ProTalk

PTQ-N2

Quantum Platform

N2 Slave Interface Module

User Manual

April 22, 2008

ProSoft TECHNOLOGY

Please Read This Notice

Successful application of this module requires a reasonable working knowledge of the Schneider Electric Quantum hardware, the PTQ-N2 Module and the application in which the combination is to be used. For this reason, it is important that those responsible for implementation satisfy themselves that the combination will meet the needs of the application without exposing personnel or equipment to unsafe or inappropriate working conditions.

This manual is provided to assist the user. Every attempt has been made to ensure that the information provided is accurate and a true reflection of the product's installation requirements. In order to ensure a complete understanding of the operation of the product, the user should read all applicable Schneider Electric documentation on the operation of the Schneider Electric hardware.

Under no conditions will ProSoft Technology be responsible or liable for indirect or consequential damages resulting from the use or application of the product.

Information in this manual is subject to change without notice and does not represent a commitment on the part of ProSoft Technology Improvements and/or changes in this manual or the product may be made at any time. These changes will be made periodically to correct technical inaccuracies or typographical errors.

1.1 PTQ Installation and Operating Instructions

The statement "power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods Article 501-10(b) of the National Electrical Code, NFPA 70 for installations in the U.S., or as specified in section 18-1J2 of the Canadian Electrical Code for installations within Canada and in accordance with the authority having jurisdiction".

The following or equivalent warnings shall be included:

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 Wiring Modules, and
C Warning - Explosion Hazard - Do not Disconnect Equipment unless Power has been switched Off or the Area is known to be Nonhazardous.
D Caution: The Cell used in this Device may Present a Fire or Chemical Burn Hazard if Mistreated. Do not Disassemble, Heat above 100°C (212°F) or Incinerate.

Important Notice:

CAUTION: THE CELL USED IN THIS DEVICE MAY PRESENT A FIRE OR CHEMICAL BURN HAZARD IF MISTREATED. DO NOT DISASSEMBLE, HEAT ABOVE 100°C (212°F) OR INCINERATE.

Maximum battery load = 200 µA.

Maximum battery charge voltage = 3.4 VDC.

Maximum battery charge current = 500 µA.

Maximum battery discharge current = 30 µA.

Your Feedback Please

We always want you to feel that you made the right decision to use our products. If you have suggestions, comments, compliments or complaints about the product, documentation or support, please write or call us.

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PTQ-N2 User Manual
April 22, 2008
PSFT.N2.PTQ.UM.08.04.22

Contents

Guide to the PTQ-N2 User Manual

Function		Section to Read	Details
Introduction (Must Do)	→	Start Here (page 11)	This Section introduces the customer to the module. Included are: package contents, system requirements, hardware installation, and basic configuration.
Verify Communication, Diagnostic and Troubleshooting	→	Verifying Communication (page 70) Diagnostics and Troubleshooting (page 61)	This section describes how to verify communications with the network. Diagnostic and Troubleshooting procedures.
Reference Product Specifications Functional Overview Glossary	→	Reference (page 73) Functional Overview (page 75) Product Specifications (page 73)	These sections contain general references associated with this product, Specifications, and the Functional Overview.
Support, Service, and Warranty Index	→	Support, Service and Warranty (page 93)	This section contains Support, Service and Warranty information. Index of chapters.

2 Start Here

In This Chapter

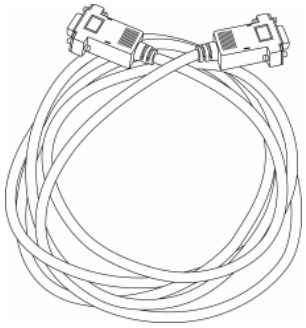
This guide is intended to guide you through the ProTalk module setup process, from removing the module from the box to exchanging data with the processor. In doing this, you will learn how to:

- Set up the processor environment for the PTQ module
- View how the PTQ module exchanges data with the processor
- Edit and download configuration files from your PC to the PTQ module
- Monitor the operation of the PTQ module

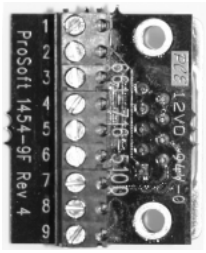
2.1 Hardware and Software Requirements

2.1.1 ProTalk Module Carton Contents

ProTalk Module



Null Modem Serial Cable



1454-9F DB-9 Female to 9 Pos Screw Terminal adapter (Serial protocol modules only)	ProSoft Solutions CD

Note: The DB-9 Female to 5 Pos Screw Terminal adapter is not required on Ethernet modules and is therefore not included in the carton with these types of modules.

2.1.2 Quantum / Unity Hardware

This guide assumes that you are familiar with the installation and setup of the Quantum / Unity hardware. The following should be installed, configured and powered up before proceeding:

- Quantum or Unity Processor
- Quantum rack
- Quantum power supply
- Quantum Modbus Plus Network Option Module (NOM Module) (optional)
- Quantum to PC programming hardware
- NOM Ethernet or Serial connection to PC

2.1.3 PC and PC Software

- Windows-based PC with at least one COM port
- Quantum programming software installed on machine

  or

- Concept™ PLC Programming Software version 2.6

  or
  ProWORX PLC Programming Software
  or
  UnityPro XL PLC Programming Software

- HyperTerminal (used in this guide) This is a communication program that is included with Microsoft Windows. You can normally find it in **Start / Programs / accessories / Communications**.

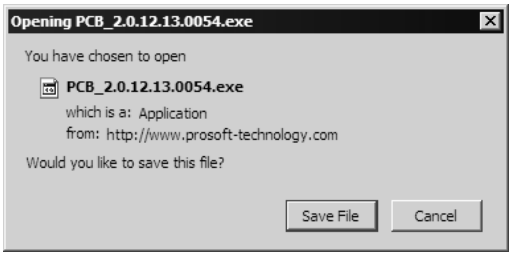
Note: ProTalk modules are compatible with common Quantum / Unity programming applications, including Concept and UnityPro XL. For all other programming applications, please contact technical support.

2.2 Install ProSoft Configuration Builder Software

You must install the ProSoft Configuration Builder (PCB) software in order to configure the PTQ-N2 module. You can always get the newest version of ProSoft Configuration Builder from the ProSoft Technology web site.

To install ProSoft Configuration Builder from the ProSoft Web Site

1. Open your web browser and navigate to http://www.prosoft-technology.com/pcb
2. Click the **Download Here** link to download the latest version of ProSoft Configuration Builder.
3. Choose "Save" or "Save File" when prompted. The following illustrations show the file download prompt for two of the most common web browsers.



4. Make a note of the location where you saved the file, for example "Desktop", or "My Documents", so you can start the installation program.
5. When the download is complete, locate and open the file, and then follow the instructions on your screen to install the program.

If you do not have access to the Internet, you can install ProSoft Configuration Builder from the ProSoft Solutions CD-ROM, included in the package with your PTQ-N2 module.

To install ProSoft Configuration Builder from the CD-ROM

1. Insert the ProSoft Solutions CD-ROM into the CD drive of your PC. Wait for the startup screen to appear.
2. On the startup screen, click *Product Documentation*. This action opens an explorer window.

3 Click to open the *Utilities* folder. This folder contains all of the applications and files you will need to set up and configure your module.
4 Double-click the *ProSoft Configuration Builder Setup* program and follow the instructions on your screen to install the software on your PC.

Note: Many of the configuration and maintenance procedures use files and other utilities on the CD-ROM. You may wish to copy the files from the Utilities folder on the CD-ROM to a convenient location on your hard drive.

3 Configuring the Processor with Concept

In This Chapter

The following steps are designed to ensure that the processor is able to transfer data successfully with the PTQ module. As part of this procedure, you will use Concept configuration software from Schneider Electric to create a project, add the PTQ module to the project, set up data memory for the project, and then download the project to the processor.

Important Note: Concept software does not report whether the PTQ module is present in the rack, and therefore is not able to report the health status of the module when the module is online with the Quantum processor. Please take this into account when monitoring the status of the PTQ module.

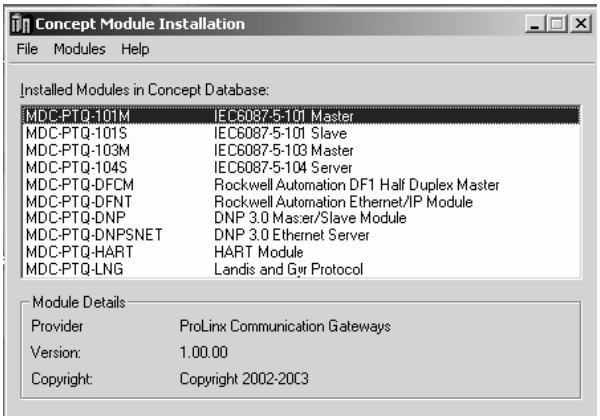
3.1 Information for Concept Version 2.6 Users

This guide uses Concept PLC Programming Software version 2.6 to configure the Quantum PLC. The ProTalk installation CD includes MDC module configuration files that help document the PTQ installation. Although not required, these files should be installed before proceeding to the next section.

3.1.1 Installing MDC Configuration Files

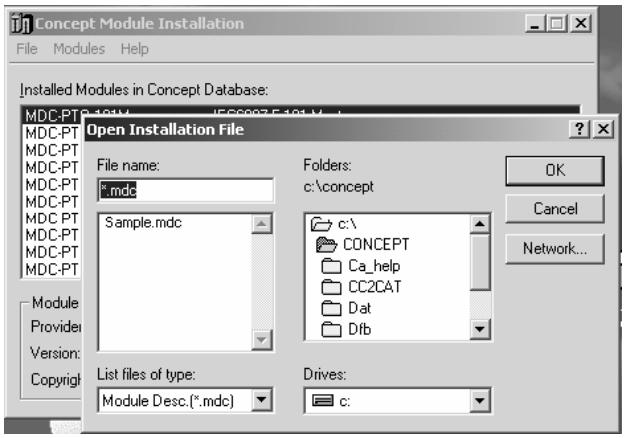
1 From a PC with Concept 2.6 installed, choose **Start / Programs / Concept / ModConnect Tool**.

This action opens the Concept Module Installation dialog box.



2 Choose **File / Open Installation File**.

This action opens the Open Installation File dialog box:

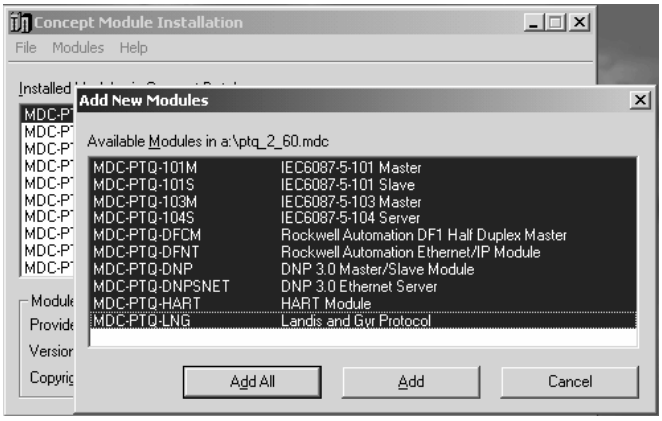


3 If you are using a Quantum processor, you will need the MDC files. In the Open Installation File dialog box, navigate to the **MDC Files** directory on the ProTalk CD.

4 Choose the MDC file and help file for your version of Concept:

- Concept 2.6 users: select PTQ_2_60.mdc and PTQMDC.hlp
- Concept 2.5 users: select PTQ_2_50.mdc and PTQMDC.hlp.

Select the files that go with the Concept version you are using, and then click **OK**. This action opens the add New Modules dialog box.

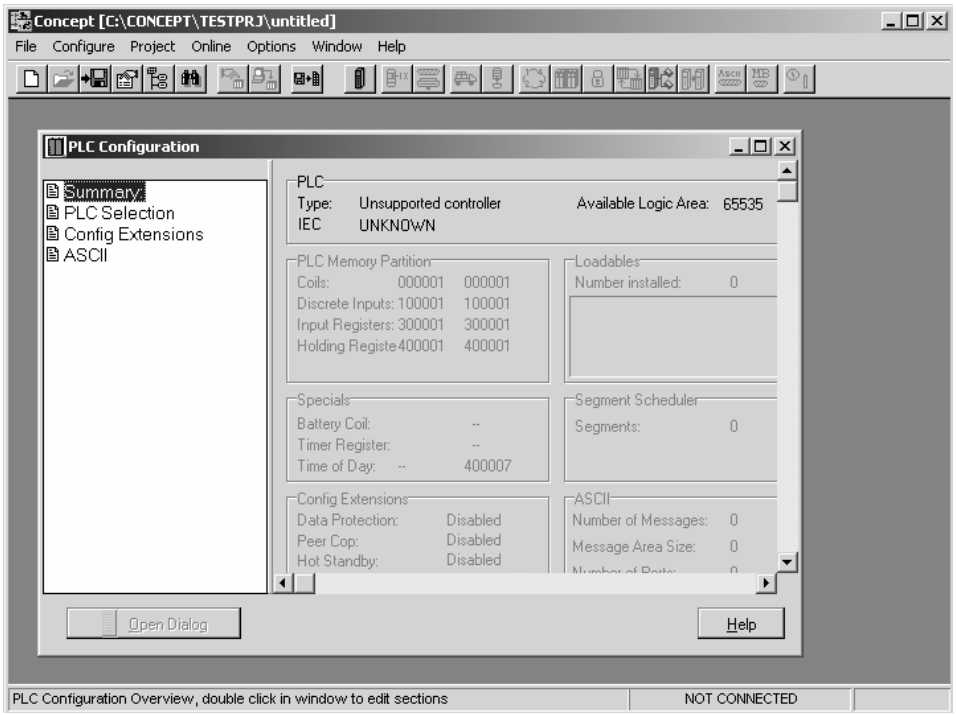


5 Click the **add all** button. A series of message boxes may appear during this process. Click **Yes** or **OK** for each message that appears.
6 When the process is complete, open the File menu and choose Exit to save your changes.

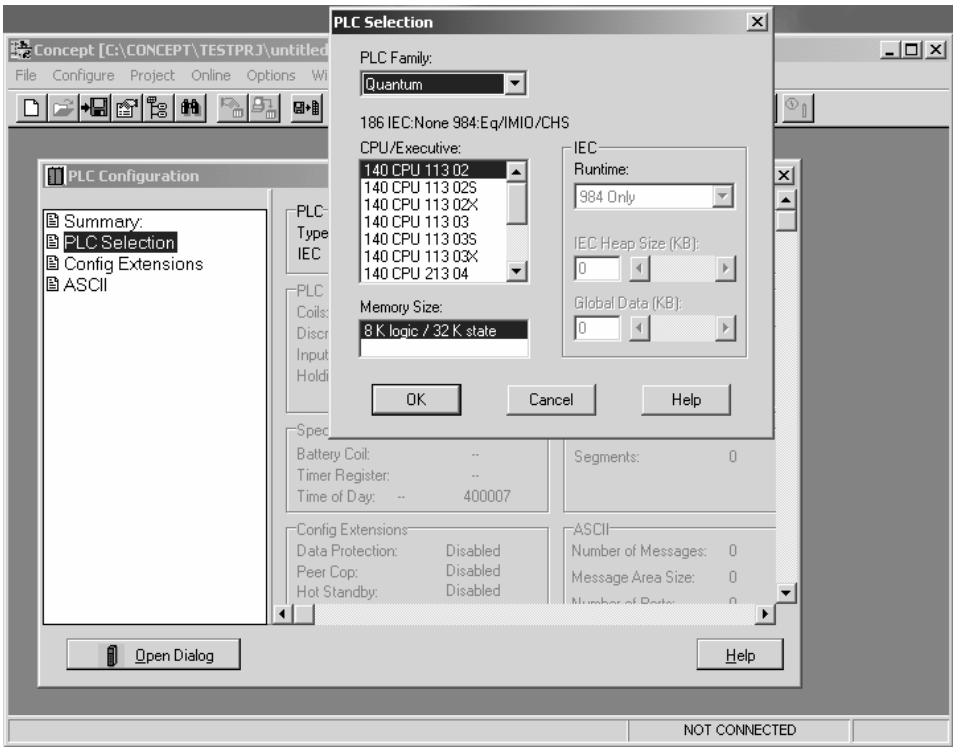
3.2 Create a New Project

This phase of the setup procedure must be performed on a computer that has the Concept configuration software installed.

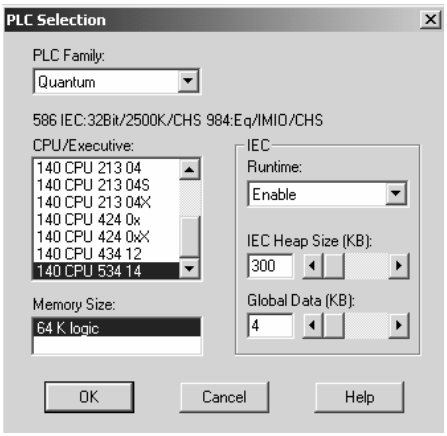
1 From your computer, choose **Start / Programs / Concept V2.6 XL.EN / Concept**. This action opens the Concept window.
2 Open the File menu, and then choose **New Project**. This action opens the PLC Configuration dialog box.



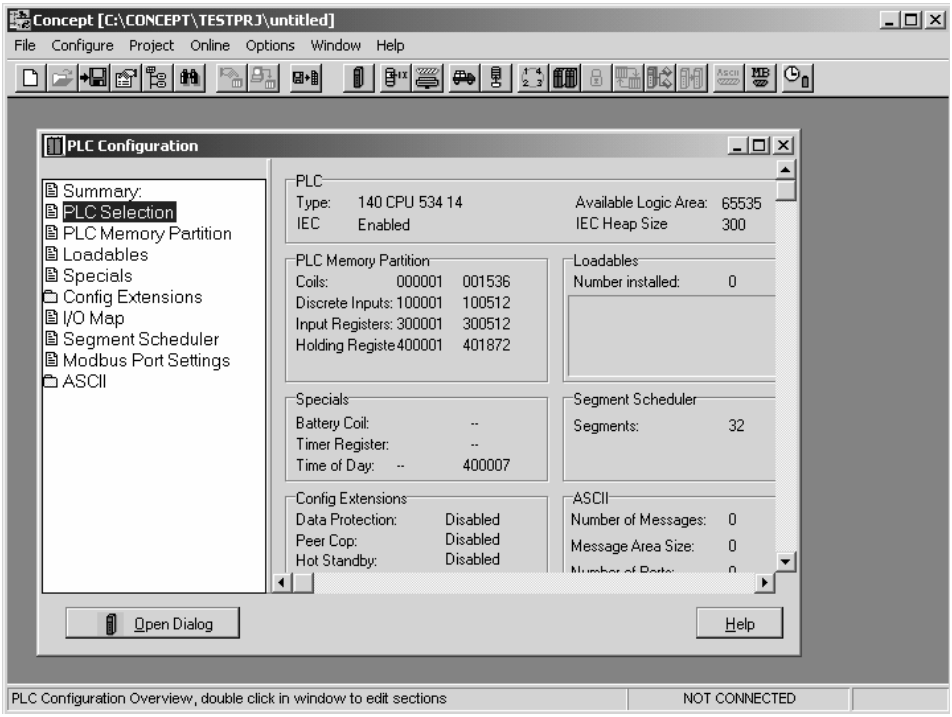
3 In the list of options on the left side of this dialog box, double-click the *PLC Selection* folder. This action opens the PLC Selection dialog box.



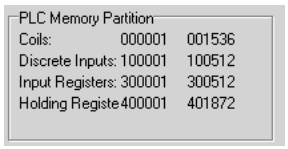
4 In the *CPU/Executive* pane, use the scroll bar to locate and select the PLC to configure.



5 Click **OK**. This action opens the *PLC Configuration* dialog box, populated with the correct values for the PLC you selected.



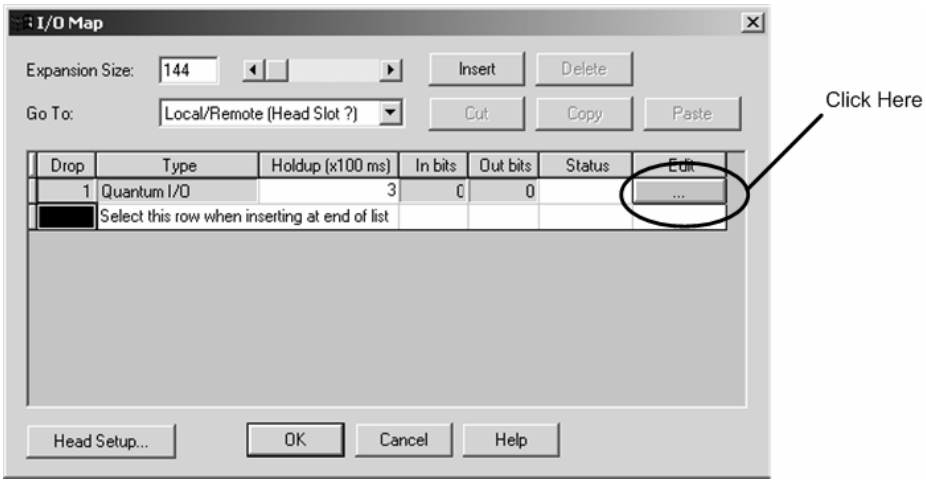
6 Make a note of the holding registers for the module. You will need this information when you modify your application as outlined in the ProTalk application Reference Guides. The Holding Registers are displayed in the PLC Memory Partition pane of the PLC Configuration dialog box.



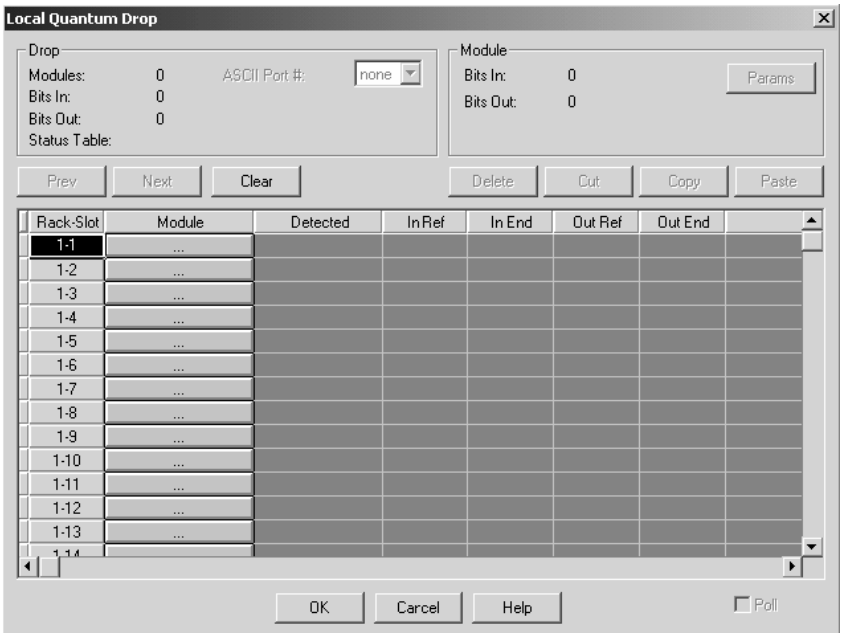
3.3 Add the PTQ Module to the Project

The next step is to add one or more of the PTQ modules to the Project. To add modules:

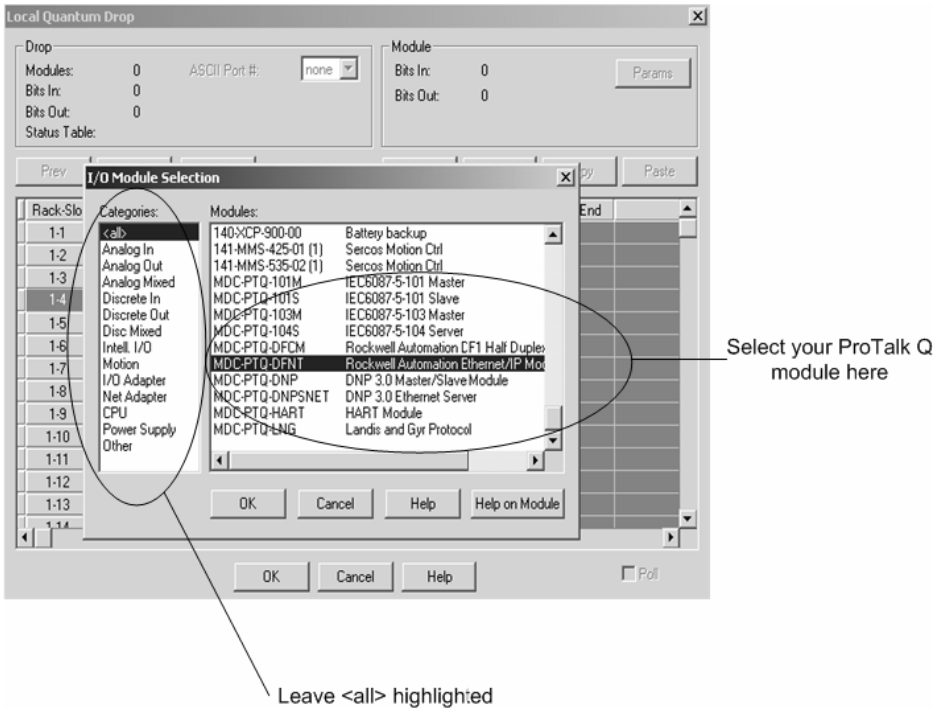
1 In the list of options on the left side of the *PLC Configuration* dialog box, double-click *I/O Map*. This action opens the I/O Map dialog box.



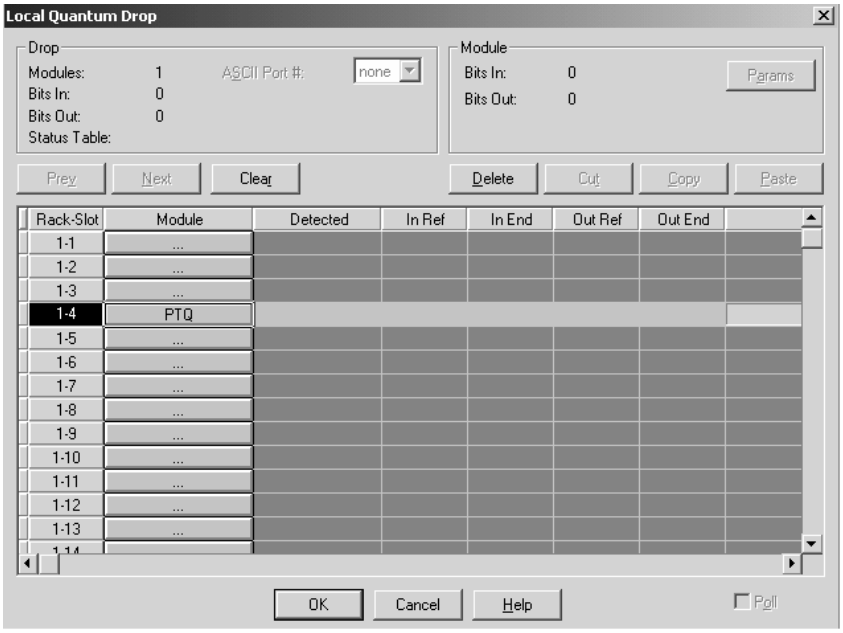
2 Click the **Edit** button to open the *Local Quantum Drop* dialog box. This dialog box is where you identify rack and slot locations.



3 Click the Module button next to the rack/slot position where the ProTalk module will be installed. This action opens the I/O Module Selection dialog box.



4 In the Modules pane, use the scroll bar to locate and select the ProTalk module, and then click OK. This action copies the description of the ProTalk module next to the assigned rack and slot number of the Local Quantum Drop dialog box.

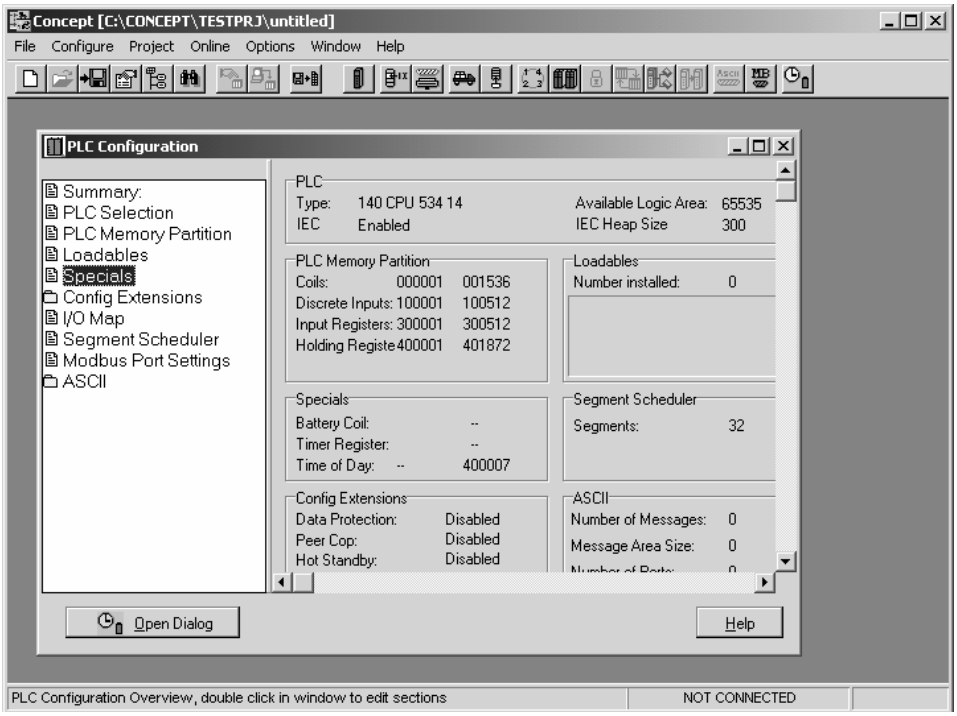


5 Repeat steps 3 through 5 for each ProTalk module you plan to install. When you have finished installing your ProTalk modules, click OK to save your settings. Click Yes to confirm your settings.

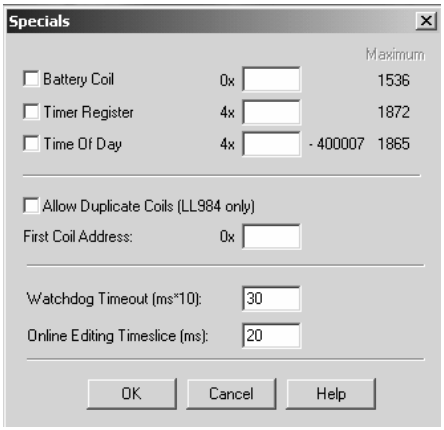
Tip: Select a module, and then click the Help on Module button for help pages.

3.4 Set up Data Memory in Project

1 In the list of options on the left side of the PLC Configuration dialog box, double-click Specials.

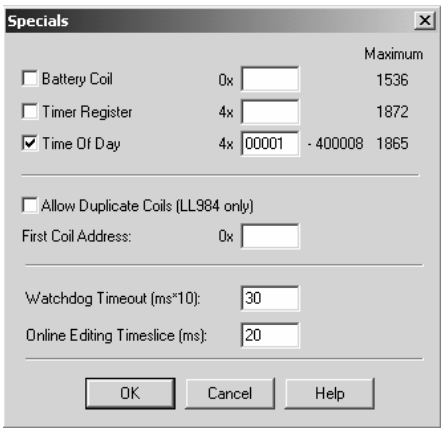


2 This action opens the Specials dialog box.



Selecting the Time of Day

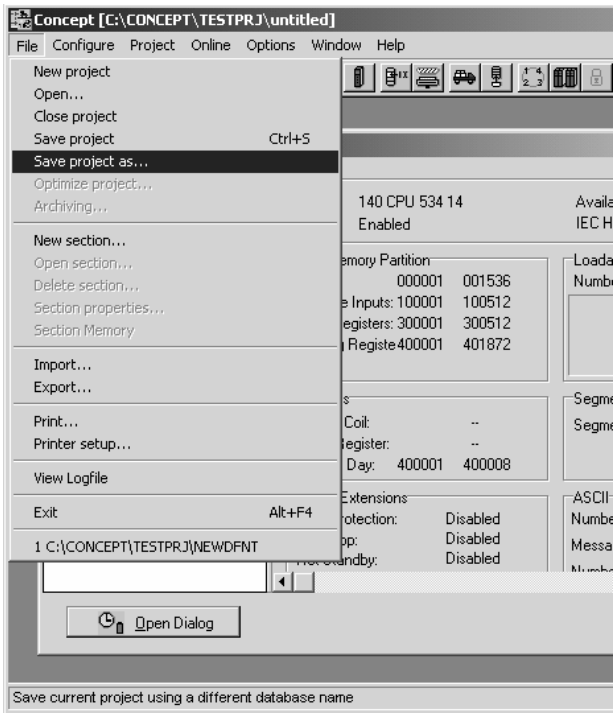
1 Select (check) the Time of Day box, and then enter the value 00001 as shown in the following example. This value sets the first time of day register to 400001.



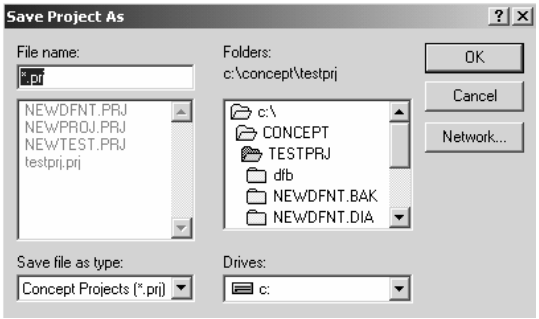
2 Click OK to save your settings and close the Specials dialog box.

Saving your project

1 In the PLC Configuration dialog box, choose File / Save project as.



2 This action opens the Save Project as dialog box.

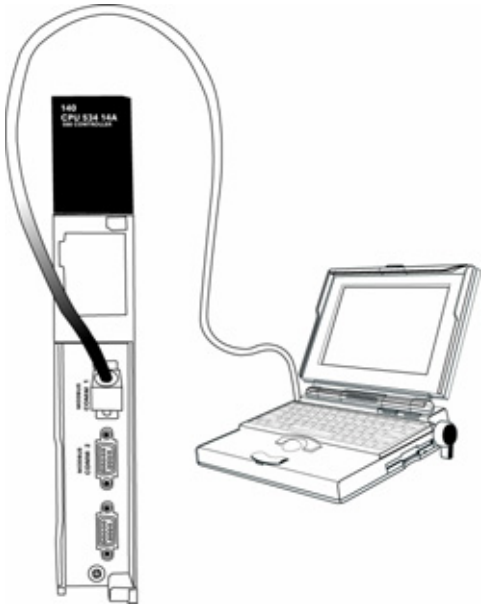


3 Name the project, and then click OK to save the project to a file.

3.5 Download the Project to the Processor

The next step is to download (copy) the project file to the Quantum Processor.

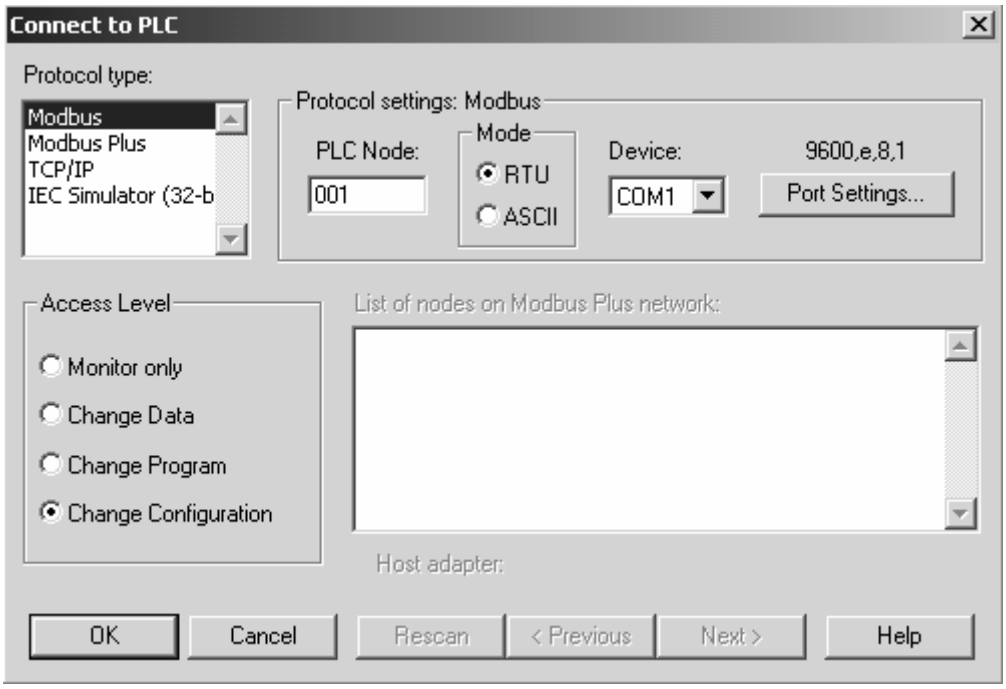
1 Use the null modem cable to connect your PC's serial port to the Quantum processor, as shown in the following illustration.



Note: You can use a Modbus Plus Network Option Module (NOM Module) module in place of the serial port if necessary.

2 Open the PLC menu, and then choose Connect.

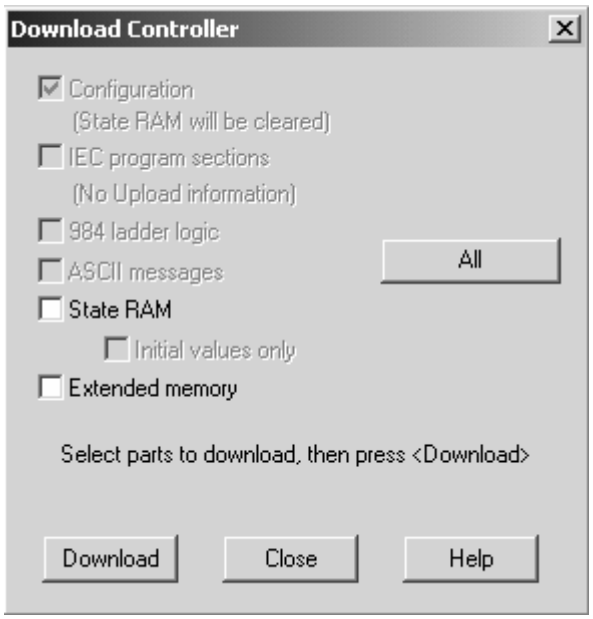
3 In the PLC Configuration dialog box, open the Online menu, and then choose Connect. This action opens the Connect to PLC dialog box.



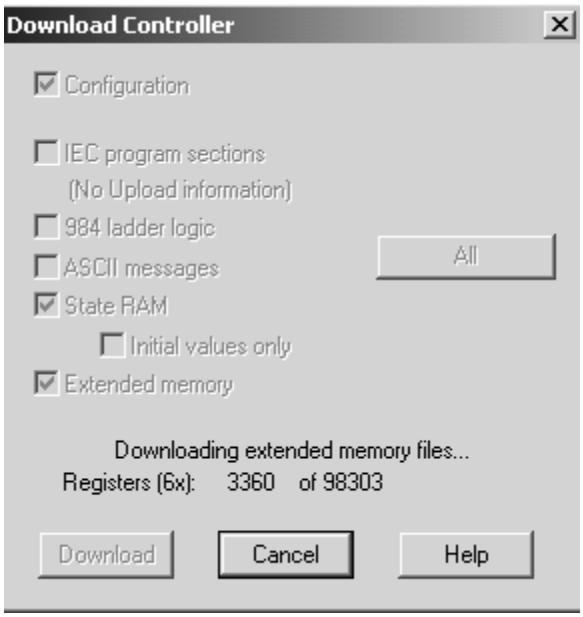
4 Leave the default settings as shown and click OK.

Note: Click OK to dismiss any message boxes that appear during the connection process.

5 In the PLC Configuration window, open the Online menu, and then choose Download. This action opens the Download Controller dialog box.



6 Click all, and then click Download. If a message box appears indicating that the controller is running, click Yes to shut down the controller. The Download Controller dialog box displays the status of the download as shown in the following illustration.

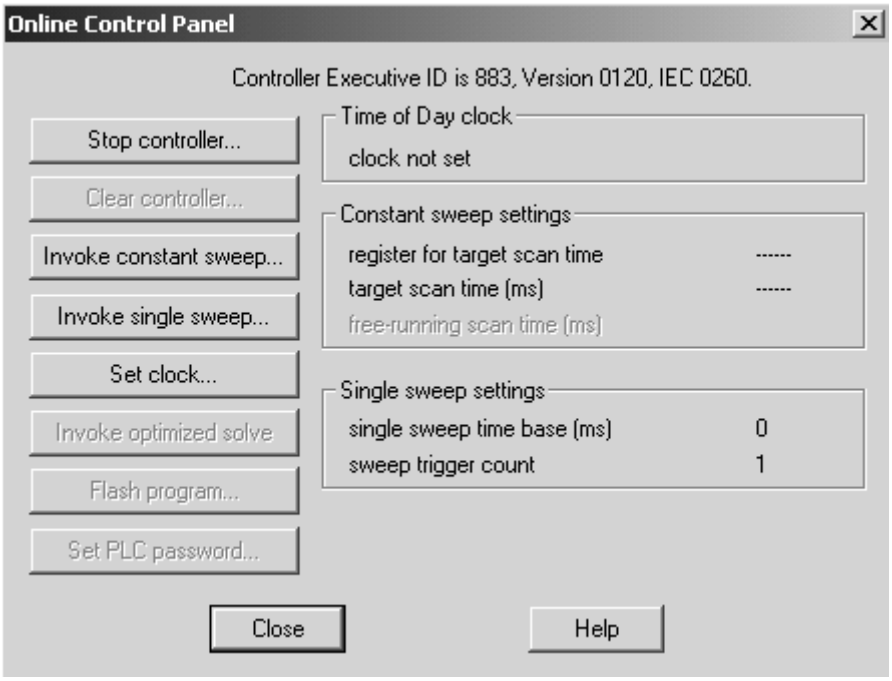


7 When the download is complete, you will be prompted to restart the controller. Click Yes to restart the controller.

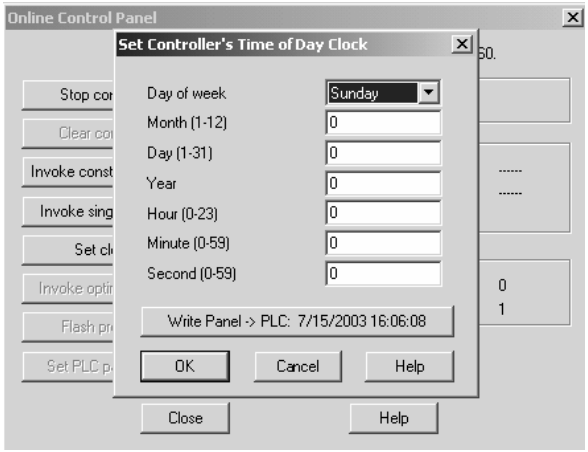
3.6 Verify Successful Download

The final step is to verify that the configuration changes you made were received successfully by the module, and to make some adjustments to your settings.

1 In the PLC Configuration window, open the Online menu, and then choose Online Control Panel. This action opens the Online Control Panel dialog box.



2 Click the Set Clock button to open the Set Controller's Time of Day Clock dialog box.

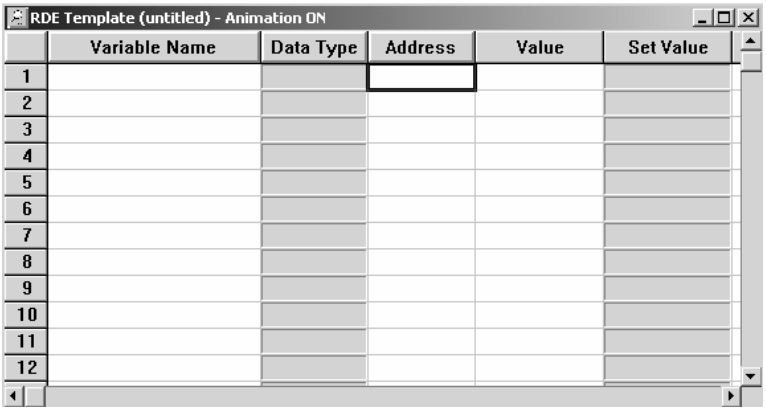


3 Click the Write Panel button. This action updates the date and time fields in this dialog box. Click OK to close this dialog box and return to the previous window.

4 Click Close to close the Online Control Panel dialog box.

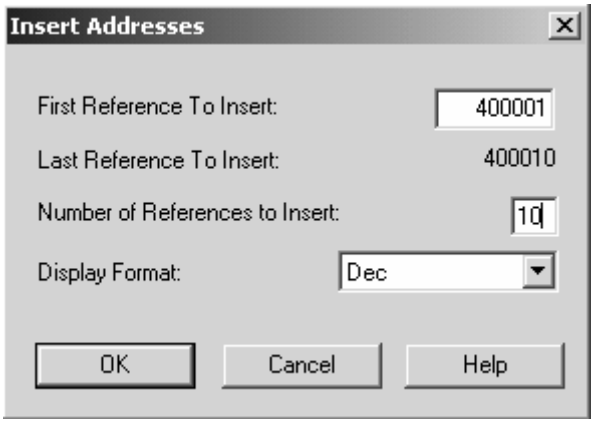
5 In the PLC Configuration window, open the Online menu, and then choose Reference Data Editor. This action opens the Reference Data Editor dialog box. On this dialog box, you will add preset values to data registers that will later be monitored in the ProTalk module.

6 Place the cursor over the first address field, as shown in the following illustration.

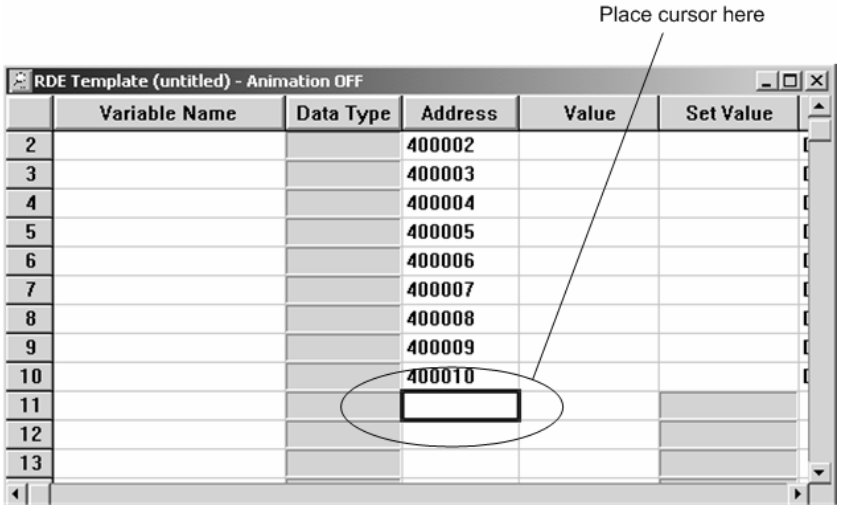


7 In the PLC Configuration window, open the Templates menu, and then choose Insert addresses. This action opens the Insert addresses dialog box.

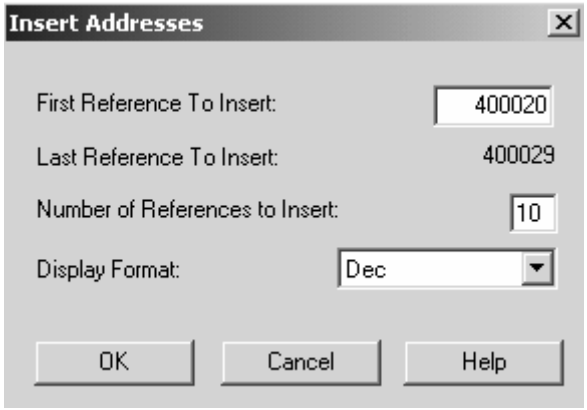
8 On the Insert addresses dialog box, enter the values shown in the following illustration, and then click OK.



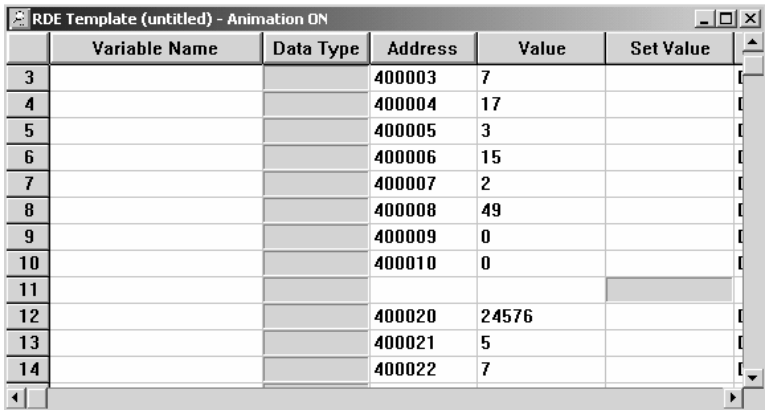
9 Notice that the template populates the address range, as shown in the following illustration. Place your cursor as shown in the first blank address field below the addresses you just entered.



10 Repeat steps 6 through 9, using the values in the following illustration:



11 In the PLC Configuration window, open the Online menu, and then choose animate. This action opens the RDE Template dialog box, with animated values in the Value field.



	Variable Name	Data Type	Address	Value	Set Value
3			400003	7	
4			400004	17	
5			400005	3	
6			400006	15	
7			400007	2	
8			400008	49	
9			400009	0	
10			400010	0	
11					
12			400020	24576	
13			400021	5	
14			400022	7	

12 Verify that values shown are cycling, starting from address 400065 on up.

13 In the PLC Configuration window, open the Templates menu, and then choose Save Template as. Name the template ptqclock, and then click OK to save the template.

14 In the PLC Configuration window, open the Online menu, and then choose Disconnect. At the disconnect message, click Yes to confirm your choice.

At this point, you have successfully

- Created and downloaded a Quantum project to the PLC
- Preset values in data registers that will later be monitored in the ProTalk module.

You are now ready to complete the installation and setup of the ProTalk module.

4 Configuring the Processor with ProWORX

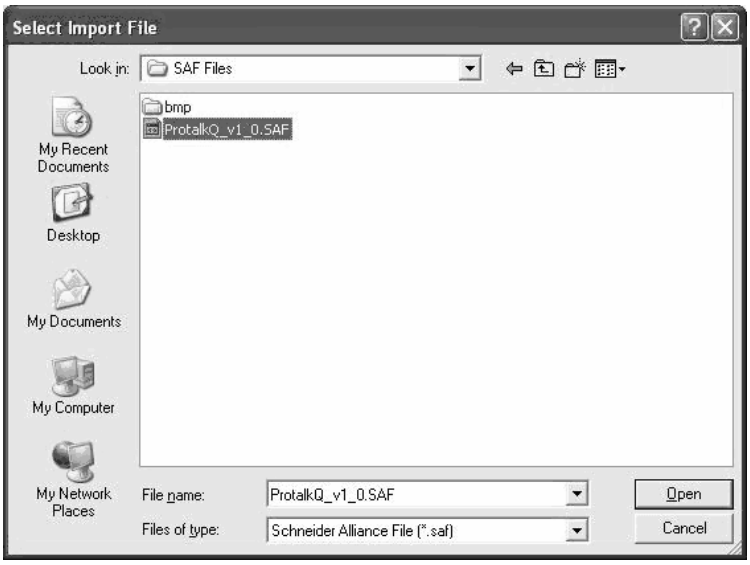
When you use ProWORX 32 software to configure the processor, use the example SaF file provided on the ProTalk Solutions CD-ROM.

Important Note: Proworx software does not report whether the PTQ module is present in the rack, and therefore is not able to report the health status of the module when the module is online with the Quantum processor. Please take this into account when monitoring the status of the PTQ module.

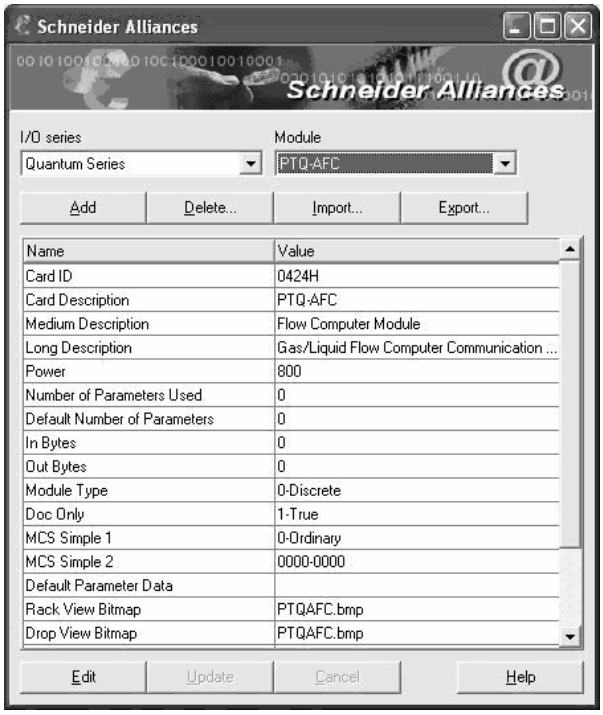
1 Run the Schneider_alliances.exe application that is installed with the Proworx 32 software:

2 Click on Import…

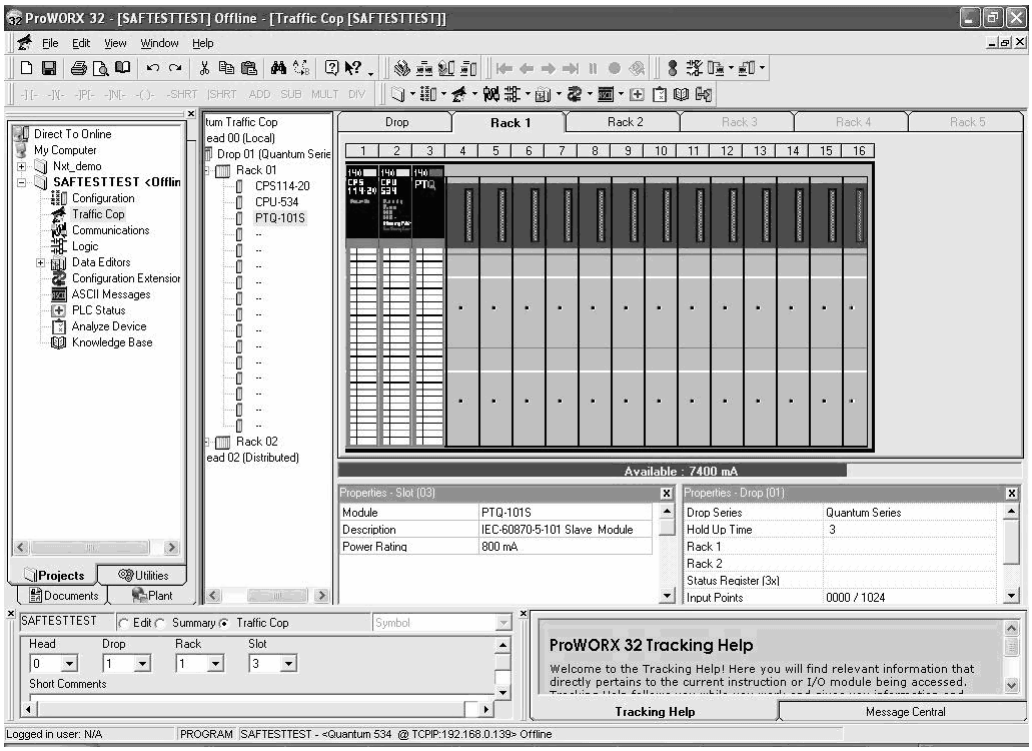
3 Select the .SaF File that is located at the CD-ROM shipped with the PTQ module.



4 After you click on Open you should see the PTQ modules imported (select I/O series as Quantum):



Now you can close the Schneider alliances application and run the Proworx 32 software. At the Traffic Cop section, select the PTQ module to be inserted at the slot:



5 Configuring the Processor with UnityPro XL

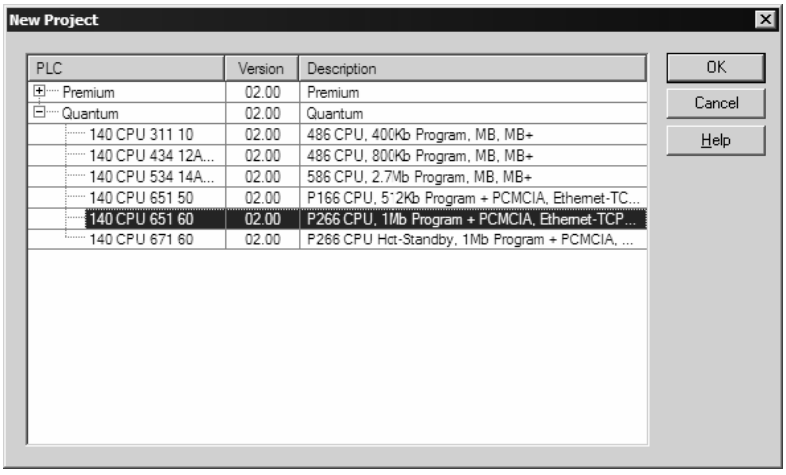
In This Chapter

The following steps are designed to ensure that the processor (Quantum or Unity) is able to transfer data successfully with the PTQ module. As part of this procedure, you will use UnityPro XL to create a project, add the PTQ module to the project, set up data memory for the project, and then download the project to the processor.

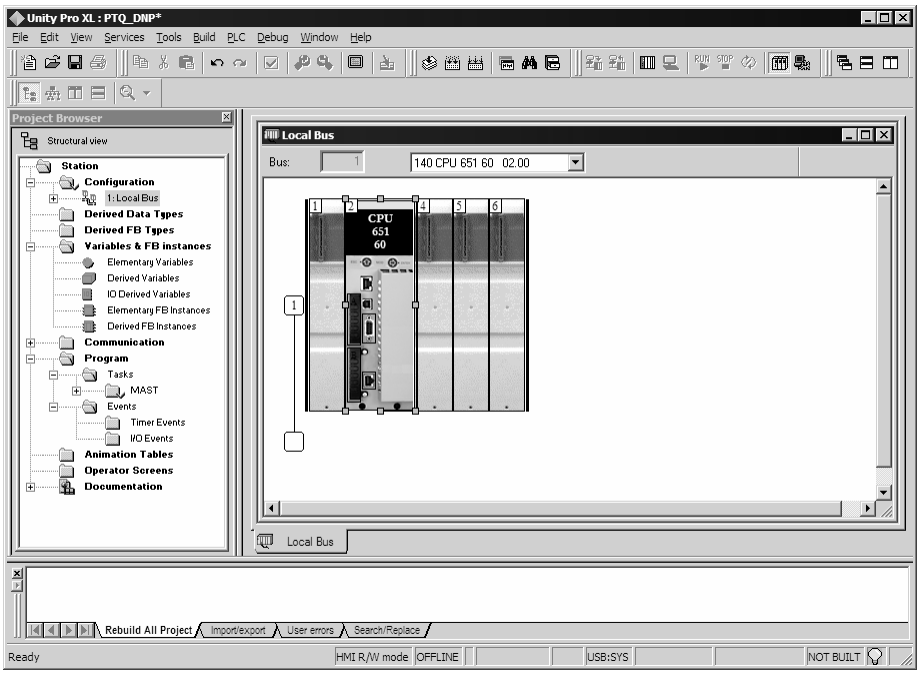
5.1 Create a New Project

The first step is to open UnityPro XL and create a new project.

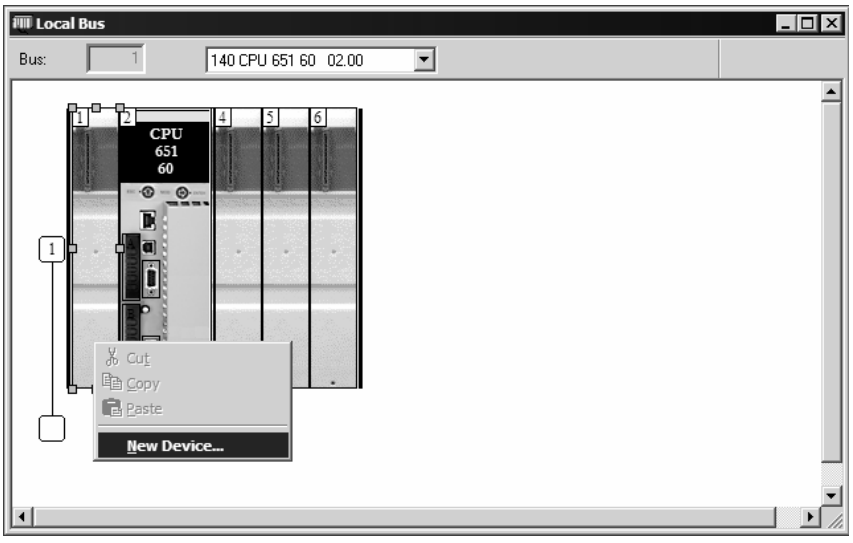
1 In the New Project dialog box, choose the CPU type. In the following illustration, the CPU is 140 CPU 651 60. Choose the processor type that matches your own hardware configuration, if it differs from the example. Click OK to continue.



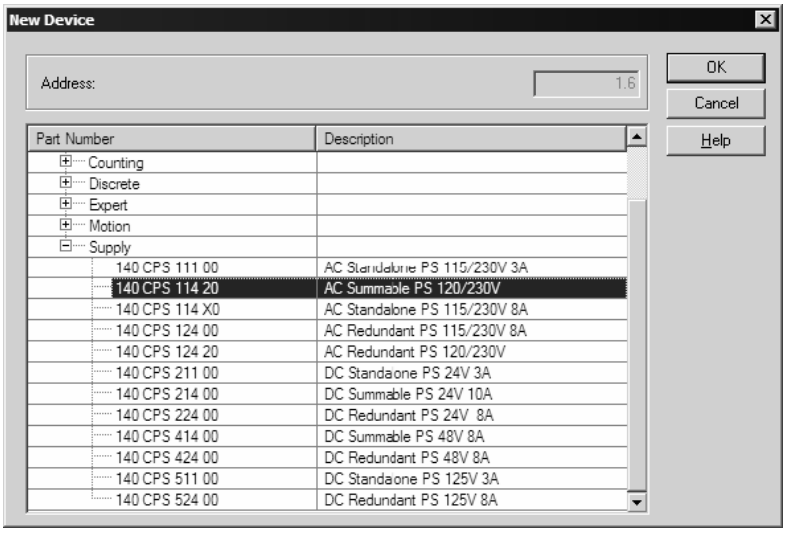
2 The next step is to add a power supply to the project. In the Project Browser, expand the Configuration folder, and then double-click the 1:LocalBus icon. This action opens a graphical window showing the arrangement of devices in your Quantum rack.



3 Select the rack position for the power supply, and then click the right mouse button to open a shortcut menu. On the shortcut menu, choose New Device..



4 Expand the Supply folder, and then select your power supply from the list. Click OK to continue.

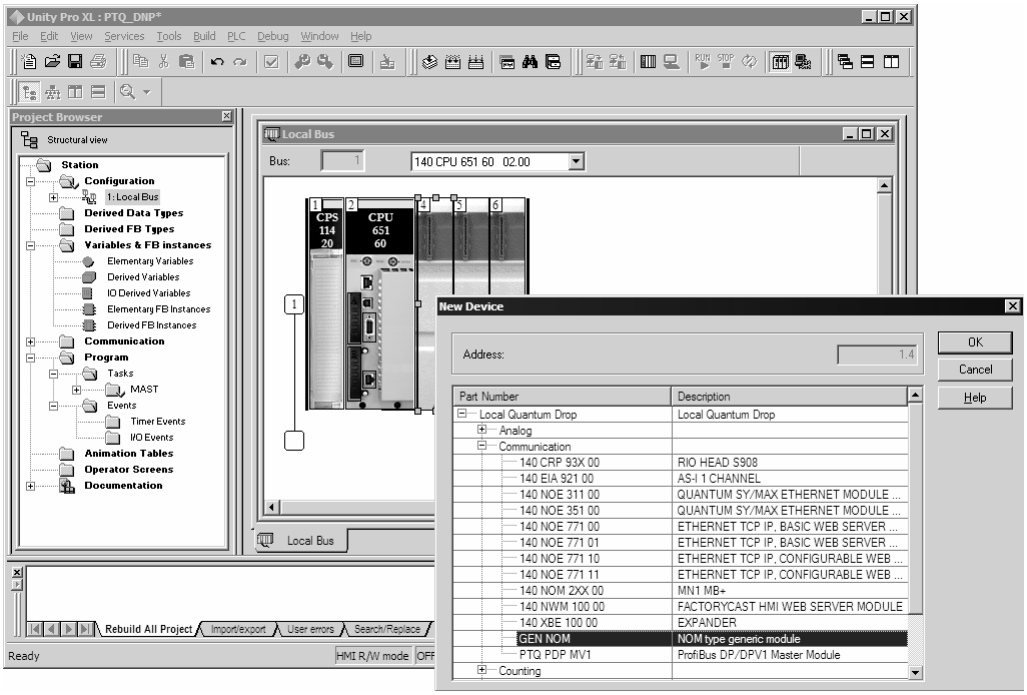


5 Repeat these steps to add any additional devices to your Quantum Rack.

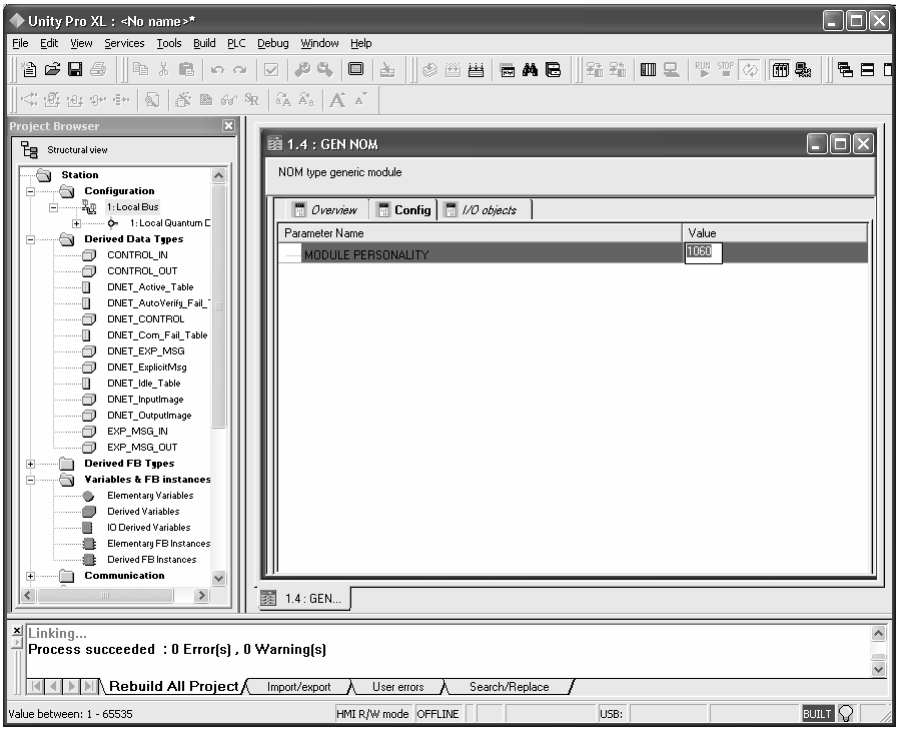
5.2 Add the PTQ Module to the Project

The next step is to add the PTQ module.

1 Expand the Communication tree, and select GEN NOM. This module type provides extended communication capabilities for the Quantum system, and allows communication between the PLC and the PTQ module without requiring additional programming.



2 Next, enter the module personality value. The correct value for ProTalk modules is 1060 decimal (0424 hex).



3 Before you can save the project in UnityProXL, you must validate the modifications. Open the Edit menu, and then choose Validate. If no errors are reported, you can save the project.

4 Save the project.

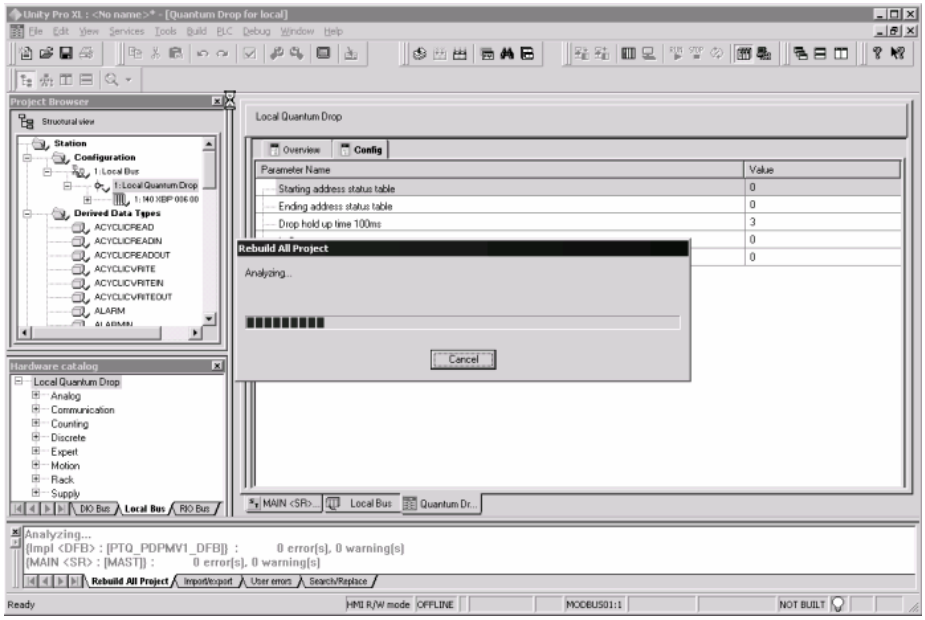
5.3 Build the Project

Whenever you update the configuration of your PTQ module or the processor, you must import the changed configuration from the module, and then build (compile) the project before downloading it to the processor.

Note: The following steps show you how to build the project in Unity Pro XL. This is not intended to provide detailed information on using Unity Pro XL, or debugging your programs. Refer to the documentation for your processor and for Unity Pro XL for specialized information.

To build (compile) the project:

1. Review the elements of the project in the Project Browser.
2. When you are satisfied that you are ready to download the project, open the Build menu, and then choose Rebuild all Project. This action builds (compiles) the project into a form that the processor can use to execute the instructions in the project file. This task may take several minutes, depending on the complexity of the project and the resources available on your PC.
3. As the project is built, Unity Pro XL reports its process in a Progress dialog box, with details appearing in a pane at the bottom of the window. The following illustration shows the build process under way.



After the build process is completed successfully, the next step is to download the compiled project to the processor.

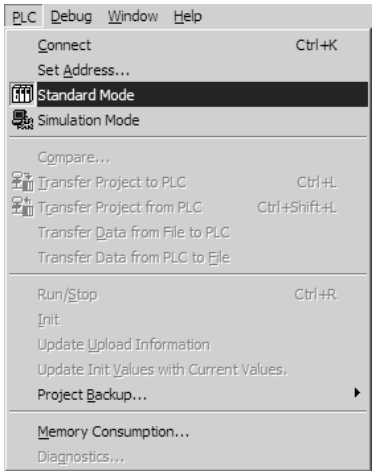
5.4 Connect Your PC to the Processor

The next step is to connect to the processor so that you can download the project file. The processor uses this project file to communicate over the backplane to modules identified in the project file.

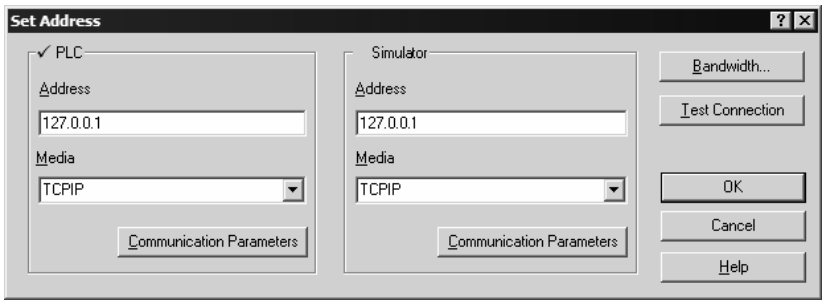
Note: If you have never connected from the PC to your processor before, you must verify that the necessary port drivers are installed and available to UnityPro XL.

To verify address and driver settings in UnityPro XL:

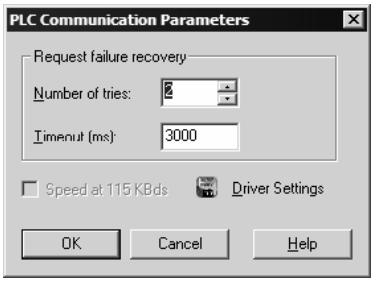
1 Open the PLC menu, and choose Standard Mode. This action turns off the PLC Simulator, and allows you to communicate directly with the Quantum or Unity hardware.



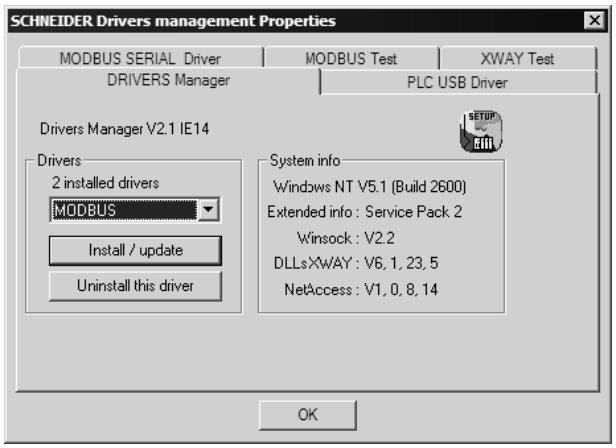
2 Open the PLC menu, and choose Set address... This action opens the Set address dialog box. Open the Media dropdown list and choose the connection type to use (TCPIP or USB).



3 If the Media dropdown list does not contain the connection method you wish to use, click the Communication Parameters button in the PLC area of the dialog box. This action opens the PLC Communication Parameters dialog box.



4 Click the Driver Settings button to open the SCHNEIDER Drivers management Properties dialog box.



5 Click the Install/update button to specify the location of the Setup.exe file containing the drivers to use. You will need your UnityPro XL installation disks for this step.

6 Click the Browse button to locate the Setup.exe file to execute, and then execute the setup program. After the installation, restart your PC if you are prompted to do so. Refer to your Schneider Electric documentation for more information on installing drivers for UnityPro XL.

5.4.1 Connecting to the Processor with TCPIP

The next step is to download (copy) the project file to the processor. The following steps demonstrate how to use an Ethernet cable connected from the Processor to your PC through an Ethernet hub or switch. Other connection methods may also be available, depending on the hardware configuration of your processor, and the communication drivers installed in UnityPro XL.

1 If you have not already done so, connect your PC and the processor to an Ethernet hub.
2 Open the PLC menu, and then choose Set address.

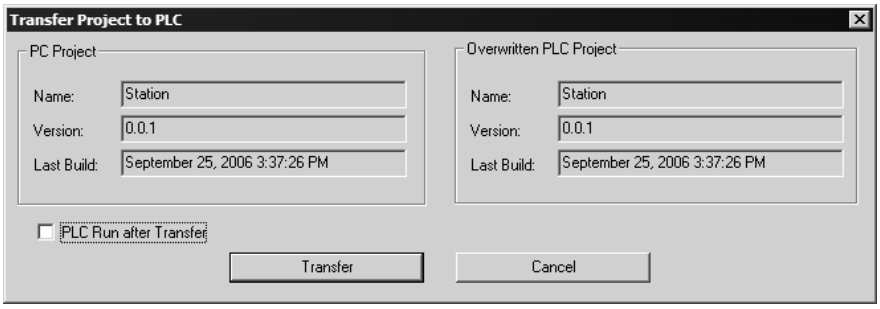
- Important: Notice that the Set address dialog box is divided into two areas. Enter the address and media type in the PLC area of the dialog box, not the Simulator area.

3 Enter the IP address in the address field. In the Media dropdown list, choose TCPIP.
4 Click the Test Connection button to verify that your settings are correct.

The next step is to download the Project to the Processor.

5.5 Download the Project to the Processor

1 Open the PLC menu and then choose Connect. This action opens a connection between the Unity Pro XL software and the processor, using the address and media type settings you configured in the previous step.
2 On the PLC menu, choose Transfer Project to PLC. This action opens the Transfer Project to PLC dialog box. If you would like the PLC to go to "Run" mode immediately after the transfer is complete, select (check) the PLC Run after Transfer check box.



3 Click the Transfer button to download the project to the processor. As the project is transferred, Unity Pro XL reports its process in a Progress dialog box, with details appearing in a pane at the bottom of the window.

When the transfer is complete, place the processor in Run mode.

6 Setting Up the ProTalk Module

In This Chapter

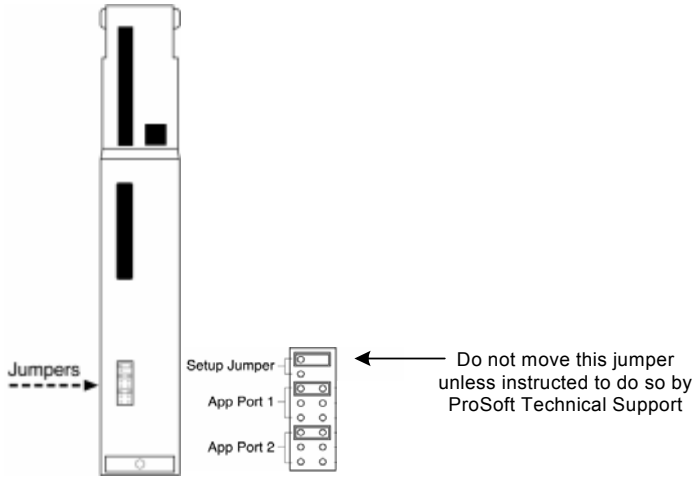
After you complete the following procedures, the ProTalk module will actively be transferring data bi-directionally with the processor.

6.1 Install the ProTalk Module in the Quantum Rack

6.1.1 Verify Jumper Settings

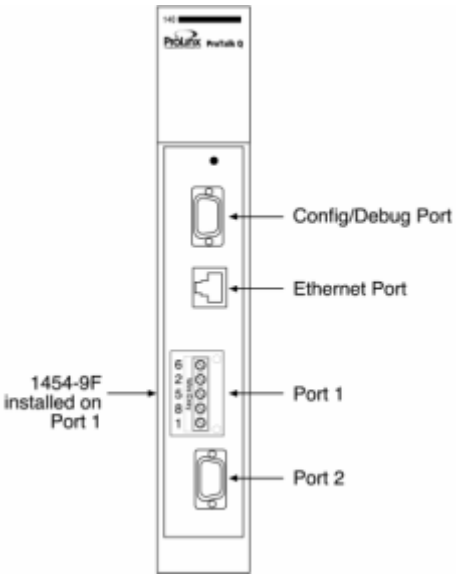
ProTalk modules are configured for RS-232 serial communications by default. To use RS-422 or RS-485, you must change the jumpers.

The jumpers are located on the back of the module as shown in the following illustration:



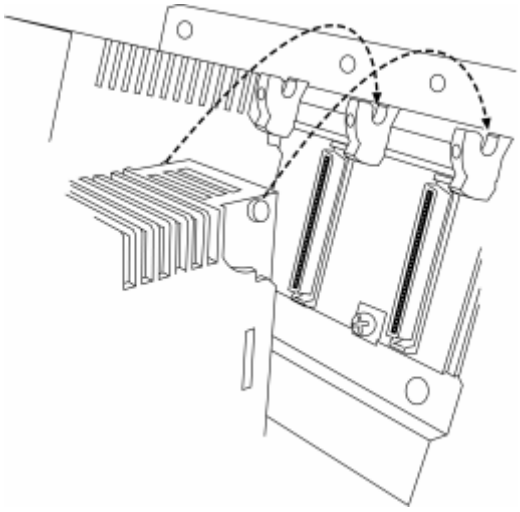
6.1.2 Inserting the 1454-9F connector

Insert the 1454-9F connector as shown. Wiring locations are shown in the table:

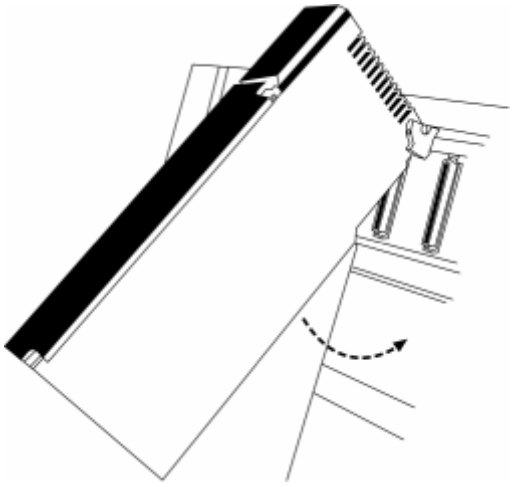


6.1.3 Install the ProTalk Module in the Quantum Rack

1. Place the Module in the Quantum Rack. The ProTalk module must be placed in the same rack as the processor.
2. Tilt the module at a 45° angle and align the pegs at the top of the module with slots on the backplane.



3 Push the module into place until it seats firmly in the backplane.

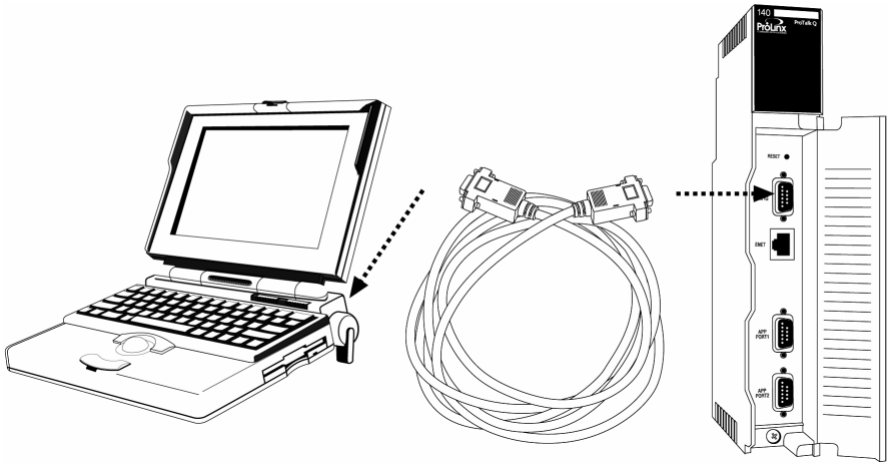


CaUTION: The PTQ module is hot-swappable, meaning that you can install and remove it while the rack is powered up. You should not assume that this is the case for all types of modules unless the user manual for the product explicitly states that the module is hot-swappable. Failure to observe this precaution could result in damage to the module and any equipment connected to it.

6.2 Connect the PC to the ProTalk Configuration/Debug Port

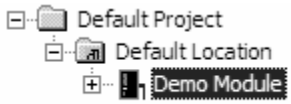
Make sure you have exited the Quantum programming software before performing these steps. This action will avoid serial port conflict.

Using the supplied Null Modem cable, connect your PC or Laptop to the Configuration/Debug port on the ProTalk module as shown

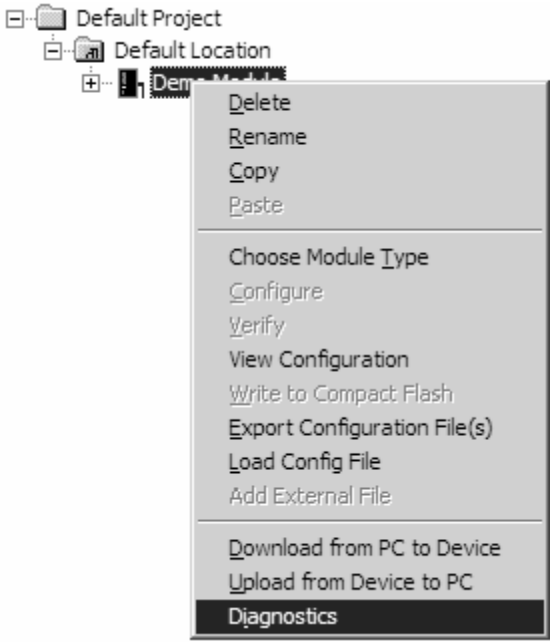


To connect to the module's Configuration/Debug serial port:

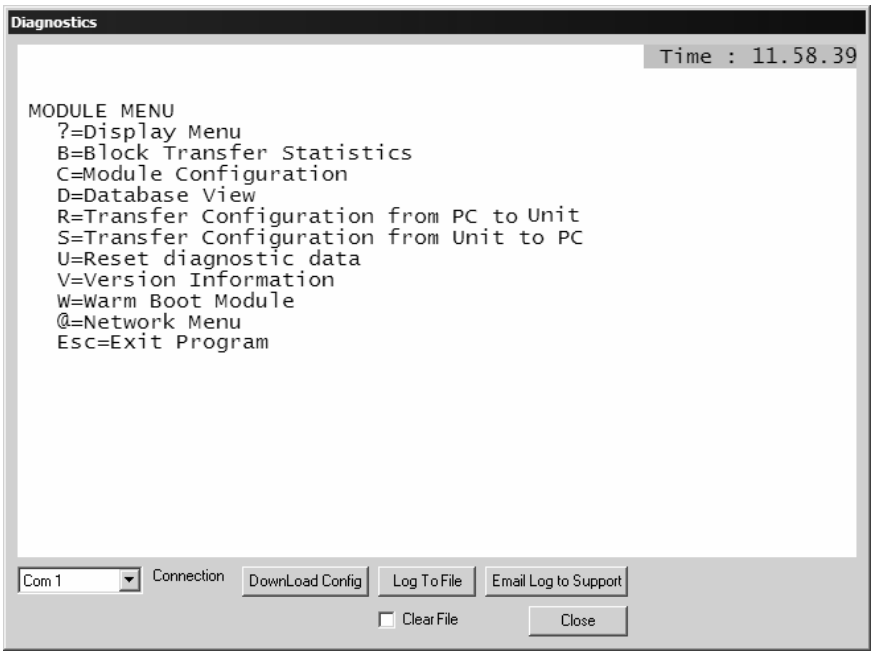
1 Start PCB program with the application file to be tested. Right click over the module icon.



2 On the shortcut menu, choose Diagnostics.



3 This action opens the Diagnostics dialog box. Press "?" to display the Main Menu.



Important: The illustrations of configuration/debug menus in this section are intended as a general guide, and may not exactly match the configuration/debug menus in your own module.

If there is no response from the module, follow these steps:

1 Verify that the null modem cable is connected properly between your computer's serial port and the module. A regular serial cable will not work.
2 On computers with more than one serial port, verify that your communication program is connected to the same port that is connected to the module.
3 If you are still not able to establish a connection, contact ProSoft Technology for assistance.

7 Module Configuration

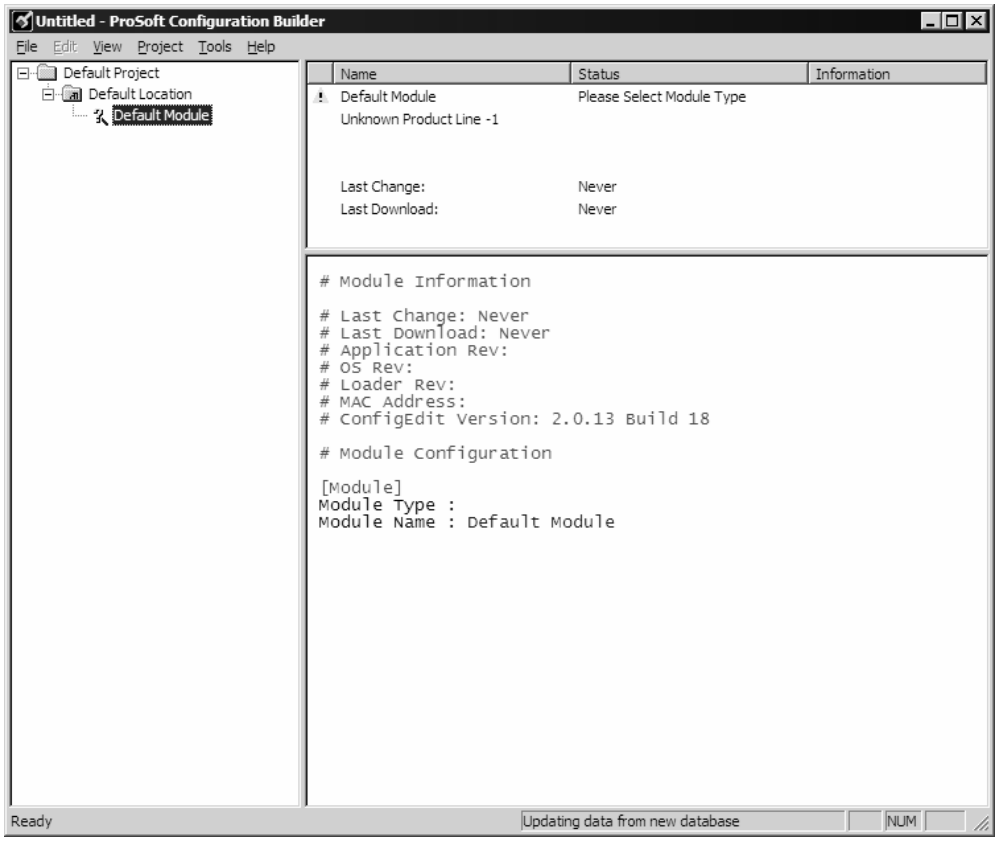
In This Chapter

7.1 ProSoft Configuration Builder

ProSoft Configuration Builder (PCB) provides a quick and easy way to manage module configuration files customized to meet your application needs. PCB is not only a powerful solution for new configuration files, but also allows you to import information from previously installed (known working) configurations to new projects.

7.1.1 Set Up the Project

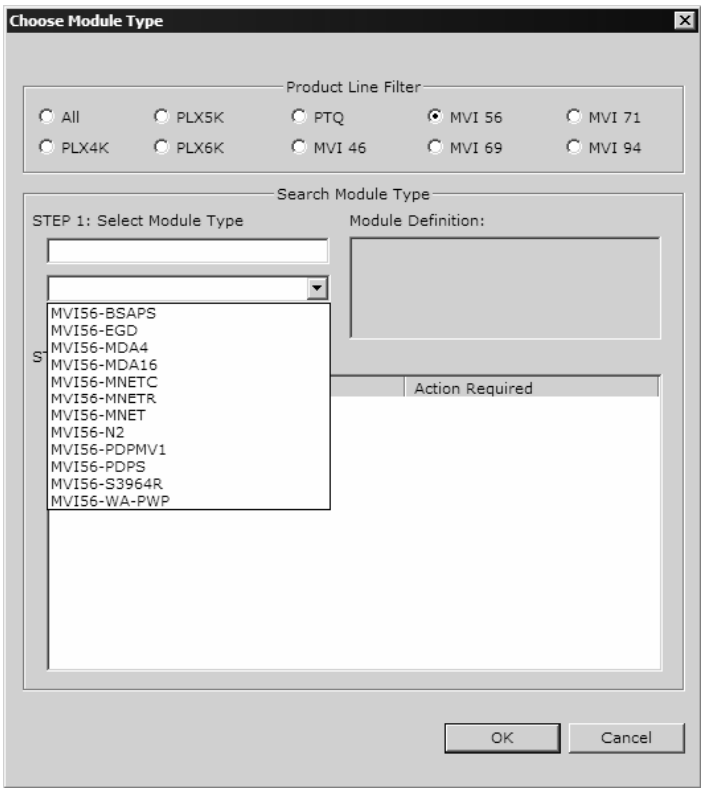
To begin, start ProSoft Configuration Builder. If you have used other Windows configuration tools before, you will find the screen layout familiar. ProSoft Configuration Builder's window consists of a tree view on the left, an information pane and a configuration pane on the right side of the window. When you first start ProSoft Configuration Builder, 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 ProSoft Configuration Builder window with a new project.



Your first task is to add the PTQ-N2 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, choose "Choose Module Type". This action opens the Choose Module Type dialog box.



3 In the Product Line Filter area of the dialog box, select PTQ. In the Select Module Type dropdown list, select PTQ-N2, and then click OK to save your settings and return to the ProSoft Configuration Builder window.

The next task is to set the module parameters.

Adding a Project

To add a project to an existing project file:

1 Select the Default Project icon.
2 Choose Project from the Project menu, then choose Add Project. A new project folder appears.

Adding a Module

To add a module to your project:

1 Double-click the Default Module icon to open the Choose Module Type dialog box.
2 On the Choose Module Type dialog box, select the module type.

or

1 Open the Project menu and choose Location

2 On the Location menu, choose Add Module.

To add a module to a different location:

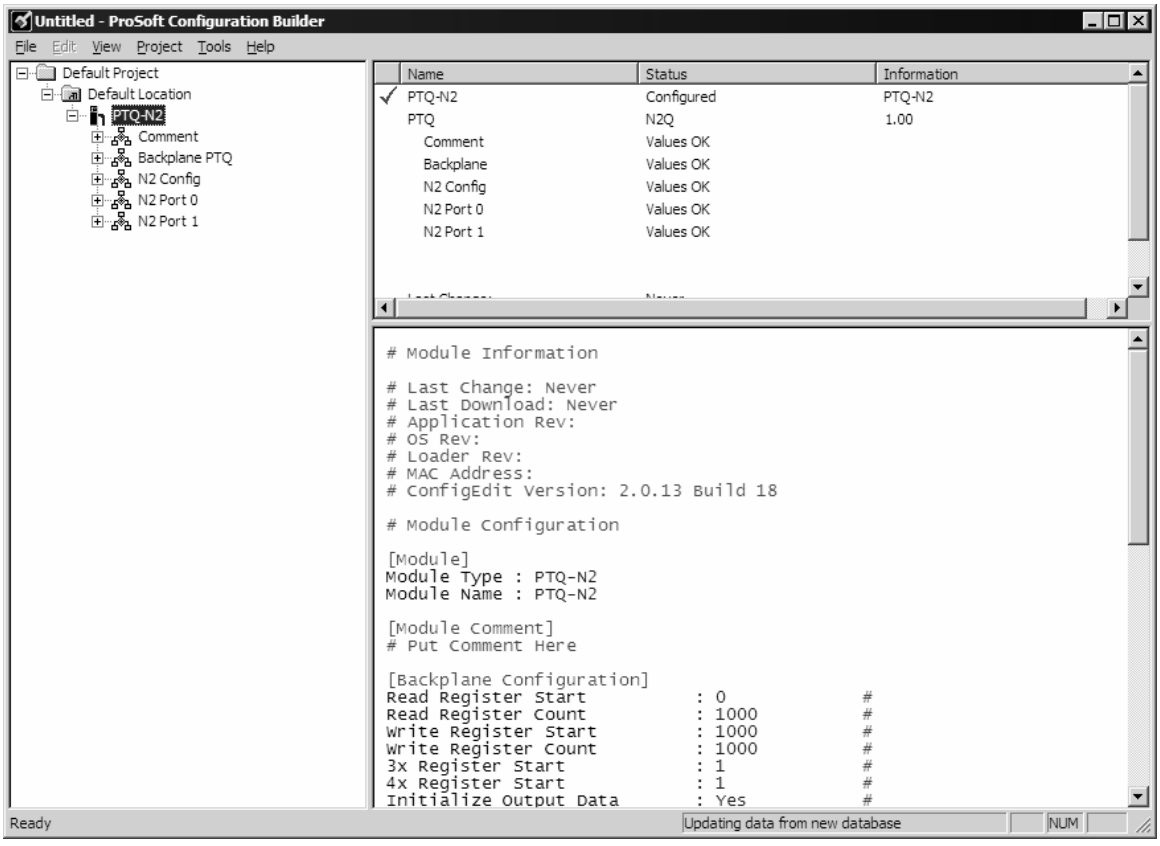
1 Right-click the Location folder and choose Add Module. A new module icon appears.

or
Select the Location icon.

2 From the Project menu, select Location, then select Add Module.

7.1.2 Set Module Parameters

Notice that the contents of the information pane and the configuration pane changed when you added the PTQ-N2 module to the project.



At this time, you may wish to rename the "Default Project" and "Default Location" folders in the tree view.

To rename an object:

1 Select the object, and then click the right mouse button to open a shortcut menu. From the shortcut menu, choose Rename.
2 Type the name to assign to the object.
3 Click away from the object to save the new name.

Module Entries

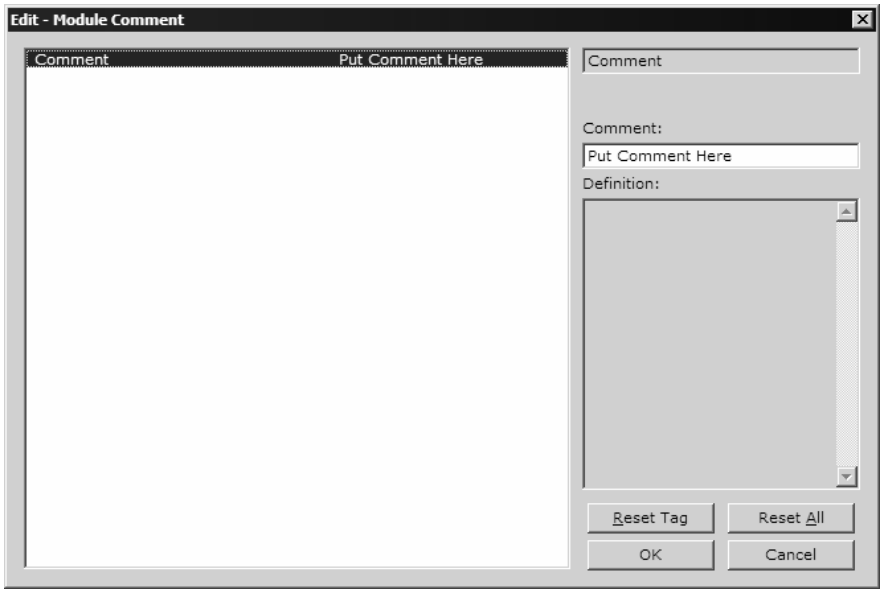
To configure module parameters

1. Click on the plus sign next to the icon Comment to expand module information.
2. Double-click the Module Comment icon to open the Edit dialog box.
3. To edit a parameter, select the parameter in the left pane and make your changes in the right pane.
4. Click OK to save your changes.

Comment Entries

To add comments to your configuration file:

1. Click the plus sign to the left of the Comment icon to expand the Module Comments.
2. Double-click the Module Comment icon. The Edit - Module Comment dialog appears.



3. Enter your comment and click OK to save your changes.

Printing a Configuration File

To print a configuration file:

1. Select the Module icon, and then click the right mouse button to open a shortcut menu.
2. On the shortcut menu, choose View Configuration. This action opens the View Configuration window.
3. On the View Configuration window, open the File menu, and choose Print. This action opens the Print dialog box.

4 On the Print dialog box, choose the printer to use from the dropdown list, select printing options, and then click OK.

7.2 [Backplane Configuration]

7.2.1 Read Register Start

1000 (recommended value)

This parameter specifies the starting register in the module where data will be transferred from the module to the processor.

Note: This value applies only when the configuration item Enable Database Output (page 57) in the [N2 Config] section is set to Yes.

7.2.2 Read Register Count

800 (recommended value)

This parameter specifies the number of registers to be transferred from the module to the processor.

Note: This value applies only when the configuration item Enable Database Output (page 57) in the [N2 Config] section is set to Yes.

7.2.3 Write Register Start

0 (recommended value)

This parameter specifies the starting register in the module where the data transferred from the processor will be placed.

7.2.4 Write Register Count

800 (recommended value)

This parameter specifies the number of registers to transfer from the processor to the module.

7.2.5 3x Register Start

1 to n

This parameter sets the first register in the processor where the data transferred from the module to the processor will be placed.

7.2.6 4x Register Start

1 to n

This parameter sets the first register in the processor where the data transferred from the processor to the module is present.

7.2.7 Failure Flag Count

0 to 65535

This parameter specifies the number of successive transfer errors that must occur before the communication ports are shut down. If the parameter is set to 0, the communication ports will continue to operate under all conditions. The value range should be between 0 and 6900.

7.2.8 Error/Status Block Pointer

1 to 7000

The Error/Status Block Pointer parameter is used to specify the range of database registers to use for error and status data. The value range should be no lower than 700, to avoid overwriting data, and no higher than 6970, to allow sufficient space for the error/status block.

7.3 [N2 Config]

This section is used to define the N2 configuration data.

7.3.1 Enable Database Output

Yes or No

When this parameter is set to No (the default value), the module will immediately pass through response data from the master to the processor without writing to the module database (Legacy mode).

When this parameter is set to Yes, response data is saved to the module database for backplane output transfer. The database location is set in the Read Register Start (page 56) parameter in the [Backplane Configuration] section.

7.3.2 Binary Input Object Count

0 to 960

Determines the number of Binary Input Objects available

7.3.3 Analog Input Object Count

0 to 256

Determines the number of Analog Input Objects available.

7.3.4 Binary Output Object Count

0 to 960

Determines the number of Binary Output Objects available.

7.3.5 Analog Output Object Count

0 to 256

Determines the number of Analog Output Objects available.

7.4 [N2 Port x]

This section is used to define the port configuration for the N2 device

7.4.1 Enable

Yes or No

This parameter specifies whether to enable or disable the port. No = Port Disabled, Yes = Port Enabled.

7.4.2 Slave Address

1 to 255

This parameter defines the Slave Node Address for the internal database. All requests received by the port with this address are processed by the module. Verify that each device has a unique address on a network. Valid range for this parameter is 1 to 255.

7.4.3 Baud Rate

300 to 115200

This parameter specifies the baud rate to be used on the port. Valid values are 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200.

7.4.4 Parity

N, O, E

This parameter specifies the parity setting for this port. Valid values are N = None, O = Odd, E = Even.

7.4.5 Data Bits

7 to 8

This parameter sets the number of data bits for each word used by the protocol.

7.4.6 Stop Bits

1 or 2

This parameter sets the number of stop bits to be used with each data value sent.

7.4.7 RTS On

0 to 65535

This parameter sets the number of milliseconds to delay after RTS is asserted before the data will be transmitted.

7.4.8 RTS Off

0 to 65535

This parameter sets the number of milliseconds to delay after the last byte of data is sent before the RTS modem signal will be set low.

7.4.9 Minimum Response Delay

0 to 65535

This parameter sets the number of milliseconds to wait to respond to a request on the port. This is required for slow reacting devices.

7.4.10 Use CTS Line

Yes or No

This parameter specifies if the CTS modem control line is to be used. If the parameter is set to No, the CTS line will not be monitored. If the parameter is set to Yes, the CTS line will be monitored and must be high before the module will send data. Normally, this parameter is required when half-duplex modems are used for communication (2-wire).

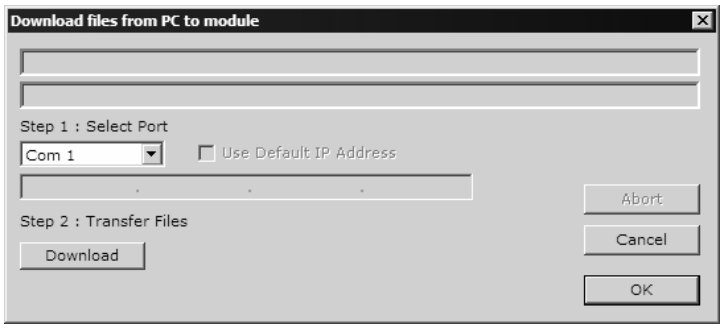
7.5 Download the Project to the Module

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.

To Download the Project File

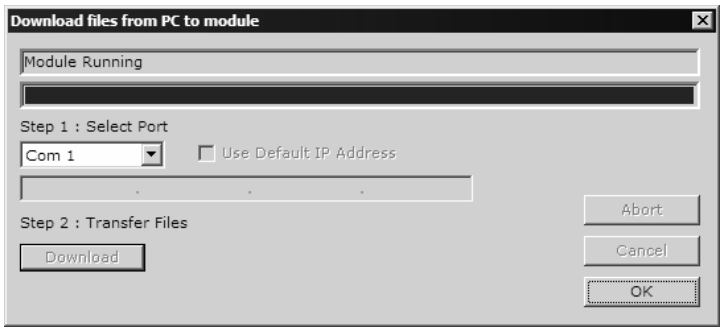
1. In the tree view in ProSoft Configuration Builder, click once to select the PTQ-N2 module.

2 Open the **Project menu,** and then choose **Module / Download**. The program will scan your PC for a valid com port (this may take a few seconds). When PCB has found a valid com port, the following dialog box will open.



3 Choose the com port to use from the dropdown list, and then click the Download button.

The module will perform a platform check to read and load its new settings. When the platform check is complete, the status bar in ProSoft Configuration Builder will be updated with the message *"Module Running*".



8 Diagnostics and Troubleshooting

In This Chapter

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

- Status data values are transferred from the module to the processor.
- Data contained in the module can be viewed through the Configuration/Debug port attached to a terminal emulator.
- LED status indicators on the front of the module provide information on the module's status.

8.1 Reading Status Data from the Module

The PTQ-N2 module returns a 30-word Status Data Block that may be used to determine the module's operating status. This data is located in the module's database in registers 6000 through 6029.

This data is transferred to the Quantum processor every 100 blocks.

The Configuration/Debug port provides the following functionality:

- Full view of the module's configuration data
- View of the module's status data
- Complete display of the module's internal database (registers 0 to 10000)
- Version Information
- Control over the module (warm boot, cold boot, transfer configuration)

8.1.1 Required Hardware

You can connect directly from your computer's serial port to the serial port on the module to view configuration information, perform maintenance, and send (upload) or receive (download) configuration files.

ProSoft Technology recommends the following minimum hardware to connect your computer to the module:

- 80486 based processor (Pentium preferred)
- 1 megabyte of memory
- At least one UART hardware-based serial communications port available. USB-based virtual UART systems (USB to serial port adapters) often do not function reliably, especially during binary file transfers, such as when uploading/downloading configuration files or module firmware upgrades.
- A null modem serial cable.

8.1.2 The Configuration/Debug Menu

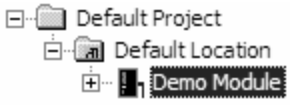
The Configuration and Debug menu for this module is arranged as a tree structure, with the Main Menu at the top of the tree, and one or more sub-menus for each menu command. The first menu you see when you connect to the module is the Main menu.

Because this is a text-based menu system, you enter commands by typing the command letter from your computer keyboard in the diagnostic window in ProSoft Configuration Builder (PCB). The module does not respond to mouse movements or clicks. The command executes as soon as you press the command letter — you do not need to press **[Enter]**. When you type a command letter, a new screen will be displayed in your terminal application.

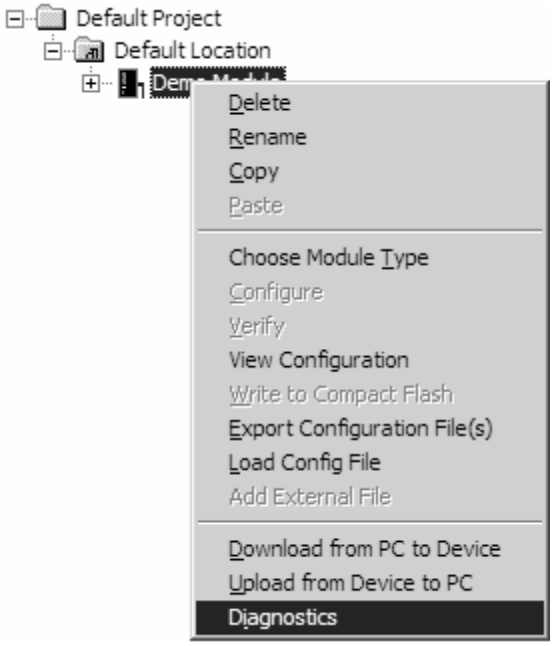
Using the Diagnostic Window in ProSoft Configuration Builder

To connect to the module's Configuration/Debug serial port:

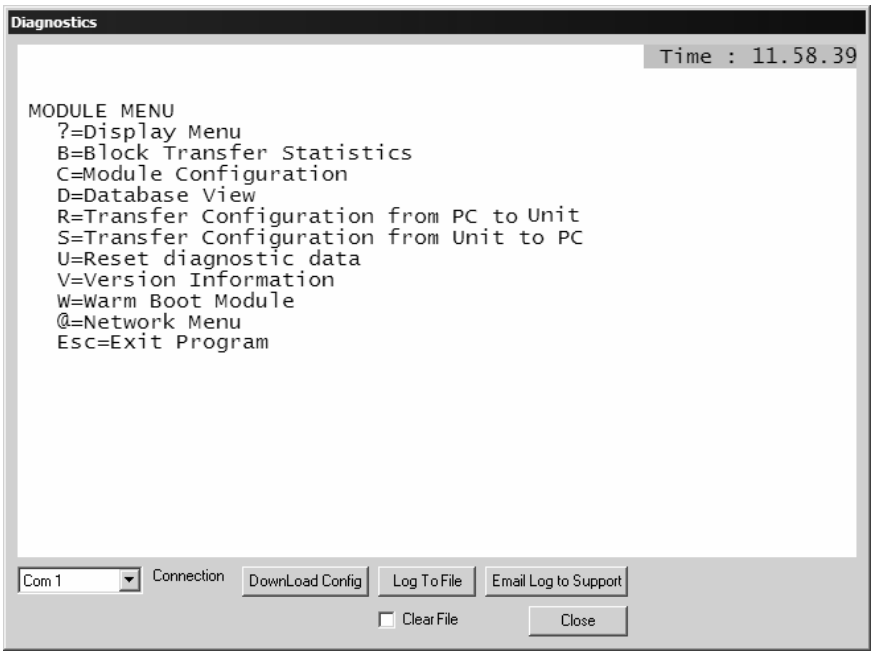
1 Start PCB program with the application file to be tested. Right click over the module icon.



2 On the shortcut menu, choose Diagnostics.



3 This action opens the Diagnostics dialog box. Press "?" to display the Main Menu.



Important: The illustrations of configuration/debug menus in this section are intended as a general guide, and may not exactly match the configuration/debug menus in your own module.

If there is no response from the module, follow these steps:

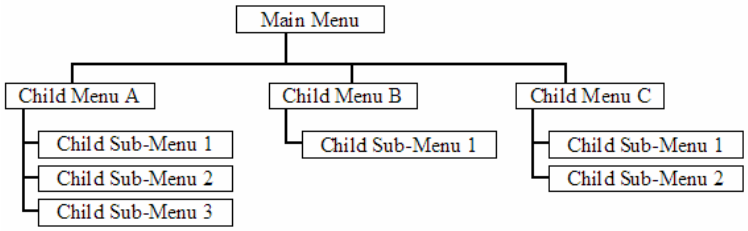
1 Verify that the null modem cable is connected properly between your computer's serial port and the module. A regular serial cable will not work.
2 On computers with more than one serial port, verify that your communication program is connected to the same port that is connected to the module.

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

Navigation

All of the sub-menus for this module contain commands to redisplay the menu or return to the previous menu. You can always return from a sub-menu to the next higher menu by pressing **[M]** on your keyboard.

The organization of the menu structure is represented in simplified form in the following illustration:



The remainder of this section shows you the menus available for this module, and briefly discusses the commands available to you.

Keystrokes

The keyboard commands on these menus are almost always non-case sensitive. You can enter most commands in lower case or capital letters.

The menus use a few special characters (**[?]**, **[-]**, **[+]**, **[@]**) that must be entered exactly as shown. Some of these characters will require you to use the **[Shift]**, **[Ctrl]** or **[Alt]** keys to enter them correctly. For example, on US English keyboards, enter the **[?]** command as **[Shift][/]**.

Also, take care to distinguish capital letter **[I]** from lower case letter **[l]** (L) and number **[1]**; likewise for capital letter **[O]** and number **[0]**. Although these characters look nearly the same on the screen, they perform different actions on the module.

8.1.3 Main menu

When you first connect to the module from your computer, your terminal screen will be blank. To activate the main menu, press the [?] key on your computer's keyboard. If the module is connected properly, the following menu will appear on your terminal screen:

```
?=Display Menu
V=Version Information
D=Database Menu
C=Clear diagnostic data
B=Backplane Menu
0=Protocol_Serial_N2 1
1=Protocol_Serial_N2 2
S=Transfer Configuration from Unit to PC
R=Transfer Configuration from PC to Unit
W=Warm Boot Module
Esc=Exit Program
```

Caution: Some of the commands available to you from this menu are designed for advanced debugging and system testing only, and can cause the module to stop communicating with the processor or with other devices, resulting in potential data loss or other failures. Only use these commands if you are specifically directed to do so by ProSoft Technology Technical Support staff. Some of these command keys are not listed on the menu, but are active nevertheless. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

Viewing Version Information

Press **[V]** to view Version information for the module.

Use this command to view the current version of the software for the module, as well as other important values. You may be asked to provide this information when calling for technical support on the product.

Values at the bottom of the display are important in determining module operation. The Program Scan Counter value is incremented each time a module's program cycle is complete.

Tip: Repeat this command at one-second intervals to determine the frequency of program execution.

Opening the Database Menu

Press **[D]** to open the Database View menu. Use this menu command to view the current contents of the module's database.

Resetting diagnostic data

Press **[C]** to reset the status counters for the client and servers in the module.

Opening the Backplane Menu

Press **[B]** from the Main Menu to view the Backplane Data Exchange List. Use this command to display the configuration and statistics of the backplane data transfer operations.

Tip: Repeat this command at one-second intervals to determine the number of blocks transferred each second.

Opening the Protocol_Serial_N2 Menu

Press **[0]** or **[1]** from the Main Menu to open the Protocol_Serial_N2 menu for N2 Ports 1 and 2.

Use this command to view communication status and statistics for the selected port. This information can be useful for trouble-shooting communication problems.

Sending the Configuration File

Press **[S]** to upload (send) an updated configuration file to the module. For more information on receiving and sending configuration files, please see Uploading and Downloading the Configuration File.

Receiving the Configuration File

Press **[R]** to download (receive) the current configuration file from the module. For more information on receiving and sending configuration files, please see Uploading and Downloading the Configuration File.

Warm Booting the Module

Caution: Some of the commands available to you from this menu are designed for advanced debugging and system testing only, and can cause the module to stop communicating with the processor or with other devices, resulting in potential data loss or other failures. Only use these commands if you are specifically directed to do so by ProSoft Technology Technical Support staff. Some of these command keys are not listed on the menu, but are active nevertheless. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

Press **[W]** from the Main Menu to warm boot (restart) the module. This command will cause the program to exit and reload, refreshing configuration parameters that must be set on program initialization. Only use this command if you must force the module to re-boot.

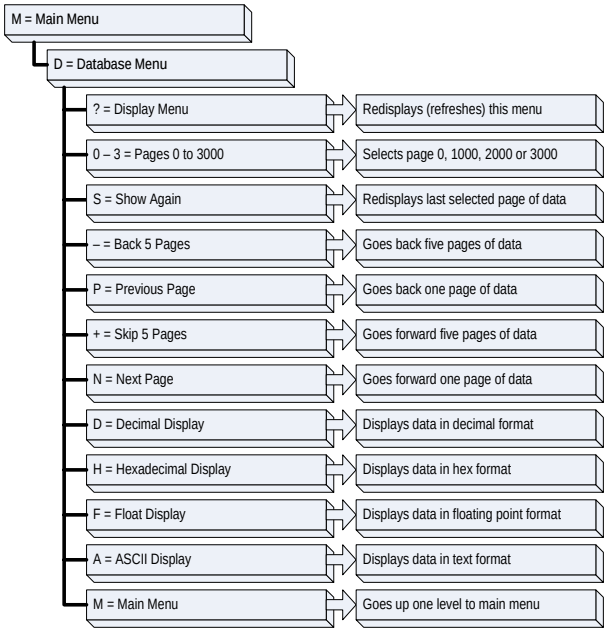
Exiting the Program

Caution: Some of the commands available to you from this menu are designed for advanced debugging and system testing only, and can cause the module to stop communicating with the processor or with other devices, resulting in potential data loss or other failures. Only use these commands if you are specifically directed to do so by ProSoft Technology Technical Support staff. Some of these command keys are not listed on the menu, but are active nevertheless. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

Press **[Esc]** to restart the module and force all drivers to be loaded. The module will use the configuration stored in the module's Flash ROM to configure the module.

8.1.4 Database View Menu

Press **[D]** from the Main Menu to open the Database View menu. Use this menu command to view the current contents of the module's database. Press **[?]** to view a list of commands available on this menu.



Viewing Register Pages

To view sets of register pages, use the keys described below:

Command	Description
[0]	Display registers 0 to 99
[1]	Display registers 1000 to 1099
[2]	Display registers 2000 to 2099

And so on. The total number of register pages available to view depends on your module's configuration.

Displaying the Current Page of Registers Again

```
DATABASE DISPLAY 0 TO 99 (DECIMAL)
  100   101   102     4     5     6     7     8     9    10
   11    12    13    14    15    16     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
    0     0     0     0     0     0     0     0     0     0
```

This screen displays the current page of 100 registers in the database.

Moving Back Through 5 Pages of Registers

Press **[-]** from the Database View menu to skip back to the previous 500 registers of data.

Viewing the Previous 100 Registers of Data

Press **[P]** from the Database View menu to display the previous 100 registers of data.

Skipping 500 Registers of Data

Hold down **[Shift]** and press **[=]** to skip forward to the next 500 registers of data.

Viewing the Next 100 Registers of Data

Press **[N]** from the Database View menu to select and display the next 100 registers of data.

Viewing Data in Decimal Format

Press **[D]** to display the data on the current page in decimal format.

Viewing Data in Hexadecimal Format

Press **[H]** to display the data on the current page in hexadecimal format.

Viewing Data in Floating Point Format

Press **[F]** from the Database View menu. Use this command to display the data on the current page in floating point format. The program assumes that the values are aligned on even register boundaries. If floating-point values are not aligned as such, they are not displayed properly.

Viewing Data in ASCII (Text) Format

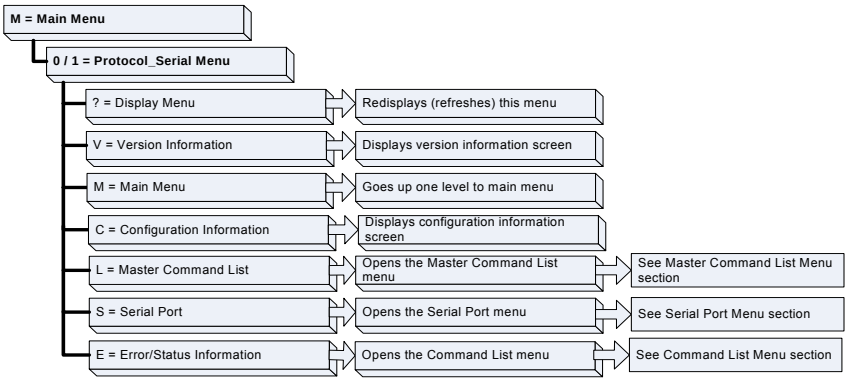
Press **[A]** to display the data on the current page in ASCII format. This is useful for regions of the database that contain ASCII data.

Returning to the Main Menu

Press **[M]** to return to the Main Menu.

8.1.5 Protocol Serial N2 Menu

Press **[0]** or **[1]** to view protocol serial information for ports 1 and 2, respectively. Use this command to view a variety of error and status screens for the port. Press **[?]** to view a list of commands available on this menu.



Redisplaying the Menu

Press **[?]** to display the current menu. Use this command when you are looking at a screen of data, and want to view the menu choices available to you.

Viewing Version Information

Press **[V]** to view Version information for the module.

Use this command to view the current version of the software for the module, as well as other important values. You may be asked to provide this information when calling for technical support on the product.

Values at the bottom of the display are important in determining module operation. The Program Scan Counter value is incremented each time a module's program cycle is complete.

Tip: Repeat this command at one-second intervals to determine the frequency of program execution.

Returning to the Main Menu

Press **[M]** to return to the Main Menu.

Viewing Configuration Information

Press **[C]** to view configuration information for the selected port, protocol, driver or device.

Opening the Command List Menu

Press **[L]** to open the Command List menu. Use this command to view the configured command list for the module.

Opening the Serial Port Menu

Press **[S]** to open the Serial Port menu. Use this command to view and change additional serial port driver settings.

Viewing Error and Status Data

Press **[E]** to display the error/status data for the module.

8.2 LED Status Indicators

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

ProTalk Module	Color	Status	Indication
DEBUG	Green	On	Data is being transferred between the module and a remote terminal using the Configuration/Debug port.
		Off	No data is being transferred on the Configuration/Debug port.
PRT1	Flashing Green	On	Port is communicating.
		Off	Port is not communicating.
PRT2	Flashing Green	On	Port is communicating.
		Off	Port is not communicating.
CFG ERR	Red	Off	The PTQ-N2 is working normally.
		On	Hardware Failure.
ERR1 P1 Fail	Red	On	Hardware failure.
		Flashing	N3 Commands are not supported
		Off	Normal Operation
ERR2 P2 Fail	Red	On	Hardware Failure
		Flashing	N2 commands are not supported.
		Off	Normal Operation
Active	Green	On	The LED is on when the module recognizes a processor and is able to communicate if the [Backplane Data Exchange] section specifies data transfer commands.
		Off	The LED is off when the module is unable to communicate with the processor. The processor either absent or not running.
BAT Low	Red	Off	The battery voltage is OK and functioning.
		On	The battery voltage is low or the battery is not present. The battery LED will illuminate briefly upon the first installation of the module or if the unit has been un-powered for an extended period of time. This behavior is normal, however should the LED come on in a working installation please contact ProSoft Technology.
E-Link	Green	N/A	Not Used
		N/A	Not Used
E-Data	Green	N/A	Not Used
		N/A	Not Used

If your module is not operating, and the status LEDs are not illustrated in the table above, please call ProSoft Technology for technical assistance.

8.2.1 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 the configuration data being transferred to the module from the Quantum processor.

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 Support.

9 Reference

In This Chapter

9.1 Product Specifications

The PTQ Johnson Controls Metasys Slave Communication Module allows Schneider Electric Quantum I/O compatible processors to interface easily with other Johnson Controls N2 master devices.

9.1.1 Features and Benefits

The PTQ-N2 module acts as an input/output module between the Johnson Controls Metasys network and the Quantum processor. The module acts as a slave receiving commands from a master device. The data transfer from the Quantum processor is asynchronous from the actions on the Johnson Controls Metasys network. An internal database in the module exchanges data between the processor and the Johnson Controls Metasys Master (NCM, N-30, NAE, NIE).

9.1.2 General Specifications

- Single Slot - Quantum backplane compatible
- The module is recognized as an Options module and has access to PLC memory for data transfer
- Configuration data is stored in non-volatile memory in the ProTalk module
- Up to six modules can be placed in a rack
- Local rack - The module must be placed in the same rack as processor
- Compatible with common Quantum / Unity programming tools
- Quantum data types supported: 3x, 4x
- High speed data transfer across backplane provides quick data update times
- Sample ladder file available

9.1.3 Hardware Specifications

Specification	Value
Backplane Current Load	800 mA @ 5 V
Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	5% to 95% (non-condensing)
Vibration	Sine vibration 4-100 Hz in each of the 3 orthogonal axes
Shock	30G, 11 mSec. in each of the 3 orthogonal axes
LED Indicators	Module Status Backplane Transfer Status Serial Port Activity LED Serial Activity and Error LED Status
Configuration Serial Port (PRT1)	DB-9M PC Compatible RS-232 only No hardware handshaking
Application Serial Ports	(PRT2, PRT3) DB-9M PC Compatible RS-232/422/485 jumper selectable RS-422/485 screw termination included RS-232 handshaking configurable 500V Optical isolation from backplane

9.1.4 Functional Specifications

- Support for the storage and transfer of internal database registers to/from the Quantum processor's controller tags
- Two ports to emulate a Johnson Controls N2 slave
- Supports the following N2 objects:
  - Binary Input: Up to 960 points
  - Analog Input: Up to 255 points
  - Binary Output: Up to 960 points
  - Analog Output: Up to 255 points
- Supported Commands/Sub-commands
  - 0/4: Poll Message No Acknowledge
  - 0/5: Poll Message with Acknowledge
  - 0/9: Status Update
  - 1/1: Read Analog Input Attributes
  - 1/2: Read Binary Input Attributes
  - 1/3: Read Analog Output Attributes
  - 1/4: Read Binary Output Attributes
  - 2/1: Write Analog Input Attributes

- 2/2: Write Binary Input Attributes
- 2/3: Write Analog Output Attributes
- 2/4: Write Binary Output Attributes
- 7/2/3: Override Analog Output
- 7/2/4: Override Binary Output
- F: Identify Device Type

- The following commands are recognized, and acknowledged, but are not communicated in any way to the processor, and do not return any data:
  - 0/0: Time Update
  - 0/8: Warm Start
  - All other commands return a Bad Command Error Code
- Configurable through the configuration file for the following:
  - Slave Address (assignable individually for Port 1 and 2)
  - Analog Input Object Count
  - Binary Input Object Count
  - Analog Output Object Count
  - Binary Output Object Count
- Warning and Alarming functions performed on Analog Input and Binary Input data types
- Change of State Response buffering
- Communication status error codes and statistics returned per port
- Communication parameter: Baud rate 9600 bps
- Memory mapping is pre-assigned to optimize data access and to ease implementation

A port configured as a Johnson Controls N2 slave permits a remote master to interact with data contained in the module. This data is derived from the Quantum processor.

9.2 Functional Overview

This section provides an overview of how the PTQ-N2 module transfers data using the N2 protocol. You should understand the important concepts in this chapter before you begin installing and configuring the module.

9.2.1 General Concepts

The following discussion explains several concepts that are important for understanding the operation of the PTQ-N2 module.

Module Power Up

On power up the module begins performing the following logical functions:

1 Initialize hardware components:
- Initialize Quantum backplane driver.
- Test and clear all RAM.
- Initialize the serial communication ports.

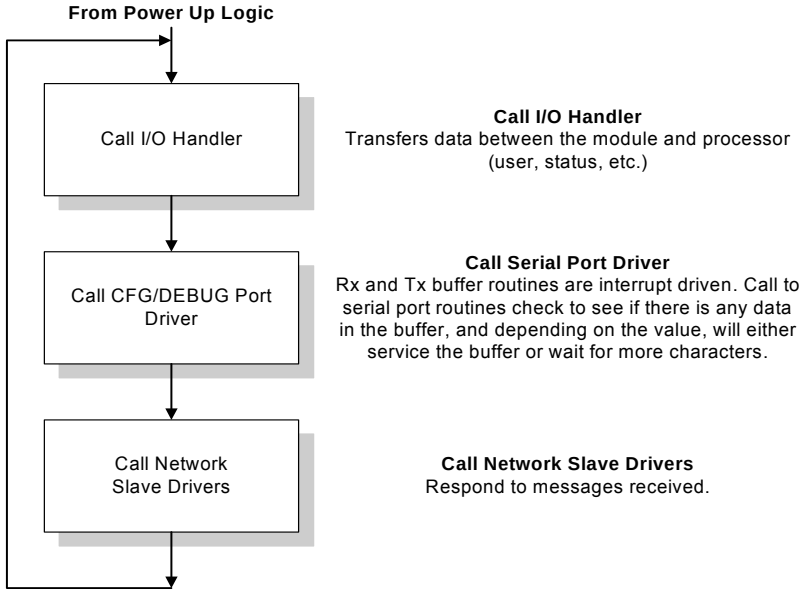
2 Initialize module register space.

3 Enable slave driver on selected ports.

After the module is configured, the module begins receiving and transmitting messages with Johnson Controls N2 devices on the network.

Main Logic Loop

Upon completing the power up configuration process, the module enters an infinite loop that performs the functions shown in the following diagram.



Quantum Processor Not in Run

Whenever the module detects that the processor has gone out of the Run mode (that is, Fault or PGM), the Johnson Controls N2 ports can be shut down as prescribed in the user configuration. When the processor is returned to a running state, the module resumes communications on the network.

Backplane Data Transfer - Legacy Mode

Legacy Mode is enabled when the Enable Database Output (page 57) configuration parameter is set to No. In Legacy Mode, incoming data from the Master is passed through immediately to the processor, and will not be written to the module database.

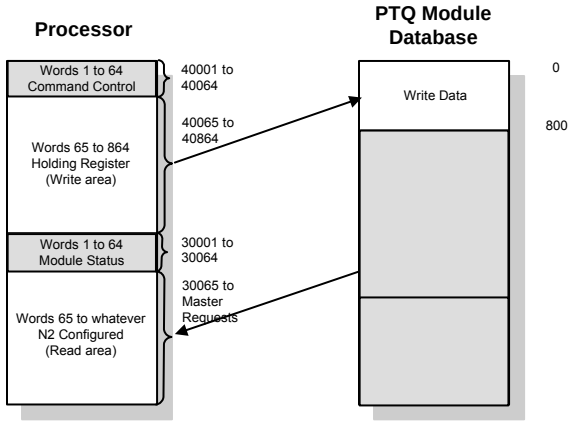
The [Backplane Configuration] section of the configuration file defines the starting registers for read and write operations, as well as the number of registers to use for each data area.

```
#These values are required to define the data area to transfer between the
#module and the processor.
Read Register Start :     0  #Database start register to move to processor
Read Register Count :     0  #Number of words moved from module to
                             #processor
```

```
Write Register Start:     0  #Database start register where data placed
                             #from processor
Write Register Count:   800  #Number of words moved from processor to
                             #module

#Used to define the area in the Processor for the module to interface with
3x Register Start:        1  #3x start register where data moved from
                             #module to processor (1-n)
4x Register Start:        1  #4x start register where data moved from
                             #processor to module (1-n)
```

The values in the example configuration file section above are illustrated in the following diagram.



The module transfers the entire write area at the end of every processor scan. The module will hold the processor scan for a certain period of time, which allows the module to transfer the entire write area. This means that the larger the write area, the longer the processor scan time will be. Refer to Module Performance for more detailed information on determining scan times.

Note: The diagram above shows the memory addresses for a Quantum processor. If you are deploying the PTQ-N2 with a Unity processor, substitute %MW for write data, and %IW for read data.

Backplane Data Transfer - Normal Mode

Normal Mode is enabled when the Enable Database Output (page 57) configuration parameter is set to No. In Normal Mode, incoming data from the Master is placed in the module's database at the location specified in the Read Register Start (page 56) parameter.

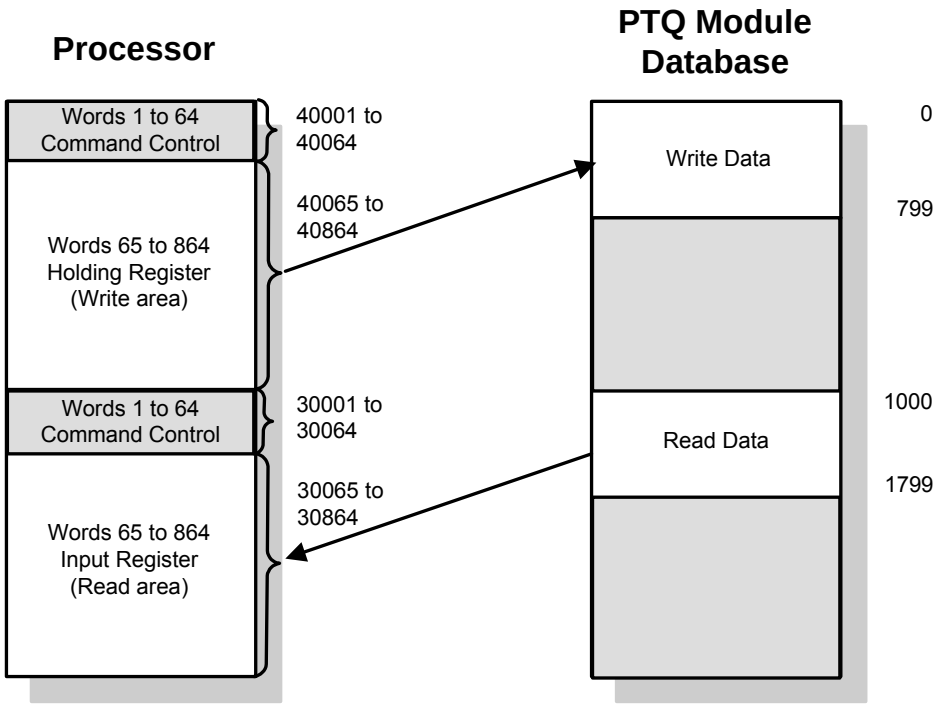
The current version of the PTQ-N2 backplane driver (version 2.10 or newer), uses a Large I/O model, which differs from previous versions of the backplane driver in that it transfers all of the data in the Read and Write databases between the module and the processor on every scan.

The [Backplane Configuration] section of the configuration file defines the starting registers for read and write operations, as well as the number of registers to use for each data area.

```
#These values are required to define the data area to transfer between the
#module and the processor.
Read Register Start :  1000  #Database start register to move to processor
Read Register Count :   800  #Number of words moved from module to
                              #processor
Write Register Start:     0  #Database start register where data placed
                              #from processor
Write Register Count:   800  #Number of words moved from processor to
                              #module

#Used to define the area in the Processor for the module to interface with
3x Register Start:        1  #3x start register where data moved from
                              #module to processor (1-n)
4x Register Start:        1  #4x start register where data moved from
                              #processor to module (1-n)
```

The values in the example configuration file section above are illustrated in the following diagram.



The module transfers the entire read and write areas at the end of every processor scan. The module will hold the processor scan for a certain period of time, which allows the module to transfer the entire read and write areas. This means that the larger the read and write areas, the longer the processor scan time will be. Refer to Module Performance for more detailed information on determining scan times.

Note: The diagram above shows the memory addresses for a Quantum processor. If you are deploying the PTQ-N2 with a Unity processor, substitute %MW for read only data, and %IW for read/write data.

Data Exchange

The module transfers all the configured read and write data at the end of each processor scan. You can configure up to 800 words in Read and Write data count. TheThe more data you configure, the longer the processor scan will be. Read Data count will be moved only if the Enable Database Output (page 57) parameter is set to Yes.

Words 0 through 63 in each read/write block are reserved for command control. Refer to Command Control for more information on command control blocks. The following table shows the relationship between the processor memory and the module database areas.

Note: Refer to Backplane Data Transfer (page 76) for the example configuration values that are used in the following tables.

Module Database	Quantum Register	Unity Register	Description
Read Data	3x	%IW	Input Register
Write Data	4x	%MW	Holding Register

The data mapping in the following example shows the relationship between processor and PTQ-N2 memory addresses, assuming a 4x register start value of 40001 and a PTQ-N2 database start value of 0.

Processor Memory Address	Module Database Address
40065	0
40066	1
40067	2
40068	3
40069	4
…	…
40864	799

The data mapping in the following example shows the relationship between processor and PTQ-N2 memory addresses, assuming a 3x register start value of 30001 and a PTQ-N2 database start value of 2000.

Legacy Mode (Enable Database Output = No)

Processor Memory Address	Module Database Address
30065	Pass Through
30066	Pass Through
30067	Pass Through
30068	Pass Through
30069	Pass Through
…	…
30864	Pass Through

Normal Mode (Enable Database Output = Yes)

Processor Memory Address	Module Database Address
30065	1000
30066	1001
30067	1002
30068	1003
30069	1004
…	…
30864	1864

Normal Data Transfer

Normal data transfer includes the paging of the user data found in the module's internal database in registers 0 to 6999 and the status data. These data are transferred through read (input image) and write (output image) blocks. The **Module Setup** section provides a description of the data objects used with the blocks and the ladder logic required. The structure and function of each block is described in the following topics.

Read Block (Status Block and Passthru Blocks)

These blocks of data transfer information from the module to the Quantum processor. The structure of the Status Block is shown in the following table:

Word Offset	Variable Name	Description
0	Sequence number	This word contains a new sequence number when the status block is filled.
1	Status request block	This word will contain the value of 9250 when the operation is complete.
2	Program Scan Count	This value is incremented each scan of the program. It can be utilized to check the program scan frequency and to make sure the module is still operational.
3-4	Product Name (ASCII)	These two words contain the product name of the module in ASCII format (DNQQ).
5-6	Revision (ASCII)	These two words contain the product revision level of the firmware in ASCII format.
7-8	Operating System Revision (ASCII)	These two words contain the module's internal operating system revision level in ASCII format.
9-10	Production Run Number (ASCII)	These two words contain the production 'batch' number for the particular chip in the module in ASCII format.
11	Number of Requests-Port1	Contains the number of port messages sent out of the port
12	Number of Respones-Port1	Contains the total number of messages received on the port
13	Number of Errors Sent -Port1	Contains the total number of message errors sent out of the port.
14	Number of Errors Received-Port1	Contains the total number of message errors Recieved out of the port.
15	Number of Requests-Port2	Contains the number of port messages sent out of the port

Word Offset	Variable Name	Description
16	Number of Respones-Port2	Contains the total number of messages received on the port
17	Number of Errors Sent -Port2	Contains the total number of message errors sent out of the port.
18	Number of Errors Received-Port2	Contains the total number of message errors Recieved out of the port.
19	Backplane Transfer Writes	Contains the total number of write blocks transferred from the processor to the module
20	Backplane Transfer Reads	Contains the total number of read blocks transferred from the module to the processor
21	Reserved	Reserved
22	Reserved	Reserved
23	Reserved	Reserved
24	BackPlane Transfer Errors	Contains the total number of block errors recognized by the module
25	Pass Thru Received	Pass thru request received on both ports
26	Current Error - Port 1	this field contains the value of the current error code returned
27	Last Error - Port 1	this field contains the value of the last error code returned
28	Current Error - Port 2	this field contains the value of the current error code returned
29	Last Error - Port 2	this field contains the value of the last error code returned
30-63	Reserverd	Reserved

Write Block

These blocks of data transfer information from the Quantum processor to the module. The structure of the output image used to transfer this data is shown in the following table:

Offset	Description	Length
1 to 64	Control Data	1
65 to N	Write Data	N

Where N values are from 0-800

All Output data will be moved in one processor scan.

Warm Boot

This block is sent from the Quantum processor to the module (output image) when the module is required to perform a warm-boot (software reset) operation. This block is commonly sent to the module any time configuration data modifications are made in the controller tags data area. This will force the module to read the new configuration information and to restart. The structure of the control block is shown in the following table:

Offset	Description	Length
0	Trigger sequence	1
1	9998	1

Offset	Description	Length
2 to 63	Not Used	

Cold Boot

This block is sent from the Quantum processor to the module (output image) when the module is required to perform the cold boot (hardware reset) operation. This block is sent to the module when a hardware problem is detected by the ladder logic that requires a hardware reset. The structure of the control block is shown in the following table:

Offset	Description	Length
0	Trigger Sequence	1
1	9999	247
2 to 63	Not Used	

(*

Block ID 9999 – to cold boot the module

MyTrigger is an alias for register 400000.

*)

IF MyTrigger = sequence; (*any number other than zero)

Coldboot(9999) := MyDataoffset 1; (* 400001 or %MW2)

2-63 not used;

END_IF;

In order to remove the cold boot request, change the "MyTrigger" value to 0 (Zero).

Pass-Through Control Blocks

The module will pass blocks with identification codes of 9001 and 9002 to the processor for each received function 7/2/4, and 7/2/3 command respectively.

- In Normal Mode (Enable database output parameter = Yes) blocks 9001 and 9002 are not generated. The module will copy all 800 registers to the processor.
- In Legacy Mode (Enable database output parameter = No), blocks 9001 and 9002 will be generated and passed to the processor one point at a time.

The structure of the pass-through control blocks are shown in the following tables:

Block 9001

Offset	Description	Length
0	Trigger Sequence	

Offset	Description	Length
1	9001	1
2	Binary Point Offset	1
3	Binary Value	1
4 to 63	Not used	

You must map these pass through blocks to your own named data tags.

Each 9001 block gets one point value. This could take considerable time, depending on the number of points. Be aware of this limitation when using pass through blocks.

The following sample of structured text (ST) demonstrates how to move data.

```
IF N2_InputData[1]=9001 THEN
  DO_Offset:= N2_InputData[2];
  Testbool:= N2_InputData[3].0;
  Tempbool[DI_Offset]:=TestBool;
```

Where N2_input data [2] has the address of 300002 if your 3x configuration is equal to 1

DO_offset is an INT

Testbool is an INT

Tempbool is an array of Bool

Block 9002

Offset	Description	Length
0	Trigger Sequence	1
1	9002	1
2	Analog Point Offset	1
3 to 4	Analog Value	2
5 to 63	Not Used	

For Analog outputs, you must copy the values to a temporary tag, and then read it from the processor memory location. The following example of structured text (ST) demonstrates how to transfer analog data.

```
IF N2_InputData[1]=9002 THEN
  Offset:= N2_InputData[2];
  Temp[0]:= N2_InputData[3];
  Temp[1]:= N2_InputData[4];
  Tempreal1:= Tempreal;
  Test[Offset]:= Tempreal1;
END_IF;
```

Offset is an INT

Temp is an array of 2 INT. This should be assigned at %MW (4x), outside the 800 words for the output data to prevent it being overwritten, for example %MW 990 or %MW 1990

TempReal is Float (REAL) that assigned an address at input image Offset 4

For example if %IW (3x) is set to start at 1 then it will be 4

If %IW (3x) is set to start at 1000 then it will be 1003 it is at offset number 4 if 3x starts at 1 then it is 4 if start at 1000 then it is 1003.

TempReal1 is Float [REAL] and it is assigned in the 4x value (%MW) same as Temp

Test is an array of REAL that depends on the configured number of Analog Outputs

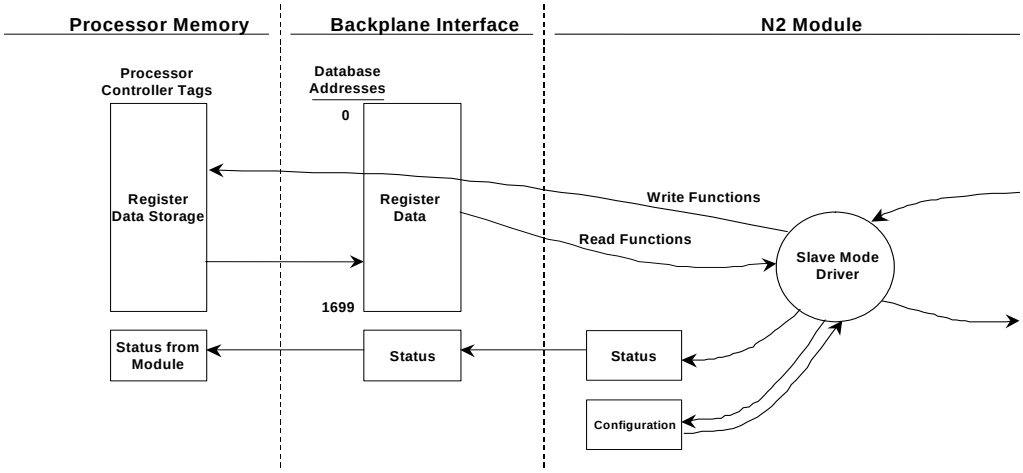
9.2.2 Data Flow Between the PTQ-N2 Module and the Quantum Processor

The following section describes the flow of data between the two pieces of hardware (Quantum processor and PTQ-N2 module). Each port on the module is configured to emulate a Johnson Controls N2 slave device. The operation of each port is dependent on this configuration.

Slave Driver

The Slave Driver Mode allows the PTQ-N2 module to respond to data read and write commands issued by a master on the Johnson Controls N2 network. The following flowchart describes the flow of data into and out of the module. The Module Setup section provides a list of the parameters that must be defined for a slave port.

All write requests will be passed directly to the processor. The following illustration shows the data flow for a slave port.



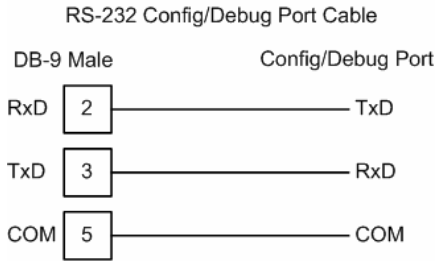
9.3 Cable Connections

The application ports on the PTQ-N2 module support RS-232, RS-422, and RS-485 interfaces. Please inspect the module to ensure that the jumpers are set correctly to correspond with the type of interface you are using.

Note: When using RS-232 with radio modem applications, some radios or modems require hardware handshaking (control and monitoring of modem signal lines). Enable this in the configuration of the module by setting the UseCTS parameter to 1.

9.3.1 RS-232 Configuration/Debug Port

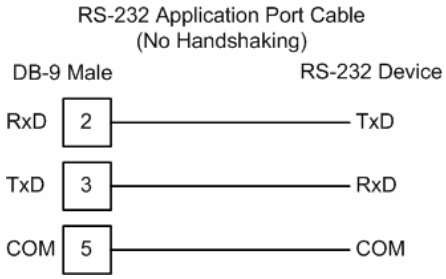
This port is physically a DB-9 connection. This port permits a PC based terminal emulation program to view configuration and status data in the module and to control the module. The cable for communications on this port is shown in the following diagram:



The Ethernet port on this module (if present) is inactive.

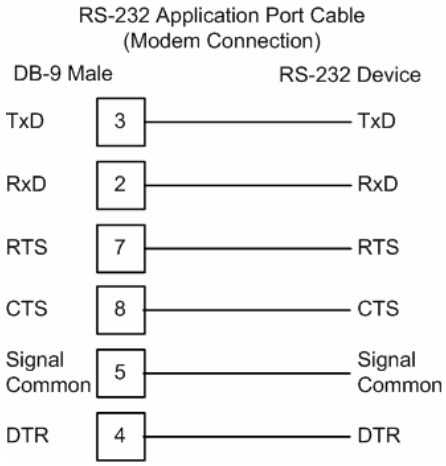
9.3.2 RS-232

When the RS-232 interface is selected, the use of hardware handshaking (control and monitoring of modem signal lines) is user definable. If no hardware handshaking will be used, the cable to connect to the port is as shown below:



RS-232: Modem Connection

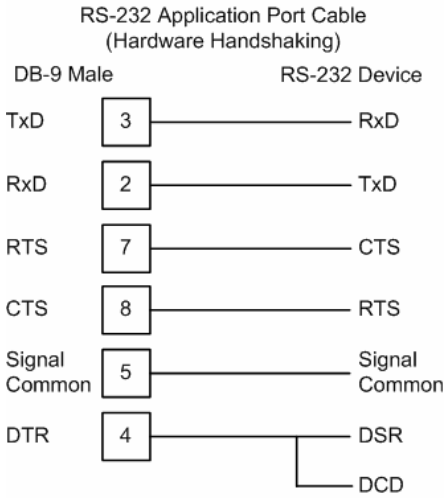
This type of connection is required between the module and a modem or other communication device.



The "Use CTS Line" parameter for the port configuration should be set to 'Y' for most modem applications.

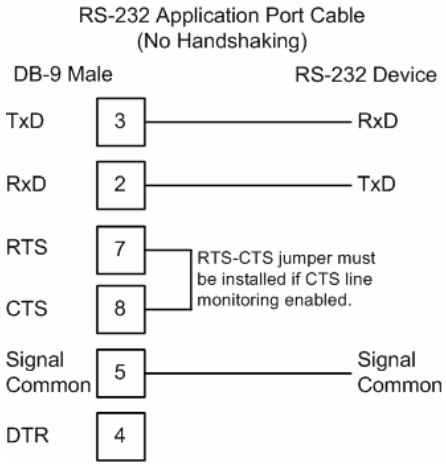
RS-232: Null Modem Connection (Hardware Handshaking)

This type of connection is used when the device connected to the module requires hardware handshaking (control and monitoring of modem signal lines).



RS-232: Null Modem Connection (No Hardware Handshaking)

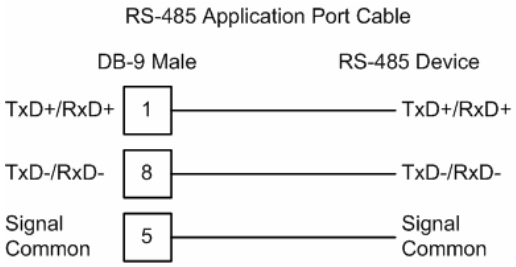
This type of connection can be used to connect the module to a computer or field device communication port.



Note: If the port is configured with the "Use CTS Line" set to 'Y', then a jumper is required between the RTS and the CTS line on the module connection.

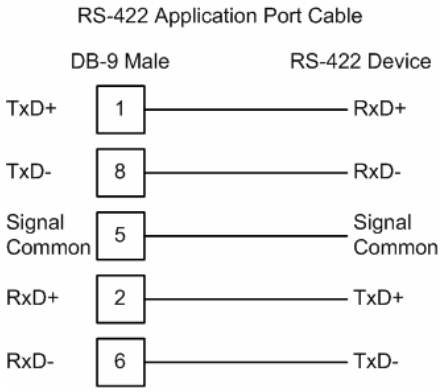
9.3.3 RS-485

The RS-485 interface requires a single two or three wire cable. The Common connection is optional and dependent on the RS-485 network. The cable required for this interface is shown below:



Note: Terminating resistors are generally not required on the RS-485 network, unless you are experiencing communication problems that can be attributed to signal echoes or reflections. In this case, install a 120 ohm terminating resistor on the RS-485 line.

9.3.4 RS-422



RS-485 and RS-422 Tip

If communication in the RS-422/RS-485 mode does not work at first, despite all attempts, try switching termination polarities. Some manufacturers interpret +/- and A/B polarities differently.

9.4 PTQ-N2 Status Data Area

This section contains a listing of the data contained in the PTQ-N2 status data object.

Word Offset	Variable Name	Description
0	Sequence number	This word contains a new sequence number when the status block is filled.
1	Status request block	This word will contain the value of 9250 when the operation is complete.
2	Program Scan Count	This value is incremented each scan of the program. It can be utilized to check the program scan frequency and to make sure the module is still operational.
3-4	Product Name (ASCII)	These two words contain the product name of the module in ASCII format (DNQQ).
5-6	Revision (ASCII)	These two words contain the product revision level of the firmware in ASCII format.
7-8	Operating System Revision (ASCII)	These two words contain the module's internal operating system revision level in ASCII format.
9-10	Production Run Number (ASCII)	These two words contain the production 'batch' number for the particular chip in the module in ASCII format.
11	Number of Requests-Port1	Contains the number of port messages sent out of the port
12	Number of Responses-Port1	Contains the total number of messages received on the port
13	Number of Errors Sent -Port1	Contains the total number of message errors sent out of the port.
14	Number of Errors Received-Port1	Contains the total number of message errors Recieved out of the port.

Word Offset	Variable Name	Description
15	Number of Requests-Port2	Contains the number of port messages sent out of the port
16	Number of Responses-Port2	Contains the total number of messages received on the port
17	Number of Errors Sent -Port2	Contains the total number of message errors sent out of the port.
18	Number of Errors Received-Port2	Contains the total number of message errors Received out of the port.
19	Backplane Transfer Writes	Contains the total number of write blocks transferred from the processor to the module
20	Backplane Transfer Reads	Contains the total number of read blocks transferred from the module to the processor
21	Reserved	Reserved
22	Reserved	Reserved
23	Reserved	Reserved
24	BackPlane Transfer Errors	Contains the total number of block errors recognized by the module
25	Pass Thru Received	Pass thru request received on both ports
26	Current Error - Port 1	this field contains the value of the current error code returned
27	Last Error - Port 1	this field contains the value of the last error code returned
28	Current Error - Port 2	this field contains the value of the current error code returned
29	Last Error - Port 2	this field contains the value of the last error code returned
30-63	Reserved	Reserved

9.5 N2 Data Object

Network Point Type	Network Point Address	Unit	Description	Notes
AI	1	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file, for example Analog Input Object Count: 16
AI	…	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Analog Input Object Count: 16
AI	300	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Analog Input Object Count: 16
BI	1	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Binary Input Object Count: 16

Network Point Type	Network Point Address	Unit	Description	Notes
BI	...	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Binary Input Object Count: 16
BI	960	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Binary Input Object Count: 16
AO	1	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Analog Output Object Count: 16
AO	...	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Analog Output Object Count: 16
AO	256	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Analog Output Object Count: 16
BO	1	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. That is, Binary Output Object Count: 16
BO	...	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Analog Output Object Count: 16
BO	960	User Defined in Ladder Program	User Defined in Ladder Program	Actual number of points supported is defined in configuration file. for example Analog Output Object Count: 16

ADF points are not supported. A write to an ADF point will return A. A read from an ADF point will return a status of unreliable and data of zero.

ADI points are not supported. A write to an ADI point will return A. A read from an ADI point will return a status of unreliable and data of zero.

BD points are not supported. A write to an BD point will return A. A read from an BD point will return a status of unreliable and data of zero.

9.6 N2 Error Codes

The Slave Error Table is a 20 word block. The location of the Error Table is determined by the Slave Error Table Pointer parameter in the Configuration Block. The structure of the data block is as follows:

Word	Description
Port 1	
0	Current port status
1	Last error condition
2	Total Messages to this slave
3	Total Msg responses from this slave
4	Total Msgs seen by this slave
Port 2	
5	Current port status
6	Last error condition
7	Total Messages to this slave
8	Total Msg responses from this slave
9	Total Msgs seen by this slave
System Information	
10-11	Product Name (ASCII)
12-13	Revision (ASCII)
14	Operating System Rev(ASCII)
15	Production Run Number (ASCII)
16-19	Spare

9.6.1 Current Port Error Status

This value represents the current value of the error code for the port. This value will only be valid if the port is configured as a Slave. The possible values are described in the following section.

Code	Description
0	All OK
1	Bad Command
2	Checksum Error
3	Recv buffer overflow
5	Command Data Error
16	Data Register Addr out of range
17	Field Data Error
18	Command Rejected
20	Unit not Warm Started
255	TX Timeout – RTS/CTS jumper missing

9.6.2 Last Error Code

This value is the last error code transmitted to the master by this slave port.

9.6.3 Total Messages to This Slave

This value represents the total number of messages that have matched this slaves address on this port, whether the slave actually determined them to be good (worthy of response) or not.

9.6.4 Total Message Responses From This Slave

This value represents the number of good (non-error) responses that the slave has sent to the master on this port. The presumption is that if the slave is responding, the message was good.

9.6.5 Total Messages Seen By This Slave

This value represents the total number of commands seen by the slave on this port, regardless of the slave address.

Note: All counters in the Slave Error Table will rollover to 0 after reaching 65535

9.6.6 Product Name

These two words represent the product name of the module in an ASCII representation. In the case of the N2 product, the letters "N2" should be displayed when placing the programming software in the ASCII data representation mode.

9.6.7 Revision

These two words represent the product revision level of the firmware in an ASCII representation. An example of the data displayed would be ‘1.00’ when placing the programming software in the ASCII data representation mode.

9.6.8 Operating System Revision

These two words represent the module’s internal operating system revision level in an ASCII representation.

9.6.9 Production Run Number

This number represents the ‘batch’ number that your particular chip belongs to in an ASCII representation.

10 Support, Service & Warranty

In This Chapter

Be sure and read the full Warranty that can be found on our web site at www.prosoft-technology.com for details and other terms and conditions. The content in this summary is subject to change without notice. The content is current at date of publication.

ProSoft Technology, Inc. strives to provide meaningful support to its customers. Should any questions or problems arise, please feel free to contact us at:

Internet	Web Site: http://www.prosoft-technology.com/support
	E-mail address: support@prosoft-technology.com

Those of us at ProSoft Technology, Inc. want to provide the best and quickest support possible, so before calling please have the following information available. You may wish to fax this information to us prior to calling.

1. Product Version Number
2. System architecture
3. Network details

In the case of hardware, we will also need the following information:

1. Module configuration and contents of file
2. Module Operation
3. Configuration/Debug status information
4. LED patterns
5. Information about the processor and user data files as viewed through the development software and LED patterns on the processor
6. Details about the networked devices interfaced, if any

For technical support calls within the United States, an after-hours answering system allows pager access to one of our qualified technical and/or application support engineers at any time to answer your questions.

10.1 How to Contact Us: Sales and Support

All ProSoft Technology Products are backed with full technical support. Contact our worldwide Technical Support team and Customer Service representatives directly by phone or email:

USA / Latin America (excluding Brasil) (Office in California)

+1(661) 716-5100
+1(661) 716-5101 (Fax)
1675 Chester Avenue, 4th Floor
Bakersfield, California 93301
U.S.A.
+1.661.716.5100, support@prosoft-technology.com
Languages spoken include: English, Spanish

Asia Pacific Sales (office in Malaysia)

+603.7724.2080
+603.7724.2090 (Fax)
C210, Damansara Intan,
1 Jalan SS20/27, 47400 Petaling Jaya
Selangor, Malaysia
+603.7724.2080, asiapc@prosoft-technology.com
Languages spoken include: Chinese, Japanese, English

Asia Pacific Support (office in China)

+86.21.64518356 x 8011
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Languages spoken include: Chinese, English

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+33 (0) 5.34.36.87.20
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Languages spoken include: French, English

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Vila Mariana - São Paulo
Cep: 04101-300 - Brasil
+55-11-5084-5178, eduardo@prosoft-technology.com
Languages spoken include: Portuguese, English

10.2 Return Material Authorization (RMA) Policies and Conditions

The following RMA Policies and Conditions apply to any returned product. These RMA Policies are subject to change by ProSoft without notice. For warranty information, see Section C below entitled "Limited Warranty". In the event of any inconsistency between the RMA Policies and the Warranty, the Warranty shall govern.

10.2.1 All Product Returns

1 In order to return a Product for repair, exchange or otherwise, the Customer must obtain a Returned Material Authorization (RMA) number from ProSoft and comply with ProSoft shipping instructions.
2 In the event that the Customer experiences a problem with the Product for any reason, Customer should contact ProSoft Technical Support at one of the telephone numbers listed above in Section A. A Technical Support Engineer will request several tests in an attempt to isolate the problem. If after these tests are completed, the Product is found to be the source of the problem, ProSoft will issue an RMA.
3 All returned Products must be shipped freight prepaid, in the original shipping container or equivalent, to the location specified by ProSoft, and be accompanied by proof of purchase. The RMA number is to be prominently marked on the outside of the shipping box. Customer agrees to insure the Product or assume the risk of loss or damage in transit. Products shipped to ProSoft without an RMA number will be returned to the Customer, freight collect. Contact ProSoft Technical Support for further information.
4 Out of warranty returns are not allowed on RadioLinx accessories such as antennas, cables, and brackets.

The following policy applies for Non-Warranty Credit Returns:

A 10% Restocking Fee if Factory Seal is *not* broken
B 20% Restocking Fee if Factory Seal is broken

ProSoft retains the right, in its absolute and sole discretion, to reject any non-warranty returns for credit if the return is not requested within three (3) months after shipment of the Product to Customer, if the Customer fails to comply with ProSoft's shipping instructions, or if the Customer fails to return the Product to ProSoft within six (6) months after Product was originally shipped.

10.3 Procedures for Return of Units Under Warranty

1 A Technical Support Engineer must pre-approve all product returns.
2 Module is repaired or replaced after a Return Material Authorization Number is entered and a replacement order is generated.
3 Credit for the warranted item is issued within 10 business days after receipt of product and evaluation of the defect has been performed by ProSoft. The credit will only be issued provided the product is returned with a valid Return Material Authorization Number and in accordance with ProSoft's shipping instructions.

a) If no defect is found, a credit is issued.

b) If a defect is found and is determined to be customer generated or if the defect is otherwise not covered by ProSoft's Warranty, or if the module is not repairable, a credit is not issued and payment of the replacement module is due.

10.4 Procedures for Return of Units Out of Warranty

1 Customer sends unit in for evaluation.

2 If no defect is found, Customer will be charged the equivalent of US $100 plus shipping, duties and taxes that may apply. A new Purchase Order will be required for this evaluation fee.

If the unit is repaired the charge to the Customer will be 30%* of the list price plus any shipping, duties and taxes that may apply. A new Purchase Order will be required for a product repair.

3 For an immediate exchange, a new module may be purchased and sent to Customer while repair work is being performed. Credit for purchase of the new module will be issued when the new module is returned in accordance with ProSoft's shipping instructions and subject to ProSoft's policy on non-warranty returns. This is in addition to charges for repair of the old module and any associated charges to Customer.

4 If, upon contacting ProSoft Customer Service, the Customer is informed that unit is believed to be unrepairable, the Customer may choose to send unit in for evaluation to determine if the repair can be made. Customer will pay shipping, duties and taxes that may apply. If unit cannot be repaired, the Customer may purchase a new unit.

10.4.1 Un-repairable Units

- 3150-All
- 3750
- 3600-All
- 3700
- 3170-All
- 3250
- 1560 can be repaired, if defect is the power supply
- 1550 can be repaired, if defect is the power supply
- 3350
- 3300
- 1500-All

*** 30% of list price is an estimated repair cost only. The actual cost of repairs will be determined when the module is received by ProSoft and evaluated for needed repairs.**

Purchasing Warranty Extension

As detailed below in ProSoft's Warranty, the standard Warranty Period is one year (or in the case of RadioLinx modules, three years) from the date of delivery. The Warranty Period may be extended for an additional charge, as follows:

- Additional 1 year = 10% of list price
- Additional 2 years = 20% of list price
- Additional 3 years = 30% of list price

10.5 LIMITED WARRANTY

This Limited Warranty ("Warranty") governs all sales of hardware, software and other products (collectively, "Product") manufactured and/or offered for sale by ProSoft, and all related services provided by ProSoft, including maintenance, repair, warranty exchange, and service programs (collectively, "Services"). By purchasing or using the Product or Services, the individual or entity purchasing or using the Product or Services ("Customer") agrees to all of the terms and provisions (collectively, the "Terms") of this Limited Warranty. All sales of software or other intellectual property are, in addition, subject to any license agreement accompanying such software or other intellectual property.

10.5.1 What Is Covered By This Warranty

A *Warranty On New Products*: ProSoft warrants, to the original purchaser only, that the Product that is the subject of the sale will (1) conform to and perform in accordance with published specifications prepared, approved, and issued by ProSoft, and (2) will be free from defects in material or workmanship; provided these warranties only cover Product that is sold as new. This Warranty expires one year (or in the case of RadioLinx modules, three years) from the date of shipment (the "Warranty Period"). If the Customer discovers within the Warranty Period a failure of the Product to conform to specifications, or a defect in material or workmanship of the Product, the Customer must promptly notify ProSoft by fax, email or telephone. In no event may that notification be received by ProSoft later than 15 months (or in the case of RadioLinx modules, 39 months) from the date of delivery. Within a reasonable time after notification, ProSoft will correct any failure of the Product to conform to specifications or any defect in material or workmanship of the Product, with either new or used replacement parts. Such repair, including both parts and labor, will be performed at ProSoft's expense. All warranty service will be performed at service centers designated by ProSoft. If ProSoft is unable to repair the Product to conform to this Warranty after a reasonable number of attempts, ProSoft will provide, at its option, one of the following: a replacement product, a full refund of the purchase price or a credit in the amount of the purchase price. All replaced product and parts become the property of ProSoft. These remedies are the Customer's only remedies for breach of warranty.

B *Warranty On Services*: Material and labor used by ProSoft to repair a verified malfunction or defect are warranted on the terms specified above for new Product, provided said warranty will be for the period remaining on the original new equipment warranty or, if the original warranty is no longer in effect, for a period of 90 days from the date of repair.

C The Warranty Period for RadioLinx accessories (such as antennas, cables, brackets, etc.) are the same as for RadioLinx modules, that is, three years from the date of shipment.

10.5.2 What Is Not Covered By This Warranty

A ProSoft makes no representation or warranty, expressed or implied, that the operation of software purchased from ProSoft will be uninterrupted or error free or that the functions contained in the software will meet or satisfy the purchaser's intended use or requirements; the Customer assumes complete responsibility for decisions made or actions taken based on information obtained using ProSoft software.

B With the exception of RadioLinx accessories referenced in paragraph 1(c) this Warranty does not cover any product, components, or parts not manufactured by ProSoft.

C This Warranty also does not cover the failure of the Product to perform specified functions, or any other non-conformance, defects, losses or damages caused by or attributable to any of the following: (i) shipping; (ii) improper installation or other failure of Customer to adhere to ProSoft's specifications or instructions; (iii) unauthorized repair or maintenance; (iv) attachments, equipment, options, parts, software, or user-created programming (including, but not limited to, programs developed with any IEC 61131-3 programming languages, or "C") not furnished by ProSoft; (v) use of the Product for purposes other than those for which it was designed; (vi) any other abuse, misapplication, neglect or misuse by the Customer; (vii) accident, improper testing or causes external to the Product such as, but not limited to, exposure to extremes of temperature or humidity, power failure or power surges outside of the limits indicated on the product specifications; or (viii) disasters such as fire, flood, earthquake, wind or lightning.

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10.5.3 DISCLAIMER REGARDING HIGH RISK ACTIVITIES

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10.5.4 DISCLAIMER OF ALL OTHER WARRANTIES

THE WARRANTIES SET FORTH IN PARAGRAPH 1 ABOVE ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

*10.5.5 LIMITATION OF REMEDIES***

IN NO EVENT WILL PROSOFT (OR ITS DEALER) BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL THEORY. DAMAGES THAT PROSOFT AND ITS DEALER WILL NOT BE RESPONSIBLE FOR INCLUDE, BUT ARE NOT LIMITED TO: LOSS OF PROFITS; LOSS OF SAVINGS OR REVENUE; LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT; LOSS OF DATA; COST OF CAPITAL; COST OF ANY SUBSTITUTE EQUIPMENT, FACILITIES, OR SERVICES; DOWNTIME; THE CLAIMS OF THIRD PARTIES, INCLUDING CUSTOMERS OF THE PURCHASER; AND INJURY TO PROPERTY.

** Some areas do not allow time limitations on an implied warranty, or allow the exclusion or limitation of incidental or consequential damages. In such areas the above limitations may not apply. This Warranty gives you specific legal rights, and you may also have other rights which vary from place to place.

10.5.6 Time Limit for Bringing Suit

Any action for breach of warranty must be commenced within 15 months (or in the case of RadioLinx modules, 39 months) following shipment of the Product.

10.5.7 No Other Warranties

Unless modified in writing and signed by both parties, this Warranty is understood to be the complete and exclusive agreement between the parties, suspending all oral or written prior agreements and all other communications between the parties relating to the subject matter of this Warranty, including statements made by salesperson. No employee of ProSoft or any other party is authorized to make any warranty in addition to those made in this Warranty. The Customer is warned, therefore, to check this Warranty carefully to see that it correctly reflects those terms that are important to the Customer.

10.5.8 Intellectual Property

A Any documentation included with Product purchased from ProSoft is protected by copyright and may not be photocopied or reproduced in any form without prior written consent from ProSoft.

B ProSoft's technical specifications and documentation that are included with the Product are subject to editing and modification without notice.

C Transfer of title shall not operate to convey to Customer any right to make, or have made, any Product supplied by ProSoft.

D Customer is granted no right or license to use any software or other intellectual property in any manner or for any purpose not expressly permitted by any license agreement accompanying such software or other intellectual property.

E Customer agrees that it shall not, and shall not authorize others to, copy software provided by ProSoft (except as expressly permitted in any license agreement accompanying such software); transfer software to a third party separately from the Product; modify, alter, translate, decode, decompile, disassemble, reverse-engineer or otherwise attempt to derive the source code of the software or create derivative works based on the software; export the software or underlying technology in contravention of applicable US and international export laws and regulations; or use the software other than as authorized in connection with use of Product.

10.5.9 Additional Restrictions Relating To Software And Other Intellectual Property

In addition to complying with the Terms of this Warranty, Customers purchasing software or other intellectual property shall comply with any license agreement accompanying such software or other intellectual property. Failure to do so may void this Warranty with respect to such software and/or other intellectual property.

10.5.10 Allocation of risks

This Warranty allocates the risk of product failure between ProSoft and the Customer. This allocation is recognized by both parties and is reflected in the price of the goods. The Customer acknowledges that it has read this Warranty, understands it, and is bound by its Terms.

10.5.11 Controlling Law and Severability

This Warranty shall be governed by and construed in accordance with the laws of the United States and the domestic laws of the State of California, without reference to its conflicts of law provisions. If for any reason a court of competent jurisdiction finds any provisions of this Warranty, or a portion thereof, to be unenforceable, that provision shall be enforced to the maximum extent permissible and the remainder of this Warranty shall remain in full force and effect. Any cause of action with respect to the Product or Services must be instituted in a court of competent jurisdiction in the State of California.

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