ProSoft TECHNOLOGY

Where Automation Connects.

PDPMV1

Stand-alone Gateway

PROFIBUS DPV1 Master

December 13, 2022

PROTOCOL MANUAL

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How to Contact Us

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

PDPMV1 Protocol Manual
For Public Use.

December 13, 2022

ProSoft Technology® Product Documentation

In an effort to conserve paper, ProSoft Technology no longer includes printed manuals with our product shipments. User Manuals, Datasheets, Sample Ladder Files, and Configuration Files are at: www.prosoft-technology.com

Important Installation Instructions

Power, Input, and Output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods, Article 501-4 (b) of the National Electrical Code, NFPA 70 for installation in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations in Canada, and in accordance with the authority having jurisdiction. The following warnings must be heeded:

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV. 2;

WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

THIS DEVICE SHALL BE POWERED BY CLASS 2 OUTPUTS ONLY.

ProLinx® Products Warnings

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DÉCONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

ProLinx Gateways with Ethernet Ports

Series C ProLinx™ Gateways with Ethernet ports do **NOT** include the HTML Web Server. The HTML Web Server must be ordered as an option. This option requires a factory-installed hardware addition. The HTML Web Server now supports:

- 8 MB file storage for HTML files and associated graphics files (previously limited to 384K)
- 32K maximum HTML page size (previously limited to 16K)

To upgrade a previously purchased Series C model

Contact your ProSoft Technology distributor to order the upgrade and obtain a Returned Merchandise Authorization (RMA) to return the unit to ProSoft Technology.

Contents

1 Functional Overview

The PROFIBUS Master protocol driver exists as a single port implementation. The driver can be configured as a Class 1 and Class 2 PROFIBUS Master to interface with other PROFIBUS slave devices. The unit is also used for configuration of the nodes on the PROFIBUS network. It provides access to standard and extended diagnostic information, as well as freeze/sync capability, Acyclic Communication (DPV1, Class 1 and 2), and Alarm Handling (DPV1). The PROFIBUS Master port can be used to continuously interface with PROFIBUS slave devices over a serial communication interface (RS-485).

1.1 About the PROFIBUS Protocol

PROFIBUS (Process Field Bus) is a widely used, open-standards protocol created by a consortium of European factory automation suppliers in 1989.

PROFIBUS is a Master/slave protocol. The Master establishes a connection to the remote slave. When the connection is established, the Master sends the PROFIBUS commands to the slave.

The ProLinx PDPMV1 gateway unit acts as an input/output module between devices on a PROFIBUS DP network and any other communication protocol. The gateway uses an internal database to send data and mailbox requests and responses to all PROFIBUS slaves on the PROFIBUS DP network.

PROFIBUS supports a variety of network types. The network type supported by the PLX-PDPMV1 gateway is PROFIBUS DP version 1.0, which is designed for remote I/O systems, motor control centers, and variable speed drives.

1.2 Compatibility Note

The PDPMV1 product is not backward-compatible with the PDPM product due to new enhancements and command structure. The PDPMV1 PROFIBUS DP-V1 Master gateway provides enhanced features beyond the PDPM DP-V0 gateway as follows:

1. Increased Cyclic I/O. The PDPMV1 provides 768 Words of Input and 768 Words of Output.
2. ProSoft Configuration Builder (PCB) complete support. The PCB provides module-level configuration and integrated PROFIBUS Master network configuration support.
3. The PDPMV1 Master supports DP-V1 Class 1 or Class 2 DPV1 features such as acyclic communication with slaves for parameterization and other slave settings, alarm handling, extended diagnostics.

1.3 PROFIBUS DP Architecture

The PROFIBUS DP-V1 Master network supports multiple Master systems with several slaves.

The following table shows the most important features of PROFIBUS DP-V1 Master:

Standard	**EIN 501 70** **DIN 19245**
Transmission equipment (Physical)	EIA RS-485 IEC 1158-2 (through link or coupler) Fiber Optic Cable (not available)
Transfer procedure	Half-duplex
Bus topology	Linear bus with active bus termination
Bus cable type	Shielded twisted pair conductors
Connector	9-pin D-Sub
Number of nodes on the bus	Max: 32 with no repeaters Max: 125 with 3 repeaters in 4 segments

1.3.1 How Cable Length Affects Communication Rate

Max Bus Cable Length Per Segment	**Baud Rates (for 12 Mbps cable)**
1.2 km	9.6 kbit/sec
1.2 km	19.2 kbit/sec
1.2 km	93.75 kbit/sec
1.0 km	187.5 kbit/sec
0.5 km	500 kbit/sec
0.2 km	1.5 Mbit/sec
0.1 km	3 Mbit/sec
0.1 km	8 Mbit/sec
0.1 km	12 Mbit/sec

1.3.2 Bus Access

Two different bus access procedures handle the various communication requirements for the PROFIBUS DP-V1 Master topology:

- Token Passing
- Polling

1.3.3 Token Passing

Token passing ring is the basis for communication between the more complex, active stations. All stations have the same rights in that a token is passed from station to station in a logical ring. The token is passed to each station with a maximum, definable token cycle time. A station is given transmission rights for the duration of time that it has the token.

1.3.4 Master/Slave Polling

Master/slave polling guarantees a cyclic, real-time based data exchange between the station with transmission rights, the active station, and its subordinates, the passive stations. In this case, the Master is able to pass data to the slave and/or receive data. The services in layer 2 (field-bus data link in ISO-OSI reference model) organize this communication.

1.4 Communication Types

In addition to point-to-point data transfer, the PROFIBUS protocol can also handle the following types of communication.

- Broadcast communication: An active node sends an unacknowledged message to all other nodes (Master and slaves)
- Multicast communication (control instructions): An active node sends an unacknowledged message to a group of nodes (Master and slaves)

1.5 Master/Slave Communication Phases

The communication between the Master and slaves takes place in the following phases:

- Parameterization and configuration phase
- Usable data transfer phase

Before a DP slave can be integrated into the usable data transfer phase, the parameterization and configuration phase runs a device identification test that verifies that the planned configuration matches the actual device configuration for each slave in the PROFIBUS network. The test verifies that:

- The appropriate device is present
- The device's station address matches the station address in the bus configuration
- The formats, telegram length information, and bus parameters are correct
- The number of configured inputs and outputs is correct

1.6 Gateway Internal Database

The internal database is central to the functionality of the gateway. This database is shared between all the ports on the gateway and is used as a conduit to pass information from one device on one network to one or more devices on either connected network. This permits data from devices on one communication port or network to be viewed and controlled by devices on another port or network.

In addition to data from the Master and slave ports, status and error information generated by the gateway can also be mapped into the internal database.

2 Configuration

2.1 Configuring the Gateway

Because the task of configuring the PROFIBUS network can be challenging, ProSoft Technology has provided a configuration tool called ProSoft Configuration Builder (PCB) that will help you with the following tasks:

- Creating a configuration project (page 13)
- Setting gateway parameters (page 15)
- Configuring the PROFIBUS network (page 43) (Master and slaves)
- Downloading the project to the gateway (page 61)

The following topics of this chapter explain each task step-by-step.

2.1.1 Installing ProSoft Configuration Builder Software

You must install the *ProSoft Configuration Builder (PCB)* software to configure the gateway.

1. Open your web browser and navigate to www.prosoft-technology.com
2. Click the **DOWNLOAD HERE** link to download the latest version of *ProSoft Configuration Builder*.
3. Choose **SAVE** or **SAVE FILE** when prompted.
4. Save the file to your *Windows Desktop*, so that you can find it easily when you have finished downloading.
5. When the download is complete, locate and open the file, and then follow the instructions on your screen to install the program.

Using the Online Help

Most of the information needed to help you use ProSoft Configuration Builder is provided in a Help System that is always available whenever you are running ProSoft Configuration Builder. The Help System does not require an Internet connection.

To view the help pages, start ProSoft Configuration Builder, open the **HELP** menu, and then choose **CONTENTS.**

Adding a Location to an Existing Project File

1. Right-click the **PROJECT** icon and select **ADD LOCATION**. A new *Location* icon appears.

   or

   Select the **PROJECT** icon.
2. Choose **PROJECT** from the **PROJECT** menu, and then choose **ADD LOCATION**. A new *Location* icon appears.

   or

   If the *Default Location* has not been named (is not already an existing project), right-click the folder and choose **RENAME**.
3. Type in the *Location* name.

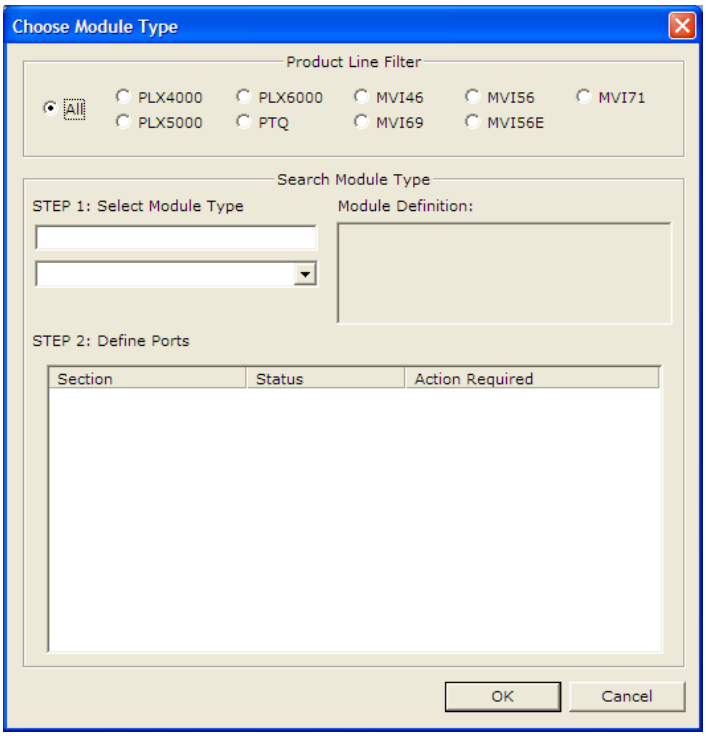
Adding a Project to an Existing Project File

1 Select the **DEFAULT PROJECT** icon.
2 Open the **PROJECT** menu, choose **PROJECT,** and then choose **ADD PROJECT**. This action opens a new *Project* folder.

Adding a Module

Begin the process of creating your custom application configuration by selecting the module type of your ProLinx gateway.

1 Double-click the **DEFAULT MODULE** icon to open the *Choose Module Type* dialog box.



2 In 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

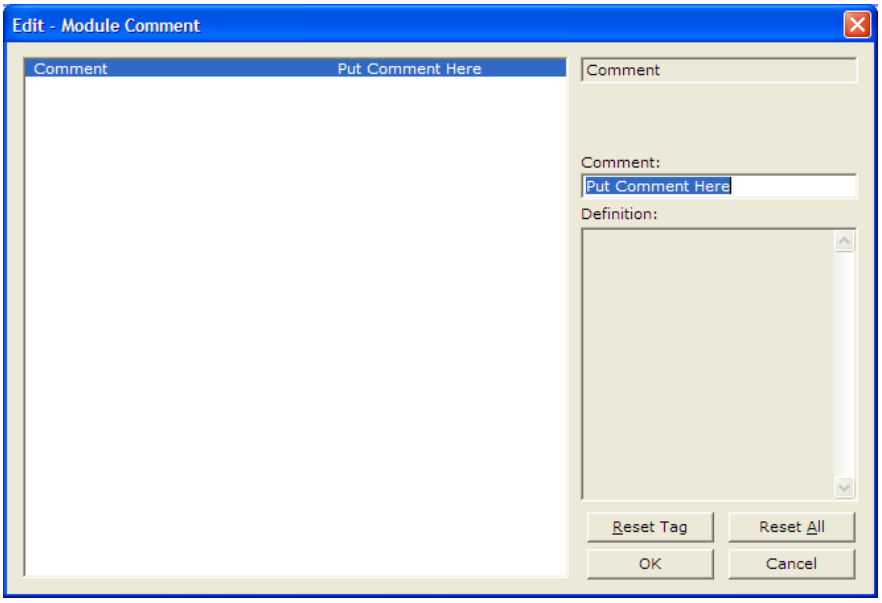
1 Select the **LOCATION** icon.
2 From the **PROJECT** menu, select **LOCATION**, and then select **ADD MODULE**.

Configuring Gateway Parameters

1 Click the **[+]** sign next to the module icon to expand gateway information.
2 Click the **[+]** sign next to any icon to view gateway information and configuration options.
3 Double-click any icon to open an *Edit* dialog box.
4 To edit a parameter, select the parameter in the left pane and make your changes in the right pane.
5 Click **OK** to save your changes.

Creating Optional Comment Entries

1 Click the **[+]** to the left of the Comment icon to expand the module comments.
2 Double-click the Module Comment icon. The *Edit - Module Comment* dialog box appears.



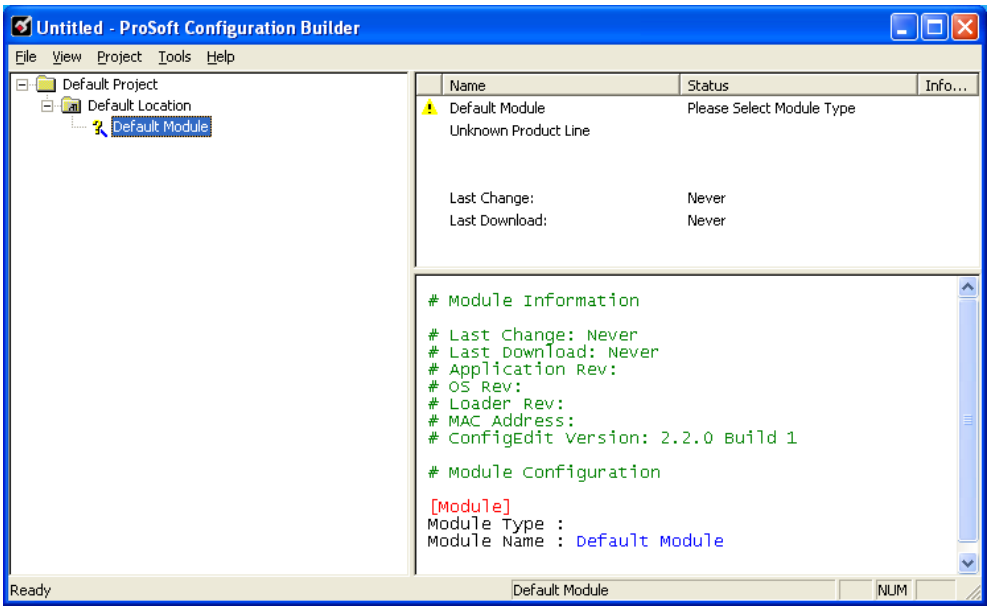
3 Enter your comment and click **OK** to save your changes.

Printing 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 In the *View Configuration* window, open the **FILE** menu, and choose **PRINT**. This action opens the *Print* dialog box.
4 In the *Print* dialog box, choose the printer to use from the drop-down list, select printing options, and then click **OK**.

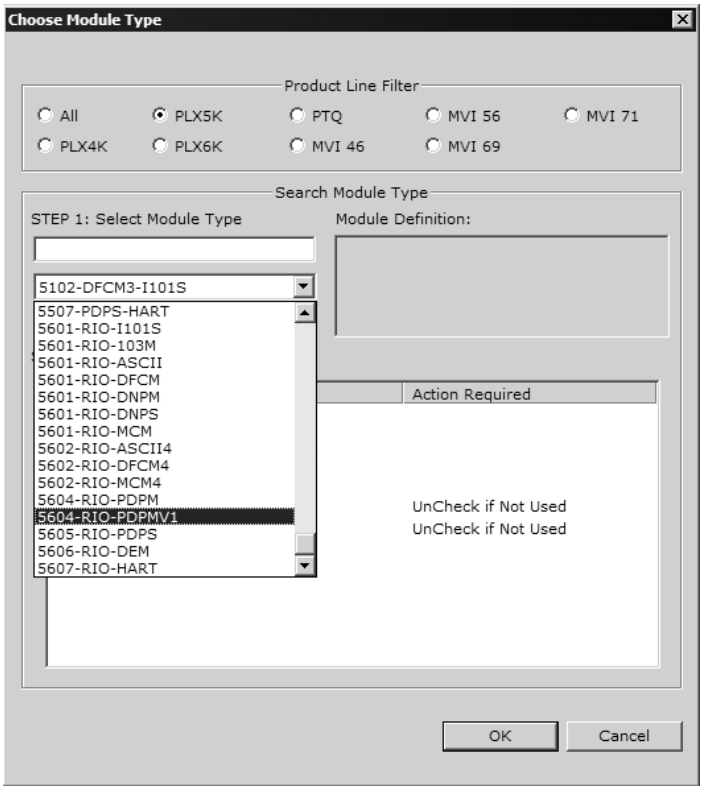
2.1.2 Setting Up the Project

To begin, start the ProSoft Configuration Builder utility. 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 PDPMV1 gateway to the project.

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

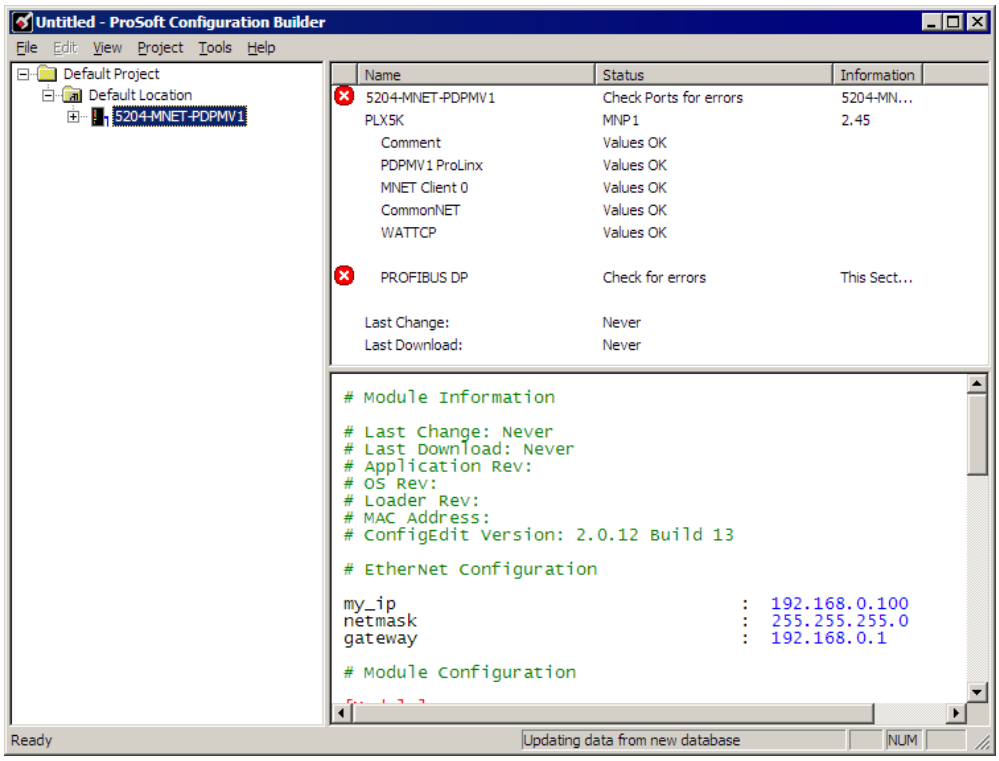


3. In the *Product Line Filter* area of the dialog box, select the gateway series (PLX5K for wired gateways, or PLX6K for wireless gateways). In the *Select Module Type* dropdown list, select the model number for your gateway (for example, 5204-MNET-PDPMV1), and then click **OK** to save your settings and return to the *ProSoft Configuration Builder* window.

The next task is to set the gateway parameters.

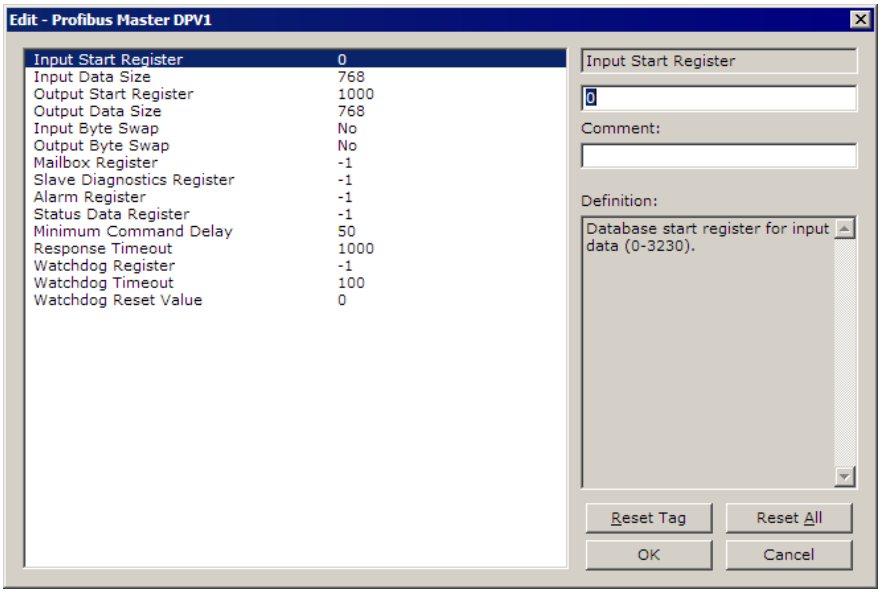
2.1.3 Setting Gateway Parameters

Notice that the contents of the information pane and the configuration pane changed when you added the PDPMV1 gateway to the project. The red "X" icon indicates that the gateway's configuration is incomplete.



1. Click the plus sign **[+]** next to the module icon to expand the module tree, and then expand the **PLX PDPM-V1** tree.
2. Double-click the **PROFIBUS MASTER DPV1** object. This action opens the *Edit* dialog box.
3. In the *Edit* dialog box, enter the values for *Input Data Size* and *Output Data Size* (PROFIBUS input and output point words) to match the values required by your application. To change a value, select the parameter to modify in the left pane, and then type the new value in the edit field in the right pane.

For the sample application, the input and output data size values are fixed to a value of 768.



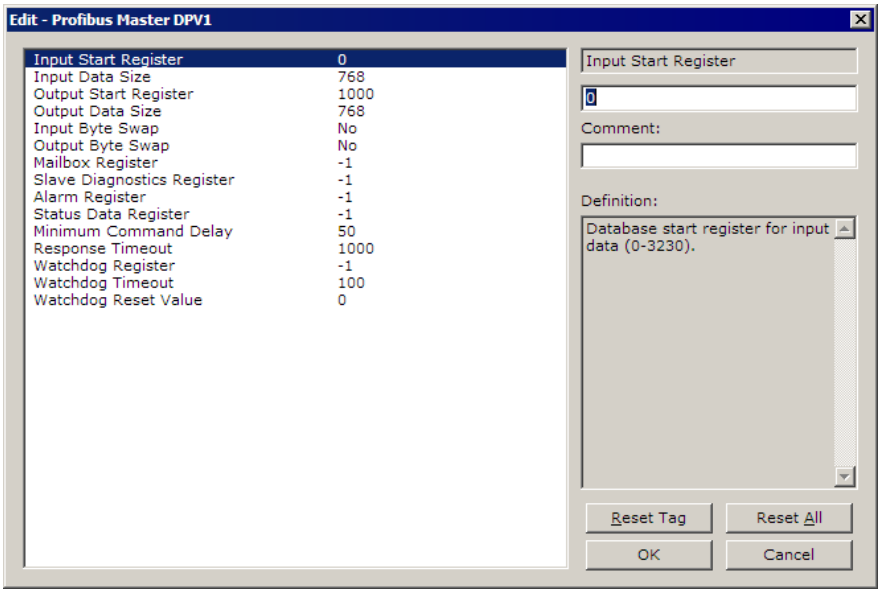
4 Click **OK** to save your settings and return to the *ProSoft Configuration Builder* window.

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.

2.2 PROFIBUS Master DPV1



2.2.1 Input Start Register

0 to **3230**

Database start register for input data.

2.2.2 Input Data Size

0 to **768**

Total number of *PROFIBUS Input Words* (one word equals two bytes) from all PROFIBUS slaves. These *Input Words* will be the data received from slave devices on the PROFIBUS network.

2.2.3 Output Start Register

0 to **3230**

Database start register for output data.

2.2.4 Output Data Size

0 to **768**

Total number of *PROFIBUS Output Words* (one word equals two bytes) to be sent to all PROFIBUS slaves. These *Output Words* will be the data sent to slave devices on the PROFIBUS network.

2.2.5 Input Byte Swap

YES or **NO**

This parameter determines if the bytes in the PROFIBUS Input Data area are swapped before being stored in the gateway memory database. If the parameter is set to **NO**, no swapping will be applied. If the parameter is set to **YES**, the order of bytes in each word will be swapped before being stored in memory.

Example:

- With Input Byte Swap set to **NO**, incoming order is unchanged - ABCDEF
- With Input Byte Swap set to **YES**, each byte pair is swapped - BADCFE

2.2.6 Output Byte Swap

YES or **NO**

This parameter determines if the bytes in the PROFIBUS Output Data area are swapped before being transmitted to slaves on the PROFIBUS network. If the parameter is set to **NO**, no swapping will be applied. If the parameter is set to **YES**, the order of bytes in each word will be swapped before being transmitted.

Example:

- With Output Byte Swap set to **NO**, outgoing output order is unchanged - ABCDEF
- With Output Byte Swap set to **YES**, each output byte pair is swapped - BADCFE

2.2.7 Mailbox Register

0 to **3700**, **-1** to disable

Enter the database register for DPV1 mailbox messages, or **-1** to disable mailbox messages.

Mailbox messages can be sent through the database to the PROFIBUS Master. This functionality requires 290 registers of the database. The map of the database area utilized for this purpose is as follows.

Offset	Description
0	This is the handshake word used to tell the PROFIBUS driver when a new acyclic message is ready to send. If the value at this location is zero (0), no message will be sent. If the value is not zero, then the PROFIBUS driver will send an acyclic message using the contents of words 1 through 144. This handshake word should be set to a non-zero value only after the complete acyclic message is stored in offsets 1 to 144. After the PROFIBUS driver has added the acyclic message to the queue, this register will be set to zero (0), so that the message is not repeated and to indicate that a new acyclic message may be prepared. **NOTE:** It would be a good practice to check the value of word 145 to be sure it is set to zero (indicating that no acyclic messages are awaiting processing) before setting this word to a non-zero value, triggering an acyclic message. This will help avoid acyclic data collisions and data loss.
1 to 144	This area holds the acyclic message bytes to send. Please refer to Mailbox Messaging (page 68) for the format of this data area. **NOTE:** The header words (first 32 bytes) are stored in little-endian format and the gateway will change the order to big-endian format before sending.
145	This handshake word indicates when a new acyclic response message has been received by the PROFIBUS driver. If the value is zero (0), no response message has been received. If the value is non-zero, a response message has been received and stored in words 146 to 289. This data should be transferred by the other gateway protocol for external processing. After the acyclic message has been externally processed, a message should be returned through the other protocol that sets this address to zero, to indicate readiness to receive and process a new acyclic response message.
146 to 289	This area holds the acyclic message response bytes. Please refer to Mailbox Messaging (page 68) for the format of this data area. The header words (first 32 bytes) are stored in little-endian format to make it easier to use.

Alarm acyclic messages are sent from the PROFIBUS driver to the database if this feature is enabled by entering a valid database register in the configuration file. This feature requires 145 database registers. The format of the data area is as follows.

Offset	Description
0	This is the alarm handshake word. If the value is not zero (0), alarm data is present in the words 1 through 144. This register should be set to zero after the alarm is process, so another alarm can be passed through the database. If this register is zero (0), the database area is ready to receive a new alarm message.
1 to 144	This area holds the alarm acyclic message received by the PROFIBUS Master device. Please refer to Mailbox Messaging (page 68) for a description of this acyclic message. The header (first 32 bytes) of the message is stored in little-endian format to make it easier to process.

2.2.8 Slave Diagnostics Register

0 to **3600**, **-1** to disable

Enter the database register start location for DPV1 slave diagnostics messages, or **-1** to disable slave diagnostics.

When this register is enabled, the gateway will automatically place 378 words of collected slave diagnostic data into the specified database start register.

Each slave requires 3 words of data. Data is gathered for slaves 0 to 125. The application will poll for a new slave every 100 milliseconds.

2.2.9 Alarm Register

0 to **3900**, **-1** to disable

Enter the database register for DPV1 alarm messages, or **-1** to disable alarm messages.

2.2.10 Status Data Register

0 to **3900**, **-1** to disable

Enter the gateway memory database register for DP-V1 status data messages, or **-1** to disable status data messages.

2.2.11 Minimum Command Delay

0 to **32767**

Minimum number of milliseconds between each command.

2.2.12 Response Timeout

0 to **5000** milliseconds

Number of milliseconds to wait for response to command. The value is set depending upon the communication network used and the expected response time of the slowest device on the network.

2.2.13 Watchdog Register

The Watchdog function allows the gateway to monitor a database register, the *Watchdog Register*, to check for loss of communication with the non-PROFIBUS communication protocol. If this function is used, the other gateway protocol is expected to change the value in the *Watchdog Register* at an interval less than the amount of time specified in the *Watchdog Timeout* parameter. If the value in the *Watchdog Register* does not change within this amount of time, a communication loss is assumed and the Watchdog function will set the PROFIBUS outputs to the default value specified in the *Watchdog Reset Value* parameter. To disable this function, set this parameter to a value of **-1**.

2.2.14 Watchdog Timeout

Sets the period of time (in 0.1s increments) for the gateway to wait for communication loss detection. For example, set this parameter to 100 to set a waiting period of 10 seconds. To disable this function, set this parameter to a value of **-1**.

2.2.15 Watchdog Reset Value

Sets the value that will be sent to the PROFIBUS output byte registers upon communication loss as detected by the Watchdog function. To disable this function, set this parameter to a value of **-1**.

2.3 PROFIBUS Master Commands

Type

- *Disabled*: command will not be executed.
- *Enabled Continuous*: command will be executed as frequently as set by *Poll Interval* parameter.
- *Enabled Conditional*: command will only be executed if the values at the database at address set by *Database Register* parameter changes.
- *Enabled With Trigger*: command will be executed if database trigger value (set by *Database Trigger* parameter) is different from 0. After the command is executed then the database trigger value is automatically set to 0 (zero).

Database Register

- Database location for the operate mode if the count is set to 0 (zero).

Count

- If *Count* is equal to zero, operate mode for command is derived from the *Database Register* parameter in the gateway database. If the count is non-zero, then the value in the *Operation Mode* field is used with the command.

Poll Interval

- Sets how frequently in seconds the command will be executed if type is configured as *Enabled Continuous*.

Swap

- On requests used only for Function Code 33 (Acyclic Write).
- On responses used for Function Code 4, 23, 24 and 32.

Database Trigger

- This functionality requires the type parameter to be set as *Enabled With Trigger*. The command will be executed if the database value set by this parameter is non-zero. After the command is executed this value will be automatically set to zero.

Function

- Set Operate Mode (FC-2)
- Set Slave Mode (FC-3)
- Get Slave Diagnostic Data (FC-4)
- Get Slave Configuration (FC-5)
- Start/Stop Slaves Dynamically (FC-11/FC-12)
- Get Database Information (FC-23) (should be viewed in ASCII for CRC Values)
- Get Live List (FC-24)
- Acyclic Read (FC-32)
- Acyclic Write (FC-33)

Operation Mode

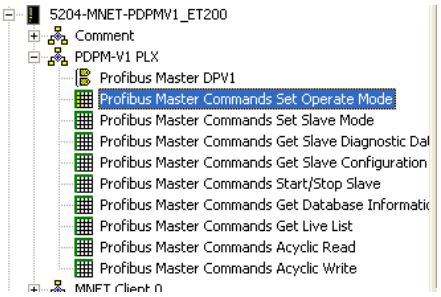
- This field is required if the count field is set to 1 and represents the new operation mode as follows:
  - 64=Stop
  - 128=Clear
  - 192=Operate

2.4 Example Mailbox Commands

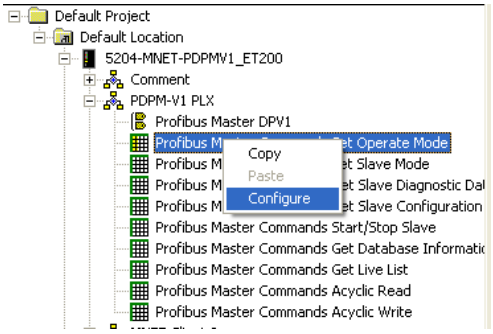
The following examples show how to issue mailbox commands for Set Operating Mode, Get Live List and Start/Stop Slaves. The rest of the supported mailbox commands are configured the same way.

2.4.1 Set Operating Mode

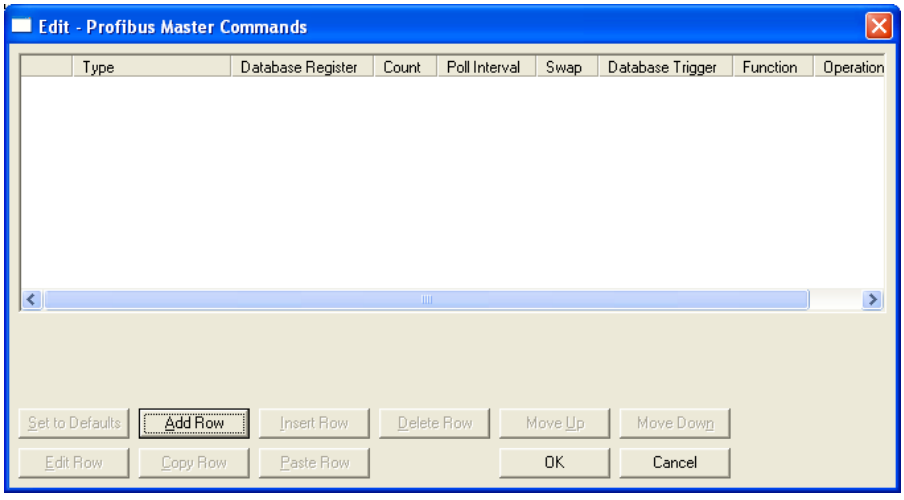
1 In ProSoft Configuration Builder (PCB), expand the **PLX PDPM-V1** section.



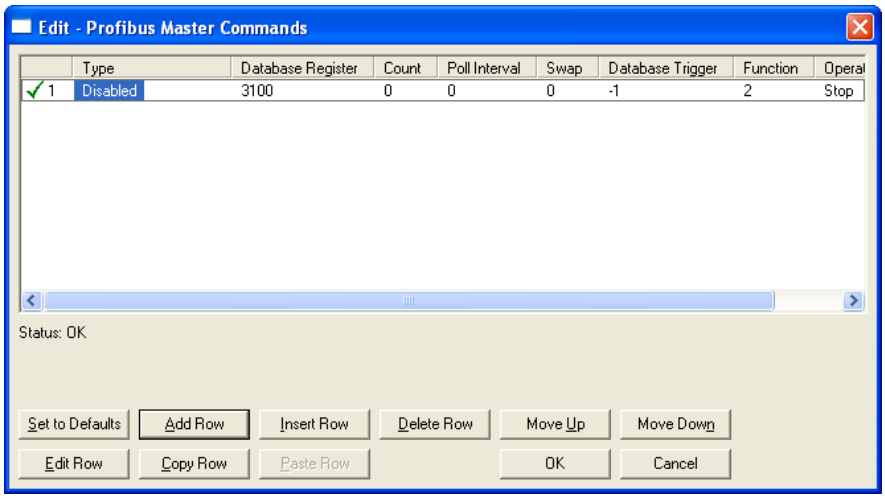
2 Select **PROFIBUS MASTER COMMANDS SET OPERATE MODE**, click the right mouse button, and then choose **CONFIGURE**.



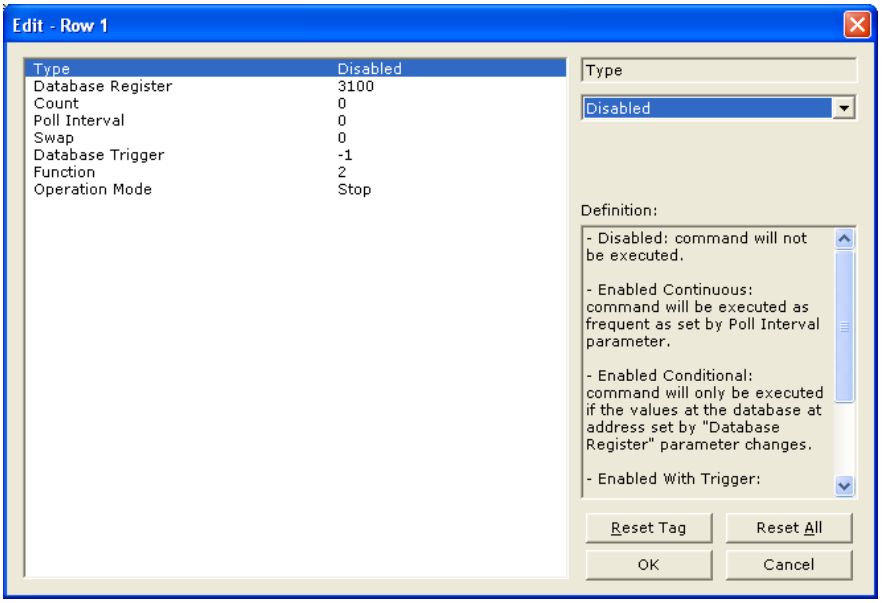
This action opens the *Edit - Profibus Master Commands* dialog box. This dialog box allows you to add commands, one row at a time, with all the necessary parameters.



3 To add a command, click **ADD ROW**. This action adds a command to the list, populated with the default values for the command.



4 To change the settings for the command, select the row, and then click **EDIT ROW**. This action opens the *Edit - Row 1* dialog box.

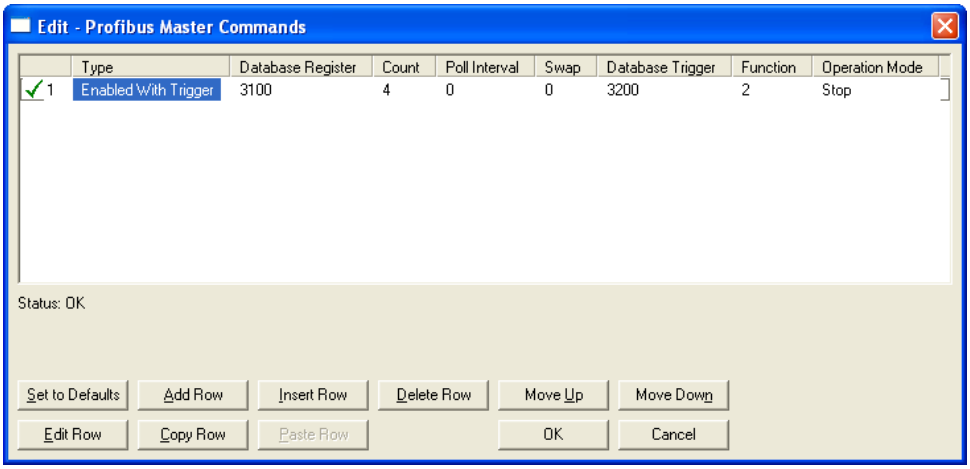


Command Layout for Set Operating Mode

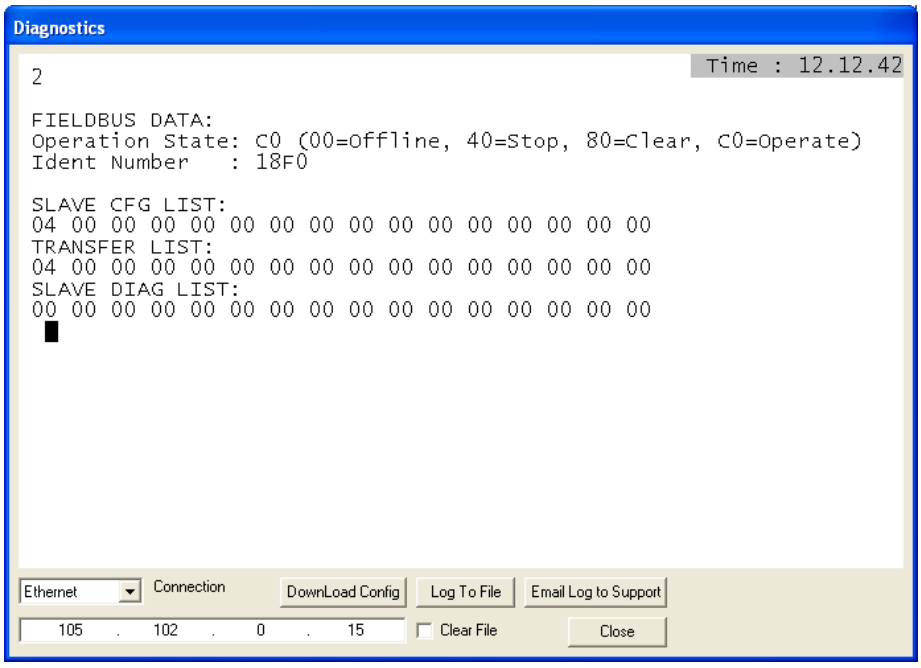
Column	Value	Description
Type	0 to 3	0 = Command Disabled 1 = Command Enabled, use poll interval 2 = Command executed when database changes (Func 2, 3, 11, 12 or 33 only) 3 = Command executed when database trigger set Not equal to 0
DB_Reg		If the count is set to 0, this is the database location for the operate mode. Place a value of 64 or 128 or 192 in parameter 1 for description.
Count		If Count is equal to 0, operate mode for command is derived from the DB_Reg in the gateway database. If the count is not equal to 0, then the value in the Param_1 field is used with the command.
Poll_Int		Only if type = 1
Swap		Not used
DB_Trigger		This functionality requires the type parameter to be set as Enabled With Trigger. The command will be executed if the database value set by this parameter is nonzero. After the command is executed this value will be automatically set to zero.
Func	2	Set Operate Mode.
Param_1	64, 128 or 192	This field is required if the count field is set to 1 and represents the new operation mode as follows: 64=Stop, 128=Clear and 192=Operate.

For this example, the command will stop the Master using database trigger register 3200. Any nonzero value placed in this register will trigger the command to execute. When the command has executed, the database register will be reset to zero.

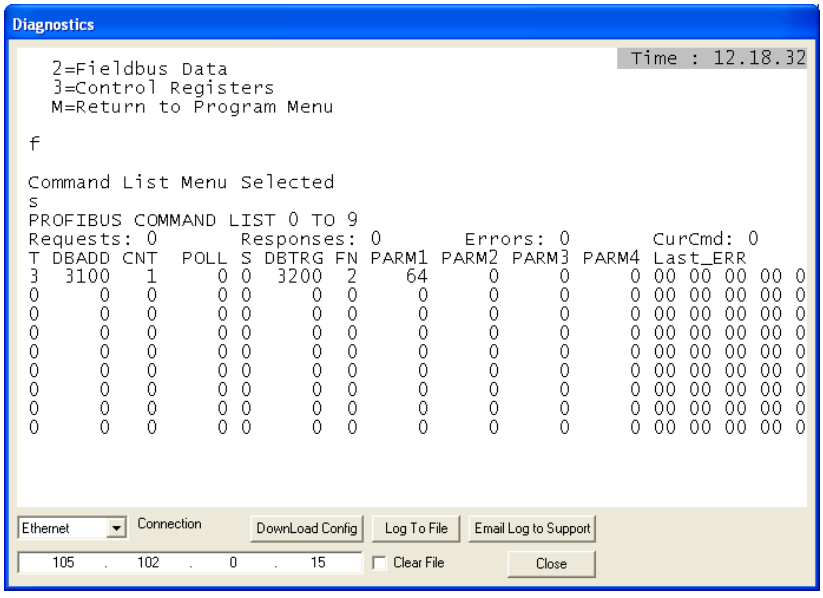
The following illustration shows the parameters that execute this command.



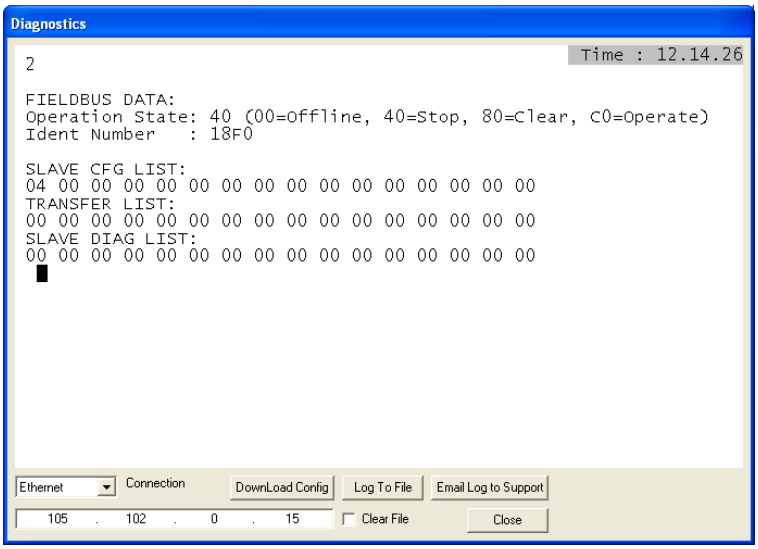
In the following illustration, from the *Diagnostics* window in ProSoft Configuration Builder, the Master's operation state is *Operate* (C0 hex). To see this screen, press **[2]** from the *Main* menu.



When you download the configuration containing this mailbox command to the gateway, and then return to the *Diagnostics* window, press **[F]** at the *Main* menu, and then press **[S]** to view the command list. The following illustration shows the command list. Notice that the first command matches the settings you made in the *Edit - Profibus Master Commands* dialog box.

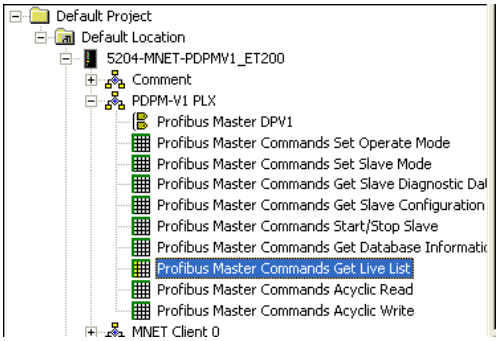


Press **[M]** to return to the *Main* menu, and then press **[2]** to view the Fieldbus Data again. Notice that the Operation State has changed to *Stop* (40 hex).

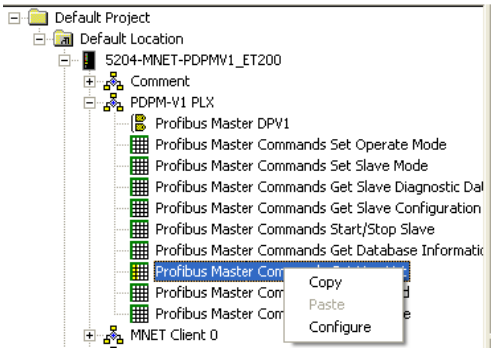


2.4.2 Get Live List

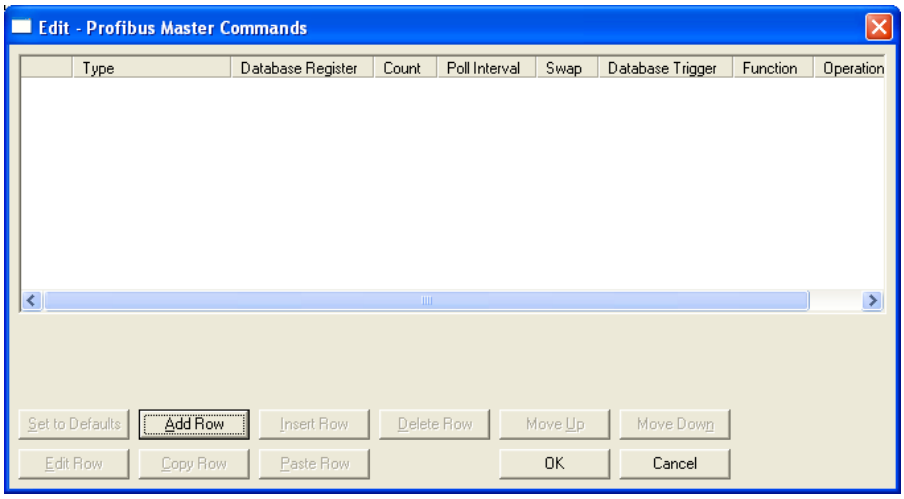
1 In ProSoft Configuration Builder (PCB), expand the **PLX PDPM-V1** section.



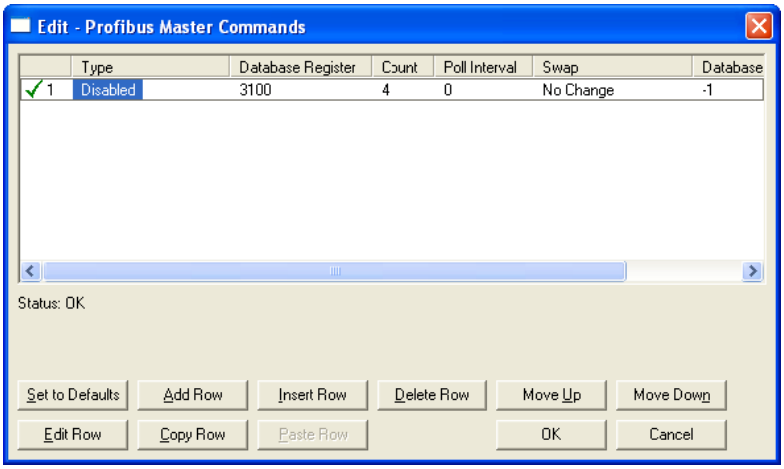
2 Select **PROFIBUS MASTER COMMANDS GET LIVE LIST**, click the right mouse button, and then choose **CONFIGURE**.



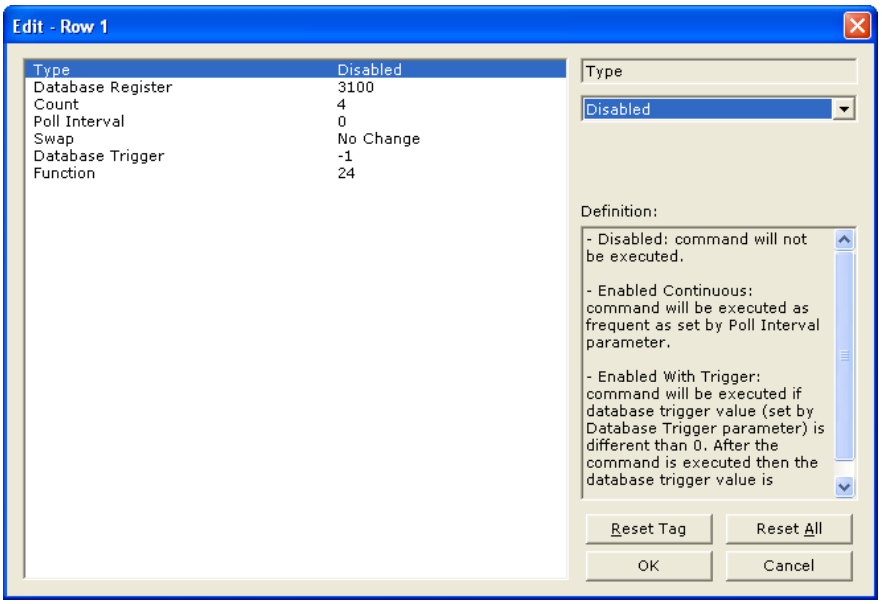
This action opens the *Edit - Profibus Master Commands* dialog box. This dialog box allows you to add commands, one row at a time, with all the necessary parameters.



3 To add a command, click **ADD ROW**. This action adds a command to the list, populated with the default values for the command.



4 To change the settings for the command, select the row, and then click **EDIT ROW**. This action opens the *Edit - Row 1* dialog box.

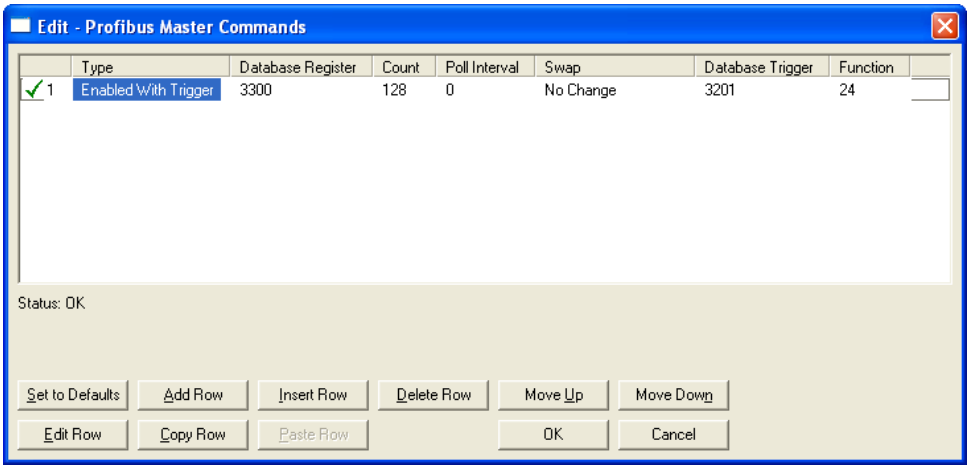


Command Layout for Get Live List

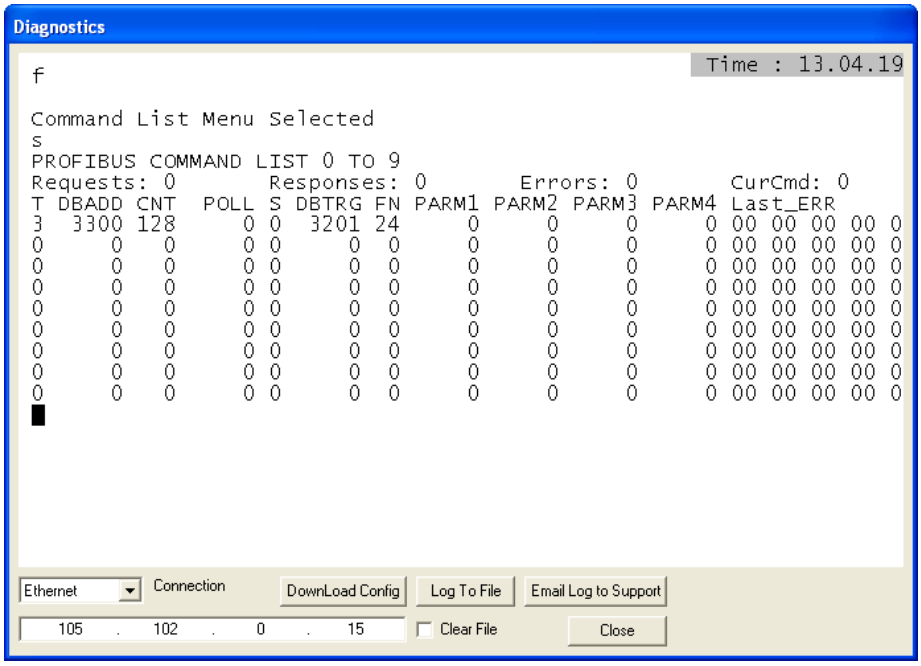
Column	Value	Description
Type	0, 1 or 3	Type 0 = Command Disabled; 1 = Command Enabled, use poll interval; 3 = Command executed when database trigger set != 0
DB_Reg		Location where the results from the command are placed.
Count		This parameter specifies the number of word registers in the reply to place in the database.
Poll_Int		Only if type = 1
Swap		Utilized on response message
DB_Trigger		This functionality requires the type parameter to be set as Enabled With Trigger. The command will be executed if the database value set by this parameter is nonzero. After the command is executed this value will be automatically set to zero.
Func	24	Get Live List

For this example, the command will retrieve the list of Masters and slaves using database trigger register 3201. Any nonzero value placed in this register will trigger the command to execute. When the command has executed, the database register will be reset to zero. Data from the response will be placed at database address 3300, with a length of 128 words.

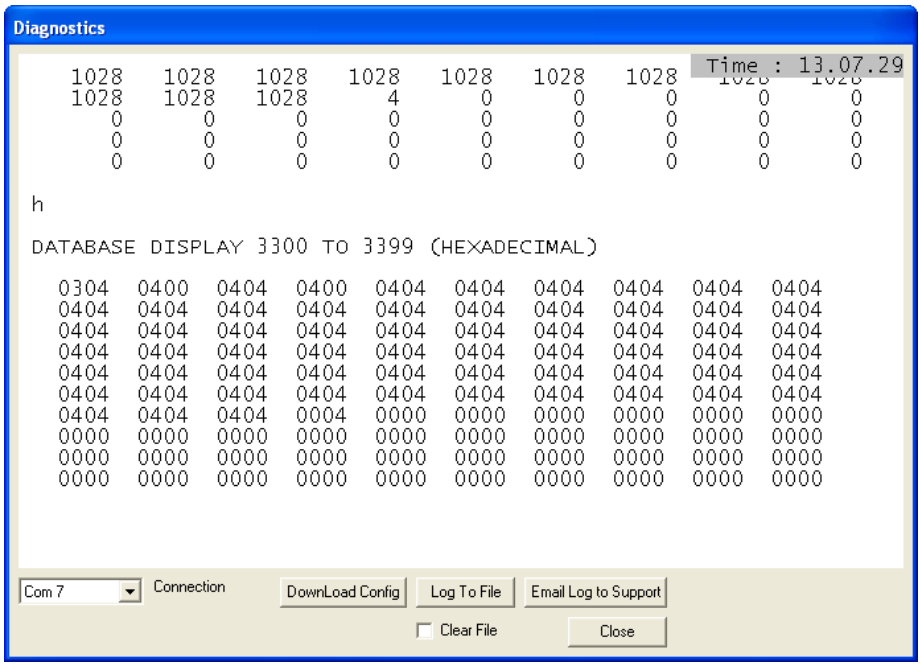
The following illustration shows the parameters that execute this command.



When you download the configuration containing this mailbox command to the gateway, and then return to the *Diagnostics* window, press **[F]** at the *Main* menu, and then press **[S]** to view the command list. The following illustration shows the command list. Notice that the first command matches the settings you made in the *Edit - Profibus Master Commands* dialog box.



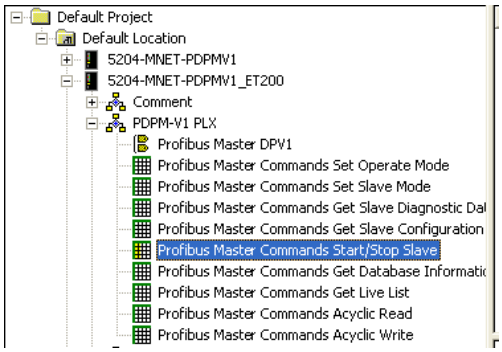
Any nonzero value placed in register 3201 issues mailbox command *Get Live List*. The results of this command are placed in the database starting at register 3300.



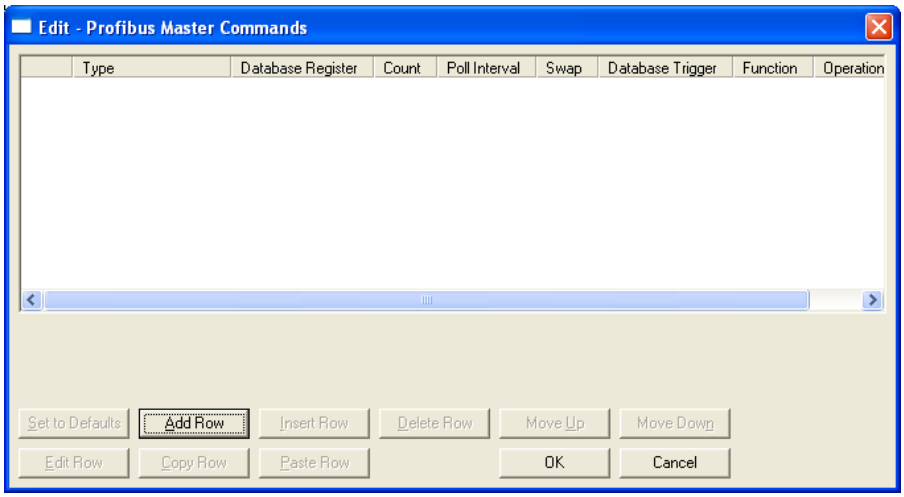
- A value of 03 HEX indicates this is the Master address which is in this case is 01.
- A value of 04 HEX indicates the slave is not configured and not connected.
- A value of 00 HEX means this slave is configured and connected. In this case Slave #2 and Slave #6 are connected to the Master and are exchanging cyclic data.

2.4.3 Start/Stop Slaves

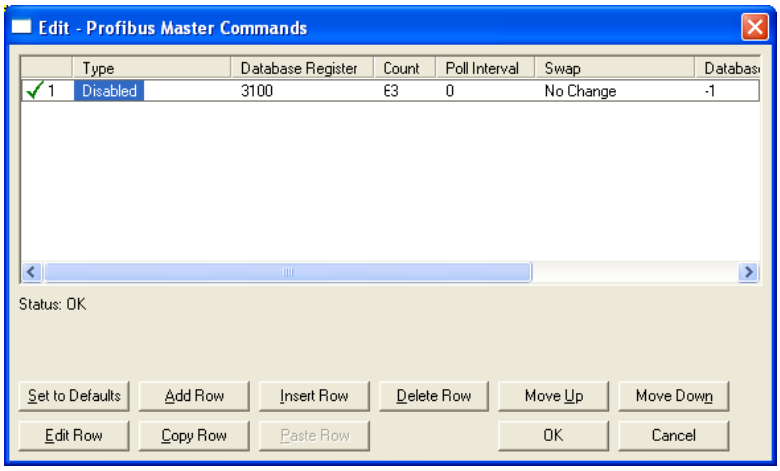
1 In ProSoft Configuration Builder (PCB), expand the **PLX PDPM-V1** section.



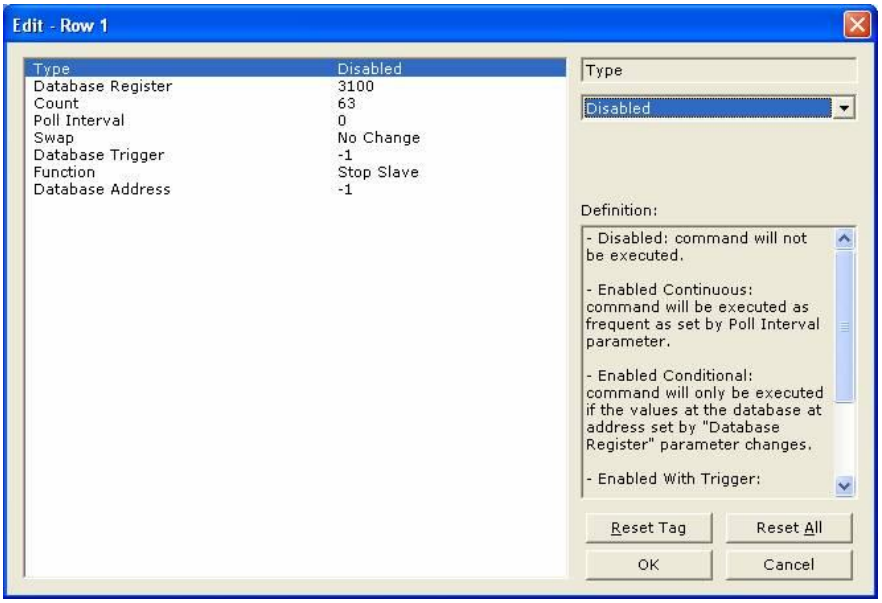
2 Select **PROFIBUS MASTER COMMANDS START/STOP SLAVE**, click the right mouse button, and then choose **CONFIGURE**. This action opens the *Edit - Profibus Master Commands* dialog box. This dialog box allows you to add commands, one row at a time, with all the necessary parameters.



3 To add a command, click **ADD ROW**. This action adds a command to the list, populated with the default values for the command.



4 To change the settings for the command, select the row, and then click **EDIT ROW**. This action opens the *Edit - Row 1* dialog box.

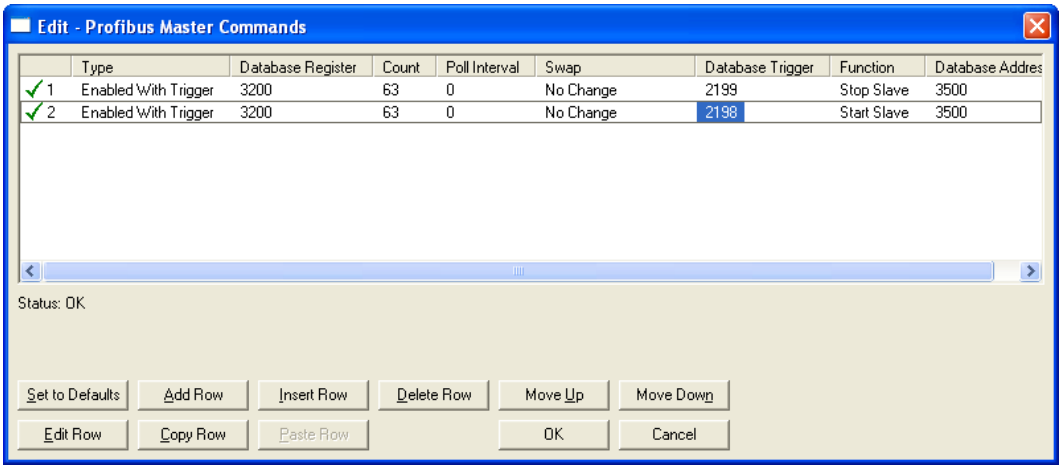


Command Layout for Start/Stop Slaves

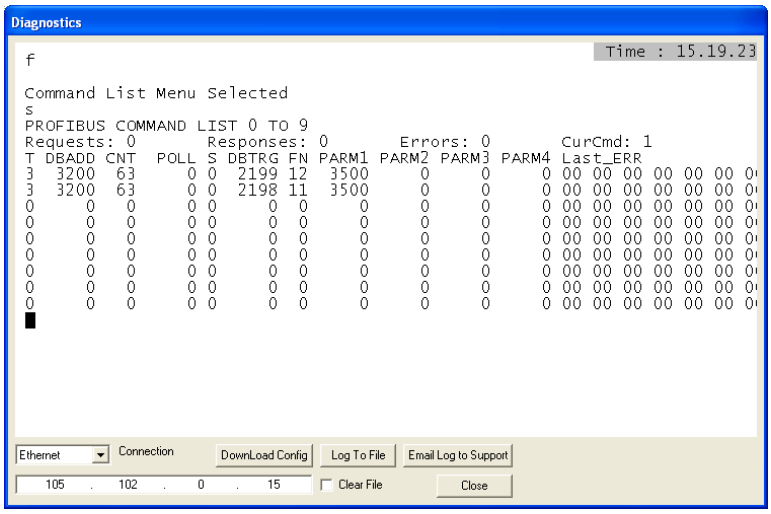
Column	Value	Description		
Type	0 to 3	Type	0	Command Disabled
			1	Command Enabled, use poll interval
			2	Command executed when database changes (Func 2, 3, 11, 12 or 33 only)
			3	Command executed when database trigger set Not equal to 0
DB_Reg		This is the database location where the 126 bytes of data for the message to be constructed for the mailbox command is present.		
Count		This field is not used as the message is always 63-words in length		
Poll_Int		Only if type = 1		
Swap		Utilized on request and response message		
DB_Trigger		Used if type is 3		
Func	11	Start Slave(s)		
	12	Stop Slave(s)		
Param_1		This field contains the database address where the 63-words of response data from the mailbox is written. Set to -1, if the data is not to be written to the database.		

For this example, the command will stop and start the specified slave(s) using Database trigger register 3199 (stop) and 3198 (start). Any nonzero value placed in either register will trigger the command to execute. When the command has executed, the database register will be reset to zero. Data will be read from database register 3200 for a count of 63 words. The response will be placed at Database address 3500 with a length of 63 words.

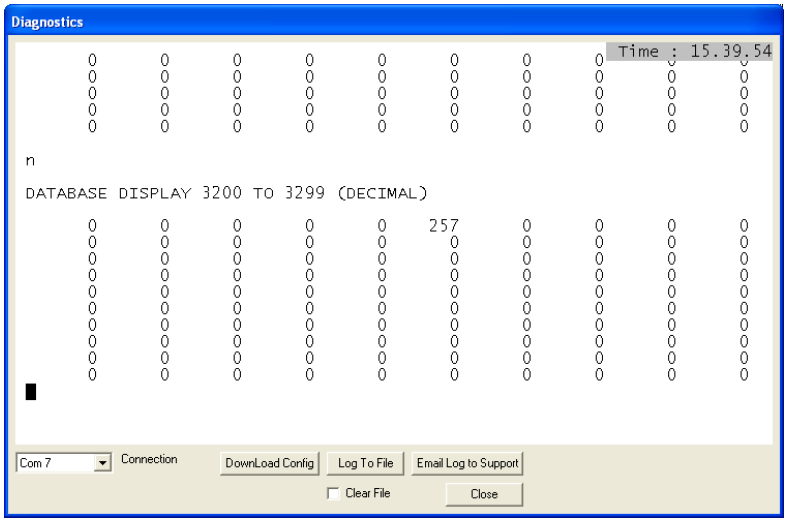
The following illustration shows the parameters that execute this command.



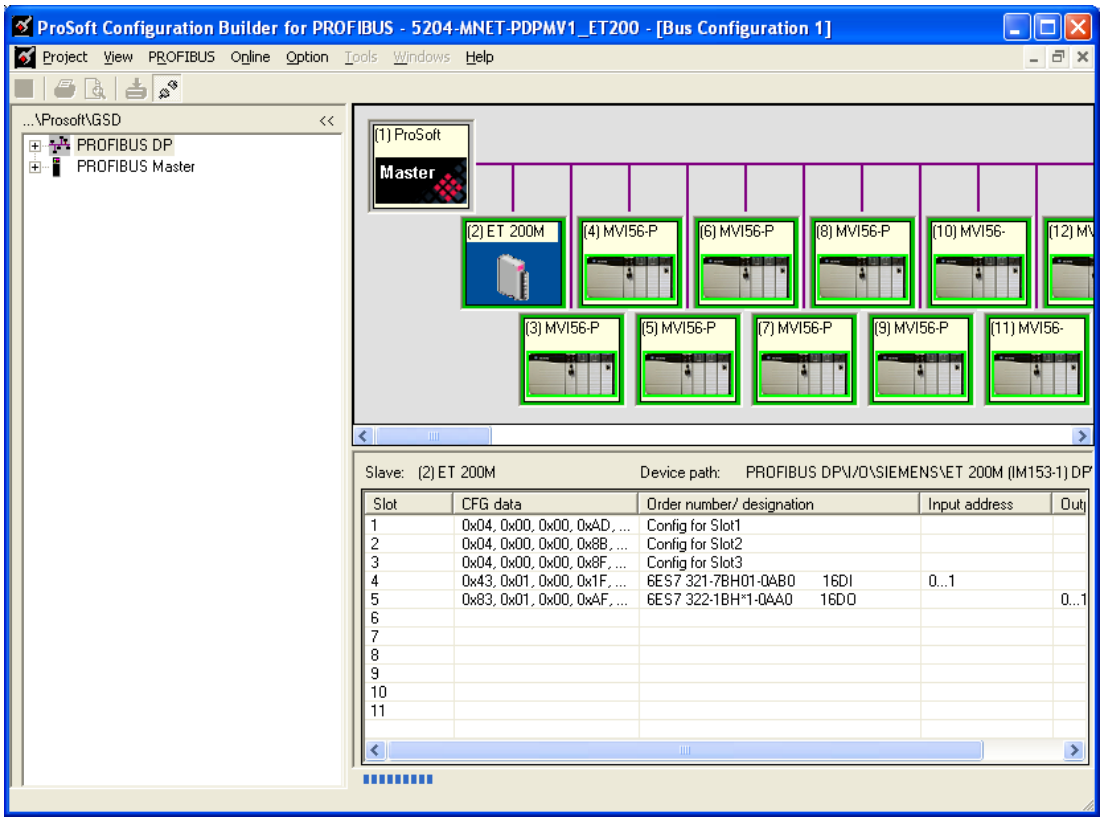
When you download the configuration containing this mailbox command to the gateway, and then return to the *Diagnostics* window, press **[F]** at the *Main* menu, and then press **[S]** to view the command list. The following illustration shows the command list. Notice that the first two commands match the settings you made in the *Edit - Profibus Master Commands* dialog box.



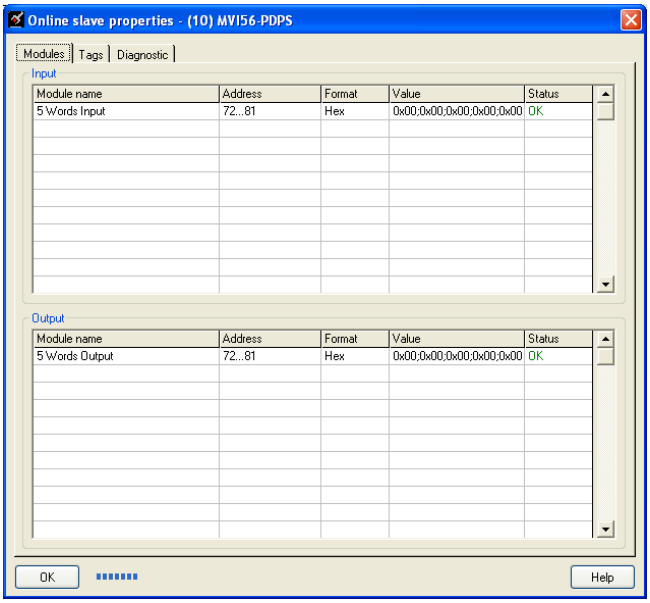
When you place any value at database register 3199, this will issue the command for the mailbox Stop slave(s). Slaves that are required to stop communicating with the master will show RED. This is a byte map value entered at database address 3200-3263. A decimal value of 257 in database register 3205 will stop slaves 10 and 11.



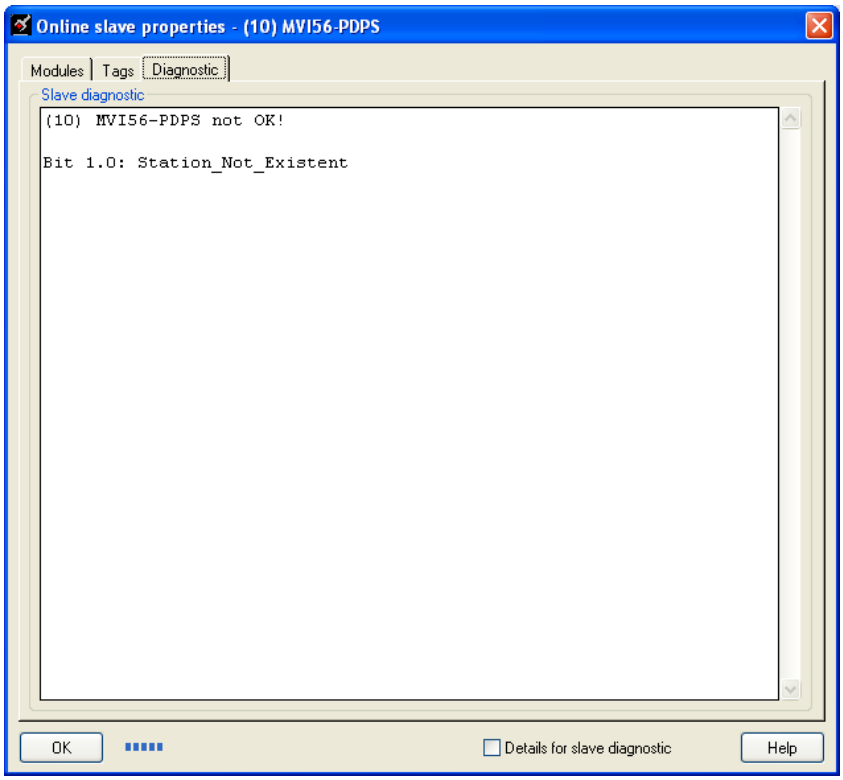
The *Monitor/Modify Slave* screen in ProSoft Configuration Builder for PROFIBUS will show that the slave is working properly.



Double-click on Slave 10.



The *Diagnostic* tab contains the following information for Slave 10, indicating that the slave has stopped exchanging cyclic data.



To start the slaves again, place any value in database register 3198.

Important Note: Values in DB register are byte mapped values of 1 and 257. Use decimal values only. There are 126 byte for 126 allowed PROFIBUS addresses. To stop slave address 100, place a value of 1 in DB 50 of the 63. To stop slave address 10 and 11, place a value of 257 at Database address 5 of the 63. If the Database start address is 3200, place a value of 257 at Database address 3205.

Refer to Mailbox Message: Start Slave (page 88) and Mailbox Message: Stop Slave (page 89) for more information on these commands.

DB_register and Param_1 should be same for both function codes 11 and 12. If you stop a certain slave address, you must restart the same address.

2.4.4 Other Mailbox Commands

3 - Set Slave Mode

Field	Value	Description
Type	0 to 3	
DB_Reg		Database location for the three values used by the command.
Count		If count == 0, the three values for the command are derived from the database. If count != 0, the three parameters for the command are present in the command list.
Poll_Int		Only if type = 1
Swap		Not used
DB_Trigger		
Func	3	
Param_1	0 to 125 or 127	This field represents the slave address for the command. Address 127 is used for multicast address.
Param_2	Group Select	Refer to Mailbox Message: Set Slave Mode (page 73)
Param_3	Control Command	Refer to Mailbox Message: Set Slave Mode (page 73)

4 - Get Slave Diagnostic Data

Field	Value	Description
Type	0, 1 or 3	
DB_Reg		This is the database location where the results of the command will be placed
Count		This parameter specifies the number of words in the response message to place in the database.
Poll_Int		Only if type = 1
Swap		Utilized on response message
DB_Trigger		
Func	4	
Param_1	0 to 125	This field represents the slave address for the command.
Param_2	Type of Req	If 0, internal database used. If 1, data polled on network. This last option is used if the slave is not controlled by this Master.

5 - Get Slave Configuration

Field	Value	Description
Type	0, 1 or 3	
DB_Reg		This is the database location where the results of the command will be placed
Count		This parameter specifies the number of words in the response message to place in the database.
Poll_Int		Only if type = 1
Swap		Utilized on response message
DB_Trigger		
Func	5	
Param_1	1 to 125	This field represents the slave address for the command.

23 - Get Database Information

Field	Value	Description
Type	0, 1 or 3	
DB_Reg		Location of the 4 words received in the response to this request.
Count		This field is not used as the message is always 4-words in length
Poll_Int		Only if type = 1
Swap		Utilized on response message
DB_Trigger		
Func	23	

32 - Acyclic Read

Field	Value	Description
Type	0, 1 or 3	
DB_Reg		Database location where read data placed
Count		Number of words in response message to write to the database.
Poll_Int		Only if type = 1
Swap		Applied to data in response message
DB_Trigger		
Func	32	
Param_1	Slave Addr	Slave address to read data from
Param_2	Slot	Slot in slave to access
Param_3	Index	Index in slave to access
Param_4	Len	Length in bytes of data to be sent from the slave.

33 - Acyclic Write

Field	Value	Description
Type	0 to 3	
DB_Reg		Starting database location of the write data.
Count		Number of word registers to read from the database into the command.
Poll_Int		Only if type = 1
Swap		Applied to data in request message
DB_Trigger		
Func	33	
Param_1	Slave Addr	Slave address to write to with data
Param_2	Slot	Slot in slave to access
Param_3	Index	Index in slave to access
Param_4	Len	Length in bytes of data to be sent to the slave.

2.5 Configuring the PROFIBUS DP Network

To configure your PROFIBUS DP network you must perform four tasks:

1. Install any PROFIBUS slave-specific device configuration files, typically called .GSD files (page 43).
2. Configure the ProLinx PROFIBUS DP Master (page 43).
3. Configure the PROFIBUS slaves.
4. Print the Unity Passthru Memory Map.

2.5.1 Installing the GSD Files

ProSoft Configuration Builder (PCB) uses PROFIBUS slave device definition files (GSD files) to obtain basic configuration information about the PROFIBUS slaves you add to the network. The GSD configuration files identify the slave's capabilities so that the PDPMV1 can communicate with it correctly. Slave device manufacturers provide the GSD files for the equipment they make. Slave device files sometimes come in various languages. When a manufacturer provides slave device files in several languages, it is a common practice to use the third letter of the file extension to indicate the language used in the file. For instance:

- .GS**D** is the most commonly used file extension and will usually be in either English or German
- .GS**E** will usually be in English
- .GS**S** will usually be in Spanish
- .GS**F** will usually be in French
- other combinations may also be seen, as well as other languages using the letters indicated above

Follow these steps to install the GSD file or files for your slave device or devices.

Tip: GSD configuration files for popular PROFIBUS slaves and ProSoft Technology solutions are included with PCB. Before installing GSD files, browse the list of available slaves in the Tree View window to see if GSD files for your slave are already installed.

GSD files are often both model number specific as well as model revision specific. Just because you may have an older GSD file from a manufacturer for the particular make and model of your slave device does not guarantee it will work for a newer revision of that device. Be sure you obtain from the device manufacturer the correct GSD file or files for your PROFIBUS slave or slaves.

To install GSD files manually

1 In ProSoft Configuration Builder tree view, click **[+]** to expand the module tree, and then double-click the **PROFIBUS DP** icon. This action opens the *PDPMV1 PROFIBUS Master Setup* dialog box.
2 Click the **CONFIGURE PROFIBUS** button. This action opens the *ProSoft Configuration Builder for PROFIBUS* application.
3 Open the **TOOLS** menu, and then choose **INSTALL NEW GS* FILE**. This action opens a dialog box that allows you to browse for the location of the GSD configuration files to install. (Depending on the device and language used in the file, the actual extension may be ".GSD", ".GSE", ".GSS", or other combinations; hence the generic reference to ".GS*" files, where "*" is a wildcard that stands for any letter.)
4 Choose the file to install, and then click **OPEN**. If the file already exists in the configuration file path, you will be prompted to overwrite the file.
5 You will be prompted to associate the GSD configuration file with a bitmap image of the slave device. Use the **FILE / OPEN** dialog box to browse for the location of the image file to use. If you have no device-specific bitmap file, you may **CANCEL** the bitmap upload, and a generic device icon will be used in the *Bus Configuration* window for this slave device.

2.5.2 Configuring the PROFIBUS Slaves

There are two essential steps to configuring a slave:

1 Add the slave in ProSoft Configuration Builder (PCB) as a device connected to the PROFIBUS Master, specifying the slave address and any necessary input and output configuration. Download the PROFIBUS Master configuration to the PDPMV1 module.
2 Configure the slave (using PCB or the configuration tool supplied by the manufacturer, for some PROFIBUS slaves). Verify that the slave address configured in the slave module matches the slave address configured in PCB. Download the PROFIBUS Slave configuration to the slave module.

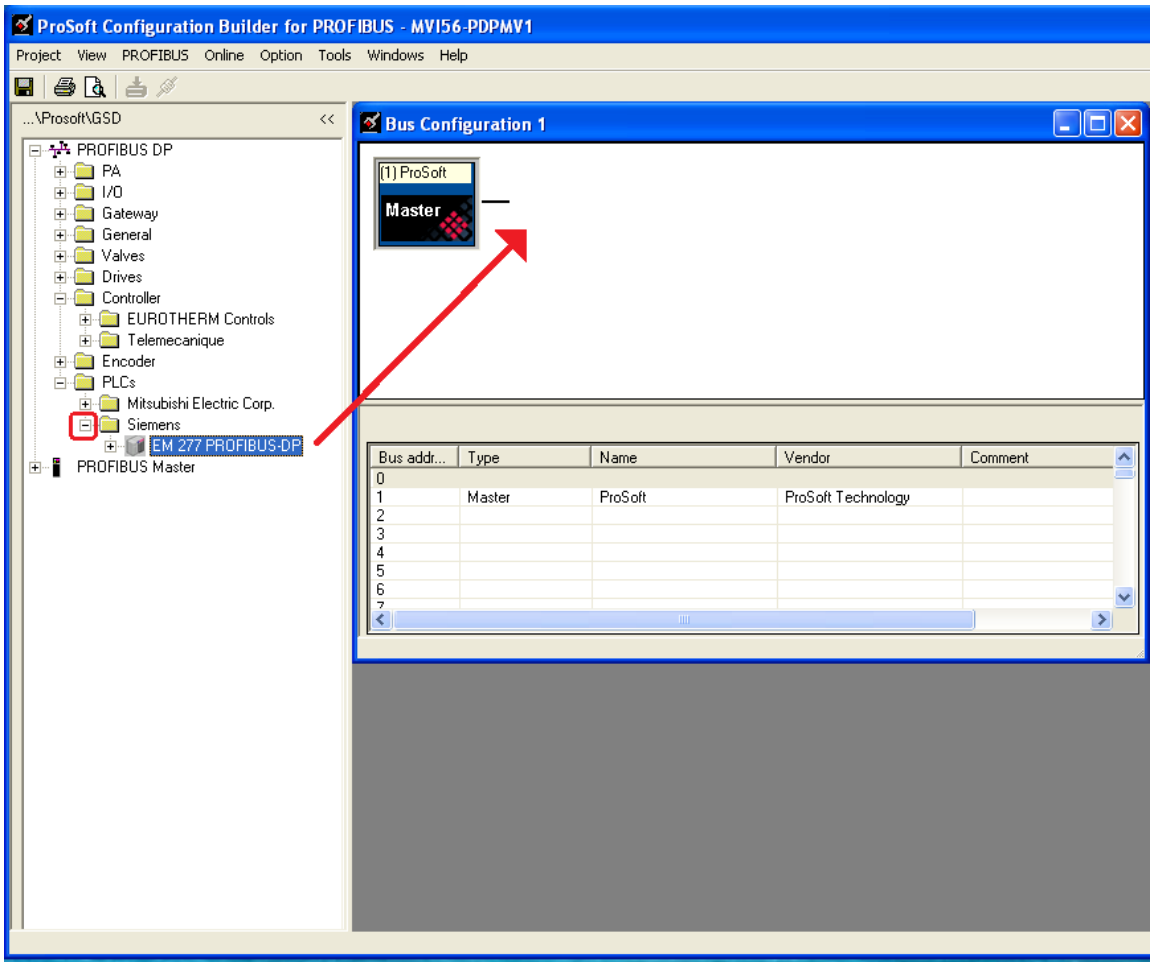
Manually Scanning for Slaves

Important: You can download a variety of example GSD files from the PROFIBUS Trade Organization website at www.profibus.org, or from the manufacturer's website for your PROFIBUS slaves.

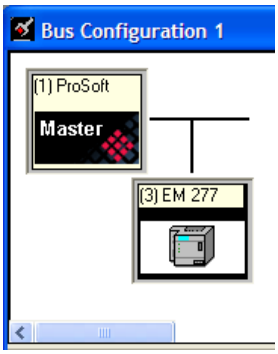
The following steps describe how to add and configure a Siemens EM 277 I/O chassis to the PROFIBUS network. The configuration information (.GSD file) for this device must be installed according to the procedure found in Install the GSD Files (page 43). Most other PROFIBUS slaves can be configured in a similar manner.

1 In *ProSoft Configuration Builder for PROFIBUS*, click the plus sign **[+]** to expand the **PROFIBUS DP** tree.

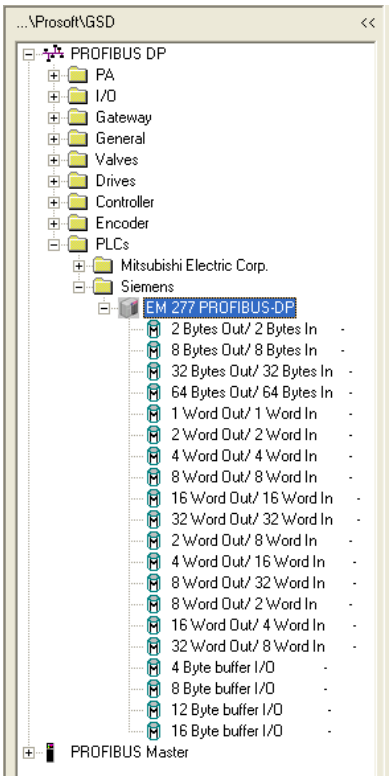
2 Navigate to the folder containing the type of slave device to add (**PLCs/SIEMENS/EM 277**, in this example), and then click the plus sign **[+]** to expand the folder.



3 Click the **EM 277 PROFIBUS-DP** icon in the tree view and drag and drop the icon into the *Bus Configuration* view. This action adds the slave device and connects it to the Master in a network relationship.

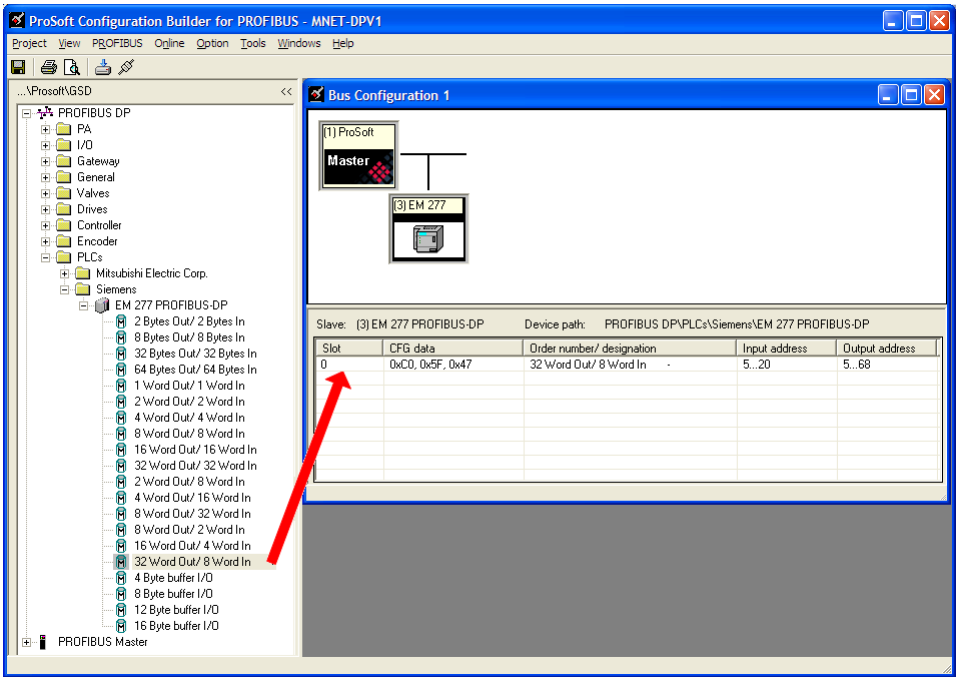


4 In the tree view, click the plus sign **[+]** to expand the slave device you added. This action opens a list of device configuration values. The following illustration shows the possible input/output configuration values for a Siemens EM 277. The selections available for other devices may be different, so you should review the specifications for the product you are installing in order to determine the correct values to use.



5 Drag the input and output parameters to the slot location grid (*Subscriber List*) below the *Bus Configuration* window. The slot view displays the slot number, configuration data, and input and output addresses. The PROFIBUS DP Master uses this information to identify and communicate with individual slaves on the network.

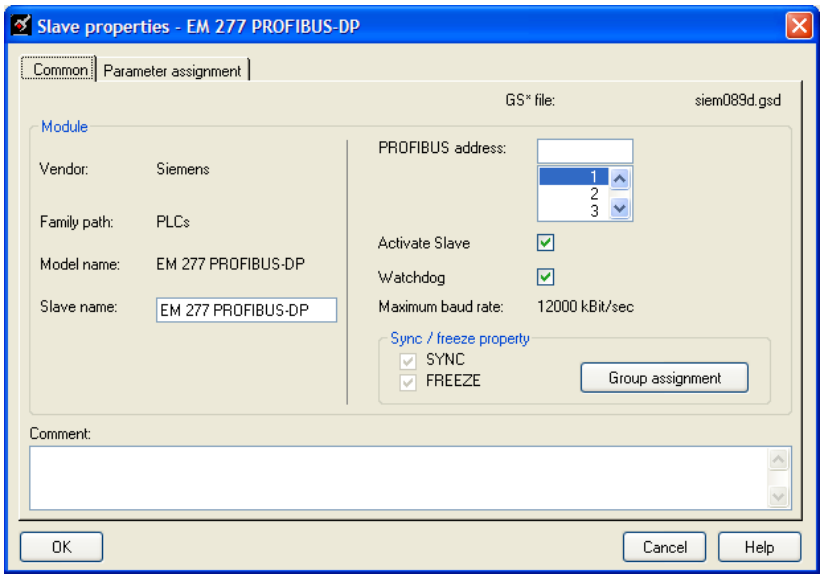
For this example, we will configure 8 words of input and 32 words of output. These input and output words are assigned to addresses within the gateway's internal database.



For each new slave added to the PROFIBUS network, ProSoft Configuration Builder automatically converts the input/output byte addresses to word input/output addresses.

Tip: To make it easier to view the data from individual slaves, you can create a spreadsheet with all added slaves and input and output data offsets, or you can view and print the data map.

6 Double-click the **SLAVE** icon to view the *Slave properties* dialog box.



ProSoft Configuration Builder automatically assigns a PROFIBUS address to each new slave. The slave address assignment begins at address 3 for the first slave added to the network (addresses 0, 1, and 2 are reserved for use with PROFIBUS Masters), and is incremented by 1 for each new slave added to the network. You may, however, assign any address, 0-125 to any Master or slave node as long as you do not assign the same address to more than one device. You can change the address in the **COMMON** tab of the *Slave properties* dialog box. ProSoft Configuration Builder will not allow you to assign a PROFIBUS address that is already in use by another device on this network.

Leave the remaining settings unchanged for now, and click **OK** to close the *Slave properties* dialog box.

7 Repeat steps 2 through 6 for all slaves you intend to place on the network.

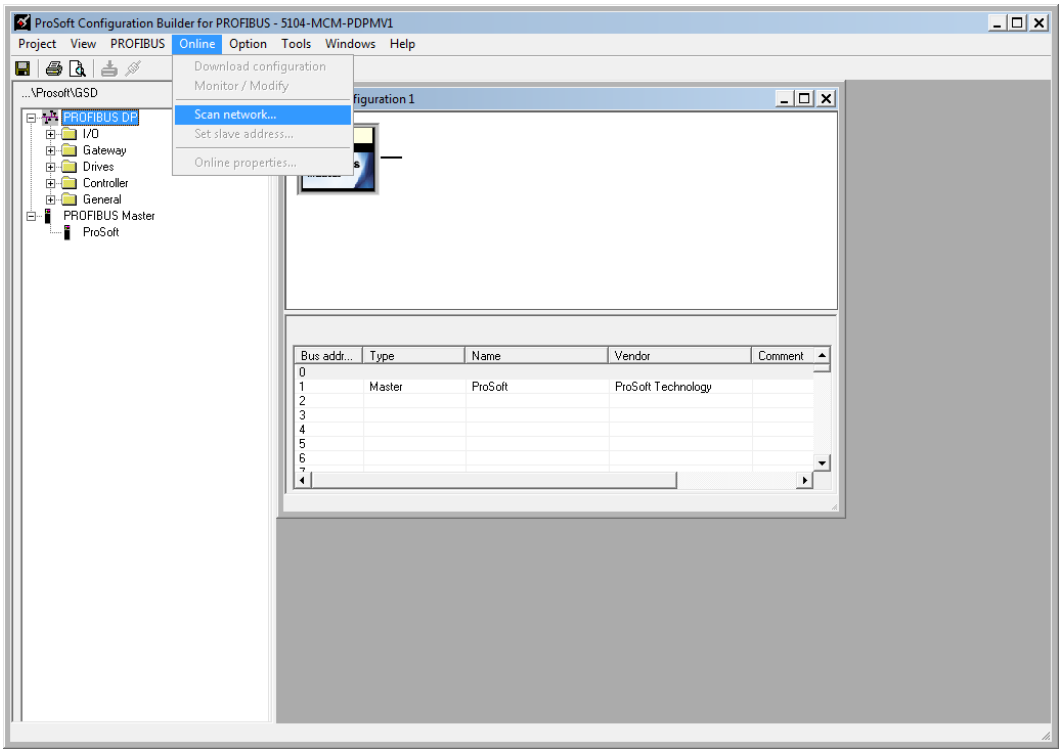
8 When you are finished adding slaves, open the **PROJECT** menu and choose **EXIT**. Click **YES** to save the project and return to the *PROFIBUS Master Setup* dialog box.

Using The Autoscan Feature

The concept of *Automatic network scanning* means that the user can instruct the *Bus Configuration* window to automatically gather information about slaves that are connected to the network. When the scan is completed the user can adopt the detected slaves to the *bus configuration* and download to the Master.

This is a quick way to get a network up and running. However, one should be aware that it is not guaranteed that any particular slave will enter data exchange since the user parameter data might not match. This is especially obvious if no associated GSD-file is found during the network scan, this means that no user parameter data would be sent to the slave.

NETWORK SCAN is selectable from the *Online* menu as well as from the drop-down menu for the **MASTER** icon.

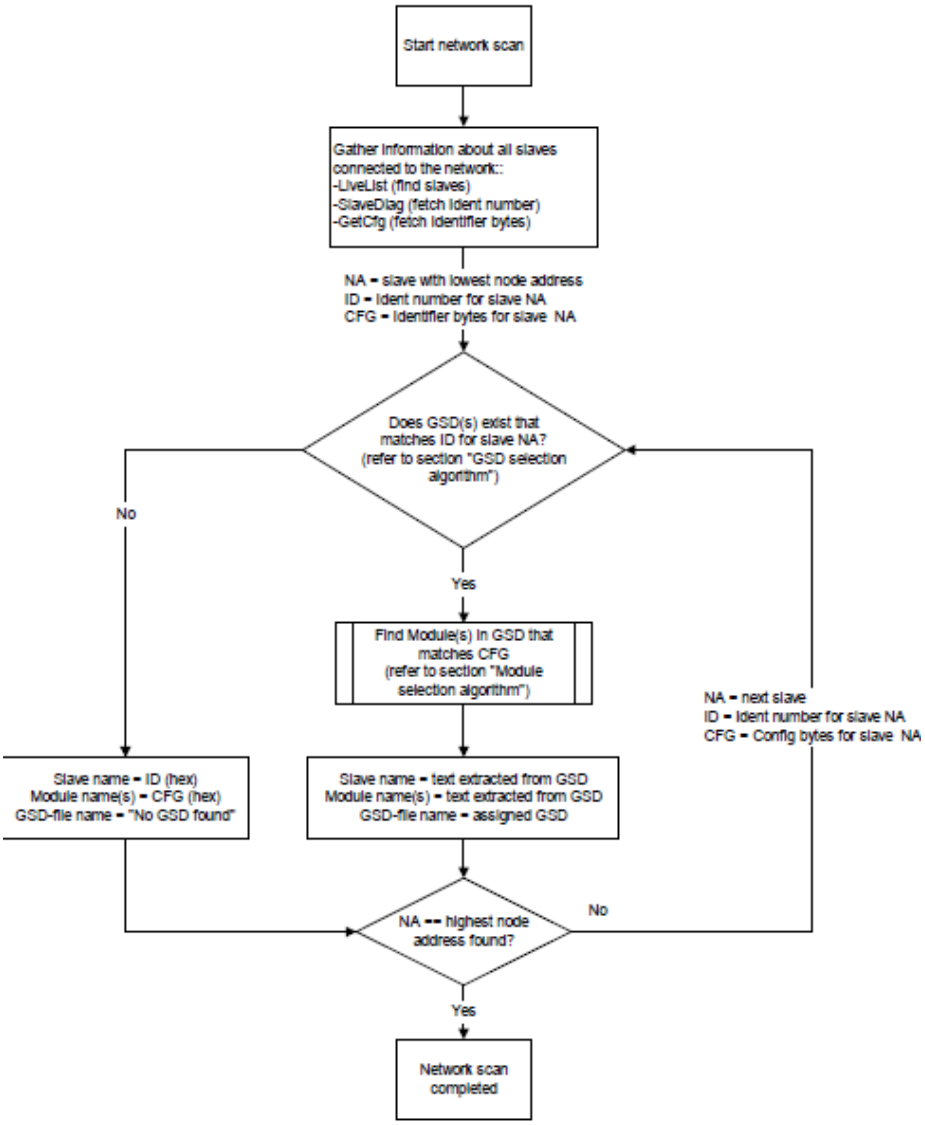


When the download is completed, the *PROFIBUS Master Configuration* window will initialize the Master to operate as a *Class 2 Master only*. In this mode it is possible to initialize the Master even if the database does not contain any slaves.

After successful initialization, the *PROFIBUS Master Configuration* window will issue the following mailboxes in order to gather information about the connected slaves:

1. 1. Send FB_APPL_GET_LIVE_LIST in order to detect connected slaves,
2. 2. Send FB_APPL_GET_SLAVE_DIAG (external request) to all devices identified as slaves according to the Live list.
3. 3. Send FB_APPL_GET_SLAVE_CONFIG to all devices identified as slaves according to the Live list.

When the information is collected the *PROFIBUS Master Configuration* window will find a matching GSD-file and extract information from it. Refer to the flowchart below for this sequence:



GSD Selection Algorithm

If two or more matching GSD-files are found, the first one found should be selected. The other compatible files should be stored so that the user can select one of them instead. If the user selects another GSD-file, the *PROFIBUS Master Configuration* window will run through the *Module Selection Algorithm* (described below) again.

Module Selection Algorithm

The algorithm used to find modules in the GSD based on the Identifier byte(s) is as follows:

Select the module that matches the largest number of Identifier bytes. If the GSD contains two or more modules with the exact set of Identifier bytes, use the first module found.

Example:

If a slave responds with identifier bytes: 0x11, 0x21, 0x31 and that the associated GSD-file contains five modules: “A” = 0x11, “B” = 0x21, “C” = 0x31, “AB” = 0x11, 0x21 and “BC” = 0x21, 0x31. The *PROFIBUS Master Configuration* window will then select modules "AB" and "C".

Note: If no matching module is found in the GSD, The *PROFIBUS Master Configuration* window will display the identifier byte(s) instead.

Network scan window

The information extracted from the GSD-file(s) will be displayed in the *Network scan* window.

Select

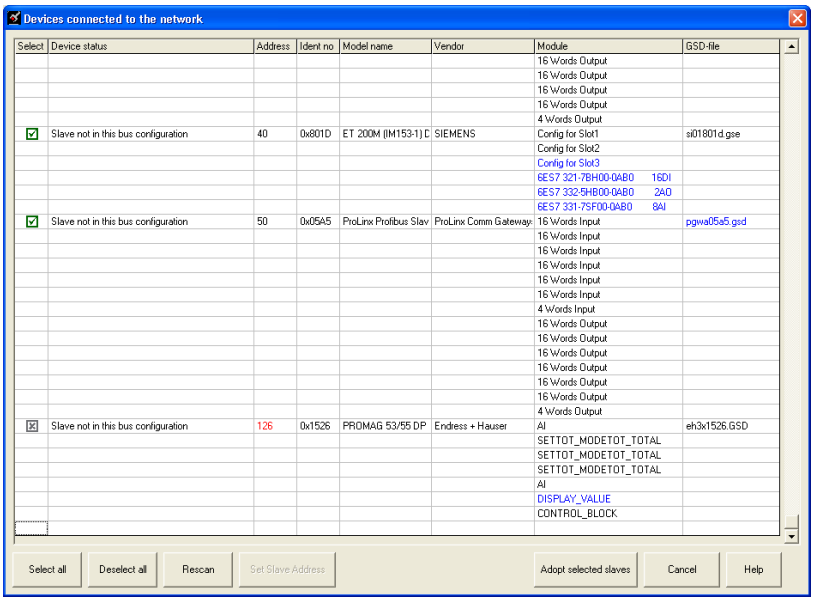
In this column all found slaves will be marked as selected by default, except for slaves with the special address 126 (refer to the next section that describes the Address column). Only selected slaves will be added to the *PROFIBUS Master Configuration* when the **ADOPT SELECTED SLAVES** button is clicked.

Address

In this column the node address of the slaves will be displayed. Found slaves should be listed in ascending order according to their node addresses.

Special address 126 -Set Slave address:

If a slave with node address 126 is detected during the network scan, the *PROFIBUS Master Configuration* window will display the address in red color. It will not be possible for the user to adopt the slave to the configuration since it is not allowed to exchange data with devices having this address. The check box in the *Select* column will be grayed out.

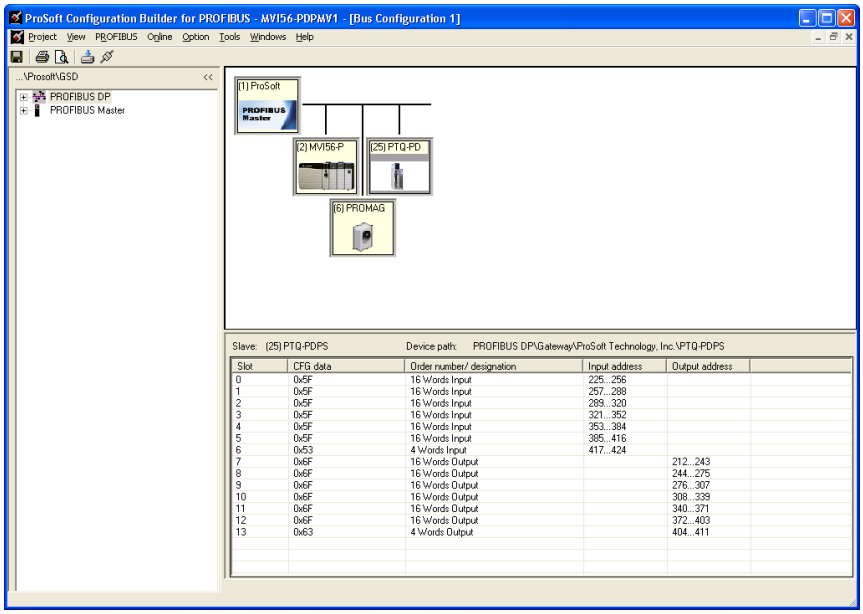


To be able to adopt a slave with address 126 the user must first assign a valid address by clicking the icon next to the node address. By doing so the *Set Slave Address* dialog box is started.

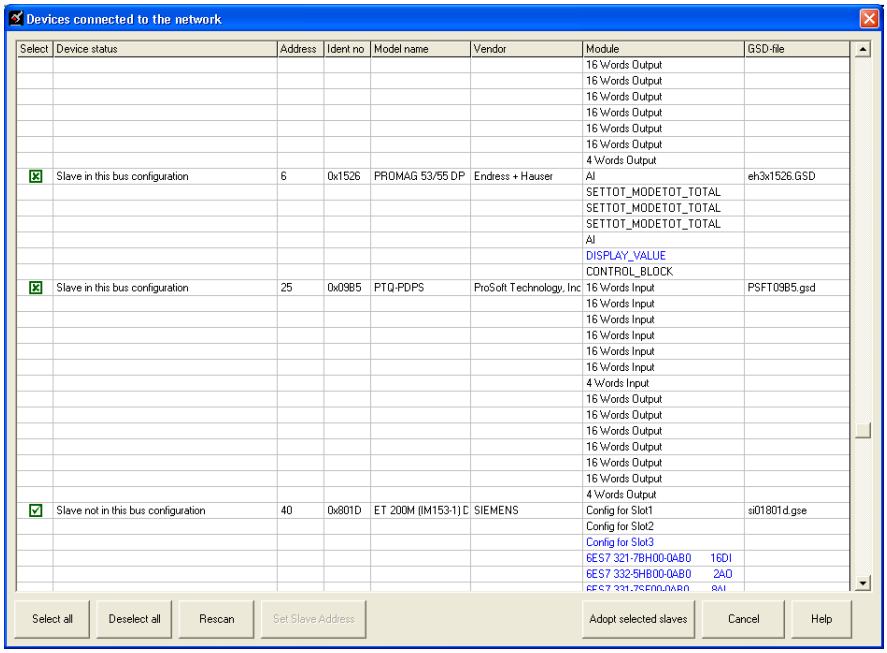
Note that the *Old slave address* is preset to a value of 126 that is not editable (grayed out).

If the Slave is in the configuration already then it will not affect the addressing.

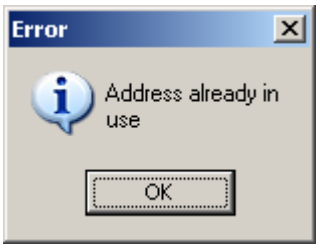
Example:



After scanning, the network finds these other slaves: 2, 6, 25, and 40
Slaves 2, 6, and 25 are found, but are marked as in the bus configuration (the mapping of the inputs and outputs will not be affected)
Slaves 40 is new and could be added and the input/output addressing will be appended to the end as shown on the last screen.



The *PROFIBUS Master Configuration* window will prevent the user from selecting a *New slave address* that is already occupied by another device; this includes detected Master stations as well. If the user selects an occupied address, a message similar to the one shown here will open.



When an address has been successfully assigned, the *PROFIBUS Master Configuration* window will update the *Network scan* window as shown here. The node address will be updated to the one that the user selected in the *Set Slave* dialog box. The check box in the *Select* column will be marked allowing the user to adopt the slave to the configuration.

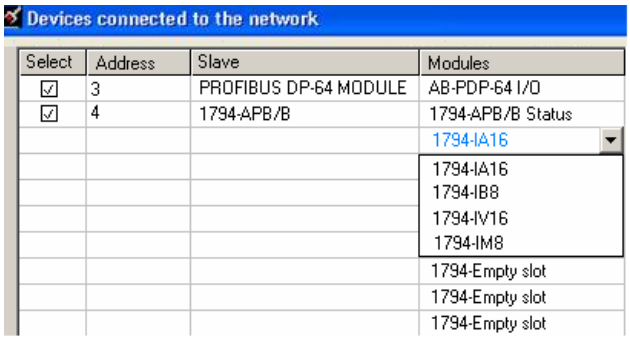
Slave

In this column the name of the slave as stated in the assigned GSD-file will be displayed. If no matching GSD-file is found the Ident number will be displayed in red color in the drop-down list.

Module

This column shows the name of the module(s) as stated in the assigned GSD-file, which matches the Identifier byte(s) derived from the *GetCfg* mailbox message. If no GSD-file or no matching module is found the Identifier byte(s) will be displayed in red color. If the configuration for a slave is constructed of several modules, the modules will be listed under each other.

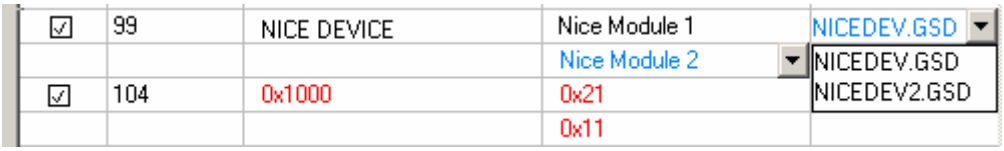
If there is more than one module in the GSD-file that matches the Identifier bytes, the first matching module will be displayed in blue color in a drop-down list. The drop-down list will contain all other matching modules so that the user can select the desired one.



Note: Only modules that have the exact same Identifier bytes as the first matching module will be displayed in the drop-down list.

GSD-file

This column shows the name of the GSD-file that matches the Ident number derived from the *SlaveDiag* mailbox message. If there are more files with the same Ident number in the device catalog, the first matching GSD-file will be displayed in blue color in a drop-down list.



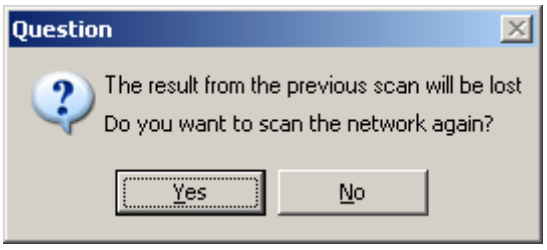
This could be the case if the device catalog contains two or more brand labeled devices, or GSD-files for two or more languages (for example NICEDEV.GSD and NICEDEV.GSE) exist.

Note: If the user selects another GSD-file, The *PROFIBUS Master Configuration* window will update the modules for that slave accordingly.

If no GSD-file is found the user will be able to copy the expected GSD to the device catalog by clicking the icon next to the text *No GSD found*. This will start the Install *new GS*-file* dialog box. When the file is installed, the *PROFIBUS Master Configuration* window will verify that the installed file matches the slave and update the modules for the slave accordingly.

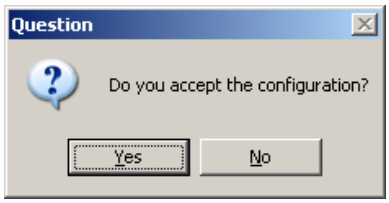
Rescan

Pressing the **YES** button will trigger a new network scan. Before proceeding with the scan a message similar to the one below will appear. If a new scan is accepted, detected slaves found during the previous scan will be lost.

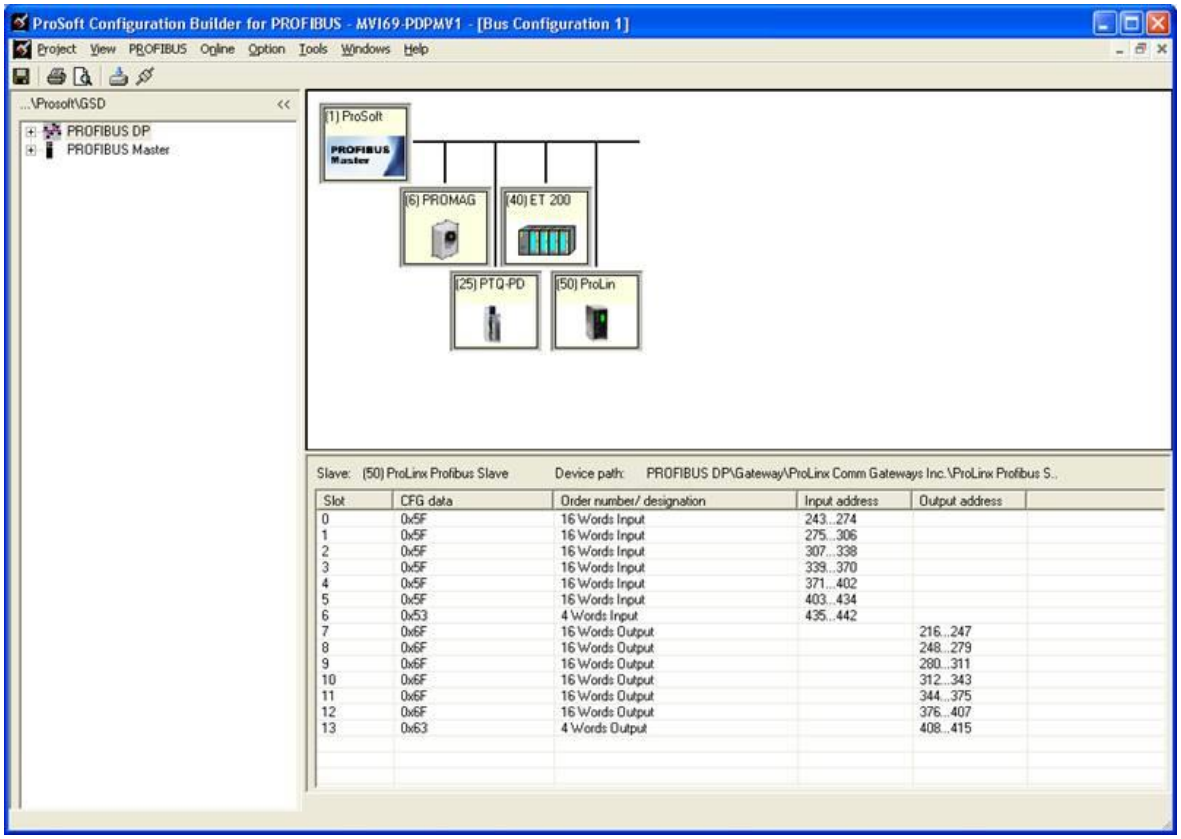


Adopt selected slaves

Pressing this button will cause all selected slaves to be adopted to the *PROFIBUS Master Configuration* window. Before carrying on with this action a message similar to the one below will appear.



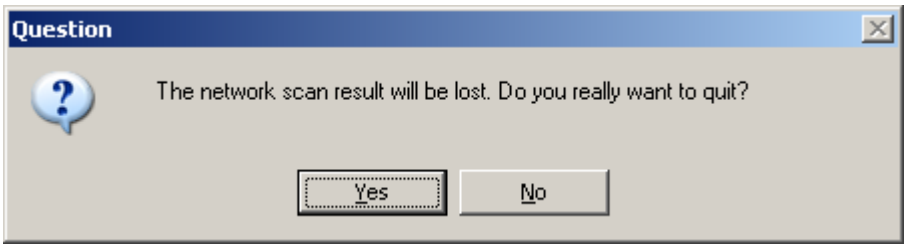
If accepted, the *network scan* window will close and the *PROFIBUS Master Configuration* window will be populated with the slaves that were found during the network scan.



Note: *Slave:* is equal to the Ident number and that the *Device path:* and *Order number/designation* fields are left empty.

Cancel and Help

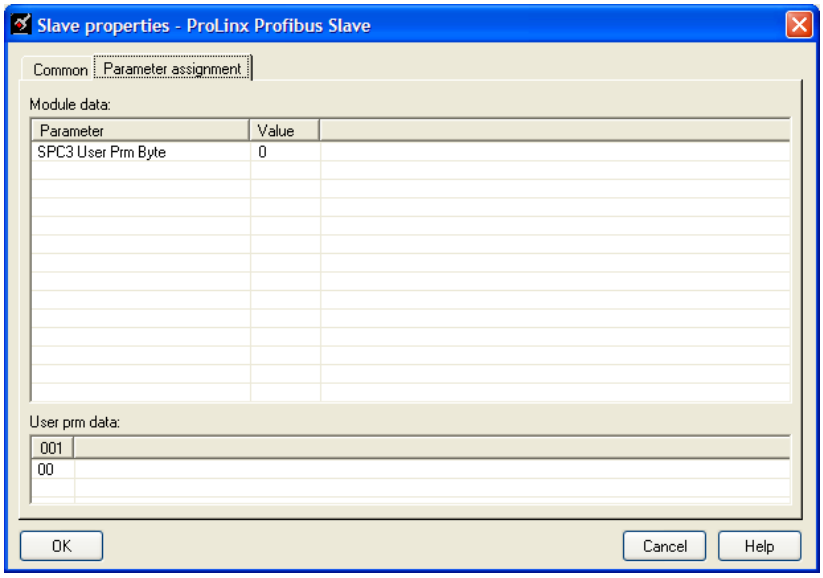
If the **CANCEL** button is pressed a message similar to the one below will appear.



If the **HELP** button is pressed the online help will start.

Set_Param (SAP61)

ProSoft PROFIBUS slave (PDPS) devices have a configurable parameter for SPC3 User Prm Byte. The following illustration shows the value of this parameter in *ProSoft Configuration Builder for PROFIBUS*, the configuration tool for ProSoft PROFIBUS Master devices.



Parameter Data Structure

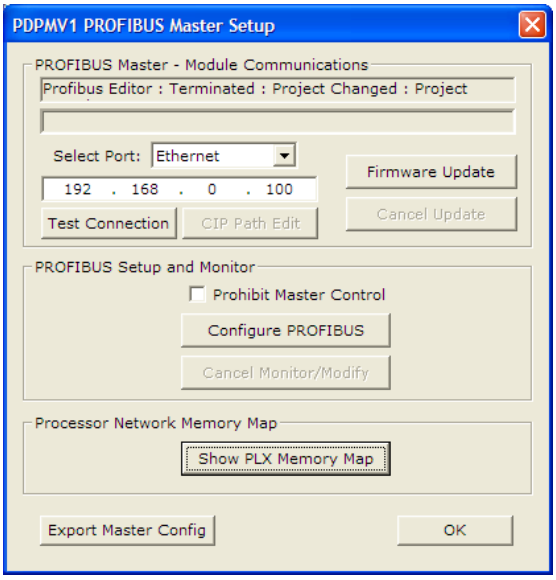
SPC3 evaluates the first seven data bytes (without user prm data), or the first eight data bytes (with user prm data). The first seven bytes are specified according to the standard. The eighth byte is used for SPC3-specific communications. The additional bytes are available to the application.

Byte	Bit Position								Designation
	7	6	5	4	3	2	1	0	
0	Lock Req	Unio Req	Sync Req	Free Req	WD on	Res	Res	Res	Station status
1									WD_Fact_1
2									WD_Fact_2
3									MinTSDR
4									Ident_Number_High
5									Ident_Number_Low
6									Group_Ident
7									Spec_User_Prm_Byte
8 to 243									User_Prm_Data

Byte 7	Spec_User_Prm_Byte		
Bit	**Name**	**Significance**	**Default State**
0	Dis_Startbit	The start bit monitoring in the receiver is switched off with this bit	Dis_Startbit = 1, Start bit monitoring is switched off.
1	Dis_Stopbit	Stop bit monitoring in the receiver is switched off with this bit	Dis_Stopbit = 0 Stop bit monitoring is not switched off.
2	WD_Base	This bit specifies the time base used to clock the watchdog. WD_Base = 0: time base 10 ms WD_Base = 1: time base 1 ms	WD_Base = 0 The time base is 10 ms.
3 to 4	Res	To be parameterized with 0	0
5	Publisher_Enable	DXB-publisher-functionality of the SPC3 is activated with this bit	Publisher_Enable = 0, DXB-request-telegrams are ignored; Publisher_Enable = 1, DXB-request-telegrams are processed
6 to 7	Res	To be parameterized with 0	0

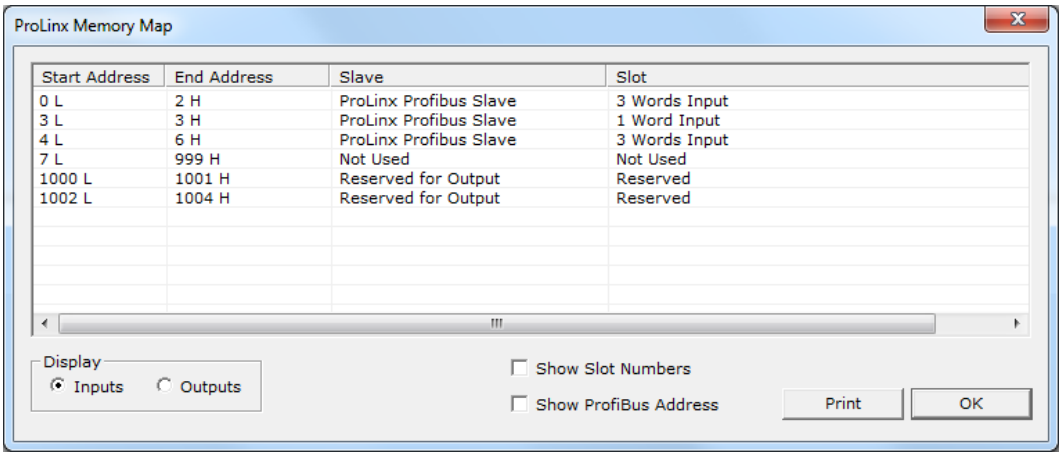
2.5.3 Printing the ProLinx Memory Map

The ProLinx Memory Map dialog box uses the information about your PROFIBUS Master and slaves to display the data types that are configured. You need this information to know the starting address of cyclic I/O and gateway status data.



To view or print the ProLinx Memory Map

1 In the *Master Setup* dialog box, click the **SHOW PLX MEMORY MAP** button, near the bottom of the window. This action opens *ProLinx Memory Map* window.



Note: This window uses 16-bit word addressing. The PROFIBUS Master configuration of the slaves uses 8-bit byte addressing.

2 Notice that there are buttons in the *Display* area of the dialog box to show inputs and outputs. These input and output maps correspond to the input and output data you configured for the PROFIBUS slaves (page 44). Notice also that there are check boxes to display slot numbers and PROFIBUS addresses.

3 Click **PRINT** to print the input and output maps for reference. Note that you must do this for both input and output maps.

4 When you have finished printing the ProLinx memory maps, click **OK** to close the dialog box. Click **OK** again to close the *Master Setup* dialog box.

5 Keep the printed memory maps available so you can refer to them when you configure the sample ladder logic in RSLogix. The sample ladder logic contains input and output arrays that must be cross-referenced with the variables.

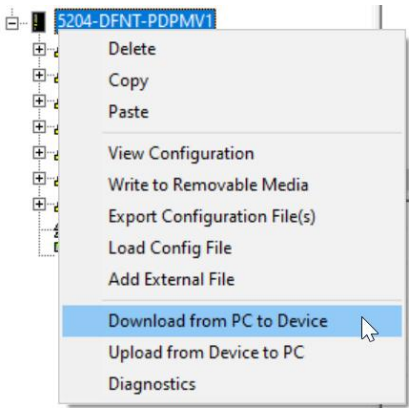
The next step is to download the project to the ProLinx gateway.

2.6 Downloading the Project to the Gateway

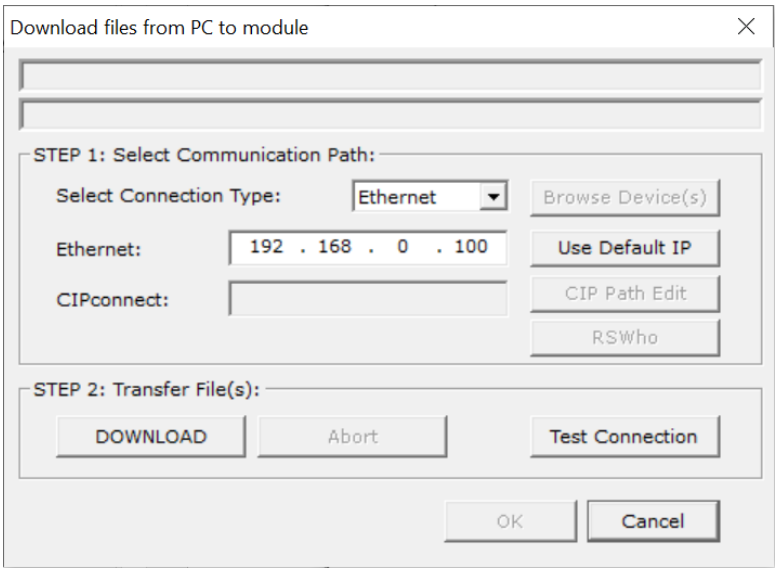
In order for the gateway to use the PROFIBUS network settings, you must download the Project file from your PC to the gateway via an Ethernet or serial connection.

2.6.1 Download via Ethernet Port

1 In the tree view in *ProSoft Configuration Builder*, right-click on the **PDPMVI1** gateway.



2 This opens the *Download* dialog box. The *Ethernet* field contains a temporary IP address (see section *Assigning a Temporary IP Address* on page 62). *ProSoft Configuration Builder* will use this temporary IP address to connect to the module.

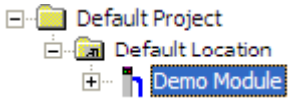


3 Click **TEST CONNECTION** to verify that the IP address allows access to the module.
4 If the connection succeeds, click **DOWNLOAD** to transfer the Ethernet configuration to the module.

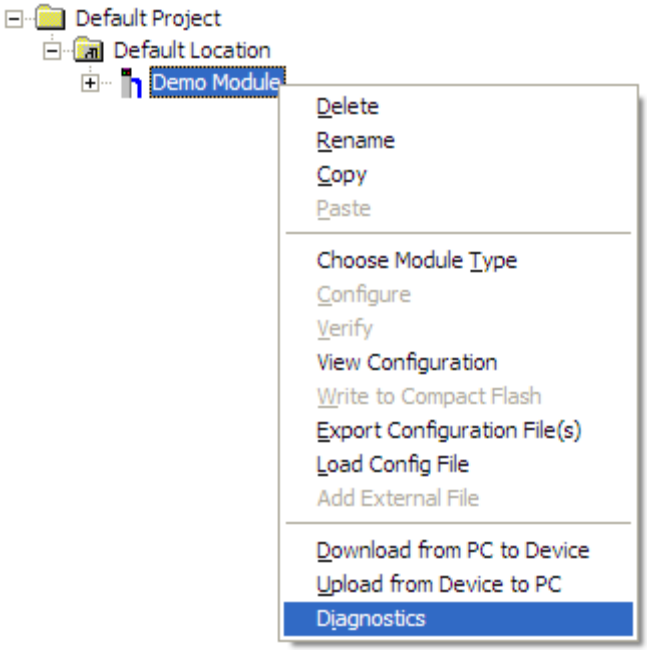
2.6.2 Assigning a Temporary IP Address

A temporary IP address can be used to assign the gateway to your local network.

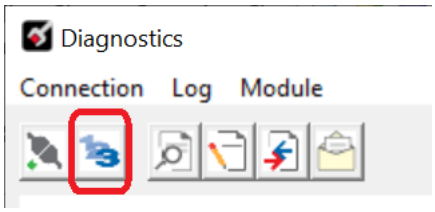
1 In the tree view in *ProSoft Configuration Builder*, select the **PDPMV1** gateway.



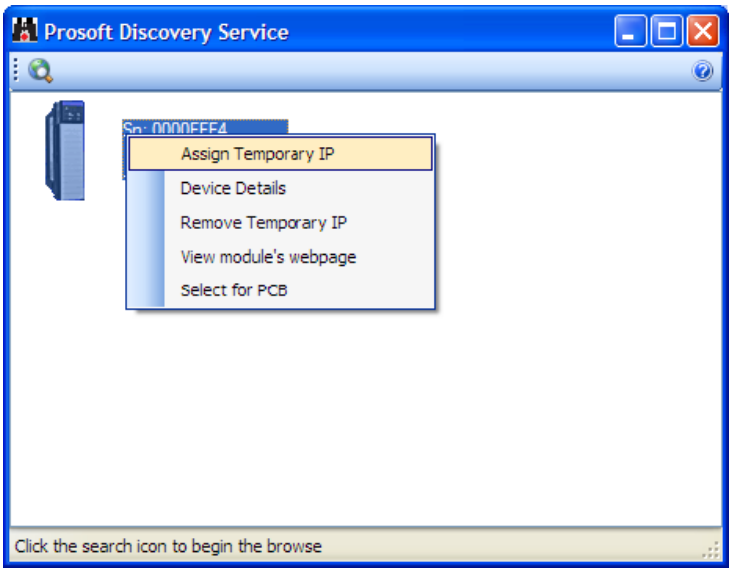
2 Click the right mouse button to open a shortcut menu. On the shortcut menu, choose **DIAGNOSTICS.**



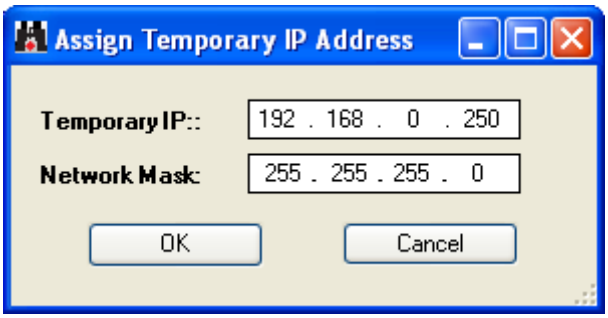
3 In the *Diagnostics* window, click the **SET UP CONNECTION** button.



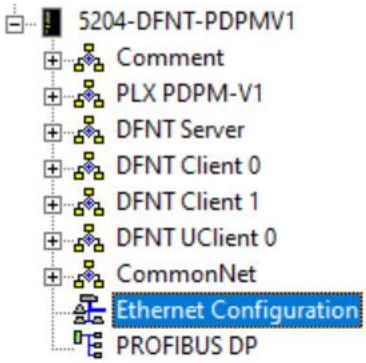
4 In the *Connection Setup* dialog box, click the **BROWSE DEVICE(S)** button to open the *ProSoft Discovery Service*. Select the gateway, then right-click and choose **ASSIGN TEMPORARY IP**.



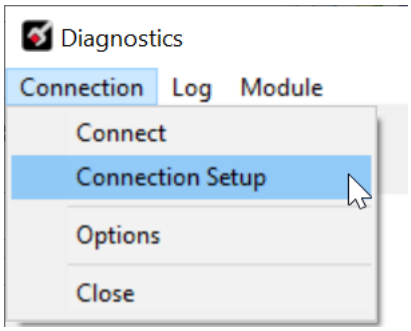
5 The module's default IP address is 192.168.0.250. Choose an unused IP within your subnet, and then click **OK**.



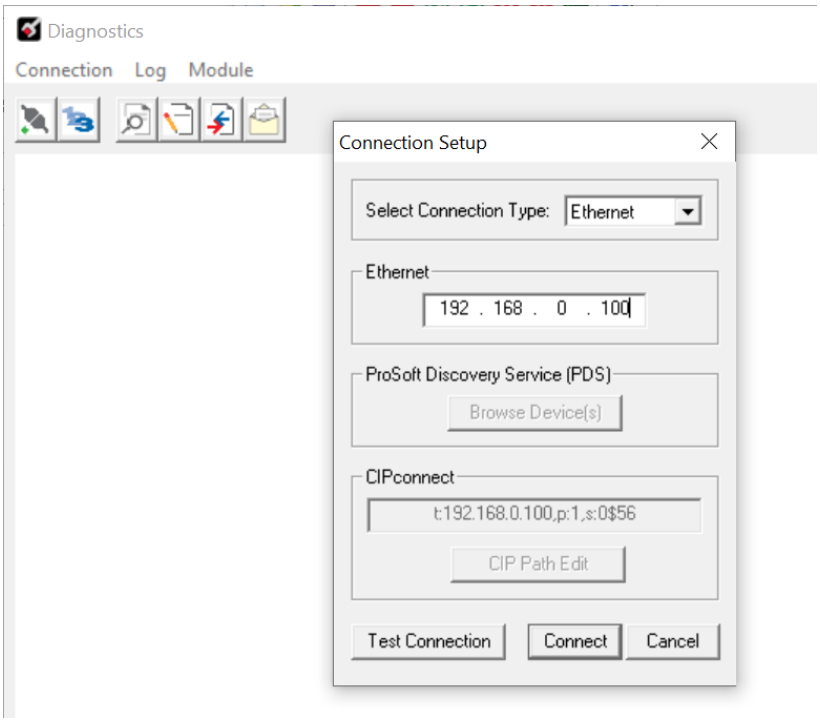
The temporary IP address is only valid until the next time the module is initialized. To set the module's permanent IP address, use the *Ethernet Configuration* menu in the tree view.



6 Close the *ProSoft Discovery Service* window.
7 Open the *Diagnostics* window and navigate to **CONNECTION** > **CONNECTION SETUP**.



8 In the *Connection Setup* dialog box, enter the temporary IP address in the *Ethernet* address field, then click the **TEST CONNECTION** button to verify that the module is accessible with the current settings.

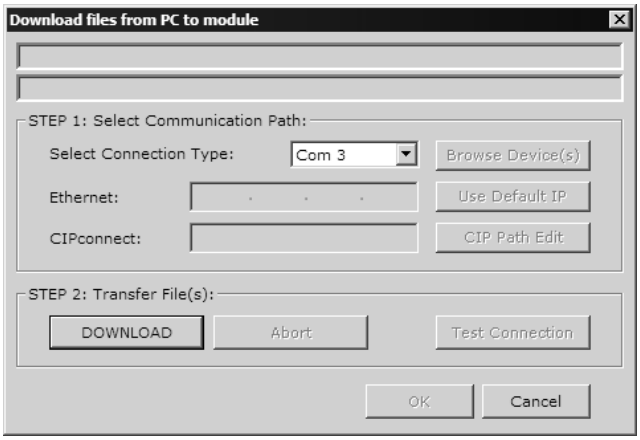


9 If the *Test Connection* is successful, click **CONNECT**. The *Diagnostics* menu will display in the *Diagnostics* window.

2.6.3 Download via Serial Port

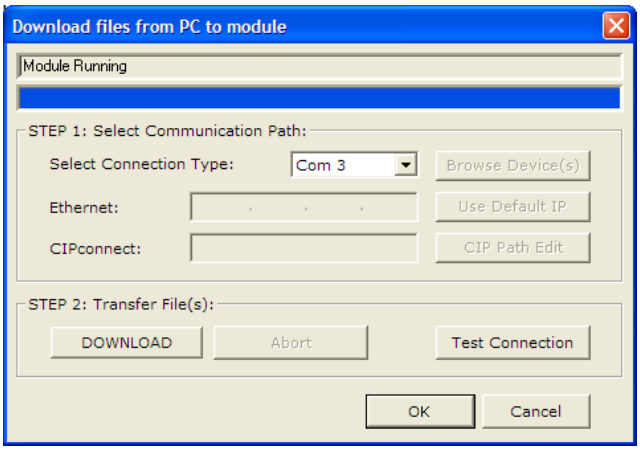
1 In the tree view in ProSoft Configuration Builder, click once to select the gateway that has PLX PDPMV1 section.

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 gateway 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*.



2.7 Backing Up the Project

In this step, you will create a backup copy of your project and configuration files. The backup procedure saves your data for reuse on another machine, or allows you to restore your data in the event of a system failure.

To save your project and configuration files

1. In *ProSoft Configuration Builder* tree view, click **[+]** to expand the *PDPMV1* tree, and then double-click the **PROFIBUS DP** icon. This action opens the *PDPMV1 PROFIBUS Master Setup* dialog box.
2. In the *PDPMV1 PROFIBUS Master Setup* dialog box, click the **EXPORT MASTER CONFIG** button. This action saves the PROFIBUS network configuration for your gateway in an XML file. The recommended location for this file is your *My Documents* folder.

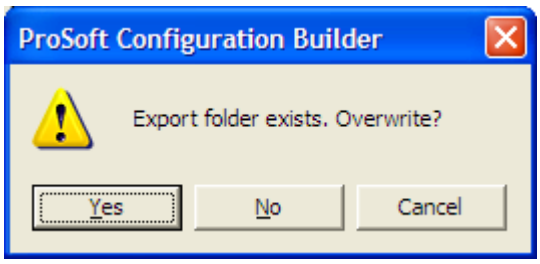
Tip: You can use the XML file created by ProSoft Configuration Builder in this step to simplify the task of configuring additional PROFIBUS network modules. Because it saves the entire network configuration, you can add modules quickly by modifying only the items that are unique for each device, typically the slot number and I/O addresses. To use this saved configuration, open Windows Explorer, navigate to the folder where you saved the Master Configuration XML file, and then drag the file onto the new PROFIBUS DP icon in the ProSoft Configuration Builder tree view.

3. In *ProSoft Configuration Builder*, open the **FILE** menu, and then choose **SAVE AS**.
4. Name the project file, and click **SAVE**. The recommended location for this file is your *My Documents* folder.

Note: All PCB project files and module-related files are automatically saved to C:\PCBExportfFiles.

A complete backup consists of the Project and Master Configuration files, plus the GSD configuration files. The default location for the GSD files is *C:\Documents and Settings\All Users\Application Data\ProSoft\GSD (Windows XP / 2000)* or *C:\My Documents*\.

PCB does this complete backup for you automatically. The default location for these backup files is *C:\PCBExportFiles*. All the files associated with your PCB configuration will be stored in a folder with the same name as the name you used to save your PCB configuration (.ppf) file. When you exit PCB, you will be prompted to overwrite your *Export* folder files.



If you have made changes to your configuration settings, you should click the **YES** button every time you see this dialog box to have the backup files updated. Having all the files for your PCB configuration stored in one folder makes it easier to transfer the application from one system to the other or to send your files to ProSoft Technical Support when you need assistance.

3 Mailbox Messaging

The PDPMV1 PROFIBUS DP Master uses a process called Mailbox Messaging to exchange parameter data between the processor, Master, and slave devices. This process provides a way to encapsulate and prioritize commands and data sent between the PROFIBUS Master and slaves.

The PROFIBUS DP-V1 protocol specifies two types of data transmission messages (telegrams): Cyclic Data Telegrams and Acyclic Data Telegrams. Cyclic data communication is the exchange of normal slave input and output (I/O) data and is handled automatically by the Master in a defined, recurring, deterministic sequence based on the configuration you create in ProSoft Configuration Builder (PCB).

Acyclic communication extends data communication beyond normal I/O data to allow moving field device parameterization and calibration data over the bus during runtime and to allow for extended diagnostics and alarm messages. Acyclic data telegrams are transmitted in the gaps between cyclic data telegrams and, therefore, have a lower priority and get less bandwidth than cyclic data.

Mailbox Messaging commands are incorporated into the sample ladder logic. Mailbox messages and responses to mailbox messages are stored in mailbox data types.

The following chapter discusses these features in more detail.

3.1 Mailbox Message Queuing

The PDPMV1 gateway operates asynchronously on the Mailbox Messages and as such provides for the queuing of the messages as they are received. The queue sizes used in the gateway are as follows:

Queue Type	Queue Size Max	Description
Output Message from processor	20	Number of messages that the ProLinx gateway will queue by type of message. Note that status of the queues can be monitored via the Queue Message Count values.
Input Messages for processor	20	
Alarm Messages from slaves for processor	20	

3.1.1 Queue Timeouts

The PDPMV1 gateway will only allow a message to stay in a queue for up to 10 seconds. If the PROFIBUS Master (for output messages) or the processor (for input and alarm messages) has not successfully received a message within 10 seconds, the gateway will clear the message out of the queue.

3.2 Special Function Mailbox Messaging Commands

The PDPMV1 gateway supports some extended PROFIBUS functions, using a mailbox data exchange mechanism implemented in the gateway.

The PDPMV1 gateway supports the following special functions through this mailbox messaging scheme.

Important Note: When you use the database to send your mailbox command, the application places a value of B0 into the first byte of the Message ID word. This value identifies the mailbox command issued, and differentiates the source of the message: either the database or the command structure. You should use a message ID value between 1 and 255 in the message ID header.

Initiated from ProSoft Configuration Builder

Message	Description
Set Operation Mode	Controls the operating state of the PROFIBUS Master
Set Slave Mode	Sends special control command to one or several slaves (Sync/Freeze)
Get Slave Diag	Gest diagnostic information from a slave
Get Slave Config	Gets slave configuration
Get Database Information	
Get Live List	Gets information from all nodes on the network
MSAC1 Read	DPV1 acyclic read (Class 1)
MSAC1 Write	DPV1 acyclic write (Class 1)
Start Slave	Start Slaves Dynamically
Stop Slave	Stop Slaves Dynamically

DPV1 Alarm Handling: Generated by Slave Devices

Message	Description
Alarm Indications	Spontaneous alarm indication from DPV1 slave. Structure of data is slave-dependent
Alarm Confirmation	This message is sent by the ProLinx gateway automatically as a confirmation to the alarm indications.

The provided Function Blocks simplify the processor logic required to implement these messaging mailbox exchanges.

Sending a mailbox message to the PDPMV1 gateway is a relatively simple process, however, it is important to follow a certain sequence.

Mailbox Message Structure: To PDPMV1 Gateway

Byte Offset	Type	Description
0	Message ID	Processor logic or user set. The Message ID field is used by the ProLinx gateway to detect a new message in the PROFIBUS Output data image. When a non-zero value is detected, the message is processed immediately. The sample ladder logic assigns specific message IDs to different mailbox messages.
1	Message Info	See individual commands for data values to be entered in each of these register locations
2	Command	
3	Data Size	
4	Frame Count	
5	Frame Number	
6	Offset High	
7	Offset Low	
8	Extended Word 1	
9	Extended Word 2	
10	Extended Word 3	
11	Extended Word 4	
12	Extended Word 5	
13	Extended Word 6	
14	Extended Word 7	
15	Extended Word 8	
-	See individual commands	
149		

3.2.1 Mailbox Message: Set Operating Mode

This command allows setting the operating mode of the PROFIBUS Master (STOP, CLEAR, or OPERATE).

Parameter	Description
Command Initiator	Application
Command Name	SET OPERATING MODE
Command Number	0200h
Fragmented	No
Extended Header Data	Fault information may be returned in the header of the response.

Command and Response Layout: Set Operating Mode

	Command		Response		
Message ID	(ID)		(ID)		
Acyclic Message Status Word	4002h		0002h		
Command	0002h		0002h		Set Operation Mode
Data size	0000h		0000h		
Frame count	0001h		0001h		
Frame number	0001h		0001h		
Offset high	0000h		0000h		
Offset low	0000h		0000h		
Extended word 1	Mode	Conf. Req	Mode	Conf. Req	
Extended word 2	-		-		
Extended word 3	-		-		
Extended word 4	-		-		
Extended word 5	-		-		
Extended word 6	-		-		
Extended word 7	-		Appl. Specific Error Code		
Extended word 8	-		Fault Information		

Mode

40h: STOP

80h: CLEAR

C0h: OPERATE

Conf. Req.

00h: Confirmation is not required

01h: Confirmation required. All confirmations are automatically sent by the Master; the user is not required to send a confirmation message.

Fault Information

If "Invalid Other" is returned in the Acyclic Message Status Word in the header of the response, information about the fault can be found here. Refer to Return Codes (page 93) for more information.

0100h: Invalid operating mode

FF00h: Module not initialized

3.2.2 Mailbox Message: Set Slave Mode

In addition to station-related user data transfer, which is executed automatically, the Master can send control commands to a single slave, a group of slaves, or all slaves simultaneously. These control commands are transmitted as multicast commands. This permits use of sync and freeze modes for event-controlled synchronization of the slaves.

The slaves begin sync mode when they receive a sync command from their assigned Master. The outputs of all addressed slaves are then frozen in their current state. During subsequent user data transmissions, the output data are stored on the slaves, but the output states remain unchanged. The stored output data are not sent to the outputs until the next sync command is received. Sync mode is concluded with the unsync command.

Similarly, a freeze control command causes the addressed slaves to assume freeze mode. In this operating mode, the states of the inputs are frozen until the Master sends the next freeze command. Freeze mode is concluded with the unfreeze command.

Note 1: It is only possible to send control commands when operating mode is either CLEAR or OPERATE.

Note 2: Not all slaves support this feature. Refer to the documentation for the actual slave for more information.

Parameter	Description
Command Initiator	Application
Command Name	SET SLAVE MODE
Command Number	0300h
Fragmented	No
Extended Header Data	Fault information may be returned in the header of the response.

Command and Response Layout: Set Slave Mode

	Command		Response		
Message ID	(ID)		(ID)		
Acyclic Message Status Word	4002h		0002h		
Command	0003h		0003h		Set Slave Mode
Data size	0000h		0000h		
Frame count	0001h		0001h		
Frame number	0001h		0001h		
Offset high	0000h		0000h		
Offset low	0000h		0000h		
Extended word 1	Slave Address	Group Select	Slave Address	Group Select	
Extended word 2	Control Command		Control Command		
Extended word 3	-		-		
Extended word 4	-		-		
Extended word 5	-		-		
Extended word 6	-		-		
Extended word 7	-		Extended Fault Information		
Extended word 8			Fault Information		

Acyclic Message Status Word

Refer to Acyclic Message Status Word (page 92).

Slave Address

Range 1 to 125; 127

If the request applies for only one slave, that Slave Address must be entered in the range 1 to 125. If a slave group is to be addressed, Slave Address should be 127 (Multicast address).

Group Select

Range 01h to FFh (Bit Coded)

This parameter determines which group to address. Refer to the following example:

b7	b6	b5	b4	b3	b2	b1	b0
Group 8	Group 7	Group 6	Group 5	Group 4	Group 3	Group 2	Group 1

Example: To address Group 1, 2, and 4, the *Group Select* value should be D0h. If an individual slave should be addressed, the correct group selection must also be made, because the slave will ignore the message if it does not belong to the requested group(s).

What group(s) a slave belongs to is determined during network configuration, and is downloaded during initialization to each slave via the PROFIBUS telegram "Set_Prm".

Control Command

This parameter specifies the command to send:

Bit	Explanation
0 (LSB)	Reserved, set to zero
1	Reserved, set to zero
2	Unfreeze input data
3	Freeze input data
4	Unsynchronize output data
5	Synchronize output data
6	Reserved, set to zero
7 (MSB)	Reserved, set to zero

Combinations of the bits (Unsync/Sync and Unfreeze/Freeze)

Bits 0 or 6	Bits 1 or 7	Explanation
0	0	No Function
0	1	Function will be activated
1	0	Function will be inactive
1	1	Function will be inactive

Fault Information and Extended Fault Information

"Fault Information" Contents		"Extended Fault Information" Contents	
0100h	Address out of range	-	
0200h	Group number 0 not permitted	-	
0A00h	Failed to send Global Control request	0A00h	Incorrect operation mode (Clear/Operate Only)
		0150h	Invalid Freeze Group (Group is not initiated to be Freeze Group)
		0250h	Invalid Sync Group (Group is not initiated to be Sync Group)
		0350h	Incorrect Control Command
		0450h	No Sync -/ or Freeze groups enabled in Master configuration
FE00h	Command not possible in Class 2 only mode	-	
FF00h	Module not initialized	-	

3.2.3 Mailbox Message: Get Slave Diagnostics

This command reads diagnostic data from a specified slave.

Note: The response data size depends on the actual slave implementation. Range 6 to 244.

Parameter	Description
Command Initiator	Application
Command Name	GET SLAVE DIAGNOSTICS
Command Number	0400h
Fragmented	No
Extended Header Data	Fault information may be returned in the header of the response.

Command and Response Layout: Get Slave Diagnostics

	Command		Response		
Message ID	(ID)		(ID)		
Acyclic Message Status Word	4002h		0002h		
Command	0004h		0004h		Get Slave Diagnostics
Data size	0000h		(Size of data)		
Frame count	0001h		0001h		
Frame number	0001h		0001h		
Offset high	0000h		0000h		
Offset low	0000h		0000h		
Extended word 1	Slave Address	Type of Request	Slave Address	Type of Request	
Extended word 2	-		-		
Extended word 3	-		-		
Extended word 4	-		-		
Extended word 5	-		Error Code 1	Error Code 2	
Extended word 6	-		Error Code 3	Error Code 4	
Extended word 7	-		Extended Fault Info		
Extended word 8	-		Fault Information		
			Station Status 1	Station Status 2	Response data word 1
			Station Status 3	Station Status 4	Response data word 2
			Ident Number		Response data word 3
			Extended Diagnostic Data		Response data word 4 ... ... Response data word n

Acyclic Message Status Word

Refer to Acyclic Message Status Word (page 92).

Slave Address

Range 1 to 125; specifies the slave from which to read diagnostics.

Type of request

00h: Internal slave diagnostic request. Returns the diagnostic information stored in the Master. Can only be requested for slaves configured by the Master.

Note: Not allowed when operating in "Class 2-Only" mode.

01h: External slave diagnostic request. Sends a diagnostic request on the network to the specified slave. Can be requested for all slaves on the network.

Error code [1 ...4]

If "Return Code" equals 8030h ("Negative indication from lower layer"), status values according to the DP-specification may be available in "Error Code 1". Error Codes 2 to 4 are reserved.

Refer to Mailbox Messaging Error Codes (page 92).

Return Code

Refer to Mailbox Messaging Error Codes (page 92)

Fault Information

If "Invalid Other" is returned in the Acyclic Message Status Word in the header of the response, information about the fault can be found here.

0100h: Address out of range.

0200h: Incorrect "Type of request"

0A00h: Failed to read diagnostic data from slave. Refer to Return Codes (page 93) for additional fault information.

0B00h: Remote station failure. Refer to Return Codes (page 93) for additional fault information.

FE00h: Command not possible; module operates as a Class 2 Master only.

FF00h: Module offline (not initialized or no valid database).

Station Status [1 ... 3]

Refer to EN50170 Vol. 2 for more information.

Master Address

Address of the Master that parameterized the slave.

Ident Number

Unique ID assigned by the PROFIBUS User Organization.

Extended Diagnostic Data

Slave user-specific data. Refer to the documentation for the actual slave for more information.

3.2.4 Mailbox Message: Get Slave Configuration

This command reads the actual configuration (identifier bytes) of a specified slave.

Note: The response data size depends on the actual slave implementation. Range 6 to 244.

Parameter	Description
Command Initiator	Application
Command Name	GET SLAVE CONFIGURATION
Command Number	0500h
Fragmented	No
Extended Header Data	Fault information may be returned in the header of the response.

Command and Response Layout: Get Slave Configuration

	Command	Response	
Message ID	(ID)	(ID)	
Acyclic Message Status Word	4002h	0002h	
Command	0005h	0005h	Get Slave Configuration
Data size	0000h	(Size of data)	Number of identifier bytes (n)
Frame count	0001h	0001h	
Frame number	0001h	0001h	
Offset high	0000h	0000h	
Offset low	0000h	0000h	
Extended word 1	Slave Address |	Slave Address |	
Extended word 2	-	-	
Extended word 3	-	-	
Extended word 4	-	-	
Extended word 5	-	Error Code 1 | Error Code 2	
Extended word 6	-	Error Code 3 | Error Code 4	
Extended word 7	-	Return Code	
Extended word 8	-	Fault Information	
		Identifier byte 1	Response data word 1
		Identifier byte 2	Response data word 2
		Identifier byte 3	Response data word 3
		...	...
		Identifier byte n	Response data word n

Acyclic Message Status Word

Refer to Acyclic Message Status Word (page 92).

Slave Address

Range 1 to 125; specifies the slave from which to read the configuration.

Error Code [1 ... 4]

If "Return Code" equals 3080h ("Negative indication from lower layer"), status values according to the DP-specification may be available in "Error Code 1", Error Codes 2 through 3 are reserved. Refer to Mailbox Messaging Error Codes (page 92).

Return Code

Refer to Mailbox Messaging Error Codes (page 92).

Fault Information

If "Invalid other" is returned in the Acyclic Message Status Word in the header of the response, information about the fault can be found here. Refer to Acyclic Message Status Word (page 92).

0100h: Address out of range.

0A00h: Failed to execute request. Refer to Return Codes (page 93) for additional information.

0B00h: Remote station failure. Refer to Return Codes (page 93) for additional information.

FF00h: Module not initialized.

Identifier Bytes [1 ... n]

Refer to EN50170 Vol. 2 for information on the structure of these bytes. In addition, refer to the documentation provided with the slave device for more information.

3.2.5 Mailbox Message: Get Database Information

This command fetches information about the stored database (that is, user-specific data that was downloaded to the gateway in the Message Data 1 to 32 via mailbox "FB_APPL_END_DATABASE_DOWNLOAD" or from the configuration tool).

This message also returns information about the amount of allocated I/O-data in the input and output areas. These sizes can be used by the application to set up the I/O-lengths for the ANYBUS_INIT message.

Parameter	Description
Command initiator	Application
Command Name	FB_APPL_GET_DATABASE_INFO
Command number	0017h
Fragmented	No
Firmware Revision	All

Command and Response Layout: Get Database Information

	Command	Response	
Message ID	(ID)	(ID)	
Acyclic Message Status Word	4002h	0002h	
Command	0017h	0017h	Get Database Info
Data size	0000h	0040h	Number of identifier bytes (n)
Frame count	0001h	0001h	
Frame number	0001h	0001h	
Offset high	0000h	0000h	
Offset low	0000h	0000h	
Extended word 1		Total Output Length	
Extended word 2	-	Total Input Length	
Extended word 3	-	Init Output Size	
Extended word 4	-	Init Input Size	
Extended word 5	-	No. of Slaves / -	
Extended word 6	-	-	
Extended word 7	-	-	
Extended word 8	-	Fault Information	
		Database Description (ASCII, 64 characters)	Response data word 1 to 32

Total Input Length, Total Output Length: The sum of Input/Output lengths for all slaves in the database (in bytes).

Init Input size, Init Output size: Required initialization Input/Output sizes for the current database. If the slaves are located in a contiguous block these sizes are the same as total Input/Output lengths.

Note: The input/output direction refers to the directions and naming used for the DPRAM areas, not to the input/output directions used in the bus database or the Bus Configuration window-PB.

Database Description: String of ASCII characters that describes the data base file. This is the string that was written to the database by the "FB_APPL_END_DATABASE_DOWNLOAD" command.

No. of Slaves: Number of configured slaves in the database.

Fault Information

If "Invalid Other" is returned in the Acyclic Message Status Word in the header of the response, information about the fault can be found here. Refer to Return Codes (page 93) for more information.

0001h: No database in flash, or download in progress.

3.2.6 Mailbox Message: Get Live List

This command returns 127 bytes of information about the nodes on the network. Every byte stands for one bus subscriber, and the position of the byte in the response data assigns the address (0 to 126); the content assigns the Station Type.

This command can be sent in all operation modes (STOP, CLEAR, and OPERATE); however, the module must be initialized properly.

Parameter	Description
Command Initiator	Application
Command Name	GET LIVE LIST
Command Number	1800h
Fragmented	No
Extended Header Data	Fault information may be returned in the header of the response.

Command and Response Layout: Get Live List

	Command	Response	
Message ID	(ID)	(ID)	
Acyclic Message Status Word	4002h	0002h	
Command	0018h	0018h	Get Live List
Data size	0000h	007Fh	127 Bytes of Data
Frame count	0001h	0001h	
Frame number	0001h	0001h	
Offset high	0000h	0000h	
Offset low	0000h	0000h	
Extended word 1	-	-	
Extended word 2	-	-	
Extended word 3	-	-	
Extended word 4	-	-	
Extended word 5	-	-	
Extended word 6	-	-	
Extended word 7	-	Return Code	
Extended word 8	-	Fault Information	
Message Data byte 1		Station Type 0	Response Data Byte 1
Message Data byte 2		Station Type 1	Response Data Byte 1
Message Data byte 3		Station Type 2	Response Data Byte 1
...		...	Response Data Byte 1
Message Data byte "n"		Station Type 126	Response Data Byte 1

Acyclic Message Status Word

Refer to Acyclic Message Status Word (page 92).

Station Type [0 … 126]

00h: Slave Station

01h: Master Station not yet ready for Token ring (station only physically at the bus)

02h: Master Station ready to enter Token ring (there is not yet any Token transmission)

03h: Master Station in Token Ring (Token transmission through the station)

04h: Station does not exist

Fault Information

If "Invalid Other" is returned in the Acyclic Message Status Word in the header of the response, information about the fault can be found here. Refer to Acyclic Message Status Word (page 92).

0AH00: Failed to build Live List.

FF00h: Module offline (not initialized or no valid database)

3.2.7 Mailbox Message: Acyclic Data Read: Class 1

This command initiates a DPV1 Class 1 acyclic read request. Refer to EN50170 (DPV1) for more information.

Parameter	Description
Command Initiator	Application
Command Name	MSAC1 READ
Command Number	2000h
Fragmented	No
Extended Header Data	Fault information may be returned in the header of the response.

Command and Response Layout: Acyclic Read

	Command		Response		
Message ID	(ID)		(ID)		
Acyclic Message Status Word	4002h		0002h		
Command	0020h		0020h		Acyclic Read
Data size	0000h		(Size of data)		Number of data bytes (n)
Frame count	0001h		0001h		
Frame number	0001h		0001h		
Offset high	0000h		0000h		
Offset low	0000h		0000h		
Extended word 1	Slave Addr.	Slot Number	Slave Addr.	Slot Number	
Extended word 2	Index	Length	Index	Length	
Extended word 3	-		-		
Extended word 4	-		-		
Extended word 5	-			Error Decode	
Extended word 6	-		Error Code 1	Error Code 2	
Extended word 7	-		Extended Fault information		
Extended word 8	-		Fault Information		
			Data 1		Response Data byte 1
			Data 2		Response Data byte 1
			Data 3		Response Data byte 1
			...		...
			Data n		Response Data byte 1

Acyclic Message Status Word

Refer to Acyclic Message Status Word (page 92).

Slave Address

Station address of the slave responder.

Slot Number and Slot Index

Used in the slave to address the desired data block.

Length

This parameter specifies the number of bytes of the data block to read. If the server data block length is less than requested, the length of the response will be the actual length of the data block. If the server data block is greater or equal, the response will contain the same amount of data.

The slave may answer with an error response if data access is not allowed.

Data [1 ... n]

Returned data.

Fault Information and Extended Fault Information

If "Invalid Other" is returned in the Acyclic Message Status Word in the header of the response, information about the fault can be found here.

"Fault Information"		"Extended Fault Information" Contents
0100h	Address out of range	-
0A00h	Failed to execute request	Refer to Return Codes (page 93).
0B00h	Remote station failure	
1000h	Remote station DPV1 failure	Function_Number
1100h	Length out of range (>240 bytes)	-
1200h	Slave does not support DPV1	-
1300h	Slave not active or not present in configuration	-
FE00h	Command not possible in "Class 2-Only" mode	-
FF00h	Module offline (not initialized or no valid database)	-

Error Decode, Error Code 1 and Error Code 2

If "Fault Information" contains error code 1000h, more information according to the DPV1 specification can be found here.

3.2.8 Mailbox Message: Acyclic Data Write: Class 1

This command initiates a DPV1 Class 1 acyclic write request. Refer to EN50170 (DPV1) for more information.

Parameter	Description
Command Initiator	Application
Command Name	MSAC1 WRITE
Command Number	2100h
Fragmented	No
Extended Header Data	Fault information may be returned in the header of the response.

Command and Response Layout: Acyclic Write

	Command		Response		
Message ID	(ID)		(ID)		
Acyclic Message Status Word	4002h		0002h		
Command	0021h		0021h		Acyclic Write
Data size	(Size of data)		(Size of data)		Number of data bytes (n)
Frame count	0001h		0001h		
Frame number	0001h		0001h		
Offset high	0000h		0000h		
Offset low	0000h		0000h		
Extended word 1	Slave Addr.	Slot Number	Slave Addr.	Slot Number	
Extended word 2	Index	Length	Index	Length	
Extended word 3	-		-		
Extended word 4	-		-		
Extended word 5	-			Error Decode-	
Extended word 6	-		Error Code 1	Error Code 2	
Extended word 7	-		Extended Fault information		
Extended word 8	-		Fault Information		
Message Data byte 1	Data 1		Data 1		
Message Data byte 2	Data 2		Data 2		
Message Data byte 3	Data 3		Data 3		
...	...		...		
Message Data byte n	Data n		Data n		

Acyclic Message Status Word

Refer to Acyclic Message Status Word (page 92).

Slave Address

Station address of the slave responder.

Slot Number and Slot Index

Used in the slave to address the desired data block.

Length

This parameter specifies the number of bytes to write. If the destination data block size is less than requested, the response will contain an error message. If the data block length is greater than or equal to the requested length, the response contains the number of bytes that have been written. The slave may answer with an error response if data access is not allowed.

Data [1 … n]

Data that should be written.

Fault Information and Extended Fault Information

If "Invalid Other" is returned in the Acyclic Message Status Word in the header of the response, information about the fault can be found here:

"Fault Information"		"Extended Fault Information" Contents
0100h	Address out of range	-
0A00h	Failed to execute request	Refer to Return Codes (page 93).
0B00h	Remote station failure	
1000h	Remote station DPV1 failure	Function_Number
1100h	Length out of range (>240 bytes)	-
1200h	Slave does not support DPV1	-
1300h	Slave not active or not present in configuration	-
FE00h	Command not possible in "Class 2-Only" mode	-
FF00h	Module offline (not initialized or no valid database)	-

Error Decode, Error Code 1, and Error Code 2

If "Fault Information" contains error code 1000h, more information according to the DPV1 specification can be found here.

3.2.9 Mailbox Message: Start Slave

This mailbox message starts a selection of slaves that was previously removed from the processing cycle by means of the mailbox message FB_APPL_STOP_SLAVE.

This message is allowed in all operation modes (STOP, CLEAR and OPERATE).

Note: The message will be accepted even if one or several slaves are not part of the configuration and can therefore obviously not be started. The application can, however, find out about this situation by evaluating the "Fault information" and "Message data words" of the response.

Command and Response Layout: Start Slave

	Command		Response		
Message ID	(ID)		(ID)		
Acyclic Message Status Word	4002h		0002h		
Command	000Bh		000Bh		Start Slave
Data size	007Eh		007Eh		
Frame count	0001h		0001h		
Frame number	0001h		0001h		
Offset high	0000h		0000h		
Offset low	0000h		0000h		
Extended word 1					
Extended word 2	-		-		
Extended word 3	-		-		
Extended word 4	-		-		
Extended word 5	-		-		
Extended word 6	-		-		
Extended word 7	-		Additional Fault Information		
Extended word 8	-		Fault Information		
Message data word 1	Slave 0	Slave 1	Slave 0	Slave 1	
Message data word 2	Slave 2	Slave 3	Slave 2	Slave 3	
Message data word 3 to 62	...	...	...	...	
Message data word 63	Slave 124	Slave 125	Slave 124	Slave 125	

Command:

- Message data word 1-63

  Byte-array stating which slave/slaves to start. Array index is equal to slave address.
  0: Do not affect slave
  1: Start slave
  2-255: Reserved

Response:

- Acyclic Message Status Word (in response header)

  "Invalid Data Size" is returned if Data size in the command header does not equal 126.
  If "Invalid Other" is returned, further information is to be found in Extended word 8.
- Additional Fault information (Extended word 7)

  If Extended word 8 equals 0x000A -"Failed to execute request" additional info can be found here
- Fault information (Extended word 8)

  0x0001: Invalid setting in Message data word 1-63 of the command.
  0x0002: At least one slave reports a warning. Refer to Message data word 1-63.
  0x000A: Failed to execute request. Additional fault information is to be found in Extended word 7.
  0x00FE: Command not possible, module operates as Class 2 Master only.
  0x00FF: Module not initialized (this command is only possible after END_INIT).
- Message data word 1-63

  Byte-array stating the status of the slaves. Array index is equal to slave address.
  0: Slave unaffected
  1: Slave started
  2: Warning - Slave could not be started because it is not part of the configuration

3.2.10 Mailbox Message: Stop Slave

This mailbox message stops a selection of slaves from the processing cycle.

This message is allowed in all operation modes (STOP, CLEAR and OPERATE).

Note: The message will be accepted even if one or several slaves are not part of the configuration and can therefore obviously not be stopped. The application can, however, find out about this situation by evaluating the "Fault information" and "Message data words" of the response.

Command and Response Layout: Stop Slave

	Command		Response		
Message ID	(ID)		(ID)		
Acyclic Message Status Word	4002h		0002h		
Command	000Ch		000Ch		Stop Slave
Data size	007Eh		007Eh		
Frame count	0001h		0001h		
Frame number	0001h		0001h		
Offset high	0000h		0000h		
Offset low	0000h		0000h		
Extended word 1	-		-		
Extended word 2	-		-		
Extended word 3	-		-		
Extended word 4	-		-		
Extended word 5	-		-		
Extended word 6	-		-		
Extended word 7	-		Additional Fault Information		
Extended word 8	-		Fault Information		
Message data word 1	Slave 0	Slave 1	Slave 0	Slave 1	
Message data word 2	Slave 2	Slave 3	Slave 2	Slave 3	
Message data word 3 to 62	...	...	...	...	
Message data word 63	Slave 124	Slave 125	Slave 124	Slave 125	

Command:

- Message data word 1-63

  Byte-array stating which slave/slaves to stop. Array index is equal to slave address.
  0: Do not affect slave
  1: Stop slave
  2-255: Reserved

Response:

- Acyclic Message Status Word (in response header)

  "Invalid Data Size" is returned if Data size in the command header does not equal 126.
  If "Invalid Other" is returned, further information is to be found in Extended word 8.

- Additional Fault information (Extended word 7)

  If Extended word 8 equals 0x000A -"Failed to execute request" additional info can be found here.

- Fault information (Extended word 8)

  0x0001: Invalid setting in Message data word 1-63 of the command.
  0x0002: At least one slave reports a warning. Refer to Message data word 1-63.
  0x000A: Failed to execute request. Additional fault information is to be found in Extended word 7.
  0x00FE: Command not possible, module operates as Class 2 Master only.
  0x00FF: Module not initialized (this command is only possible after END_INIT).

- Message data word 1-63

  Byte-array stating the status of the slaves. Array index is equal to slave address.
  0: Slave unaffected
  1: Slave stopped
  2: Warning - Slave could not be stopped because it is not part of the configuration
  3: Warning - Slave already stopped

3.3 Mailbox Messaging Error Codes

3.3.1 Acyclic Message Status Word

This register contains bit and code information about the mailbox message. The register is divided into five areas according to the following illustration:

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5 b4	b3 b2 b1 b0
Message Type								ERR	C/R	(reserved)	Error Code

Bit / Field	Description	Contents
ERR	This bit indicates if the received command contained any errors.	0: Message OK 1: Error (See also "Error Code" below)
C/R	This bit specifies whether the message is a command or a response.	0: Response Message 1: Command Message
Error Code	If the ERR bit is set, this field contains additional information about the error.	0h: Invalid Message ID 1h: Invalid Message Type 2h: Invalid Command 3h: Invalid Data Size 4h: Message header malformed (offset 008h) 5h: Message header malformed (offset 00Ah) 6h: Message header malformed (offset 00Ch to 00Dh) 8h: Invalid Response 9h: Flash Config Error Fh: **Invalid Other** (All other values are reserved)
Message Type	This field specifies the type of the message.	1h: Application Message 2h: PROFIBUS Specific Message 3h: Memory Message 5h: Reset Message (All other values are reserved)

3.3.2 Return Codes

Possible error codes in Message Data word "Return Code" *(The Return Codes can be byte swapped)*

Return Code	Name	Meaning
8010h	DPMC_ERR_V1C_CLOSED	Internal DPMC instance no longer exists
8011h	DPMC_ERR_V1C_STOPPED	Internal DPMC instance has already been stopped
8012h	DPMC_ERR_V1C_STARTED	Internal DPMC instance has already been started
8013h	DPMC_ERR_V1C_STATE_UNKNOWN	Internal DPMC instance has entered an undefined state
8021h	DPMC_ERR_V1C_REQ_ACTIVE	A request is already active
8022h	DPMC_ERR_V1C_NOT_ALLOWED	Internal DPMC module not initialized correctly
8023h	DPMC_ERR_V1C_INVALID_PAR	Invalid parameter in user request
8024h	DPMC_ERR_V1C_MEM_ALLOC	Internal memory allocation error
8025h	DPMC_ERR_V1C_L2_REQ	Unknown opcode in the confirmation
8026h	DPMC_ERR_V1C_TIMEOUT	Active request terminated with timeout
8028h	DPMC_ERR_V1C_INVALID_LEN	Invalid length in user request
8030h	DPMC_ERR_V1C_REQ_NEG[1]	Negative indication from lower layer
8031h	DPMC_ERR_V1C_REQ_RE	Message frame format error in response
8042h	DPMC_ERR_V1C_REQ_WITHDRAW	Request was recalled
8043h	DPMC_ERR_V1C_REQ_NOT_FOUND	Associated request block not found
80C1h	DPMC_ERR_V1C_MM_FE	Format error in request frame
80C2h	DPMC_ERR_V1C_MM_NI	Function not implemented
80C3h	DPMC_ERR_V1C_MM_AD	Access denied
80C4h	DPMC_ERR_V1C_MM_EA	Area too large
80C5h	DPMC_ERR_V1C_MM_LE	Data block length too large
80C6h	DPMC_ERR_V1C_MM_RE	Format error in response frame
80C7h	DPMC_ERR_V1C_MM_IP	Invalid parameter
80C8h	DPMC_ERR_V1C_MM_SC	Sequence conflict
80C9h	DPMC_ERR_V1C_MM_SE	Sequence error
80CAh	DPMC_ERR_V1C_MM_NE	Area non-existent
80CBh	DPMC_ERR_V1C_MM_DI	Data incomplete or incorrect
80CCh	DPMC_ERR_V1C_MM_NC	Master parameter set not compatible

Refer to Error Codes (page 94).

3.3.3 Error Codes

If the return code indicates DPMC_ERR_V1C_REQ_NEG, the status values according to the DP-standard may be available in Error Code 1. Refer to the PROFIBUS DP specification for information on how to interpret these status values.

Error Code	Name	Meaning
01h	L2_STATUS_UE	
02h	L2_STATUS_RR	
03h	L2_STATUS_RS	
0Ch	L2_STATUS_RDL	Refer to PROFIBUS DP specification
0Dh	L2_STATUS_RDH	
0Fh	L2_STATUS_NA	

3.3.4 DP-V1 Error Codes

Possible error codes in Message Data word "Return Code".

Return Code	Name	Meaning
0003h	DPMC_ERR_M_MEM_ALLOC	Internal memory allocation error
0004h	DPMC_ERR_M_L2_REQ	Unknown opcode in the configuration
0005h	DPMC_ERR_M_INVALID_PAR	Invalid parameter in user request
0007h	DPMC_ERR_M_NOT_IN_DATA	Slave is not in DataExchange (thus no DP-V1 request can exist)
0012h	DPMC_ERR_M_REQ_ACTIVE	A request is already active
0018h	DPMC_ERR_M_NOT_ALLOWED	Internal DPMC module not initialized correctly
0021h	DPMC_ERR_M_CLOSED	Internal DPMC instance no longer exists
0022h	DPMC_ERR_M_STOPPED	Internal DPMC instance has already been stopped
0023h	DPMC_ERR_M_STARTED	Internal DPMC instance has already been started
0024h	DPMC_ERR_M_STATE_UNKNOWN	Internal DPMC instance has entered an undefined state
002Fh	DPMC_ERR_M_SLAVE_NOT_FOUND	Slave does not respond
0031h	DPMC_ERR_M_TIMEOUT	Active request terminated with timeout
0034h	DPMC_ERR_M_INVALID_LEN	Invalid length in user request
0035h	DPMC_ERR_M_REQ_NEG	Negative indication from lower layer
0036h	DPMC_ERR_M_REQ_RE	Message frame format error in response
0037h	DPMC_ERR_M_REQ_WITHDRAW	Request was recalled
0038h	DPMC_ERR_M_REQ_NOT_FOUND	Associated request block not found
0040h	DPMC_ERR_M_MM_FE	Format error in request frame
0041h	DPMC_ERR_M_MM_NI	Function not implemented
0042h	DPMC_ERR_M_MM_AD	Access denied
0043h	DPMC_ERR_M_MM_EA	Area too large
0044h	DPMC_ERR_M_MM_LE	Data block length too large
0045h	DPMC_ERR_M_MM_RE	Format error in response frame
0046h	DPMC_ERR_M_MM_IP	Invalid parameter
0047h	DPMC_ERR_M_MM_SC	Sequence conflict
0048h	DPMC_ERR_M_MM_SE	Sequence error
0049h	DPMC_ERR_M_MM_NE	Area non-existent
004Ah	DPMC_ERR_M_MM_DI	Data incomplete or incorrect
004Bh	DPMC_ERR_M_MM_NC	Master parameter set not compatible
004Ch	DPMC_ERR_M_S7_XA	
004Dh	DPMC_ERR_M_S7_XR	PROFIBUS error for DP-V1 (NRS-PDU received)
004Eh	DPMC_ERR_M_S7_XW	

3.3.5 Command Error Codes

Errors reported from the command list of the gateway require 8 bytes or 4 words per command. If the first 7 bytes of the error are 0xFF, this is a gateway-generated error as follows:

Value of Last Byte	Error Definition
0x00	Too few parameters for command in command list section of configuration file.
0x01	Invalid type value specified for command.
0x02	Invalid database offset specified for command.
0x03	Invalid swap type code specified for command.
0x04	Invalid database trigger address
0x05	Invalid database address and count combination
0x10	Invalid function code specified for command.
0xFF	Response timeout for command recognized.

Refer to Error Codes (page 94) for an explanation of other error codes.

The 8 bytes (4 words) represent the extended words 5 to 8 in response messages.

4 Diagnostics and Troubleshooting

There are two ways to troubleshoot ProLinx gateways:

- Using the LEDs located on the front of the gateway.
- Using the Debug port, which provides a view into the gateway's internal database.

4.1 Required Hardware

You can connect directly from your PC's serial port to the serial port on the gateway to view configuration information, perform maintenance, and send or receive configuration files.

ProSoft Technology recommends the following minimum hardware to connect your PC to the gateway:

- 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 gateway firmware upgrades.

4.2 Basic Troubleshooting Steps

1 Verify that the gateway is installed correctly, and the *Main* menu is displayed.
2 Install the most current version of ProSoft Configuration Builder.
3 Note the color and behavior of the LED Status Indicators (lights) on the front panel. Refer to the chart in the following section for examples.

4.3 PROFIBUS DP-V1 (PDPMV1 Driver) Master LED Indicators

The LEDs indicate the gateway's operating status.

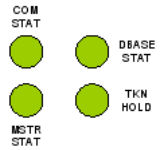
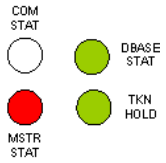
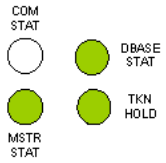
PROFIBUS Master Status LEDs

- COM STAT
- DBASE STAT
- MAST STAT
- TKN HOLD

4.3.1 PROFIBUS Master Indicators

LED	State	Description
TKN HLD	GREEN	The gateway has the token
	OFF	The gateway does not have the token
DBASE STAT	GREEN	Database OK
	GREEN-Flashing	Database download in progress
	RED	Invalid database
	OFF	No databases have been downloaded
MSTR STAT	GREEN	Operating mode
	GREEN-Flashing	Clear mode
	RED	Stop mode
	OFF	Offline
COM STAT	GREEN	Data exchange with all configured slaves
	GREEN-Flashing	Data exchange with at least one configured slave but not all configured slaves
	RED	Bus control error (possible bus short circuit or configuration error)
	OFF	No data exchange with any configured slave
ALL LEDs	RED	Fatal error

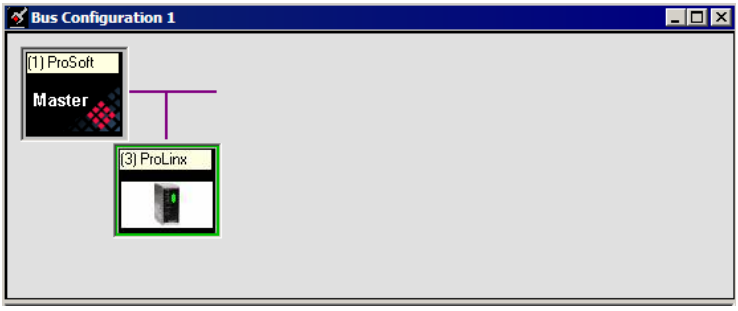
4.3.2 Examples

	Gateway Status	PROFIBUS Master Status	PROFIBUS Master Status LED Description
Normal operation	ACTIVE (ON)		**COM STAT (GREEN):** Master is communicating with all configured slaves. **DBASE STAT (GREEN):** PROFIBUS has been configured. **TKN HOLD (GREEN):** Gateway is holding the PROFIBUS token. **MSTR STAT (GREEN):** Master is in operating mode.
PROFIBUS Master is stopped	ACTIVE		**COM STAT (OFF):** Master is not communicating with configured slaves. **DBASE STAT (GREEN):** PROFIBUS has been configured. **TKN HOLD (GREEN):** Gateway is holding the PROFIBUS token. **MSTR STAT (RED):** Master is in STOP mode.
Master not communicating with slaves	ACTIVE		**COM STAT (OFF):** Master is operating but there are no slaves responding. **DBASE STAT (GREEN):** PROFIBUS has been configured. **TKN HOLD (GREEN):** Gateway is holding the PROFIBUS token. **MSTR STAT (GREEN):** Master is in operating mode.

4.4 Viewing the Online Status of the PROFIBUS Network

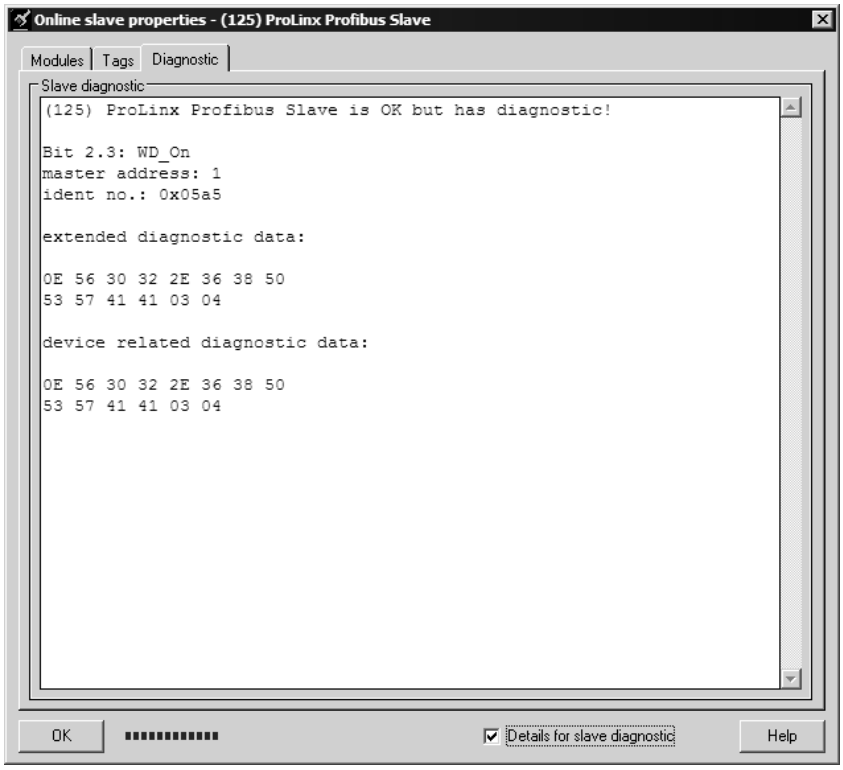
Note: For this procedure, you must connect a serial cable from the serial port on your PC to the RJ45 to DB9M adaptor cable on the PDPMV1 gateway.

1 In *ProSoft Configuration Builder for PROFIBUS*, open the **ONLINE** menu, and then choose **MONITOR/MODIFY**. ProSoft Configuration Builder will establish communication with the PDPMV1 gateway, and will indicate communication status.



- If the slave icon in the *Bus Configuration* window has a green border, then the PDPMV1 gateway is correctly communicating with the PROFIBUS slave.
- If the slave icon in the *Bus Configuration* window has a red border, then the gateway is not communicating with the slave.
- If the slave icon in the *Bus Configuration* window has a blue border, the slave is communicating with the Master, but is generating diagnostic data. To view diagnostic data for the slave, select the slave, and click the right mouse button to open a shortcut menu. On the shortcut menu, choose **ONLINE PROPERTIES**.

2 In the *Online Slave Properties* dialog box, click the **DIAGNOSTIC** tab, and select **(CHECK) DETAILS FOR SLAVE DIAGNOSTIC**. Slave diagnostic information will appear in the *Diagnostic* window. Refer to the documentation for your PROFIBUS slave to determine the meaning of the diagnostic data.



4.5 Using ProSoft Configuration Builder (PCB) for Diagnostics

The *Configuration and Debug* menu for this gateway 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 gateway is the *Main* menu.

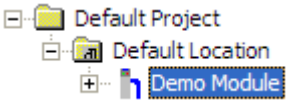
Because this is a text-based menu system, you enter commands by typing the [command letter] from your computer keyboard in the *Diagnostic* window in *ProSoft Configuration Builder (PCB)*. The gateway does not respond to mouse movements or clicks. The command executes as soon as you press the **[COMMAND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

4.5.1 Using the Diagnostic Window in ProSoft Configuration Builder

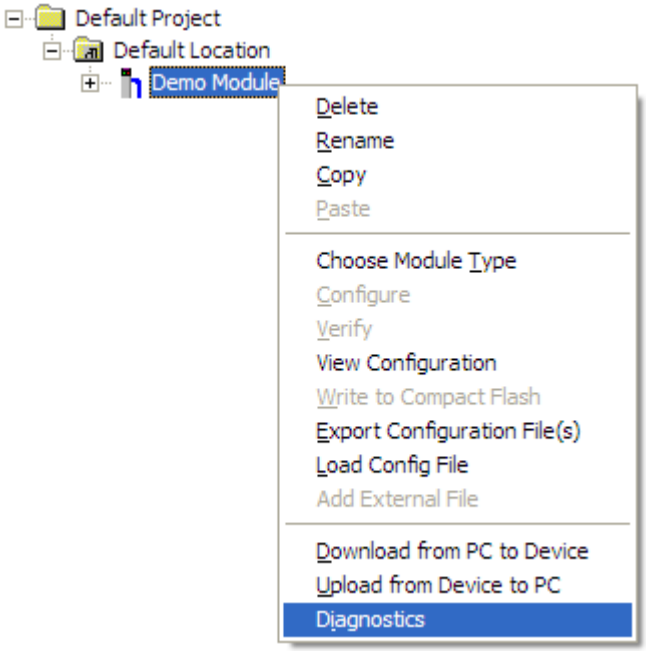
Tip: You can have a ProSoft Configuration Builder Diagnostics window open for more than one module or gateway at a time.

To connect to the gateway's Configuration/Debug serial port

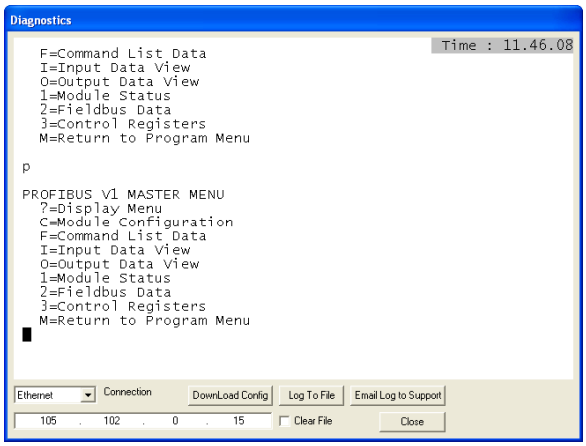
1 Start ProSoft Configuration Builder with the application file to be tested. Right-click the module icon.



2 On the shortcut menu, choose **DIAGNOSTICS**.



3 This action opens the following dialog box. Press **[?]** to display the *Main* menu.



If there is no response from the gateway, follow these steps.

1 Verify that the cables are connected properly between your computer and the gateway.

- PROFIBUS cable to PROFIBUS port
- Null modem cable to Config/Debug port

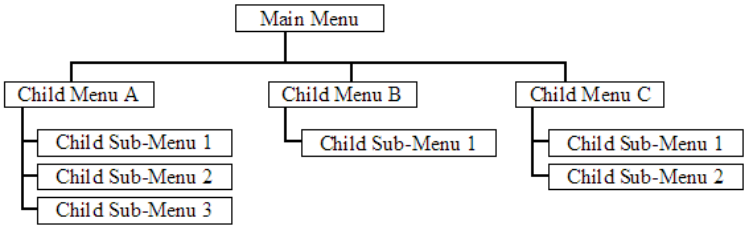
2 On computers with more than one serial port, verify that your communication program is connected to the same port that is connected to the gateway.

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

Navigation

All of the submenus for this gateway contain commands to redisplay the menu or return to the previous menu. You can always return from a submenu 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 the menus available for this gateway, and briefly discusses the commands available to you.

Keystrokes

The keyboard commands on these menus are usually not case sensitive. You can enter most commands in lowercase or uppercase 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** and ***/***.

Also, take care to distinguish the different uses for uppercase letter "eye" (**I**), lowercase letter "el" (**L**), and the number one (**1**). Likewise, uppercase letter "oh" (**O**) and the number zero (**0**) are not interchangeable. Although these characters look alike on the screen, they perform different actions on the gateway and may not be used interchangeably.

4.5.2 Main Menu

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

```
PROFIBUS V1 MASTER MENU
  ?=Display Menu
  C=Module Configuration
  F=Command List Data
  I=Input Data View
  O=Output Data View
  1=Module Status
  2=Fieldbus Data
  3=Control Registers
  M=Return to Program Menu
```

Caution: Some of the commands available to you from this menu are designed for advanced debugging and system testing only, and can cause the gateway to stop communicating with the processor or with other devices, resulting in potential data loss or other communication failures. Use these commands only if you fully understand their potential effects, or if you are specifically directed to do so by ProSoft Technology Technical Support Engineers.

There may be some special command keys that are not listed on the menu but that may activate additional diagnostic or debugging features. If you need these functions, you will be advised how to use them by Technical Support. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

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 PROFIBUS Configuration

Press **[C]** to view the PROFIBUS Configuration screen.

Use this command to display the current configuration and statistics for the gateway.

Viewing PROFIBUS Data

Press **[2]** to view PROFIBUS data. Use this command to view information related to the status of each slave in the PROFIBUS network, and to verify that each slave is configured (SLAVE CFG LIST), exchanging data with the Master (TRANSFER LIST) and in diagnostic mode (SLAVE DIAG LIST).

You can also check the gateway's operation state, where:

- 00 = Offline
- 40 = Stop
- 80 = Clear
- C0 = Operate

Viewing Gateway Status

Press **[1]** to view status information about the gateway. This screen also contains useful information for mailbox troubleshooting:

- Scan count
- Mailbox counters
- Alarm counters
- Number of acyclic read and write operations performed by the gateway

You can also view the number of mailbox messages in the input and output queues, and the number of alarms in the alarm queue.

Viewing Control Registers

Press **[3]** to view information about the PROFIBUS Master's Control Registers. Use this command to view general information about the gateway, such as the firmware version and its serial number. The gateway status contains two possible codes:

- 0400 = gateway is running but not communicating with slaves
- 0401 = gateway is running and communicating with slaves

If the gateway is in STOP mode, the status code is displayed as 0400.

Exiting the Program

Press **[ESC]** to restart the gateway and force all drivers to be loaded. The gateway will use the configuration stored in the gateway's flash memory to configure the gateway.

4.6 Standard PROFIBUS Slave Diagnostic Bytes

The diagnostic information consists of 6 bytes of standard diagnostic information plus any user-related diagnostic information. The standard information is shown in the tables below.

Byte	Description
0	Station status 1
1	Station status 2
2	Station status 3
3	Master address
4	Ident number high
5	Ident number low

4.6.1 Byte 0 - Station Status 1 Bits

Bit	Description
0	Station not existent
1	Station not ready
2	Configuration fault
3	Extended diagnostic data present
4	Not supported
5	Invalid slave response
6	Parameter fault
7	Master lock

4.6.2 Byte 1 - Station Status 2 Bits

Bit	Description
0	Parameter request
1	Static diagnostic
2	Slave device
3	Watchdog on
4	Freeze mode
5	Sync mode
6	Reserved
7	Slave deactivated

4.6.3 Byte 2 - Station Status 3 Bits

Bit	Description
0	Reserved
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Extended diagnostic overflow

4.6.4 Byte 3 - Master Address

This byte shows the address of the assigned PROFIBUS Master after parameterization. If there is an error during the parameterization process, this byte will display the value FF (hexadecimal).

4.6.5 Byte 4 - Ident Number High

This byte shows the high byte of the specific Ident Number assigned to the module by the PROFIBUS User Organization.

4.6.6 Byte 5 - Ident Number Low

This byte shows the low byte of the specific Ident Number assigned to the module by the PROFIBUS User Organization.

4.7 Status and Status Mapping

If the *Status Data Register* parameter is set to any value between 0 and 3900 in the PCB configuration, gateway status data will be placed in the gateway's database, starting at the register specified by the parameter. The status data is organized as follows.

Byte Offset		
Start	**End**	**Description**
0	9	Unique gateway 10-byte pattern as text
10	11	Reserved
12	13	User-configured PROFIBUS input data size stated as a word count
14	15	User-configured PROFIBUS output data size stated as a word count
16	17	Database starting address for input data
18	19	Database starting address for output data
20	21	Reserved for future use
22	22	User-configured flag to indicate if input data is swapped before placing in the input image for the controller. If 0, no swapping. If not 0, then swap bytes.
23	23	User-configured flag to indicate if output data is swapped after receiving from the output image of the controller. If 0, no swapping. If not 0, then swap bytes.
24	24	Gateway software major version number.
25	25	Gateway software minor version number
26	41	Fieldbus data of slave configuration list
42	57	Fieldbus data of slave data transfer list
58	73	Fieldbus data of slave diagnostic list
74	74	Fieldbus pad byte to make data word aligned (not used)
75	75	Fieldbus operating state (00h=Offline, 40h=Stop, 80h=Clear & C0h=Operate)
76	76	Fieldbus identification number most significant byte (MSB)
77	77	Fieldbus identification number least significant byte (LSB)
78	81	Control data gateway serial number
82	82	Control data gateway version number MSB
83	83	Control data gateway version number LSB
84	84	Control data gateway status MSB (00h=App stopped, 04h=App running)
85	85	Control data gateway status LSB (bit 0=data exchange, bit 1=slave input frozen/cleared, bit 4=reset)
86	89	PROFIBUS configuration CRC32
90	93	Gateway configuration CRC32
94	95	Gateway program scan counter
96	97	Gateway PROFIBUS output image data update counter
98	99	Gateway PROFIBUS input image data update counter
100	101	Gateway out mailbox counter
102	103	Gateway in mailbox counter
104	105	Gateway alarm IND receive counter
106	107	Gateway alarm CON receive counter
108	109	Gateway acyclic read request message counter
110	111	Gateway acyclic write request message counter
112	113	Reserved
114	115	Reserved
116	117	Reserved
118	119	Gateway File Error Word (bitmapped)

Byte Offset		
Start	**End**	**Description**
120	121	Reserved
122	123	Reserved
124	125	Reserved
126	127	Reserved
128	129	Reserved
130	131	Reserved
132	133	Configured response timeout
134	135	Reserved
136	137	Reserved
138	139	Database register for mailbox messaging
140	141	Alarm Register for mailbox messaging
142	143	Reserved
144	145	Status Register
146	147	Number of message in the in mailbox queue
148	149	Number of message in the out mailbox queue
150	151	Number of message in the alarm queue
152	153	Reserved
154	155	Reserved
156	157	Reserved

4.7.1 PDPMV1 Command Status Data Area

Status Register	Description
13100	Command Count
13101	Command Request Count
13102	Command Response Count
13103	Command Error Count
13104	Number of Request Packets
13105	Number of Response Packets
13106	Errors Sent
13107	Errors Received
13108	Configuration Error Word
13109	Current Error
13110	Last Error
13111 to 13910	Command List Errors (8 bytes per command for 800-word registers)
13911 to 13999	Reserved for future use

5 Reference

5.1 PROFIBUS comDTM

DTM (Device Type Manager) is a standard way to provide all necessary data and functionality for a communication device, for example a PROFIBUS DP card. This technology is similar to the way Microsoft Windows supports printer drivers supplied by manufacturers and available to any Windows application, rather than requiring a custom printer driver for each specific application.

PROFIBUS comDTM, distributed by ProSoft Technology, is a DTM for PDPMV1 gateways. Configuration is available through Ethernet for the ProLinx series PDPMV1.

PROFIBUS comDTM allows configuration tools, instruments, and communication devices on a field network to recognize and use the module's capabilities.

Note: This functionality requires comDTM version 1.0.1.5 with install version 1.01.0003. For information on how to check the comDTM version and install version, refer to Verifying the comDTM Version and comDTM Install Version (page 118).

5.1.1 ProSoft Technology Product Availability

Part Number	Description
PSW-cDTM-PDPM	PROFIBUS DPV1 Master comDTM software gateway

5.1.2 Introduction to PROFIBUS comDTM

Why Use PROFIBUS comDTM?

Customers from around the world have different machines, fieldbusses, and other end-user equipment. Each is equipped with the field bus requested by their end-user. Since there are so many variations, the automation solution in their standard machine ends up being different from case to case.

This means that service engineers need to have different configuration tools for every fieldbus. Or maybe even one for every device. You want one, but the reality is you have many. This is where PROFIBUS comDTM can help with configuring and communicating with different networks, products and suppliers.

What is FDT?

FDT (Field Device Tool) is the specification for software interfaces for the integration of field devices, drives, and controls in engineering and configuration tools. FDT is manufacturer-independent and allows for trouble-free parameterization and configuration of the user's specific processing system.

FDT technology standardizes the communication interface between field devices and systems. The key feature is its independence from the communication protocol and the software environment of either the device or the host system. FDT allows any device to be accessed from any host through any protocol.

The FDT container implements the FDT specification. It serves as an interface between FDT and a superior application. It uses the DTMs to gain access to the devices. FDT frame application is an engineering or configuration tool which has an FDT container.

FDT technology comprises three key components: the Frame Application, Device DTMs, and Communication DTMs.

- The DTM (Device Type Manager) is used for the configuration and maintenance of field devices, drives and so on. It is only functional with an FDT container.
- The FDT container implements the FDT specification. It serves as interface between FDT and a superior application. It uses the DTMs to gain access to devices.
- FDT frame application is an engineering or configuration tool that has an FDT container. The user interface of the DTMs is displayed here.

To better understand the functionality of these components, consider the analogy of the Internet - a standard web browser allows users to view countless web pages created by many content providers. The host system supplier typically creates the Frame Application, just as Microsoft supplies the Internet Explorer web browser. Just as a web browser opens a web page that contains code from the company that makes the web page, an FDT frame opens the Device DTM, which is the plug-in software from the device vendor.

Similar to a web browser, the Frame Application has menu bars, toolbars, and a navigation tree. Visually, the frame application surrounds the device vendor's DTM. Like opening a web page from a 'favorites' navigation tree, a user can navigate down a tree that lists the field device tags, click on one, and open the device vendor's DTM inside the frame. And, like web pages that let users interact with a reservation system or a shopping service, the Device DTMs let the user interact with the field device in a wide variety of ways. The Device DTM vendor can create a graphically rich user interface that does virtually anything possible in an advanced Windows PC-type interface. The third part of the technology, the Communication DTM, provides a standardized communication Application Process Interface (API) inside the PC, interfacing between the Device Vendor's DTM and the host system's specific driver that handles pass-through communications from the PC down to the fieldbus interface card.

The host system vendor supplies a Communication DTM (comDTM) for each supported fieldbus protocol. This ensures that the details of the PC, network, interface cards, and pass-through protocols of the host system, are transparent to the device vendor's DTM. This correlates back to the internet analogy where: the web page is transparent to the PC it's running in, the brand of the network interface card in the PC, or whether communication is DSL or broadband cable.

FDT technology complements and expands existing device description languages. It does not replace but rather builds upon existing DDs.

In particular, FDT expands the capabilities of DD for complex devices. Device Description languages have limitations in the graphical representation of the device at the user interface and allow only a limited integration of special features. FDT/DTM removes these limitations.

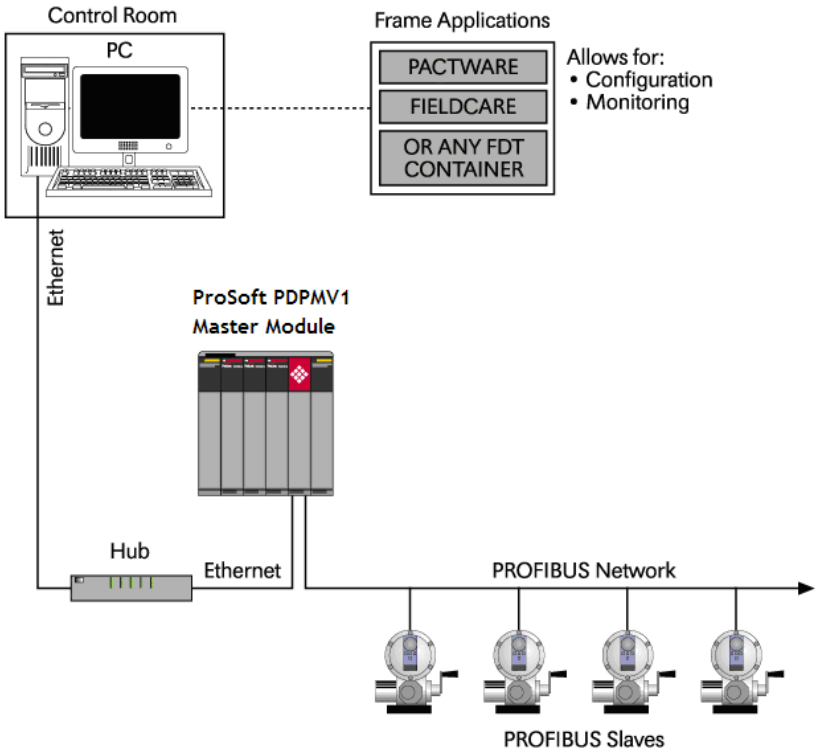
Typical frame applications are

- Pactware from The PACTware Consortium e.V (freeware)
- FieldCare from Endress & Hauser
- Field Control from ABB

What is DTM?

DTM (Device Type Manager) is a standard way to provide all necessary data and functionality for a communication device, for example a PROFIBUS DP card. This technology is similar to the way Microsoft Windows supports printer drivers supplied by manufacturers and available to any Windows application, rather than requiring a custom printer driver for each specific application.

PROFIBUS comDTM, distributed by ProSoft Technology, is a DTM for PTQ and MVI series PDPMV1 modules and ProLinx PDPMV1 gateways. It allows configuration tools, instruments and communication devices on a field network to recognize and use the module's capabilities.



What is PROFIBUS?

PROFIBUS (Process Field Bus) is a widely-used, open-standards protocol created by a consortium of European factory automation suppliers in 1989.

PROFIBUS is a Master/slave protocol. The Master establishes a connection to the remote slave. When the connection is established, the Master sends the PROFIBUS commands to the slave.

5.1.3 System Requirements

Confirm that your system meets the following hardware and software requirements before you start the installation.

Hardware Requirements (Recommended)

- Pentium 4 processor rated for at least 2 GHz
- 450 MB hard drive space for DTM Libraries
- Video card capable of 1024 X 768 resolution at 64k colors
- Ethernet Network Interface Card (NIC)
- One of the following ProSoft Technology PROFIBUS DPV1 Master modules:
  - ProLinx PDPMV1 Ethernet only, serial port not supported

Software Requirements (Minimum)

- Windows NT 4.0 Service Pack 6A, Windows 2000 SP3 or Windows XP Professional SP2, or better
- Microsoft Internet Explorer Version 6.0, or better
- FDT 1.2.1 compliant FDT frame application. Compatible applications include:
  - PACTware
  - FieldCare
  - M&M fdt CONTAINER

Some FDT Containers require the following components:

- Microsoft Management Console
- Adobe Acrobat Reader 5.0, or better

5.1.4 Installation

To install comDTM

1. Navigate to www.prosoft-technology.com and download the **PROFIBUS comDTM Software**.
2. Double-click the **SETUP.EXE** file. This action starts the installation wizard.
3. Follow the instructions on the installation wizard to install the program.
4. Click **FINISH** to complete the installation. If you are prompted to restart your computer, save your work in any applications that are running, close the applications, and allow the computer to restart.

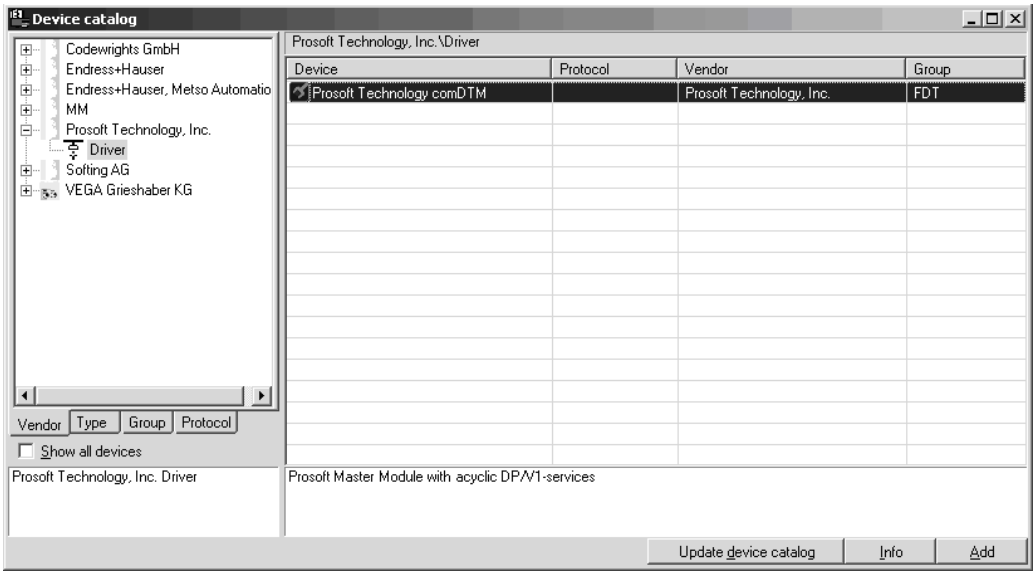
Note: During installation, you will be prompted to accept or change the location for the database folder. The default location for this folder is the Program Files directory on your local hard drive (normally Drive C:). If you intend to allow multiple workstations to access the same database folder, you should choose a network drive that other workstations can access.

5.1.5 Quick Start

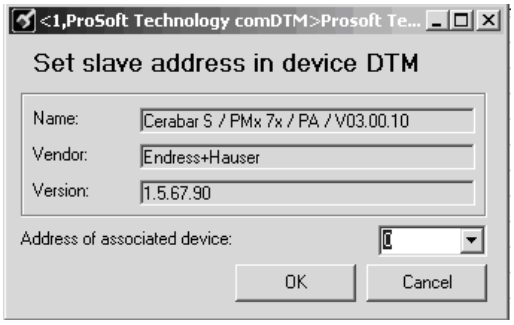
The following steps demonstrate how to start the FDT (Field Device Tool) program and configure the PROFIBUS comDTM.

Starting FDT

1. Start the FDT program and login as administrator. The following procedures use PACTware 3.0 software.
2. Click the **UPDATE DEVICE CATALOG** button. If PROFIBUS comDTM was installed successfully, it will appear in the *Device Catalog* window.



3. Select the **PROSOFT TECHNOLOGY COMDTM** entry in the device catalog, and then click **ADD**.
4. Repeat steps 1 through 3 to add any other manufacturer's device DTMs installed on your computer. Select the correct address for each device, and then click **OK** to proceed.

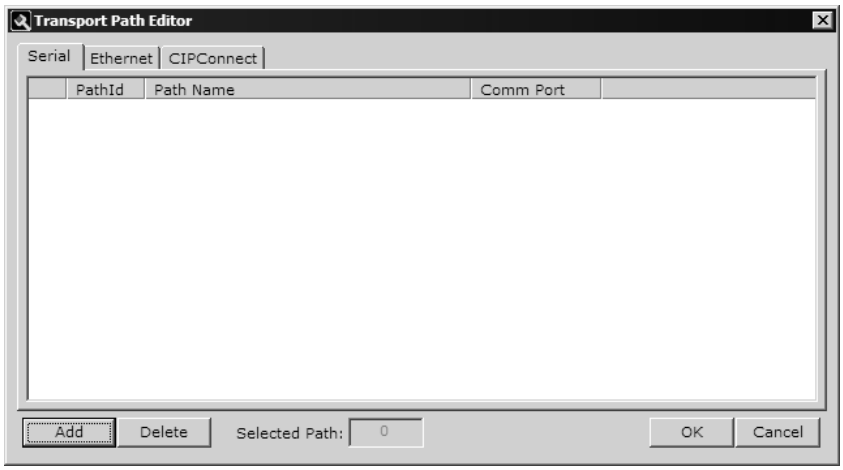


Note: You must use the same PROFIBUS device address that you used when setting up the device.

Connecting the comDTM to the Master to Establish Communication

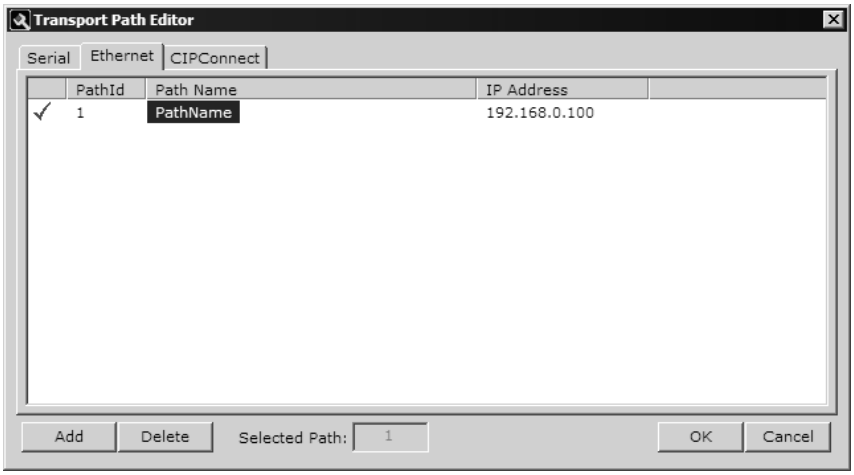
Note: The features described in this section require the current version of PROFIBUS comDTM. You can always download the newest version from www.prosoft-technology.com.

1. From the Windows **START** button, navigate to **PROGRAMS** > **PROSOFT TECHNOLOGY**, and then choose **PROSOFT TRANSPORT PATH EDITOR**.
2. If you have not created a communication path, click the **ADD** button. If you have already created a path, skip to step 5.

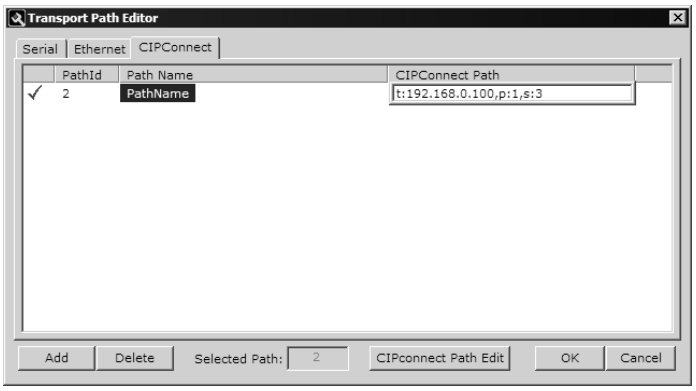


3. Select the **ETHERNET** tab, and enter the IP Address of the module or gateway. Enter a descriptive path name. Click the **OK** button to confirm.

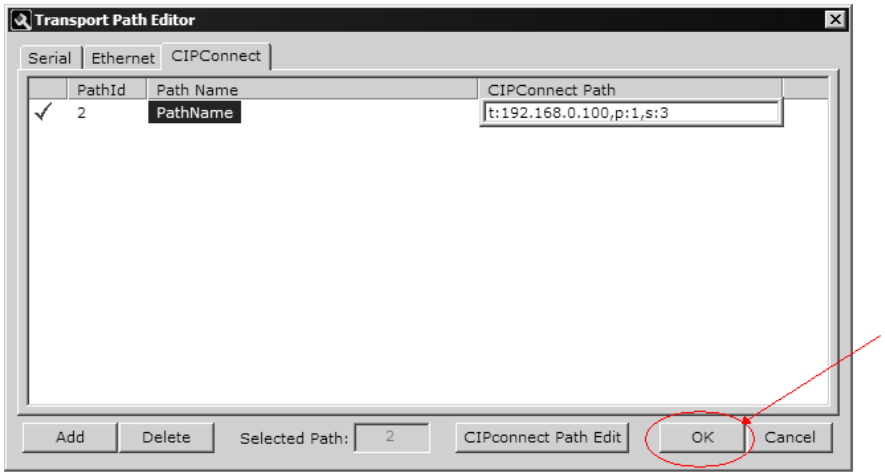
Note: Do not include the underscore (_) for the path name.



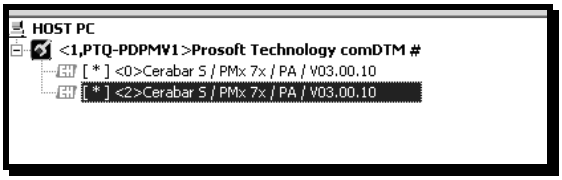
4 The communication path will be displayed at the top grid panel as shown in the following illustration.



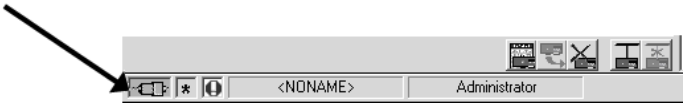
5 Select the path and click the **OK** button to exit the *Transport Path Editor* window.



6 Select the **COMDTM** icon and click the right mouse button to open a shortcut menu. On the shortcut menu, choose **CONNECT**. If the connection is successful, the icon will be highlighted, as shown in the following illustration.



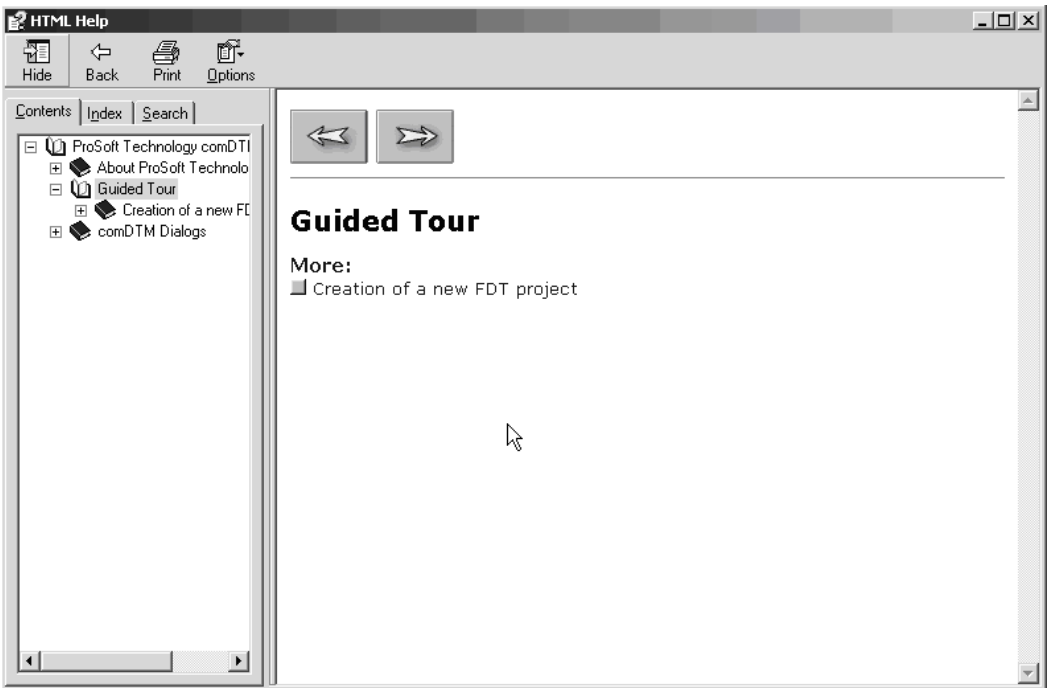
When the comDTM is connected with the Master, PACTware indicates the connection Master by displaying a green plug in the status bar.



This completes the installation and Quick Start Guide for the ProSoft Technology PROFIBUS comDTM. Refer to the online help and documentation additional information on each DTM component you have installed and configured.

The comDTM provides a *Guided Tour* section in the online help that explains the basic features and operation of the program. To open the online help, click the right mouse button on **PROSOFT TECHNOLOGY COMDTM**, and choose **ADDITIONAL FUNCTIONS** > **ONLINE HELP** from the shortcut menu.

Click the **GUIDED TOUR** icon. Use the navigation buttons on each help page to view the help topics.



Refer to the documentation and online help for your FDT frame program for specific FDT frame instructions.

5.1.6 Verifying the comDTM Version and comDTM Install Version

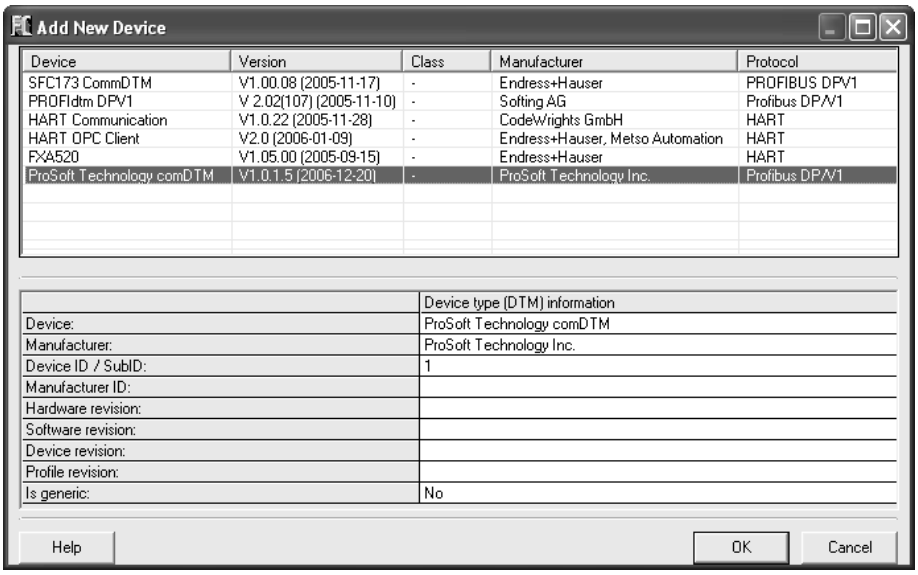
Introduction

There are two versions associated to the comDTM – the comDTM version and the comDTM install version. Starting with comDTM version 1.0.1.5, each upgrade will indicate the same comDTM version but a different comDTM install version.

This section describes how to check the comDTM version and comDTM install version.

Checking the comDTM Version

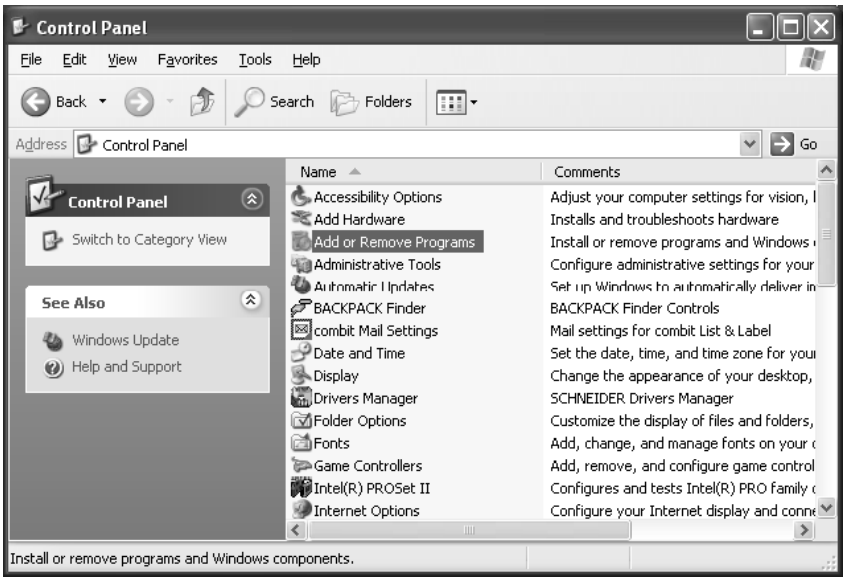
Refer to the *Version* column indicated when you add the comDTM to the DTM Container project.



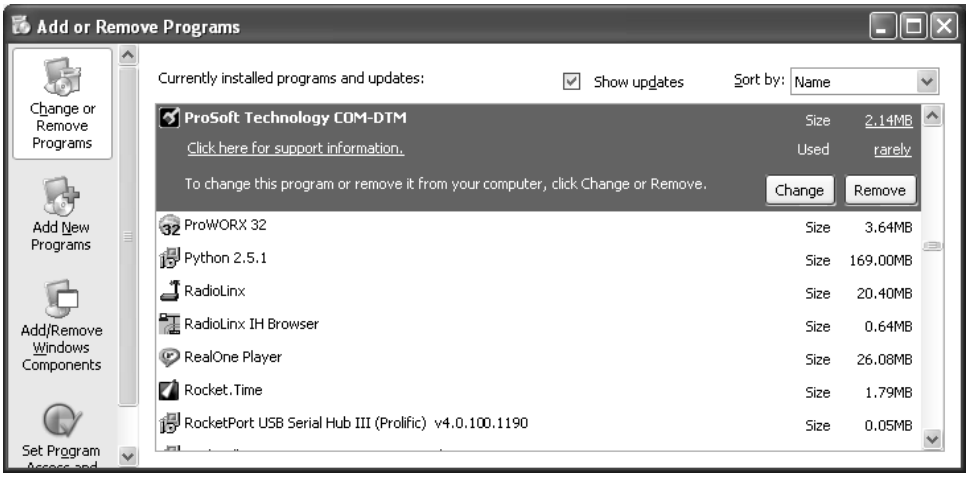
Checking the comDTM Install Version

1 Click the **START** menu and then choose **CONTROL PANEL**.

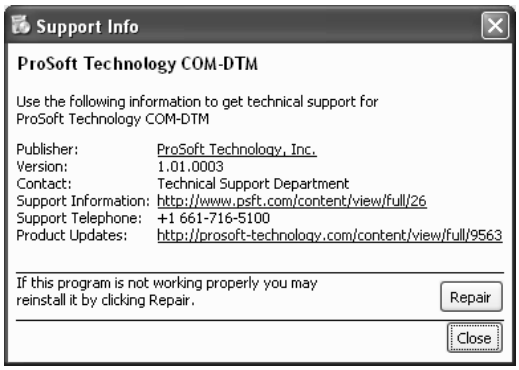
2 In the list of **CONTROL PANEL** applets, select **ADD OR REMOVE PROGRAMS**.



3 Select **PROSOFT TECHNOLOGY COM-DTM**, and then click on the link **CLICK HERE FOR SUPPORT INFORMATION**.

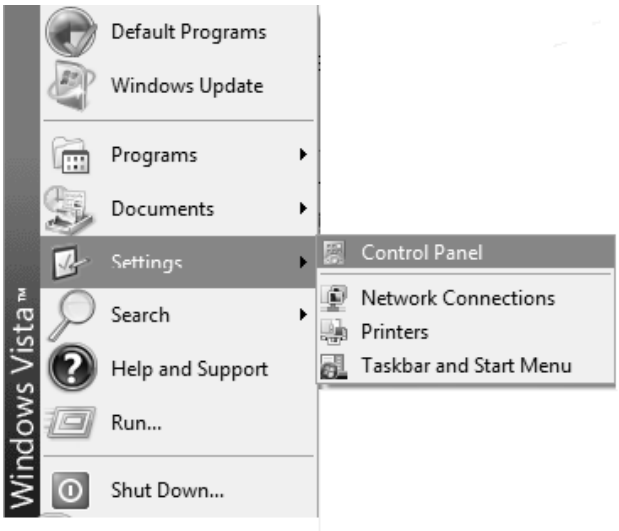


4 You will see the comDTM Install Version in the *Version* field, as shown in the following illustration (1.01.0003 for this example).



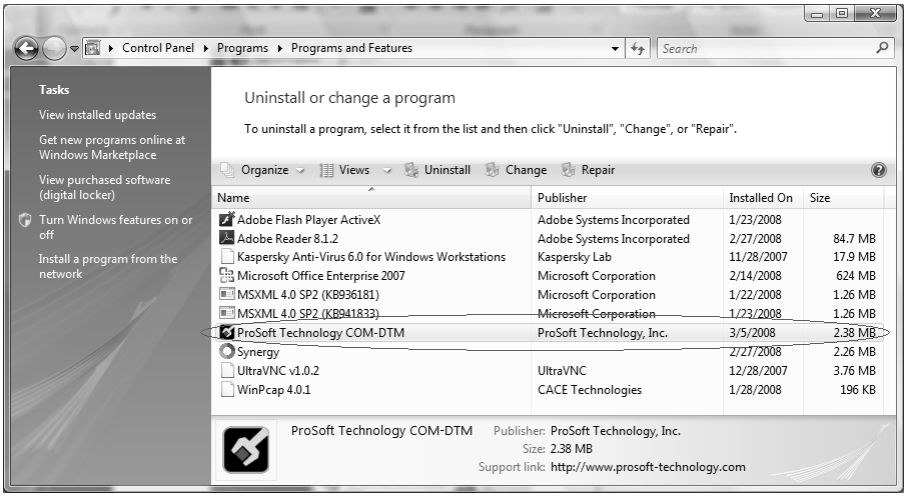
Checking the Install Version for Vista

1 Select **CONTROL PANEL**.

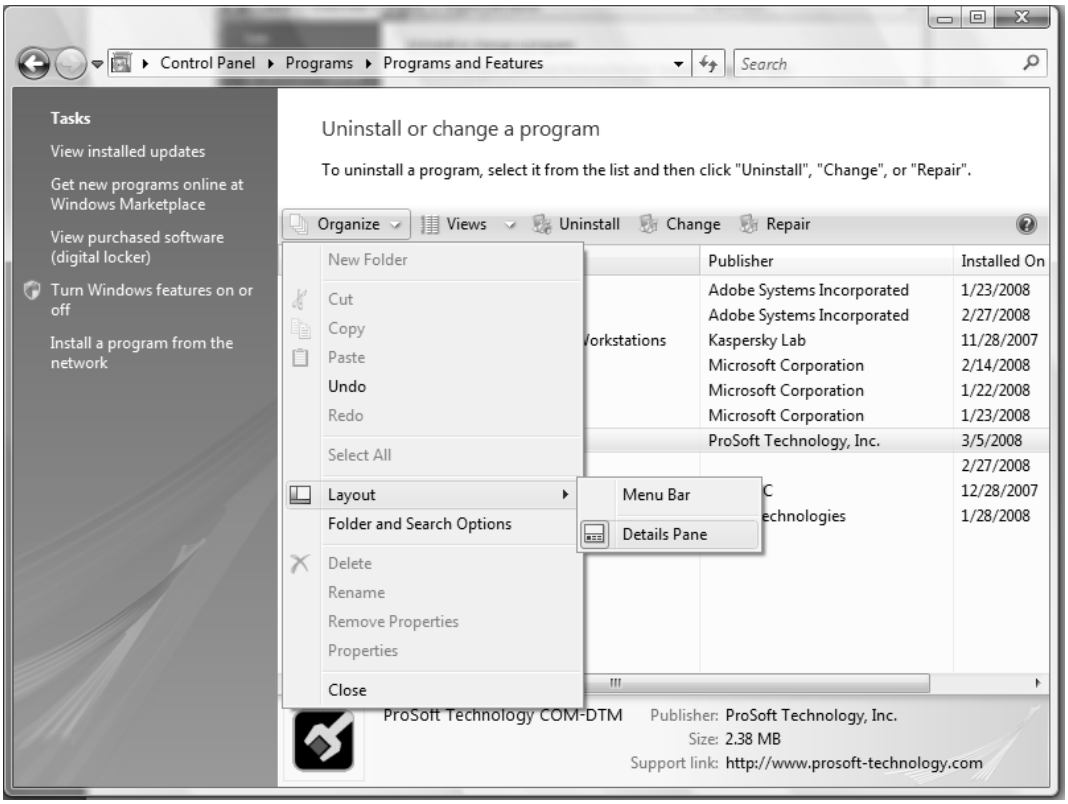


2 Select **UNINSTALL PROGRAMS**.

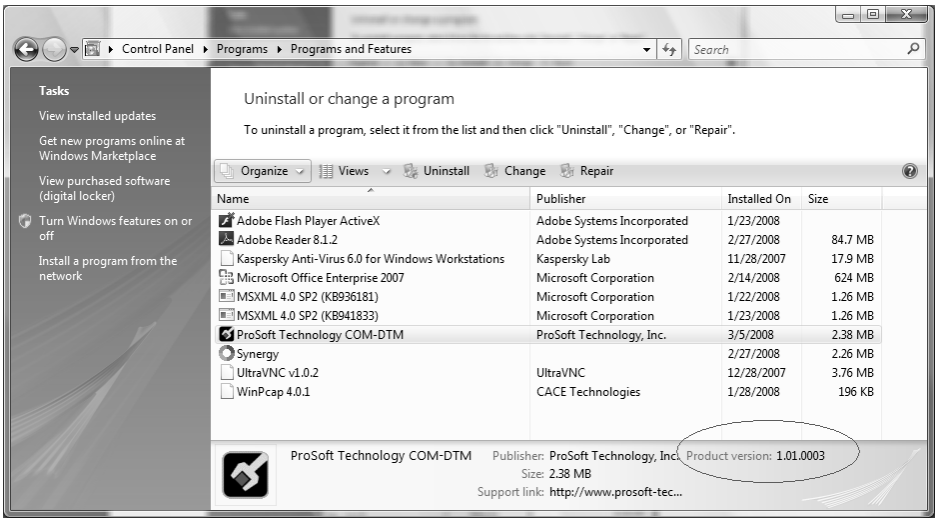
3 Select ProSoft Technology COM-DTM (click once)



4 Click the **ORGANIZE** tab and select **LAYOUT** > **DETAILS PANE**.

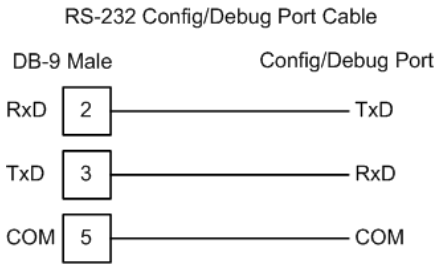


5 Check the Install Version at the bottom right portion of the window.

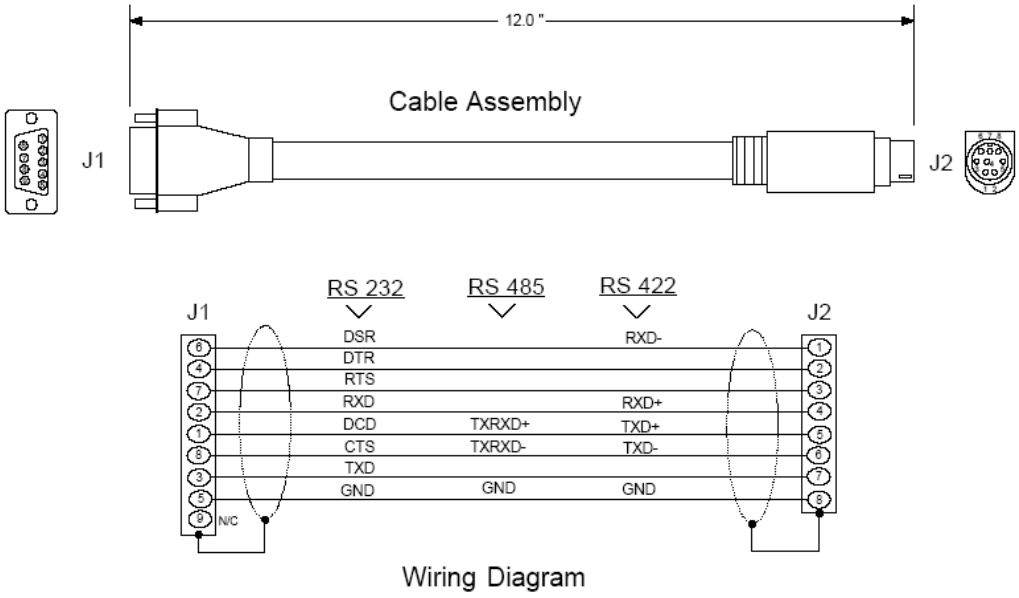


5.2 RS-232 Configuration/Debug Port

This port is physically an eight-pin, Mini-DIN8F connection. A Mini-DIN8M to DB9M adapter cable is included with the gateway. This port permits a PC-based terminal emulation program to view configuration and status data in the gateway and to control the gateway. Here are the cable pinouts for RS-232 communication on this port.



5.3 DB9 to Mini-DIN Adaptor (Cable 09)



5.4 PROFIBUS Master Port

The following diagram has been imported from the PROFIBUS Master documentation. Note that the signals to reference are the D-Sub signals in the table.

D-Sub (male)	Board to Board	Screw Terminal	Signal
Housing	1	5	Cable shield
1	4	-	-
2	7	-	-
3	6	4	B-Line
4	3	6	RTS
5	2	2	GND_BUS
6	8	1	+5V BUS (output)
7	9	-	-
8	5	3	A-Line
9	10	-	-

5.5 Supported PROFIBUS Services

The following table lists all available services according to the PROFIBUS specification.

Service	PROFIBUS Version	Master Class 1		Master Class 2	
		Request	Response	Request	Response
DDLM_Data-Exchange	DP-V0	Yes		No	
DDLM_Set_Prm	DP-V0	Yes		No	
DDLM_Chk_cfg	DP-V0	Yes		No	
DDLM Slave Diag	DP-V0	Yes		No	
DDLM_Global_Control	DP-V0	Yes		No	
DDLM_Get_Cfg	DP-V0			Yes	
DDLM_Set_Slave_Add	DP-V0			Yes	
DDLM_Read_Input	DP-V0			No	
DDLM_Read_Output	DP-V0			No	
DDLM_Get_Master_Diag	DP-V0		Yes		
DDLM_Start_Seq	DP-V0		No	No	
DDLM_Download	DP-V0		No	No	
DDLM_Upload	DP-V0		No	No	
DDLM_End_Seq	DP-V0		No	No	
DDLM_Act_Param_Brct	DP-V0		No	No	
DDLM_Act_Param	DP-V0		No	No	
MSAC1_Read	DP-V1	Yes			
MSAC1_Write	DP-V1	Yes			
MSAL1_Alarm	DP-V1		Yes		
MSAL1_Alarm_Ack	DP-V1		Yes		
MSAC2_Initiate	DP-V1			No	
MSAC2_Read	DP-V1			No	
MSAC2_Write	DP-V1			No	
MSAC2_DataTransport	DP-V1			No	
MSAC2_Abort	DP-V1			No	
Data_eXchange_Broadcast	DP-V2	No			
Isochrone_mode (Takt sync)	DP-V2	No			
Extended_Set_Prm (Subscriber)	DP-V2	No			

5.6 Constructing a Bus Cable for PROFIBUS DP

The bus cable for connecting PROFIBUS DP devices must be constructed by the user. A special PROFIBUS cable (twisted pair) is required here. This standard cable is available from various manufacturers and is a Belden part number 3079A.

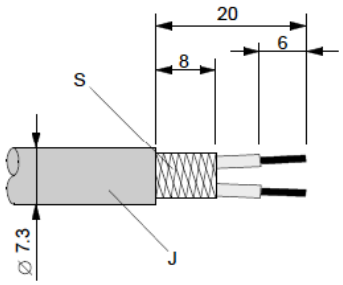
If you plan to construct your own bus cable, the following part numbers are provided for your convenience.

- PROFIBUS connector: Siemens part number 6ES7972-0BA40-0XA0
- PROFIBUS cable: Belden part number 3079A.

To construct the cable, proceed as follows:

1 Cut the cable to the required length.

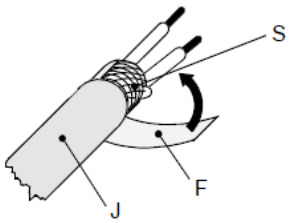
2 Prepare the cable ends as shown in the illustration (dimensions in mm):



J = PVC Jacket
S = Braided shielding

3 Remove the PVC jacket J to the indicated length.

4 Wrap the provided copper shielding F around the shield braiding S:



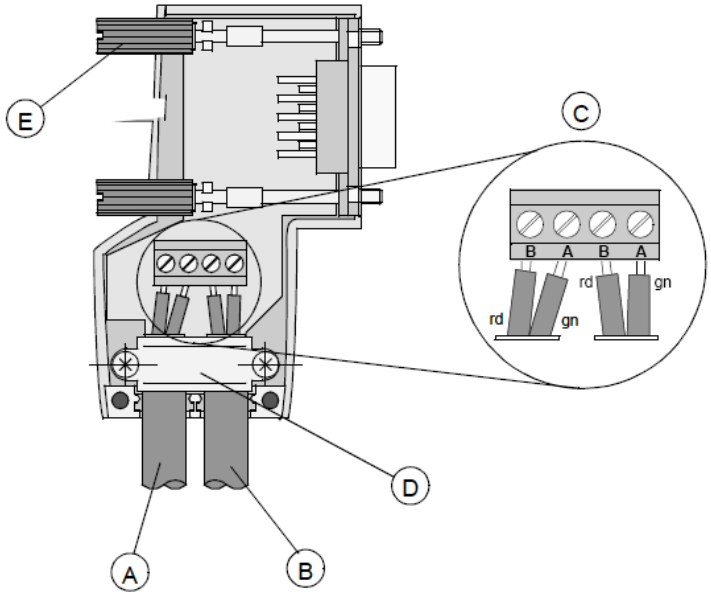
J = PVC Jacket
S = Braided shielding
F = Copper foil shielding

5 Plug the leads of the corresponding cable(s) into the terminals as shown:

- Green leads in terminal A
- Red lead in terminal B

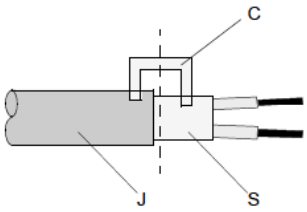
Note: Do not tighten the corresponding screws yet.

Connection terminal assignment on the PROFIBUS DP:



A = Incoming cable
B = Outgoing cable
C = Connection terminals (only once (B,A))
D = Cable cleat for reliving tension
E = Bus connector screws

6 Attach the cables with the provided cable cleat to create a robust shielded connection and to relieve any tension as shown:



J = PVC Jacket
S = Braided shielding with foil shielding
C = Cable cleat

Note: Half of the cable jacket must lie under the cable cleat!

Pay attention to the cable cleat installation instructions.

7 Fasten the individual wires of the PROFIBUS cable to the terminals
8 Close the connector housing.

Note: The shielding of both cables is connected internally with the metal housing of the connector.

9 Complete the Central Shielding Measures (below) and grounding operations for the shielding before you connect the cable connector to the gateway.

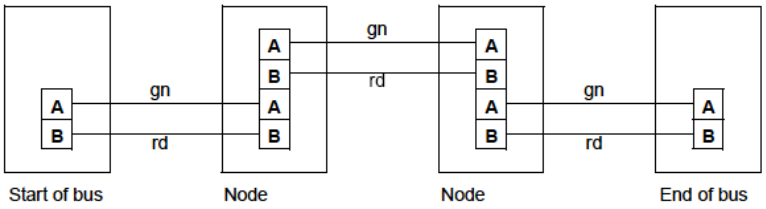
10 Plug the PROFIBUS DP connector into the gateway and secure it with the screws.

Bus Begin and Bus End

The PROFIBUS connector with termination is required at the beginning and the end of the bus. These connectors emulate the line impedance.

It is recommended that at least one connector with diagnostics interface is used.

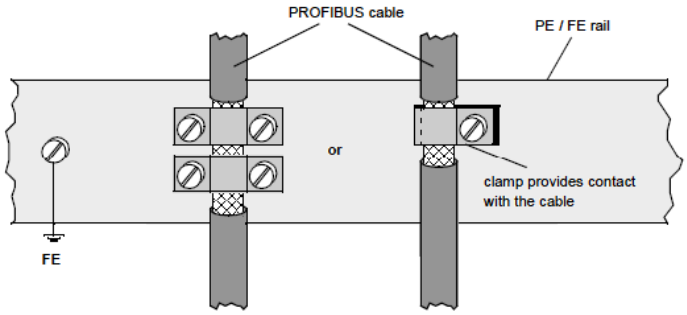
Wiring diagram for a PROFIBUS DP cable:



Grounding and Shielding for Systems with Equipotential Bonding

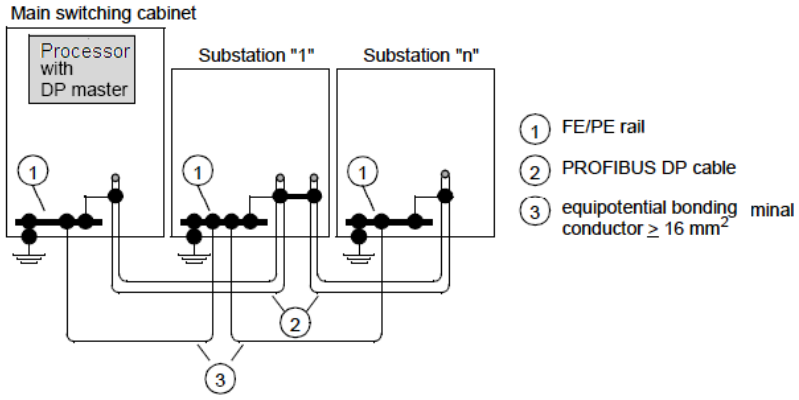
Each cable shield should be galvanically grounded with the earth using FE/PE grounding clamps immediately after the cable has been connected to the cabinet.

This example indicates the shielding connection from the PROFIBUS cable to the FE/PE rail.



Note: An equalization current can flow across a shield connected at both ends because of fluctuations in ground potential. To prevent this, it is imperative that there is potential equalization between all the attached installation components and devices.

This example indicates the system components and devices in a system with equipotential bonding.

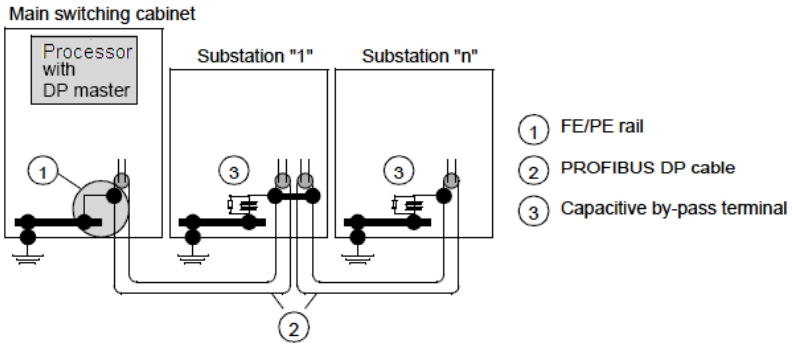


Grounding and Shielding for Systems without Equipotential Bonding

Note: Grounding and shielding is to be carried out the same as for systems **with** equipotential bonding.

If this is not possible because of system or construction specific reasons however, use distributed ground with a capacitive coupling of high frequency interference signals.

This representation shows distributed grounding with capacitive coupling.



6 Support, Service & Warranty

6.1 Contacting Technical Support

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

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

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

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

Note: For technical support calls within the United States, ProSoft Technology's 24/7 after-hours phone support is available for urgent plant-down issues.

North America (Corporate Location)	Europe / Middle East / Africa Regional Office
Phone: +1.661.716.5100 info@prosoft-technology.com Languages spoken: English, Spanish REGIONAL TECH SUPPORT support@prosoft-technology.com	Phone: +33.(0)5.34.36.87.20 france@prosoft-technology.com Languages spoken: French, English REGIONAL TECH SUPPORT support.emea@prosoft-technology.com
Latin America Regional Office	**Asia Pacific Regional Office**
Phone: +52.222.264.1814 latinam@prosoft-technology.com Languages spoken: Spanish, English REGIONAL TECH SUPPORT support.la@prosoft-technology.com	Phone: +60.3.2247.1898 asiapc@prosoft-technology.com Languages spoken: Bahasa, Chinese, English, Japanese, Korean REGIONAL TECH SUPPORT support.ap@prosoft-technology.com

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

6.2 Warranty Information

For complete details regarding ProSoft Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS, go to www.prosoft-technology.com/legal