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MVI56E-61850S

ControlLogix Platform

IEC 61850 Server Communication Module

September 3, 2014

USER MANUAL

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MVI56E-61850S User Manual

September 3, 2014

In an effort to conserve paper, ProSoft Technology no longer includes printed manuals with our product shipments. User Manuals, Datasheets, Sample Ladder Files, and Configuration Files are provided on the enclosed DVD and are available at no charge from our web site: http://www.prosoft-technology.com

Content Disclaimer

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Important Safety Information

North America Warnings

A Warning - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2.
B Warning - Explosion Hazard - When in Hazardous Locations, turn off power before replacing or rewiring modules.
C Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.
D Suitable for use in Class I, Division 2 Groups A, B, C, and D, Hazardous Locations or Non-Hazardous Locations.

ATEX/IECEx Warnings and Conditions of Safe Usage:

Power, Input, and Output (I/O) wiring must be in accordance with the authority having jurisdiction

A Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or wiring modules.
B Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
C These products are intended to be mounted in an ATEX/IECEx Certified, tool-secured, IP54 enclosure. The devices shall provide external means to prevent the rated voltage being exceeded by transient disturbances of more than 40%. This device must be used only with ATEX certified backplanes.
D Before operating the reset switch, be sure the area is known to be non-hazardous.

Agency Approvals and Certifications

Agency
RoHS
ATEX
CSA
CE
CSA CB Safety
cULus
GOST-R

<Ex>
II 3 G
Ex nA IIC T4 Gc
0°C <= Ta <= 60°C
-25°C <= Ta <= 70°C (XT models only)
II – Equipment intended for above ground use (not for use in mines).
3 – Category 3 equipment, investigated for normal operation only.
G – Equipment protected against explosive gasses. <cULus>
E183151
Class I, DIV 2, groups A,B,C,D
T5 for all models
0°C to +60°C
-25°C to +70°C (XT models only)

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To get the most benefit from this User Manual, you should have the following skills:

- **Rockwell Automation® RSLogix™ software:** launch the program, configure ladder logic, and transfer the ladder logic to the processor
- **Microsoft Windows®:** install and launch programs, execute menu commands, navigate dialog boxes, and enter data
- **Hardware installation and wiring:** install the module, and safely connect IEC 61850 and ControlLogix devices to a power source and to the MVI56E-61850S module's application port(s)

1.1 System Requirements

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

- Rockwell Automation® ControlLogix® processor (firmware version 10 or higher) with compatible limited voltage power supply and one free slot in the rack for the MVI56E-61850S module. The module requires 800 mA of available 5 VDC and 3 mA of available 24 VDC power.

- Rockwell Automation RSLogix™ 5000 programming software
  - Version 16 or higher required for Add-On Instruction
- Rockwell Automation RSLinx® communication software version 2.51 or higher
- ProSoft Configuration Builder (PCB) (included)
- ProSoft Discovery Service (PDS) (included in PCB)
- Pentium® II 450 MHz minimum. Pentium III 733 MHz (or better) recommended
- Supported operating systems:
  - Microsoft Windows® Vista
  - Microsoft Windows XP Professional with Service Pack 1 or 2
  - Microsoft Windows 7 Professional (32 or 64-bit)
  - Microsoft Windows 2000 Professional with Service Pack 1, 2, or 3
  - Microsoft Windows Server 2003
- 128 MB of RAM minimum, 256 MB of RAM recommended
- 100 MB of free hard disk space (or more based on application requirements)
- 256-color VGA graphics adapter, 800 x 600 minimum resolution (True Color 1024 × 768 recommended)
- DVD drive

Note: The Hardware and Operating System requirements in this list are the minimum recommended to install and run software provided by ProSoft Technology®. Other third party applications may have different minimum requirements. Refer to the documentation for any third party applications for system requirements.

Note: You can install the module in a local or remote rack. For remote rack installation, the module requires EtherNet/IP or ControlNet communication with the processor.

1.2 Package Contents

The following components are included with your MVI56E-61850S module, and are all required for installation and configuration.

Important: Before beginning the installation, please verify that all of the following items are present.

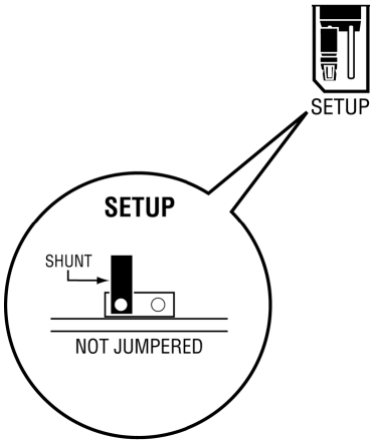
Qty.	Part Name	Part Number	Part Description
1	MVI56E-61850S Module	MVI56E-61850S	IEC 61850 Server Communication Module
1	Ethernet Cable	RL-CBL025	Straight-through Ethernet cable
1	ProSoft Solutions DVD	DVD-001	Contains sample programs, utilities, and documentation. Files can also be found at http://www.prosoft-technology.com

If any of these components are missing, please contact ProSoft Technology Technical Support for replacement parts. If the DVD is not present, please visit http://www.prosoft-technology.com for the latest files.

1.3 Setting Jumpers

The Setup Jumper acts as "write protection" for the module's flash memory. In "write protected" mode, the Setup pins are not connected, and the module's firmware cannot be overwritten. The module is shipped with the Setup jumper OFF. Do not jumper the Setup pins together unless you are directed to do so by ProSoft Technical Support (or to update the module firmware).

The following illustration shows the MVI56E-61850S jumper configuration with the Setup Jumper OFF.



1.4 Installing the Module in the Rack

Make sure your ControlLogix processor and power supply are installed and configured, before installing the MVI56E-61850S module. Refer to your Rockwell Automation product documentation for installation instructions.

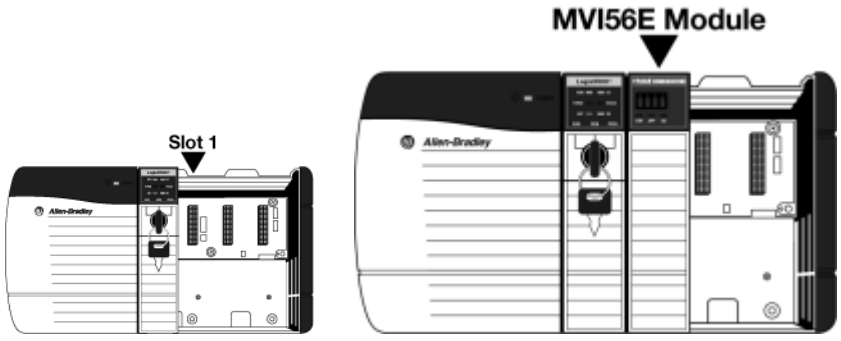
Warning: You must follow all safety instructions when installing this or any other electronic devices. Failure to follow safety procedures could result in damage to hardware or data, or even serious injury or death to personnel. Refer to the documentation for each device you plan to connect to verify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

After you have checked the placement of the jumpers, insert the MVI56E-61850S into the ControlLogix chassis. Use the same technique recommended by Rockwell Automation to remove and install ControlLogix modules.

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 the 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.

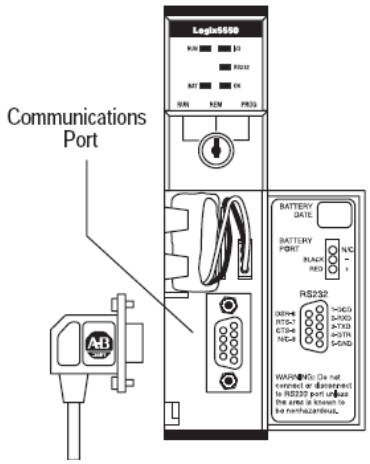
Note: If you insert the module improperly, the system may stop working or may behave unpredictably.

1.5 Connecting Your PC to the ControlLogix Processor

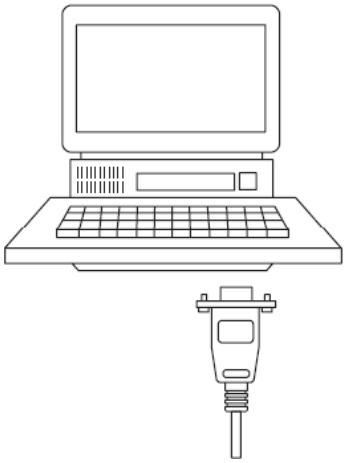
There are several ways to establish communication between your PC and the ControlLogix processor. The following steps show how to establish communication through the serial interface.

Note: It is not mandatory that you use the processor's serial interface. You may access the processor through whatever network interface is available on your system. Refer to your Rockwell Automation documentation for information on other connection methods.

1 Connect the right-angle connector end of the cable to your controller at the communications port.



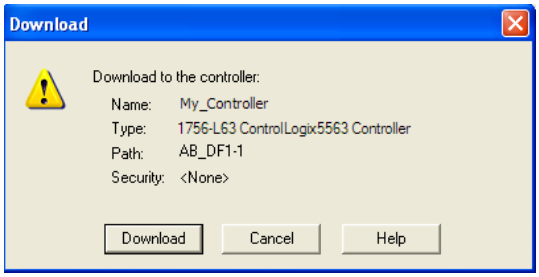
2 Connect the straight connector end of the cable to the serial port on your computer.



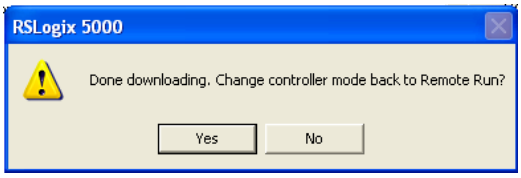
1.6 Downloading the Sample Program to the Processor

Note: The key switch on the front of the ControlLogix processor must be in the REM or PROG position.

1. If you are not already online with the processor, in RSLogix 5000 open the *Communications* menu, and then choose **DOWNLOAD**. RSLogix 5000 will establish communication with the processor. You do not have to download through the processor's serial port, as shown here. You may download through any available network connection.
2. When communication is established, RSLogix 5000 will open a confirmation dialog box. Click the **DOWNLOAD** button to transfer the sample program to the processor.



3. RSLogix 5000 will compile the program and transfer it to the processor. This process may take a few minutes.
4. When the download is complete, RSLogix 5000 will open another confirmation dialog box. If the key switch is in the REM position, click **OK** to switch the processor from PROGRAM mode to RUN mode.

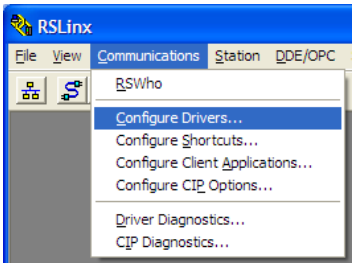


Note: If you receive an error message during these steps, refer to your RSLogix documentation to interpret and correct the error.

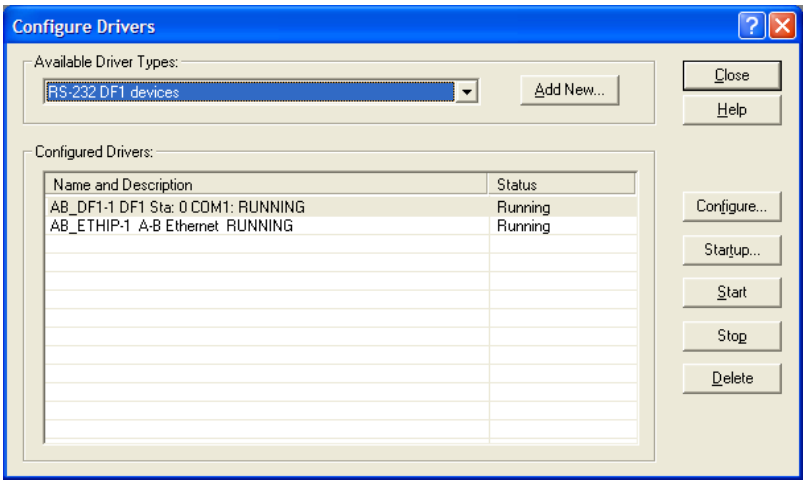
1.6.1 Configuring the RSLinx Driver for the PC COM Port

When trying to connect serially, if RSLogix is unable to establish communication with the processor, follow these steps.

1. Open *RSLinx*.
2. Open the **COMMUNICATIONS** menu, and click **CONFIGURE DRIVERS**.

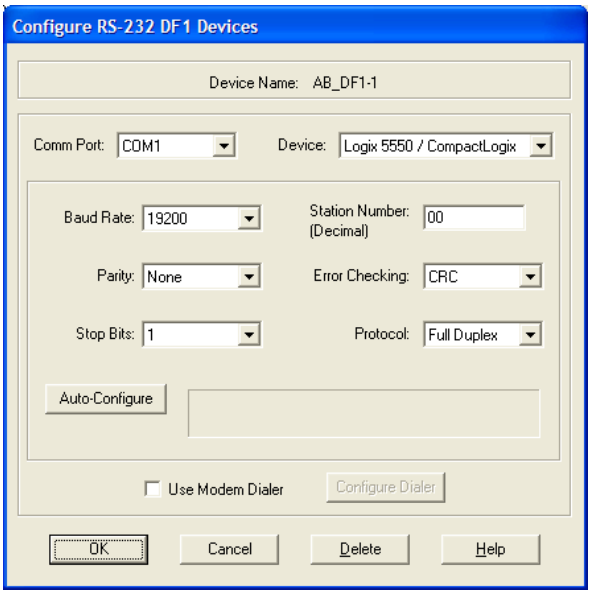


This action opens the *Configure Drivers* dialog box.



Note: If the list of configured drivers is blank, you must first choose and configure a driver from the *Available Driver Types* list. The recommended driver type to choose for serial communication with the processor is *RS-232 DF1 Devices*.

3 Click to select the driver, and then click **CONFIGURE**. This action opens the *Configure RS-232 DF1 Devices* dialog box.



4 Click the **AUTO-CONFIGURE** button. RSLinx will attempt to configure your serial port to work with the selected driver.

5 When you see the message *Auto Configuration Successful*, click the **OK** button to dismiss the dialog box.

Note: If the auto-configuration procedure fails, verify that the cables are connected correctly between the processor and the serial port on your computer, and then try again. If you are still unable to auto-configure the port, refer to your RSLinx documentation for further troubleshooting steps.

2 Setting Up ProSoft Configuration Builder

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ProSoft Configuration Builder (PCB) software provides a convenient way to configure, monitor, and troubleshoot your MVI56E-61850S module.

2.1 Installing ProSoft Configuration Builder

The ProSoft Configuration Builder (PCB) software is used to configure the module. You can find the latest version of the ProSoft Configuration Builder (PCB) on our web site: http://www.prosoft-technology.com, or you can install it from the ProSoft Solutions DVD. The installation filename contains the PCB version number. For example, **PCB_4.1.0.4.0206.EXE**.

If you are installing PCB from the ProSoft website:

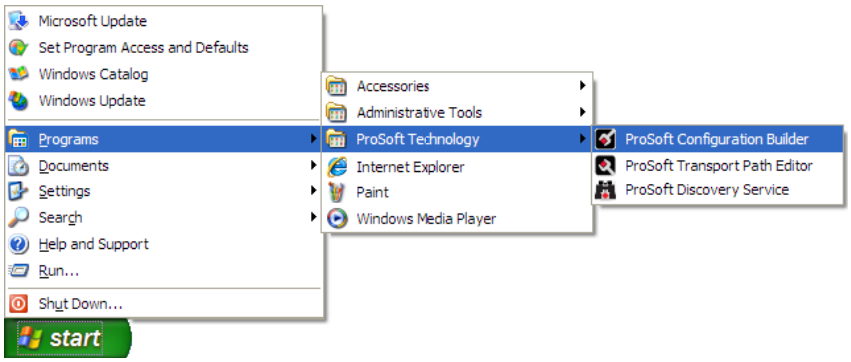
1. Open a browser window and navigate to http://www.prosoft-technology.com/pcb.
2. Click the download link for ProSoft Configuration Builder, and save the file to your Windows desktop.
3. After the download completes, double-click the file to install. If you are using Windows 7, right-click on the PCB installation file and click **RUN AS ADMINISTRATOR**. Follow the instructions that appear on the screen.
4. If you want to find additional software specific to your MVI56E-61850S, enter the model number into the website search box and press the Enter key.

If you are installing PCB from the ProSoft Solutions DVD:

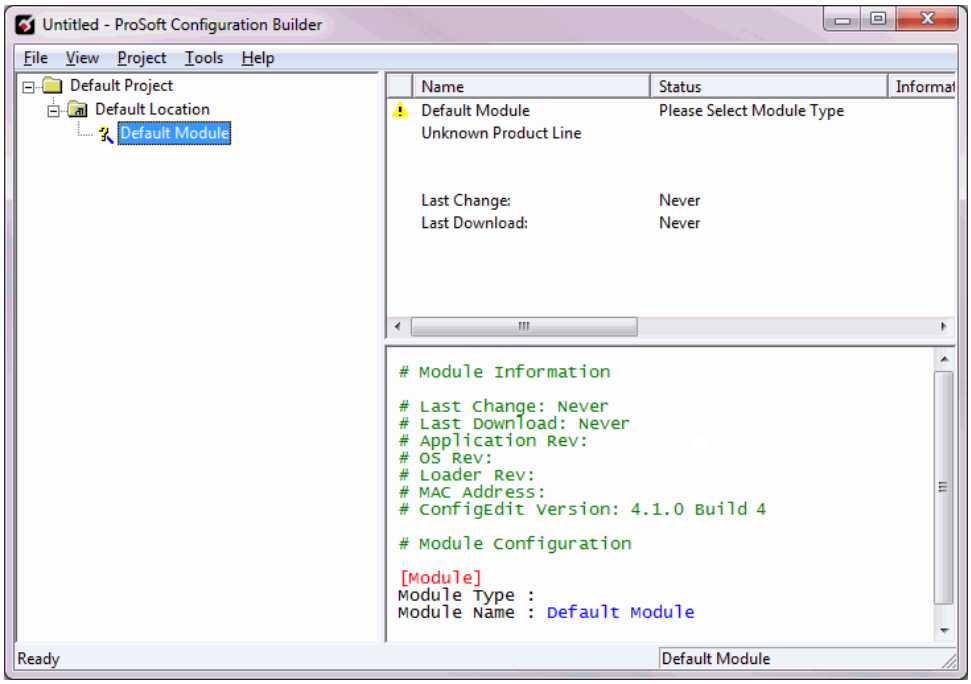
1. Insert the ProSoft Solutions DVD into your computer's DVD drive and wait for the ProSoft Installation program to start.
2. If the ProSoft Installation program does not start, open the Windows file Explorer, navigate to the DVD, and double-click on the ProSoft_DVD.exe file.
3. Navigate to the MVI56E-61850S selection using the **PLATFORM** and **PRODUCT** selections.
4. Click **PROSOFT CONFIGURATION BUILDER**.
5. Follow the instructions that appear on the screen.

2.2 Setting Up the Project

To begin, start **PROSOFT CONFIGURATION BUILDER** (PCB).

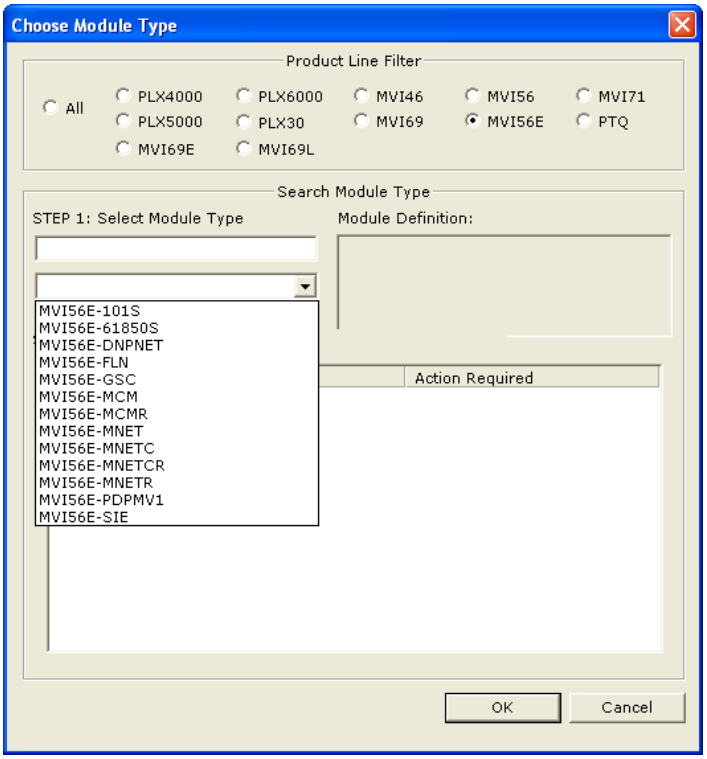


If you have used other Windows configuration tools before, you will find the screen layout familiar. *PCB*'s window consists of a tree view on the left, and an information pane and a configuration pane on the right side of the window. When you first start *PCB*, the tree view consists of folders for *Default Project* and *Default Location*, with a *Default Module* in the *Default Location* folder. The following illustration shows the *PCB* window with a new project.



Your first task is to add the MVI56E-61850S module to the project.

1 Use the mouse to select **DEFAULT MODULE** in the tree view, and then click the right mouse button to open a shortcut menu.
2 On the shortcut menu, select **CHOOSE MODULE TYPE**. This action opens the *Choose Module Type* dialog box.



3 In the *Product Line Filter* area of the dialog box, select **MVI56E**. In the *Select Module Type* dropdown list, select **MVI56E-61850S**, and then click **OK** to save your settings and return to the *ProSoft Configuration Builder* window.

3 MVI56E-61850S Configuration

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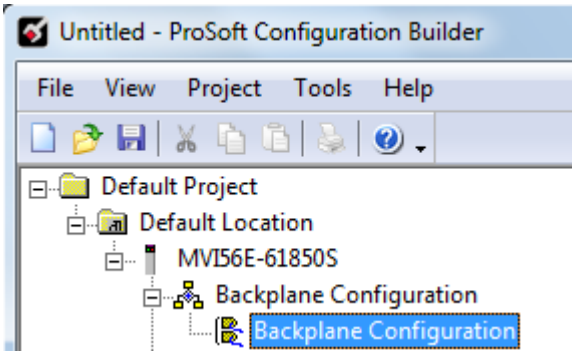
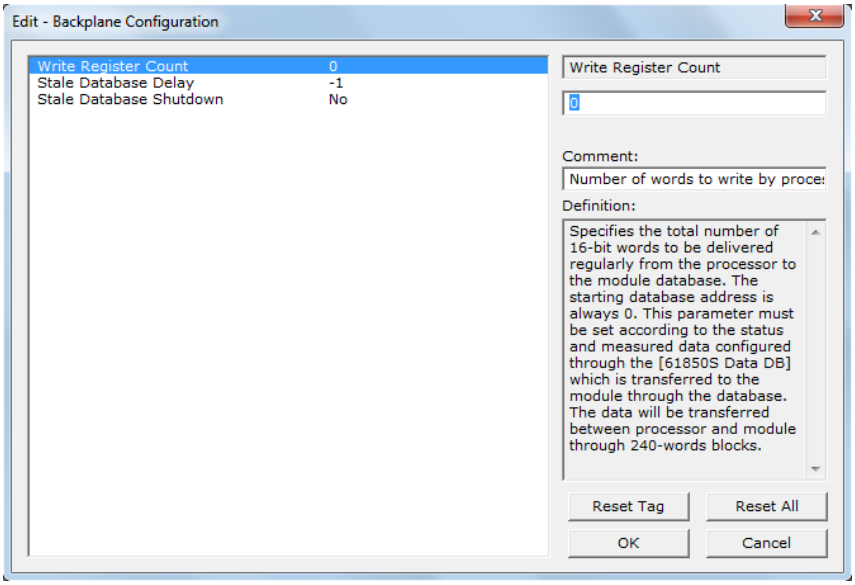
This chapter covers the MVI56E-61850S configuration within ProSoft Configuration Builder.

3.1 Backplane Configuration

This section of the configuration describes the database setup and module-level parameters. Double-click the **BACKPLANE CONFIGURATION** icon to edit the parameters.





Name	Range	Description
Write Register Count	0 to 4000	For Data DB objects. Number of registers to write from processor to module. The starting register is 0. This parameter must be set according to the status and measured data configured through the [61850S Data DB] section, which is transferred to the module through the database.
Stale Database Delay	1 to 300000 -1 = Ignore 0 = No delay (issue a stale-database event upon detecting failure)	Minimum duration (ms) of backplane I/O failure that causes the database to be marked stale.
Stale Database Shutdown	Yes/No	Determines whether to shut down the 61850 protocol upon a stale-database event.

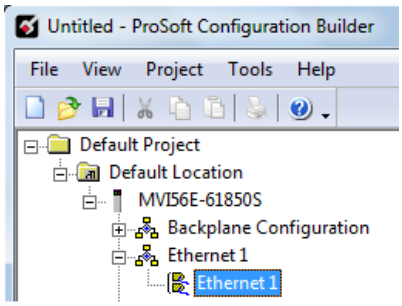
3.2 Ethernet1

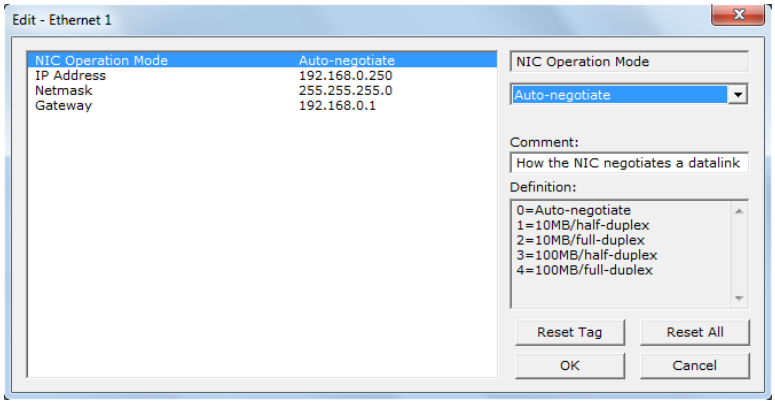
In this step, you assign an IP address for the MVI56E-61850S module. This becomes the permanent IP address for the module after you download the configuration to the module. The module's default IP address is 192.168.0.250. Determine the network settings for your module, with the help of your network administrator if necessary.

- IP address (fixed IP required) _____ . _____ . _____ . _____
- Subnet mask _____ . _____ . _____ . _____
- Gateway address _____ . _____ . _____ . _____

Note: The gateway address is optional, and is not required for networks that do not use a default gateway.

Double-click the **ETHERNET1** icon to edit the parameters.



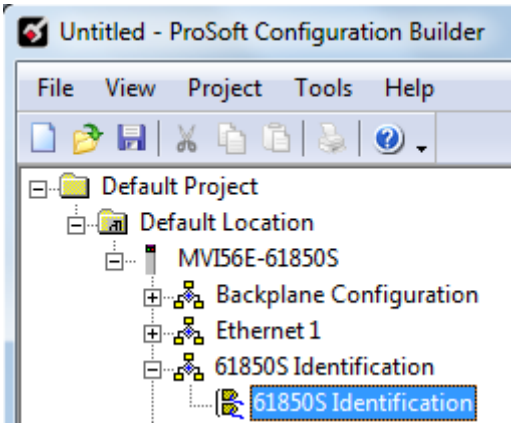


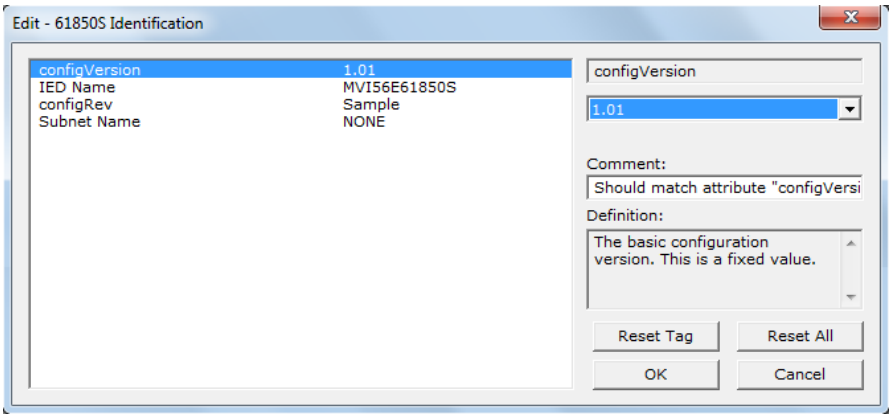
Name	Description
NIC Operation Mode	Mode in which the NIC negotiates a datalink 0 = Auto-negotiate 1 = 10MB/half-duplex 2 = 10MB/full-duplex 3 = 100MB/half-duplex 4 = 100MB/full-duplex
IP Address	Default private class 3 address
Netmask	Default class 3 network mask
Gateway	Default gateway to another network

3.3 61850S Identification

This section allows you to assign unique IED identification parameters to the module.

Double-click the **61850S IDENTIFICATION** icon to edit the parameters.



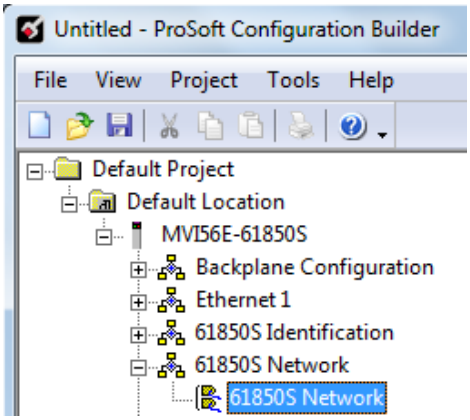


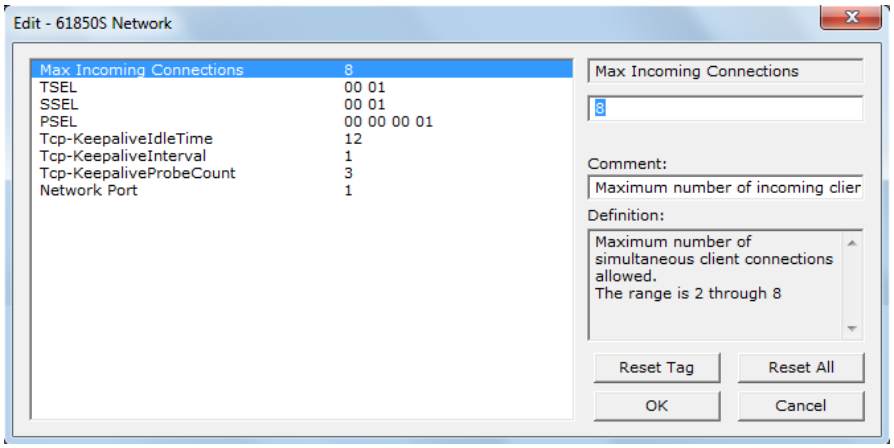
Name	Description
configVersion	Version of the configuration. It should match attribute "configVersion" of CID's "IED" element
IED Name	Name of this IED, which must be unique over all IEDs
configRev	Uniquely identifies the configuration the IED. Mapped 61850 to data attribute LLN0DCNamPlt$configRev
Subnet Name	Name of the station "subnetwork" on which this IED resides; meaningful only for SCD files

3.4 61850S Network

This section allows you to set the parameters on incoming IEC 61850 client connections.

Double-click the **61850S NETWORK** icon to edit the parameters.



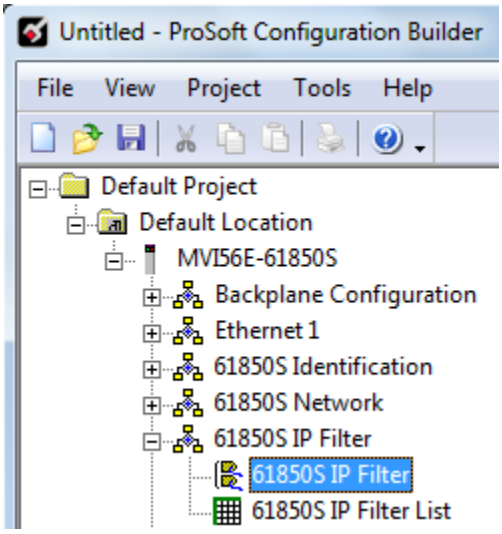


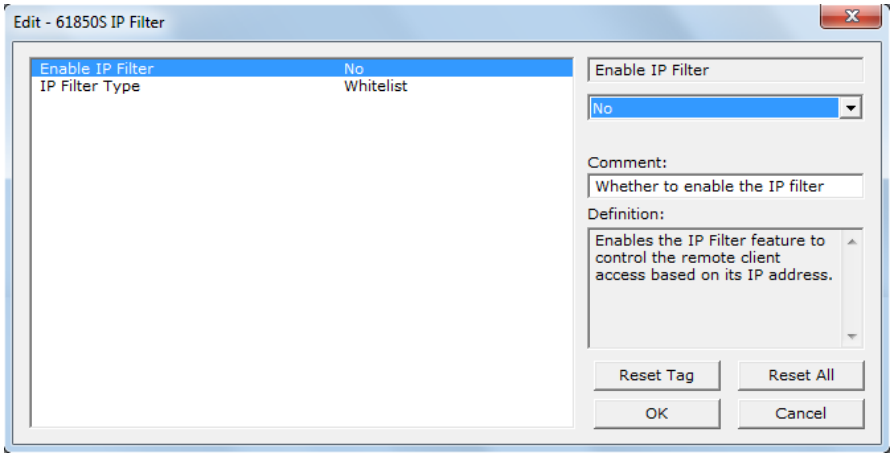
Name	Range	Description
Max Incoming Connections	2 to 8	Maximum number of simultaneous client connections allowed.
TSEL		Transport Selector
SSEL		Session Selector
PSEL		Presentation Selector
Tcp-KeepaliveIdleTime	1 to 60	Maximum TCP-connection idle time before beginning keep-alive probes, in seconds.
Tcp-KeepaliveInterval	1 to 60	Interval between failed keep-alive probes, in seconds.
Tcp-KeepaliveProbeCount	1 to 9	Number of consecutive failed keep-alive probes causing connection to be deemed broken
Network Port	1	This number selects the physical Ethernet interface to be used for the 61850 protocol. This value cannot be changed.

3.5 61850S IP Filter

This section allows you to create a whitelist or blacklist to allow/deny outside IP address connections.

Double-click the **61850S IP FILTER** icon to edit the parameters.

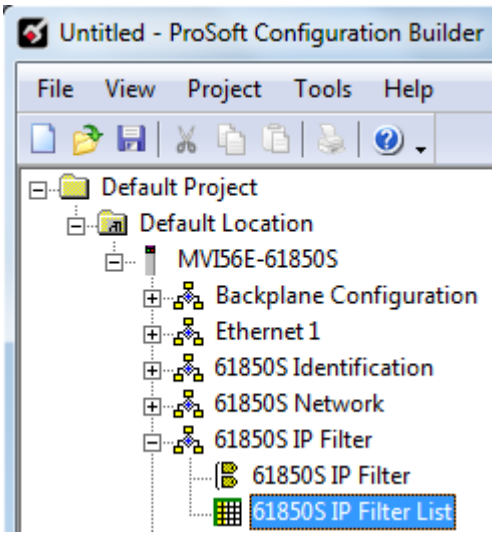




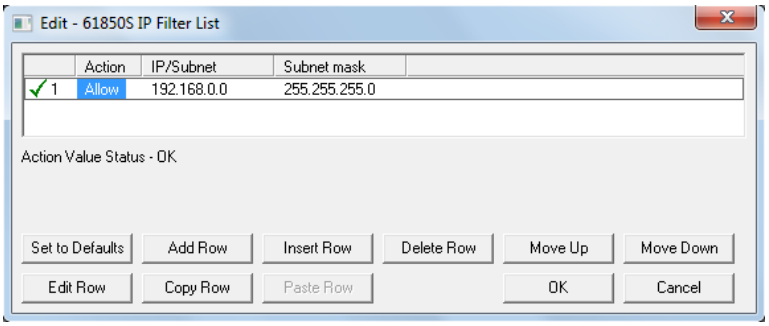
Name	Range	Description
Enable IP Filter	Yes/No	Enables control of the remote client access based on its IP address.
IP Filter Type	Whitelist/Blacklist	*Whitelist* denies all IPs except those IPs or subnets listed as allowed in IP Filter List. *Blacklist* allows all IPs except those listed as denied in IP Filter List.

If the IP Filter is enabled, you will need to configure the IP addresses to be filtered.

1 Double-click the **61850S IP FILTER LIST** icon.



2 Click **ADD ROW** then **EDIT ROW** to enter the IP address information.

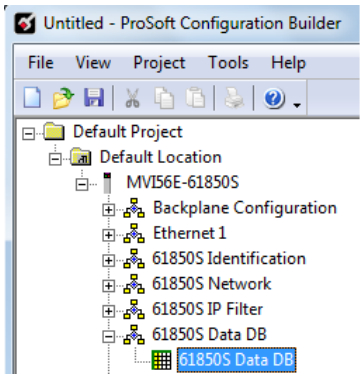


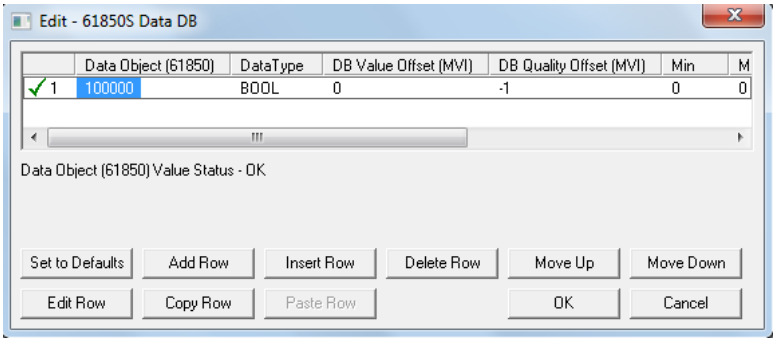
Name	Range	Description
Action	Allow/Deny	Select *Allow* for allowed IP or subnet for Whitelist filter type. Select *Deny* for denied IP or subnet for Blacklist filter type.
IP/Subnet		Enter an IPv4 address or subnet in standard dotted notation. The candidate IP matches this entry if it matches this IP or subnet.
Subnet mask		Enter an IPv4 subnet mask in standard dotted notation. The candidate IP and the IP/subnet match if they are the same under this mask.

3.6 61850S Data DB Configuration

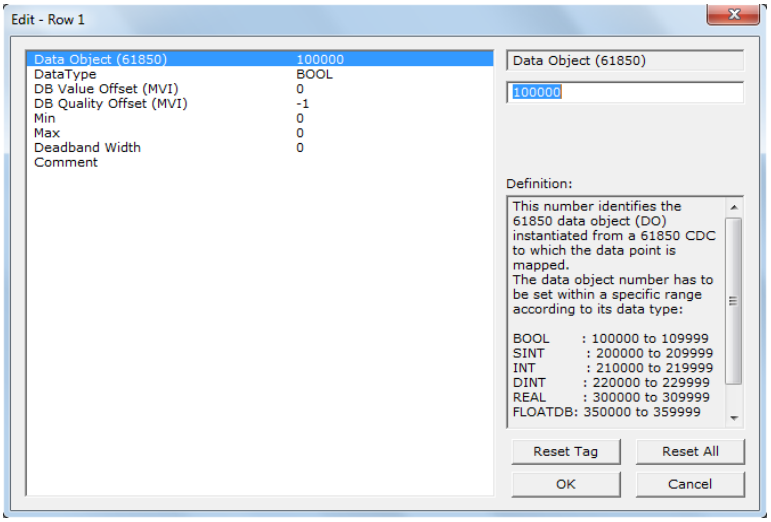
This section allows you to configure DB data objects (DO's) for the MVI56E-61850S. This data will be updated to the module from the processor.

1 Double-click the **61850S DATA DB** icon to open the configuration window.





2 Click **ADD ROW** then **EDIT ROW** to edit.

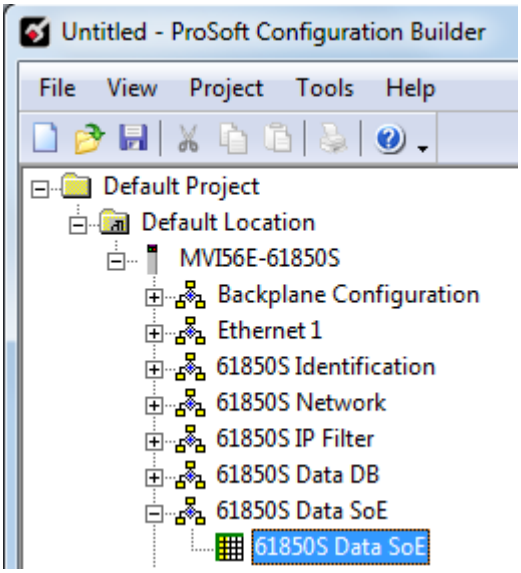


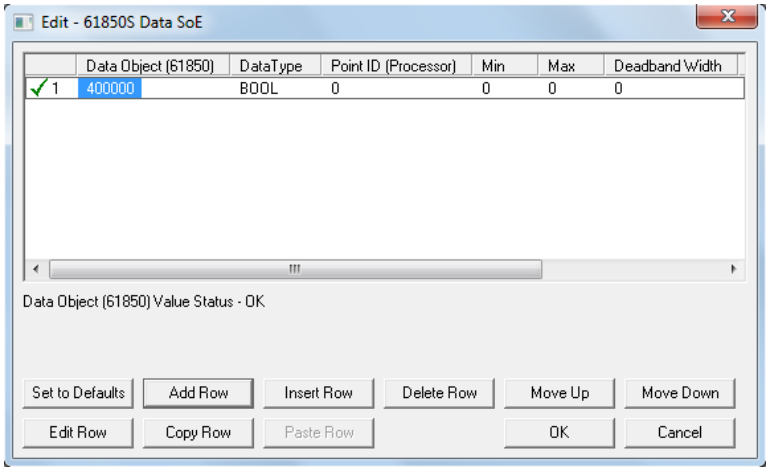
Name	Description
Data Object	This value identifies the 61850 data object (DO) instantiated from a 61850 CDC to which the data point is mapped. The data object number has to be set within a specific range according to its data type: BOOL: 100000 to 109999 SINT: 200000 to 209999 INT: 210000 to 219999 DINT: 220000 to 229999 REAL: 300000 to 309999 FLOATDB: 350000 to 359999 (50 points maximum)
Data Type	Type of the data as it resides in the internal database. BOOL: Boolean / Bit SINT: (Signed-8 bits) / Byte INT: (Signed-16 bits) / Word DINT: (Signed-32 bits) / Double word REAL: (32-bit floating) / Double word FLOATDB: (32-bit floating) / Double word deadbanded
DB Value Offset	The offset of the data point value in the internal database. The database addressing value is interpreted according to the data type as follows: BOOL: Boolean addressing SINT: Byte addressing INT: Word addressing DINT: Double-word addressing REAL: Double-word addressing FLOATDB: Double-word addressing Specify -1 if the associated status data attribute is not to be mapped.
DB Quality Offset	The offset (in bytes) of the corresponding quality byte in the internal database, which must reside in the same backplane block (240-word block) as the status value itself. The database is transferred from the processor to the module in blocks of 240 words. As the quality information is tightly linked to the actual status value data, the module must receive them both simultaneously in order for them both to be correctly processed. If the status point has no associated quality information in the processor, therefore no quality byte is to be delivered, specify as -1.
Min	*Only applicable for FLOATDB type. The minimum valid value of the instantaneous analog value, delivered from the processor to the 61850 data attribute. If the received status value from processor is less than configured minimum value, the module will set the *Out of Range* quality flag.
Max	*Only applicable for FLOATDB type. The maximum valid value of the instantaneous analog value, delivered from the processor to the 61850 data attribute. If the received status value from processor is greater than configured maximum value, the module will set the *Out of Range* quality flag.
Deadband Width	*Only applicable for FLOATDB type. The deadband width, as parts per 100,000 of the extent "Max"-"Min" of the valid range. The actual width, in the engineering units of the analog input is set by: DbWdth * [(Max-Min)/100000]
Comment	Comments cannot be edited

3.7 61850S Data SoE

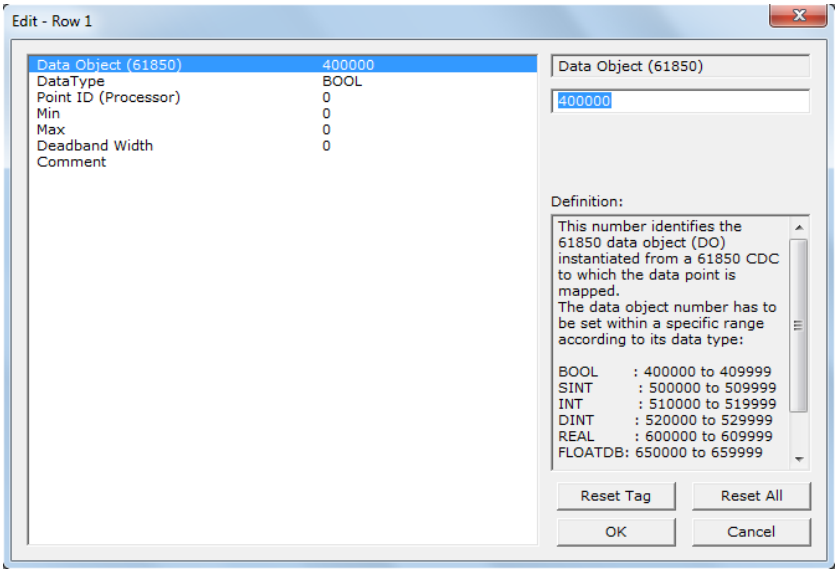
This section allows you to configure SoE data objects (DO's) for the MVI56E-61850S. This data will be updated to the module from the processor.

1 Double-click the **61850S DATA SOE** icon to open the configuration window.





2 Click **ADD ROW** then **EDIT ROW** to edit.

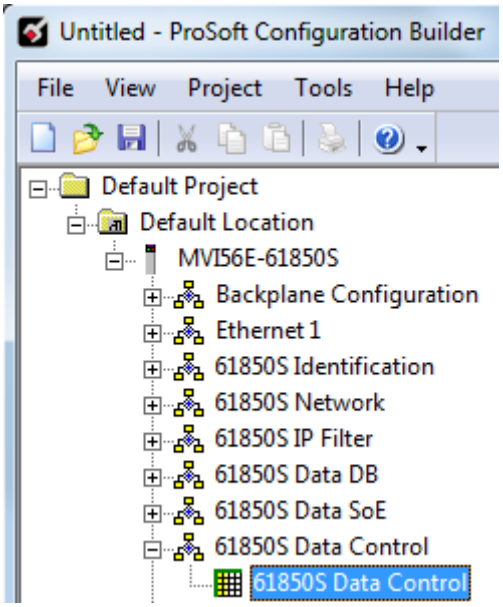


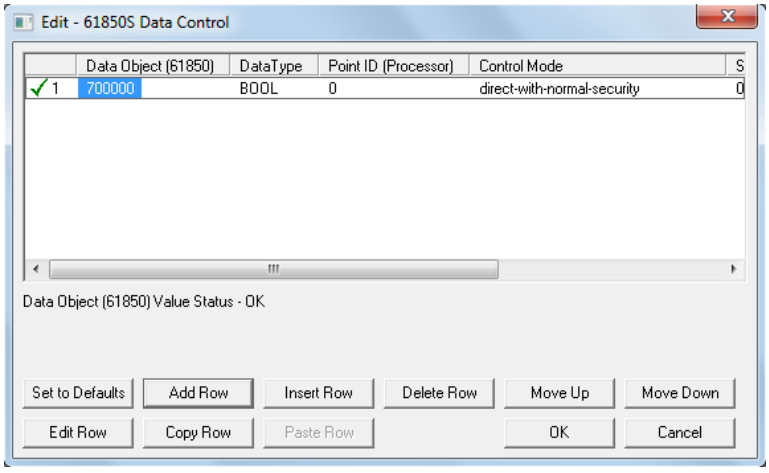
Name	Description
Data Object	This value identifies the 61850 data object (DO) instantiated from a 61850 CDC to which the data point is mapped. The data object number has to be set within a specific range according to its data type: BOOL: 400000 to 409999 SINT: 500000 to 509999 INT: 510000 to 519999 DINT: 520000 to 529999 REAL: 600000 to 609999 FLOATDB: 650000 to 659999 (50 points maximum)
Data Type	Type of the data as it resides in the internal database. BOOL: Boolean / Bit SINT: (Signed-8 bits) / Byte INT: (Signed-16 bits) / Word DINT: (Signed-32 bits) / Double word REAL: (32-bit floating) / Double word FLOATDB: (32-bit floating) / Double word deadbanded
Point ID	Unique identifier for the SoE point in the processor. It is a 16-bit value.
Min	*Only applicable for FLOATDB type. The minimum valid value of the instantaneous analog value, delivered from the processor to the 61850 data attribute. If the received status value from processor is less than configured minimum value, the module will set the *Out of Range* quality flag.
Max	*Only applicable for FLOATDB type. The maximum valid value of the instantaneous analog value, delivered from the processor to the 61850 data attribute. If the received status value from processor is greater than configured maximum value, the module will set the *Out of Range* quality flag.
Deadband Width	*Only applicable for FLOATDB type. The deadband width, as parts per 100,000 of the extent "Max"-"Min" of the valid range. The actual width, in the engineering units of the analog input is set by: DbWdth * [(Max-Min)/100000]
Comment	Comments cannot be edited

3.8 61850S Data Control

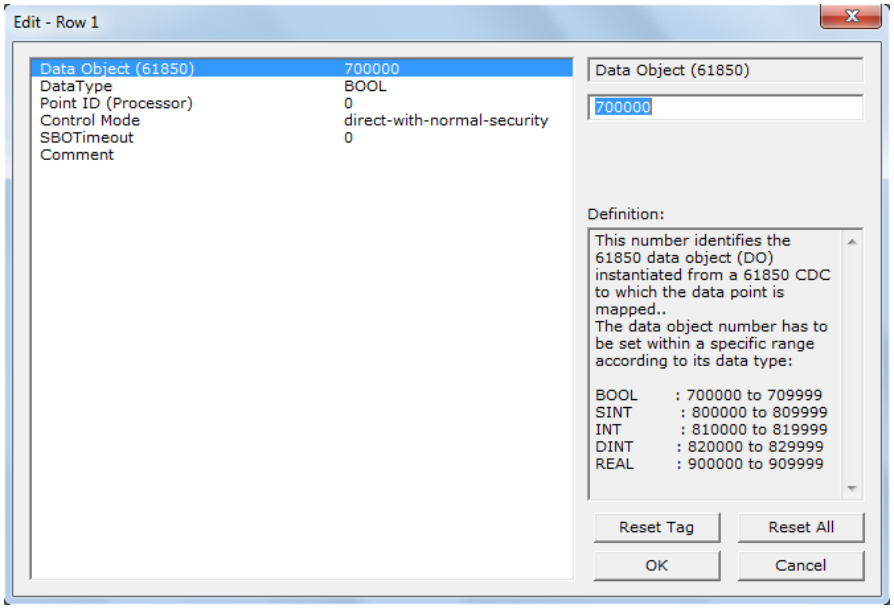
This section allows you to you to configure Control data objects (DO's) for the MVI56E-61850S. Control data originates from an IEC 61850 client. The module passes this data to the processor where it is acknowledged. This processor-acknowledged data is updated back to the module for a handshake back to the client.

1 Double-click the **61850S DATA CONTROL** icon to open the configuration window.





2 Click **ADD ROW** then **EDIT ROW** to edit.

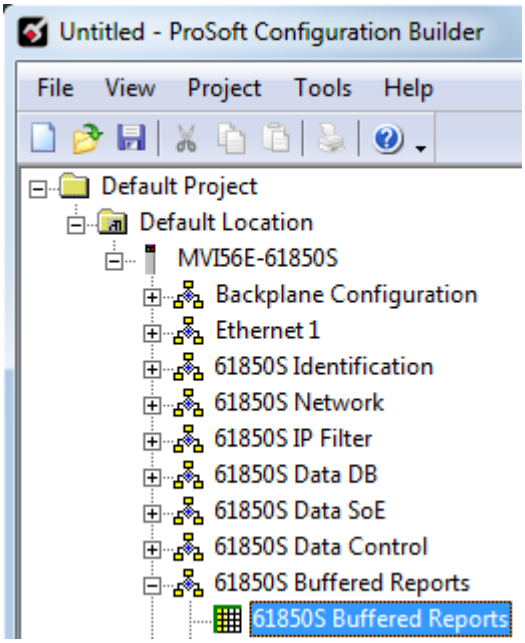


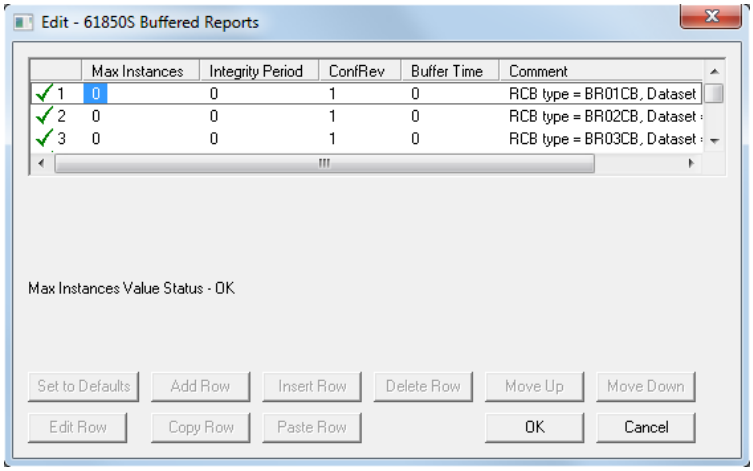
Name	Description
Data Object	This value identifies the 61850 data object (DO) instantiated from a 61850 CDC to which the data point is mapped. The data object number has to be set within a specific range according to its data type: BOOL: 700000 to 709999 SINT: 800000 to 809999 INT: 810000 to 819999 DINT: 820000 to 829999 REAL: 900000 to 909999
Data Type	Type of the data as it resides in the internal database. BOOL: Boolean / Bit SINT: (Signed-8 bits) / Byte INT: (Signed-16 bits) / Word DINT: (Signed-32 bits) / Double word REAL: (32-bit floating) / Double word
Point ID	Unique identifier for the Control point in the processor. It is a 16-bit value.
Control Mode	A code that selects the 61850 control mode according to IEC61850 specification: Direct-with-normal-security Sbo-with-normal-security, operate-once Sbo-with-normal-security, operate-many Direct-with-enhanced-security Sbo-with-enhanced-security, operate-once Sbo-with-enhanced-security, operate-many
SBO Timeout	*Only applicable for SBO control mode The timeout in milliseconds for the control object to remain selected without receiving an Oper or Cancel request
Comment	Comments cannot be edited

3.9 61850S Buffered Reports

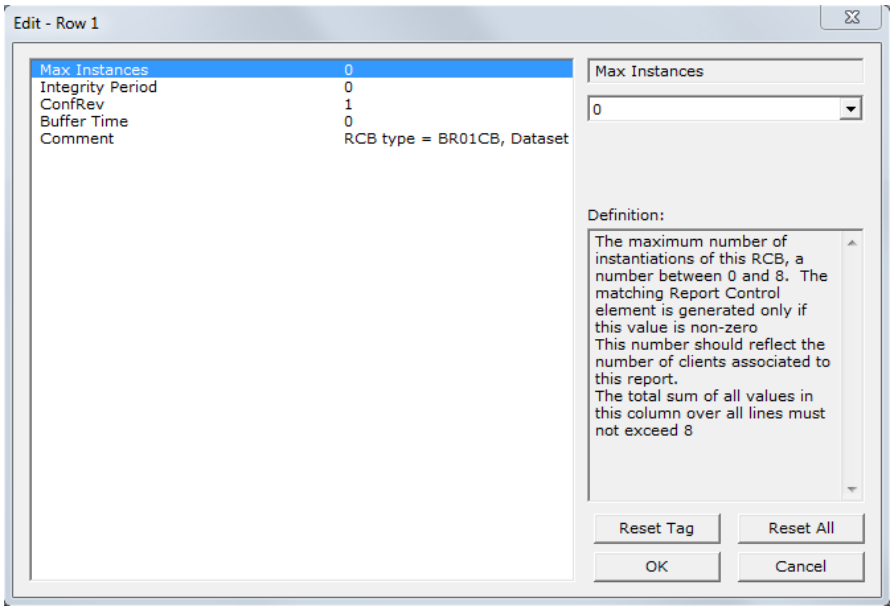
A buffered report logs the changes in data if the IEC 61850 client/server connection has been lost. Once the connection has be re-established, the report can be sent upon condition.

1 Double-click the **61850S BUFFERED REPORTS** icon to open the configuration window.





2 Double-click on the row to be edited.

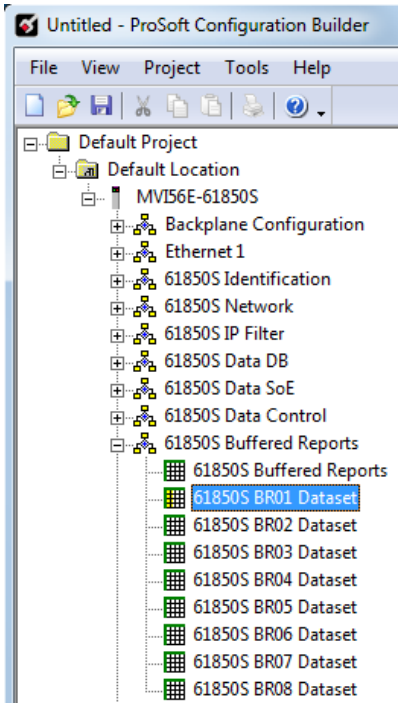


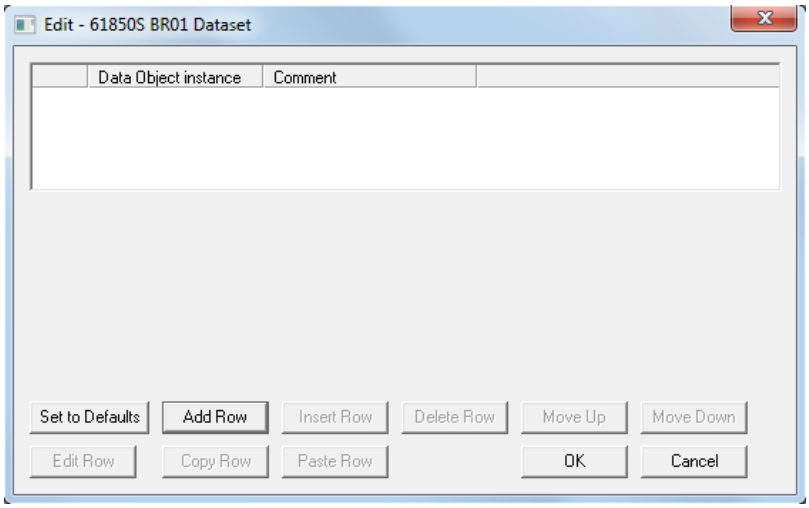
Name	Range	Description
Max Instances	0 to 8	Maximum number of instantiations of this RCB. The matching Report Control element is generated only if this value is non-zero. This number should reflect the number of clients associated to this report. The total sum of all values in this column over all lines must not exceed 8.
Integrity Period	0 to 2,147,483,647	The integrity period for this report in milliseconds, at which the module will send the report to the client associated to this report. This value may be overridden by the 61850 client during the report-enable sequence. 0 = Disabled
ConfRev	0 to 2,147,483,647	Number of reconfigurations of the report's associated dataset
Buffer Time	0 to 65535	Maximum amount of time, in milliseconds, that buffered events will be held pending before being reported.
Comment		User defined

3.9.1 61850S BR0x Dataset

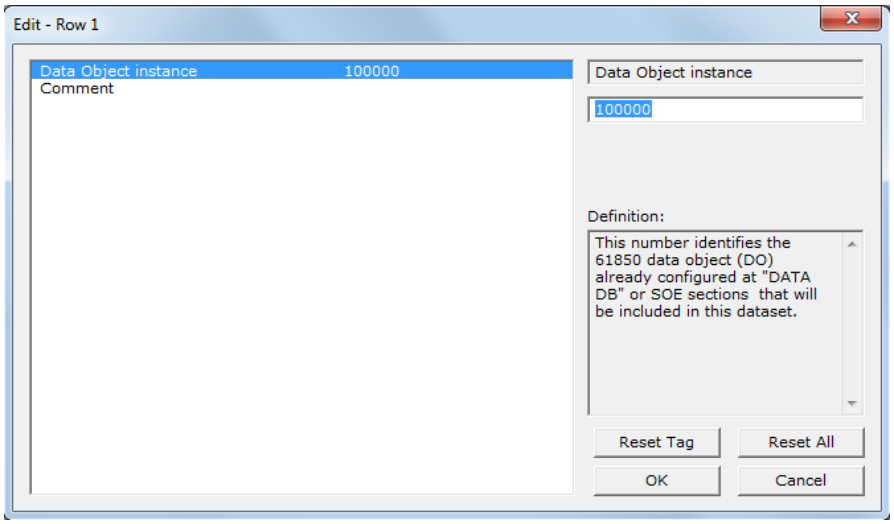
This section allows you to set up datasets for data objects for buffered reports.

1 Double-click the **61850S BR0X DATASET** icon to open the configuration window.





2 Click **ADD ROW** then **EDIT ROW** to edit.

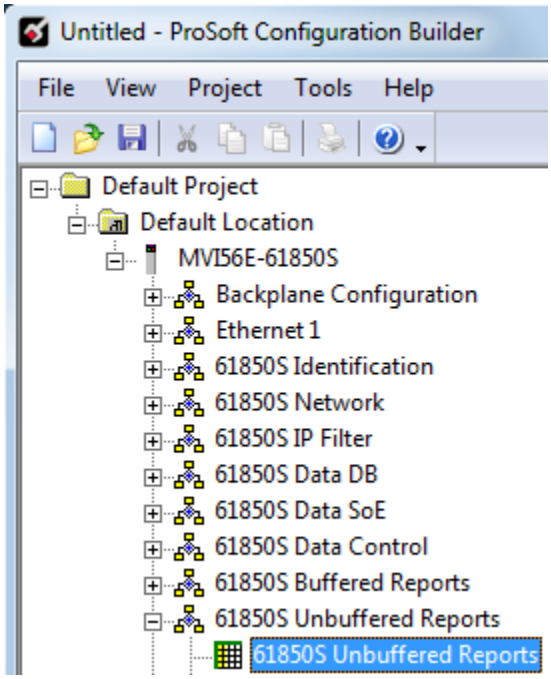


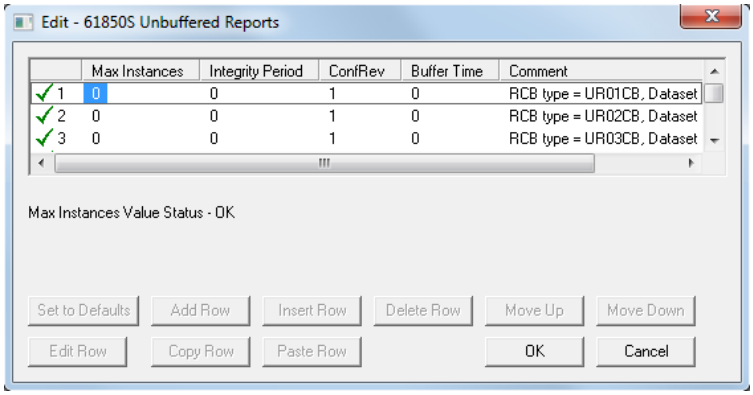
Name	Description
Data Object Instance	This value identifies the 61850 data object (DO) number already configured at "DATA DB" or SoE sections that will be included in this dataset.
Comment	User defined

3.10 61850S Unbuffered Reports

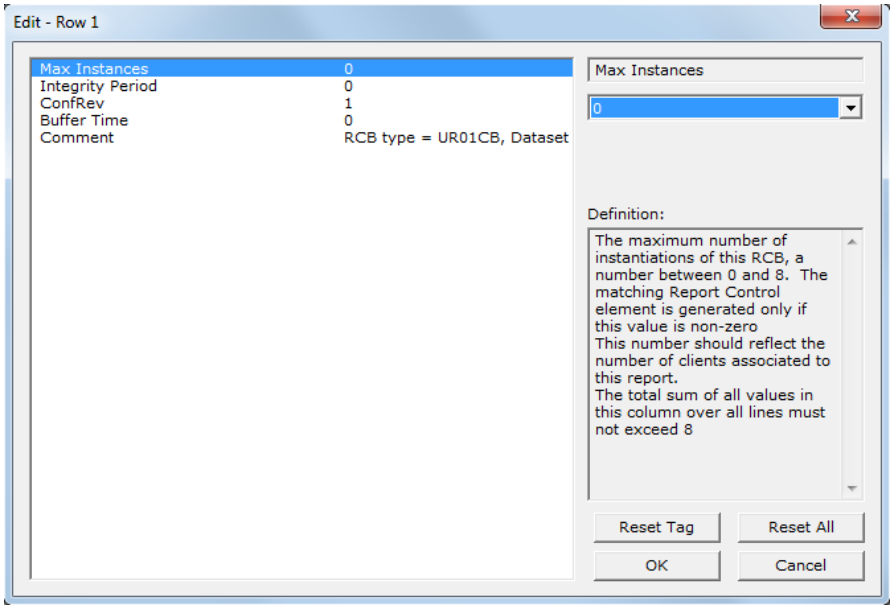
An unbuffered report logs a change in data if the IEC 61850 client/server connection has been lost. Once the connection has be re-established, only the last reported data change will be sent.

1 Double-click the **61850S UNBUFFERED REPORTS** icon to open the configuration window.





2 Double-click on the row to be edited.

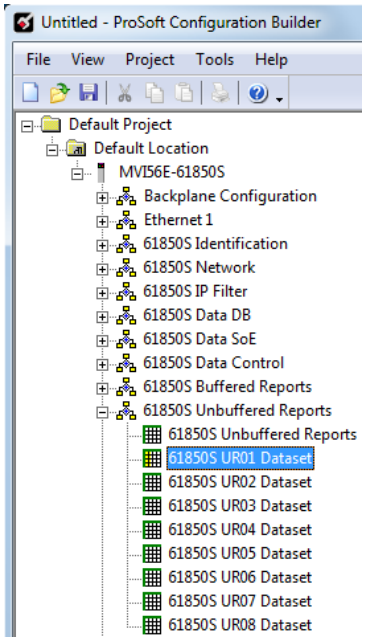


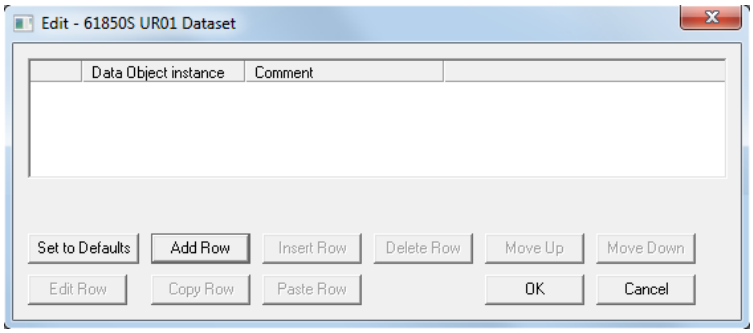
Name	Range	Description
Max Instances	0 to 8	Maximum number of instantiations of this RCB. The matching Report Control element is generated only if this value is non-zero. This number should reflect the number of clients associated to this report. The total sum of all values in this column over all lines must not exceed 8.
Integrity Period	0 to 2,147,483,647	The integrity period for this report in milliseconds, at which the module will send the report to the client associated to this report. This value may be overridden by the 61850 client during the report-enable sequence. 0 = Disabled
ConfRev	0 to 2,147,483,647	Number of reconfigurations of the report's associated dataset
Buffer Time	0 to 65535	Maximum amount of time, in milliseconds, that buffered events will be held pending before being reported.
Comment		User defined

3.10.1 61850S UR0x Dataset

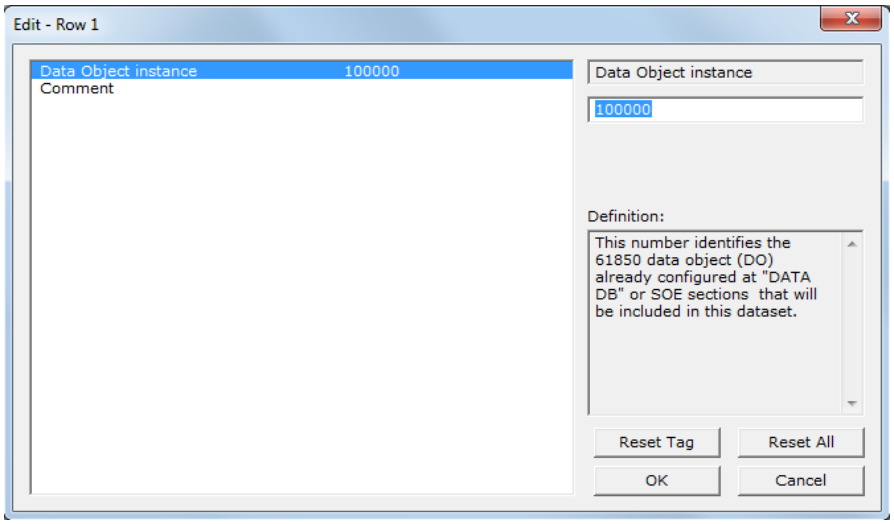
This section allows you to set up datasets for data objects for unbuffered reports.

1 Double-click the **61850S BR0X DATASET** icon to open the configuration window.





2 Click **ADD ROW** then **EDIT ROW** to edit.



Name	Description
Data Object Instance	This value identifies the 61850 data object (DO) number already configured at "DATA DB" or SoE sections that will be included in this dataset.
Comment	User defined

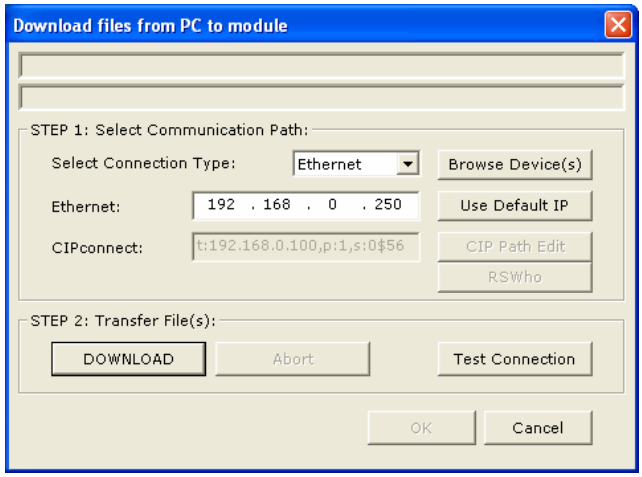
3.11 Downloading the Project to the Module

In order for the module to use the settings you configured, you must download (copy) the updated Project file from your PC to the module.

1. In the tree view in *ProSoft Configuration Builder*, right-click the **MVI56E-61850S** icon to open a shortcut menu.
2. Choose **DOWNLOAD FROM PC TO DEVICE.** This opens the *Download* dialog box.
3. In the *Download* dialog box, choose the connection type in the *Select Connection Type* dropdown box:
   - Choose **ETHERNET** if you are connecting to the module through the Ethernet cable.
   - Choose **1756 ENBT** if you are connecting to the module through CIPconnect or RSWho.

   Refer to *Connecting Your PC to the Module's Ethernet Port* (Page 44) for more information.

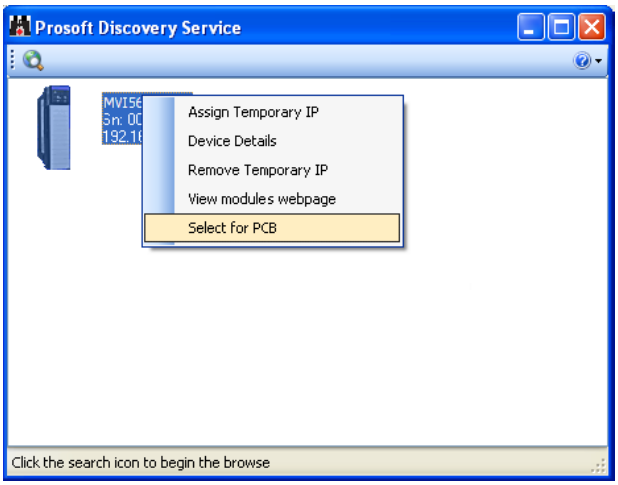
Note: If you connected to the module using an Ethernet cable and set a temporary IP address, the Ethernet address field contains that temporary IP address. *ProSoft Configuration Builder* uses this temporary IP address to connect to the module.



4. Click **TEST CONNECTION** to verify that the IP address allows access to the module.
5. If the connection succeeds, click **DOWNLOAD** to transfer the Ethernet configuration to the module.

If the *Test Connection* procedure fails, you will see an error message. To correct the error, follow these steps.

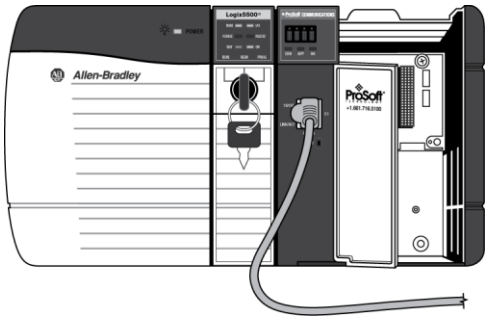
1 Click **OK** to dismiss the error message.
2 In the *Download* dialog box, click **BROWSE DEVICE(S)** to open *ProSoft Discovery Service*.



3 Select the module, and then click the right mouse button to open a shortcut menu. On the shortcut menu, choose **SELECT FOR PCB**.
4 Close *ProSoft Discovery Service*.
5 Click **DOWNLOAD** to transfer the configuration to the module.

3.11.1 Connecting Your PC to the Module's Ethernet Port

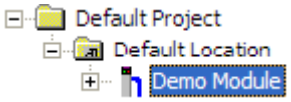
With the module securely mounted, connect one end of the Ethernet cable to the *Config (E1)* Port, and the other end to an Ethernet hub or switch accessible from the same network as your PC. You can also connect directly from the Ethernet Port on your PC to the *Config (E1)* Port on the module by using an Ethernet crossover cable (not included).



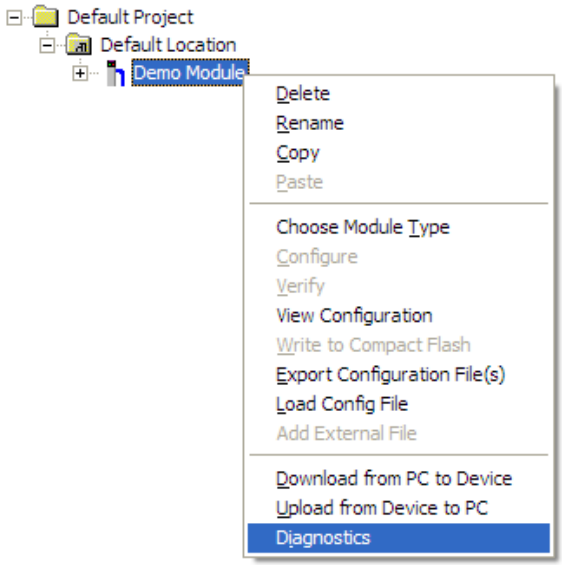
Setting Up a Temporary IP Address

Important: *ProSoft Configuration Builder* locates MVI56E-61850S modules through UDP broadcast messages. These messages may be blocked by routers or layer 3 switches. In that case, *ProSoft Discovery Service* will be unable to locate the modules.
To use *ProSoft Configuration Builder*, arrange the Ethernet connection so that there is no router/ layer 3 switch between the computer and the module OR reconfigure the router/ layer 3 switch to allow routing of the UDP broadcast messages.

1 In the tree view in *ProSoft Configuration Builder*, select the **MVI56E-61850S** module.

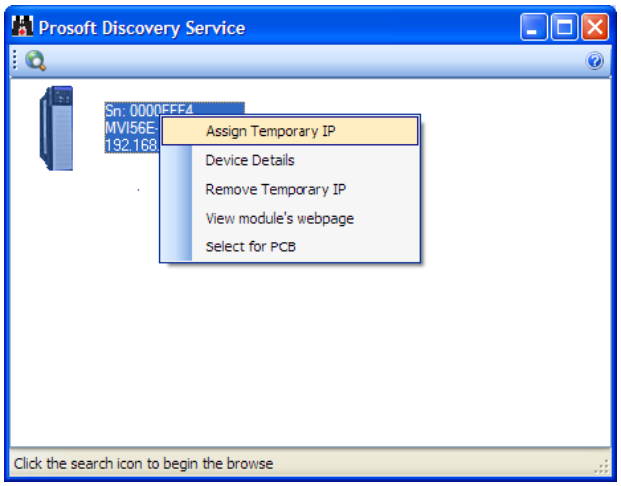


2 Click the right mouse button to open a shortcut menu. On the shortcut menu, choose **DIAGNOSTICS.**

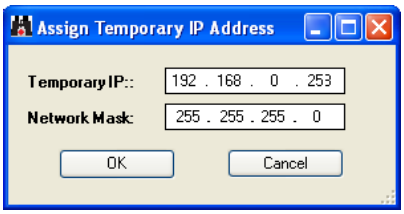


3 In the *Diagnostics* window, click the **SET UP CONNECTION** button.

4 In the *Connection Setup* dialog box, click the **BROWSE DEVICE(S)** button to open the *ProSoft Discovery Service*. Select the module, then right-click and choose **ASSIGN TEMPORARY IP**.

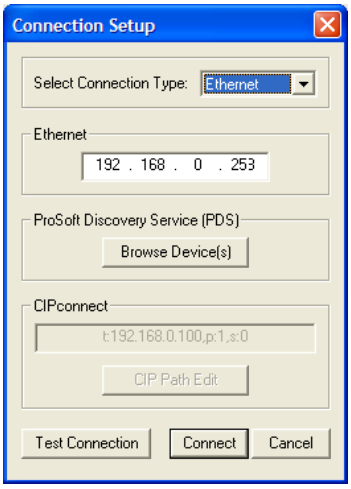


5 The module's default IP address is 192.168.0.250. Choose an unused IP within your subnet, and then click **OK**.

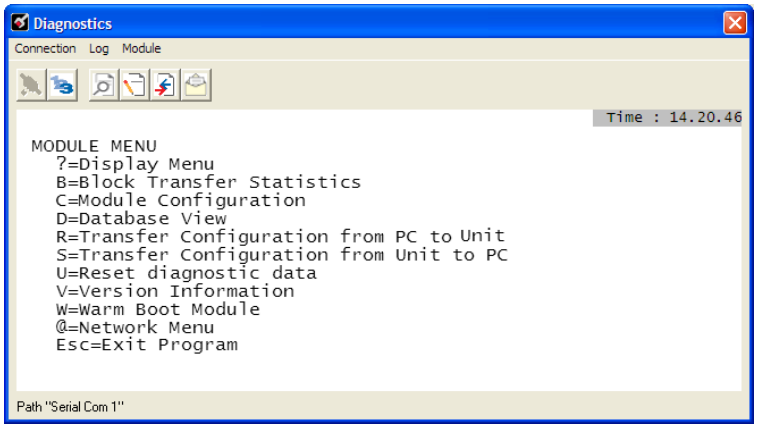


Important: The temporary IP address is only valid until the next time the module is initialized. For information on how to set the module's permanent IP address, see Ethernet Configuration.

6 Close the *ProSoft Discovery Service* window. Enter the temporary IP in the Ethernet address field of the *Connection Setup* dialog box, then click the **TEST CONNECTION** button to verify that the module is accessible with the current settings.



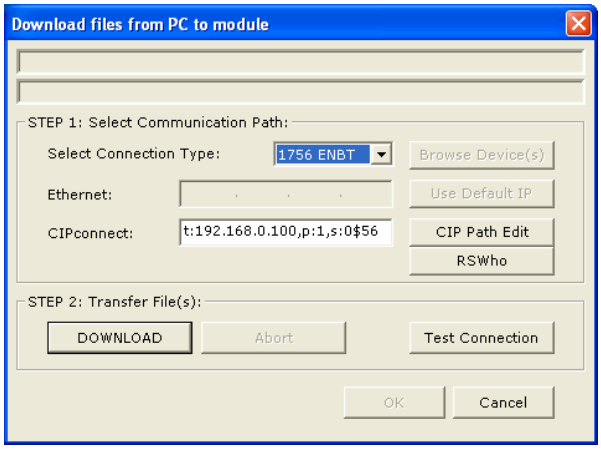
7 If the *Test Connection* is successful, click **CONNECT**. The *Diagnostics* menu will display in the *Diagnostics* window.



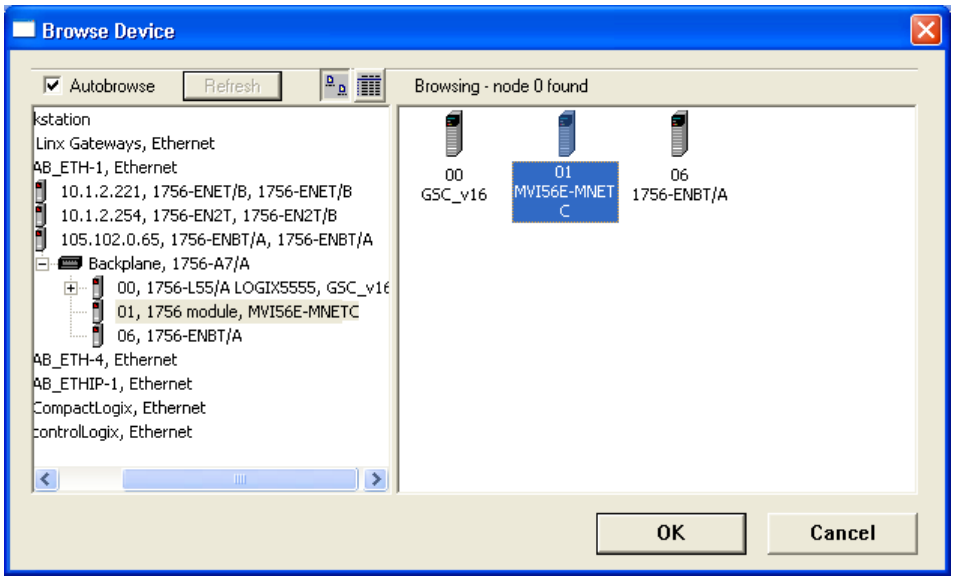
Using RSWho to Connect to the Module

You need to have RSLinx installed on your PC to use this feature. You also need an ENBT module set up in the rack. For information on setting up the ENBT module, see Using CIPconnect to Connect to the Module.

1. In the tree view in *ProSoft Configuration Builder*, right-click the **MVI56E-61850S** module.
2. From the shortcut menu, choose **DOWNLOAD FROM PC TO DEVICE**.
3. In the *Download* dialog box, choose **1756 ENBT** from the *Select Connection Type* dropdown box.



4. Click **RSWHO** to display modules on the network. The MVI56E-61850S module will automatically be identified on the network.



5. Select the module, and then click **OK**.

4 RSLogix 5000 Configuration

In This Chapter

- MVI56E-61850S User-Defined Data Types 49
- MVI56E-61850S Controller Tags 49

Although the MVI56E-61850S configuration is done in PCB, it is maintained in the *MVI56E61850S* controller tags of RSLogix 5000. This chapter covers the tag structure and locations of the MVI56E-61850S parameters in RSLogix 5000.

4.1 MVI56E-61850S User-Defined Data Types

The sample ladder logic relies heavily on the use of User-Defined Data Types (UDTs) to help group and structure the wide variety and volume of data and control features the module offers. Lower-order UDT structures are often embedded in higher-order structures to help further organize data into more easily understood data collections.

All data and control parameters related to the MVI56E-61850S are contained in User-defined Data Types (UDTs). The *MVI56E61850S_MODULEDEF* UDT is the primary, top level data structure in which all other lower-order data types are grouped and organized. All groups branch down from this UDT.

To utilize all the features and functions of the module, an instance of each data type is required. This is accomplished by declaring controller tag variables using these data types in the Controller Tags Edit Tags dialog box.

Some UDTs hold process or status data (*Module Data Objects*). This data can be monitored and manipulated by the application-specific ladder logic program. Other UDTs are used to store and organize the parameters needed for special functions and control features (*Special Data Objects*). These data types will be discussed in more detail in succeeding topics.

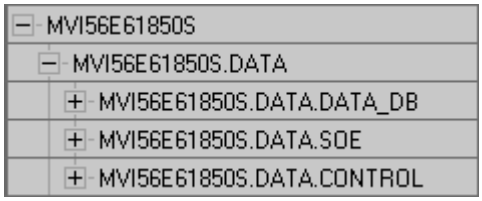
4.2 MVI56E-61850S Controller Tags

4.2.1 61850S Controller Tag Overview

Name	Description
MVI56E61850S.DATA	MVI56E-61850S input and output data transferred between the processor and the module
MVI56E61850S.COMMAND	Governs the data movement between the PLC rack and the module
MVI56E61850S.STATUS	Status data
MVI56E61850S.UTIL	Generic tags used for internal ladder processing (DO NOT MODIFY)

4.2.2 MVI56E61850S.DATA

This array contains the tags used for data transfer (Database, Sequence of Event and Control). Values written to or received from a remote 61850 client are populated here. Setup information can be found in *Examples (page 53).*



Data DB

MVI56E61850S.DATA.DATA_DB.	**Description**
Database.WriteData[x]	MVI56E-61850S database array written from processor to the module.

Sequence of Event (SoE)

MVI56E61850S.DATA.SOE.	**Description**
BOOL	Array contains the tags to populate and trigger SoE Boolean data
SINT	Array contains the tags to populate and trigger SoE SINT data
INT	Array contains the tags to populate and trigger SoE INT data
DINT	Array contains the tags to populate and trigger SoE DINT data
REAL	Array contains the tags to populate and trigger SoE REAL data
FLOATDB	Array contains the tags to populate and trigger SoE FLOATDB data

Control

MVI56E61850S.DATA.CONTROL.	**Description**
BOOL	Array contains the tags to populate and trigger Control Boolean data
SINT	Array contains the tags to populate and trigger Control SINT data
INT	Array contains the tags to populate and trigger Control INT data
DINT	Array contains the tags to populate and trigger Control DINT data
REAL	Array contains the tags to populate and trigger Control REAL data

4.2.3 MVI56E61850S.COMMAND

This array includes the control of module time, control block acknowledgement, and reboot commands.

Time operations for reading/writing time values between the processor and the module:

MVI56E61850S.COMMAND.TIME.	Description
GetProcessorTime	Reads date/time from processor to TIME tag
GetModuleTime	Reads date/time from module to TIME tag
SetModuleTime	Writes date/time from TIME tag to the module
DisableFirstScanGetProcessorTime	0 = Prevents the logic to update TIME from processor time during first scan
TIME	Date/time to be read/written between the processor and module

Control acknowledgement and its status:

MVI56E61850S.COMMAND.CONTROL.	Description
Auto_Ack	ON = Automatically ack every control block. OFF = User must ack every control block using own logic
User_Ack	When Auto_ACK = OFF, this bit can be used to ack the last control. The logic will ack with UTIL.ControlAck structure.
Reset_Pending	Resets pending bit without sending ack back to module. This can be used so the logic can spend multiple scans preparing the ack
Pending	Automatically set to ON once new control block is received. Automatically reset to OFF once control is acknowledged.

Module reboot commands:

MVI56E61850S.COMMAND.BOOT.	Description
Warmboot	Warmboots the module
Coldboot	Coldboots the module
Coldboot_Reset_SOE_Data	Coldboots the module and resets SoE data stored in the processor
Coldboot_Reset_Control_Data	Coldboots the module and resets Control data stored in processor

4.2.4 MVI56E61850S.STATUS Tag

This array contains the overall module status.

MVI56E61850S.STATUS.	Description
ScanCounter	Scan counter increments at every module scan of the ladder logic
BackplanePhase	0 = Running 2 = Init/Initialize SoE/Control data from Processor 4 = InitTransfer PointIDs 6 = Init/Set clock 7 = InitWaiting Processor
ProductCode	Product Code 61S5
Firmware	Firmware version information
Backplane	Backplane statistics between the module and processor including read/write data block counts, block error counts, DB, SoE, and Control block counts.
General	General diagnostics including initialization error, time-stamp module and connection statistics.
Connection	Diagnostics for each of the 8 client connections including time-stamp, IP address, and data packet status.

4.2.5 MVI56E61850S.UTIL Tag

The UTIL array is used for internal ladder implementation. Do not update or delete these tags.

5 Examples

In This Chapter

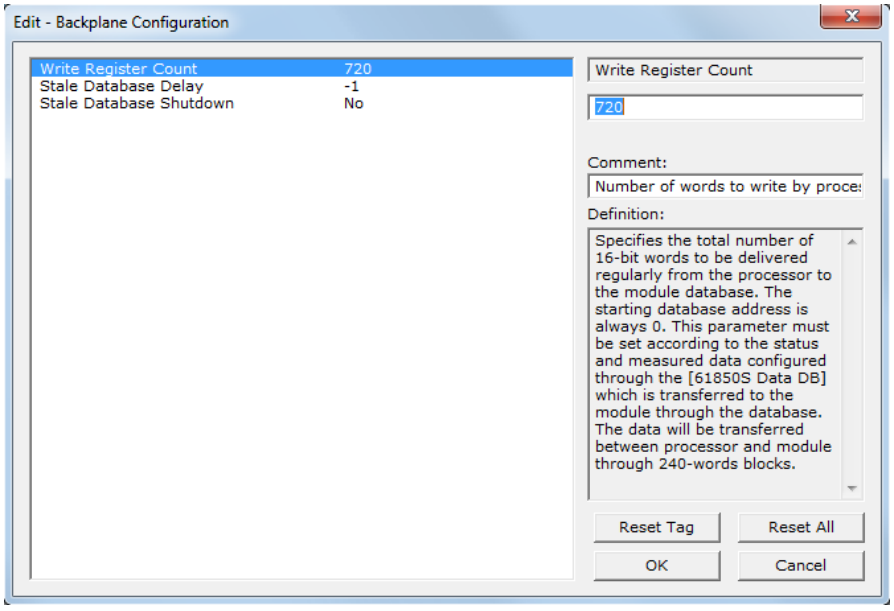
- Data DB Example 53
- SoE Example 58
- Control Example 62

This chapter includes examples of setting up the module for Data DB, SoE, and Control data exchange.

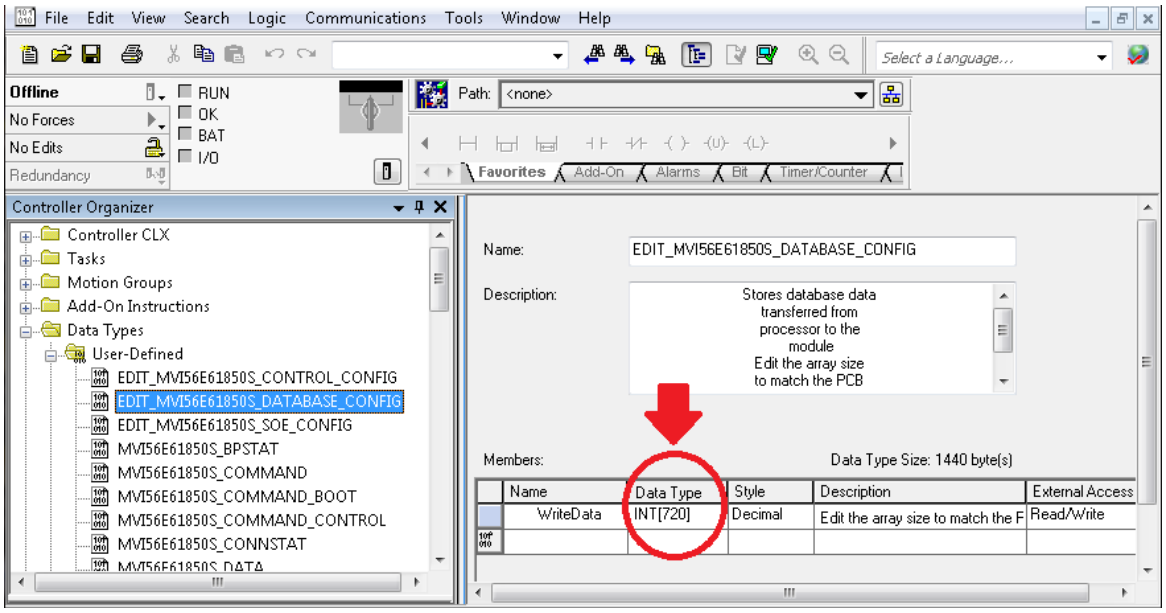
5.1 Data DB Example

This example shows how to set up boolean, integer, and real DB data objects (DO's). In this section, you will configure the PCB file, edit a data value in RSLogix 5000, and verify the value has been updated in module memory.

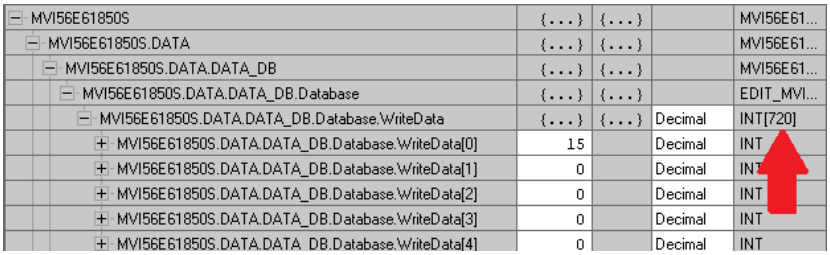
1 In PCB, enter **720** in the *Write Register Count* parameter value. The module breaks down this data into blocks of 240 words. Therefore 720 words will cause the module to generate 3 data blocks to be transferred between the processor and the module.



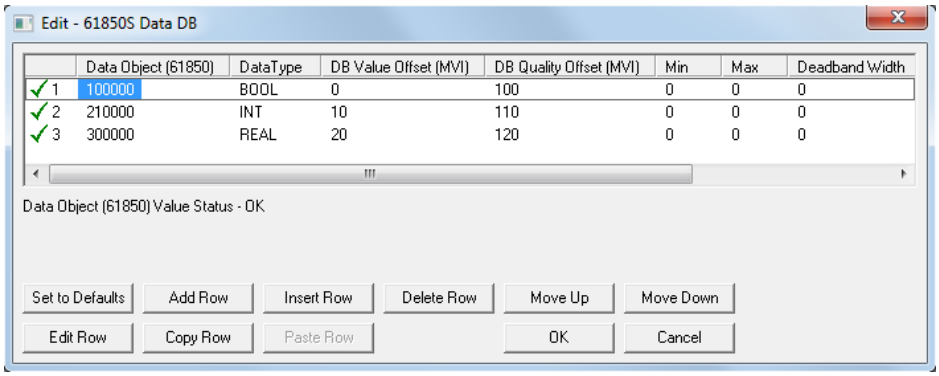
2 In RSLogix 5000, edit the *EDIT_MVI56E61850S_DATABASE_CONFIG* User-Defined Data Type to **720**:



3 The *MVI56E61850S.DATA.DATA_DB.Database.WriteData* array now contains 720 elements. The sample ladder will adjust to accommodate the 3 data blocks needed.



4 In PCB, configure the DO's in the *61850S Data DB* section.



For **Boolean** data, enter the following values. One bit of data will be allotted for this DO in the module's internal memory register 0, bit 0. This location corresponds to *MVI56E61850S.DATA.DATA_DB.Database.WriteData[0].0* in RSLogix 5000.
An (optional) quality byte value is assigned to module memory 100. This location corresponds to the least significant byte in *MVI56E61850S.DATA.DATA_DB.Database.WriteData[50]* in RSLogix 5000.

Data Object	100000
Data Type	BOOL
DB Value Offset	0
DB Quality Offset	100

For **Integer** data, enter the following values. A 16-bit register will be allotted for this DO in the module's internal memory register 10. This location corresponds to *MVI56E61850S.DATA.DATA_DB.Database.WriteData[10]* in RSLogix 5000.
An (optional) quality byte value is assigned to module memory 110. This location corresponds to the least significant byte in *MVI56E61850S.DATA.DATA_DB.Database.WriteData[55]* in RSLogix 5000.

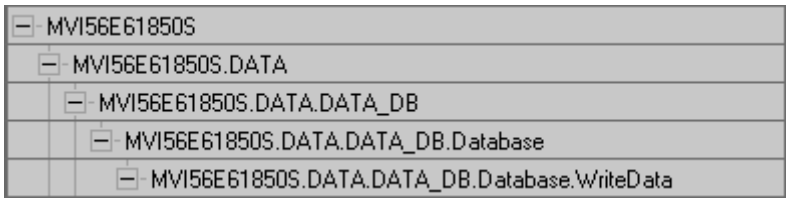
Data Object	210000
Data Type	INT
DB Value Offset	10
DB Quality Offset	110

For **Real** data, enter the following values. A 32-bit value (stored as two 16-bit registers) will be allotted for this DO in the module's internal memory register 20. This location corresponds to *MVI56E61850S.DATA.DATA_DB.Database.WriteData[40] and [41]* in RSLogix 5000.
An (optional) quality byte value is assigned to module memory 100. This location corresponds to the least significant byte in *MVI56E61850S.DATA.DATA_DB.Database.WriteData[60]* in RSLogix 5000.

Data Object	300000
Data Type	REAL
DB Value Offset	20
DB Quality Offset	120

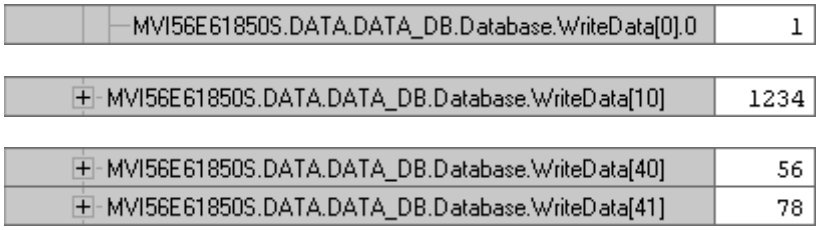
5 Save and download the PCB file to the module. For more information, see *Downloading the Sample Program to the Processor* (page 13)

6 With the processor in RUN mode in RSLogix 5000, locate the *MVI56E61850S.DATA.DATA_DB.Database.WriteData* array.



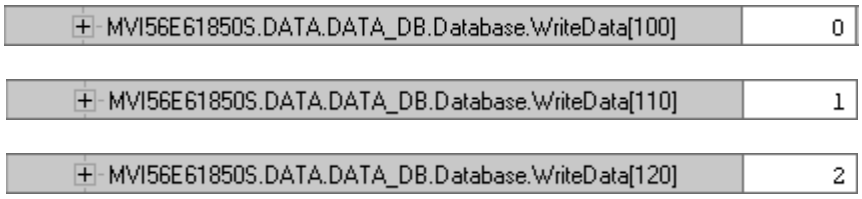
7 Enter arbitrary values in each of the corresponding tags for the Boolean, Integer, and Real points configured in PCB.

Boolean: MVI56E61850S.DATA.DATA_DB.Database.WriteData[0].0
Integer: MVI56E61850S.DATA.DATA_DB.Database.WriteData[10]
Real: MVI56E61850S.DATA.DATA_DB.Database.WriteData[40] and [41]



8 Enter the Quality value describing the data integrity of each DO. This memory address corresponds to the *DB Quality Offset* parameter in PCB above.

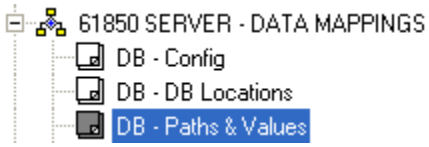
Value	61850 Quality Validity	Descripiton
0	Good	No bit set
1	Questionable	Old data bit set
2	Invalid	Oscillatory bit set
3	Invalid	Old data and oscillatory bits set

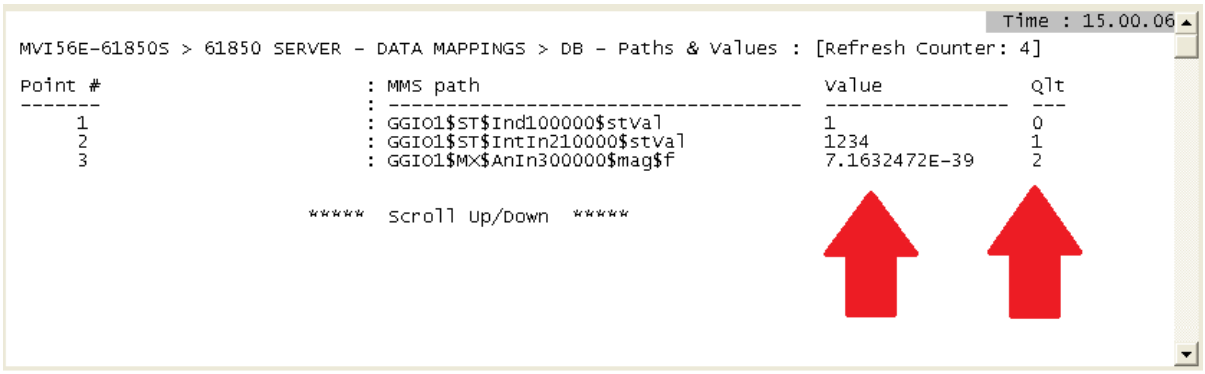


9 The MVI56E-61850S ladder logic sends these values over the backplane to the MVI56E-61850S module memory on every scan.

10 Verify the values of the module memory by viewing the MVI56E-61850S database in the PCB. For more information, see *Using the Diagnostics Menu in ProSoft Configuration Builder*

11 In the Diagnostics window, click on **61850 SERVER - DATA MAPPINGS** > **DB - Paths & Values**. The DO and quality values are displayed here.

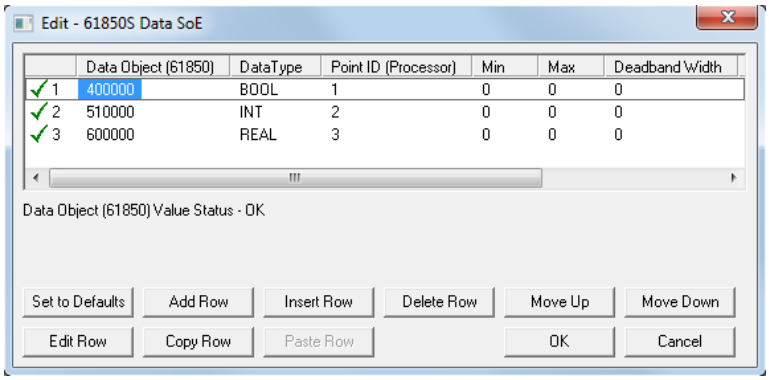




5.2 SoE Example

This example shows how to set up boolean, integer, and real Sequence of Event (SoE) data objects (DO's). In this section, you will configure the PCB file, edit events in RSLogix 5000, and verify the value has been updated in module memory.

1 In PCB, configure the DB points in the *61850S Data DB* section.



For **Boolean** data, enter the following values. One bit of data will be allotted for this DO.

Data Object	400000
Data Type	BOOL
Point ID	1

For **Integer** data, enter the following values. A 16-bit register will be allotted for this DO.

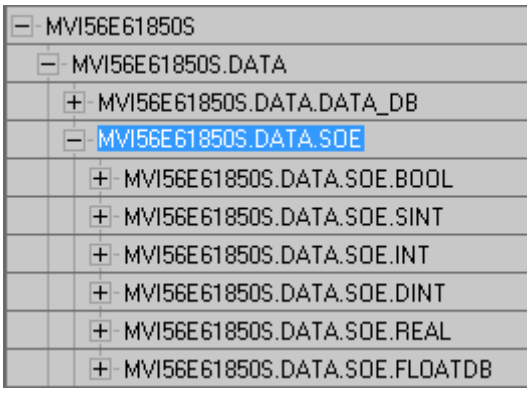
Data Object	510000
Data Type	INT
Point ID	2

For **Real** data, enter the following values. A 32-bit value (stored as two 16-bit registers) will be allotted for this DO.

Data Object	600000
Data Type	REAL
Point ID	3

2 Save and download the PCB file to the module. For more information, see *Downloading the Sample Program to the Processor* (page 13)

3 With the processor in RUN mode in RSLogix 5000, locate the *MVI56E61850S.DATA.SOE* array.



4 In order for the SoE data to be sent from the processor to the module, you must populate then trigger an event in this array. You can send the event(s) in a consecutive group or all at once (up to 24).

5 For **Boolean** data, locate the *MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[x]* array. All boolean SoE data will be populated in this array. Enter the values as shown below. (These steps also apply to **SINT**, **INT**, **DINT**, **REAL** DO's)

MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[0]	{...}
MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[0].PointID	1
MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[0].Reserved	0
MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[0].q	0
MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[0].EventNumber	0
MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[0].t	DT#...
MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Event[0].stVal	1

BOOL

Event[0].	Value	Description
PointID	1	This value must match the corresponding BOOL *Point ID* parameter in PCB
Reserved	-	Not used at this time
q	0	0 = Good data, No bit set, 1 = Questionable, Old data bit set 2 = Invalid, Oscillatory bit set, 3 = Old data and oscillatory bits set
EventNumber	-	Not used at this time
t	dd/tt	Date and time, Time-stamp of event
stVal	1	Data value: 0 = 'Off', 1 = 'On' (BOOL)

INT

Event[1].	Value	Description
PointID	2	This value must match the corresponding INT *Point ID* parameter in PCB
Reserved	-	Not used at this time
q	0	0 = Good data, No bit set, 1 = Questionable, Old data bit set 2 = Invalid, Oscillatory bit set, 3 = Old data and oscillatory bits set
EventNumber	-	Not used at this time
t	dd/tt	Date and time, Time-stamp of event
stVal	4321	Data value

REAL

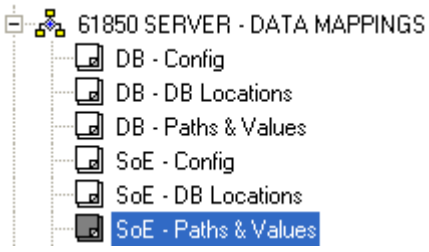
Event[2].	Value	Description
PointID	3	This value must match the corresponding REAL *Point ID* parameter in PCB
Reserved	-	Not used at this time
q	0	0 = Good data, No bit set, 1 = Questionable, Old data bit set 2 = Invalid, Oscillatory bit set, 3 = Old data and oscillatory bits set
EventNumber	-	Not used at this time
t	dd/tt	Date and time, Time-stamp of event
stVal	99.9	Data value

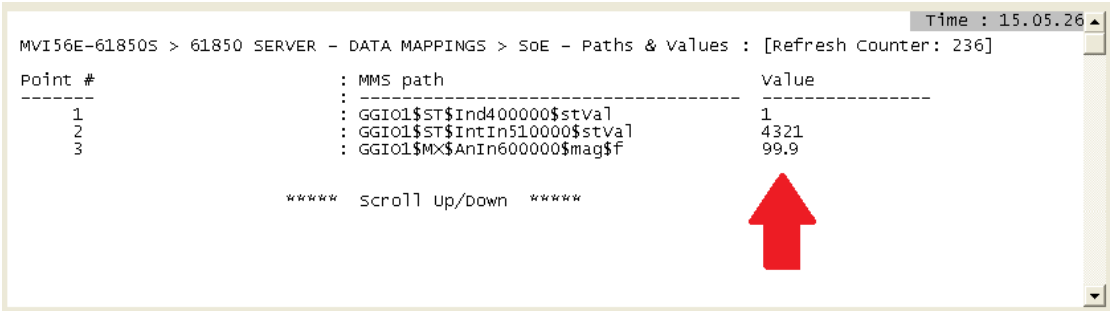
6 Once these values are populated, enter the number of boolean events to be sent to the module.

7 To send the data to the module, enter **1** in the *MVI56E61850S.DATA.SOE.BOOL.WriteEvent.Trigger* tag. It will reset back to **0** once triggered.

8 Verify the values in module memory by viewing the MVI56E-61850S database in the PCB. For more information, see *Using the Diagnostics Menu in ProSoft Configuration Builder*

9 In the Diagnostics window, click on **61850 SERVER - DATA MAPPINGS** > **SoE - Paths & Values**. The DO values are displayed here.





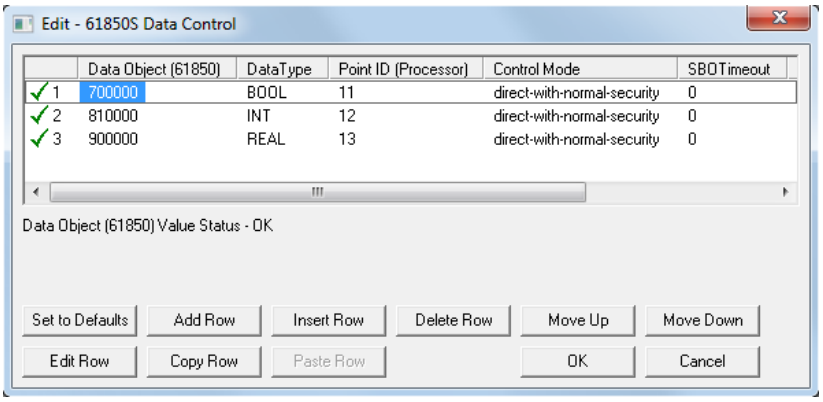
5.3 Control Example

This example shows how to set up boolean, integer, and real Control data objects (DO's). In this section, you will configure the PCB file, configure the related parameters in RSLogix 5000, and verify the value has been populated in module memory using an automatic acknowledge feature.

When a IEC 61850 client sends Control DO data to the MVI56E-61850S, the MVI56E-61850S passes this data to the processor. This data can be analyzed by the user's ladder logic. Data with time-stamp and quality attributes can then be returned to the module for the client to read.

The processor can also acknowledge the data with no user-logic needed, this feature is enabled by default at *MVI56E61850S.COMMAND.CONTROL.Auto_Ack.*

1 In PCB, configure the DB points in the *61850S Data DB* section.



For **Boolean** data, enter the following values. One bit of data will be allotted for this DO.

Data Object	700000
Data Type	BOOL
Point ID	11

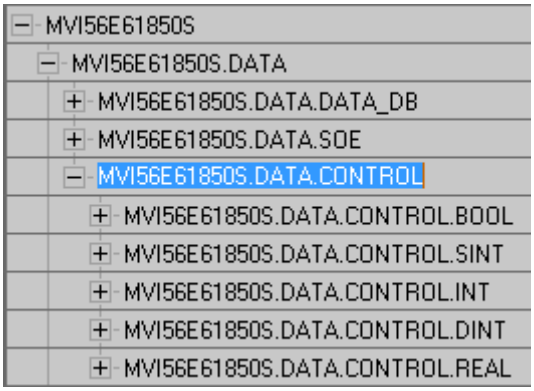
For **Integer** data, enter the following values. A 16-bit register will be allotted for this DO.

Data Object	810000
Data Type	INT
Point ID	12

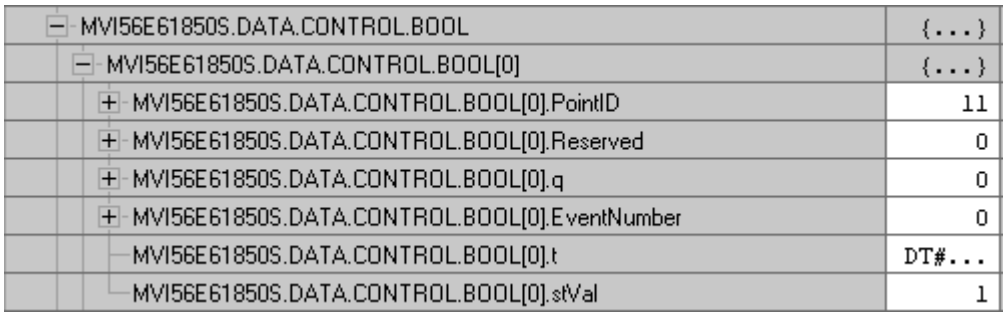
For **Real** data, enter the following values. A 32-bit value (stored as two 16-bit registers) will be allotted for this DO.

Data Object	900000
Data Type	REAL
Point ID	13

2 Save and download the PCB file to the module. For more information, see *Downloading the Sample Program to the Processor* (page 13)
3 With the processor in RUN mode in RSLogix 5000, locate the *MVI56E61850S.DATA.SOE* array.



4 For **Boolean** data, locate the *MVI56E61850S.DATA.CONTROL.BOOL[x]* array. All boolean Control data will be populated in this array. Enter the values as shown below. (These steps also apply to **SINT**, **INT**, **DINT**, **REAL** DO's)



BOOL

BOOL[0].	Value	Description
PointID	11	This value must match the corresponding BOOL *Point ID* parameter in PCB
Reserved	-	Not used at this time
q	0	0 = Good data, No bit set, 1 = Questionable, Old data bit set 2 = Invalid, Oscillatory bit set, 3 = Old data and oscillatory bits set
EventNumber	-	Not used at this time
t	dd/tt	Date and time, Time-stamp of event
stVal	1	Data value: 0 = 'Off', 1 = 'On'

INT

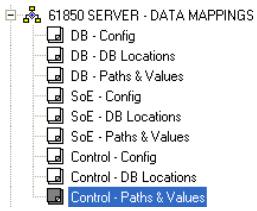
INT[0].	Value	Description
PointID	12	This value must match the corresponding INT *Point ID* parameter in PCB
Reserved	-	Not used at this time
q	0	0 = Good data, No bit set, 1 = Questionable, Old data bit set 2 = Invalid, Oscillatory bit set, 3 = Old data and oscillatory bits set
EventNumber	-	Not used at this time
t	dd/tt	Date and time, Time-stamp of event
stVal	1000	Data value

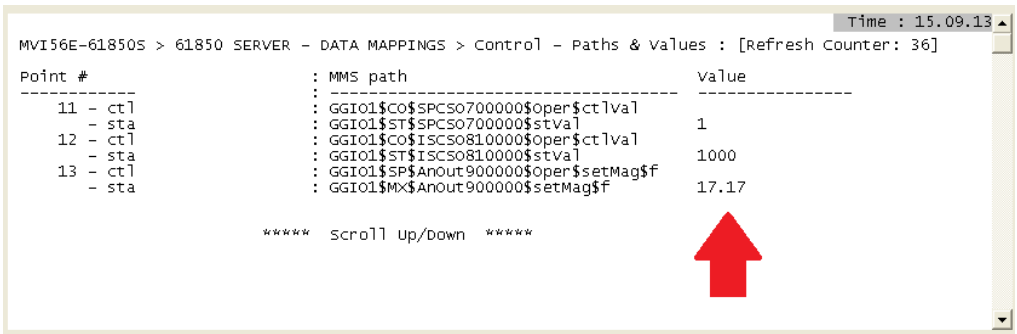
REAL

REAL[0].	Value	Description
PointID	13	This value must match the corresponding REAL *Point ID* parameter in PCB
Reserved	-	Not used at this time
q	0	0 = Good data, No bit set, 1 = Questionable, Old data bit set 2 = Invalid, Oscillatory bit set, 3 = Old data and oscillatory bits set
EventNumber	-	Not used at this time
t	dd/tt	Date and time, Time-stamp of event
stVal	17.17	Data value

5 Verify the acknowledged data in module memory by viewing the MVI56E-61850S database in the PCB. For more information, see *Using the Diagnostics Menu in ProSoft Configuration Builder*

6 In the Diagnostics window, click on **61850 SERVER - DATA MAPPINGS** > **Control - Paths & Values**. The DO values are displayed here.





6 Diagnostics and Troubleshooting

In This Chapter

- Ethernet LED Indicators 65
- Clearing a Fault Condition 67
- Troubleshooting 68
- Using the Diagnostics Menu in ProSoft Configuration Builder 69
- Connect to the Module's Web Page 78

The module provides information on diagnostics and troubleshooting in the following forms:

- LED status indicators on the front of the module provide information on the module's status.
- Status data contained in the module can be viewed in *ProSoft Configuration Builder* through the Ethernet port.
- Status data values are transferred from the module to the processor.

6.1 Ethernet LED Indicators

The Ethernet LEDs indicate the module's Ethernet port status as follows:

LED	State	Description
Data	OFF	Ethernet connected at 10Mbps duplex speed
	AMBER Solid	Ethernet connected at 100Mbps duplex speed
Link	OFF	No physical network connection is detected. No Ethernet communication is possible. Check wiring and cables.
	GREEN Solid or Blinking	Physical network connection detected. This LED must be ON solid for Ethernet communication to be possible.

6.1.1 Scrolling LED Status Indicators

The scrolling LED display indicates the module's operating status as follows:

Initialization Messages

Code	Message
Boot / DDOK	Module is initializing
Ladd	Module is waiting for required module configuration data from ladder logic to configure the ports
Waiting for Processor Connection	Module did not connect to processor during initialization ▪ Sample ladder logic is not loaded on processor ▪ Module is located in a different slot than the one configured in the ladder logic ▪ Processor is not in RUN or REM RUN mode
Last config: <date>	Indicates the last date when the module changed its IP address. You can update the module date and time through the Connect to the Module's Web Page (page 78), or in MVI56E-61850S controller tags.

Operation Messages

After the initialization step, the following message pattern will be repeated.

```
<Backplane Status> <IP Address> <Backplane Status> <Port Status>
```

Code	Message
<Backplane Status>	OK: Module is communicating with processor ERR: Module is unable to communicate with processor. For this scenario, the <Port Status> message above is replaced with "Processor faulted or is in program mode".
<IP Address>	Module IP address
<Port Status>	OK: Port is communicating without error Client/Server Communication Errors: port is having communication errors. Refer to Diagnostics and Troubleshooting (page 65) for further information about the error.

6.1.2 Non-Scrolling LED Status Indicators

The non-scrolling LEDs indicate the module's operating status as follows:

LED Label	Status	Indication
APP	OFF	The module is not receiving adequate power or is not securely plugged into the rack. May also be OFF during configuration download.
	GREEN	The MVI56E-61850S is working normally.
	RED	The most common cause is that the module has detected a communication error during operation of an application port. The following conditions may also cause a RED LED: ▪ The firmware is initializing during startup ▪ The firmware detects an on-board hardware problem during startup ▪ Failure of application port hardware during startup ▪ The module is shutting down ▪ The module is rebooting due to a ColdBoot or WarmBoot request from the ladder logic or Debug Menu
OK	OFF	The module is not receiving adequate power or is not securely plugged into the rack.
	GREEN	The module is operating normally.
	RED	The module has detected an internal error or is being initialized. If the LED remains RED for over 10 seconds, the module is not working. Remove it from the rack and re-insert it to restart its internal program.
ERR	RED	Not used.

6.2 Clearing a Fault Condition

Typically, if the OK LED on the front of the module turns RED for more than ten seconds, a hardware problem has been detected in the module or the program has exited.

To clear the condition, follow these steps:

1. Turn off power to the rack.
2. Remove the card from the rack.
3. Verify that all jumpers are set correctly.
4. If the module requires a Compact Flash card, verify that the card is installed correctly.
5. Re-insert the card in the rack and turn the power back on.
6. Verify correct configuration data is being transferred to the module from the ControlLogix controller.

If the module's OK LED does not turn GREEN, verify that the module is inserted completely into the rack. If this does not cure the problem, contact ProSoft Technology Technical Support.

6.3 Troubleshooting

Use the following troubleshooting steps if you encounter problems when the module is powered up. If these steps do not resolve your problem, please contact ProSoft Technology Technical Support.

Processor Errors

Problem Description	Steps to take
Processor Fault	Verify that the module is plugged into the slot that has been configured for the module in the I/O Configuration of RSLogix. Verify that the slot location in the rack has been configured correctly in the ladder logic.
Processor I/O LED flashes	This indicates a problem with backplane communications. A problem could exist between the processor and any installed I/O module, not just the MVI56E-61850S. Verify that all modules in the rack are correctly configured in the ladder logic.

Module Errors

Problem Description	Steps to take
MVI56E modules with scrolling LED display: <*Backplane Status*> condition reads ERR	This indicates that backplane transfer operations are failing. Connect to the module's Configuration/Debug port to check this. To establish backplane communications, verify the following items: ▪ The processor is in RUN or REM RUN mode. ▪ The backplane driver is loaded in the module. ▪ The module is configured for read and write data block transfer. ▪ The ladder logic handles all read and write block situations. ▪ The module is properly configured in the processor I/O configuration and ladder logic.
OK LED remains RED	The program has halted or a critical error has occurred. Connect to the Configuration/Debug port to see if the module is running. If the program has halted, turn off power to the rack, remove the card from the rack and re-insert the card in the rack, and then restore power to the rack.

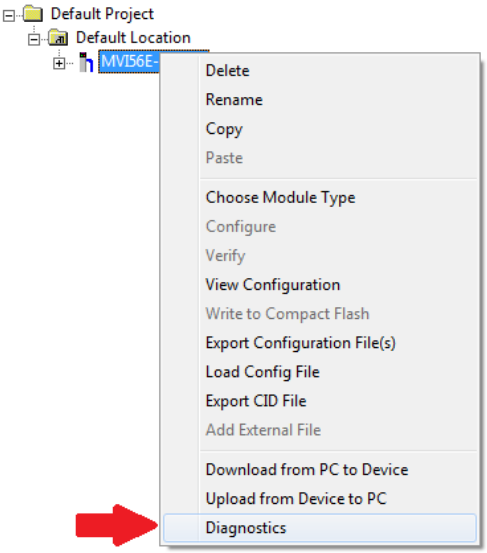
6.4 Using the Diagnostics Menu in ProSoft Configuration Builder

The *Diagnostics* menu, available through the Ethernet configuration port for this module, is arranged as a tree structure, with the *Main* menu at the top of the tree, and one or more submenus for each menu command. The first menu you see when you connect to the module is the *Main* menu.

Tip: You can have a ProSoft Configuration Builder *Diagnostics* window open for more than one module at a time.

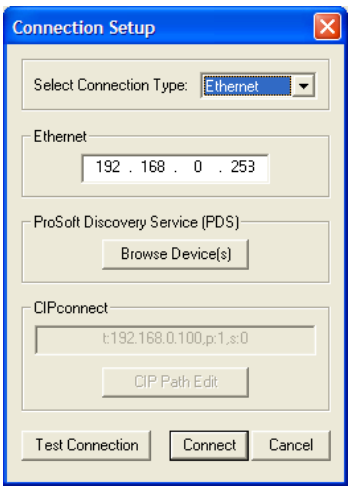
To connect to the module, refer to Connecting Your PC to the Module.

1. In the tree view in *ProSoft Configuration Builder*, right-click the **MVI56E-61850S** icon to open a shortcut menu.
2. On the shortcut menu, choose **DIAGNOSTICS.**

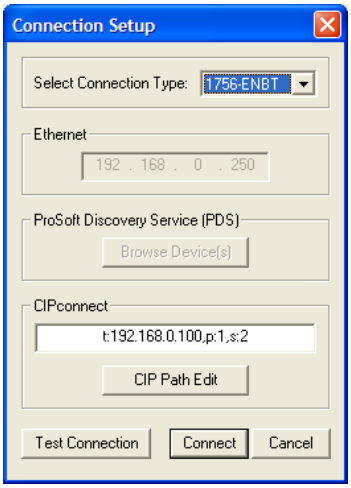


3. In the *Diagnostics* window, click the **SET UP CONNECTION** button.

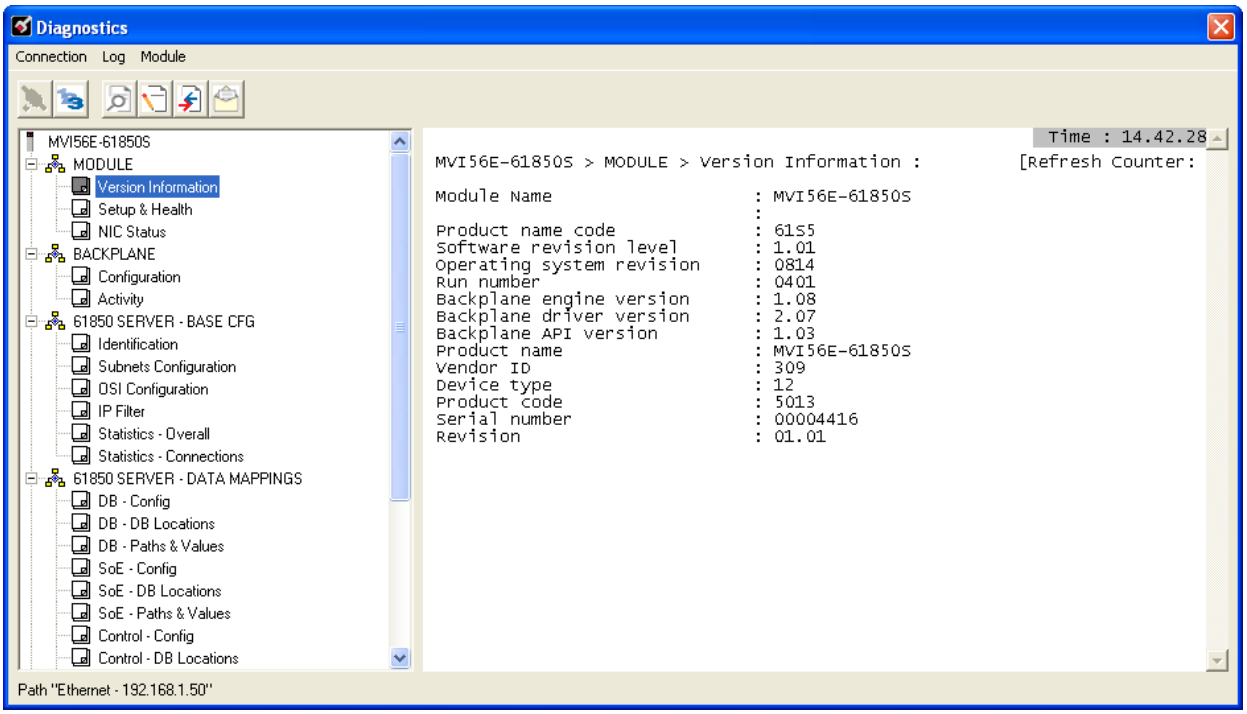
4 In the *Ethernet* field of the *Connection Setup* dialog box, enter the IP address that was assigned the module in Assigning a Permanent IP Address. In the *Connection Setup* dialog box, click the **TEST CONNECTION** button to verify that the module is accessible with the current settings.



You can also use CIPconnect® to connect to the module through a 1756-ENBT card by choosing *1756-ENBT* in the **SELECT CONNECTION TYPE** list. Refer to Using CIPconnect to Connect to the Module for information on how to construct a CIP path.

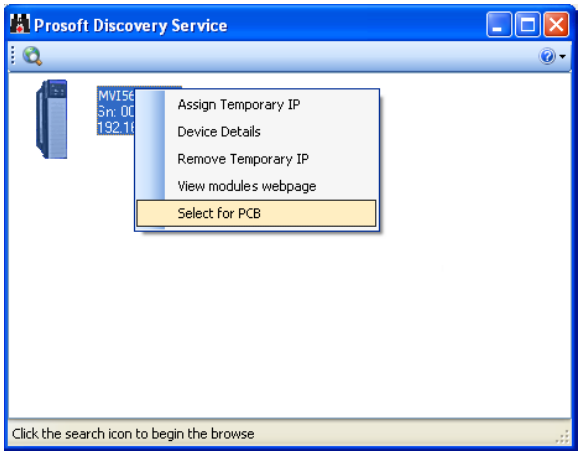


5 If the *Test Connection* is successful, click **CONNECT** to display the *Diagnostics* menu in the Diagnostics Window.



If *PCB* is unable to connect to the module:

1 Click the **BROWSE DEVICE(S)** button to open the *ProSoft Discovery Service*. Select the module, then right-click and choose **SELECT FOR PCB**.



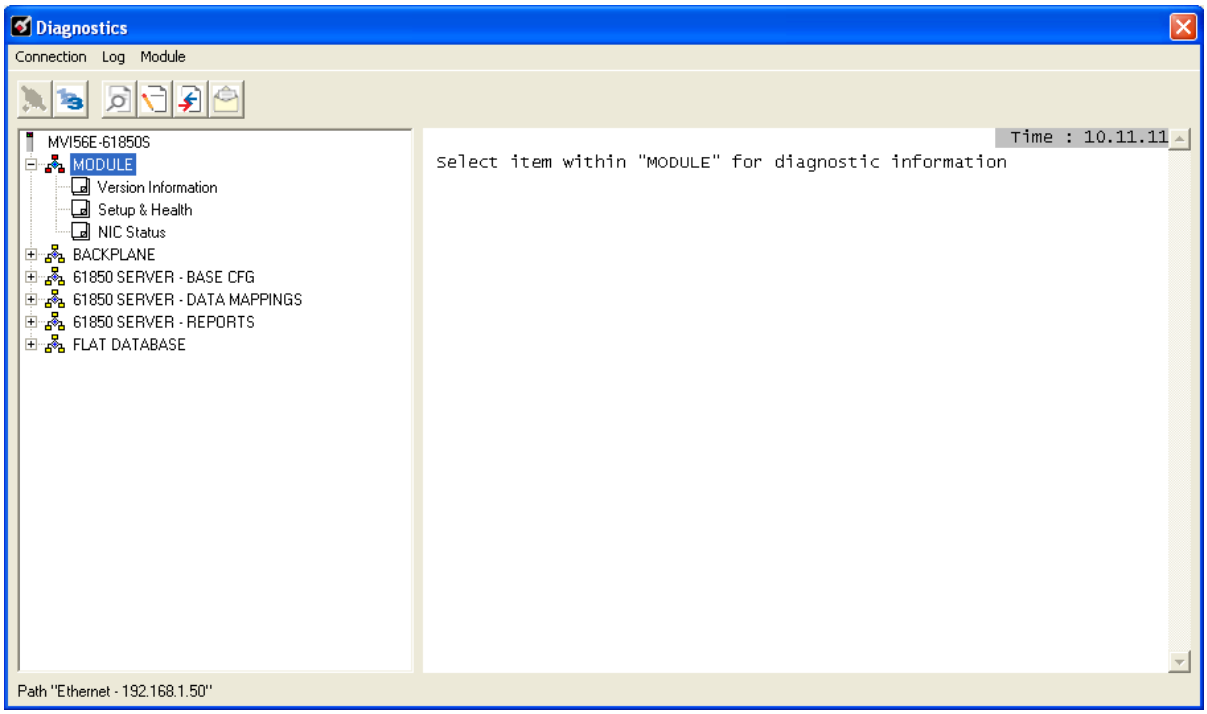
2 Close *ProSoft Discovery Service*, and click the **CONNECT** button again.

3 If these troubleshooting steps fail, verify that the Ethernet cable is connected properly between your computer and the module, either through a hub or switch (using the grey cable) or directly between your computer and the module (using the red cable).

If you are still not able to establish a connection, contact ProSoft Technology for assistance.

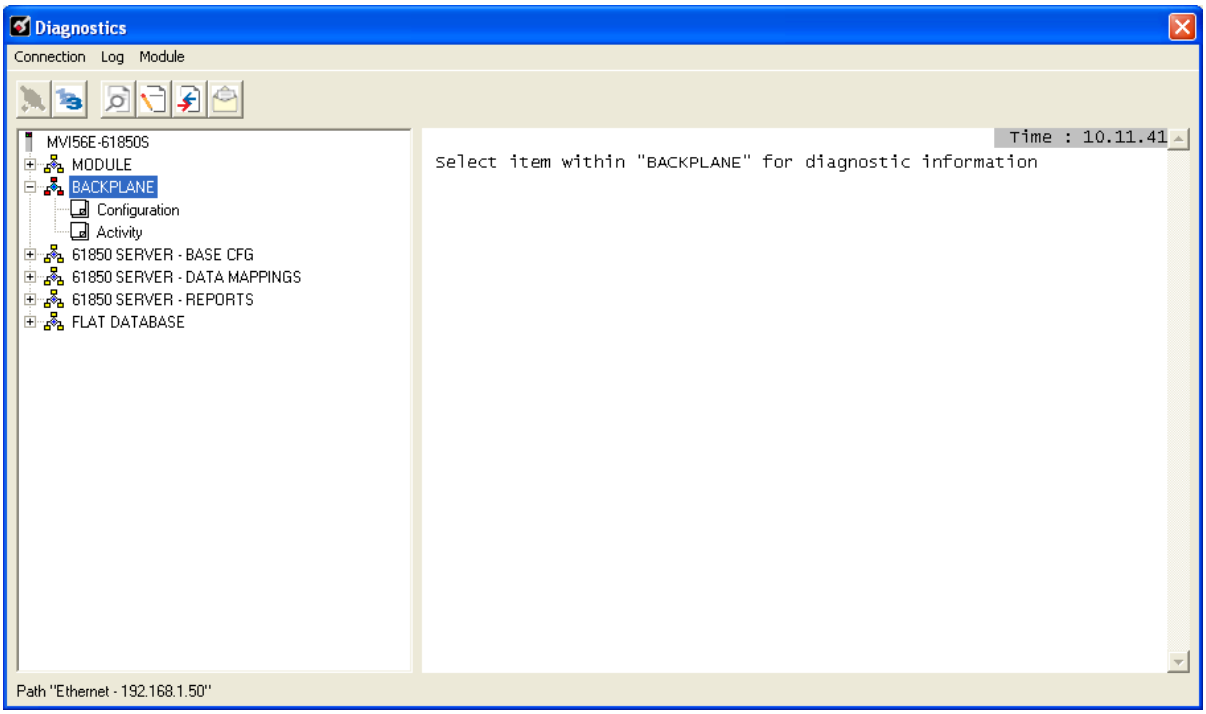
6.4.1 Monitoring Module Information

Use the *MODULE* selection to view the module version, setup and health, and NIC status.



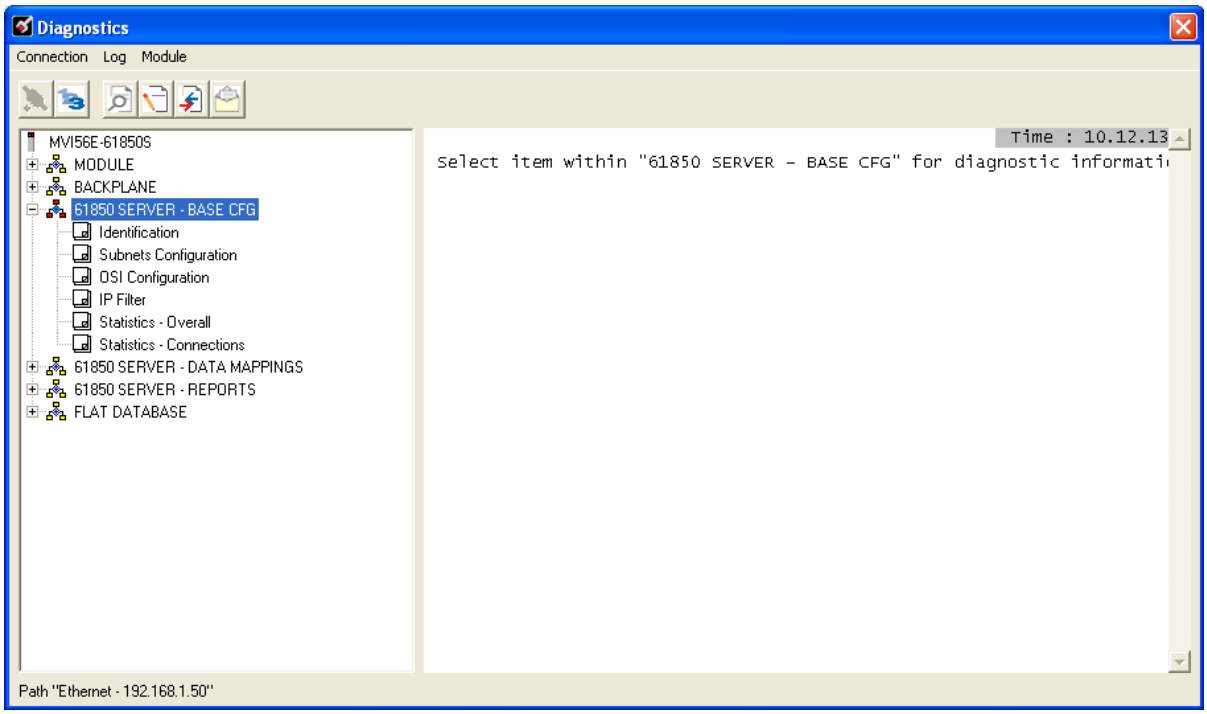
6.4.2 Monitoring Backplane Information

Use the *BACKPLANE* selection to view the configuration and backplane status information for the MVI56E-61850S module.



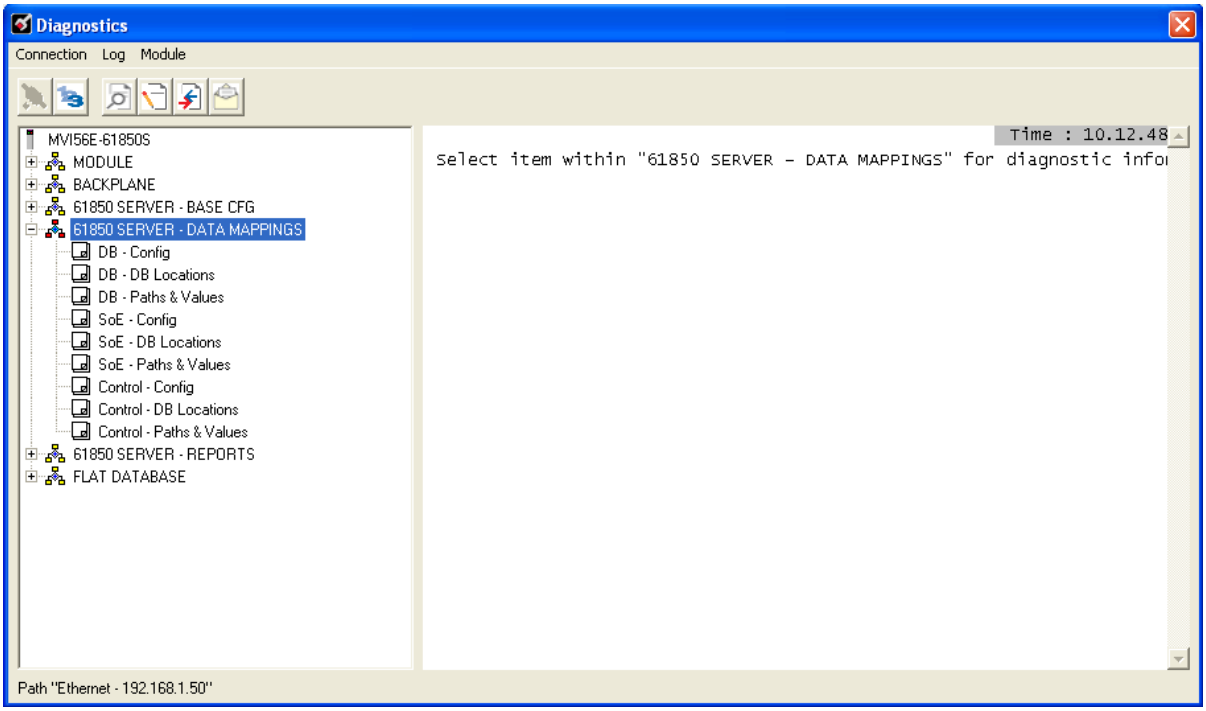
6.4.3 Monitoring Base Configuration Information

Use the *61850 SERVER - BASE CFG* selection to view the 61850 server status information of the MVI56E-61850S module.



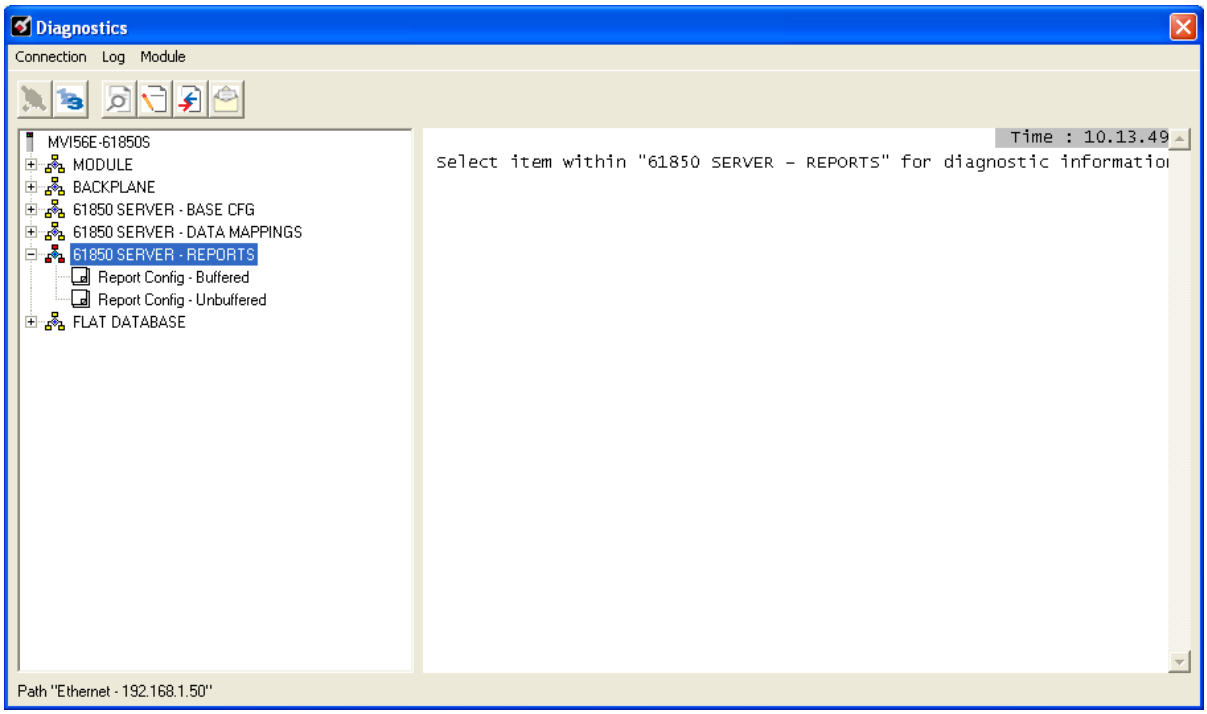
6.4.4 Monitoring Data Mappings Information

Use the *61850 SERVER - DATA MAPPINGS* selection to view the configured data mappings of each Data Object for the MVI56E-61850S module.



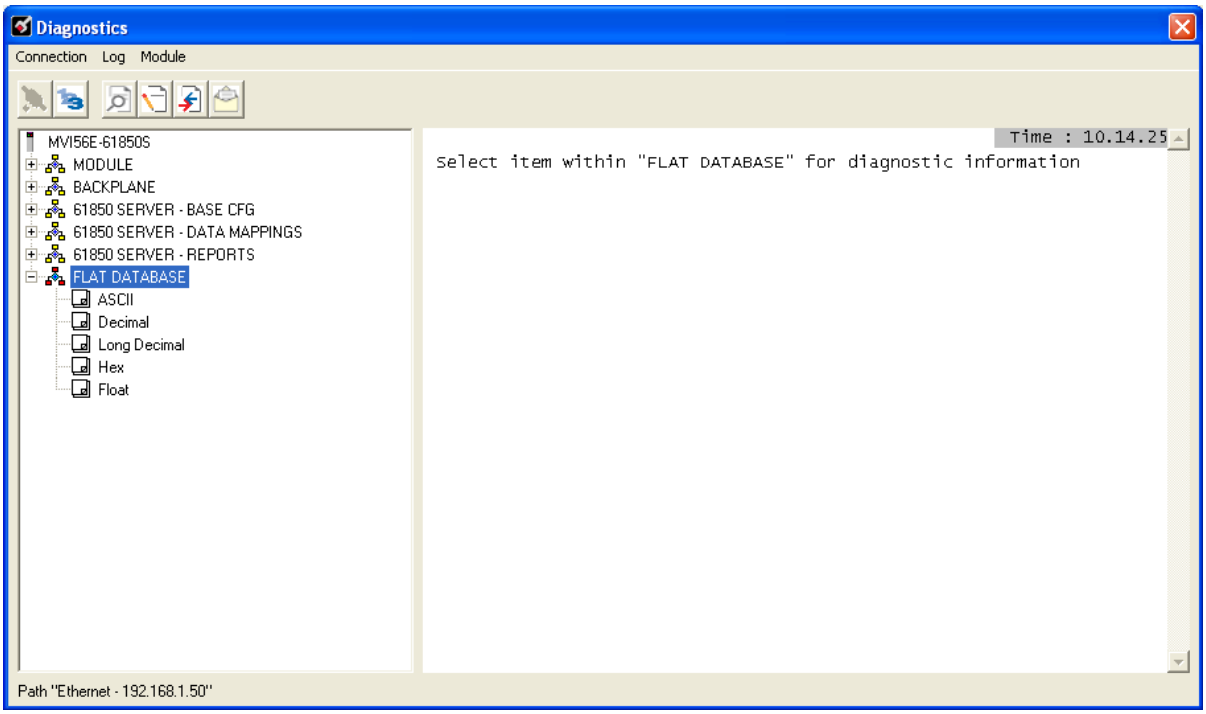
6.4.5 Monitoring Backplane Information

Use the *61850 SERVER - REPORTS* selection to view the 61850 protocol report configurations for the MVI56E-61850S module.



6.4.6 Monitoring Flat Database Information

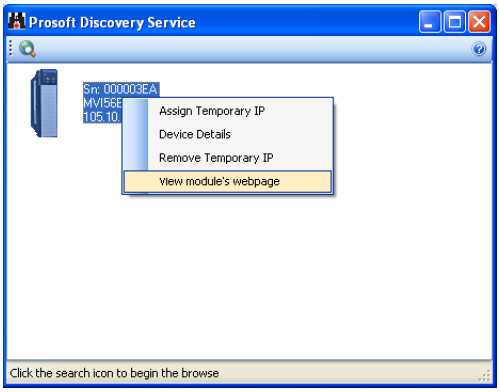
Use the *FLAT DATABASE* selection to view the raw data values that currently populate the MVI56E-61850S module memory.



6.5 Connect to the Module's Web Page

The module's internal web server provides access to module status, diagnostics, and firmware updates. If the module's IP address has already been assigned, simply enter in the IP address into a web browser. If not, follow the steps below:

1. In *ProSoft Configuration Builder*, click the **PROJECT** menu, then choose **MODULE > DOWNLOAD FROM PC TO DEVICE**. This opens the *Download* dialog box.
2. In the *Download* dialog box, choose the connection type in the *Select Connection Type* dropdown box:
   - Choose **ETHERNET** if you are connecting to the module through the Ethernet cable.
   - Choose **1756 ENBT** if you are connecting through CIPconnect or RSWho. Refer to *Connecting Your PC to the Module* for more information.
3. In the *Download files from PC to module* dialog box, click **BROWSE DEVICE(S)**.
4. In *ProSoft Discovery Service*, right-click the MVI56E-61850S icon and choose **VIEW MODULE'S WEBPAGE** from the shortcut menu.



This displays the module webpage.

7 Support, Service & Warranty

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- Contacting Technical Support 79
- Warranty Information 80

7.1 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 serial, Ethernet or Fieldbus devices interfaced to the module, if any.

Note: *For technical support calls within the United States, ProSoft's 24/7 after-hours phone support is available for urgent plant-down issues. Detailed contact information for all our worldwide locations is available on the following page.*

Internet	Web Site: www.prosoft-technology.com/support E-mail address: support@prosoft-technology.com
Asia Pacific (location in Malaysia)	Tel: +603.7724.2080 E-mail: asiapc@prosoft-technology.com Languages spoken include: Chinese, English
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Europe (location in Dubai, UAE)	Tel: +971-4-214-6911 E-mail: mea@prosoft-technology.com Languages spoken include: English, Hindi
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Brasil (location in Sao Paulo)	Tel: +55-11-5083-3776 E-mail: brasil@prosoft-technology.com Languages spoken include: Portuguese, English

7.2 Warranty Information

For complete details regarding ProSoft Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS please see the documents on the Product DVD or go to www.prosoft-technology/legal

Documentation is subject to change without notice.

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