN**.

→ * ↑ Gonfiguration Manager Proje → 20201210		ٽ ~	Search 20201210		
Organize 🔻 New folder					1
CidFiles ^ Name	· ^	Date modified 12/10/2020 10:23 AM		Туре	
Studio 5000 Proj	roject 1.prj			PRJ File	
This PC	roject 2.prj	12/10/2020) 12:44 PM	PRJ File	
3D Objects					
Desktop					
Documents					
🖶 Downloads					
👌 Music					
E Pictures					
Videos					
- Local Disk (C)					
Ebedi bisk (ci)					
Alabuark V C					

The Configuration Manager opens the project.


- 6 Edit the configuration as you see fit. For help with this, see <u>"Configure the IED</u> <u>Network"</u> on page 27 and <u>"Map Data Attributes for the IEDs"</u> on page 29.
- 7 Export the configuration by taking the steps in <u>"Export the Configuration to the Add-On Profile</u>" on page 58. During the export, the Configuration Manager will ask if you want to overwrite the PRJ file and the CFG file. Select **YES** in both cases. The Configuration Manager will display an additional dialog asking you to confirm the deletion. Click **YES**.



8 Reimport the project into Studio 5000 Logix Designer by taking the steps in section 4.2.3. In the *Import Configuration* dialog, you will need to select *Overwrite* for the *Operation* parameter to update the changes in the existing program.

4.2.5 Class 3 Explicit Messages

Certain IEC 61850 data attributes, such as strings and attributes with DC and EX functional constraints, are relatively large and infrequently updated. Because Class 1 connections have a limited size (500 bytes input) and involve continuous data transfer, these data attributes are better suited to Class 3 explicit messages rather than Class 1.

The ProSoft MVI56E-61850C Configuration Manager does not generate Class 3 messages, so you must create these in Studio 5000. The *Explicit Messages Data Mapping* window provides information you need to create the Class 3 messages.

After completing the IEC 61850 data mapping with the ProSoft MVI56E-61850C Configuration Manager, you can access the *Explicit Messages Data Mapping* window by right-clicking the project bubble (labeled *ProSoft MVI56E-61850C*) and selecting **EXPLICIT MESSAGES DATA MAPPING**.



The *Explicit Messages Data Mapping* window appears as follows:

OVOE				
O'NOL	Ox04	1024	OxA	
Ox0E	Ox04	1024	OxB	
Ox0E	Ox04	1024	OxC	
Ox0E	Ox04	1024	OxD	
Ox0E	Ox04	1024	OxE	
Ox0E	Ox04	1024	OxF	
Ox0E	Ox04	1024	Ox10	
Ox0E	Ox04	1024	Ox11	
Ox0E	Ox04	1024	Ox12	
Ox0E	Ox04	1024	Ox13	
Ox0E	Ox04	1024	Ox14	
Ox0E	Ox04	1024	Ox15	
Ox0E	Ox04	1024	Ox16	
Ox0E	Ox04	1024	Ox17	
Ox0E	Ox04	1024	Ox18	
Ox0E	Ox04	1024	Ox19	
Ox0E	Ox04	1024	Ox1A	
Ox0E	Ox04	1024	Ox1B	
Ox0E	Ox04	1024	Ox1C	
Ox0E	Ox04	1024	Ox1D	
Ox0E	Ox04	1024	Ox1E	
Ox0E	Ox04	1024	Ox1F	
Ox0E	Ox04	1024	Ox20	
Ox0E	Ox04	1024	Ox21	
Ox0E	Ox04	1024	Ox22	
Ox0E	Ox04	1024	Ox23	1
				>
	Ox0E Ox0E Ox0E Ox0E Ox0E Ox0E Ox0E Ox0E	Ox0E Ox04 Ox0E <td>Ox0E Ox04 1024 Ox0E Ox04 1024</td> <td>Ox0E Ox04 1024 Ox8 Ox0E Ox04 1024 OxC Ox0E Ox04 1024 OxC Ox0E Ox04 1024 OxD Ox0E Ox04 1024 OxE Ox0E Ox04 1024 OxF Ox0E Ox04 1024 OxF Ox0E Ox04 1024 Ox11 Ox0E Ox04 1024 Ox11 Ox0E Ox04 1024 Ox12 Ox0E Ox04 1024 Ox12 Ox0E Ox04 1024 Ox13 Ox0E Ox04 1024 Ox14 Ox0E Ox04 1024 Ox15 Ox0E Ox04 1024 Ox16 Ox0E Ox04 1024 Ox18 Ox0E Ox04 1024 Ox18 Ox0E Ox04 1024 Ox18 Ox0E Ox04 1024 Ox18 <</td>	Ox0E Ox04 1024 Ox0E Ox04 1024	Ox0E Ox04 1024 Ox8 Ox0E Ox04 1024 OxC Ox0E Ox04 1024 OxC Ox0E Ox04 1024 OxD Ox0E Ox04 1024 OxE Ox0E Ox04 1024 OxF Ox0E Ox04 1024 OxF Ox0E Ox04 1024 Ox11 Ox0E Ox04 1024 Ox11 Ox0E Ox04 1024 Ox12 Ox0E Ox04 1024 Ox12 Ox0E Ox04 1024 Ox13 Ox0E Ox04 1024 Ox14 Ox0E Ox04 1024 Ox15 Ox0E Ox04 1024 Ox16 Ox0E Ox04 1024 Ox18 Ox0E Ox04 1024 Ox18 Ox0E Ox04 1024 Ox18 Ox0E Ox04 1024 Ox18 <

For example, suppose we wanted to create a class 3 message to poll the first data attribute in the following screen capture (*PhyNam.vendor*):

Explicit Messages Data Mapping					\times	
	Tag Name	Service Code	Class	Instance	Attribute	^
	ED2_REF_IED\$LD1\$LPHD1\$DC\$PhyNam.vendor	Ox0E	Ox04	1024	OxA	
	ED2_REF_IED\$LD1\$LPHD1\$DC\$PhyNam.hwRev	Ox0E	Ox04	1024	OxB	
	ED2_REF_IED\$LD1\$LPHD1\$DC\$PhyNam.swRev	Ox0E	Ox04	1024	OxC	
	ED2_REF_IED\$LD1\$LPHD1\$DC\$PhyNam.serNum	Ox0E	Ox04	1024	OxD	
	ED2_REF_IED\$LD1\$LPHD1\$DC\$PhyNam.model	Ox0E	Ox04	1024	OxE	

1 In Studio5000 Logix Designer, create a MESSAGE tag and then create the ladder logic with the message instruction to poll the vendor tag.

Read_Vendor	MSG Message Control MSG PN vendor
	Read_Vendor

2 Configure the message tag as follows according to the *Explicit Messages Data Mapping* windows settings.

Configuratio	on Communication Tag		
Message	Type: CIP Generic) ~	
Service Type: Service Code: Instance:	Get Attribute Single	 Source Element Source Length: x) Destination x) Element: 	0 (Bytes)
Instance:	1024 Attri <u>b</u> ute: a (He	x) Element:	Ne <u>w</u> Tag
) Enable	◯ Enable Waiting ◯ Start	⊖ Done	Done Length: 0
) Enable) Error Coo ror Path: I ror Text:	◯ Enable Waiting ◯ Start de: Extended Error Code: MVI56E61850C	() Done	Done Length: 0

Note: All messages must be set with a Service Type of Get Attribute Single (Service Code = E hex).

The destination element must match the Studio 5000 data attribute tag (in this example, ED2_REF_IED.LD1.LPHD1.DC_PhyNam.vendor).

3 Select the *Communication* tab.

Message Configuration - MSG_PN_vendor				
Configuration Communication* Tag				
<u>Path:</u> <u>B</u> rowse				
◯ Broadcast: ✓				
Communication Method				
● CIP ○ DH+ Channel: 'A'Destination Link: 0				
CIP <u>With</u> Source ID Source Link: 0 ♀ Destination Node: 0 ♀ (Octal)				
Connected Cache Connections				
⊖ Enable → Enable Weiting → Stat → Dage Length: 0				
C Enable C Enable Walking C Start C Done Done Length. V				
○ Error Code: Extended Error Code: ☐ Timed Out ♥ Error Path: MVI56E61850C Error Text:				
OK Cancel <u>A</u> pply Help				

4 Click **BROWSE** to open the *Message Path Browser* dialog.

5 Select the MVI56E-61850C module and then select **OK**.

Message Configuration - MSG_PN_vendor	\times
Configuration Communication Tag	
<u>P</u> ath: MVI56E61850C <u>B</u> rowse	
Broad Message Path Browser X	
Commun Path: MVI56E61850C ● CIP MVI56E61850C □	
CIP y I/O Configuration Sourd I 756 Backplane, 1756-A7 Conr III 0011756-L85EP cMdl3_description III MVI56E-61850C MVI56E61850C III T56-L85EP cMdl3_description	lotal) lion
O Enable	
○ Error Code: Extended Error Code: ☐ Timed Out ← Error Path: MVI56E61850C Error Text:	
OK Cancel Apply H	lelp

The *Message Configuration* dialog redisplays with the module appearing in the *Path* field.

Message Configuration - MSG_PN_vendor	×
Configuration Communication Tag	
Path: MVI56E61850C Browse	
MVI56E61850C	
◯ Broadcast: ✓	
Communication Method	
O CIP ○ DH+ Channel: 'A'Destination Link: 0	
CIP <u>With</u> <u>S</u> ource Link: 0 ➡ Destination <u>N</u> ode: 0 ➡ (Octa	il)
Connected Cache Connections	
⊖ Enable ⊖ Enable Waiting ⊖ Start ⊖ Done Done Length: 0	
⊖ Error Code: Extended Error Code: ☐ Timed Out ♥	
Error Path: MVI56E61850C Error Text:	
OK Cancel Apply Help	1

6 Click OK.

5 Automatic Device Replacement (ADR)

The MVI56E-61850C module supports automatic device replacement (ADR). This feature allows for the automatic configuration of a new MVI56E-61850C installed in place of a failed module, reducing the potential for downtime and errors typically associated with such a replacement.

As explained in <u>"Configuring the MVI56E-61850C Module,"</u> the MVI56E-61850's configuration file resides in the ControlLogix processor. Upon the MVI56E-61850C initialization, the module reads the configuration file stored in the ControlLogix processor before starting in operation mode. If a module fails and the user replaces it with a new one, the processor will transfer the same configuration to the new module. Within a matter of seconds, the new module will be configured and in operation without any user intervention.

Important: If you make any changes to the IEC 61850 network in the MVI56E-61850C Configuration Manager, remember to save the configuration and export it to the Add-On Profile. Otherwise, the ControlLogix processor could configure a newly installed replacement module with an out-of-date configuration file.

The user installs a new module and configures it using the MVI56E-61850C Configuration Manager. Studio 5000 Logix Designer downloads the configuration file to the ControlLogix processor, which then uploads the configuration to the new module.



6 Parallel Redundancy Protocol (PRP)

Note: For instructions on enabling PRP, see <u>"Enable Parallel Redundancy Protocol (PRP)</u>" on page 16.

The MVI56E-61850C module supports Parallel Redundancy Protocol (PRP) according to standard IEC 62439-3:2016.

PRP mode eliminates the chance of disruption in operation in the event of a network issue by providing seamless redundancy for data traffic.

When PRP mode is enabled, the module's two Ethernet ports operate in parallel and connect to two independent networks, known as LAN A and LAN B. Both ports have the same MAC ID, IP address, subnet mask, and default gateway address.

The module simultaneously sends and receives duplicate Ethernet frames through both ports. When receiving frames, the module accepts whichever frame arrives first and discards the subsequent copy. If a failure occurs in one of the paths, data communication continues through the other path with no recovery time.

The following diagram illustrates the exchange of data between the MVI56E-61850C and remote IEDs when PRP mode is enabled:



You can enable PRP by setting *PRP Mode* to *Redundant* on the *Ethernet Configuration* tab of the *Module Properties* dialog box, as explained in <u>"Enable Parallel Redundancy</u> <u>Protocol (PRP)"</u> on page 16.

Logix Designer - Demo_20210908_2 [1756-L81E 32.11]						
Module Properties: Local:1 (MVI56E-61850C 1.001) ×						
General Connection*	Ethernet Configuration					
Module Info Time Sync Ethernet Configuration* PRP Network Redundancy IED Status Vendor	 Manually configure IP address Obtain IP Settings using DHCP 					
	Module IP Address: 192 . 168	3.0.250 Su				
		G				
		Disabled				
	Redundant	○ Enabled				
	Time Synchronization ————	Firmware Lock ———				
	Disabled	OUnlocked				

When PRP is enabled, you can the monitor the status of LAN A (Ethernet port 1) and LAN B (Ethernet port 2) on the *PRP Network Redundancy* tab of the *Module Properties* dialog box.

Count	DDD Network Dr	dundangu	
General	FRP Network Re	culluancy	
Connection			
- Module Info			
- Time Sync			
 Ethemet Configuration 			
PRP Network Redundancy	LAN A Status:	ок	
- IED Status			
- Vendor	LAN B Status:	Failure	
			Refresh

7 Time Synchronization

Note: This feature is always enabled over the backplane (between the ControlLogix processor and the MVI56E-61850C module). You can also enable time synchronization over Ethernet through the *Ethernet Configuration* tab of the MVI56E-61850C Add-On Profile.

7.1 Overview

The MVI56E-61850C module supports the PTP Power Profile according to standard C37.238 Ed 2017 to propagate a time signal to the IEC 61850 network with peer-to-peer delay path mechanism.

The module supports time synchronization over three different ports: the backplane, Ethernet Port 1, and Ethernet Port 2 (if redundancy is enabled).

Time synchronization over the backplane is always enabled. If the MVI56E-61850C detects that the ControlLogix processor is the time master over the backplane, the module will automatically synchronize its clock based on the ControlLogix processor's time source.

You can configure time synchronization over Ethernet through the *PRP Mode* and *Time Synchronization* parameters in the Add-On Profile's *Ethernet Configuration* tab.

To enable time synchronization for Ethernet Port 1 only, configure these settings as follows (*PRP Mode* = *Simplex* and *Time Synchronization* = *Enabled*):

PRP Mode	
● Simplex ○ Redundant	
Time Synchronization O Disabled Enabled	

To enable time synchronization for both Ethernet ports (redundant mode), use the following configuration (*PRP Mode* = *Redundant* and *Time Synchronization* = *Enabled*):

PRP Mode	
◯ Simplex	
Redundant	
Time Synchronization	
○ Disabled	
Enabled	

If the Ethernet Time Synchronization parameter is disabled, the module will operate as an *ordinary clock* with a single port (backplane). The module can either operate as a time master or time slave in ordinary clock mode. If the module operates as a time master, the module becomes the time source over the backplane. If the module operates as a time slave, the time master device (for example, the ControLogix processor) will synchronize module time over the backplane.

If the Ethernet Time Synchronization parameter is enabled, the module will operate as a *boundary clock* with the backplane and Ethernet ports actively operating in time synchronization mode. In boundary clock mode, the module will pass the time received from the backplane to the Ethernet port or vice versa. In this case the MVI56E-61850C ports can have different time roles depending on whether the time master is located at the backplane or on the Ethernet network.

For example, the backplane port can operate as a time slave while the Ethernet port operates as a time master. This scenario is illustrated in the following diagram:



As shown in the diagram above, the 1756-TIME module is the time master by synchronizing time over the backplane. The MVI56E-61850C backplane port operates as a time slave, thus receiving the time source from the 1756-TIME card.

The time is passed to the MVI56E-61850C Ethernet port, which operates as a time master over the Ethernet network by synchronizing the IED clocks.

In case the MVI56E-61850C detects a better clock on the Ethernet network, it can automatically switch the port roles, so that the module's Ethernet port operates as a time slave receiving the time synchronization from another time master device on the Ethernet network. For this scenario, the backplane port operates as a time master synchronizing the other devices over the backplane.



7.2 Diagnostics

The *Time Sync* tab of the *Module Properties* dialog box displays diagnostics information related to the Time Synchronization feature of the module. For details see <u>"Time Synchronization Diagnostics"</u> on page 113.

8 Diagnostics and Troubleshooting

There are multiple ways to troubleshoot the MVI56E-61850C module:

- Use the LEDs located on the front of the module. See <u>"LED Diagnostics"</u> below for more information.
- Use the MVI56E-61850C Diagnostics Tool. See <u>"ProSoft MVI56E-61850C</u> <u>Diagnostics Tool"</u> on page 86.
- The MVI56E-61850C Add-On Profile displays diagnostics data in Studio 5000 Logix Designer. See <u>"Diagnostics in the MVI56E-61850C Add-On Profile"</u> on page 111
- Use the *Controller Tags* dialog in Studio 5000 to view tags related to diagnostics.

8.1 LED Diagnostics

8.1.1 Operating Status LEDs

The MVI56E-61850C provides four diagnostic LEDs, as shown in the following image:



The LEDs indicate the operating status of the MVI56E-61850C as follows:

LED	Indication	Off	Red	Green	Amber
LINK	Connection established with the configured IEDs	Power OFF No IEDs connected	Loss of all IEDs	Solid: All configured IEDs connected Blinking: Some IEDs connected	N/A
PRP	Module is operating in Redundant/PRP mode	Power OFF Not in PRP mode	Loss of LAN A and LAN B	PRP mode, LAN A and LAN B active	Lost link, LAN A or LAN B
CONFIG	Configuration error detected	Power OFF	Configuration error	Configuration OK	N/A
ОК	Module running	Power OFF	Solid: Major fault Blinking: Minor fault	Solid: Normal operation Blinking: I/O not active	N/A

8.1.2 Ethernet LEDs

The link speed and status LEDs are driven directly by the Ethernet controllers. There is no user control. The following table explains their function:

LED Function	LED Color	LED State	Description
Link Speed	Green/Orange	Off	10 Mbps link speed
		Green	100 Mbps link speed
		Orange	1000 Mbps link speed
Link Status and Activity	Yellow	Off	No Link
		Steady On	Link established; no activity detected
		Blinking	Link established; activity detected

8.1.3 Scrolling LED

The following information is displayed during module operation or initialization:

Display Characters	Description	State	Examples
Boot/DDOK	Module is initializing	Initialization	Boot/DDOK
Waiting for Processor Connection	The module is waiting to connect to the ControlLogix processor	Initialization	Waiting for Processor Connection
Waiting for Configuration	Module is waiting for required module configuration data from the Controller	Initialization	Waiting for Configuration
Last Config <date></date>	Last date/time the module was configured	Initialization	Last Config 2019-10-23
Project File <name></name>	File name of project files stored on module	Operation	Project file Filename.prx
BP <backplane status=""></backplane>	OK: Module is communicating with the processor ERR <code>: Module is unable to communicate with the processor</code>	Operation	BP OK BP ERR 99
<ip address=""></ip>	Module IP Address	Operation/Error	192.168.0.250
If DHCP is enabled:			
Waiting for IP	DHCP – MAC – [MAC Address]	Operation	DHCP – MAC – 192.168.0.250
After IP is set	DHCP – IP – [IP Address]	Operation	DHCP – IP – 00:0D:8D:00:10:A3

8.2 ProSoft MVI56E-61850C Diagnostics Tool

8.2.1 Diagnostics Tool Overview

The ProSoft MVI56E-61850C Diagnostics Tool is a standalone Windows application that displays diagnostics data and timestamped events.

Note: You must run the Diagnostics Tool on a computer connected to the IEC 61850 network, as the diagnostics data will be polled directly from the MVI56E-61850C module's Ethernet port.

To launch the Diagnostics Tool and connect to the module:

1 Select the **MODULE DIAGNOSTICS** icon from the MVI56E-61850C Configuration Manager menu bar.



Tip: The Diagnostics Tool can also be launched from the Windows START menu.

2 From the **ONLINE** menu, select **CONNECT**.



3 Enter the MVI56E-61850C module's IP address and click **OK**.

Enter IP Address	×
MVI56E-61850C IP Address IP Address: 192, 168, 18, 101	
OK Cancel	

Once the Diagnostics Tool connects to the MVI56E-61850C module, the Diagnostics menu structure displays in the left pane of the window.

The status of the connection to the module is indicated in the status bar at the bottom of the window and in the right pane of the window.

S ProSoft MVI56E-61850C Diagnostics Tool			\times
Settings Online Help			
Settings Online Help Diagnostics Data Monitor Event Logger - MVI56E-61850C - Backplane - Driver Status - Configuration Status - Configuration Status - Configuration Settings - IED Config IED Status - PlatformService - PRP - System - System - System - System Status - Time Synch - Status			^
Connected to MVI56E-61850C at 192.168.18.101			~

The Diagnostics Tool provides the following three categories of diagnostics data, each appearing on a separate tab in the tool:

Diagnostics

The Diagnostics tab includes the configuration settings and data communication status information. You can monitor different aspects of the IEC 61850 data communication, such as which IEDs are connected to the module and which reports have been successfully subscribed.

- *Data Monitor* The *Data Monitor* tab allows you to monitor the configured tag data values. You can select and monitor any configured report, GOOSE Subscribe, control or MMS read tag.
- Event Logger

The *Event Logger* tab allows you to monitor timestamped events logged by the module, including IED disconnection, IED connection, and report subscription failure.

•

These three tabs are explained in the following subsections.

8.2.2 Diagnostics Tab

The *Diagnostics* tab displays configuration and diagnostics data grouped into the following categories:

- Backplane
- IEC61850C
- PlatformService
- System
- Time Synch

These categories appear in the Diagnostics menu structure in the left pane of the window. Under each category is one or more subcategories that you can select to view the associated data.

Following are descriptions of these categories and their subcategories.

<u>Driver Status</u>

The *Driver Status* screen (*Backplane > Driver Status*) shows the data communication status between the MVI56E-61850C module and the ControlLogix processor.



The following table describes the data displayed on the Driver Status screen:

Parameter	Description
Number of Configured Connections	Total number of configured connections.
Number of High Priority Connections	Total number of high priority connections. The high priority connections are reserved for GOOSE and control data.
Number of Normal Priority Connections	Total number of normal priority connections. The normal priority connections are reserved for report and MMS read data.
Number of Reserved Connections	Total number of reserved connections. The reserved connections are not used by the module for data transfer.
Class 1 Error Connection Count	Total number of times a connection error is detected.
Class 3 Requests	The total number of times a class 3 request is received by the module. The module supports class 3 messaging for diagnostics and specific data read from ControlLogix processor such as string data.

Parameter	Description
Class 3 Response	The total number of times a class 3 response is sent by the module. The module supports class 3 messaging for diagnostics and specific data read from ControlLogix processor such as string data.

IEC 61850C

Communication Status

The Communication Status screen shows the global status for all configured IEDs.

 ProSoft MVI56E-61850C Diagnostics Tool Settings Online Help Diagnostics Data Monitor Event Logger MVI56E-61850C Backplane Driver Status IEC61850C Communication Status Configuration Settings Goose Publish IED Status PlatformService PRP System 	MVI56E-61850C > IEC61850C > Communicat IEDs status Connection Successes Commedia Reads Requested Command Reads Succeeded Command Reads Failed Command Writes Requested Command Writes Requested Command Writes Failed Report Messages Received GODSE Messages Transmitted	cion Status : 11 : 2 : 0 : 119 : 10 : 1 : 0 : 1 : 147 : 1 : 4	[Refresh Counter: 77]	×
G System G System Status G Time Synch L Status	(GODSE Messages Received GODSE Messages Transmitted Identification Response Errors Create DataType Errors	: 1 : 4 : 0 : 0		~
Connected to MVI56E-61850C at 192.168.18.101				

The following table describes the data displayed on the *Communication Status* screen:

Parameter	Description			
IEDs Status	Bitmap register where the number of bits correspond to the number of configured IED, where bit X indicates the connection status of IED X.			
	For example, in case two IEDs are configured then the IED status is displayed as follows:			
	MVI56E-61850C > IEC61850C > Communication Status			
	IEDs status : 11			
	Where:			
	Bit 0 (IED 0) = 1			
	Bit 1 (IED 1) = 1			
	If IED 0 is disconnected, the IED status is updated as follows:			
	MVI56E-61850C > IEC61850C > Communication Status			
	IEDs status : 01			
	Where:			
	Bit 0 (IED 0) = 0			
	Bit 1 (IED 1) = 1			
Connection Successes	Incremented every time a connection is successful established with an IED.			
Connection Failures	Incremented every time a connection attempt with an IED fails.			

Parameter	Description
Command Reads Requests	Incremented every time a MMS read command is sent to an IED
Command Reads Succeeded	Incremented every time a MMS read response is received from an IED.
Command Reads Failed	Incremented every time a MMS read response failure occurs.
Command Write Requests	Incremented every time a MMS write command is sent to an IED.
Command Write Succeeded	Incremented every time a MMS write response is received from an IED.
Command Writes Failed	Incremented every time a MMS write response failure occurs.
Report Messages Received	Incremented every time a report is received from an IED.
GOOSE Messages Received	Incremented every time a GOOSE message with new data is received from an IED.
GOOSE Messages Transmitted	Incremented every time a GOOSE message with new data is published by the MVI56E-61850C module.
Identification Response Errors	Incremented every time an identification error is received from an IED.
Create Data Type Errors	Incremented every time a data type error is received from an IED.

Configuration Settings

The *Configuration Settings* screen shows the global IEC 61850 configuration settings for all IEDs, including the following:

- Project signature
- Number of configured IEDs
- Number of reports configured
- Number of MMS commands configured
- Number of GOOSE subscriptions configured
- Number of GOOSE publications configured



GOOSE Publish

The *GOOSE Publish* screen shows the configuration settings for all configured GOOSE Publish Objects (a maximum of 8).

S ProSoft MVI56E-61850C Diagnostics Tool	-	×
Settings Online Help Diagnostics Data Monitor Event Logger Image: Settings MV156E-61850C Goose Publish [Refresh Counter: 69] Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Settings Image: Setings Image: Setings Ima		~
		 _

IED Config

The IED Configuration screen shows the configuration settings for each IED.

FroSoft MVI56E-61850C Diagnostics Tool			_	×
Settings Online Help				
Diagnostics Data Monitor Event Logger				
	★ ►	[Refresh Cou	nter: 201	
Driver Status	IED Configured	. 0		
IEC61850C	IED Name	: SEL700G		
Communication Status	IED IP Address	: 192.168.18.70		
Configuration Settings	Inter-scan Delay	: 1000		
Goose Publish	MMSping	: 12		
IED Config	General Timeout (default) EmdTerm Timeout (default)	: 2		
IED Status	Connect/Disconnect Timeout	: 10		
Distances				
	Commands Configured :			
PRP	Command Configurad			
⊡ System	Command Index Entry		- 0	
System Status	Datapath		: SEL700GCON/RBGGIO1\$CO\$SPCSO01\$Oper	
🚊 👘 Time Synch	Tag Name		: SEL700G\$CON\$RBGGIO1\$CO\$SPCSO01\$Oper	
Status				
	Command Configured :			
	Command Index Entry		: 1	
	Datapath		: SEL700GMET/METXMMXU1\$MX\$A\$phsA\$cVal\$mag\$f	
	Tag Name		: SEL700G\$MET\$METXMMXU1\$MX\$A\$phsA\$cVal\$mag\$f	
F	Reports Configured :			
	Penert Configured			
	Report Index Entry		: 0	
	Report Domain Name Entry	7	: SEL700GCFG	
	Report Data Reference E	ntry	: LLN0\$BR\$Measurands01	
	Report ID		: BRep01	
	Integrity Period (mSec)		: 1000	
	# of Tags Associated Wit	th Report	: 7	
		-		
				~
Connected to MVI56E-61850C at 192.168.18.10	1			

To navigate through the different IEDs, use the IED selection buttons at the top of the screen.



The IED Configuration screen is divided into the following sections:

IED Configuration Settings

IED Configured	: 0
IED Name	: SEL700G
IED IP Address	: 192.168.18.70
Inter-scan Delay	: 1000
MMSping	: 12
General Timeout (default)	: 2
CmdTerm Timeout (default)	: 5
Connect/Disconnect Timeout	: 10

MMS Commands Configured

Commands Config	ured :	
Command	Configured : Command Index Entry Datapath Tag Name	: 0 : SEL700GCON/RBGGIO1\$CO\$SPCSO01\$Oper : SEL700G\$CON\$RBGGIO1\$CO\$SPCSO01\$Oper
Command	Configured : Command Index Entry Datapath Tag Name	: 1 : SEL700GMET/METXMMXU1\$MX\$A\$phsA\$cVal\$mag\$f : SEL700G\$MET\$METXMMXU1\$MX\$A\$phsA\$cVal\$mag\$f

Reports Configured

Reports	Configured :	
	Report Configured :	
	Report Index Entry	: 0
	Report Domain Name Entry	: SEL700GCFG
	Report Data Reference Entry	: LLN0\$BR\$Measurands01
	Report ID	: BRep01
	Integrity Period (mSec)	: 1000
	Configuration Revision	: 1
	# of Tags Associated With Report	: 7
	Report Configured :	
	Report Index Entry	: 1
	Report Domain Name Entry	: SEL700GCFG
	Report Data Reference Entry	: LLNO\$BR\$Alarms
	Report ID	: BRep02
	Integrity Period (mSec)	: 5000
	Configuration Revision	: 1
	<pre># of Tags Associated With Report</pre>	: 252

GOOSE Subscriptions Configured

GOOSE	Subscriptions Configured :	
	GOOSE Index Entry	: 0
	Data Set Reference	: SEL700GCFG/LLN0\$GPDSet01
	GOOSE CB Reference	: SEL700GCFG/LLN0\$GO\$GPub01
	Application ID	: Gen1
	Multicast Address	: 01 OC CD 01 00 06
	Configuration Revision	: 1
	tags :	
	GOOSE FCDA Datapath	: SEL700GPRD/BXXCBR1\$ST\$Pos\$stVal
	GOOSE FCDA Datapath	: SEL700GPRO/BXXCBR1\$ST\$Pos\$q
	GOOSE FCDA Datapath	: SEL700GPRO/BYXCBR2\$ST\$Pos\$stVal
	GOOSE FCDA Datapath	: SEL700GPRO/BYXCBR2\$ST\$Pos\$q
	GOOSE FCDA Datapath	: SEL700GCON/RBGGIO1\$ST\$SPCSO01\$stVal
	GOOSE FCDA Datapath	: SEL700GCON/RBGGIO1\$ST\$SPCSO01\$q
	GOOSE FCDA Datapath	: SEL700GCON/RBGGIO1\$ST\$SPCSO02\$stVal
	GOOSE FCDA Datapath	: SEL700GCON/RBGGIO1\$ST\$SPCSO02\$q
	GOOSE FCDA Datapath	: SEL700GCON/RBGGIO1\$ST\$SPCSO03\$stVal
	GOOSE FCDA Datapath	: SEL700GCON/RBGGIO1\$ST\$SPCSO03\$q

IED Status

The IED Status screen shows the status data for each configured IED.



To navigate through the different IEDs, use the IED selection buttons at the top of the screen.



The *IED Status* screen is divided into the following sections:

IED Status

IED Status 0	: Ox		
IED Name	: SEL700G		
IED IP Address	: 192.168.18.70		
IED Vendor	: Triangle MicroWorks, Inc		
IED Model	: MMSd		
IED Revision	: 11.0		
Connection Successes	: 2		
Connection Failures	: 24		
Command Reads Requested	: 2678		
Command Reads Succeeded	: 2678		
Command Reads Failed	: 0		
Command Read Last Error Code	: 0000000h		
Command Writes Requested	: 1		
Command Writes Succeeded	: 0		
Command Writes Failed	: 1		
Command Write Last Error Tag	: SEL700GCON/RBGGIO1\$CO\$SPCSO01\$Oper		
Command Write Last Error Code	: 004D000Bh		
Report Subscriptions OK	: 1		
Report Subscriptions In Error	: 1		
Report Last Error ID	: BRep02		
Report Last Error Code	: 00000001h		
Report Messages Received	: 2732		
GOOSE Messages Received	: 1		

MMS Command Status

IED	Command Stat	tus :									
	Command	Status	:								
		Command	Status Entry #	:	0						
		Current	Command Status	:	ERR						
		Command	Error Count	:	1						
		Command	Last Error	:	Raw	004D000Bh	: Contro	l svc	Operate	; action	Write
; co	de (line) 1	1									

Report Status

Report	Status :	
	Report Status :	
	Report Status Entry #	: 0
	Report Enable State	: Enabled
	Reports Received Count	: 2785
	Report Status :	
	Report Status Entry #	: 1
	Report Enable State	: Error
	Reports Received Count	: 0

GOOSE Subscription Status

```
GOOSE Subscription Status :

GOOSE Status :

GOOSE Status Entry # : 0

GOOSE CB Reference : SEL700GCFG/LLN0$GO$GPub01

Goose Messages Received Count : 1
```

PRP Status

The *PRP Status* screen (*PlatformService* > *PRP*) shows the redundancy operation status in case the PRP feature is enabled through the Add-On Profile.

The following table describes the data displayed on the PRP Status screen:

Parameter	Description
PRP LAN A/B Status	LAN status (Not Configured/OK/Failure).
Transmit Count Port A/B	Messages transmitted
Receive Count Port A/B	Messages received.
Wrong Port Count Port A/B	Messages received at one port which was tagged for the other port.
Unique Entries Count Port A/B	Unique messages received. During normal operation this counter should be continuously incrementing, since the port should not detect multiple instances of the same message.
Multiple Entries Count Port A/B	Multiple messages received. This counter indicates that the port received multiple instances of the same message.

Time Synch Status

The time synch status screen shows whether the module clock is synchronized by another time source.

S ProSoft MVI56E-61850C Diagnostics Tool	_		×
Settings Online Help			
Diagnostics Data Monitor Event Logger			1
Image: MVI56E-61850C Image: Backplane Image: Driver Status Image: Driver Driter Driver Driver Driver Driver Driver Driver Driver Dr	Counter:	1]	^
			~
Connected to MVI56E-61850C at 192.168.18.101			

System Status

The System Status screen (*System* > *System Status*) shows the status of different module operating registers such as the following:

- Ethernet read/write counters
- LED status
- Product information
- Uptime
- IP settings

S ProSoft MVI56E-61850C Diagnostics Tool – 🗆 🗙					
Settings Online Help					
Diagnostics Data Monitor Event Logger					
 MVI56E-61850C Backplane Driver Status IEC61850C IEC61850C IIII Communication Status 	MVI56E-61850C > System > System Status ethernet : RX Bytes	[Refresh Counter: 121] : 2447801		^	
Configuration Settings Goose Publish ED Config	RX Packets TX Bytes TX Packets OK	: 35980 : 1656 : 20 : OFF			
PlatformService PRP	CFG LINK PRP	: OFF : OK : OFF			
⊡ System System Status ⊡ Time Synch	Mode Product Type Product Name Module Name	: MVI56E : MVI56E-61850C-(Beta2) : Auto2.prj			
i Status	Product Version MAC Address Serial Number Status	: 1.01.023 : 00:0D:8D:06:56:C4 : 000D8D0656C4 : OK			
	Days hours Minutes Seconds	: 0 : 6 : 17 : 27			
	Network Mode IP Address Network Mask Gateway	: STATIC : 192.168.18.101 : 255.255.255.0 : 192.168.18.1			
Connected to MVI56E-61850C at 192.168.18.1	01			\sim	

8.2.3 Data Monitor

<u>Overview</u>

The *Data Monit*or feature allows you to monitor the configured data tag values as read directly from the module. To do so, you create a *tag view*, which is a consolidated table of tags that you select from all tags available for the IEDs on the network. You can create multiple tag views, each of which can contain any combination of available tags.

The *Data Monitor* screen is divided into two sections: the *Tag Views* list (left pane) and a list of tags (right pane).

The *Tag Views* list (left pane) is a list of tag views that you have created. When you select a tag view from this list, its associated tags display in the list on the right.

The list of tags (right pane) shows the tags contained in the selected tag view. This list can include both data objects and data attributes. You can expand a data object to view its attributes.

ProSoft MVI56E-61850C Diagnostics Tool		_	×
Diagnostics Data Monitor Event Logger			
····· Tag Views	Tag Tag Name	Data Type	Value
Add TagView	٢		>
Connected to MVI56E-61850C at 192.168.18.10	1		

- <u>Create a Tag View</u>
- 1 Click ADD TAGVIEW.



2 In the *Edit TagView Table* window, enter a name for the tag view.

Edit TagView Table		
TagView Name	MyTagView	

The left pane of the *Edit TagView Table* window shows each IED on the IEC 61850 network.

Edit TagView Table		×
TagView Name	TagView Tags	
E - Configured Tags E - IED 1: SEL 700G E - IED 2: GE_850_Feeder	TagName	DataType
		OK Cancel

3 Expand an IED to see its configured tags that can be selected for data monitoring.

4 Drag the tags that you wish to monitor from the left pane and drop them into the right pane.

it TagView Table		
TagView Name MyTagView	TagView Tags	
EL 700G SEL 700G SEL 700G SEL 700G SMET \$METXIMIXU 1\$MX\$TotW\$mag\$f SEL 700G\$MET\$METXIMIXU 1\$MX\$TotVA\$mag\$f SEL 700G\$MET\$METXIMIXU 1\$MX\$TotVA\$mag\$f SEL 700G\$MET\$METXIMIXU 1\$MX\$TotP5mag\$f SEL 700G\$MET\$METXIMIXU 1\$MX\$FotP5mag\$f SEL 700G\$MET\$METXIMIXU 1\$MX\$PPV\$phsAB\$cVal\$ma SEL 700G\$MET\$METXIMIXU 1\$MX\$PV\$phsAB\$cVal\$ma SEL 700G\$MET\$METXMIXU 1\$MX\$PV\$phsAB\$VY physBhybbybbybbybbybbybbybbybbybbybbybbybbybb	SEL 700G\$MET5METXMMXU1\$MX\$TotW\$mag\$f SEL 700G\$MET\$METXMMXU1\$MX\$PPV\$phsBb\$cVal\$ SEL 700G\$MET\$METXMMXU1\$MX\$PPV\$phsBb\$cVal\$ SEL 700G\$MET\$METXMMXU1\$MX\$PPV\$phsCA\$cVal\$ SEL 700G\$PRO\$BXXCBR1\$ST\$Pos\$stVal SEL 700G\$PRO\$BXXCBR1\$ST\$Pos\$stVal SEL 700G\$CON\$RBGGIO1\$ST\$SPCSO01\$stVal	REAL REAL REAL UBYTE UBYTE BOOL
SEL 7005 \$PRO \$AXXEN 1551 \$P05\$4 SEL 7005 \$PRO \$BYXCBR 25ST \$P05\$47 SEL 7005 \$PRO \$BYXCBR 25ST \$P05\$47 SEL 7005 \$CON\$RBGGI0 1\$ST \$SPC500 1\$47 SEL 7005 \$CON\$RBGGI0 1\$ST \$SPC500 1\$47 SEL 7005 \$CON\$RBGGI0 1\$ST \$SPC500 2\$st Val SEL 7005 \$CON\$RBGGI0 1\$ST \$SPC500 3\$st		
- SEL 7006\$PRO\$PX1PIOC1\$ST\$Op\$general - SEL 7006\$PRO\$PX1PIOC1\$ST\$Op\$general - SEL 7006\$PRO\$PX2PIOC2\$ST\$Op\$general - SEL 7006\$PRO\$PX2PIOC2\$ST\$Op\$general - SEL 7006\$PRO\$PXAPIOC2\$ST\$Op\$t - SEL 7006\$PRO\$PXAPIOC2\$ST\$Op\$t - SEL 7006\$PRO\$PXAPIOC2\$ST\$Op\$t - SEL 7006\$PRO\$PXAPIOC2\$ST\$Op\$t		
SEL700G\$PRO\$PXDPIOC+\$\$1\$0p\$general SEL700G\$PRO\$PXDPIOC4\$51\$0p\$t SEL700G\$PRO\$PXCPIOC5\$ST\$0p\$general SEL700G\$PRO\$PXCPIOC5\$ST\$0p\$t ✓		
		OK Cancel

- **5** Repeat steps 3 and 4 to select tags from other IEDs.
- 6 After you have selected all tags to be included in the tag view, click **OK** to close the window.

⊡ Tag Views <u>MyTaqView</u>	Tag Tag Name	Data Type	Value	
		,	,	

The new tag view appears in the left pane of the Data Monitor tab.

7 Select the new tag view. The associated data tags and values display on the right.

ProSoft MVI56E-61850C Diagnostics Tool Settings Online Help					×
Diagnostics Data Monitor Event Logger					1
⊡Tag Views <mark>MyTagView</mark>	Tag	Tag Name	Data Type	Value	
	1	SEL700G\$MET\$METXMMXU1\$MX\$TotW\$mag\$f	REAL	67.980003	
	2	SEL700G\$MET\$METXMMXU1\$MX\$TotVAr\$mag\$f	REAL	98.231003	
	3	SEL700G\$MET\$METXMMXU1\$MX\$TotVA\$mag\$f	REAL	105.680000	
	4	SEL700G\$MET\$METXMMXU1\$MX\$TotPF\$mag\$f	REAL	35.564999	
	5	SEL700G\$MET\$METXMMXU1\$MX\$PPV\$phsAB\$cVal\$mag\$f	REAL	212.320007	
	6	SEL700G\$MET\$METXMMXU1\$MX\$PPV\$phsBC\$cVal\$mag\$f	REAL	215.119995	
	7	SEL700G\$MET\$METXMMXU1\$MX\$PPV\$phsCA\$cVal\$mag\$f	REAL	216.229996	
Add TagView					
Connected to MVI56E-61850C at 192.168.18.192					

8.2.4 Event Logger

The *Event Logger* tab of the ProSoft MVI56E-61850C Diagnostics Tool shows a list of timestamped events, including the following:

- IED connection and disconnection
- Module initialization
- Report subscription errors

ResourceID	Date and Time	Driver	EventLevel	Message
ith	2021-09-02 19:43:15.713	IEC61850C	ERROR	ConfRev read error (report): dient 0 '192.168.18.70', element 1 'SEL700GCFG/LLN0\$BR\$Alarms\$C
th	2021-09-02 19:43:15.702	IEC61850C	ERROR	Fail get type of var 'SEL700GCFG/LLN0\$BR\$Alarms\$ConfRev', dient 0 to server 'SEL700G'(192.168
th	2021-09-02 19:43:15.070	IEC61850C	INFO	Client 0 connected to server 'SEL700G'(192.168.18.70).
th	2021-09-02 19:43:09.070	IEC61850C	WARNING	Client 1 connection to server 'GE_850_Feeder'(192.168.18.85) failed (6a18); retry every 5000 ms.
th	2021-09-02 19:43:09.069	IEC61850C	WARNING	Client 0 connection to server 'SEL700G'(192.168.18.70) failed (6a18); retry every 5000 ms.
th	2021-09-02 19:43:03.807	IEC61850C	INFO	Created Event Log. Success.
.th	2021-08-30 18:56:14.563	IEC61850C	INFO	Created Event Log. Success.

8.3 Diagnostics Controller Tags

When you import the MVI56E-61850C program into Studio 5000 (see section 4.2.3), the ProSoft MVI56E-61850C Configuration Manager generates controller tags related to module diagnostics.

8.3.1 MVI56E61850C_Diagnostics

Open the Controller Tags editor to view the diagnostics tags.



Expand *MVI56E61850C_Diagnostics* to view the following categories of tags:

- MVI56E61850C_Diagnostics.Poll
- MVI56E61850C_Diagnostics.IEC61850
- MVI56E61850C_Diagnostics.IED
- MVI56E61850C Diagnostics.PRP
- MVI56E61850C_Diagnostics.General
- MVI56E61850C_Diagnostics.Backplane
- MVI56E61850C Diagnostics.Project Signature
- MVI56E61850C_Diagnostics.Util

The following section describes the data contained in these tags.

8.3.2 Diagnostics Data Reference

Name	Data Type	Description			
Auto_Poll	BOOL	Enables the automatic polling of diagnostics data at the rate set in Auto_Poll_Interval.			
Auto_Poll_Interval	DINT	The rate at which diagnostics data contained within Diagnostics.IEC61850 will be refreshed. The minimum is 5000 ms.			
Poll_Once	BOOL	Entering a value of 1 will cause a one-time refreshing of diagnostics data, after which the value will automatically reset to 0.			

MVI56E61850C Diagnostics.Poll

MVI56E61850C Diagnostics.IEC61850

Data Type	Description
USINT	Number of IEDs connected with the module
UINT	How many connections have been established successfully
UINT	Number of times an IED connection was terminated with the module
USINT	Number of configured IEDs
ULINIT	The online status bitmap – bit 0 refers to IED 0, bit 1 to IED 1, etc. If IED is connected, value will be 1, if not then 0. Online bitmap status 1=online, 0=offline
UINT	Number of times the module issued a MMS read command request
UINT	Number of times the module received an OK response to a MMS
UINT	Number of times the module received an error response to a MMS Read request.
UINT	Number of times the module issued a MMS write command request
UINT	Number of times the module received an OK response to a MMS Write request.
UINT	Number of times the module received an error response to a MMS Write request.
UINT	Number of times the module subscribed to a report
UINT	Number of times the report subscription attempt failed
UINT	Number of times a report was received
UINT	Number of times a GOOSE message was received with data change
UINT	Number of times module published a GOOSE message with data change
UINT	IED number of the IED that sent the latest message response with error.
UINT	Last error code associated with the latest error message received from an IED
	Data Type USINT UINT USINT UINT UINT

MVI56E61850C_Diagnostics.IED

This data structure is an array of 40 IEDs that can be expanded to show information about each device.

Name	Data Type	Description
[IED#].Index.Code	USINT	IED Code (0-based)
[IED#].Name	STRING	IED Name
[IED#].IP_Address	USINT[4]	IED IP Address
[IED#].Status_Code	USINT	IED Status Code (-1 = Initialization, -2 = Fault, 1 = OK)
[IED#].Connection_OK_Count	UINT	Number of times the connection was established with the IED
[IED#].Connection_Error_Count	UINT	Number of times the connection was terminated with the IED
[IED#].MMS_Read_Cmd_Request_Counter	UINT	Number of times the module issued a MMS read command request
[IED#].MMS_Read_Cmd_Response_OK_Counter	UINT	Number of times the module received an OK response to a MMS Read request
[IED#].MMS_Read_Cmd_Response_Error_Counter	UINT	Number of times the module received an error response to a MMS Read request.
[IED#].MMS_Read_Last_Error_Code	SINT	Error code associated with the last mms read error response received
[IED#].MMS_Write_Cmd_Request_Counter	UINT	Number of times the module issued a MMS write command request
[IED#].MMS_Write_Cmd_Response_OK_Counter	UINT	Number of times the module received an OK response to a MMS Write request.
[IED#].MMS_Write_Cmd_Response_Error_Counter	UINT	Number of times the module received an error response to a MMS Write request.
[IED#].MMS_Write_Last_Error_Tag	STRING	Tag name which generated an error response from the IED
[IED#].MMS_Write_Last_Error_Code	SINT	Error code associated with the last error response from the IED
[IED#].Report_Subscription_OK_Counter	UINT	Number of times the module subscribed to a report Read/Write
[IED#].Report_Subscription_Error_Counter	UINT	Number of times the report subscription attempt failed
[IED#].Report_Subscription_Last_Error	STRING	Report name of report control block that failed the subscription operation
[IED#].Report_Subscription_Last_Error_Code	SINT	Error code associated with the last report subscription error
[IED#].Report_Received_Counter	UINT	Number of report messages received
[IED#].GOOSE_Received_Counter	UINT	Number of times a GOOSE message was received with data change
Name	Data Type	Description
--------------------------	-----------	---
LAN_A_Status	SINT	LAN A Status Code (-1 = LAN A Failure, 0 = PRP Disabled, 1 = LAN A OK)
LAN_B_Status	SINT	LAN B Status Code (-1 = LAN B Failure, 0 = PRP Disabled, 1 = LAN B OK)
LAN_A_Fault_Count	UINT	Number of times LAN A failure was detected
LAN_B_Fault_Count	UINT	Number of times LAN B failure was detected
LAN_A_TX_Count	UDINT	Number of frames transmitted to LAN A
LAN_B_TX_Count	UDINT	Number of frames transmitted to LAN B
LAN_A_RX_Count	UDINT	Number of frames received from LAN A
LAN_B_RX_Count	UDINT	Number of frames received from LAN B
LAN_A_Unique_Entry_Count	UDINT	Number of tagged frames received on LAN A but not received on LAN B
LAN_B_Unique_Entry_Count	UDINT	Number of tagged frames received on LAN B but not received on LAN A
Duplicate_Entry_Count	UDINT	Number of tagged frames received on LAN A and LAN B. This number should increment during normal operation and it is not an indication of error.
Reserved	UDINT	

MVI56E61850C Diagnostics.General

Name	Data Type	Description
Timestamp_Last_Startup	LINT	Date/Time of latest module initialization
Program_Scan_Count	UINT	Incremented upon the end of each module program cycle
State_Code	SINT	Module state code (-1 Initialization, -2 = Configuration, 1 = Operation)
General_Configuration_Error_Code	SINT	Configuration Error Code (0 = No Error, <1 = Configuration Error)

MVI56E61850C Diagnostics.Backplane

This data is related to communication between the ControlLogix processor and the MVI56E-61850C module. "Class 1" refers to implicit messaging connections, while "Class 3" refers to explicit messaging between the MVI56E-61850C Add-On Profile and the module and also between the Diagnostics Add-On Instruction and the module.

Name	Data Type	Description
Class_1_Connection_Established_Count	UINT	Number of times each implicit (Class 1) connection is established
Class_1_Connection_Error_Count	UINT	Number of implicit (Class 1) connections in error
Class_3_Message_Request_Received_Count	UINT	Number of times the module received a explicit (class 3) message
Class_3_Message_Responses_OK_Count	UINT	Number of times the module sent an explicit (class 3 response) OK
Class_3_Message_Responses_Error_Count	UINT	Number of times the module sent an explicit (class 3 response) error

MVI56E61850C_Diagnostics.Project_Signature

Project signatures ensure that the data in Studio 5000 Logix Designer is synchronized with the data in the MVI56E-61850C module. The Synchronization_Status flag indicates the synchronization status of the two project signatures.

Name	Data Type	Description
Studio5000_Program	SINT[36]	Project signature associated with the Studio 5000 program. Configuration Manager automatically sets the values in this array.
Module_Configuration	SINT[36]	Project signature associated with the module configuration
Synchronization_Status	SINT	If the Studio5000_Program signature is equal to the Module_Configuration signature, the value of Synchronization_Status will be 1. If they are not equal, the value will be -1.

For more information on project signatures, see <u>"Project Signature"</u> on page 114.

MVI56E61850C Diagnostics.Util

The tags in the MVI56E61850C_Diagnostics.Util section are for internal processing use only.

8.4 Diagnostics in the MVI56E-61850C Add-On Profile

8.4.1 Module Info

The *Module Info* tab of the *Module Properties* dialog box displays information regarding the current status of the MVI56E-61850C module.

General	Module Info	
Connection Module Info Time Sync Ethemet Configuration PRP Network Redundancy IED Status Vendor	Identification Vendor: Prosoft Technology Product Type: Communications Adapter Product Name: MVI56E-61850C Revision: 1.001 Product Code: MVI56E-61850C Serial Number: 0001AEB4	Status Major Fault: None Minor Fault: None Internal State: Run mode Configured: No Owned: No Module Identity: Match Protection Mode: Implicit Refresh Reset Module
s: Running		OK Cancel Appl

8.4.2 IED Status

The *IED Status* tab of the *Module Properties* dialog box in the MVI56E-61850C Add-On Profile lists all IEDs connected to the 61850 network and provides the status of each. The IEDs will show as connected only when configured for MMS data communication (report, control, or MMS read). If an IED is configured only for GOOSE, it will not show as connected, since GOOSE does not require a TCP connection.

Note: The IED Status tab displays data only when Logix Designer is online with the Logix controller.

đ	Logix Designer - Demo_20210611_1 [1756-L81E 32.11]						
	Module Properties: Local:1 (MVI56E-61850C 1.001) ×						
	General Connection Module Info Time Sync Ethemet Configuration PRP Network Redundancy IED Status Vendor	IED	Number	ED Name GE_850_Feeder SEL700G	IP Address 192.168.18.85 192.168.18.70	Status OK Faulted	
	- Vendor		1 2	GE_850_Feeder SEL700G	192.168.18.85 192.168.18.70	OK Faulted	I

8.4.3 PRP Diagnostics

When PRP redundant mode is enabled, as explained in <u>"Enable Parallel Redundancy</u> <u>Protocol (PRP)</u>" on page 16, you can the monitor the status of LAN A (Ethernet port 1) and LAN B (Ethernet port 2) on the *PRP Network Redundancy* tab of the *Module Properties* dialog box.

Note: The *PRP Network Redundancy* tab displays data only when Logix Designer is online with the Logix controller.

General	PRP Network Redundancy	
Connection		
Nodule Info		
Time Sync		
Ethemet Configuration		
PRP Network Redundancy	LAN A Status: OK	
IED Status		
Vendor	LAN B Status: Failure	
		Defeat

8.4.4 Time Synchronization Diagnostics

Time Synchronization diagnostics are available on the *Time Sync* tab of the *Module Properties* dialog box.

General	Time Sync				
Connection Module Info Time Sync Time Sync Ethernet Configuration PRP Network Redundancy IED Status Vendor	CIP Sync Time Synchron UTC System Time: Grandmaster Clock Description: User Name: User Location:	ization: Enabled 5/18/2021 4:3	5:19 AM Local Clock Synchronization Status: Offset to Master: Backnlane:	Synchronized 0 ns	
	Protocol Address: Physical Address:	v			
	Identity: Class: Accuracy: Variance: Source: Priority 1: Priority 2:	5C8816FFFF1CE07 187 48 65535 Hand Set 128 128	Identity: FFFF0 Class: 187 Accuracy: 49 Variance: 65535 Source: Oscilla Priority 1: 128 Priority 2: 128	FFFF01350001AEI 187 49 65535 Oscillator 128 128	84
Running			ОК	Cancel Ap	ply Help

Following are descriptions of the parameters on the *Time Sync* tab:

Parameter	Description
CIP Sync Time Synchronization	Indicates if time synchronization is enabled or disabled on the device.
UTC System Time	The current system time in Universal Coordinated Time (UCT). The time does not include time zone or Daylight Savings Time offsets.
Grandmaster Clock	
Description	Displays information about the clock. The grandmaster clock is controlled by the vendor of the grandmaster clock.
Identity	Unique identifier for the clock. The format depends on the network protocol. Ethernet network encodes the MAC address into the identifier while ControlNet and DeviceNet networks encode the vendor ID and serial number into the identifier.
Class	A measure of the traceability of the clock to primary reference sources. This is predefined by the hardware manufacturer. Values are defined from 0 through 255 with 0 as the best clock. Clocks with Class values below 128 may only be master clocks.
Accuracy	The expected absolute accuracy of the clock relative to the clock epoch of January 1, 1970. The accuracy is specified as a graduated scale starting at 25 nanoseconds (ns) and ending at greater than 10 seconds or unknown. The lower the accuracy value, the better the clock.

Parameter	Description
Variance	The measure of the inherent stability properties of the clock. The value is represented in offset scaled log units. The lower the variance, the better the clock.
Source	The time source of the clock. The available values are Atomic clock, GPS, Radio, PTP, HAND set, Other, and Oscillator.
Priority 1 / Priority 2	The relative priority of the clock to other clocks in the system. Values range from 0 to 255. The highest priority is 0. The default value for both settings is 128.
Local Clock	
Synchronization Status	Specifies whether the local clock is synchronized or not synchronized with the grandmaster reference clock. A clock is synchronized if it has one port in the slave state and is receiving updates from the time master.
Offset to Master	The amount of deviation between the local clock and the grandmaster clock in nanoseconds, updated every sync interval.
Backplane	Current state of the backplane. Available values are Initializing, Faulty, Disabled, Listening, PreMaster, Master, Passive, Uncalibration, Slave, and None.
Identity, Class, Accuracy, Variance, and Source	Definitions for these parameters are the same for the local clock and the grandmaster clock. Refer to the descriptions above.

8.5 **Project Signature**

When you save and export a project from the ProSoft MVI56E-61850C Configuration Manager software, the following associated files are assigned the same project signature value in one of the XML data members:

- Configuration File (.cfg)
- MDDT File (.xml)
- Studio 5000 Program Export (.L5X)
- CID File (.CID)

You can use this signature to confirm that the files were generated from the same project save/export operation.

Following is an example of the configuration file section that includes the project signature value at the beginning of the file:

<?xml version="1.0" encoding="UTF-8"?>

<DeviceConfig moduleName="SampleProject.prj" productName="MV156E-61850C" DriverAutoRestart="Yes" ProjectSignature="55DB80D1-4891-4070-BD9B-1A7D33054120">

Every time you edit and save or export a new project in the ProSoft MVI56E-61850C Configuration Manager, a new project signature value is automatically generated.

One application of the project signature is to allow you to confirm whether the configuration file exported to the Add-On Profile is consistent with the MVI56E-61850C program imported into Studio 5000 (that is, both files are from the same project). If these files are inconsistent, it might prevent data transfer between the ControlLogix processor and the module.

The MVI56E-61850C Program file includes the following tags that allow you to confirm whether the configuration file is consistent with Studio 5000:

Name	Data Type	Description
Studio5000_Program	SINT[36]	Project signature associated with the Studio 5000 program. Configuration Manager automatically sets the values in this array.
Module_Configuration	SINT[36]	Project signature associated with the module configuration
Synchronization_Status	SINT	If the Studio5000_Program signature is equal to the Module_Configuration signature, the value of Synchronization_Status will be 1. If they are not equal, the value will be -1.

In the following example, the configuration file and Studio 5000 Programs are consistent, as evidenced by a Synchronization Status value of 1:

 MVI56E61850C_Diagnostics.Project_Signature 	{}
MVI56E61850C_Diagnostics.Project_Signature.Studio5000_Program	{}
MVI56E61850C_Diagnostics.Project_Signature.Module_Configuration	{}
MVI56E61850C_Diagnostics.Project_Signature.Synchronization_Status	1

If you reconfigure the module but forget to reimport the Studio 500 program, then the Synchronization Status will be automatically updated as -1, indicating that the configuration and the Studio 5000 program do not match.

8.6 CIP Diagnostics Tags

Following are the CIP objects implemented by the CIP Diagnostics Add-On Instruction.

8.6.1 Identity

Class (hex) = 1, Instance (hex) = 1

Attribute (dec)	Description	Data Type	Bytes
1	Vendor ID	UINT	2
2	Device Type	UINT	2
3	Product Code	UINT	2
4	Fw Version Major	USINT	1
4	Fw Version Minor	USINT	1
5	Status	UINT	2
	Pad	INT	2
6	Serial Number	UDINT	4
7	Product Name (LEN)	DINT	4
	Product Name (DATA)	SINT[82]	

8.6.2 Module

Class (hex) = 4, Instance (hex) = 300

Attribute (dec)	Description	Data Type	Bytes
0	All Data		
1	Timestamp Last Startup	LINT	8
2	Reserved	UINT	2
3	Reserved	SINT	1
4	Reserved	SINT	1
	Pad	DINT	4
		Total	16

8.6.3 PRP

Class (hex) = 4, Instance (hex) = 303

Attribute (dec)	Description	Data Type	Bytes
0	All Data		
1	LAN A Status	SINT	1
2	LAN B Status	SINT	1
3	LAN A Fault Count	UDINT	2
4	LAN B Fault Count	UDINT	2
	Pad	INT	2
5	LAN A Tx Count	ULINT	4
6	LAN B Tx Count	ULINT	4
7	LAN A Rx Count	ULINT	4
8	LAN B Rx Count	ULINT	4
9	LAN A Unique Entry Count	ULINT	4
10	LAN B Unique Entry Count	ULINT	4
11	LAN A Duplicate Entry Count	ULINT	4
12	LAN B Duplicate Entry Count	ULINT	4
		Total	40

8.6.4 Backplane

Class (hex) = 4 Instance (hex) = 310

Attribute (dec)	Description	Data Type	Bytes
0	All Data		
1	Class 1 Connection Established Count	UINT	2
2	Class 1 Connection Error Count	UINT	2
3	Class 3 Message Requests Received Count	UINT	2
4	Class 3 Message Responses OK Count	UINT	2
5	Class 3 Message Responses Error Count	UINT	2
	Pad	INT	2
		Total	12

8.6.5 IEC61850C, General

Class (hex) = 4 Instance (hex) = 320

Attribute (dec)	Description	Data Type	Bytes
0	All Data		
1	Active IED Connection Count	USINT	1
	Pad	SINT	1
2	IED Connection OK Count	UINT	1
3	IED Connection Error Count	UINT	2
4	IEDs Configured Count	USINT	1
	Pad	SINT	1
5	IEDs Online Status (bitmap): 1=online, 0=offline	ULINT	8
6	MMS Read Command Request Count	UINT	2
7	MMS Read Command Response OK Count	UINT	2
8	MMS Read Command Response Error Count	UINT	2
9	MMS Write Command Request Count	UINT	2
10	MMS Write Command Response OK Count	UINT	2
11	MMS Write Command Response Error Count	UINT	2
12	Report Subscription OK Count	UINT	2
13	Report Subscription Error Count	UINT	2
14	Report Received Count	UINT	2
15	New GOOSE Received Count	UINT	2
16	New GOOSE Published Count	UINT	2
17	Last Error Received IED # (1-based)	USINT	1
		Total	40

8.6.6 IEC61850C, IED Status

Class (hex) = 4 Instance (hex) = 321 to 348

Attribute (dec)	Description	Data Type	Bytes
0	All Data		
1	IED Index Code (1-based): =Instance-321h+1	USINT	1
	Pad	SINT x 3	3
2	IED Name (truncated to 14 characters) LEN	DINT	4
	IED Name (truncated to 14 characters) DATA	SINT[82]	82
	Pad	INT	2
3	IP Address (IPv4, Network Byte Order)	USINT[4]	4
4	IED Status Code: -1=Init, -2=Fault, 1=OK	SINT	1
	Pad	SINT	1
5	IED Connection OK Count	UINT	2
6	IED Connection Error Count	UINT	2
7	MMS Read Command Request Count	UINT	2
8	MMS Read Command Response OK Count	UINT	2
9	MMS Read Command Response Error Count	UINT	2
10	MMS Read Last Error Code	DINT	1
	Pad	SINT	1
11	MMS Write Command Request Count	UINT	2
12	MMS Write Command Response OK Count	UINT	2
13	MMS Write Command Response Error Count	UINT	2
14	MMS Write Command Last Error Tag LEN	DINT	4
	MMS Write Command Last Error Tag DATA	SINT[82]	82
15	MMS Write Last Error Code	DINT	1
16	Report Subscription OK Count	UINT	2
17	Report Subscription Error Count	UINT	2
	Pad	INT	2
18	Report Subscription Last Error RptId LEN	DINT	4
	Report Subscription Last Error RptId DATA	SINT[82]	82
19	Report Subscription Last Error Code	DINT	1
20	Report Received Count	UINT	2
21	New GOOSE Received Count	UINT	2
		Total	300

9.1 Specifications

9.1.1 IEC 61850 Client

Supports up to 40 IEDs on the network with a maximum of 300 data attributes each (max number of data attributes is determined by user-configured data types and size of user-configured data points).

Specification	Description
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, DataRefInc
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 within Studio 5000

9.1.2 Hardware Specifications

Specification	Description
Backplane Current Load	1.4 A @ 5.1 VDC
Operating Temperature IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25°C to 60 °C (Series C Chassis) -25°C to 50 °C (Series B Chassis)
Temperature, non-operating IEC 60068-2-1 (Test Ab, Unpackaged Cold) IEC 60068-2-2 (Test Bb, Unpackaged Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Thermal Shock)	-40°C to 85°C (-40°F to 185°F)
Relative Humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5 to 95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2g @ 10 to 500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30g
Shock, non-operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	4 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80 to 2000 MHz 10V/m with 1 kHz sine-wave 80% AM from 2000 to 2700 MHz

Specification	Description
EFT/B immunity IEC 61000-4-4	+/- 2 kV at 5 kHz on Ethernet ports
Surge transient immunity IEC 61000-4-5	+/- 2 kV line-earth (CM) on Ethernet ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz to 80 MHz
Ethernet Ports (E1, E2)	(2) 10/100/1000 Base-T half duplex RJ45 Connector Link and Activity LED indicators
Dimensions	Standard 1756 Single-slot module

10 Support, Service & Warranty

10.1 Contacting Technical Support

ProSoft Technology, Inc. is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

- **1** Product Version Number
- 2 System architecture
- 3 Network details

If the issue is hardware related, we will also need information regarding:

- 1 Module configuration and associated ladder files, if any
- 2 Module operation and any unusual behavior
- **3** Configuration/Debug status information
- 4 LED patterns
- 5 Details about the interfaced serial, Ethernet or Fieldbus devices

North America (Corporate Location)	Europe / Middle East / Africa Regional Office
Phone: +1 661-716-5100	Phone: +33.(0)5.34.36.87.20
ps.prosofttechnology@belden.com	ps.europe@belden.com
Languages spoken: English, Spanish	Languages spoken: English, French, Hindi, Italian
REGIONAL TECH SUPPORT	REGIONAL TECH SUPPORT
ps.support@belden.com	ps.support.emea@belden.com
Latin America Regional Office	Asia Pacific Regional Office
Phone: +52.222.264.1814	Phone: +60.3.2247.1898
ps.latinam@belden.com	ps.asiapc@belden.com
Languages spoken: English, Spanish,	Languages spoken: Bahasa, Chinese, English,
Portuguese	Hindi, Japanese, Korean, Malay
REGIONAL TECH SUPPORT	REGIONAL TECH SUPPORT
ps.support.la@belden.com	ps.support.ap@belden.com

For additional ProSoft Technology contacts in your area, please see: www.prosoft-technology.com/About-Us/Contact-Us

10.2 Warranty Information

For details regarding ProSoft Technology's legal terms and conditions, please see: www.prosoft-technology.com/ProSoft-Technology-Legal-Terms-and-Conditions

For Return Material Authorization information, please see: <u>www.prosoft-technology.com/RMA</u>