User Manual

smart mcc
COMMUNICATIONS

Connectivity to Industrial Networks
Third Party Compatible
PROFIBUS Solutions

SIEMENS

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Smart MCC Network Communications

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Prosoft Technologies MVI56-PDPMV1 PROFIBUS Scanner Card for ControlLogix PLC®
Prosoft Technologies PTQ-PDPMV1 PROFIBUS Scanner Card for Quantum PLC®

Hilscher RIF 1769 for CompactLogix PLC®

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⚠ WARNING
This instruction manual contains procedures for commissioning industrial control networks. These procedures must be performed on systems that are not in operation. That is to say, all required equipment for the procedure must be operational, but not in a state of active use with “live” or running equipment.

While following these instructions you may have to either:
A. Cycle power to the devices
B. Cycle between the “RUN” and “PROGRAMMING” modes

⚠ CAUTION
Only qualified personnel with proper training on PLC programming maintenance, and full access to the required equipment should perform these procedures. Within the context of this manual, qualified persons are defined as persons who have the skills and knowledge related to the construction and operation of the equipment and the equipment on which it is installed, and have received safety training to recognize and avoid any hazards involved.

These procedures assume technical skill and familiarity with Rockwell Automation ControlLogix PLC, Rockwell Software RSLogix5000, Rockwell Software RSNetworx for Devicenet, Modicon Quantum PLC, Concept 2.6XL programming software, Windows Hyperterminal software, Ethernet wiring practices, and Ethernet IP/Subnet addressing ranges available for the installation.

Lack of knowledge or experience with these programming environments may create potentially unsafe operating conditions, which may result in death, severe personal injury or serious property damage.

NOTE
THESE INSTRUCTIONS DO NOT PURPORT TO COVER ALL DETAILS OR VARIATIONS IN EQUIPMENT, OR TO PROVIDE FOR EVERY POSSIBLE CONTINGENCY TO BE MET IN CONNECTION WITH INSTALLATION, OPERATION OR MAINTENANCE. SHOULD FURTHER INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE, WHICH ARE NOT COVERED SUFFICIENTLY FOR THE PURCHASER’S PURPOSES, THE MATTER SHOULD BE REFERRED TO THE LOCAL SIEMENS SALES OFFICE. THE CONTENTS OF THIS INSTRUCTION MANUAL SHALL NOT BECOME PART OF OR MODIFY ANY PRIOR OR EXISTING AGREEMENT, COMMITMENT OR RELATIONSHIP. THE SALES CONTRACT CONTAINS THE ENTIRE OBLIGATION OF SIEMENS. THE WARRANTY CONTAINED IN THE CONTRACT BETWEEN THE PARTIES IS THE SOLE WARRANTY OF SIEMENS. ANY STATEMENTS CONTAINED HEREIN DO NOT CREATE NEW WARRANTIES OR MODIFY THE EXISTING WARRANTY.

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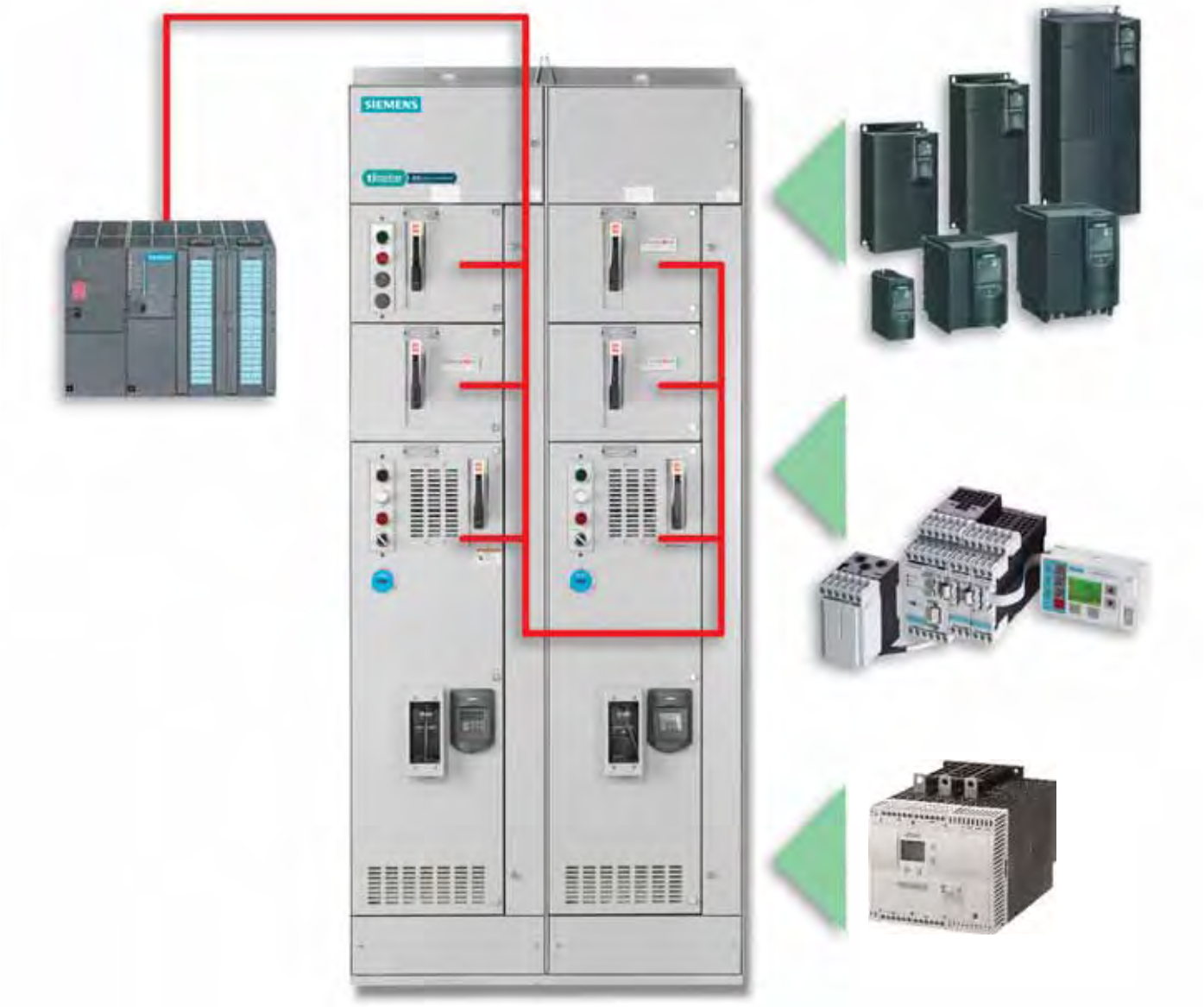
1. Introduction

The goal of this manual is to review the Siemens Smart MCC offering, and define the most common ways to connect to and control the individual motors wired to the MCC.

1.1. TIAStar MCC

A TIAStar (Smart) MCC is an MCC with the following characteristics:

- Internal PROFIBUS and/or ASi wiring to connect equipment together
- May or may not have PROFIBUS repeaters or gateways to competitive networks
- Has more than one of the following devices installed:
  - SIMOCODE Smart Overload Controllers
  - MM440 or 6SED VFD with PROFIBUS communication boards installed
  - 3RW44 Soft-starters with PROFIBUS Communication board installed



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1.2 TIAStar MCC Overview

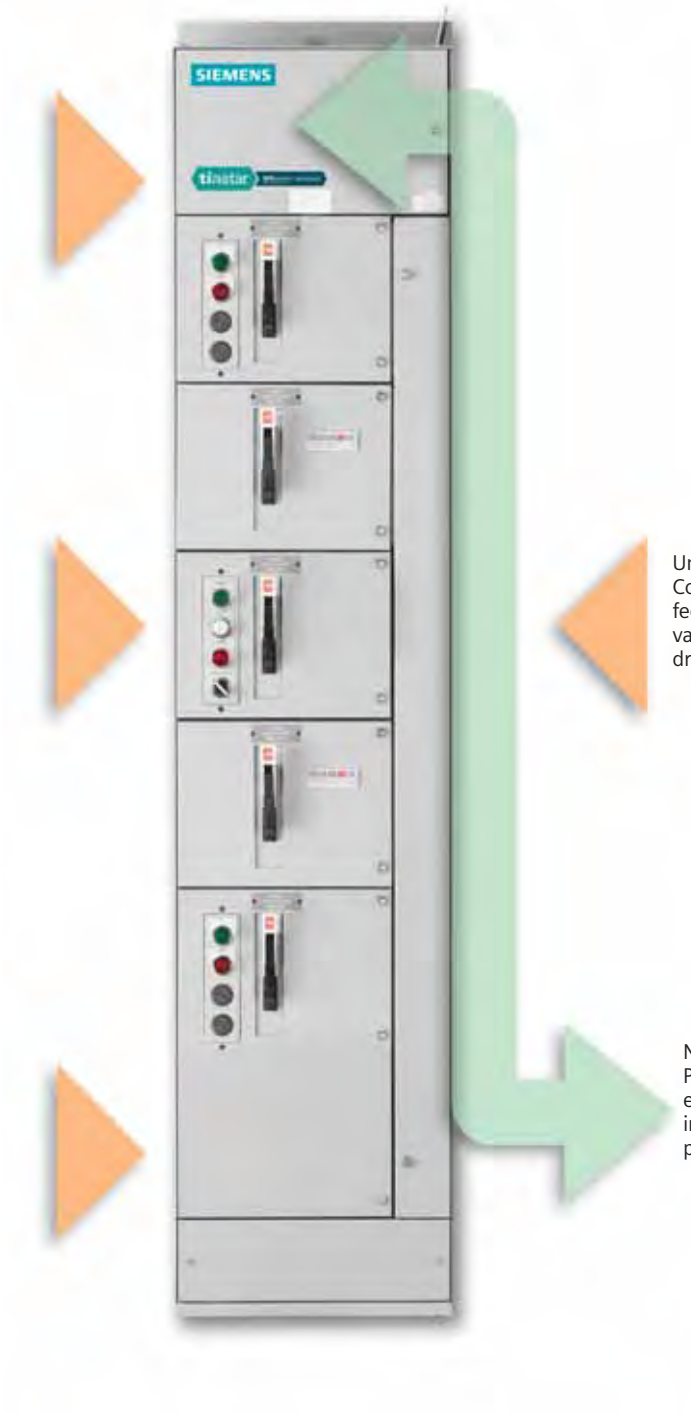
1.2.1. MCC Design

The MCC will be designed as a series of sections, each section containing individual units, or “buckets.”

Top:
Allows access to cross-sectional wiring and horizontal power busway.

Section:
May contain up to six 12-inch buckets or twelve 6-inch buckets.

Bottom:
Allows access to cross-sectional wiring and ground bus



Unit or Bucket:
Contains a starter, feeder breaker, variable frequency drive, or soft-starter

Network Wiring:
PROFIBUS wiring from each networked device in the section to the previous and next sections

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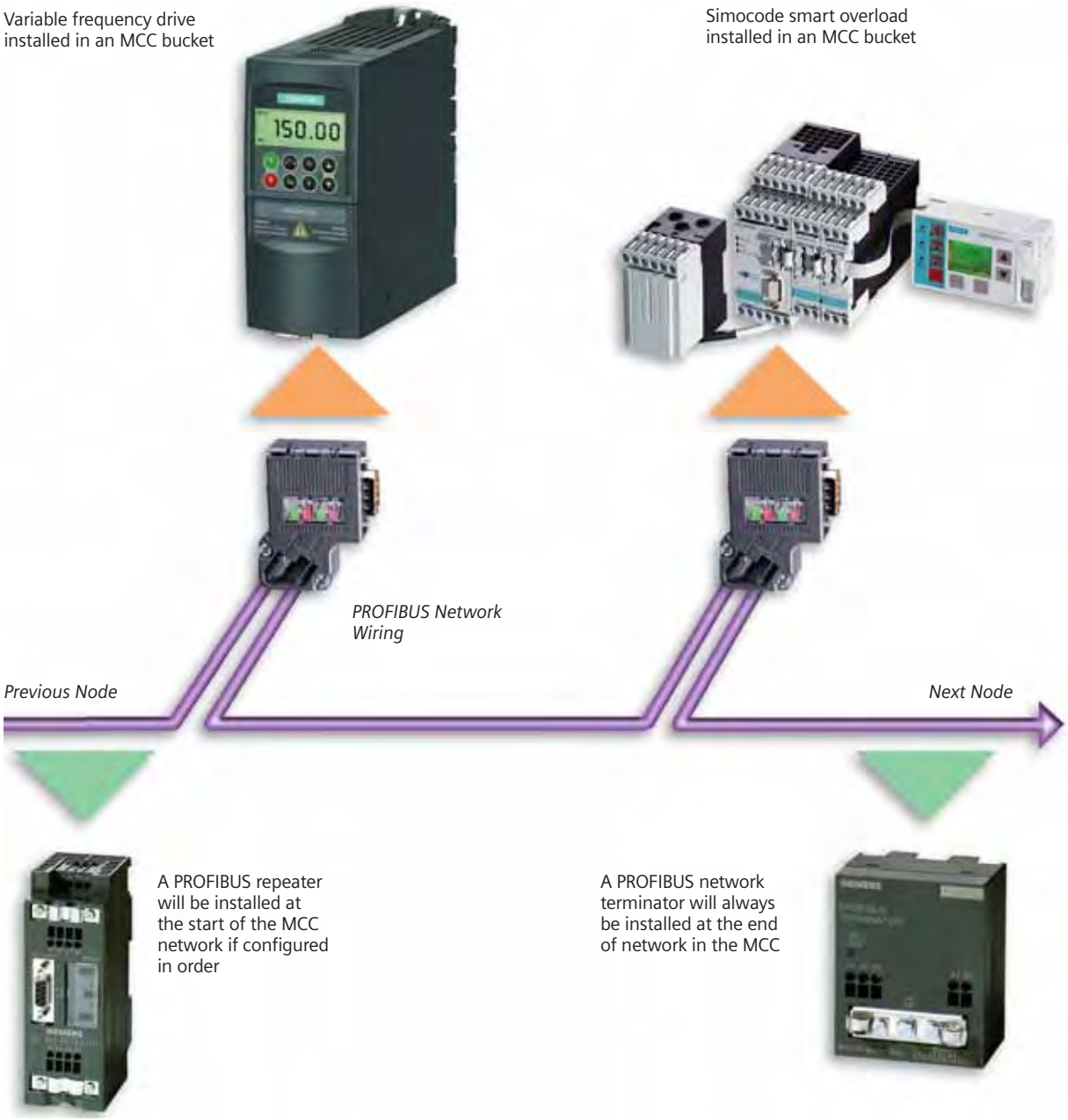
1.2.2. MCC Network Installation

The basic communication backbone for the Smart MCC is Siemens PROFIBUS Network. This is a high-speed, two-wire network capable of delivering deterministic data and control to the controlling processor. You may get additional information on PROFIBUS at www.pto.com

This network is used to connect all of the devices in the MCC. Each device in the MCC has its own node number on the network.



1.2.3. Default Configuration

The following network testing and configuration will be completed prior to shipment:

- Setting of the node address for every device. The node address is determined from the starting address of 2, unless specified differently by the customer, and then incremented by one for every node attached to the network. The node number is incremented in the order that it is attached to the network cable starting from the first node beginning in the upper left of the first MCC section in the order.

- A VFD drive is set to the default settings with the following exceptions:
  - Node number
  - Speed command source (from communications network)
  - Start / Stop command source (from communications network)

- A SIMOCODE overload is set to the default settings with the following exceptions:
  - Node number
  - Motor overload is set to maximum value

- A 3RW44 soft-start is set to the default settings with the following exceptions:
  - Node number

- Verification that the network itself is properly installed and all devices connected to the network are powered and active on the network.

Please note that these default configuration comments are not true for all configurations that are available, and may be changed at any time by the production engineering group to facilitate production or field requests.

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1.3. Communication to a TIAStar MCC

The Siemens Smart MCC with integrated PROFIBUS is capable of being controlled by every major supplier of PLC today. Of course, the most powerful option is to use a Siemens PLC for control of the MCC, but it may not be possible in all environments to use a Siemens PLC for the controller.

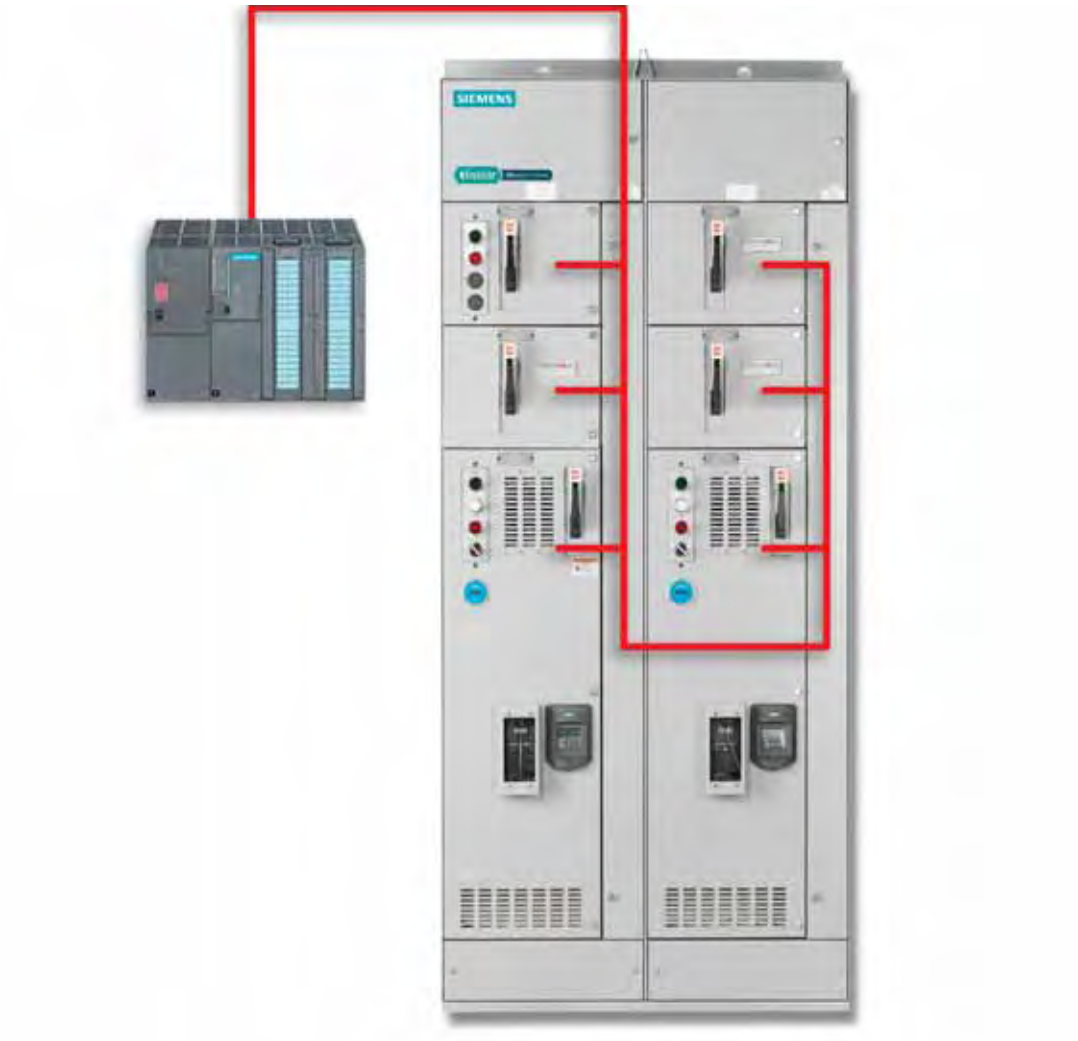
Siemens has qualified a limited number of 3rd party cards for use in competitor PLC's that will work with a Siemens Smart MCC, and currently has available a series of gateways that can be installed and configured by Siemens to allow a Siemens Smart MCC to be installed into a non-PROFIBUS control network.

Further details on the 3rd party cards and gateway are included in subsequent sections of this manual.

1.3.1. Siemens PLC or PCS System

The best performance combination in terms of speed and ease of integration is to connect a Siemens Smart MCC with a Siemens PLC or PCS network master. This can be any S7-300, S7-400, or PCS-7 system that is capable if controlling the number of devices installed in the Siemens Smart MCC.

The combination of a Siemens Controller with a Siemens TIAStar MCC is a powerful, flexible, system that will provide you with information and control unlike any other motor control center on the market today.



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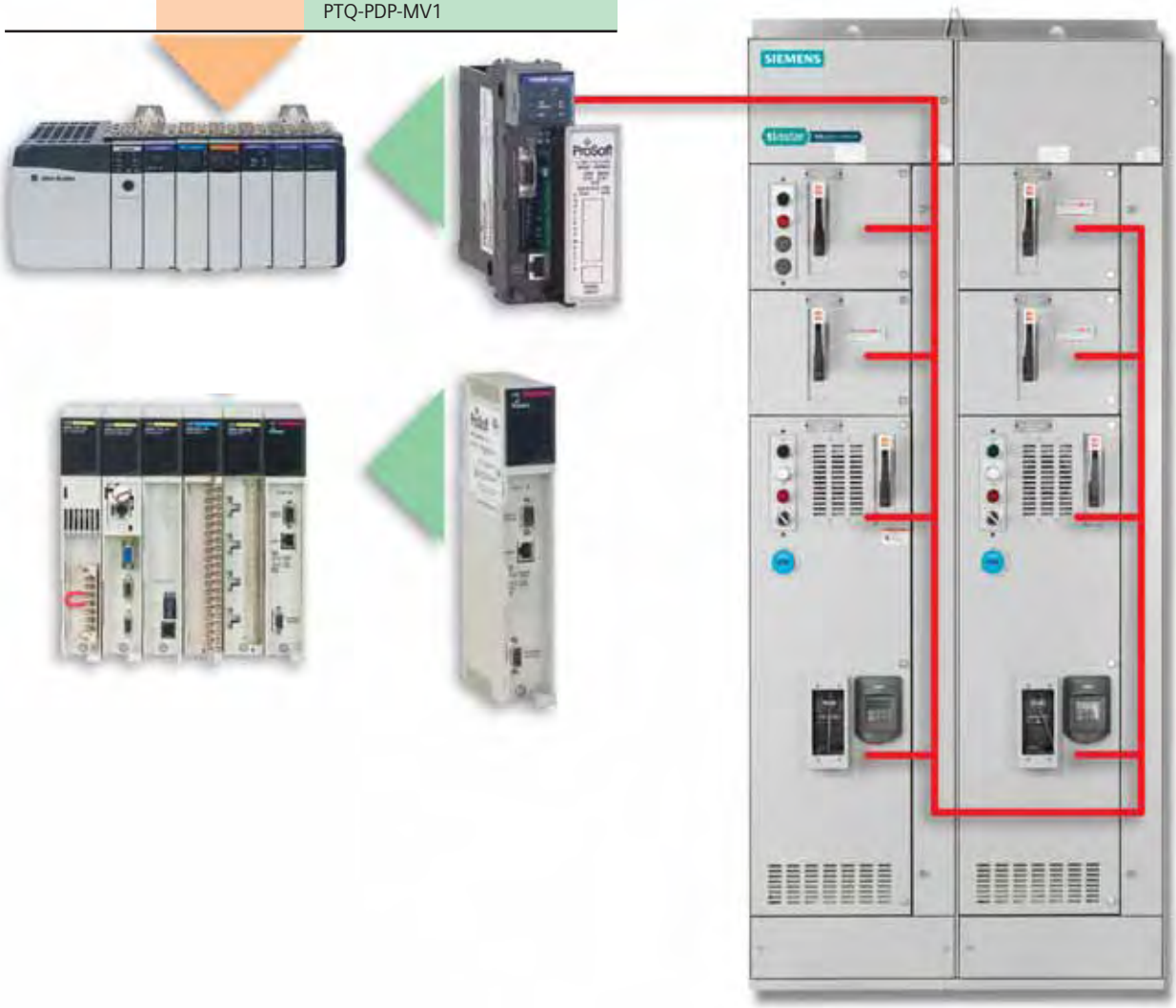
1.3.2. Recommended PLC Cards

The following PLC cards have been tested and certified to properly control Siemens TIAStar via PROFIBUS-DP. These cards are not included as part of the Siemens MCC solution, and should be purchased separately.

Manufacturer	Processor	PROFIBUS Scanner for Processor	
Allen-Bradley	ControlLogix	ProSoft Technology 1756-PDPMV1	Woodhead Industries SST-PFB-CLX-RLL
Allen-Bradley	CompactLogix, or Micrologix 1500	Hilscher RIF1769-DPM	
Modicon	Quantum	ProSoft Technology PTQ-PDP-MV1	



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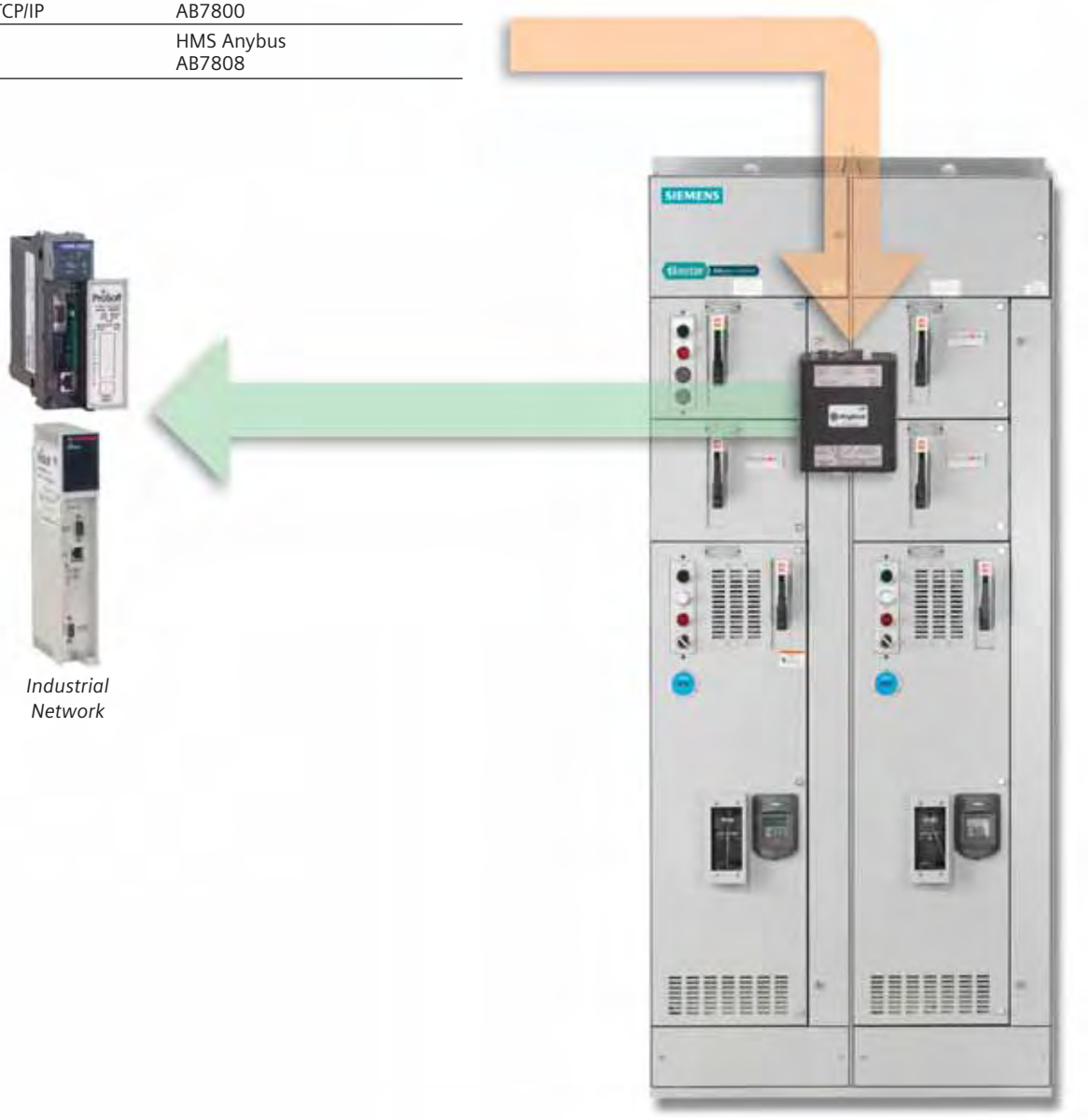
1.3.3. Recommended Gateways

These gateways can be supplied by Siemens as part of a Smart MCC order. When Siemens supplies one of these gateway modules, it will typically be mounted in a 12-inch bucket with necessary power supply and additional wiring terminations. Siemens will connect the internal PROFIBUS network to the "scanner" side of the gateway, leaving the "adapter" side of the gateway to be terminated by the customer upon installation in the field.

I/O Network	Gateway
DeviceNet	HMS Anybus AB7802
Ethernet/IP	HMS Anybus AB7800
Modbus TCP/IP	HMS Anybus AB7800
Modbus	HMS Anybus AB7808



Industrial Network

1.4. Scope of Responsibilities

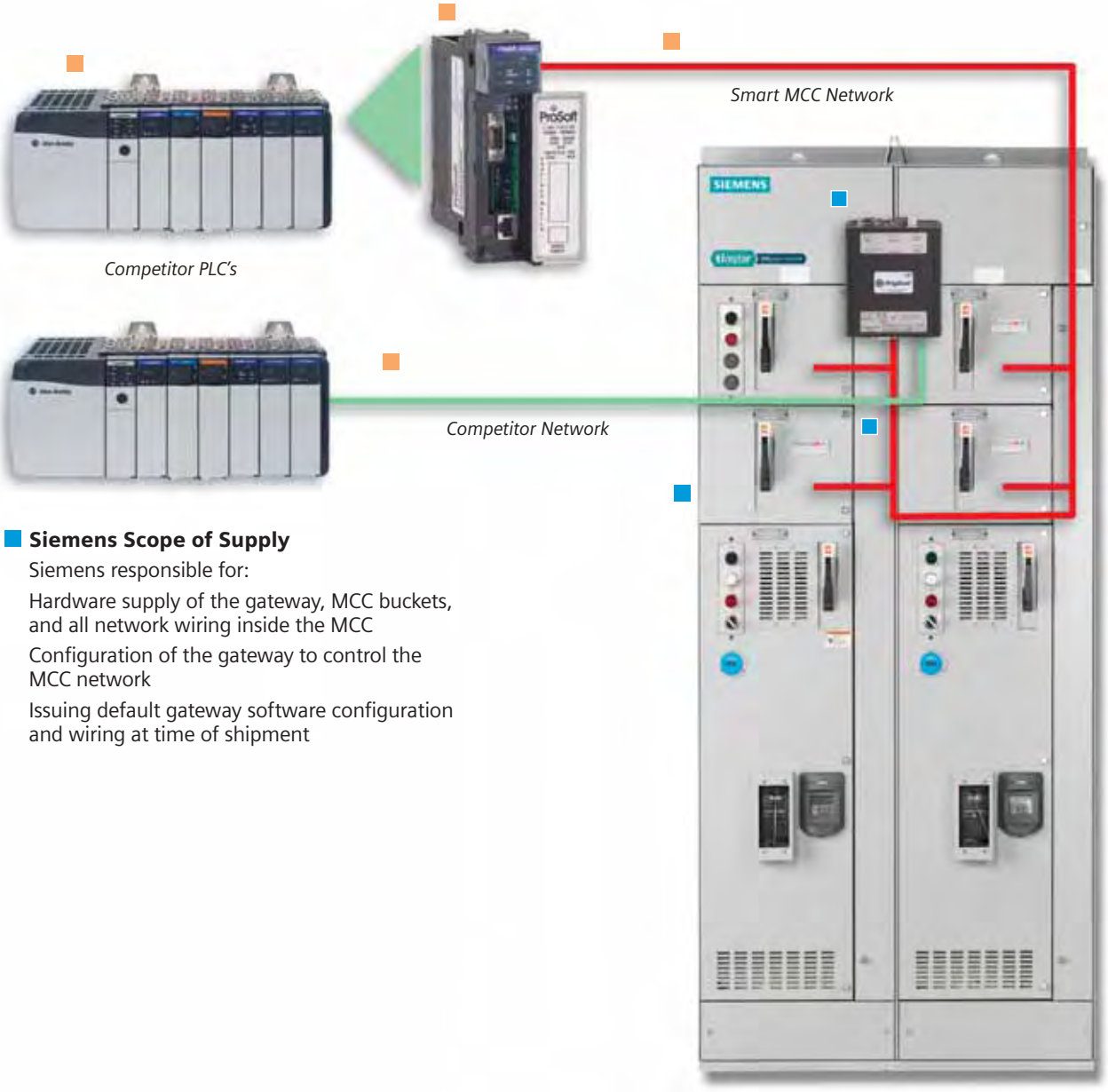
Customer Scope of Supply

Customer responsible for:

Installation of PROFIBUS or competitor network from MCC to PLC

Installation, programming, and configuration of PLC network card

Programming of PLC and competitor network connected to gateway



Siemens Scope of Supply

Siemens responsible for:

Hardware supply of the gateway, MCC buckets, and all network wiring inside the MCC

Configuration of the gateway to control the MCC network

Issuing default gateway software configuration and wiring at time of shipment

1.5. Fieldbus Definitions

1.5.1. Devicenet, Controlnet, Ethernet/IP

Devicenet, Controlnet, Ethernet/IP
DeviceNet, ControlNet, Ethernet/IP, which are based on Common Industrial Protocol (CIP) upper-layer protocol
Developer/ support organizations: ODVA (Open DeviceNet Vendor Association) and ControlNet International (CI), which co-manage EtherNet/IP
Installed base: approximately 3.5 million nodes, total for all CIP networks
Topology: linear (trunkline/dropline) for DeviceNet; linear, tree, star or combination (ControlNet); active star with devices connected to an Ethernet switch (Ethernet/IP)
Physical media: twisted-pair for signal and power (DeviceNet); coaxial or fiber (ControlNet); 10/100-base T twisted-pair Cat 5E (Ethernet/IP)
Max. devices: 64 nodes (DeviceNet); 99 nodes (ControlNet), no limit (EtherNet/IP)
Max. distance: 500 meters at 125 kbps, depending on data rate (DeviceNet); 1 km via coax with two nodes, 3 km over fiber with 99 nodes, 30 km over fiber or coax with repeaters up to 99 nodes (ControlNet); no limit (EtherNet/IP)
Communication method: producer/consumer with peer-to-peer and master/slave option for DeviceNet and ControlNet
Data Rate: 500 kbps, 250 kbps or 125 kbps (DeviceNet); 5 Mbps (ControlNet); 10/100 Mbps (Ethernet/IP)
Data packet size: 0-8 bytes variable (DeviceNet); 0-510 bytes variable (ControlNet); 0 to 65,511 bytes variable (Ethernet/IP)

1.5.2. Modbus

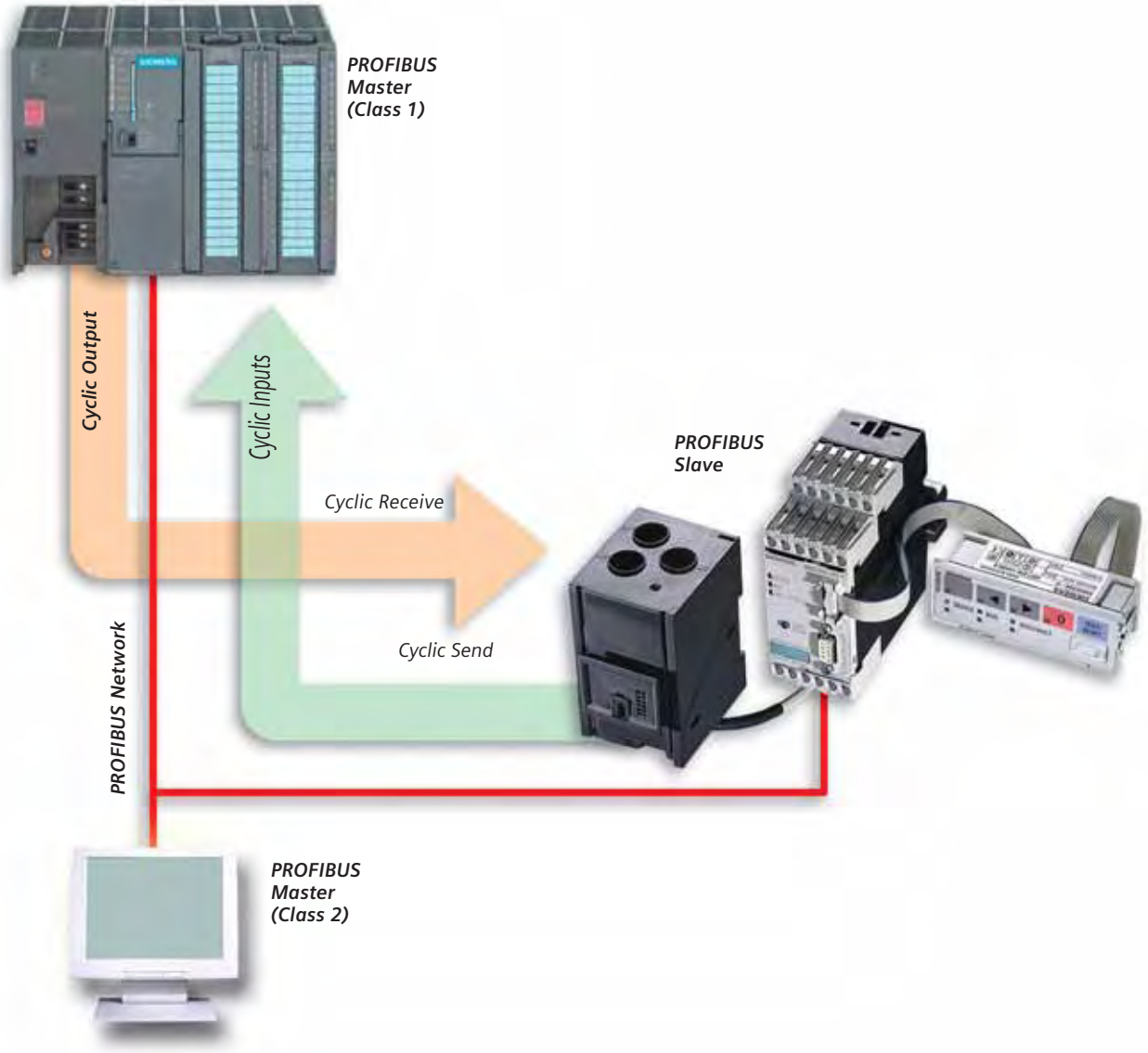
Modbus
Modbus RTU/ASCII, Modbus Plus, Modbus TCP/IP
Developer/originator: Modicon, Schneider Electric
Support organization: Modbus-IDA
Topology: linear; line, star, tree with segments
Physical media: twisted-pair; RS-232 and RS-485
Max devices: 32 nodes per segment and 64 segments for Modbus Plus; 250 nodes per segment for RTU/ASCII
Max distance: 500 meters per segment for Modbus Plus; 350 m for RTU/ASCII; 100 m for TCP/IP between switches
Communication method: master/slave or client/server
Transmission properties: 1 Mbps for Modbus Plus; 300 bps-38.4 kbps for RTU/ASCII; 100 Mbps for TCP/IP
Data packet size: variable for Modbus Plus; 0-254 bytes for RTU/ASCII; 1,500 bytes for TCP/IP

1.5.3. PROFIBUS

PROFIBUS
Name: PROFIBUS-PA, PROFIBUS-DP, Profinet, ProfiSafe
Developer/originator: Siemens AG
Support organization: PROFIBUS Nutzerorganisation e.V. (PNO) and the PROFIBUS Trade Organization (PTO)
Installed base: more than 10 million nodes
Topology: line, star, ring, or bus
Physical media: twisted-pair or fiber
Max devices: 127 nodes in four segments with three repeaters, plus three masters
Max distance: 100 meters between segments at 12 Mbps, or 12 km with fiber
Communication method: master/slave, peer-to-peer
Transmission properties: 500 kbps, 1.5 or 12, Mbps for PROFIBUS DP; 31.25 kbps for PROFIBUS PA
Data packet size: 256 bytes
Cycle time: configuration dependent, less than 2 msec

2. PROFIBUS Integration Overview

2.1. PROFIBUS Network Basics



Important Concepts:

1. CYCLIC INPUTS AND OUTPUTS are transferred once per I/O scan.
2. An I/O scan is transfer of cyclic inputs and outputs for every PROFIBUS slave from Node 1 to the Highest Station Address configured (default is 126, but is usually manually reset in the PROFIBUS Class 1 master to the last slave node on the network.)
3. The size of the byte package to transfer between the master and the slave is determined by the slave configuration and the configuration in the master. This configuration usually must match, but in some cases the master configuration will determine the actual bytes transferred. (The slave adapts to the master request.).

2.2 Default Cyclic Interface

2.2.1. SIMOCODE Pro Cyclic Interface

SIMOCODE Pro V Type 1				SIMOCODE Pro V Type 2			
Inputs (Device to Master)		Outputs (Master to Device)		Inputs (Device to Master)		Outputs (Master to Device)	
Address	Description	Address	Description	Address	Description	Address	Description
0.0	DP - Status = ON<	0.0	DP - ON<	0.0	DP - Status - On<	0.0	DP - On<
0.1	DP - Status - OFF	0.1	DP - OFF	0.1	DP - Status - OFF	0.1	DP - OFF
0.2	DP - Status - ON>	0.2	DP - ON>	0.2	DP - Status - ON>	0.2	DP - ON>
0.3	DP - Overload	0.3	DP - Test1	0.3	DP - Overload	0.3	DP - Test1
0.4	DP - Interlocking Time Active	0.4	DP - Emer Start	0.4	DP - Interlocking Time Active	0.4	DP - Emer Start
0.5	DP - Remote Mode	0.5	DP - Remote Mode	0.5	DP - Remote Mode	0.5	DP - Remote Mode
0.6	DP - Fault	0.6	DP - Reset	0.6	DP - Fault	0.6	DP - Reset
0.7	DP - Warning	0.7	Unused Cyclic Bit	0.7	DP - Warning	0.7	Unused Cyclic Bit
1.0	Unused Cyclic Bit	1.0	Unused Cyclic Bit	1.0	Unused Cyclic Bit	1.0	Unused Cyclic Bit
1.1	Unused Cyclic Bit	1.1	Unused Cyclic Bit	1.1	Unused Cyclic Bit	1.1	Unused Cyclic Bit
1.2	Unused Cyclic Bit	1.2	Unused Cyclic Bit	1.2	Unused Cyclic Bit	1.2	Unused Cyclic Bit
1.3	Unused Cyclic Bit	1.3	Unused Cyclic Bit	1.3	Unused Cyclic Bit	1.3	Unused Cyclic Bit
1.4	Unused Cyclic Bit	1.4	Unused Cyclic Bit	1.4	Unused Cyclic Bit	1.4	Unused Cyclic Bit
1.5	Unused Cyclic Bit	1.5	Unused Cyclic Bit	1.5	Unused Cyclic Bit	1.5	Unused Cyclic Bit
1.6	Unused Cyclic Bit	1.6	Unused Cyclic Bit	1.6	Unused Cyclic Bit	1.6	Unused Cyclic Bit
1.7	Unused Cyclic Bit	1.7	Unused Cyclic Bit	1.7	Unused Cyclic Bit	1.7	Unused Cyclic Bit
2.0	2.0 Max Current	2.0	Unused Cyclic Word Byte 0	2.0	2.0 Max Current		
2.1	2.1 Max Current	2.1	Unused Cyclic Word Byte 0	2.1	2.1 Max Current		
2.2	2.2 Max Current	2.2	Unused Cyclic Word Byte 0	2.2	2.2 Max Current		
2.3	2.3 Max Current	2.3	Unused Cyclic Word Byte 0	2.3	2.3 Max Current		
2.4	2.4 Max Current	2.4	Unused Cyclic Word Byte 0	2.4	2.4 Max Current		
2.5	2.5 Max Current	2.5	Unused Cyclic Word Byte 0	2.5	2.5 Max Current		
2.6	2.6 Max Current	2.6	Unused Cyclic Word Byte 0	2.6	2.6 Max Current		
2.7	2.7 Max Current	2.7	Unused Cyclic Word Byte 0	2.7	2.7 Max Current		
3.0	3.0 Max Current	3.0	Unused Cyclic Word Byte 1	3.0	3.0 Max Current		
3.1	3.1 Max Current	3.1	Unused Cyclic Word Byte 1	3.1	3.1 Max Current		
3.2	3.2 Max Current	3.2	Unused Cyclic Word Byte 1	3.2	3.2 Max Current		
3.3	3.3 Max Current	3.3	Unused Cyclic Word Byte 1	3.3	3.3 Max Current		
3.4	3.4 Max Current	3.4	Unused Cyclic Word Byte 1	3.4	3.4 Max Current		
3.5	3.5 Max Current	3.5	Unused Cyclic Word Byte 1	3.5	3.5 Max Current		
3.6	3.6 Max Current	3.6	Unused Cyclic Word Byte 1	3.6	3.6 Max Current		
3.7	3.7 Max Current	3.7	Unused Cyclic Word Byte 1	3.7	3.7 Max Current		
4.0	Unused Cyclic Word Byte 0						
4.1	Unused Cyclic Word Byte 0						
4.2	Unused Cyclic Word Byte 0						
4.3	Unused Cyclic Word Byte 0						
4.4	Unused Cyclic Word Byte 0						
4.5	Unused Cyclic Word Byte 0						
4.6	Unused Cyclic Word Byte 0						
4.7	Unused Cyclic Word Byte 0						
5.0	Unused Cyclic Word Byte 1						
5.1	Unused Cyclic Word Byte 1						
5.2	Unused Cyclic Word Byte 1						
5.3	Unused Cyclic Word Byte 1						
5.4	Unused Cyclic Word Byte 1						
5.5	Unused Cyclic Word Byte 1						
5.6	Unused Cyclic Word Byte 1						
5.7	Unused Cyclic Word Byte 1						
6.0	Unused Cyclic Word Byte 0						
6.1	Unused Cyclic Word Byte 0						
6.2	Unused Cyclic Word Byte 0						
6.3	Unused Cyclic Word Byte 0						
6.4	Unused Cyclic Word Byte 0						
6.5	Unused Cyclic Word Byte 0						
6.6	Unused Cyclic Word Byte 0						
6.7	Unused Cyclic Word Byte 0						

2.2.1. SIMOCODE Pro Cyclic Interface (cont'd)

SIMOCODE Pro V Type 1 Inputs (Device to Master)	
Address	Description
7.0	Unused Cyclic Word Byte 1
7.1	Unused Cyclic Word Byte 1
7.2	Unused Cyclic Word Byte 1
7.3	Unused Cyclic Word Byte 1
7.4	Unused Cyclic Word Byte 1
7.5	Unused Cyclic Word Byte 1
7.6	Unused Cyclic Word Byte 1
7.7	Unused Cyclic Word Byte 1
8.0	Unused Cyclic Word Byte 0
8.1	Unused Cyclic Word Byte 0
8.2	Unused Cyclic Word Byte 0
8.3	Unused Cyclic Word Byte 0
8.4	Unused Cyclic Word Byte 0
8.5	Unused Cyclic Word Byte 0
8.6	Unused Cyclic Word Byte 0
8.7	Unused Cyclic Word Byte 0
9.0	Unused Cyclic Word Byte 1
9.1	Unused Cyclic Word Byte 1
9.2	Unused Cyclic Word Byte 1
9.3	Unused Cyclic Word Byte 1
9.4	Unused Cyclic Word Byte 1
9.5	Unused Cyclic Word Byte 1
9.6	Unused Cyclic Word Byte 1
9.7	Unused Cyclic Word Byte 1

PROFIBUS Integration Overview
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2.2.2. MM440 VFD Cyclic Interface

Inputs (Device to Master)		Outputs (Master to Device)	
Address	Description	Address	Description
0.0	PWK Input 0.0	0.0	PWK Output 0.0
0.1	PWK Input 0.1	0.1	PWK Output 0.1
0.2	PWK Input 0.2	0.2	PWK Output 0.2
0.3	PWK Input 0.3	0.3	PWK Output 0.3
0.4	PWK Input 0.4	0.4	PWK Output 0.4
0.5	PWK Input 0.5	0.5	PWK Output 0.5
0.6	PWK Input 0.6	0.6	PWK Output 0.6
0.7	PWK Input 0.7	0.7	PWK Output 0.7
1.0	PWK Input 1.0	1.0	PWK Output 1.0
1.1	PWK Input 1.1	1.1	PWK Output 1.1
1.2	PWK Input 1.2	1.2	PWK Output 1.2
1.3	PWK Input 1.3	1.3	PWK Output 1.3
1.4	PWK Input 1.4	1.4	PWK Output 1.4
1.5	PWK Input 1.5	1.5	PWK Output 1.5
1.6	PWK Input 1.6	1.6	PWK Output 1.6
1.7	PWK Input 1.7	1.7	PWK Output 1.7
2.0	PWK Input 2.0	2.0	PWK Output 2.0
2.1	PWK Input 2.1	2.1	PWK Output 2.1
2.2	PWK Input 2.2	2.2	PWK Output 2.2
2.3	PWK Input 2.3	2.3	PWK Output 2.3
2.4	PWK Input 2.4	2.4	PWK Output 2.4
2.5	PWK Input 2.5	2.5	PWK Output 2.5
2.6	PWK Input 2.6	2.6	PWK Output 2.6
2.7	PWK Input 2.7	2.7	PWK Output 2.7
3.0	PWK Input 3.0	3.0	PWK Output 3.0
3.1	PWK Input 3.1	3.1	PWK Output 3.1
3.2	PWK Input 3.2	3.2	PWK Output 3.2
3.3	PWK Input 3.3	3.3	PWK Output 3.3
3.4	PWK Input 3.4	3.4	PWK Output 3.4
3.5	PWK Input 3.5	3.5	PWK Output 3.5
3.6	PWK Input 3.6	3.6	PWK Output 3.6
3.7	PWK Input 3.7	3.7	PWK Output 3.7
4.0	PWK Input 4.0	4.0	PWK Output 4.0
4.1	PWK Input 4.1	4.1	PWK Output 4.1
4.2	PWK Input 4.2	4.2	PWK Output 4.2
4.3	PWK Input 4.3	4.3	PWK Output 4.3
4.4	PWK Input 4.4	4.4	PWK Output 4.4
4.5	PWK Input 4.5	4.5	PWK Output 4.5
4.6	PWK Input 4.6	4.6	PWK Output 4.6
4.7	PWK Input 4.7	4.7	PWK Output 4.7
5.0	PWK Input 5.0	5.0	PWK Output 5.0
5.1	PWK Input 5.1	5.1	PWK Output 5.1
5.2	PWK Input 5.2	5.2	PWK Output 5.2
5.3	PWK Input 5.3	5.3	PWK Output 5.3
5.4	PWK Input 5.4	5.4	PWK Output 5.4
5.5	PWK Input 5.5	5.5	PWK Output 5.5
5.6	PWK Input 5.6	5.6	PWK Output 5.6
5.7	PWK Input 5.7	5.7	PWK Output 5.7
6.0	PWK Input 6.0	6.0	PWK Output 6.0
6.1	PWK Input 6.1	6.1	PWK Output 6.1
6.2	PWK Input 6.2	6.2	PWK Output 6.2
6.3	PWK Input 6.3	6.3	PWK Output 6.3
6.4	PWK Input 6.4	6.4	PWK Output 6.4
6.5	PWK Input 6.5	6.5	PWK Output 6.5
6.6	PWK Input 6.6	6.6	PWK Output 6.6
6.7	PWK Input 6.7	6.7	PWK Output 6.7
7.0	PWK Input 7.0	7.0	PWK Output 7.0
7.1	PWK Input 7.1	7.1	PWK Output 7.1
7.2	PWK Input 7.2	7.2	PWK Output 7.2

Inputs (Device to Master)		Outputs (Master to Device)	
Address	Description	Address	Description
7.3	PWK Input 7.3	7.3	PWK Output 7.3
7.4	PWK Input 7.4	7.4	PWK Output 7.4
7.5	PWK Input 7.5	7.5	PWK Output 7.5
7.6	PWK Input 7.6	7.6	PWK Output 7.6
7.7	PWK Input 7.7	7.7	PWK Output 7.7
8.0	Ready for ON=1	8.0	1=ON 0=OFF1
8.1	Ready for Run=1	8.1	1=Operate 0=0FF2
8.2	Operation Enabled=1	8.2	1=Operate 0=OFF3
8.3	Fault is Active=1	8.3	1=Enable
8.4	OFF Command Applied=0	8.4	1=Operate
8.5	OFF Command Applied=0	8.5	1=Ramp 0=Ramp Hold
8.6	Starting Lockout=1	8.6	1=Enable Support
8.7	Alarm Is Active=1	8.7	1=Ack Fault
9.0	Setpoint Reached=1	9.0	1=CW Inching
9.1	Local Control Active=0	9.1	1=CCW Inching
9.2	Max Freq=1	9.2	1=Setpoint Valid
9.3	Current Limit Alarm=1	9.3	1=Setpoint Inverted
9.4	Motor Brake Enabled=1	9.4	
9.5	Motor Overload=1	9.5	1=Motor Pot Up
9.6	CW Rotation=1	9.6	1=Motor Pot Down
9.7	Converter Overload=1	9.7	1=Remote Operation
10.0	Speed Feedback	10.0	Speed Command
10.1	Speed Feedback	10.1	Speed Command
10.2	Speed Feedback	10.2	Speed Command
10.3	Speed Feedback	10.3	Speed Command
10.4	Speed Feedback	10.4	Speed Command
10.5	Speed Feedback	10.5	Speed Command
10.6	Speed Feedback	10.6	Speed Command
10.7	Speed Feedback	10.7	Speed Command
11.0	Speed Feedback	11.0	Speed Command
11.1	Speed Feedback	11.1	Speed Command
11.2	Speed Feedback	11.2	Speed Command
11.3	Speed Feedback	11.3	Speed Command
11.4	Speed Feedback	11.4	Speed Command
11.5	Speed Feedback	11.5	Speed Command
11.6	Speed Feedback	11.6	Speed Command
11.7	Speed Feedback	11.7	Speed Command

2.2.3. 3RW44 Soft Starter

Inputs (Device to Master)		Outputs (Master to Device)	
Address	Description	Address	Description
0.0	Ready (Automatic)	0.0	Motor Right
0.1	Motor On	0.1	Motor Left
0.2	Group Error	0.2	
0.3	Group Warning	0.3	Tip Reset
0.4	Input 1	0.4	Emergency Start
0.5	Input 2	0.5	
0.6	Input 3	0.6	Slow Speed
0.7	Input 4	0.7	
1.0	Motor Current Bit 0	1.0	Output 1
1.1	Motor Current Bit 1	1.1	Output 2
1.2	Motor Current Bit 2	1.2	Parameter Set Bit 0
1.3	Motor Current Bit 3	1.3	Parameter Set Bit 1
1.4	Motor Current Bit 4	1.4	
1.5	Motor Current Bit 5	1.5	
1.6	Manual Operation (Local)	1.6	
1.7	Ramp Operation	1.7	Disable Quick Stop

PROFIBUS Integration Overview
Smart MCC Network Communications

2.2.4. 9300 Power Meter

Inputs (Device to Master)		Outputs (Master to Device)	
Address	Description	Address	Description
0.0	Data - Byte 0	0.0	Data - Byte 0
0.1	Data - Byte 0	0.1	Data - Byte 0
0.2	Data - Byte 0	0.2	Data - Byte 0
0.3	Data - Byte 0	0.3	Data - Byte 0
0.4	Data - Byte 0	0.4	Data - Byte 0
0.5	Data - Byte 0	0.5	Data - Byte 0
0.6	Data - Byte 0	0.6	Data - Byte 0
0.7	Data - Byte 0	0.7	Data - Byte 0
1.0	Data - Byte 1	1.0	Data - Byte 1
1.1	Data - Byte 1	1.1	Data - Byte 1
1.2	Data - Byte 1	1.2	Data - Byte 1
1.3	Data - Byte 1	1.3	Data - Byte 1
1.4	Data - Byte 1	1.4	Data - Byte 1
1.5	Data - Byte 1	1.5	Data - Byte 1
1.6	Data - Byte 1	1.6	Data - Byte 1
1.7	Data - Byte 1	1.7	Data - Byte 1
2.0	Data - Byte 2	2.0	Data - Byte 2
2.1	Data - Byte 2	2.1	Data - Byte 2
2.2	Data - Byte 2	2.2	Data - Byte 2
2.3	Data - Byte 2	2.3	Data - Byte 2
2.4	Data - Byte 2	2.4	Data - Byte 2
2.5	Data - Byte 2	2.5	Data - Byte 2
2.6	Data - Byte 2	2.6	Data - Byte 2
2.7	Data - Byte 2	2.7	Data - Byte 2
3.0	Data - Byte 3	3.0	Data - Byte 3
3.1	Data - Byte 3	3.1	Data - Byte 3
3.2	Data - Byte 3	3.2	Data - Byte 3
3.3	Data - Byte 3	3.3	Data - Byte 3
3.4	Data - Byte 3	3.4	Data - Byte 3
3.5	Data - Byte 3	3.5	Data - Byte 3
3.6	Data - Byte 3	3.6	Data - Byte 3
3.7	Data - Byte 3	3.7	Data - Byte 3
4.0	Register - Byte 0	4.0	Register - Byte 0
4.1	Register - Byte 0	4.1	Register - Byte 0
4.2	Register - Byte 0	4.2	Register - Byte 0
4.3	Register - Byte 0	4.3	Register - Byte 0
4.4	Register - Byte 0	4.4	Register - Byte 0
4.5	Register - Byte 0	4.5	Register - Byte 0
4.6	Register - Byte 0	4.6	Register - Byte 0
4.7	Register - Byte 0	4.7	Register - Byte 0
5.0	Register - Byte 1	5.0	Register - Byte 1
5.1	Register - Byte 1	5.1	Register - Byte 1
5.2	Register - Byte 1	5.2	Register - Byte 1
5.3	Register - Byte 1	5.3	Register - Byte 1
5.4	Register - Byte 1	5.4	Register - Byte 1
5.5	Register - Byte 1	5.5	Register - Byte 1
5.6	Register - Byte 1	5.6	Register - Byte 1
5.7	Register - Byte 1	5.7	Register - Byte 1
6.0	Register Ack - 0 (01=Ack)	6.0	Register Ack - 0 (01=Ack)
6.1	Register Ack - 1 (01=Ack)	6.1	Register Ack - 1 (01=Ack)
6.2	Block Ack - 0 (01=Ack)	6.2	Block Ack - 0 (01=Ack)
6.3	Block Ack - 1 (01=Ack)	6.3	Block Ack - 1 (01=Ack)
6.4	Command - 0 (1=R,2=W)	6.4	Command - 0 (1=R,2=W)
6.5	Command - 1 (1=R,2=W)	6.5	Command - 1 (1=R,2=W)
6.6	Command - 2 (1=R,2=W)	6.6	Command - 2 (1=R,2=W)
6.7	Command -3 (1=R,2=W)	6.7	Command - 3 (1=R,2=W)

Inputs (Device to Master)		Outputs (Master to Device)	
Address	Description	Address	Description
7.0	Block Number	7.0	Block Number
7.1	Block Number	7.1	Block Number
7.2	Block Number	7.2	Block Number
7.3	Block Number	7.3	Block Number
7.4	Block Number	7.4	Block Number
7.5	Block Number	7.5	Block Number
7.6	Block Number	7.6	Block Number
7.7	Block Number	7.7	Block Number
8.0	Item #1 Data - Byte 0		
8.1	Item #1 Data - Byte 0		
8.2	Item #1 Data - Byte 0		
8.3	Item #1 Data - Byte 0		
8.4	Item #1 Data - Byte 0		
8.5	Item #1 Data - Byte 0		
8.6	Item #1 Data - Byte 0		
8.7	Item #1 Data - Byte 0		
9.0	Item #1 Data - Byte 1		
9.1	Item #1 Data - Byte 1		
9.2	Item #1 Data - Byte 1		
9.3	Item #1 Data - Byte 1		
9.4	Item #1 Data - Byte 1		
9.5	Item #1 Data - Byte 1		
9.6	Item #1 Data - Byte 1		
9.7	Item #1 Data - Byte 1		
10.0	Item #1 Data - Byte 2		
10.1	Item #1 Data - Byte 2		
10.2	Item #1 Data - Byte 2		
10.3	Item #1 Data - Byte 2		
10.4	Item #1 Data - Byte 2		
10.5	Item #1 Data - Byte 2		
10.6	Item #1 Data - Byte 2		
10.7	Item #1 Data - Byte 2		
11.0	Item #1 Data - Byte 3		
11.1	Item #1 Data - Byte 3		
11.2	Item #1 Data - Byte 3		
11.3	Item #1 Data - Byte 3		
11.4	Item #1 Data - Byte 3		
11.5	Item #1 Data - Byte 3		
11.6	Item #1 Data - Byte 3		
11.7	Item #1 Data - Byte 3		
12.0	Item #2 Data - Byte 0		
12.1	Item #2 Data - Byte 0		
12.2	Item #2 Data - Byte 0		
12.3	Item #2 Data - Byte 0		
12.4	Item #2 Data - Byte 0		
12.5	Item #2 Data - Byte 0		
12.6	Item #2 Data - Byte 0		
12.7	Item #2 Data - Byte 0		
13.0	Item #2 Data - Byte 1		
13.1	Item #2 Data - Byte 1		
13.2	Item #2 Data - Byte 1		
13.3	Item #2 Data - Byte 1		
13.4	Item #2 Data - Byte 1		
13.5	Item #2 Data - Byte 1		
13.6	Item #2 Data - Byte 1		
13.7	Item #2 Data - Byte 1		
14.0	Item #2 Data - Byte 2		
14.1	Item #2 Data - Byte 2		
14.2	Item #2 Data - Byte 2		
14.3	Item #2 Data - Byte 2		
14.4	Item #2 Data - Byte 2		
14.5	Item #2 Data - Byte 2		
14.6	Item #2 Data - Byte 2		
14.7	Item #2 Data - Byte 2		

2.2.4. 9300 Power Meter (cont'd)

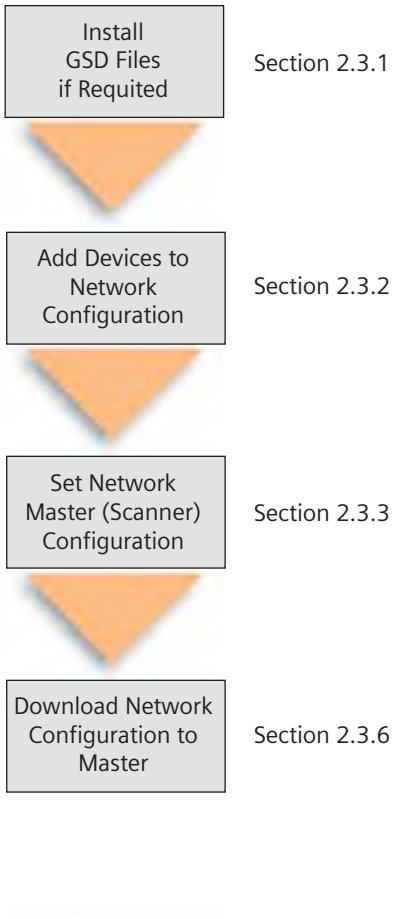
Inputs (Device to Master)	
Address	Description
15.0	Item #2 Data - Byte 3
15.1	Item #2 Data - Byte 3
15.2	Item #2 Data - Byte 3
15.3	Item #2 Data - Byte 3
15.4	Item #2 Data - Byte 3
15.5	Item #2 Data - Byte 3
15.6	Item #2 Data - Byte 3
15.7	Item #2 Data - Byte 3
16.0	Item #3 Data - Byte 0
16.1	Item #3 Data - Byte 0
16.2	Item #3 Data - Byte 0
16.3	Item #3 Data - Byte 0
16.4	Item #3 Data - Byte 0
16.5	Item #3 Data - Byte 0
16.6	Item #3 Data - Byte 0
16.7	Item #3 Data - Byte 0
17.0	Item #3 Data - Byte 1
17.1	Item #3 Data - Byte 1
17.2	Item #3 Data - Byte 1
17.3	Item #3 Data - Byte 1
17.4	Item #3 Data - Byte 1
17.5	Item #3 Data - Byte 1
17.6	Item #3 Data - Byte 1
17.7	Item #3 Data - Byte 1
18.0	Item #3 Data - Byte 2
18.1	Item #3 Data - Byte 2
18.2	Item #3 Data - Byte 2
18.3	Item #3 Data - Byte 2
18.4	Item #3 Data - Byte 2
18.5	Item #3 Data - Byte 2
18.6	Item #3 Data - Byte 2
18.7	Item #3 Data - Byte 2
19.0	Item #3 Data - Byte 3
19.1	Item #3 Data - Byte 3
19.2	Item #3 Data - Byte 3
19.3	Item #3 Data - Byte 3
19.4	Item #3 Data - Byte 3
19.5	Item #3 Data - Byte 3
19.6	Item #3 Data - Byte 3
19.7	Item #3 Data - Byte 3
20.0	Item #4 Data - Byte 0
20.1	Item #4 Data - Byte 0
20.2	Item #4 Data - Byte 0
20.3	Item #4 Data - Byte 0
20.4	Item #4 Data - Byte 0
20.5	Item #4 Data - Byte 0
20.6	Item #4 Data - Byte 0
20.7	Item #4 Data - Byte 0
21.0	Item #4 Data - Byte 1
21.1	Item #4 Data - Byte 1
21.2	Item #4 Data - Byte 1
21.3	Item #4 Data - Byte 1
21.4	Item #4 Data - Byte 1
21.5	Item #4 Data - Byte 1
21.6	Item #4 Data - Byte 1
21.7	Item #4 Data - Byte 1
22.0	Item #4 Data - Byte 2
22.1	Item #4 Data - Byte 2
22.2	Item #4 Data - Byte 2
22.3	Item #4 Data - Byte 2
22.4	Item #4 Data - Byte 2
22.5	Item #4 Data - Byte 2
22.6	Item #4 Data - Byte 2
22.7	Item #4 Data - Byte 2

Inputs (Device to Master)	
Address	Description
23.0	Item #4 Data - Byte 3
23.1	Item #4 Data - Byte 3
23.2	Item #4 Data - Byte 3
23.3	Item #4 Data - Byte 3
23.4	Item #4 Data - Byte 3
23.5	Item #4 Data - Byte 3
23.6	Item #4 Data - Byte 3
23.7	Item #4 Data - Byte 3
24.0	Item #5 Data - Byte 0
24.1	Item #5 Data - Byte 0
24.2	Item #5 Data - Byte 0
24.3	Item #5 Data - Byte 0
24.4	Item #5 Data - Byte 0
24.5	Item #5 Data - Byte 0
24.6	Item #5 Data - Byte 0
24.7	Item #5 Data - Byte 0
25.0	Item #5 Data - Byte 1
25.1	Item #5 Data - Byte 1
25.2	Item #5 Data - Byte 1
25.3	Item #5 Data - Byte 1
25.4	Item #5 Data - Byte 1
25.5	Item #5 Data - Byte 1
25.6	Item #5 Data - Byte 1
25.7	Item #5 Data - Byte 1
26.0	Item #5 Data - Byte 2
26.1	Item #5 Data - Byte 2
26.2	Item #5 Data - Byte 2
26.3	Item #5 Data - Byte 2
26.4	Item #5 Data - Byte 2
26.5	Item #5 Data - Byte 2
26.6	Item #5 Data - Byte 2
26.7	Item #5 Data - Byte 2
27.0	Item #5 Data - Byte 3
27.1	Item #5 Data - Byte 3
27.2	Item #5 Data - Byte 3
27.3	Item #5 Data - Byte 3
27.4	Item #5 Data - Byte 3
27.5	Item #5 Data - Byte 3
27.6	Item #5 Data - Byte 3
27.7	Item #5 Data - Byte 3
28.0	Item #6 Data - Byte 0
28.1	Item #6 Data - Byte 0
28.2	Item #6 Data - Byte 0
28.3	Item #6 Data - Byte 0
28.4	Item #6 Data - Byte 0
28.5	Item #6 Data - Byte 0
28.6	Item #6 Data - Byte 0
28.7	Item #6 Data - Byte 0
29.0	Item #6 Data - Byte 1
29.1	Item #6 Data - Byte 1
29.2	Item #6 Data - Byte 1
29.3	Item #6 Data - Byte 1
29.4	Item #6 Data - Byte 1
29.5	Item #6 Data - Byte 1
29.6	Item #6 Data - Byte 1
29.7	Item #6 Data - Byte 1
30.0	Item #6 Data - Byte 2
30.1	Item #6 Data - Byte 2
30.2	Item #6 Data - Byte 2
30.3	Item #6 Data - Byte 2
30.4	Item #6 Data - Byte 2
30.5	Item #6 Data - Byte 2
30.6	Item #6 Data - Byte 2
30.7	Item #6 Data - Byte 2

Inputs (Device to Master)	
Address	Description
31.0	Item #6 Data - Byte 3
31.1	Item #6 Data - Byte 3
31.2	Item #6 Data - Byte 3
31.3	Item #6 Data - Byte 3
31.4	Item #6 Data - Byte 3
31.5	Item #6 Data - Byte 3
31.6	Item #6 Data - Byte 3
31.7	Item #6 Data - Byte 3

2.3. ProSoft and HMS PROFIBUS Network Configuration

This configuration process can be used for the ProSoft PROFIBUS Master cards, and the HMS Anybus PROFIBUS gateways.



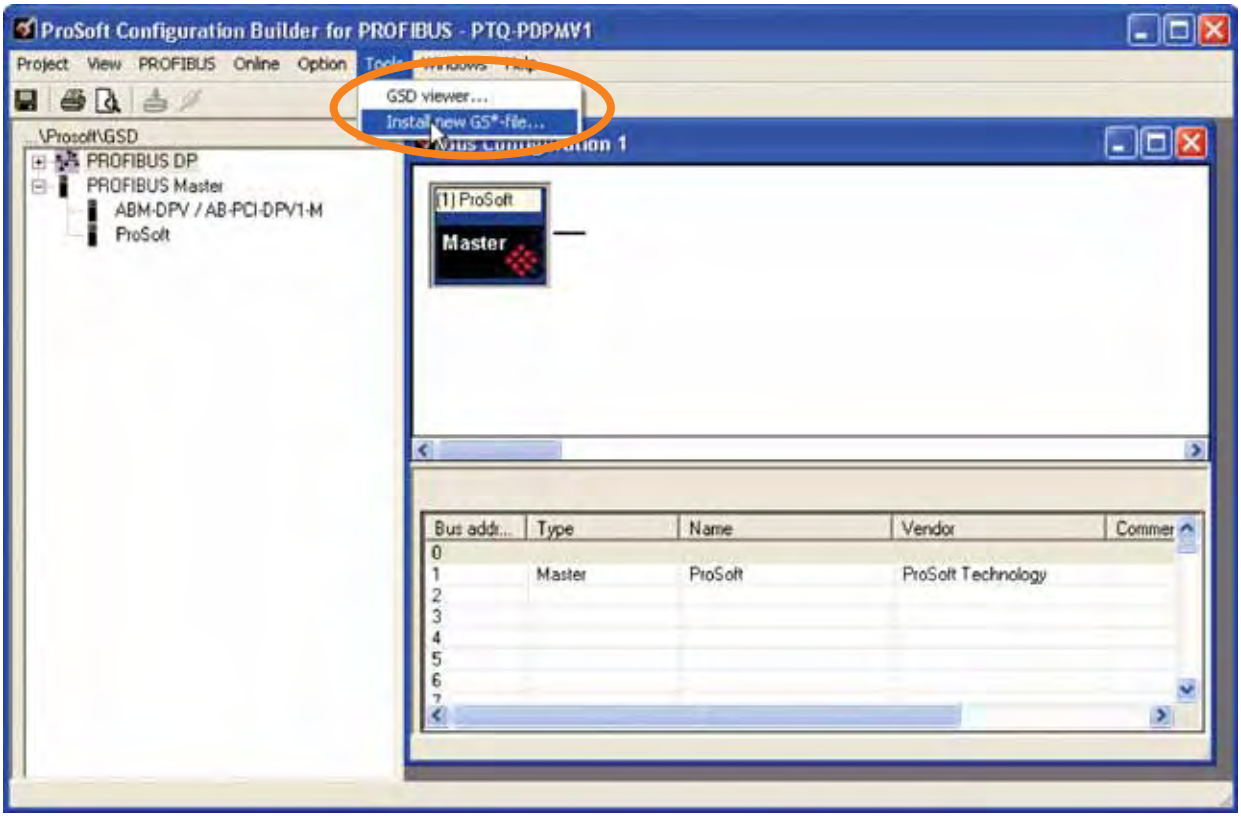
PROFIBUS Integration Overview
Smart MCC Network Communications

2.3.1. Install GSD Files

Before the network can be properly configured, all of the GSD files for the devices on the network need to be installed into the software.

A GSD file is a text file with the extension .GSD (but may have the extension .GSE for English). This text file defines the properties of the device to the PROFIBUS master (Scanner). Each device must have the correct GSD file installed prior to configuration and use.

The Siemens Smart MCC GSD files may be obtained from the Siemens Support web site, a CD that came with the Smart MCC Documentation Package, or from Siemens Smart MCC support services.

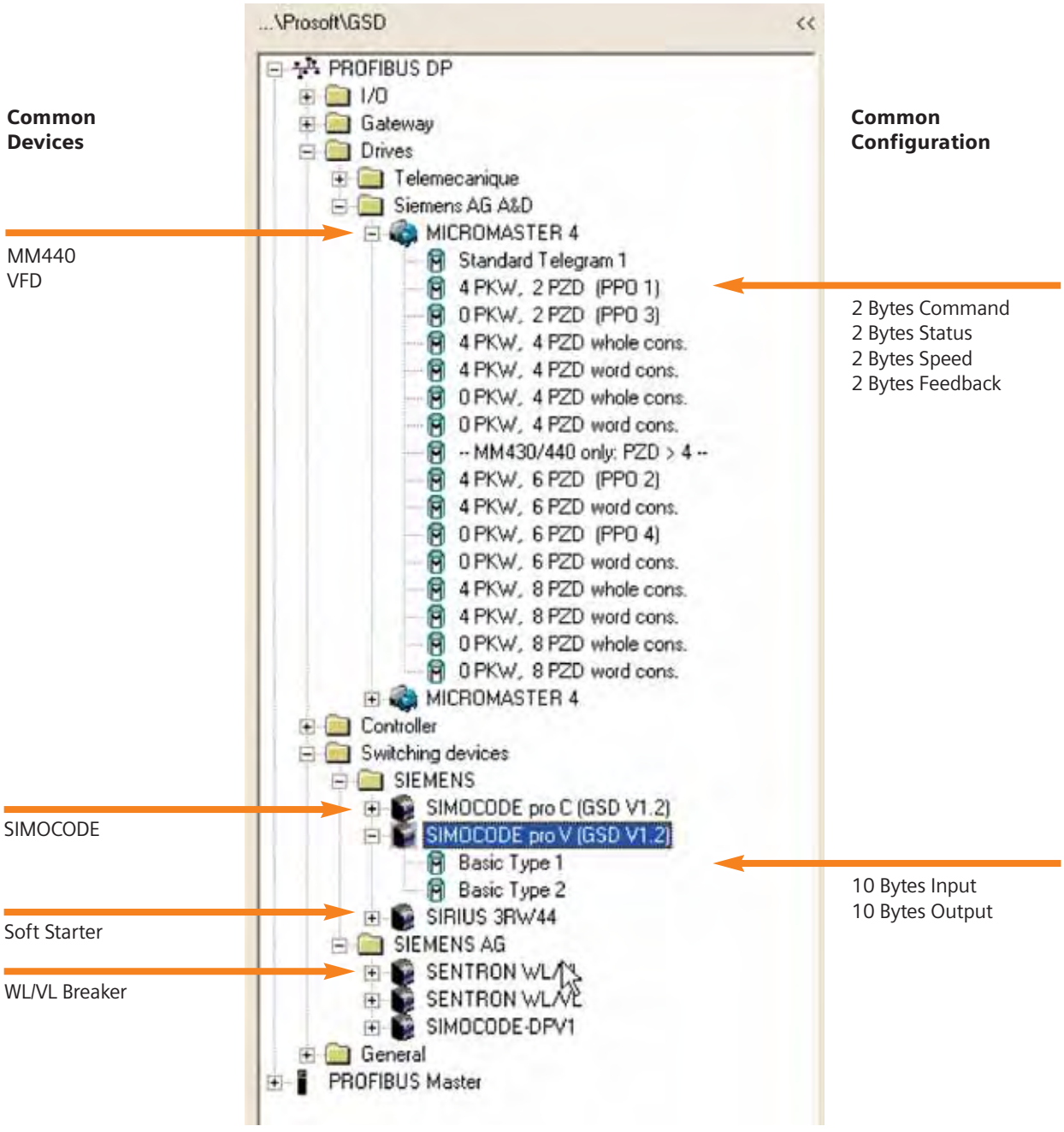


PROFIBUS Integration Overview
Smart MCC Network Communications

This shows a list of common components used in Siemens short MCC configurations.

Common Devices

Common Configuration



MM440
VFD

2 Bytes Command
2 Bytes Status
2 Bytes Speed
2 Bytes Feedback

SIMOCODE

10 Bytes Input
10 Bytes Output

Soft Starter

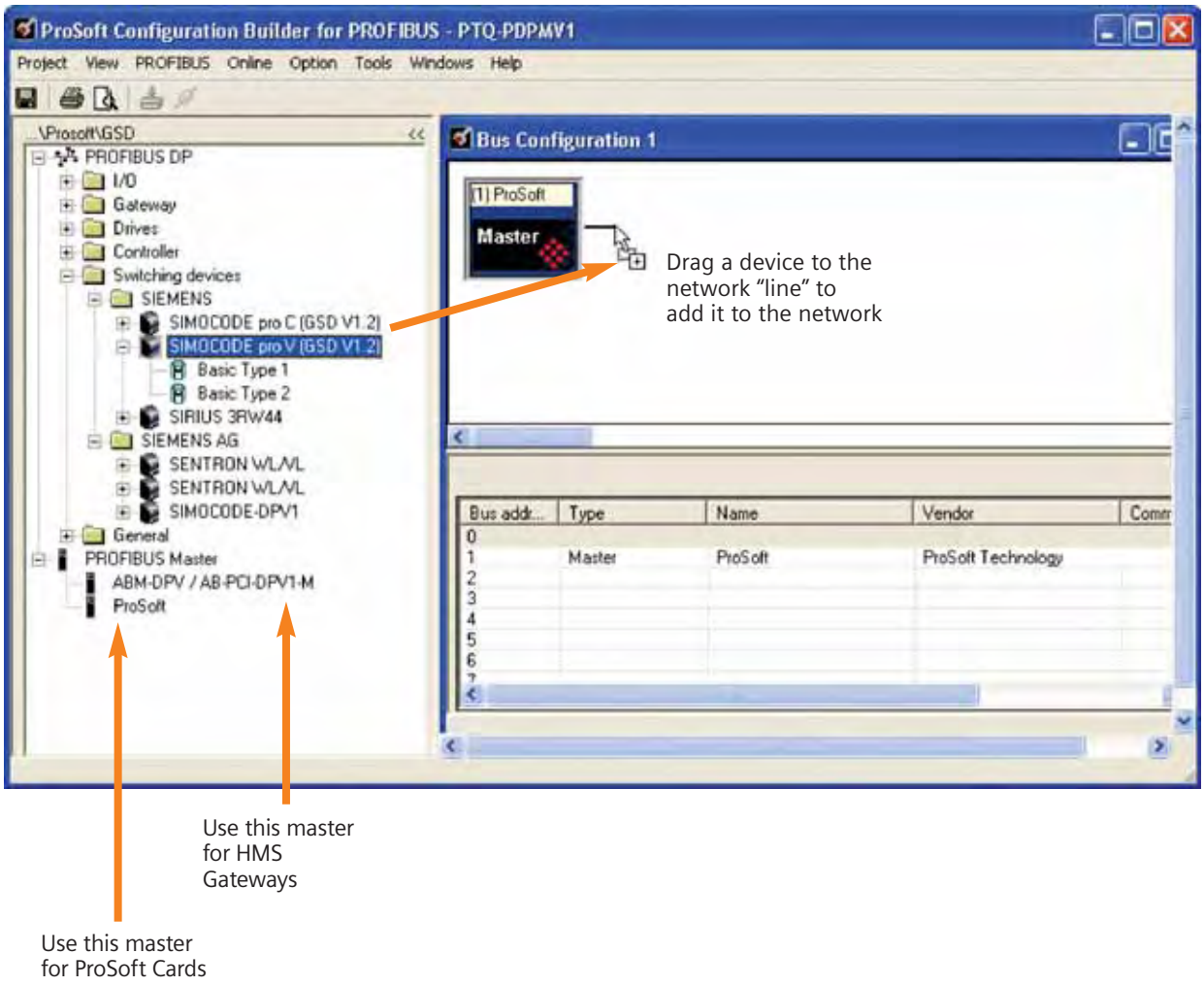
WL/VL Breaker

2.3.2. Add Devices to Network Configuration

When creating a network configuration, you must:

1. Add a "master" to network. The PROFIBUS master can be either a ProSoft Gateway or Gateway device.
2. Add all devices (slaves) to the network.

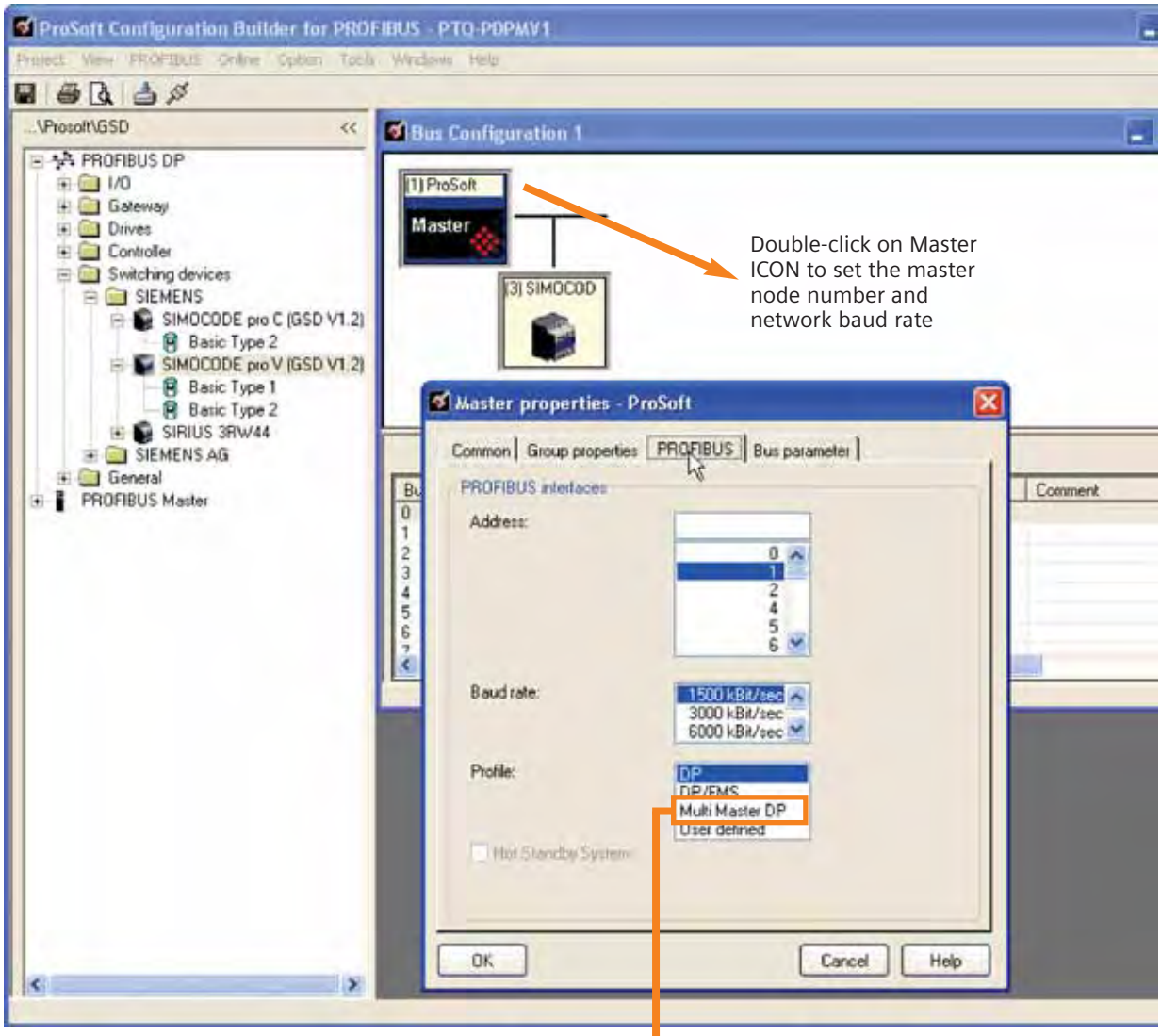
The procedure to add devices to the network configuration is to single-click on the device and drag the item to the bus configuration window on the right. This procedure is shown in the screenshot below.



PROFIBUS Integration Overview
Smart MCC Network Communications

2.3.3. Setting Network Master (Scanner) Configuration

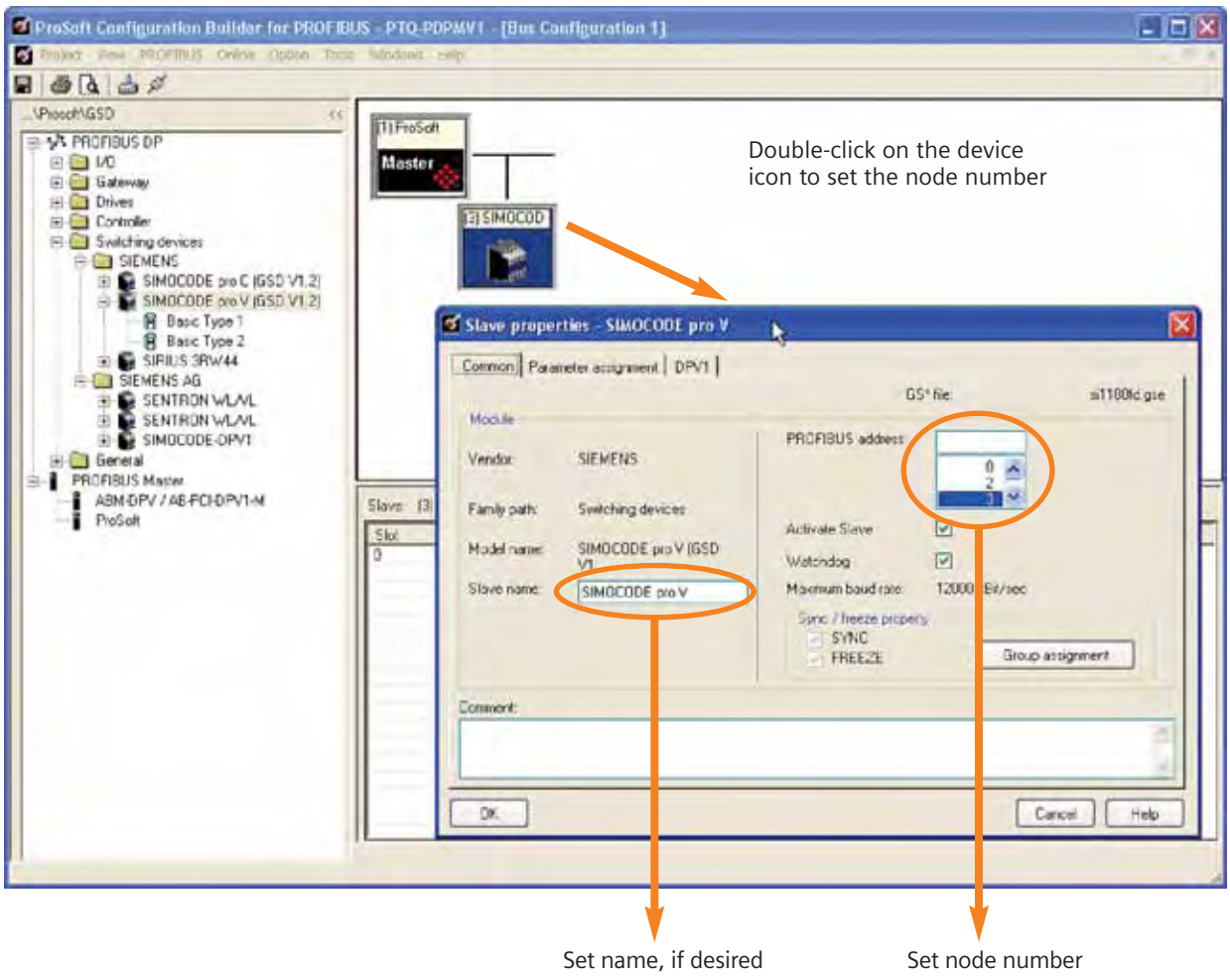
The master node is usually node 1
The default baud rate is 1500 Kbit/sec
These values may be user adjusted



Each profile defines a bus timing calculation for transmitting and receiving messages between the master and all slaves. Due to limitations on some slaves, not all profiles will work with all baud rates and all slaves. To most closely mimic the bus bit timing used by Siemens S7 PLC's, select the Multi-Master DP profile. This will allow the widest selection of baud rates for most slaves, and still allow programming stations to be connected to the PROFIBUS-DP network.

2.3.4. Setting Device Properties

Each device will automatically be given a node address.
This node number may be manually reset.



2.3.5. Setting Device Cyclic Data

Most devices have a net number of cyclic bytes that are exchanged with the master.

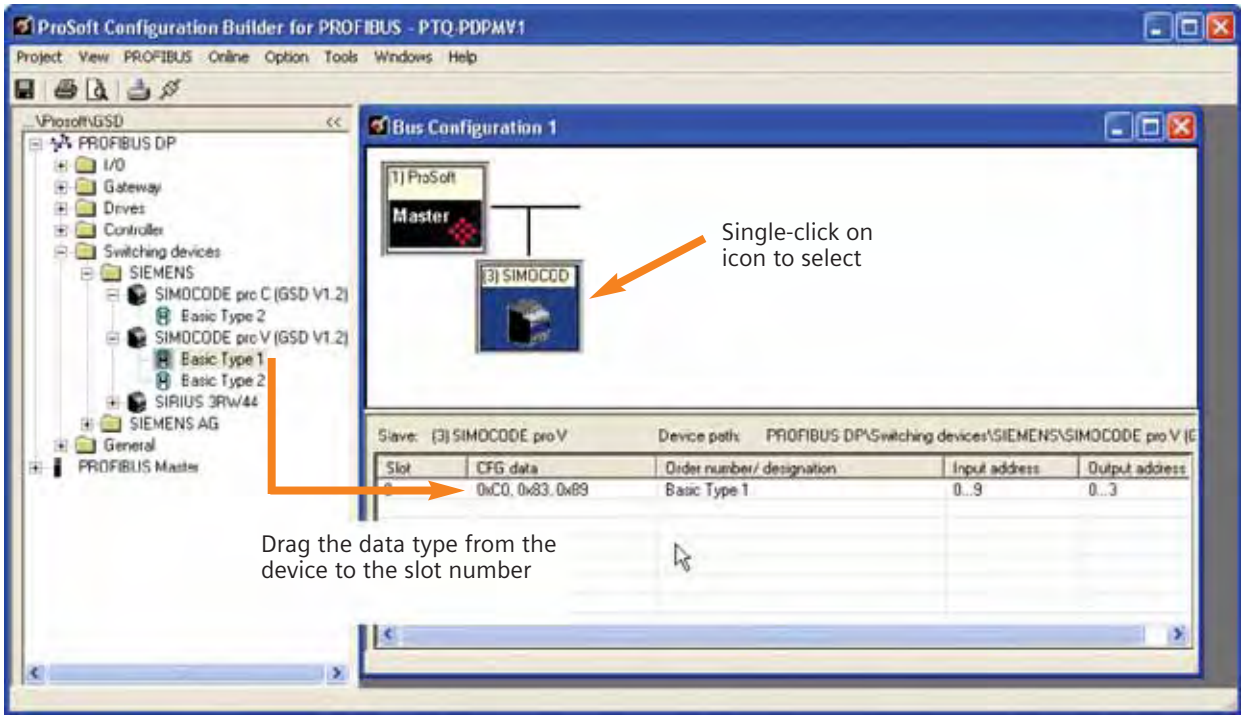
However, there are two devices that have adjustable number of bytes: MM440 VFD and SIMOCODE PRO V

MM440 VFD

- Chose setting PP01 for the device configuration
- Choosing something other than PP01, will require reconfiguring the VFD. i.e., PP01 is a VFD default setting
- PP01 allocates 12 bytes input and 12 bytes output data to and from the PROFIBUS master
- The first 8 bytes of input and output can effectively be ignored for basic configuration. Refer to the PROFIBUS Manual for the MM440 for more information
- The last 4 bytes of input and output are used for network control of the drive. Refer to Section 2.2 for data breakdown.

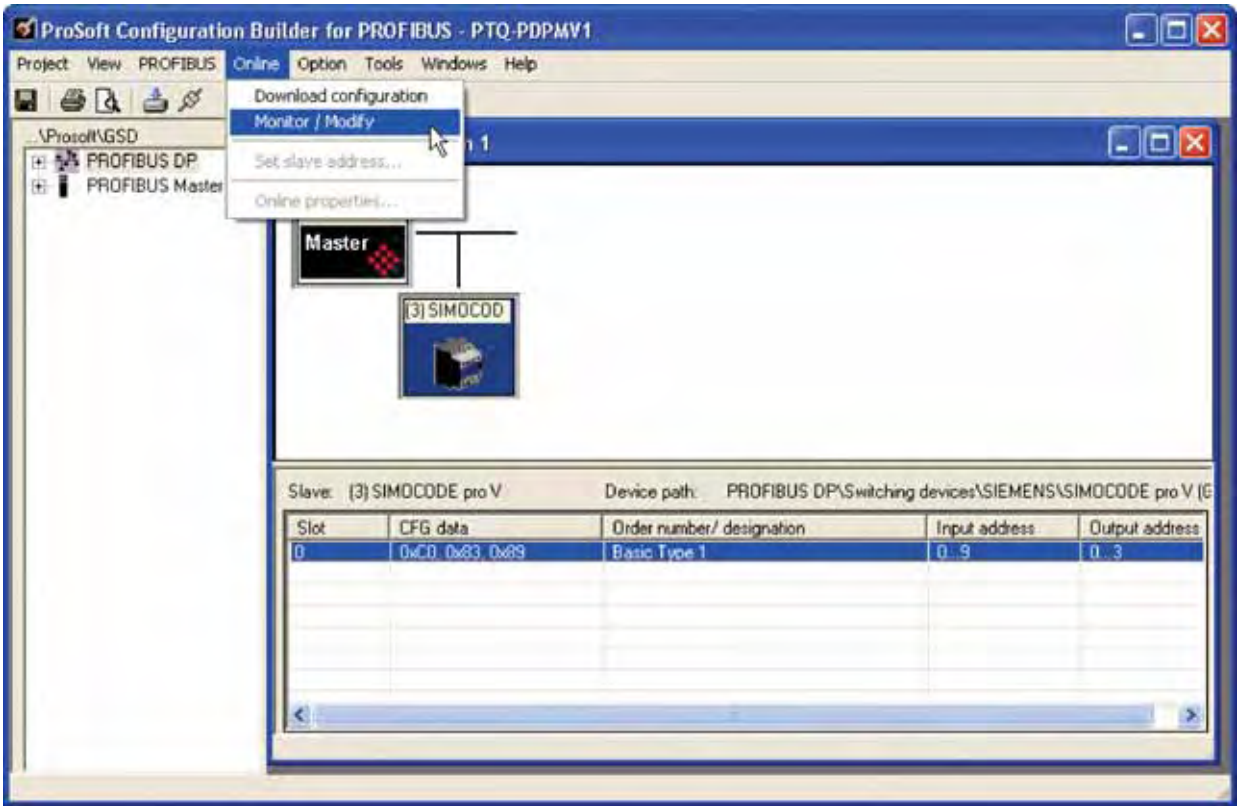
SIMOCODE PRO V

- Type 1 is 10 bytes of input and 4 bytes of output
- Type 2 is 4 bytes of input and 2 bytes of output
- Refer to Section 2.2 for data breakdown



Procedure to set the cyclic data type for the device:
1. Single-click on the device icon to select
2. Drag the data type to the slot number

2.3.6. Download/Monitor PROFIBUS Network Configuration



Important Point to Remember:
The download / monitor mechanism is set prior to launching the network configuration. You may either use the serial port or the Ethernet connection. Siemens recommends the use of the Ethernet connection.

Refer to the following sections depending on the type of module you are configuring:

Modicon Quantum	Section 3.3.4.
Rockwell ControlLogix	Section 4.1.3.

Modicon Quantum PLC
Smart MCC Network Communications

3. Modicon Quantum PLC

The modicon PLC in this section contains integration examples for the ProSoft PTQ-PDPM card (which is a PROFIBUS Scanner for the Quantum PLC), a Modbus TCP gateway, and a Modbus RTU gateway.

3.1. Introduction

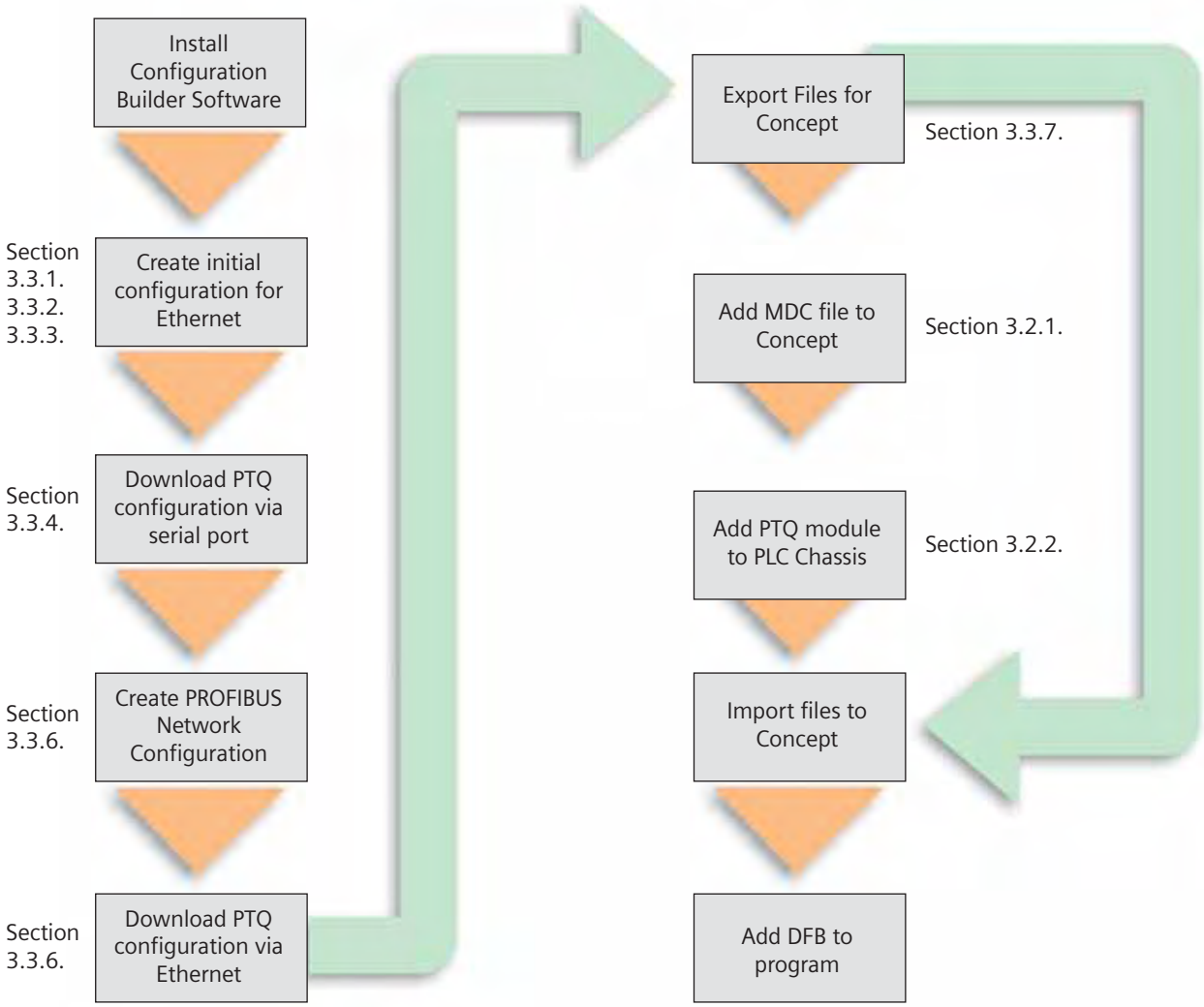
The equipment and programming software for these examples in this section are:

1. Programming Software Concept 2.6XL,
2. Quantum CPU (140CPU43412A),
3. ProSoft Technologies PROFIBUS Scanner card (PTQ-PDPM),
4. Schneider Ethernet card (140NOE77111).
5. Modbus TCP gateway HMS Anybus ABX-PDPM-EIPS (AB7800)
6. Modbus RTU gateway HMS Anybus ABX-PDPM-RTUS (AB7808).

Download EXEC q5rv131e.bin to CPU

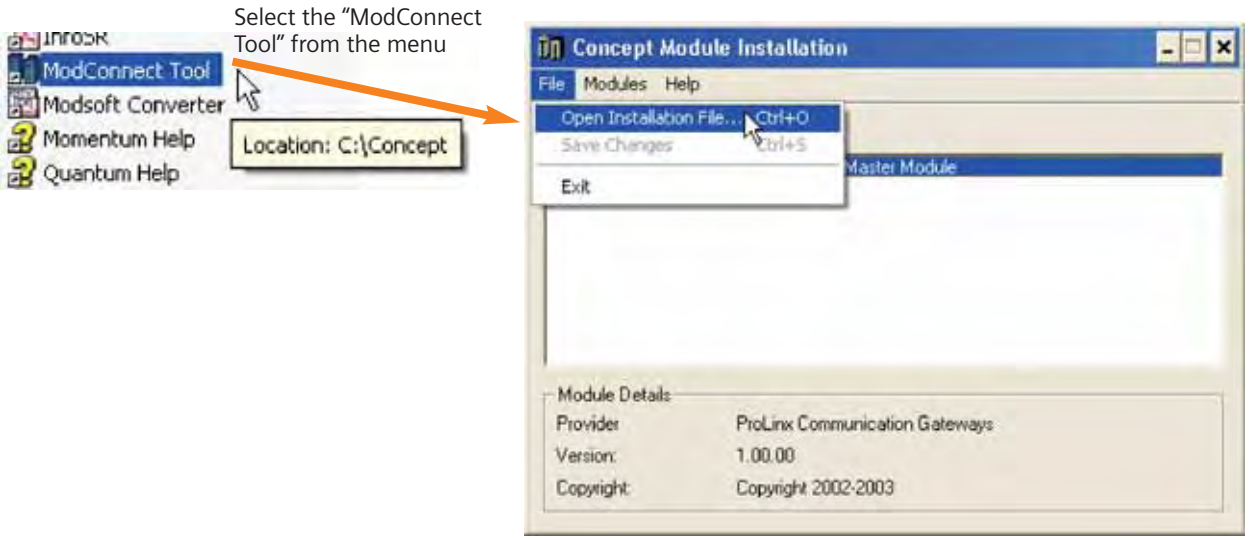
3.2. PTQ to Quantum Integration

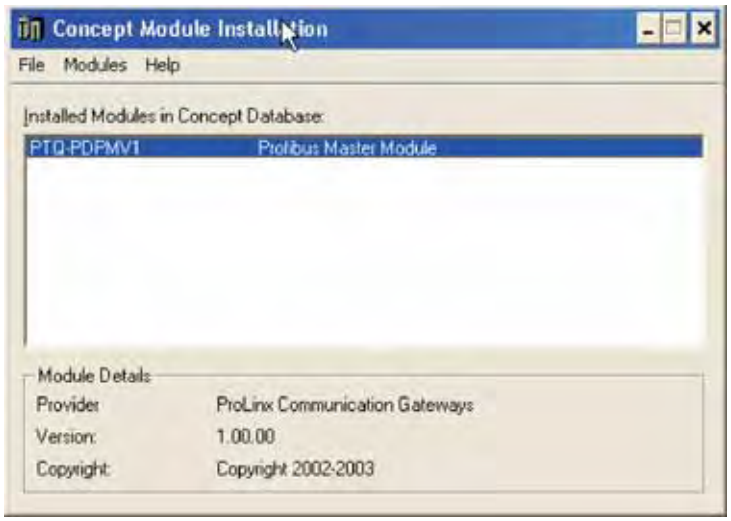
This is an overview of the process to integrate the PTQ module to Modicon Quantum PLC. Subsequent sections will have more details about some of these steps in the sequence, but other details may be elsewhere in this manual.



3.2.1. Setup Concept Software

1. Install the CONCEPT 2.6XL software, if not already installed.
2. Get the PTQ module .MDC file from ProSoft (CD or Web) [ptq_2_60.mdc] for concept 2.6
3. Run the conversion software to load MDC into programming software:



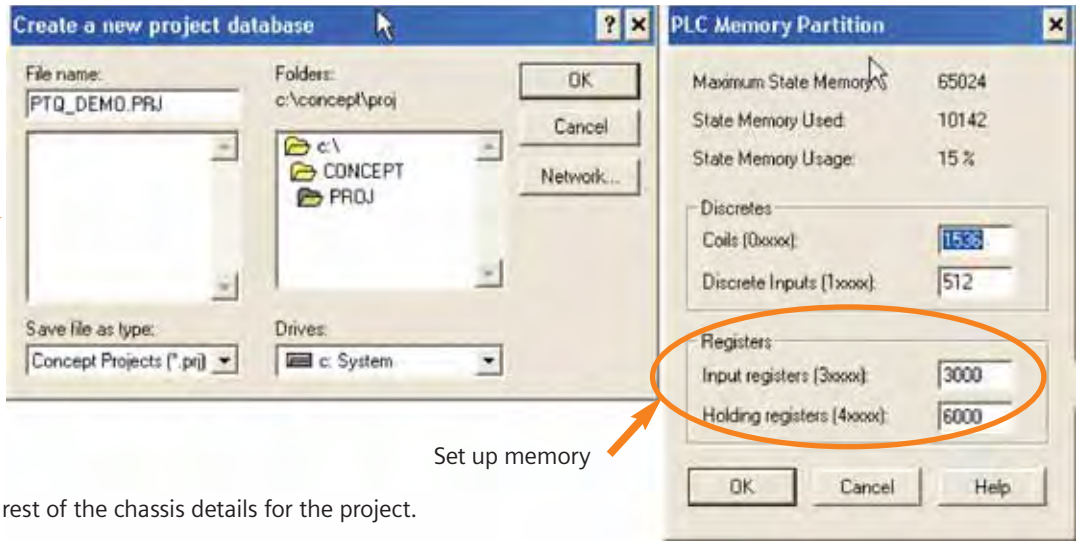


When the MDC file for the PTQ card is installed, it should look something like this

3.2.2. Create Project

Using CONCEPT 2.6XL programming software, create the project you want to use with the PTQ module. For our example, we will create

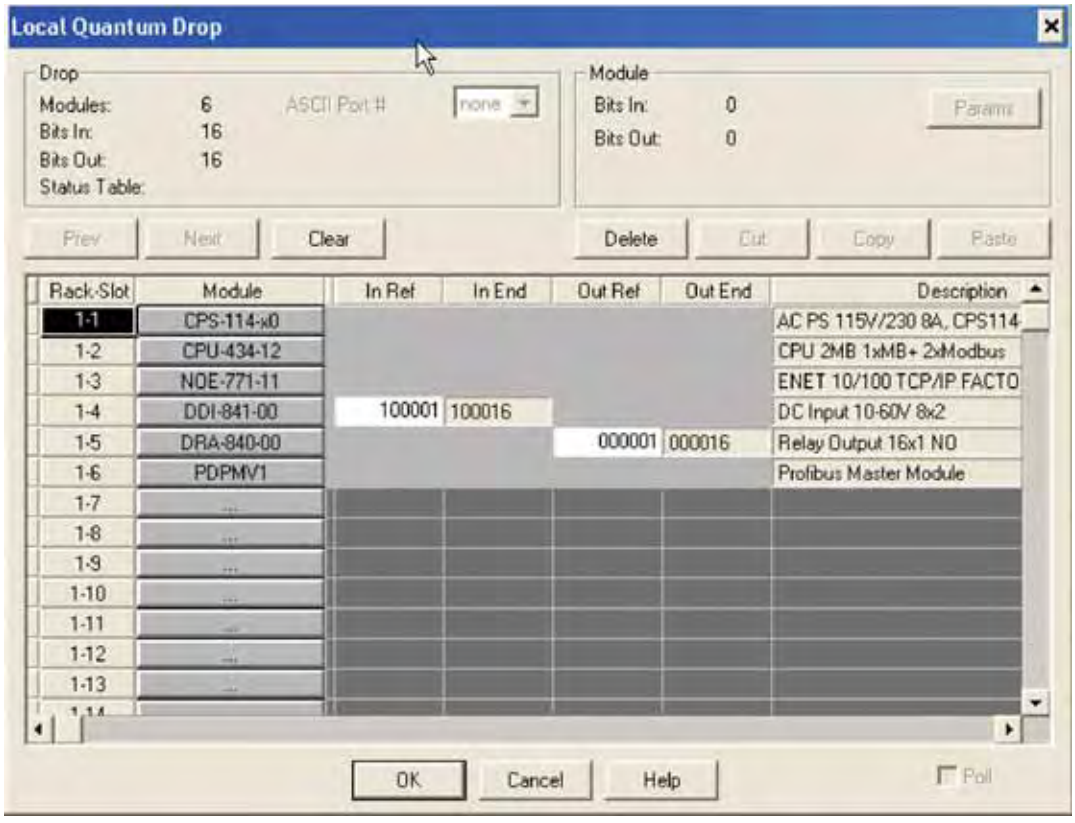
Create new project



Set up memory

Then create the rest of the chassis details for the project.

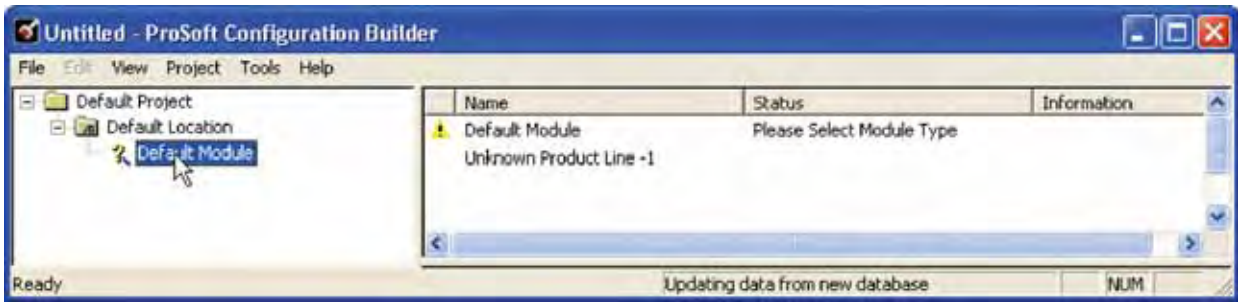
Set up modules in chassis



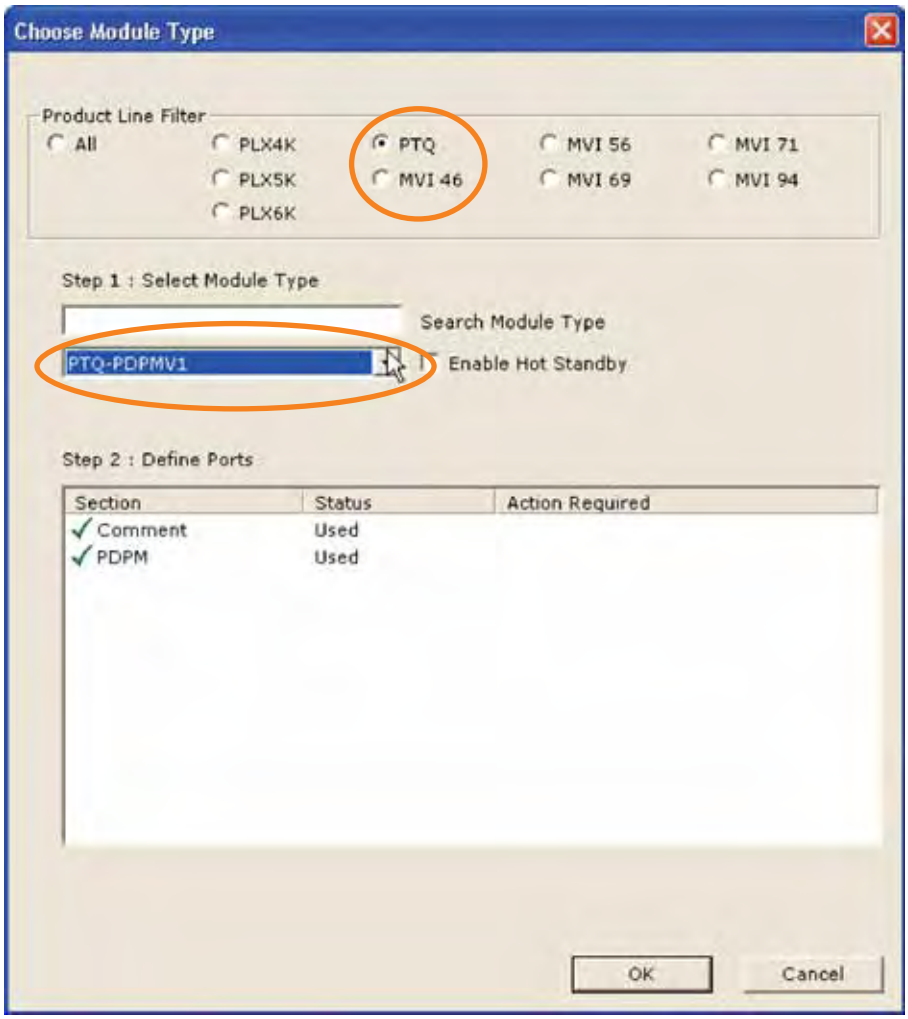
3.3. ProSoft and PROFIBUS Configuration Software

Install the ProSoft Configuration Builder for the PTQ module. This software will come on a CD with module, or may be downloaded from the web.

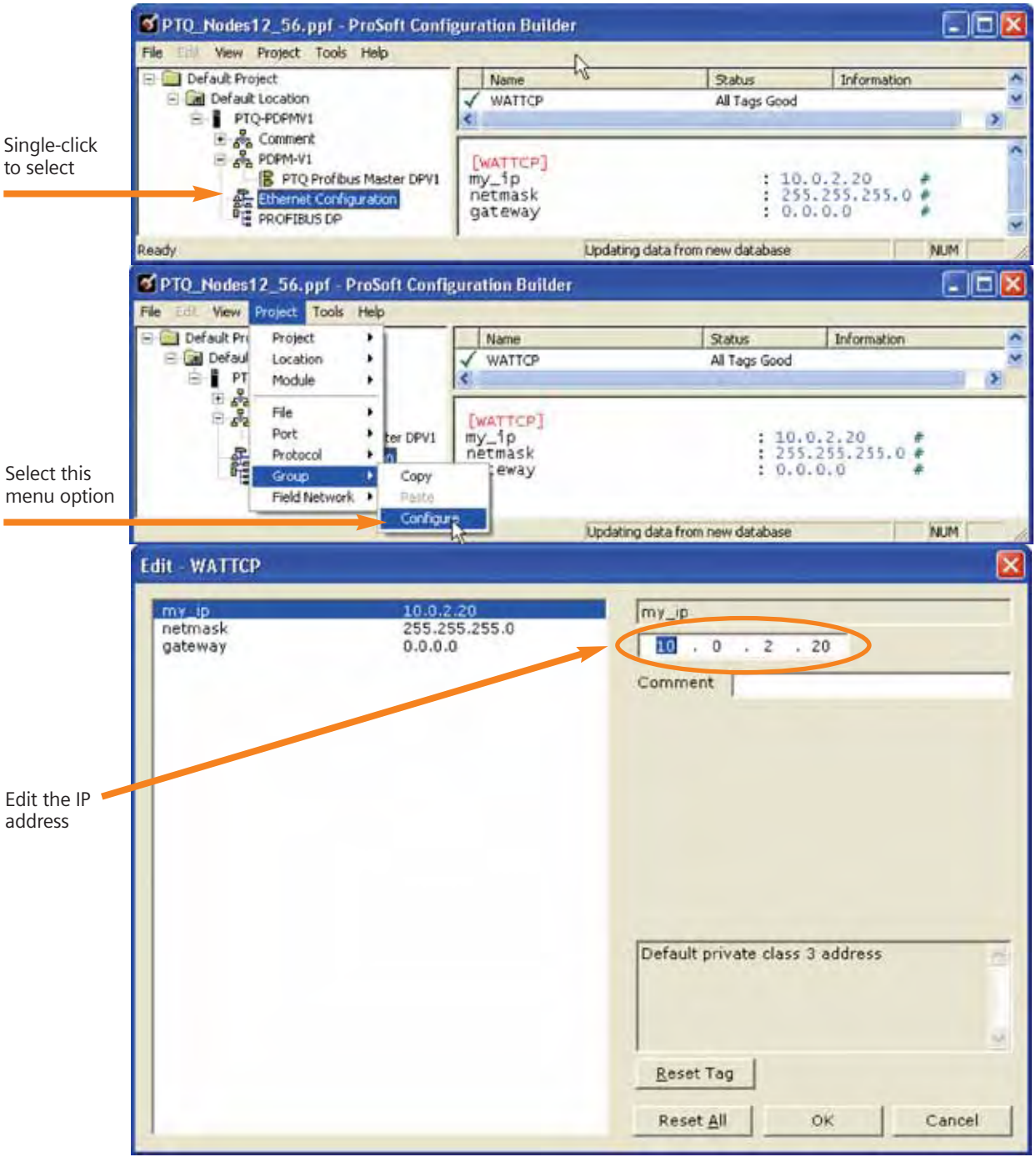
3.3.1. Create a new configuration



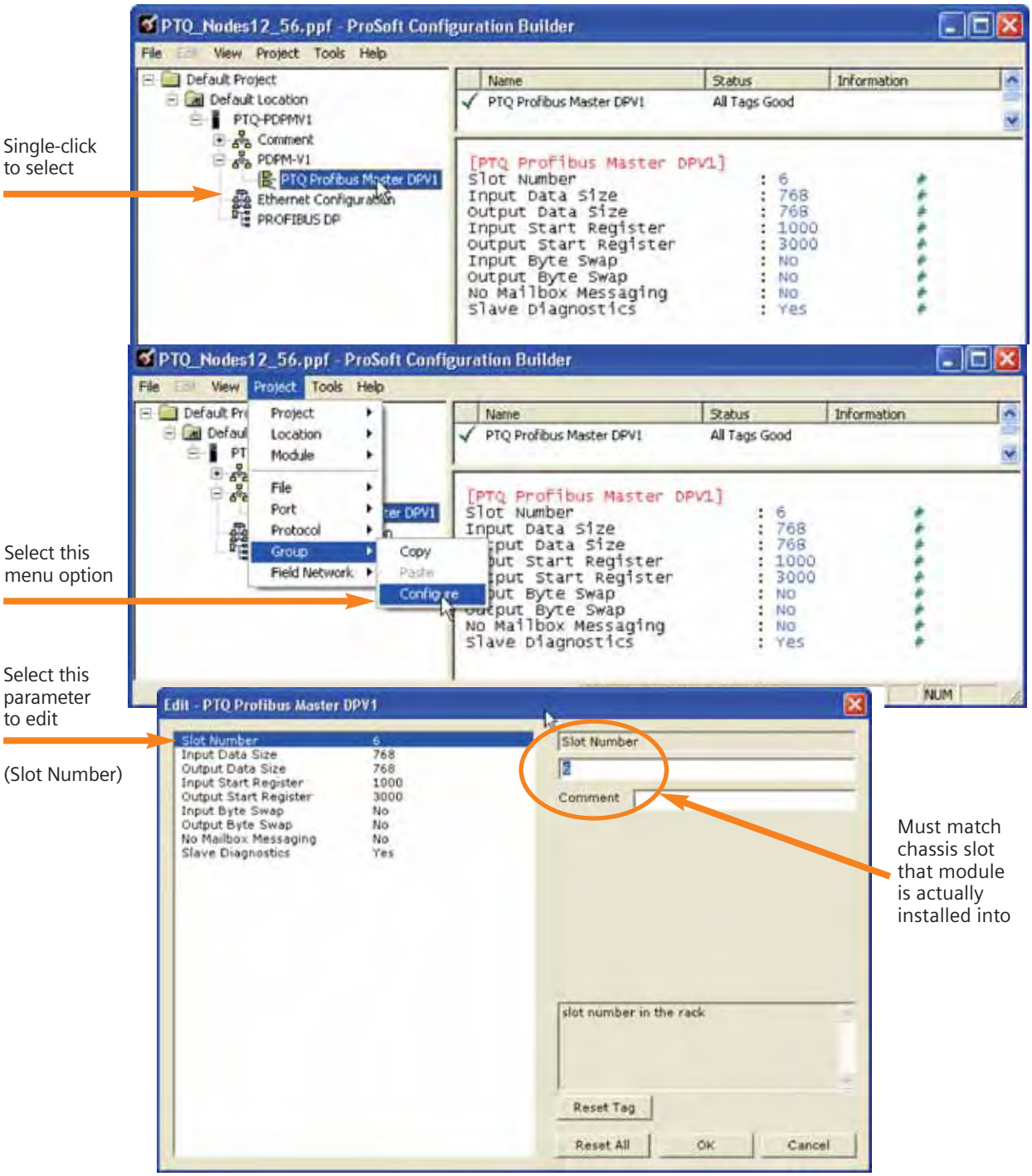
Double click on the "Default Module" to set the module type.



3.3.2. Configure the Ethernet Port

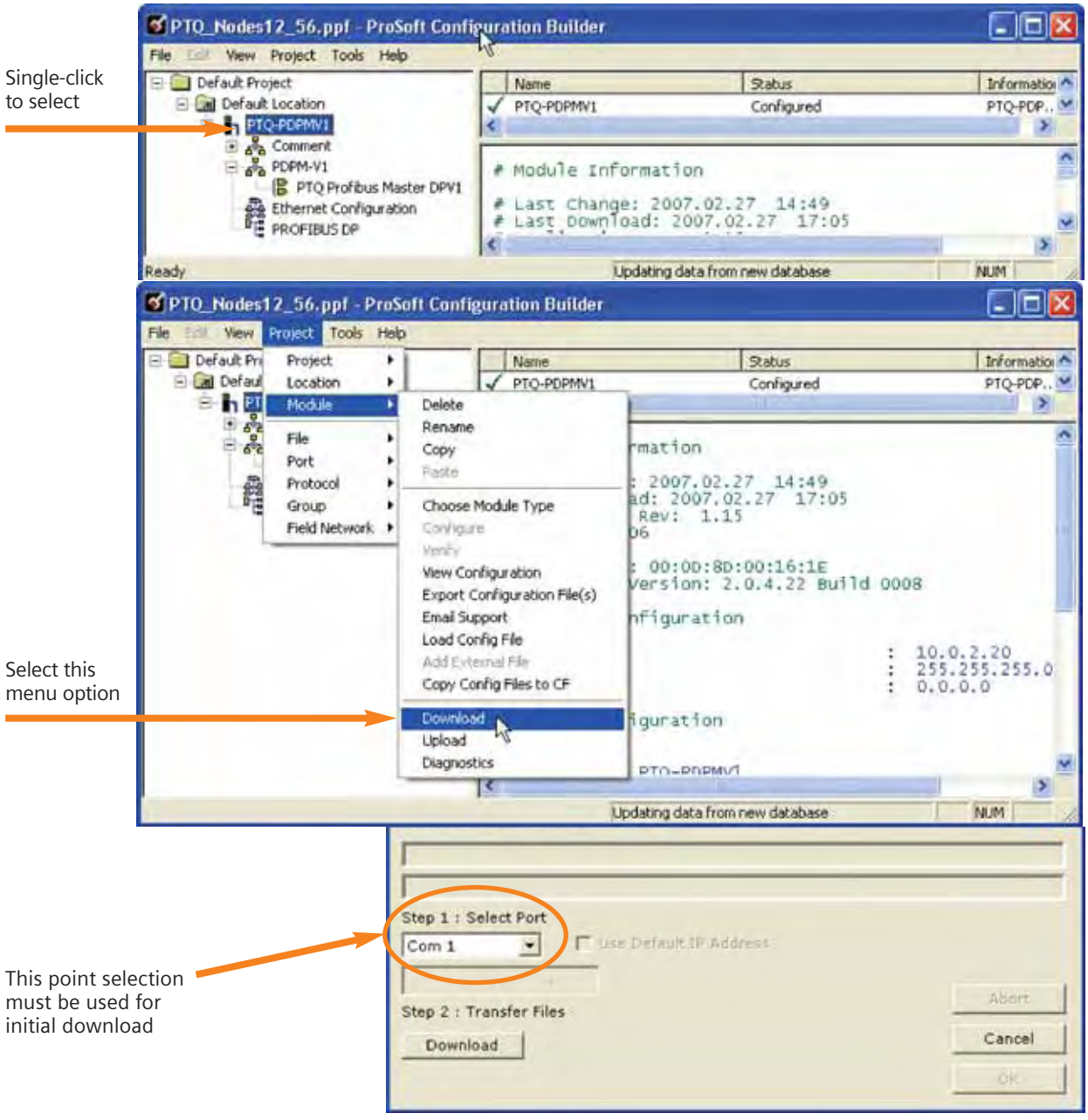


3.3.3. Edit Quantum Chassis Slot Number



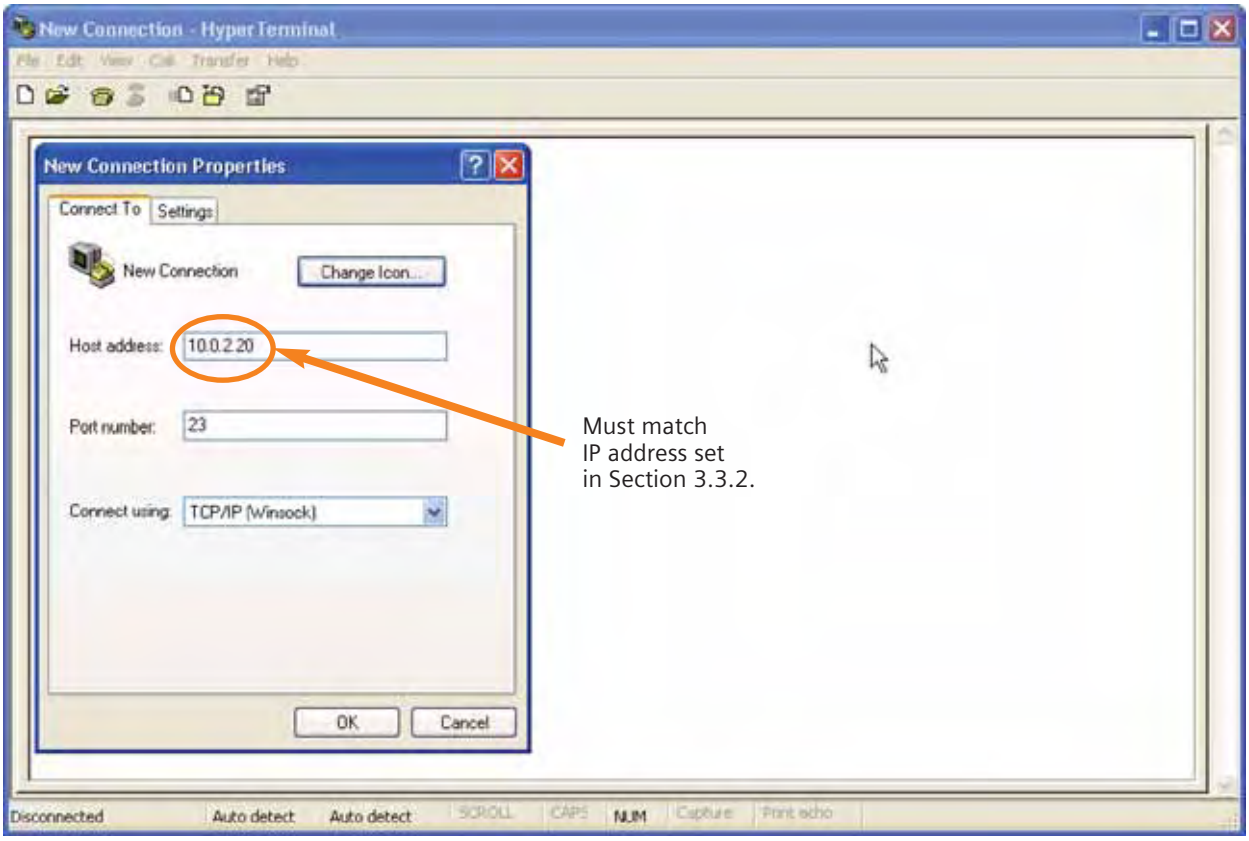
3.3.4. Initial Configuration Download

The initial configuration download that sets the IP address for the Ethernet port and slot number needs to be downloaded via the serial port first.



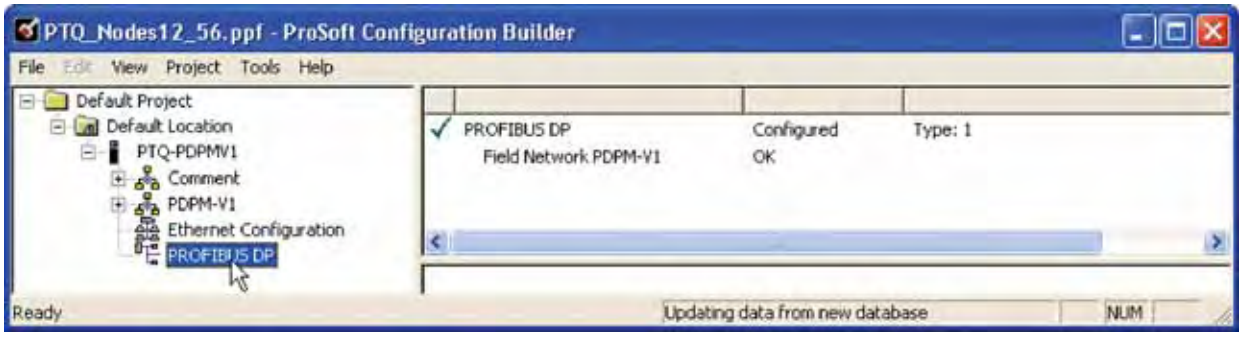
3.3.5. Module Debug Mode

After the initial configuration download to the PTQ module, you can use hyperterminal to create a TCP connection to the module. The module has a series of debug screens for configuration, testing, and troubleshooting the operation of the module. These screens and their functions are documented in the user manual for the module.

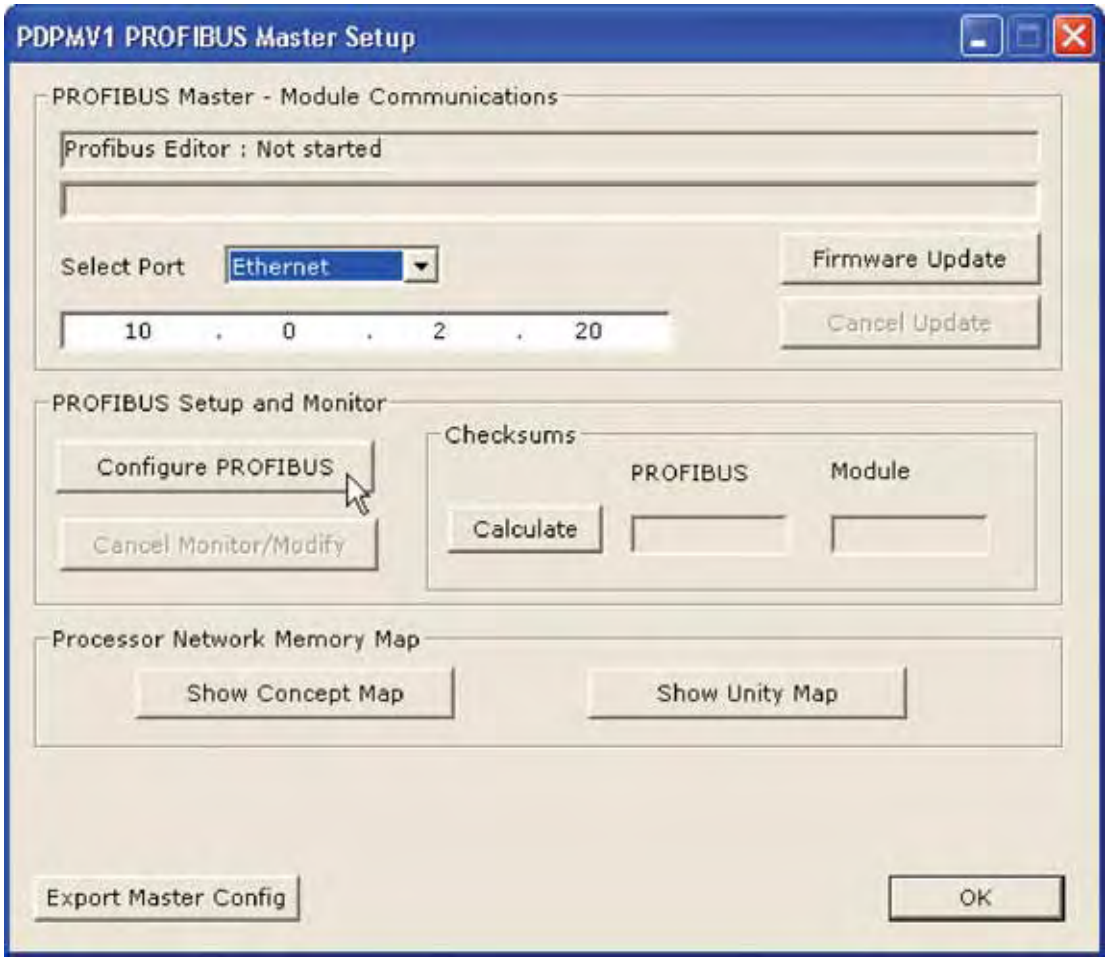


3.3.6. Configure the PROFIBUS Network

Double-click on the PROFIBUS DP entry to configure the PROFIBUS network.

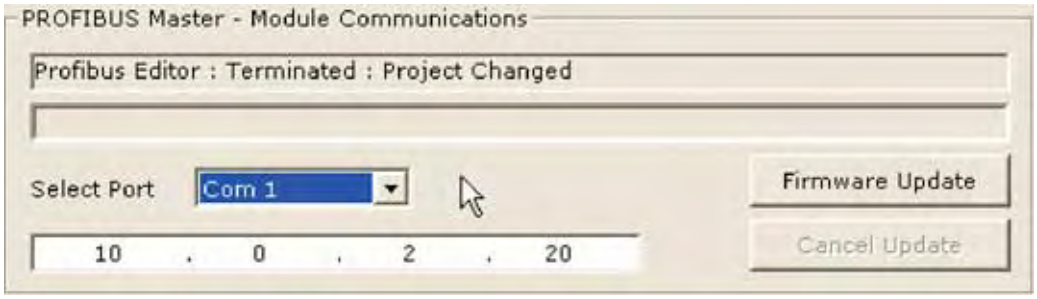


The following dialog box appears to select the communications method to the module.

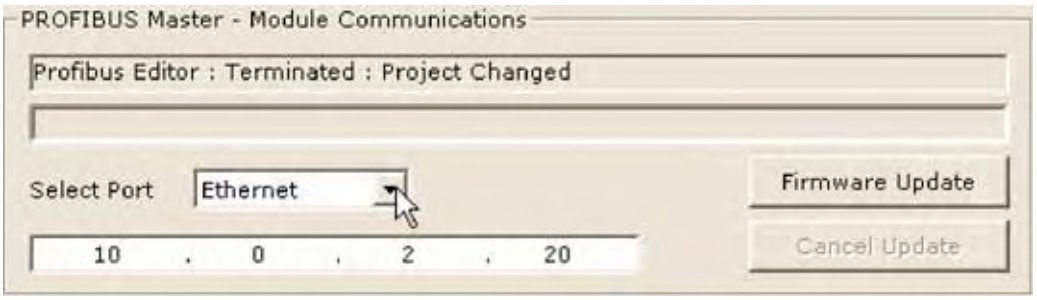


1. Select the method for downloading and monitoring the PROFIBUS network configuration.

   A) COM1



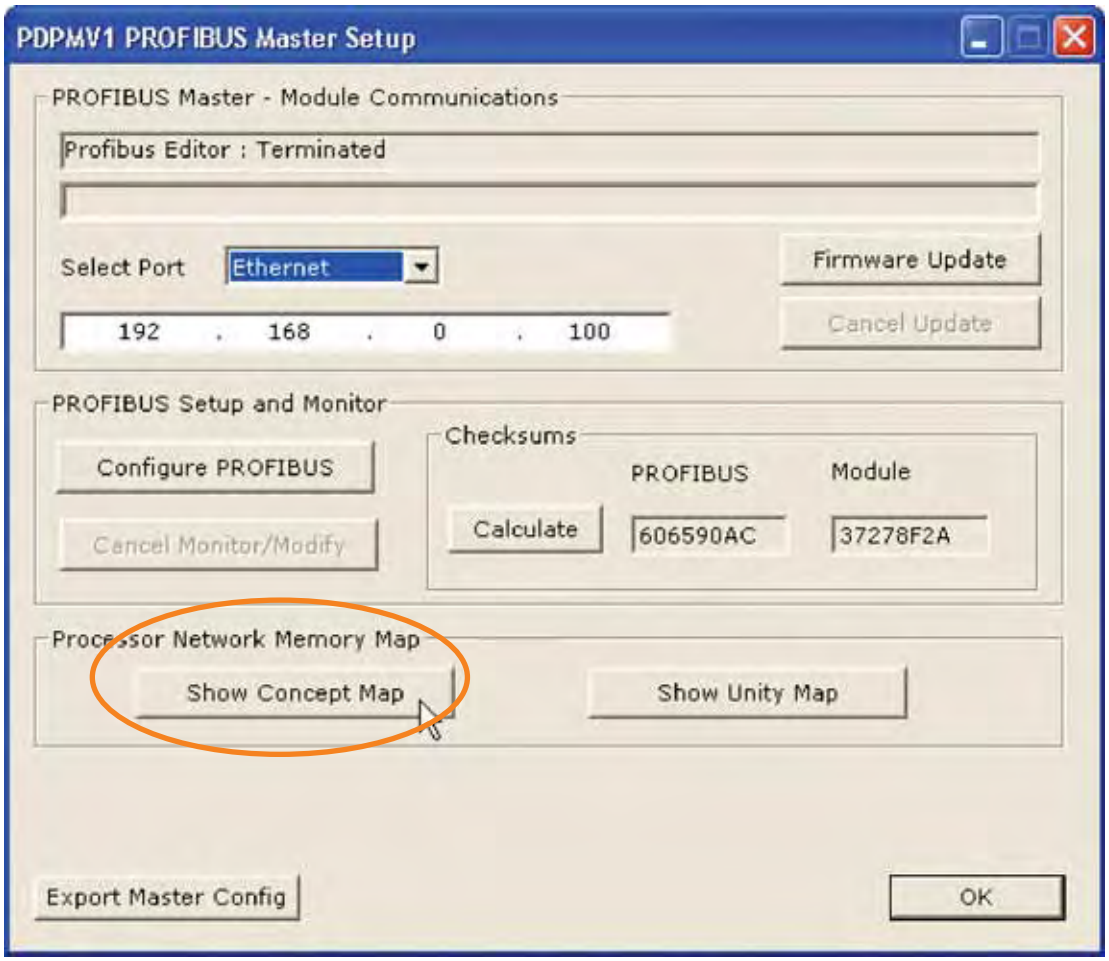
   B) Ethernet

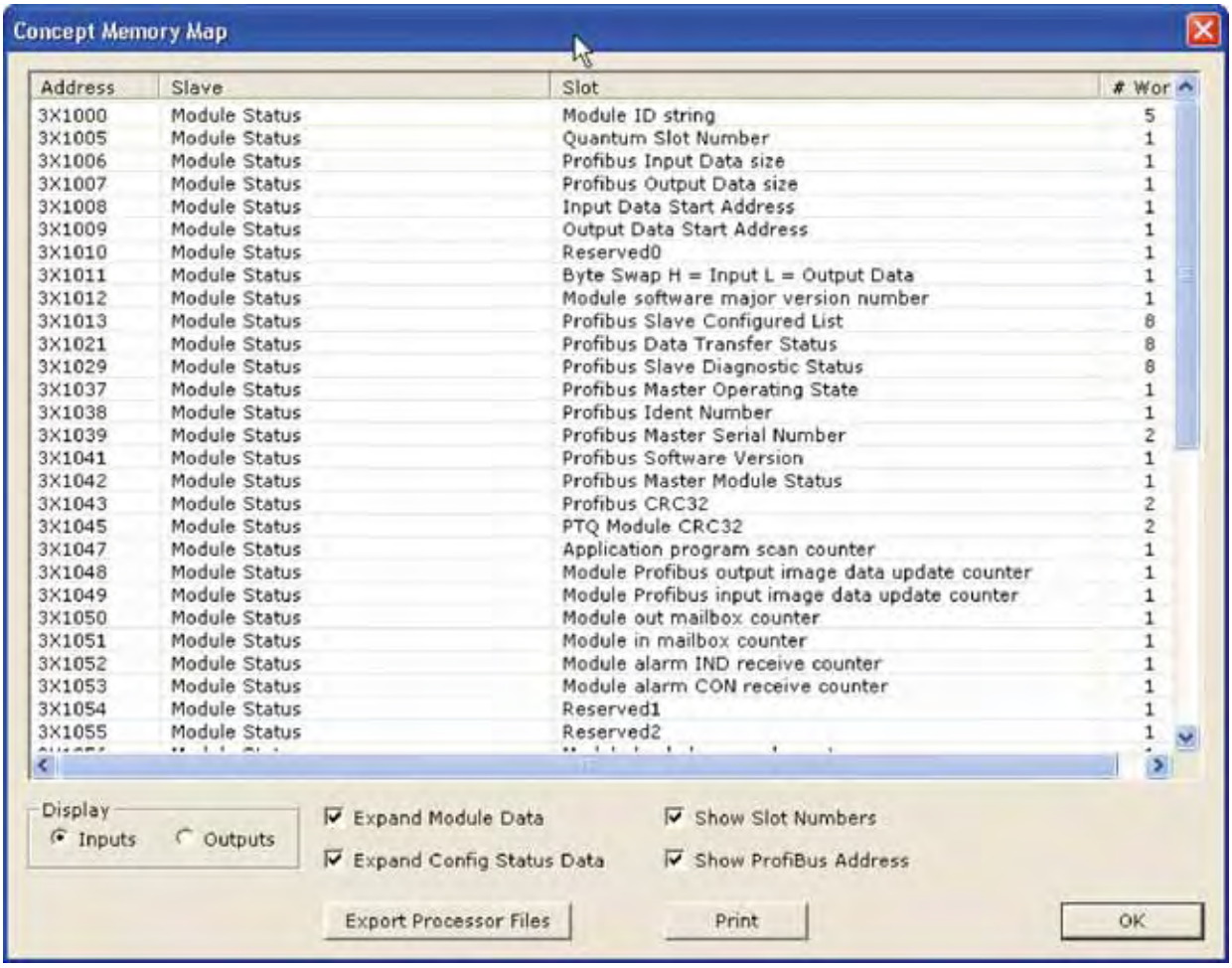


2. Then click on the  button.

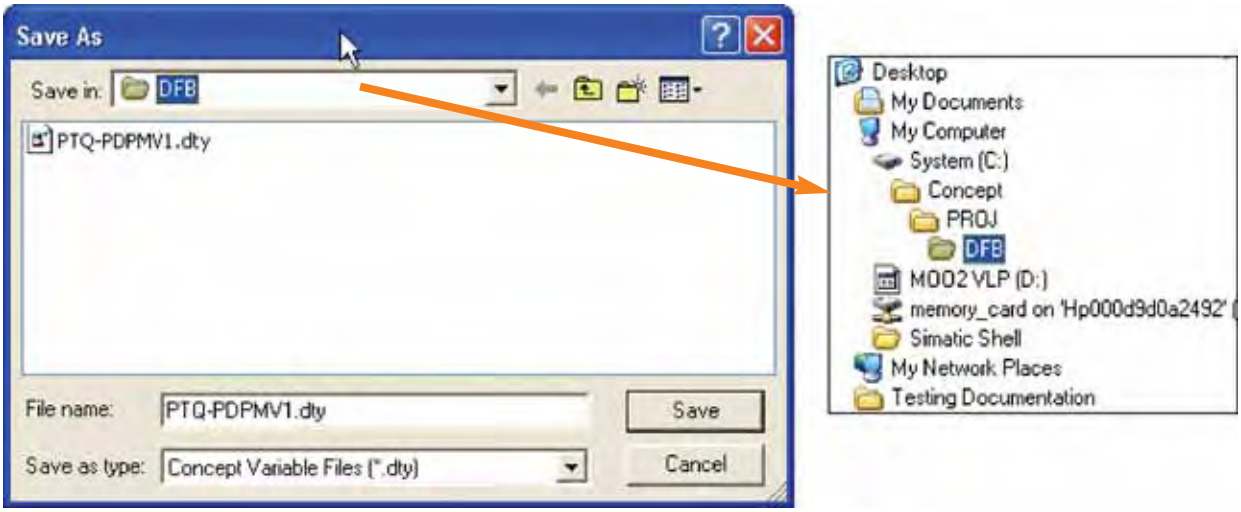
3.3.7. Export Files for Concept

Important Note:
The PROFIBUS Network configuration must have been created prior to this step, and downloaded to the PTQ card.





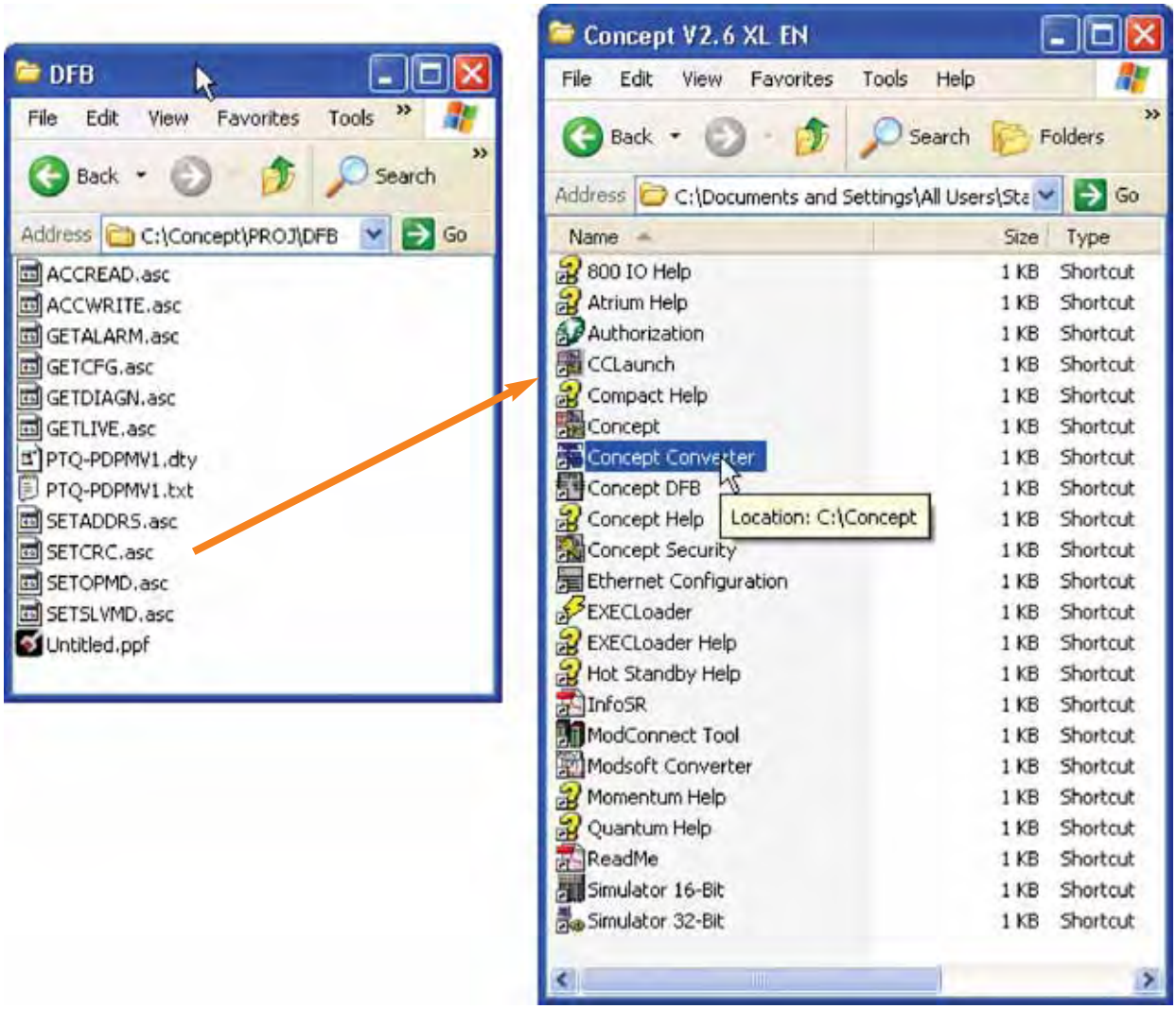
Pressing the Export Processor Files button will create a .DTY file that must be stored in the project folder.



3.3.8. Import Files to Concept DFB

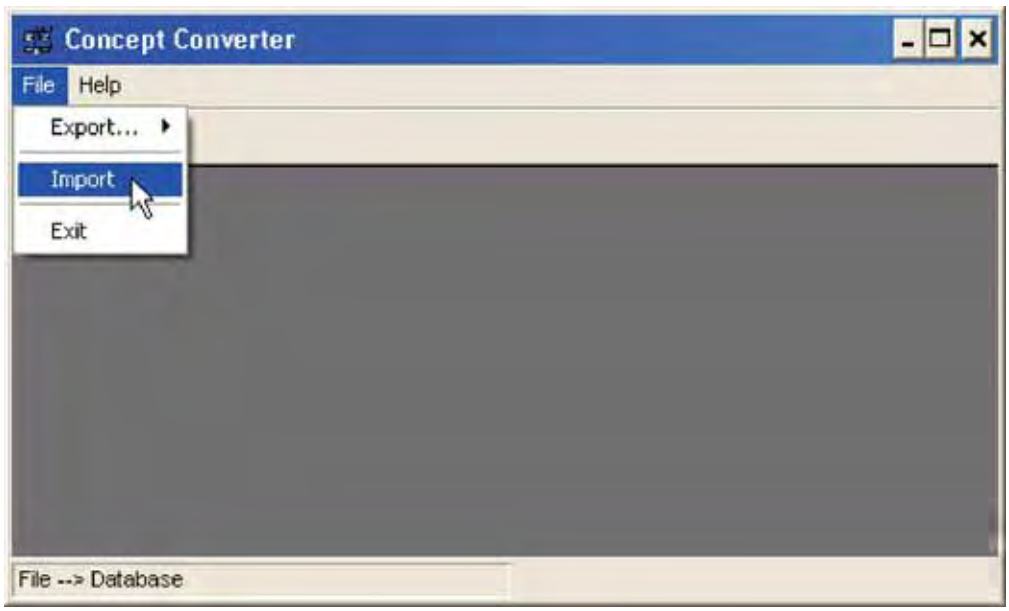
When the file [PTQ-PDPMV1.dty] was saved in the project folder, there are additional critical files with the extension [.asc] that are created. These [.asc] files are text files that must be imported into the CONCEPT programming software before the project can continue to be edited.

The Concept Converter must be used to import the [.asc] files into DFB subroutines.

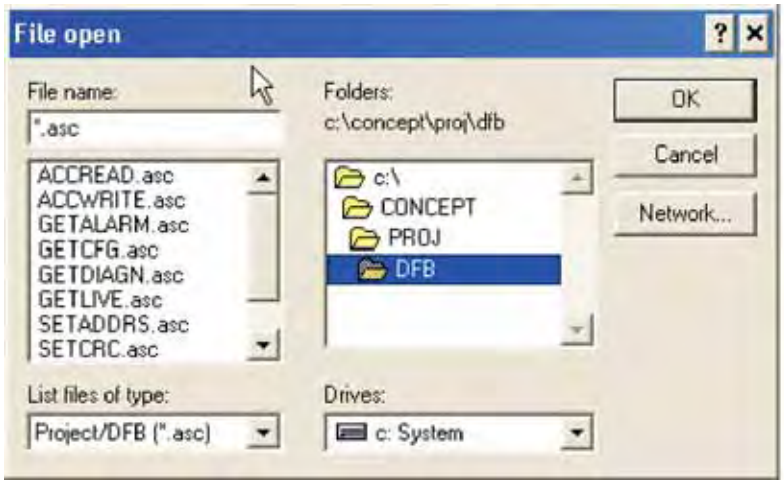


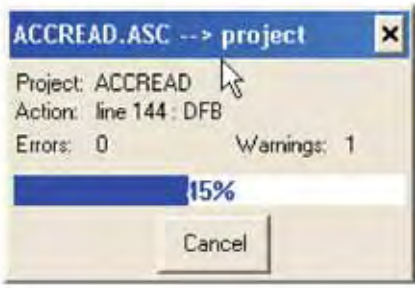
Modicon Quantum PLC
Smart MCC Network Communications

Running the concept converter, then selecting import function.

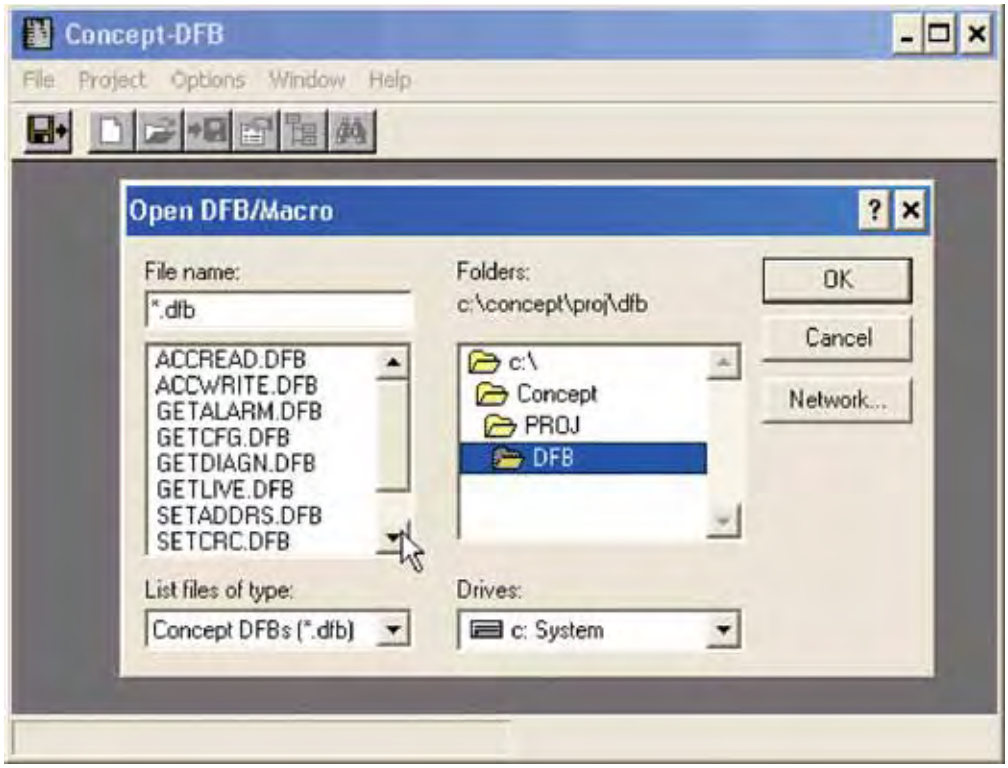


When "Import" is selected, then a list of available function to import will appear. Double-clicking on the [.asc] file will start the import process.





When finished importing all of the [.asc] files, there should then be a list of available DFB functions in the project folder, as shown below.



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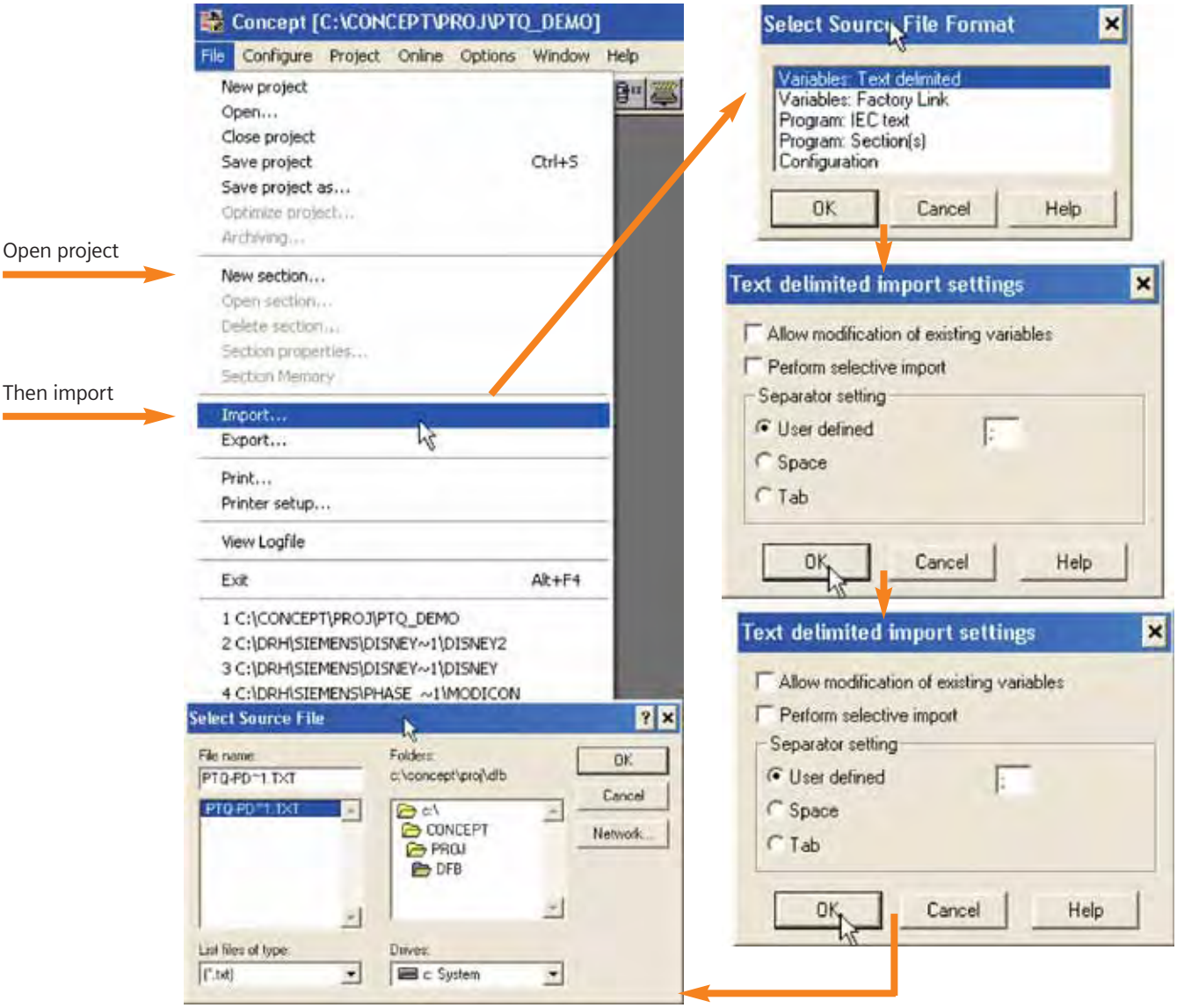
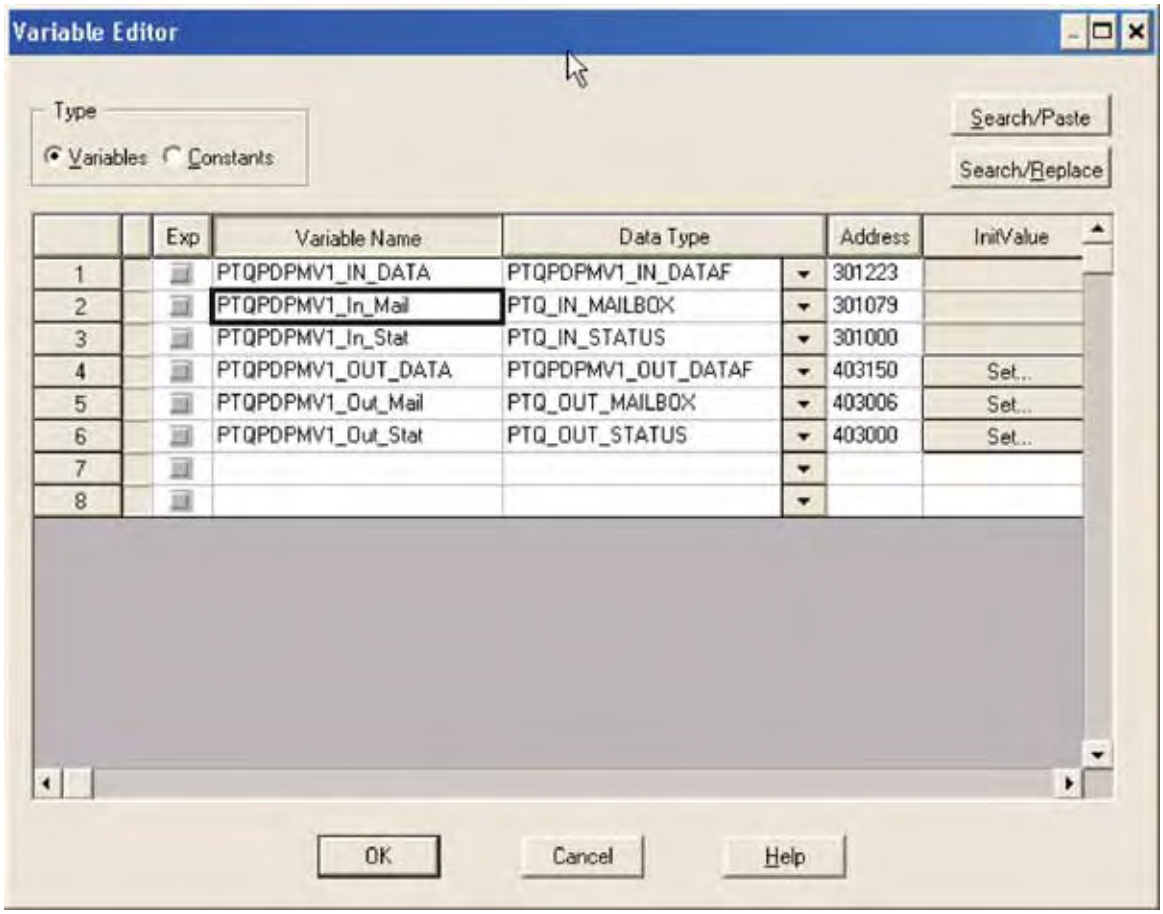
Final step is to import the variable list into the program that has been previously created.

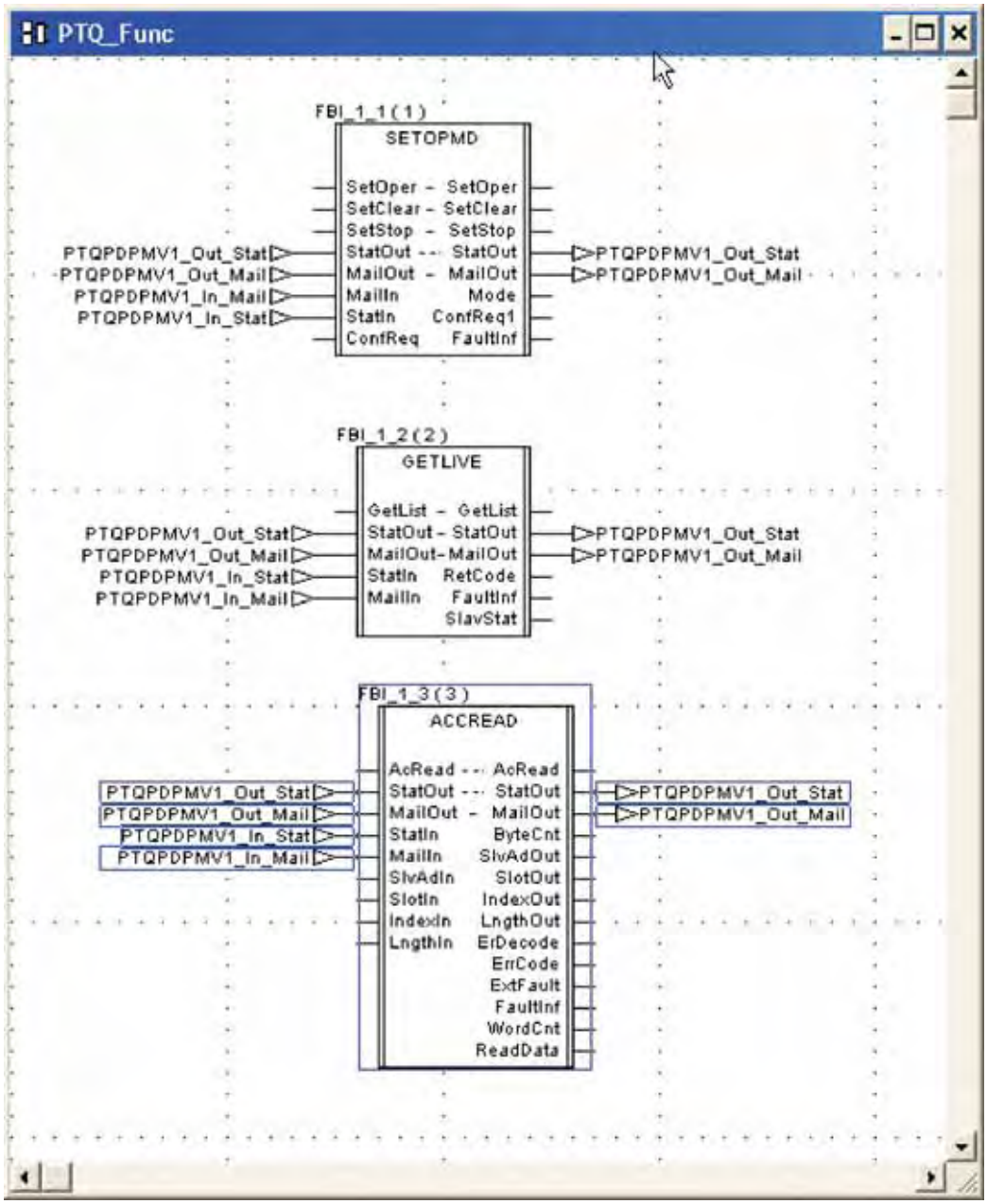


After importing the variable list ([.txt]) file, then the following variables will be created in the PLC program.



3.3.9. Add DFB Routines to Program

The final step of the integration, is to add the DFB routines to the PLC program that are required by the application.



You must have at least the SETOPMD DFB in the application program. In this example we have the operating mode, retrieve the live nodes on PROFIBUS, and read acyclic data from a slave DFB installed.

Modicon Quantum PLC
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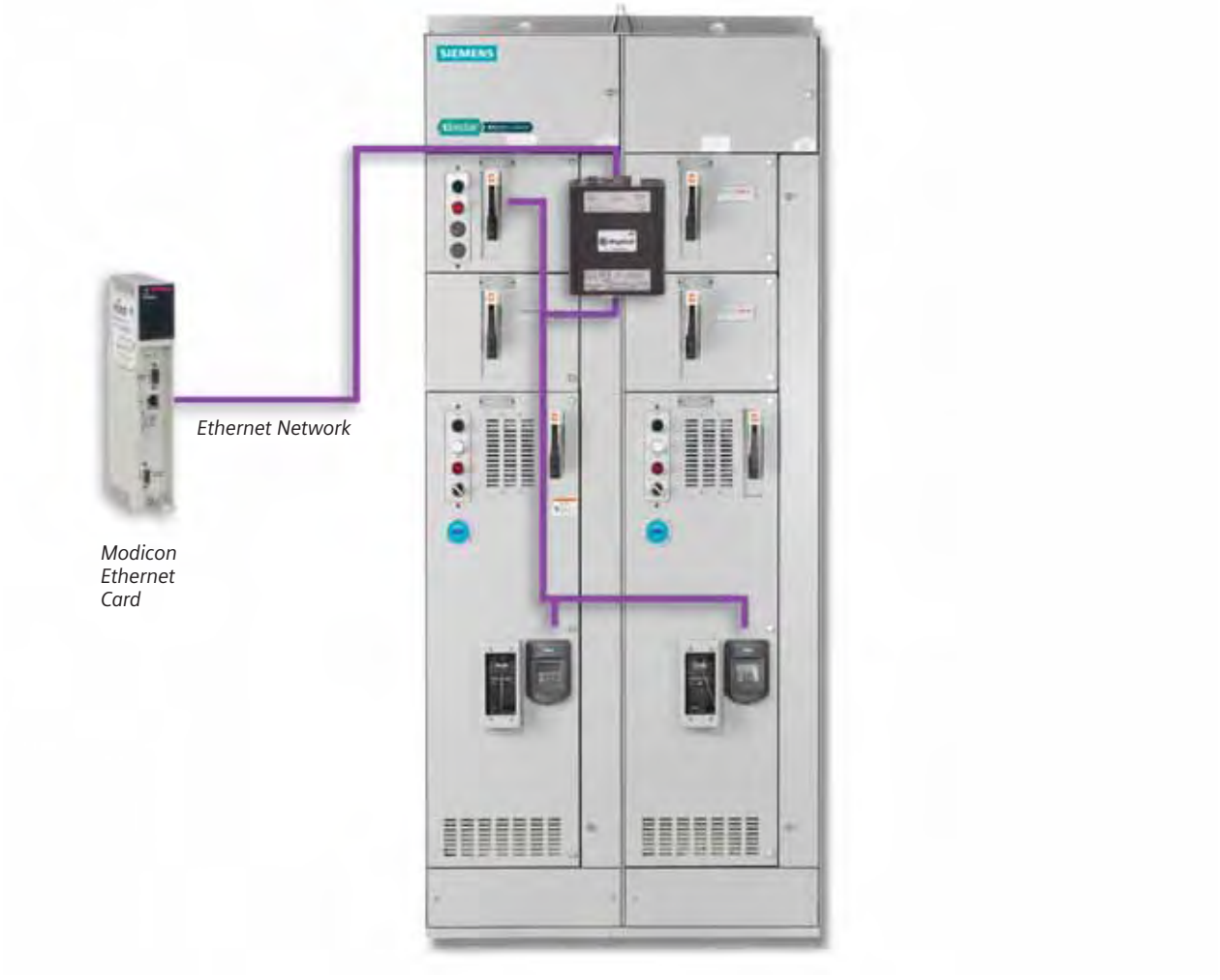
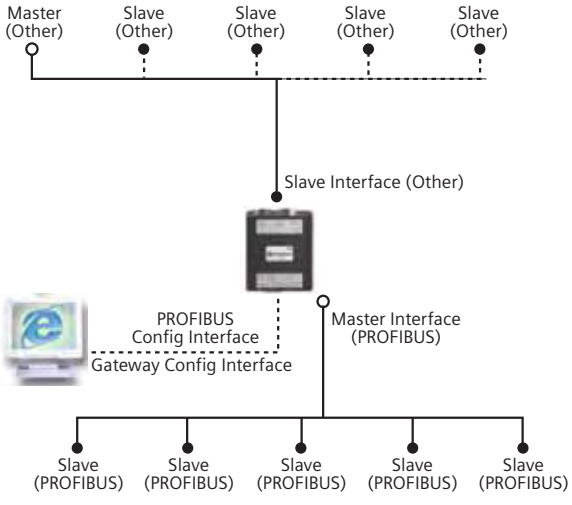
3.4 MODICON Ethernet (140NOE77111) to MODBUS TCP Gateway



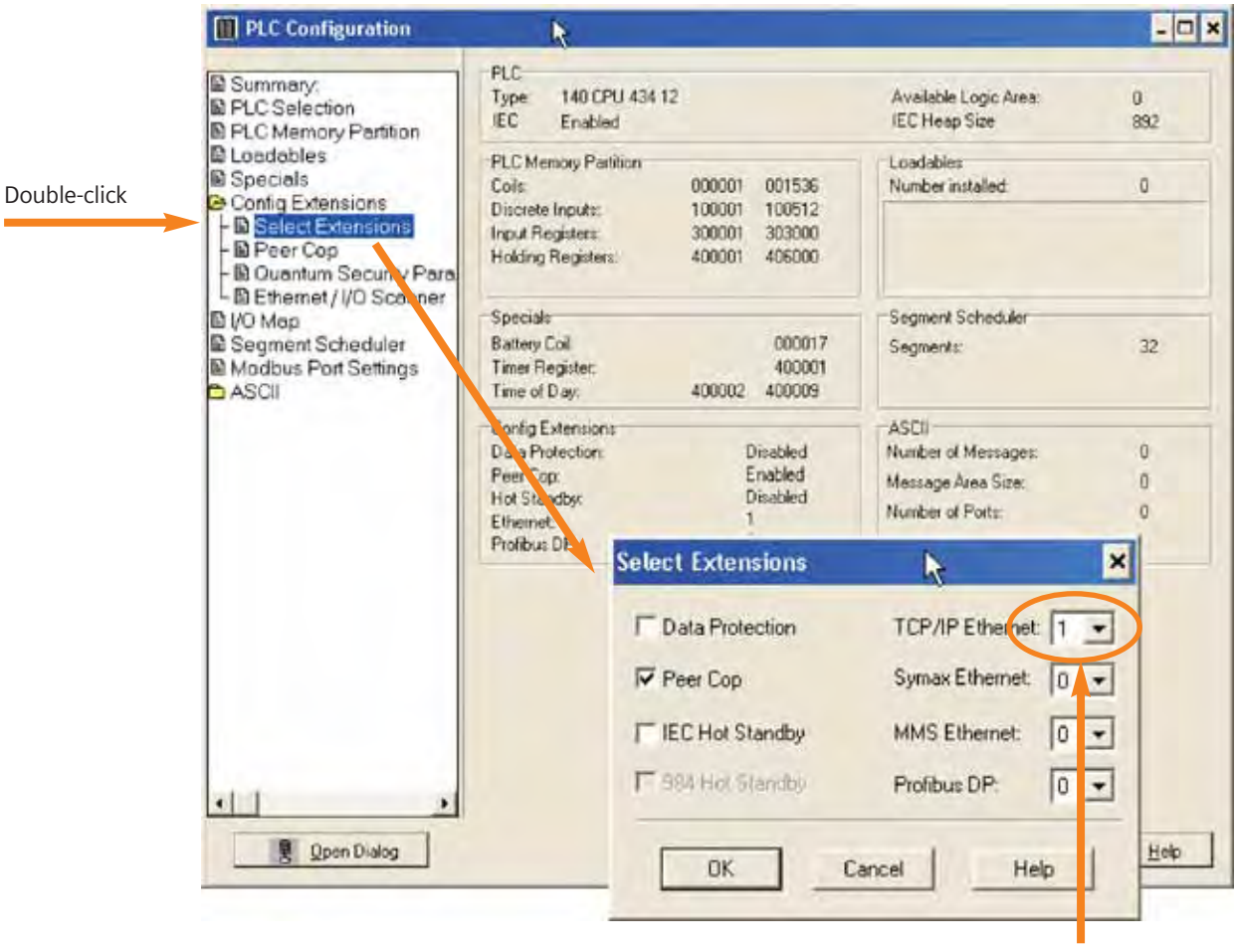


PROFIBUS Status LED's

LED	State	Indication
MS	Green	Operate mode
	Green, flashing	Clear mode
	Red	Stop mode
	Off	Offline
DB	Green	Database OK
	Green, flashing	Database download in progress
	Red	Database invalid
COM	Green	Data exchange with all configured slaves
	Green, flashing	Data exchange with at least one slave
	Red	Bus control error
TOK	Green	The Master Interface has the token

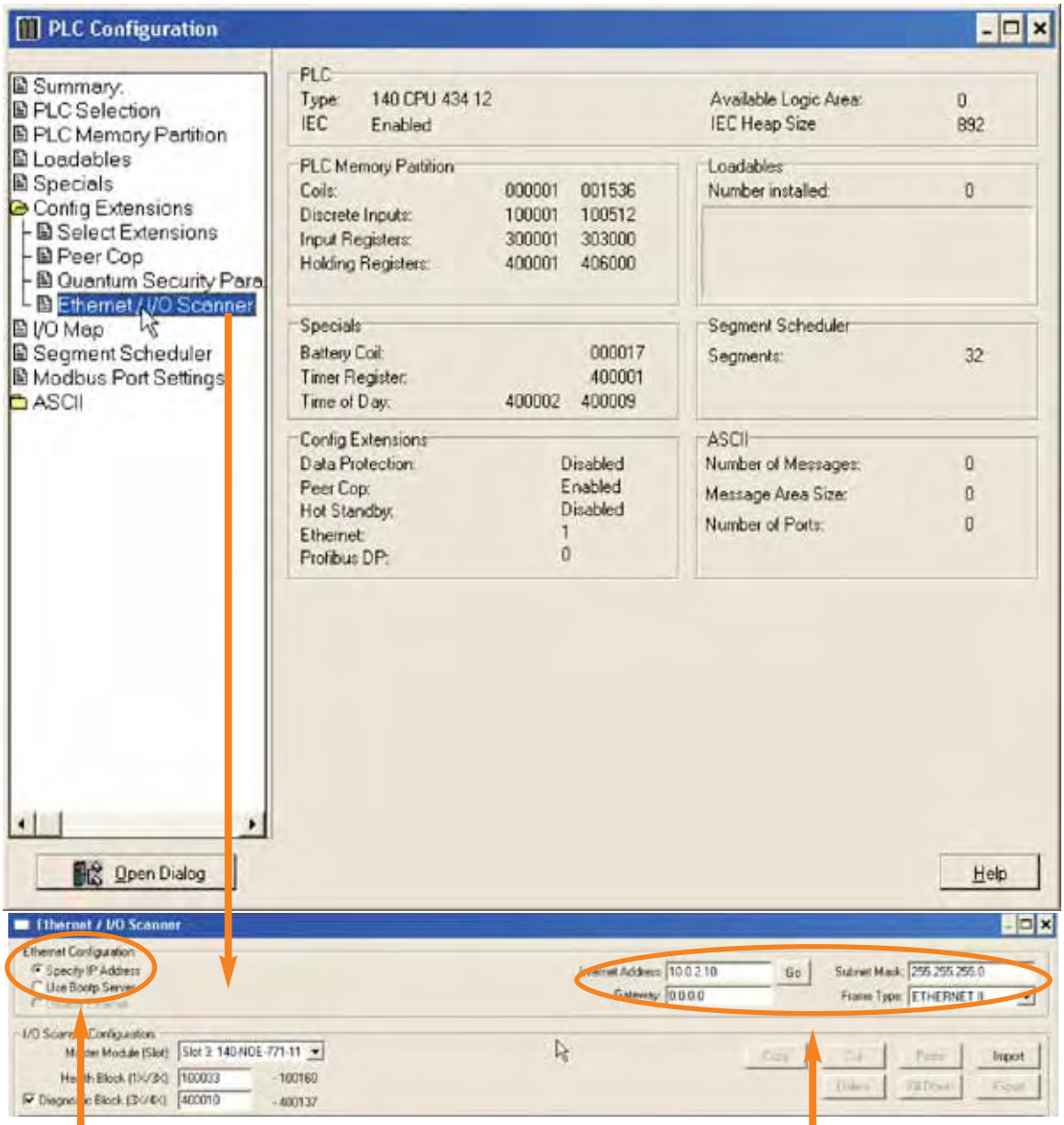
3.4.1. Add the Ethernet Module

The ethernet module needs to be added to the current PLC chassis by opening the dialog box PLC configuration.



Must set the TCP/IP Ethernet numeric selection to 1. This is the number of Ethernet cards (Optional NOE cards) that have been installed in the chassis. In this example, we have only installed one card, so we set this value to one.

3.4.2. Configure the Ethernet Module



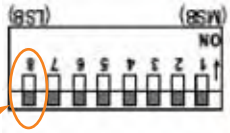
3.4.3. Configure the Ethernet Gateway IP Address

A summary of the process is given here, with a fuller explanation of each step detailed subsequently. For our example, the gateway will be configured to IP 10.0.2.11 to match the same octet sequence as the Ethernet card we are trying to talk to. (Reminder: Ethernet card has been set to 10.0.2.10 in prior steps).

1. Set the computer Ethernet port IP address to 192.168.0.100 (first three octets must match the gateway default IP address, or 192.168.0)
2. Turn off any proxy server in the internet browser configuration.
3. Turn on the IP address LSB switch to the ON position on the gateway, and cycle power to the gateway.
4. Open the internet browser, and enter address 192.168.0.1
5. When the HMS Anybus page opens, select the configuration page.
6. Enter the IP address of 10.0.2.11 for the gateway.
7. Turn off the IP address LSB switch on the gateway and cycle power.
8. Type the IP address 10.0.2.11 in the internet browser and make sure that the gateway web page opens.

On the Ethernet gateway, set the switch position for the default IP address:

Turn this switch to the ON position to allow browser to connect to the gateway



In the internet browser configuration, turn off any configuration that has a proxy server defined. The following example is for Microsoft Internet Explorer.

Make sure that your browser properties have this UNCHECKED

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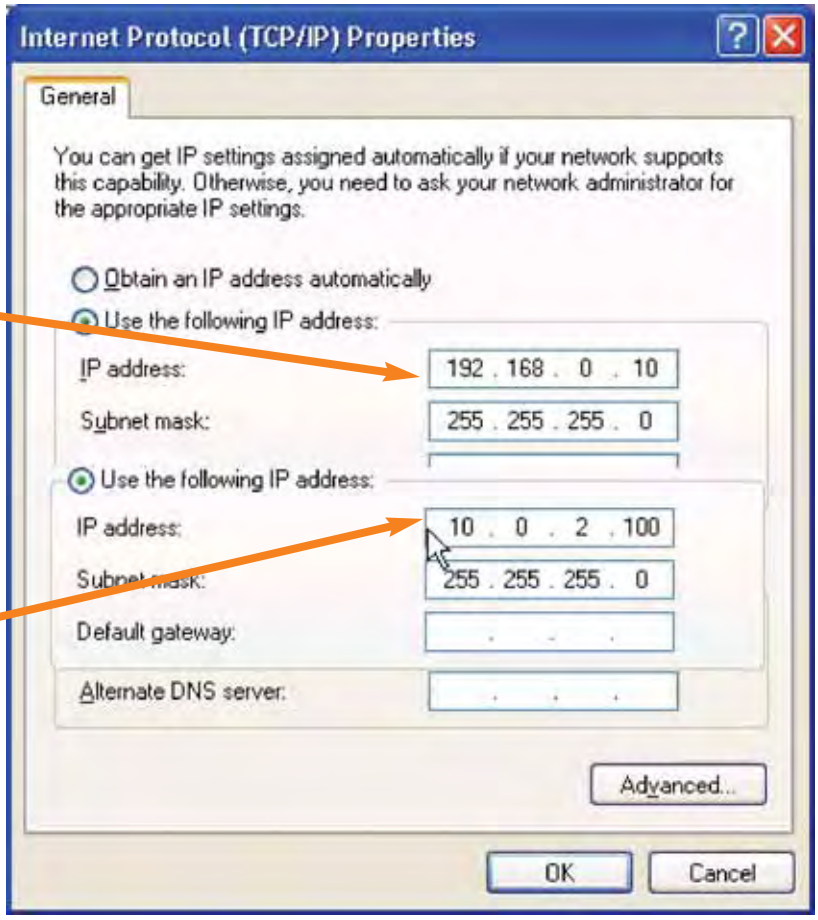
On the computer used for programming the Ethernet gateway, set the computer IP address to talk to the gateway.

Initial gateway configuration IP address

Set the IP address to match the first 3 octets of the gateway (10.0.2) in this example, when the gateway has already been configured



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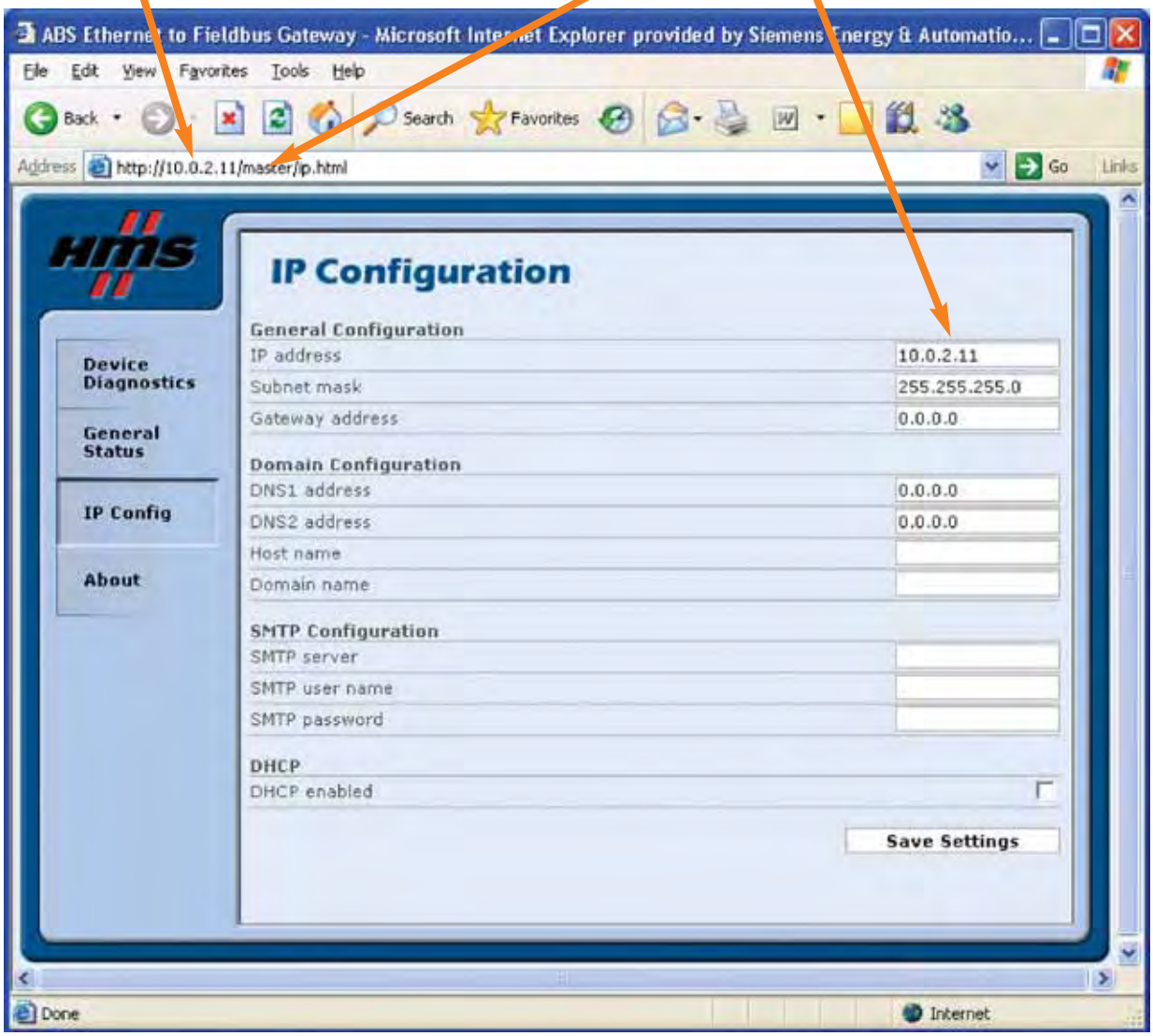
For initial configuration, type 192.168.0.1 (default gateway configuration) in the browser address window.

For all subsequent access to the gateway, type in the gateway IP address. In this example 10.0.2.11.

Type 192.168.0.1 as an address if:
1. The IP properties are set to 192.168.0.
2. The configuration switch LSB in ON.

Type the address configured in the gateway if:
1. The IP properties are set to match the gateway.
2. All configuration switches are OFF.

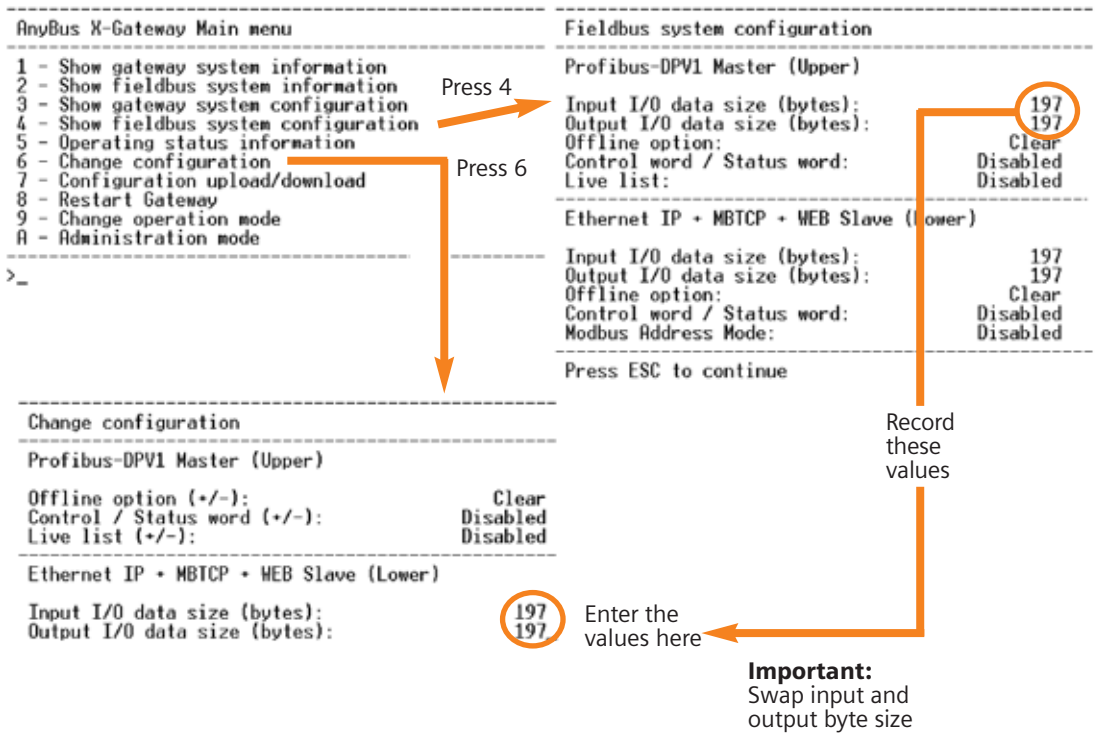


3.4.4. Configure the Ethernet Gateway Fieldbus

Using hyperterminal (for windows), and connect to the gateway configuration port with a null modem cable.

Press <ESC> to display the configuration menu interface for the gateway. Sometimes it may be necessary to cycle power to the gateway to allow hyperterminal to properly work with the gateway.

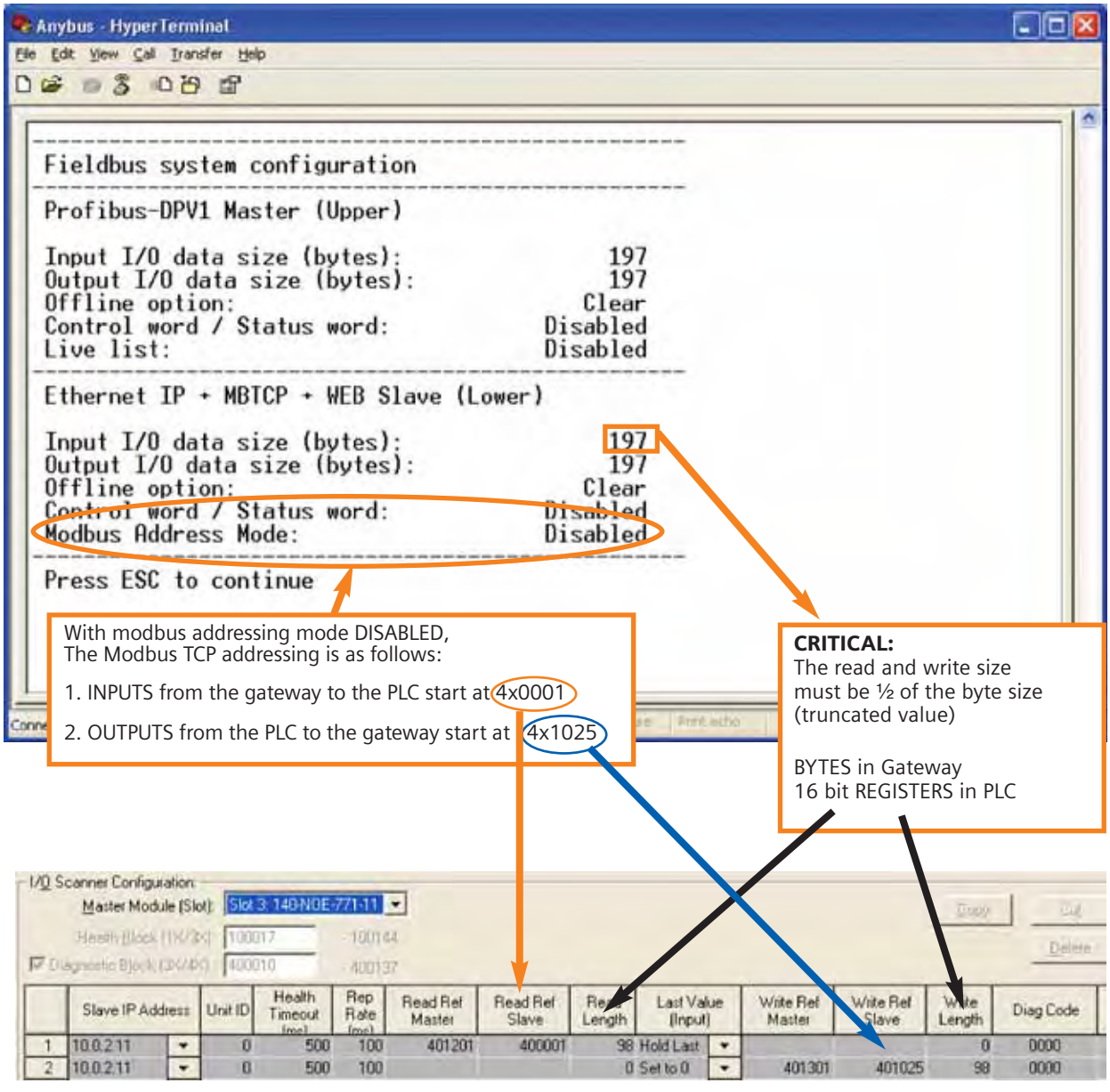
Press option 4 to get the PROFIBUS configuration size, then press 6 to set the I/O size to the same values for the Ethernet interface, as shown in the example below.



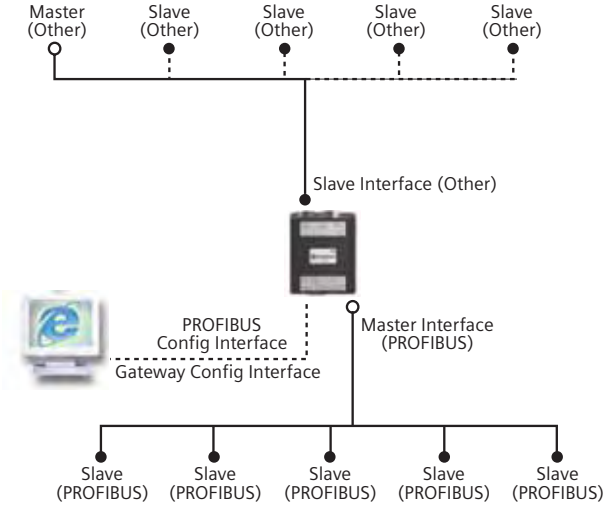
After pressing "6" for changing the configuration, and entering the I/O size as shown in the example above, it is important to keep the "**Modbus Address Mode**"as "**Disabled**"

3.4.5. Configure the Ethernet Module Commands

Configure the read and write Ethernet requests in the Ethernet I/O scanner (Modicon Concept Software). These requests will transfer data between the gateway and the PLC via Modbus TCP.



3.5. Modbus RTU Gateway



PROFIBUS Status LED's

LED	State	Indication
MS	Green	Operate mode
	Green, flashing	Clear mode
	Red	Stop mode
	Off	Offline
DB	Green	Database OK
	Green, flashing	Database download in progress
	Red	Database invalid
COM	Green	Data exchange with all configured slaves
	Green, flashing	Data exchange with at least one slave
	Red	Bus control error
TOK	Green	The Master Interface has the token

3.5.1. Modbus Addressing for Gateway

Outgoing Data Exchange (Gateway to Modbus)

Outgoing data is mapped to Modbus register 1 and forward. The same data is mapped to Input Registers, Holding Registers and Coil Registers.

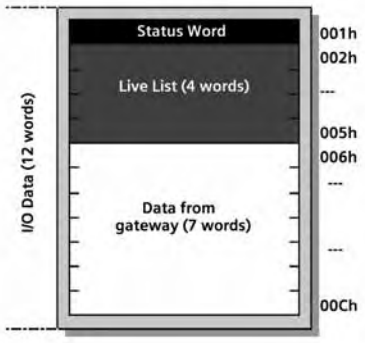
The table below specifies how the data is mapped in the Modbus address space.

Word Address [a]	Bit Address [b]	Contents
001h	0001h ... 0010h	Outgoing Data word 1
002h	00011h ... 0020h	Outgoing Data word 2
003h	0021h ... 0030h	Outgoing Data word 3
	...	...
200h	2000h ... 2010h	Outgoing Data word 256

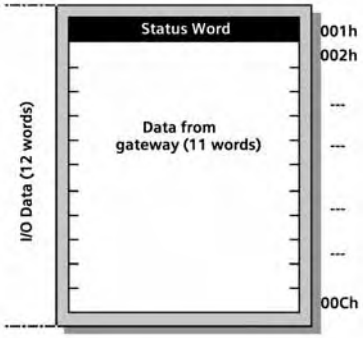
a. Used for input-and Holding-Register access.
b. Used for Coil Register access.

Depending on the type of gateway and how it has been set up to operate, up to 5 words (registers 1 to 5) may be occupied by the Status Word and the Live List, see below.

(For further information about the Status Word and the Live List, consult the main user manual).



Example A:
I/O Data Size = 12 words (24 bytes)
Live List = Enabled
Control and Status Word = Enabled



Example B:
I/O Data Size = 12 words (24 bytes)
Live List = Disabled
Control and Status Word = Enabled

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Incoming Data Exchange (Modbus to Gateway)

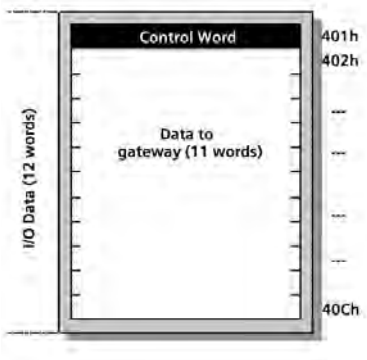
Increasing data is mapped to Modbus register 401h and forward. The same data is mapped to Input Registers, Holding Registers and Coil Registers.

The table below specifies how the data is mapped in the Modbus address space.

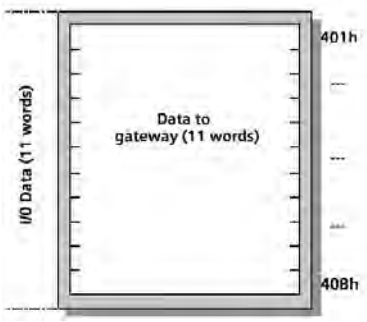
Word Address [a]	Bit Address [b]	Contents
401h	4001h ... 4010h	Incoming Data word 1
402h	4011h ... 4020h	Incoming Data word 2
403h	4021h ... 4030h	Incoming Data word 3
	...	...
600h	6000h ... 6010h	Outgoing Data word 256

a. Used for Input-and Holding-Register access.
b. Used for Coil Register access.

Depending on the type of gateway is set to operate, register address 401h may be occupied by the Control Word, see below. (For further information about the Control Word, consult the main user manual).

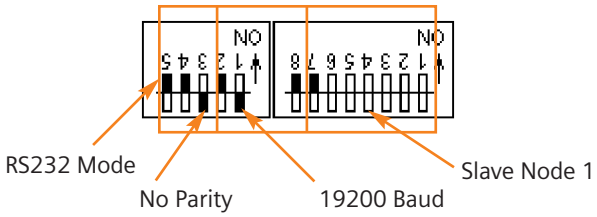


Example A:
I/O Data Size = 12 words (24 bytes)
Control Word = Enabled



Example B:
I/O Data Size = 11 words (22 bytes)
Control Word = Disabled

3.5.2. Modbus RTU Gateway Switch Configuration



3.5.3. Modbus Message Commands Via the XXMIT Block

Important note:
Slave address in HEX (401)

Master address in decimal (1501 using the DEC display in the reference data editor)

XXMIT_WRITE_MSGOUT

	Name	Type	Value
	XXMIT_WRITE_MSGOUT	WordArr128	
	XXMIT_WRITE_MSGOUT[1]	WORD	16#10
	XXMIT_WRITE_MSGOUT[2]	WORD	16#62
	XXMIT_WRITE_MSGOUT[3]	WORD	2
	XXMIT_WRITE_MSGOUT[4]	WORD	401
	XXMIT_WRITE_MSGOUT[5]	WORD	1501

RDE Template (MOD_RTU.RDF) - Animation ON

	Variable Name	Data Type	Address	Value	Set Value	Format
203	DB55[199]	TIME		960ms		Time
204	XXMIT_WRITE_MSGOUT[4]	WORD		401	0	Hex
205	XXMIT_WRITE_MSGOUT[5]	WORD		1501	0	Dec
206	XXMIT_READ_MSGOUT[4]	WORD		1		Hex
207	XXMIT_READ_MSGOUT[5]	WORD		1401	0	Dec

XXMIT_READ_MSGOUT

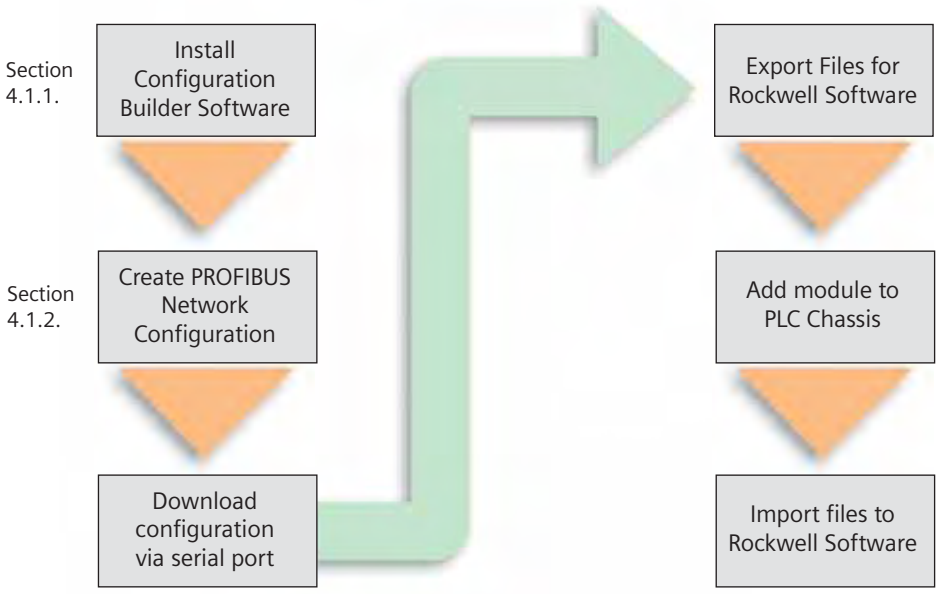
	Name	Type	Value
	XXMIT_READ_MSGOUT	WordArr128	
	XXMIT_READ_MSGOUT[1]	WORD	16#3
	XXMIT_READ_MSGOUT[2]	WORD	16#62
	XXMIT_READ_MSGOUT[3]	WORD	2
	XXMIT_READ_MSGOUT[4]	WORD	1
	XXMIT_READ_MSGOUT[5]	WORD	16#1401

Important note:
The slave address must be in HEX, but the master PLC address must be entered in DECIMAL. Please note how the values are shown in the variable initial values table, versus the display in the reference data editor. (RFD Template Window).

4. Rockwell Automation

4.1. ProSoft MV156-PDPMVI (ControlLogix)

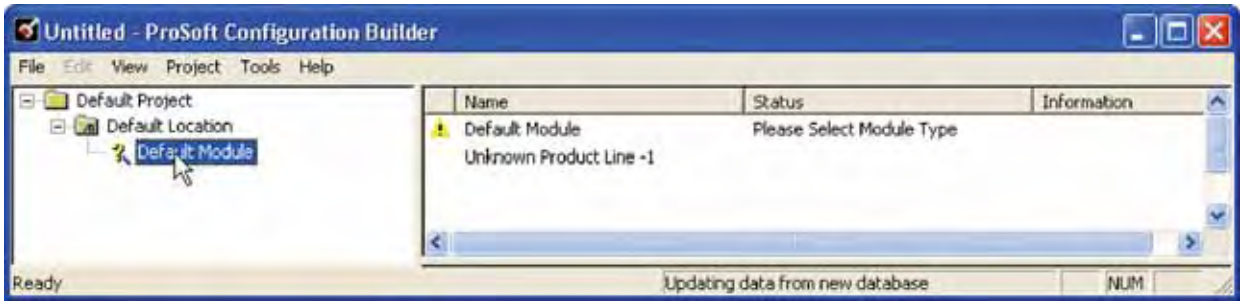
This is an overview of the process to integrate the MV156-PDPMV1 to the ControLogix PLC. Subsequent sections will have more details about some of these steps in the sequence, but other details may be elsewhere in this manual.



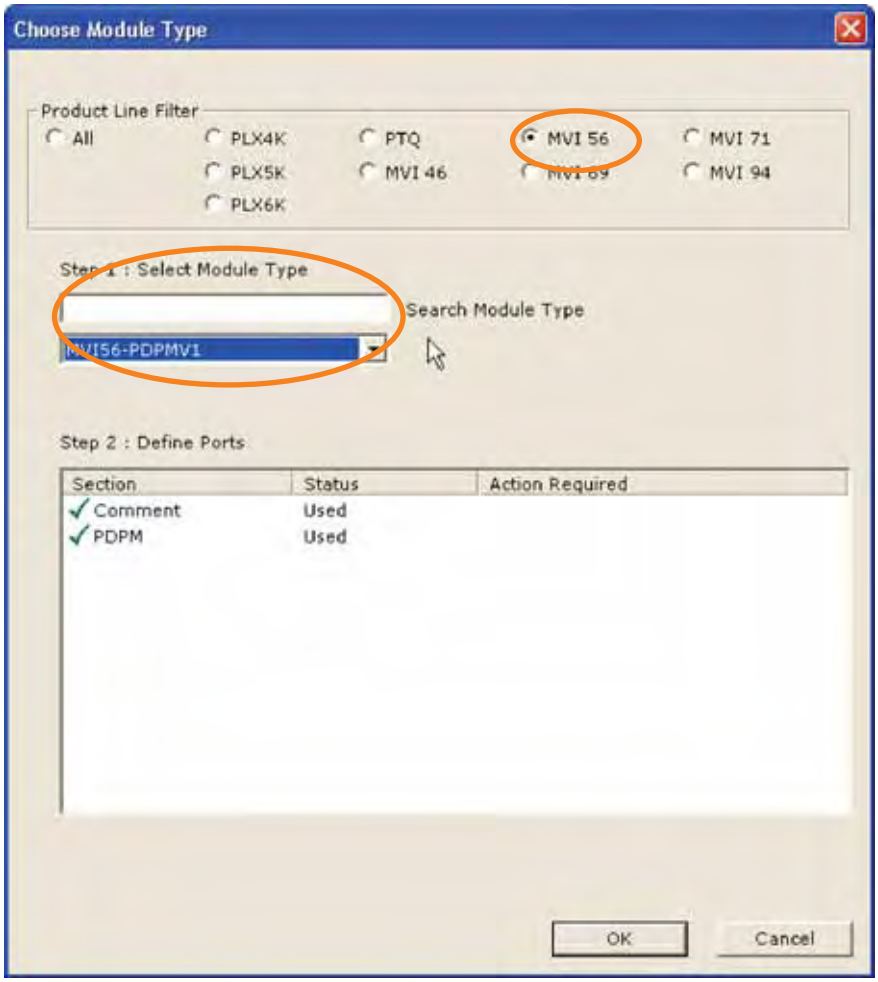
4.1.1. ProSoft PROFIBUS Configuration Software

Install the ProSoft Configuration Builder for the PTQ module. This software will come on a CD with the module, or may be downloaded from the web.

4.1.2. Create a New Configuration

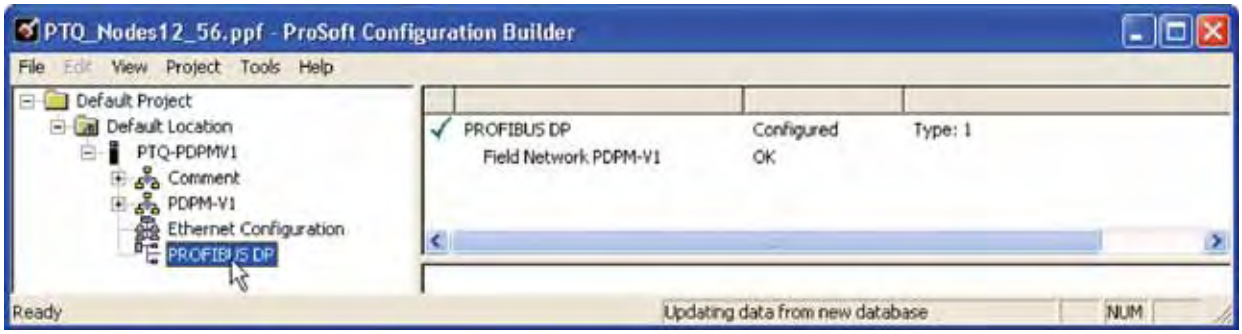


Double click on the "Default Module" to set the module type.

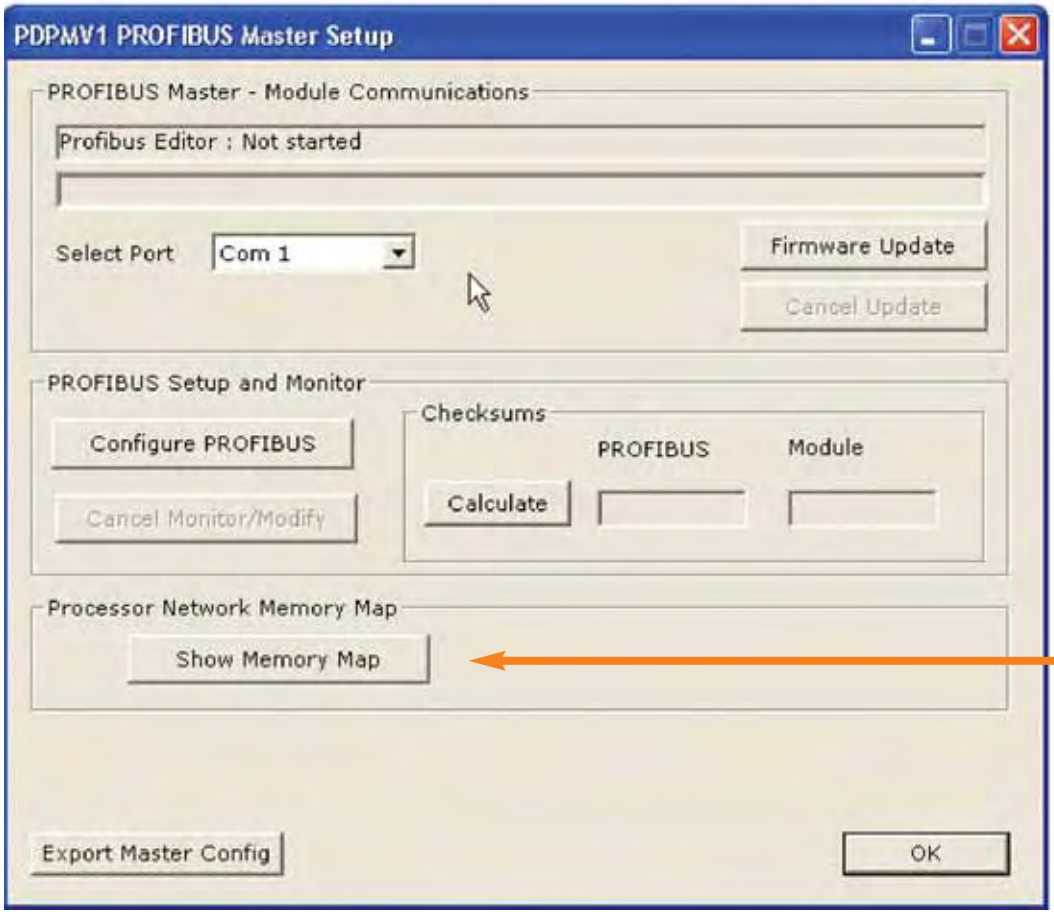


4.1.3. Configure the PROFIBUS Network

Double-click on the PROFIBUS DP entry to configure the PROFIBUS network.

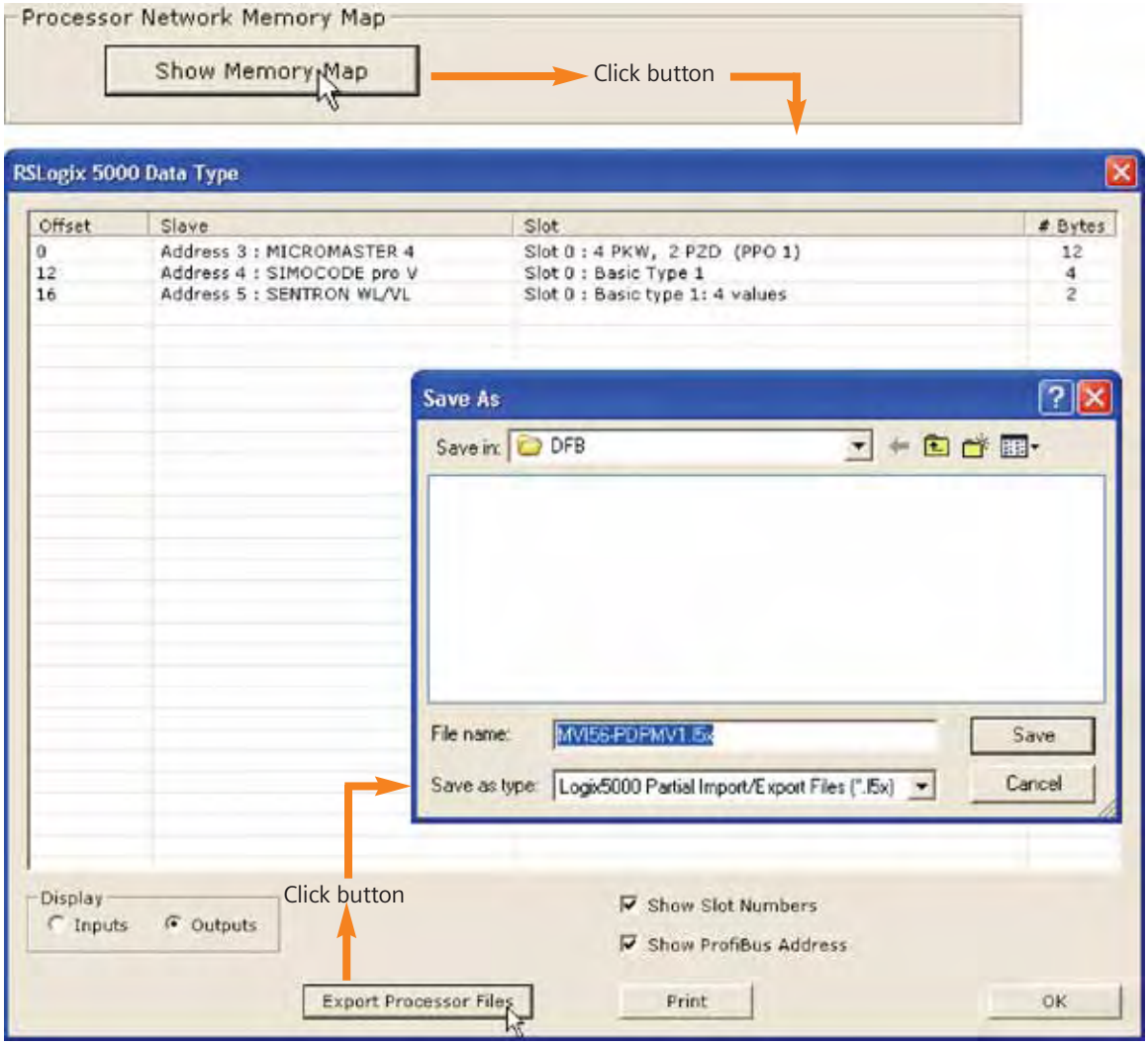


The following dialog box appears to select the communications method to the module.

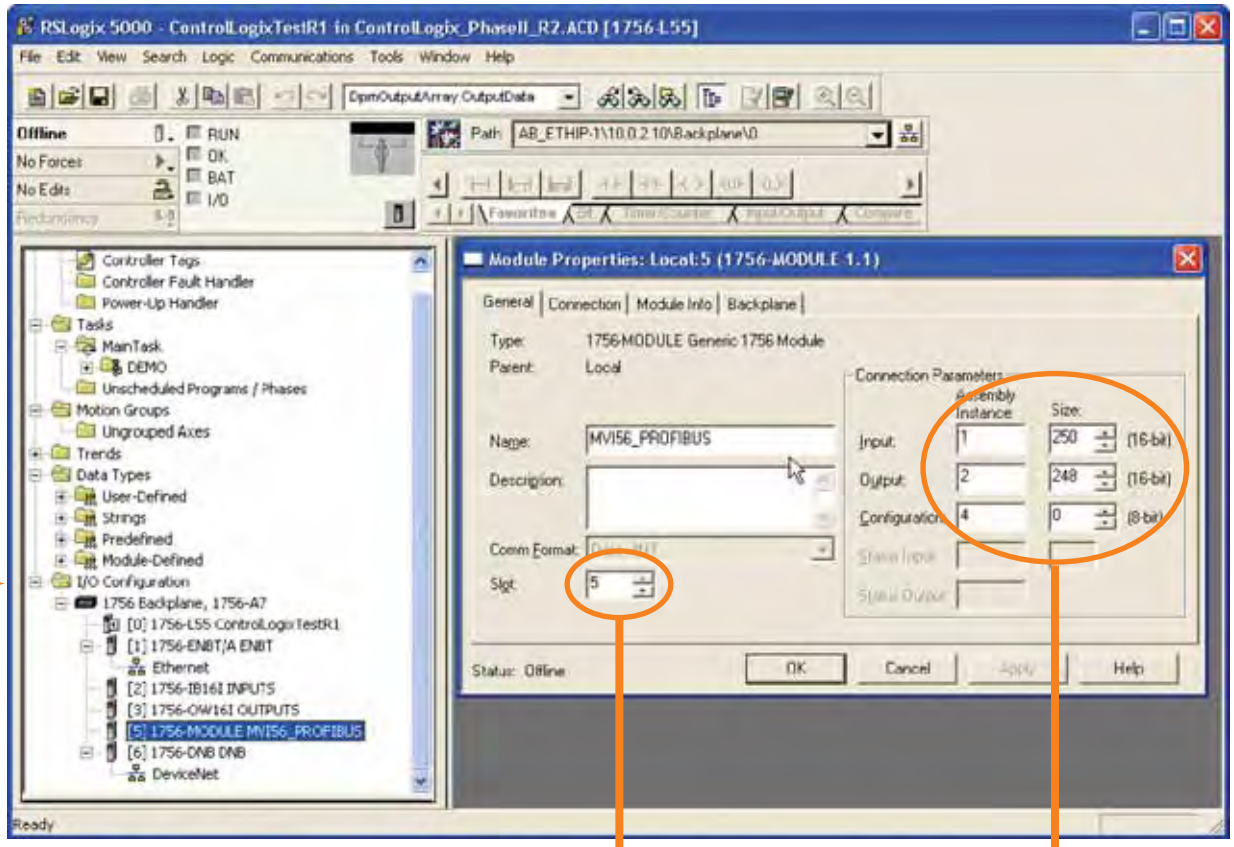


Click here to export files Section 4.1.4.

4.1.4. Export Files for ControlLogix



4.1.5. Add MV156-PDPMV1 to I/O Configuration



Add the "1756-Generic Module," and configure the input, output, and configuration Assembly Instance and Size per the example above.

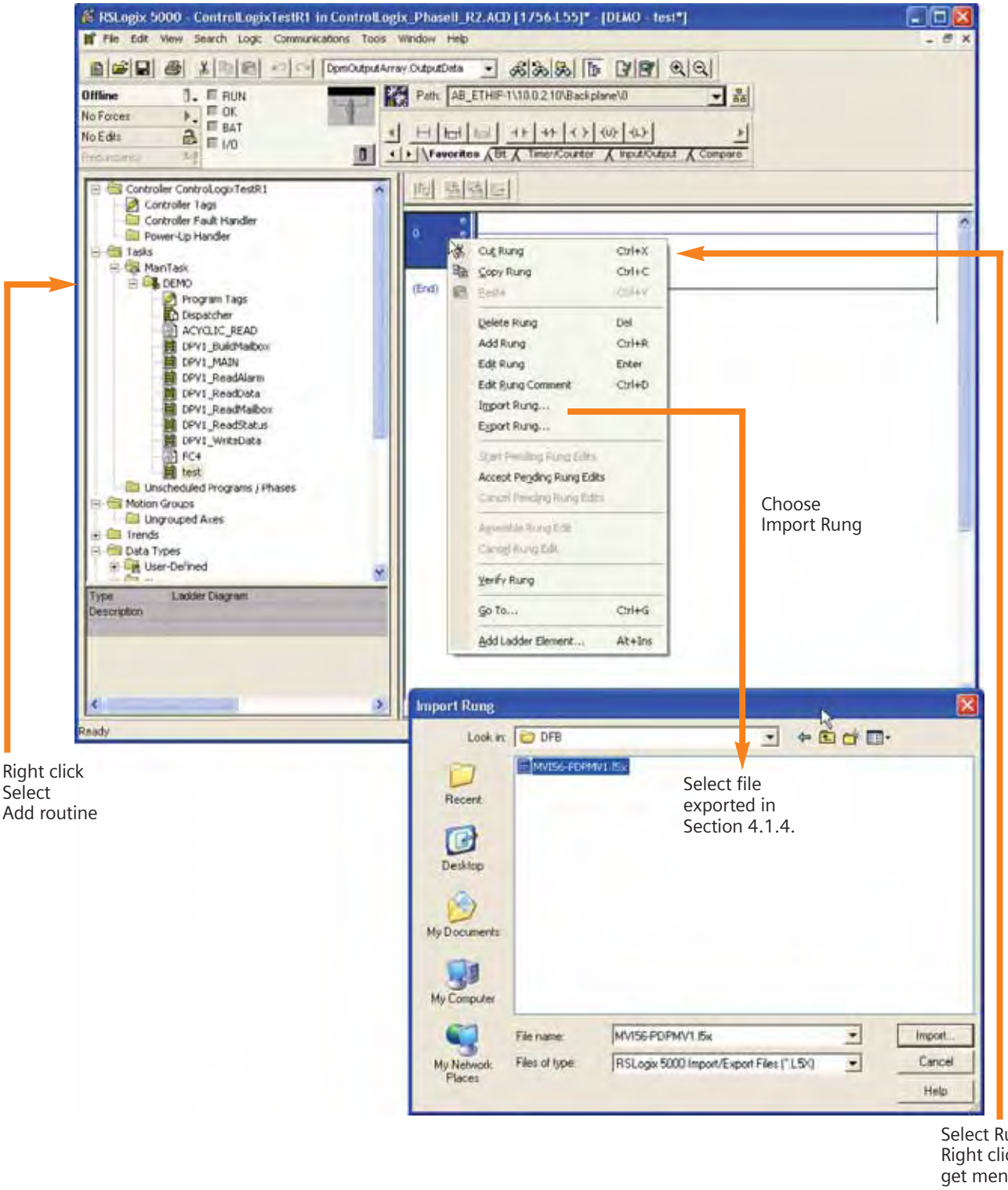
Right click
Select new module
Choose "1756-Module Generic"

Select slot module is inserted into

Configure as:

Assembly	Size
Input: 1	250 (16 bit)
Output: 2	248 (16 bit)
Configuration: 4	0 (16 bit)

4.1.6. Import PROFIBUS Configuration Files



4.2. Hilscher 1769-DPM (CompactLogix)

An overview of the process to follow for installation, configuration, and operation of the Hilscher PROFIBUS Scanner module is:

A. Install the PROFIBUS configuration software.

B. Download the template PLC program from the Hilscher web site.

C. Install the module in the PLC.

D. Create the module configuration in the PLC program.

There are two key manuals to get from Hilscher:

A. RIF1769DPM....PDF

This is the manual on the module itself. Section 4.1 contains the process to configure the module in the I/O configuration of the PLC program.

B. DTMMPD....PDF

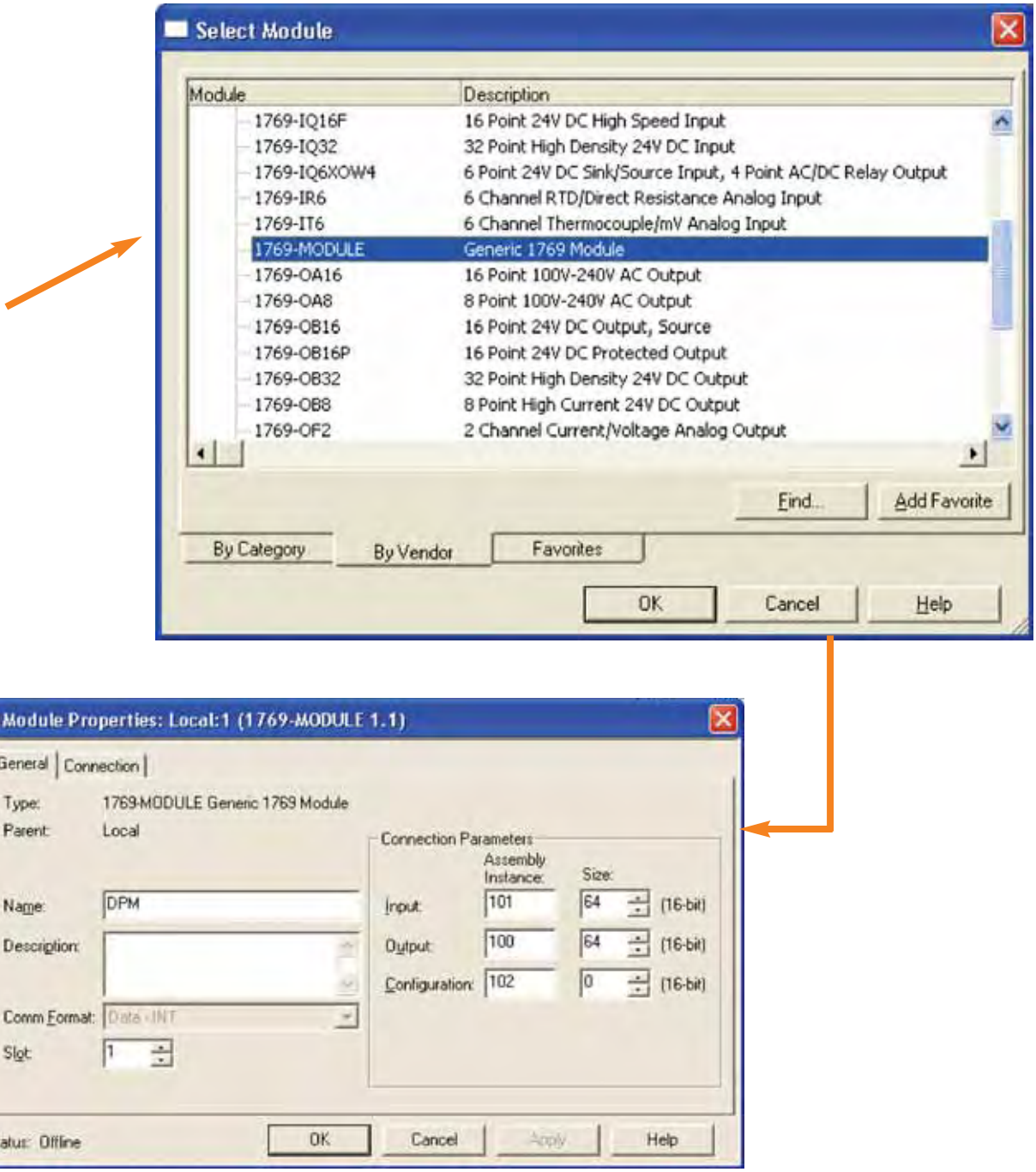
This manual is on the software used to configure the PROFIBUS network. This software is critical to the operation of the scanner module.

4.2.1. Default PLC Configuration for 1769-DPM Module

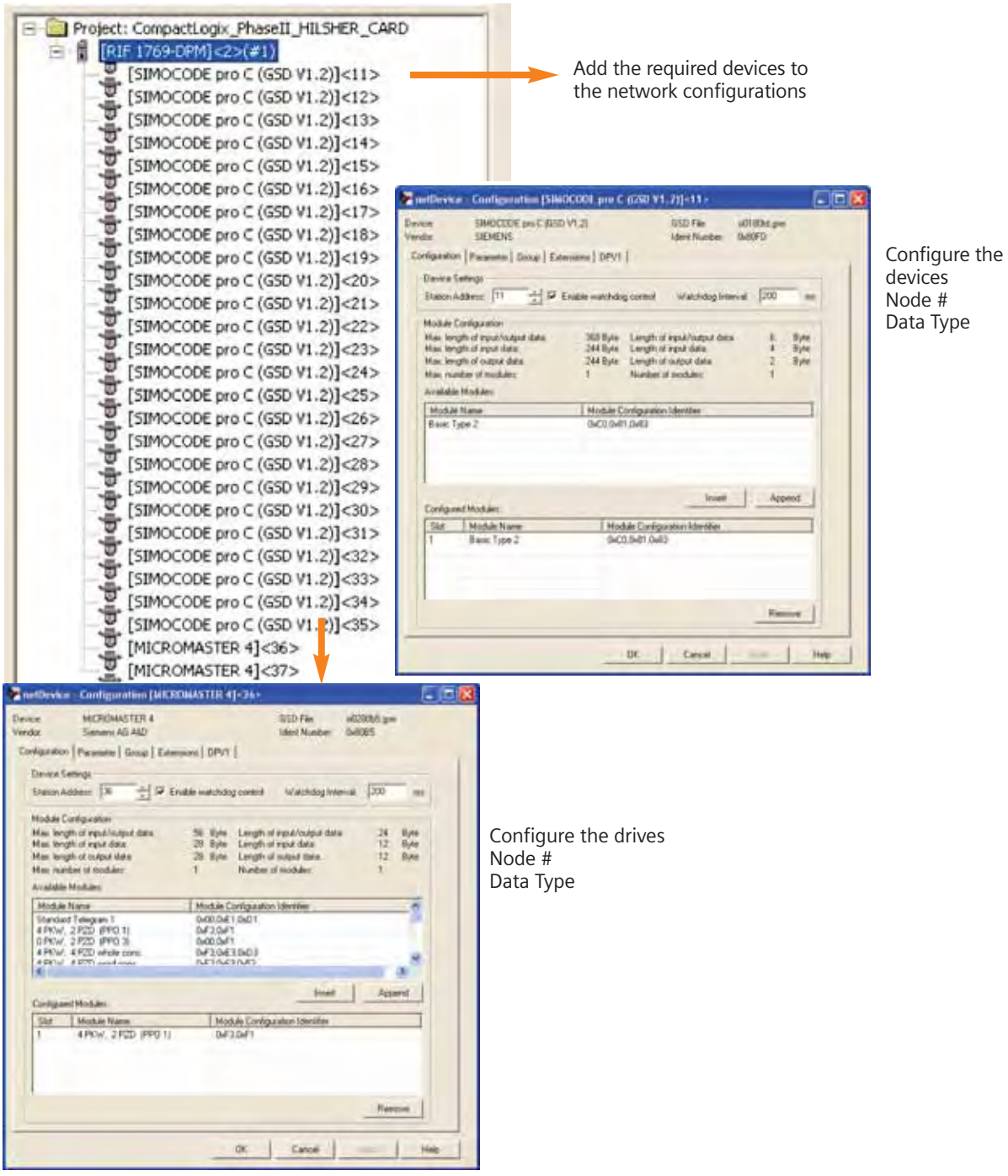
A complete description of the process to add the module to the PLC I/O configuration can be found in the Hilscher Manual RIF 1769-DPM.

A summary process is:

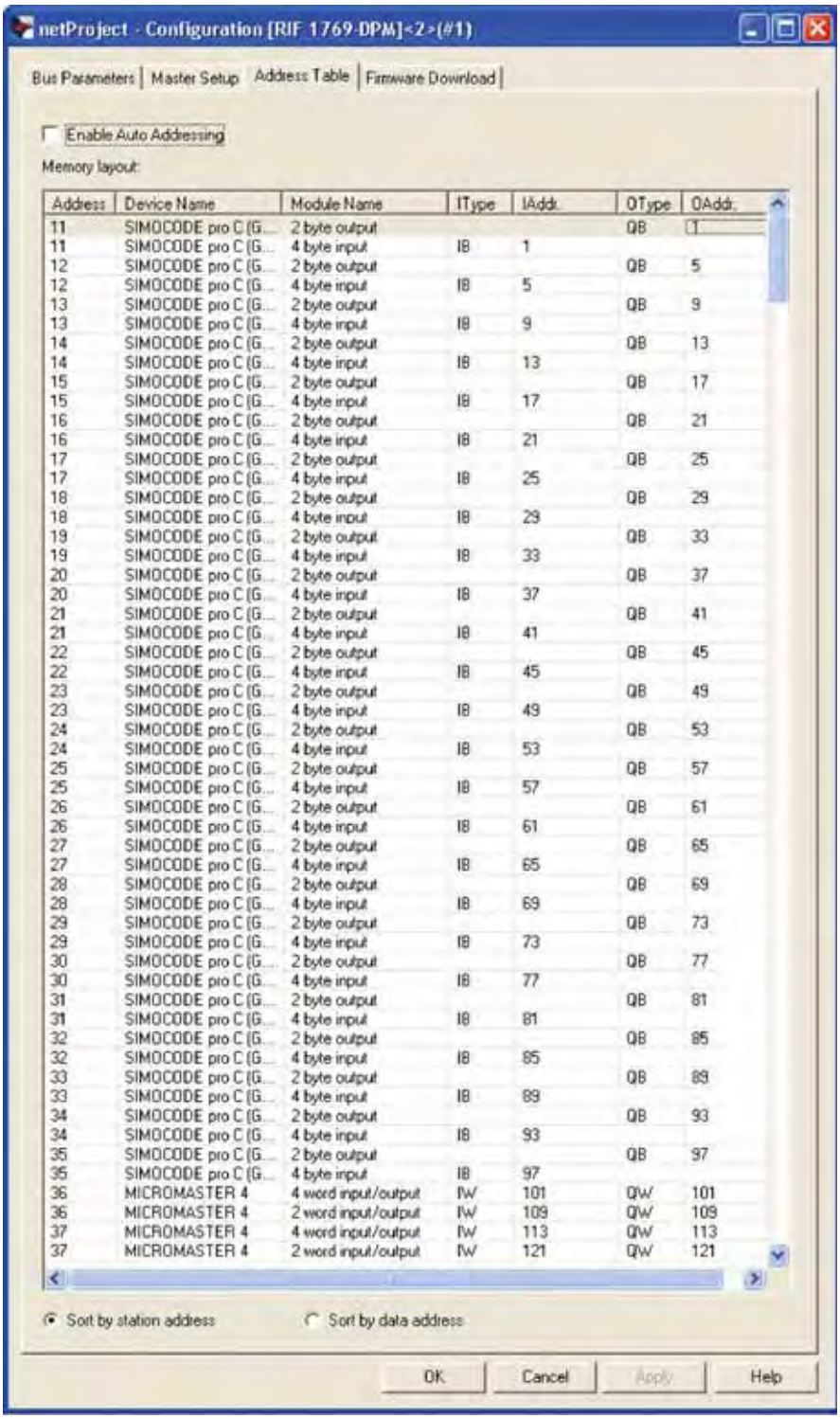
Add a generic module to the I/O configuration. Configure the Input, Output, and Configuration Instance and Size Values.



4.2.2. Example PROFIBUS Configuration for 1769-DPM Module

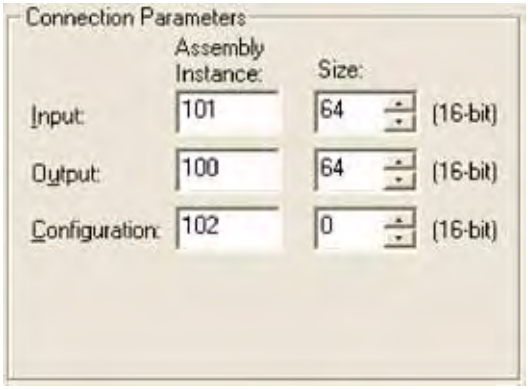


The input and output sizes need to be adjusted to match the PROFIBUS input and output address space defined in the module configuration software.



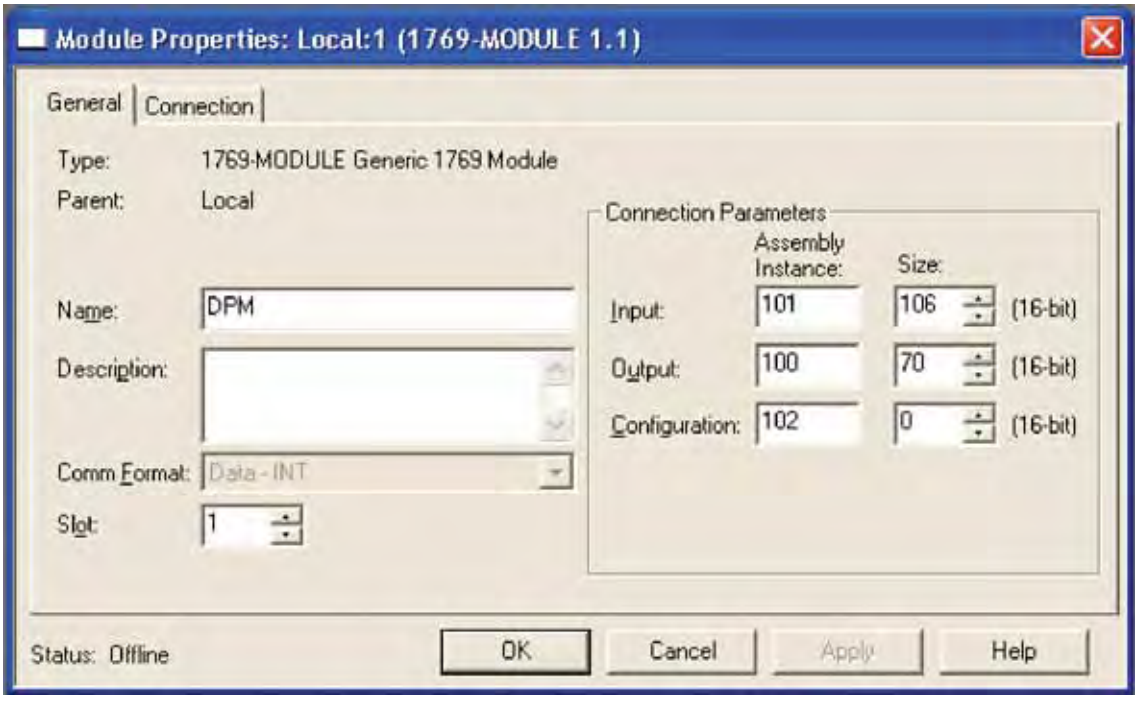
Address	Device Name	Module Name	IType	IAddr.	OType	OAddr.
11	SIMOCODE pro C (G...	2 byte output			QB	1
11	SIMOCODE pro C (G...	4 byte input	IB	1		
12	SIMOCODE pro C (G...	2 byte output			QB	5
12	SIMOCODE pro C (G...	4 byte input	IB	5		
13	SIMOCODE pro C (G...	2 byte output			QB	9
13	SIMOCODE pro C (G...	4 byte input	IB	9		
14	SIMOCODE pro C (G...	2 byte output			QB	13
14	SIMOCODE pro C (G...	4 byte input	IB	13		
15	SIMOCODE pro C (G...	2 byte output			QB	17
15	SIMOCODE pro C (G...	4 byte input	IB	17		
16	SIMOCODE pro C (G...	2 byte output			QB	21
16	SIMOCODE pro C (G...	4 byte input	IB	21		
17	SIMOCODE pro C (G...	2 byte output			QB	25
17	SIMOCODE pro C (G...	4 byte input	IB	25		
18	SIMOCODE pro C (G...	2 byte output			QB	29
18	SIMOCODE pro C (G...	4 byte input	IB	29		
19	SIMOCODE pro C (G...	2 byte output			QB	33
19	SIMOCODE pro C (G...	4 byte input	IB	33		
20	SIMOCODE pro C (G...	2 byte output			QB	37
20	SIMOCODE pro C (G...	4 byte input	IB	37		
21	SIMOCODE pro C (G...	2 byte output			QB	41
21	SIMOCODE pro C (G...	4 byte input	IB	41		
22	SIMOCODE pro C (G...	2 byte output			QB	45
22	SIMOCODE pro C (G...	4 byte input	IB	45		
23	SIMOCODE pro C (G...	2 byte output			QB	49
23	SIMOCODE pro C (G...	4 byte input	IB	49		
24	SIMOCODE pro C (G...	2 byte output			QB	53
24	SIMOCODE pro C (G...	4 byte input	IB	53		
25	SIMOCODE pro C (G...	2 byte output			QB	57
25	SIMOCODE pro C (G...	4 byte input	IB	57		
26	SIMOCODE pro C (G...	2 byte output			QB	61
26	SIMOCODE pro C (G...	4 byte input	IB	61		
27	SIMOCODE pro C (G...	2 byte output			QB	65
27	SIMOCODE pro C (G...	4 byte input	IB	65		
28	SIMOCODE pro C (G...	2 byte output			QB	69
28	SIMOCODE pro C (G...	4 byte input	IB	69		
29	SIMOCODE pro C (G...	2 byte output			QB	73
29	SIMOCODE pro C (G...	4 byte input	IB	73		
30	SIMOCODE pro C (G...	2 byte output			QB	77
30	SIMOCODE pro C (G...	4 byte input	IB	77		
31	SIMOCODE pro C (G...	2 byte output			QB	81
31	SIMOCODE pro C (G...	4 byte input	IB	81		
32	SIMOCODE pro C (G...	2 byte output			QB	85
32	SIMOCODE pro C (G...	4 byte input	IB	85		
33	SIMOCODE pro C (G...	2 byte output			QB	89
33	SIMOCODE pro C (G...	4 byte input	IB	89		
34	SIMOCODE pro C (G...	2 byte output			QB	93
34	SIMOCODE pro C (G...	4 byte input	IB	93		
35	SIMOCODE pro C (G...	2 byte output			QB	97
35	SIMOCODE pro C (G...	4 byte input	IB	97		
36	MICROMASTER 4	4 word input/output	IW	101	QW	101
36	MICROMASTER 4	2 word input/output	IW	109	QW	109
37	MICROMASTER 4	4 word input/output	IW	113	QW	113
37	MICROMASTER 4	2 word input/output	IW	121	QW	121

The default configuration is 44 words plus 20 words of slave device input information (details in Hilsher manual). This leads to the 64 word (16 bit int) configuration definition in the I/O module configuration.

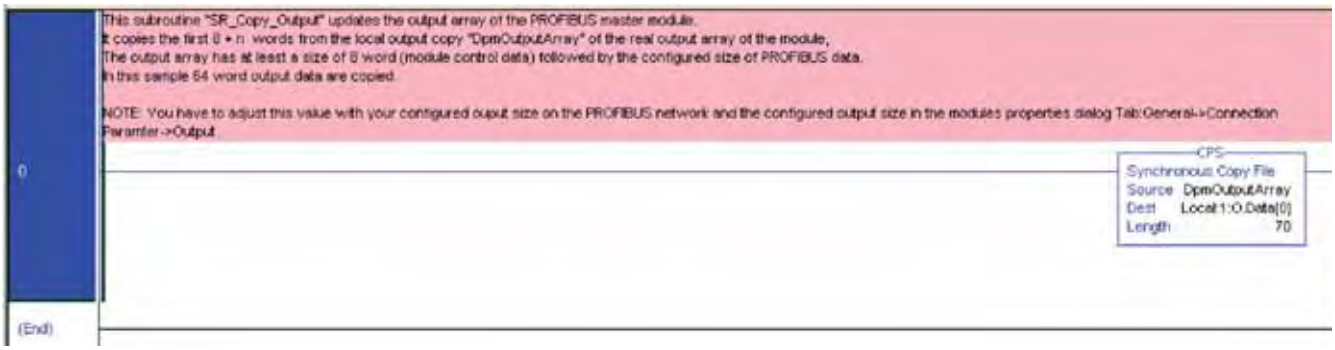


But, our test network has 124 input bytes, and 124 output bytes, or 62 input words and 62 output words.

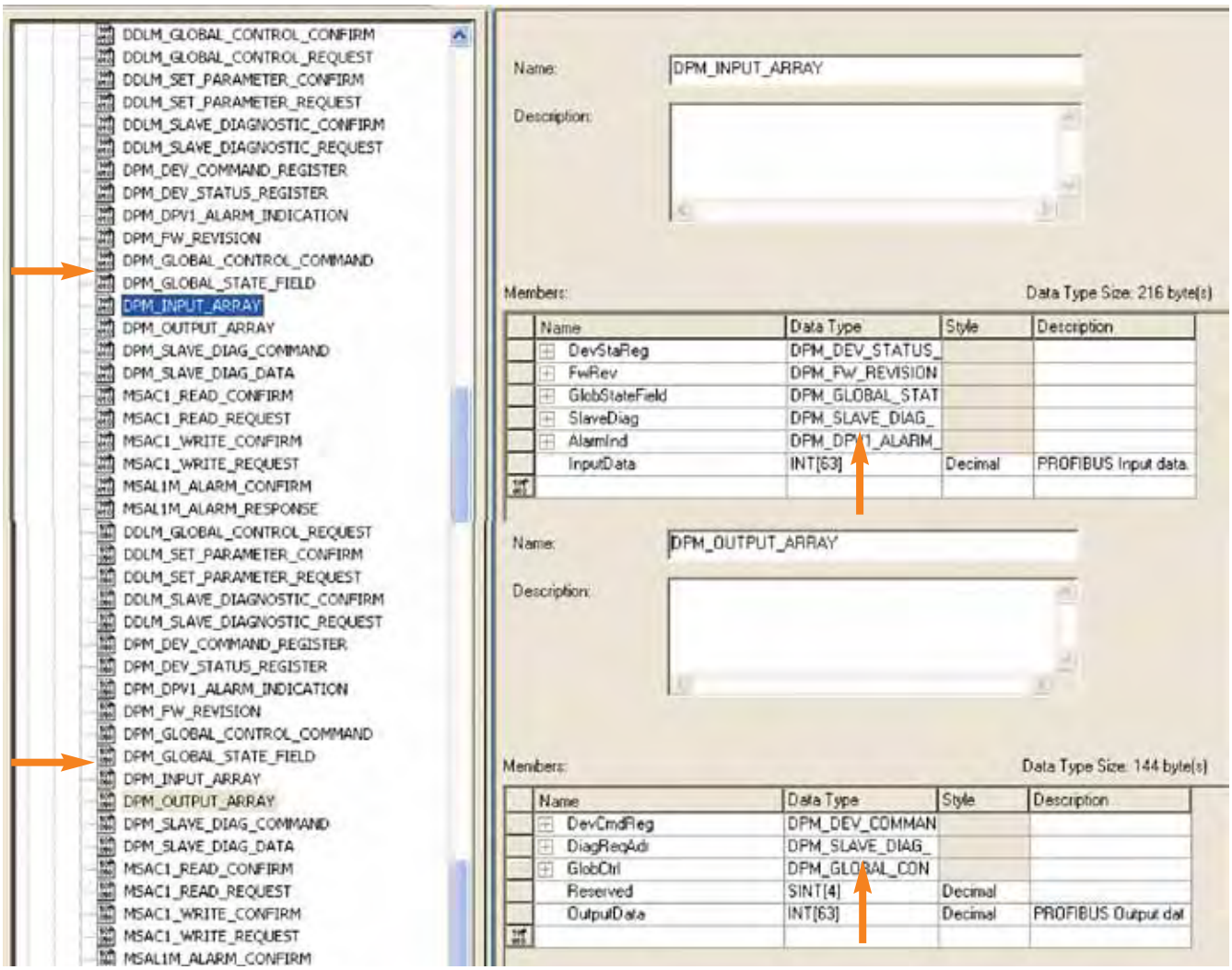
We need to reset the module configuration to:
44 words + 62 words = 106 words of input slave data
And
8 words + 62 words = 70 words of output slave data.



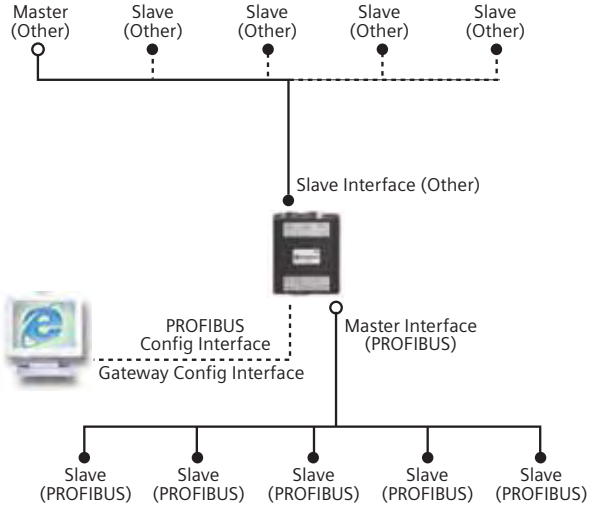
For the output data, you also need to change the output copy rung in file SR_Copy_Output:



You also need to readjust the input and output data space in the data type in the PLC.



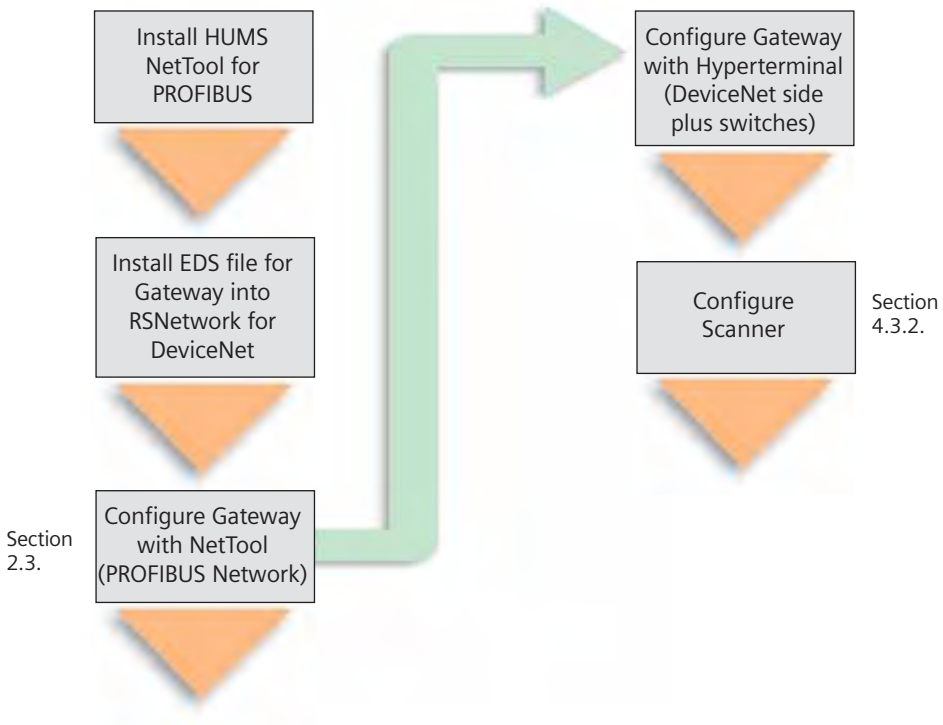
4.3. Devicenet Gateway



PROFIBUS Status LED's

LED	State	Indication
MS	Green	Operate mode
	Green, flashing	Clear mode
	Red	Stop mode
	Off	Offline
DB	Green	Database OK
	Green, flashing	Database download in progress
	Red	Database invalid
COM	Green	Data exchange with all configured slaves
	Green, flashing	Data exchange with at least one slave
	Red	Bus control error
TOK	Green	The Master Interface has the token

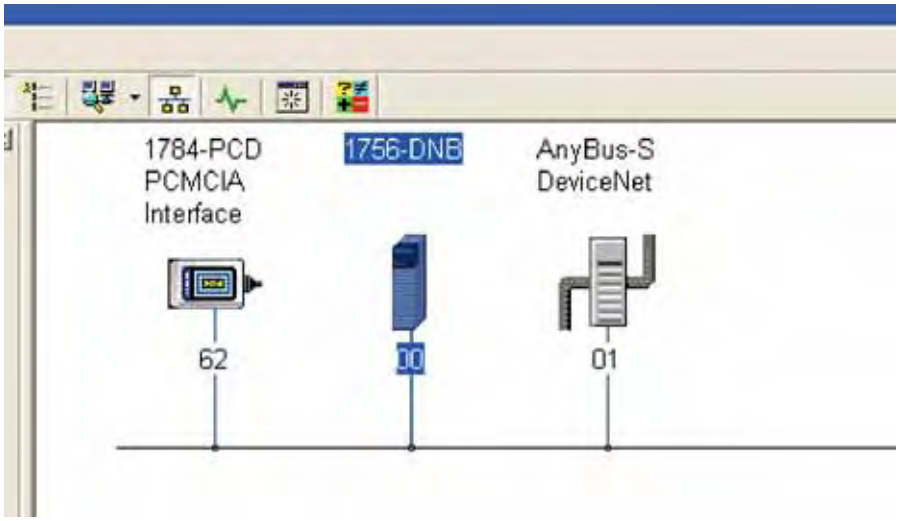
4.3.1. Gateway Configuration Process Overview



4.3.2. Configure Devicenet Scanner

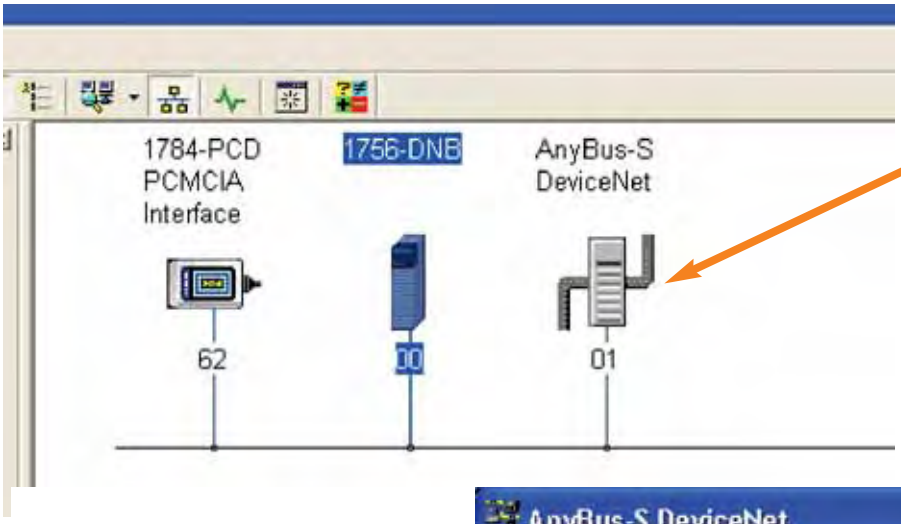
Prerequisites for this step:

1. Install the EDS file for the gateway in RSNetwork for Devicenet.
2. Configure the PROFIBUS network, and download to the gateway.
3. Configure the Devicenet side of the gateway
4. Perform node commissioning on the scanner to match the baud rate set for the gateway (if required).
5. Attach the gateway to the devicenet network. The scanner must not be operational for the next series of steps. This implies that the system is NOT operational.



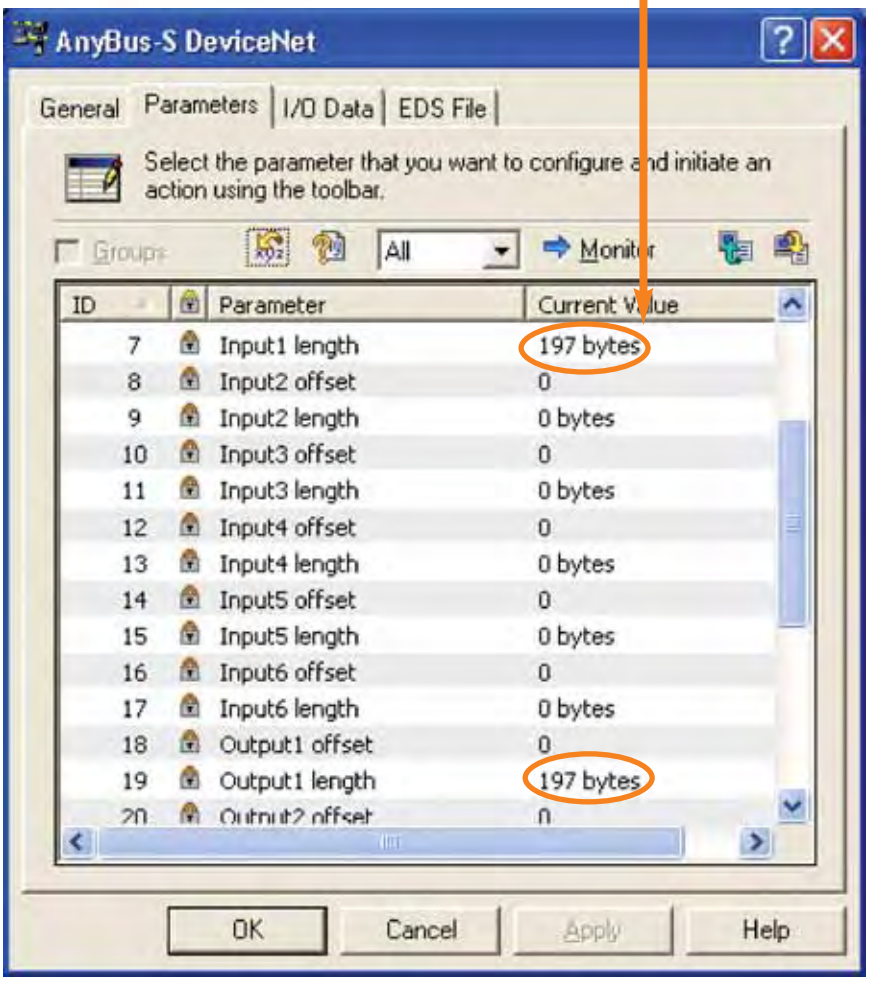
Step 1:
Browse the Devicenet Network with RSNetworks for Devicenet.

Step 2: Record the number of input and output bytes.

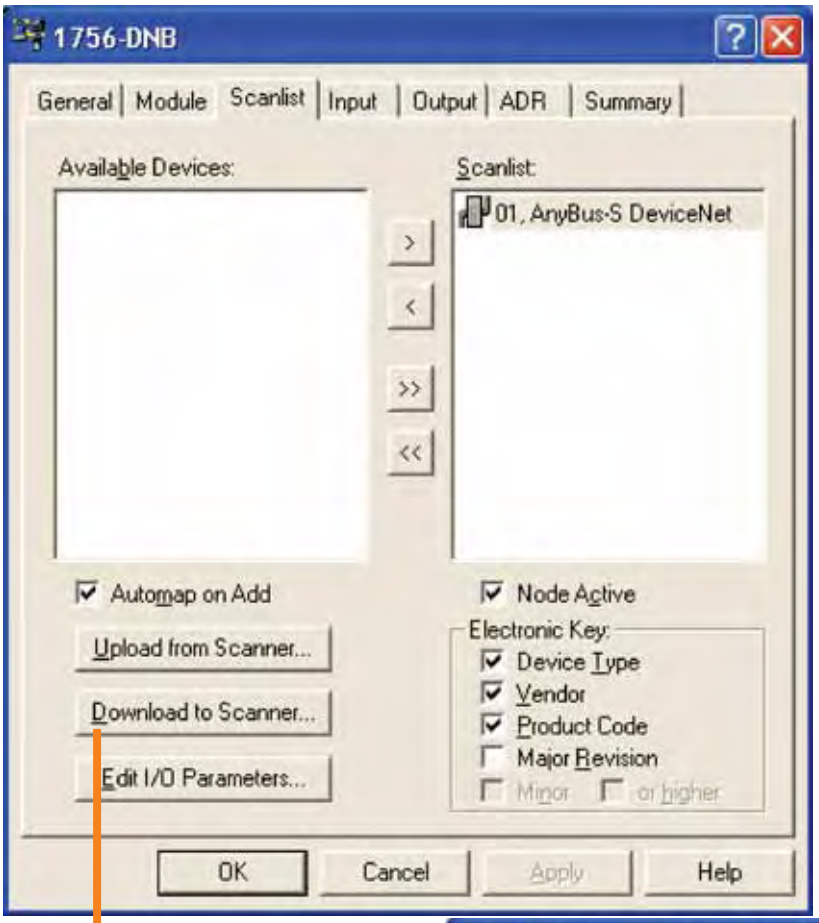


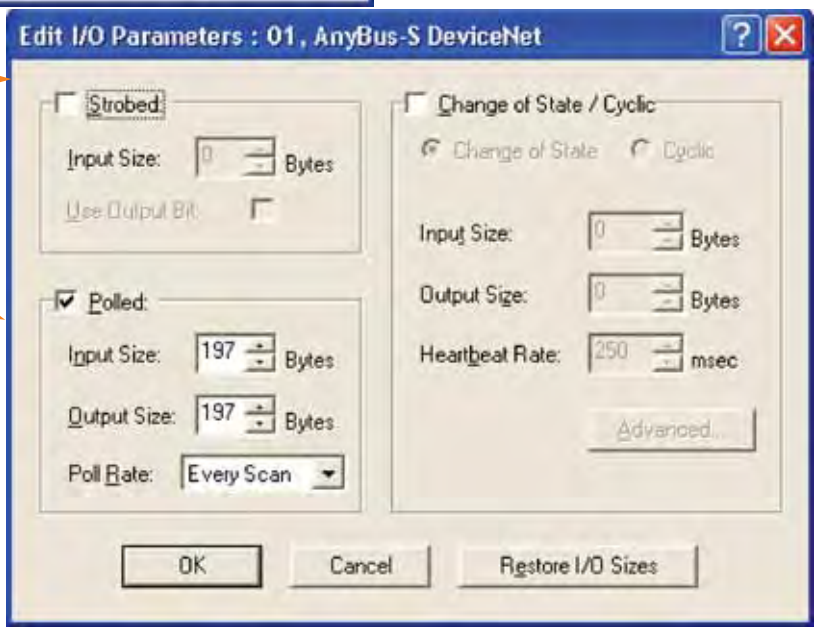
Double-click on the AnyBus icon to get the parameter list.

Record the Input 1 length and Output 1 length



Step 3: Double-click on the scanner icon, and add the AnyBus device to the scanlist.

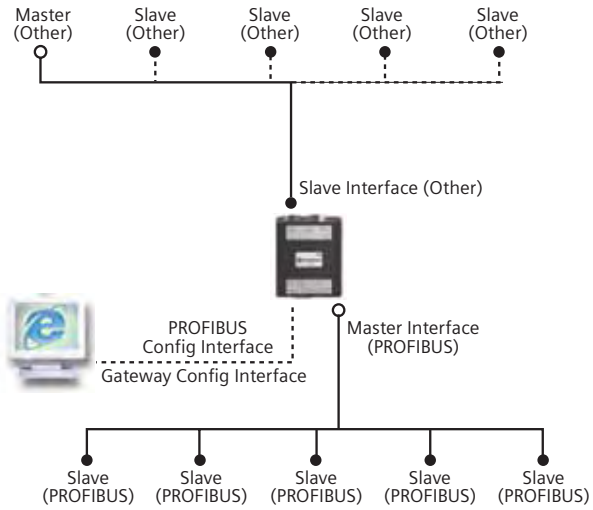




Enter the input and output bytes recorded on the previous step

You must swap input and output byte sizes

4.4. Ethernet/IP Gateway



PROFIBUS Status LED's

LED	State	Indication
MS	Green	Operate mode
	Green, flashing	Clear mode
	Red	Stop mode
	Off	Offline
DB	Green	Database OK
	Green, flashing	Database download in progress
	Red	Database invalid
COM	Green	Data exchange with all configured slaves
	Green, flashing	Data exchange with at least one slave
	Red	Bus control error
TOK	Green	The Master Interface has the token

4.4.1. Configure the Ethernet Gateway IP Address

A summary of the process is given here, with a fuller explanation of each step detailed subsequently. For our example, the gateway will be configured to IP 10.0.2.11 to match the same octet sequence as the Ethernet card we are trying to talk to. (Reminder: Ethernet card has been set to 10.0.2.10 in prior steps)

1. Set the computer Ethernet port IP address to 192.168.0.100 (first three octets must match the gateway default IP address, or 192.168.0)
2. Turn off any proxy server in the internet browser configuration.
3. Turn on the IP address LSB switch to the ON position on the gateway, and cycle power to the gateway.
4. Open the internet browser, and enter address 192.168.0.1
5. When the HMS Anybus page opens, select the configuration page.
6. Enter the IP address of 10.0.2.11 for the gateway.
7. Turn off the IP address LSB switch on the gateway and cycle power.
8. Type the IP address 10.0.2.11 in the internet browser and make sure that the gateway web page opens.

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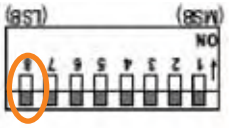
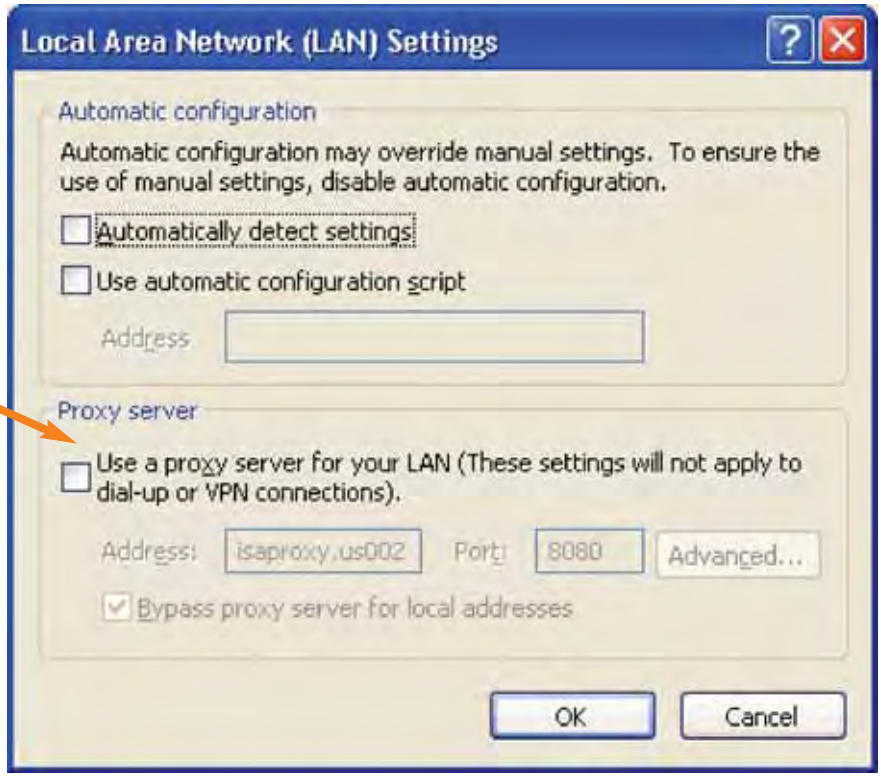
On the Ethernet gateway, set the switch position for the default IP address:

Turn this switch to the ON position to allow browser to connect to the gateway



In the internet browser configuration, turn off any configuration that has a proxy server defined. The following example is for Microsoft Internet Explorer.

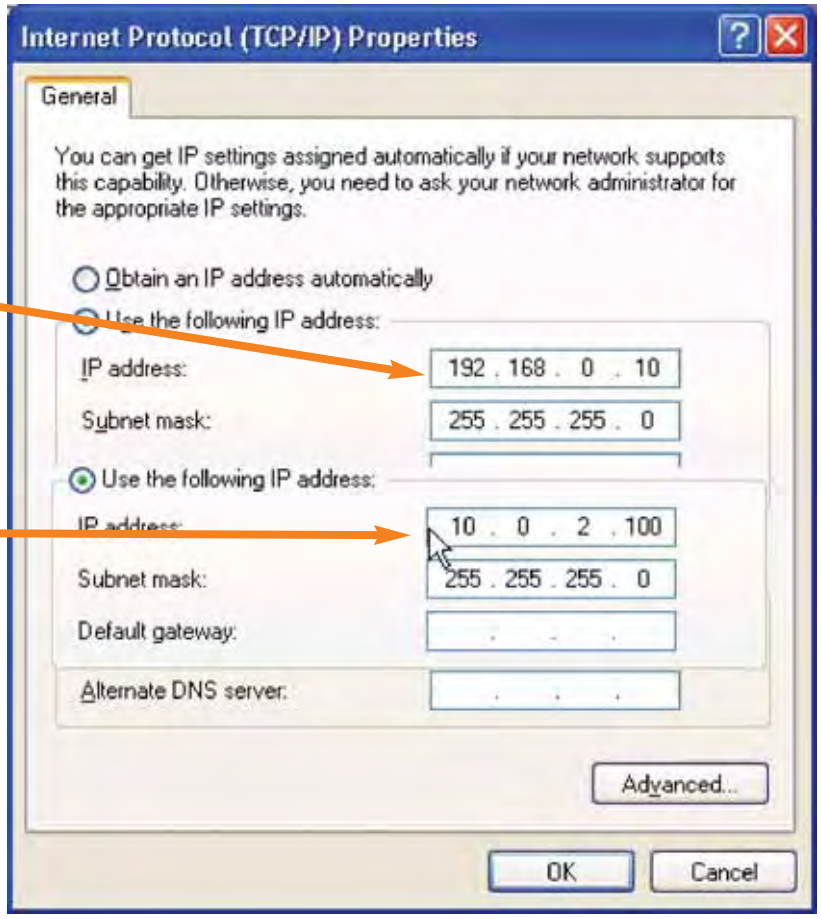
Make sure that your browser properties have this UNCHECKED



On the computer used for programming the Ethernet gateway, set the computer IP address to talk to the gateway.

Initial gateway configuration IP address

Set the IP address to match the first 3 octets of the gateway (10.0.2) in this example, when the gateway has already been configured.

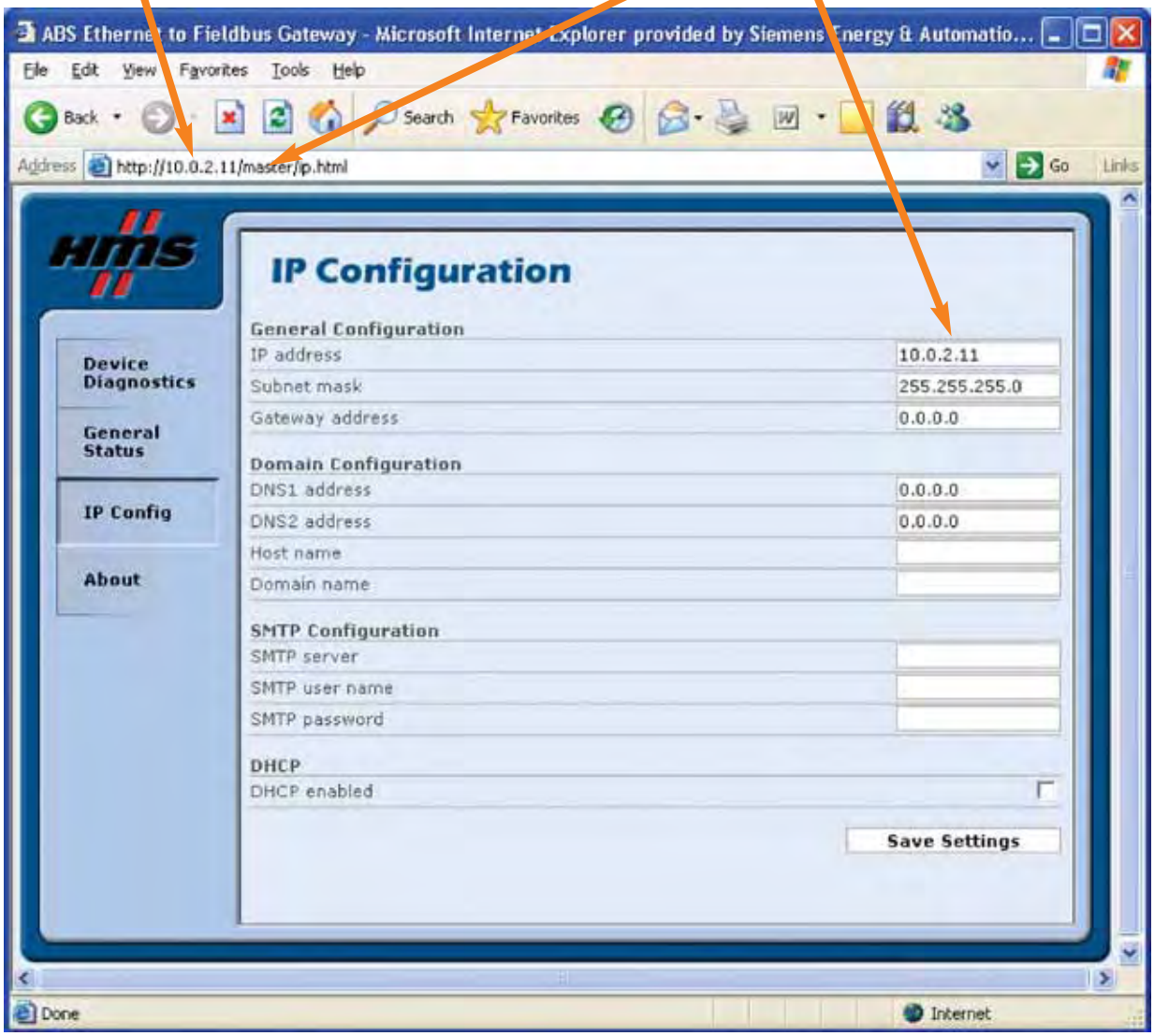


For initial configuration, type 192.168.0.1 (default gateway configuration) in the browser address window.

Type 192.168.0.1 as an address if:
1. The IP properties are set to 192.168.0.
2. The configuration switch LSB in ON.

For all subsequent access to the gateway, type in the gateway IP address. In this example 10.0.2.11.

Type the address configured in the gateway if:
1. The IP properties are set to match the gateway.
2. All configuration switches are OFF.

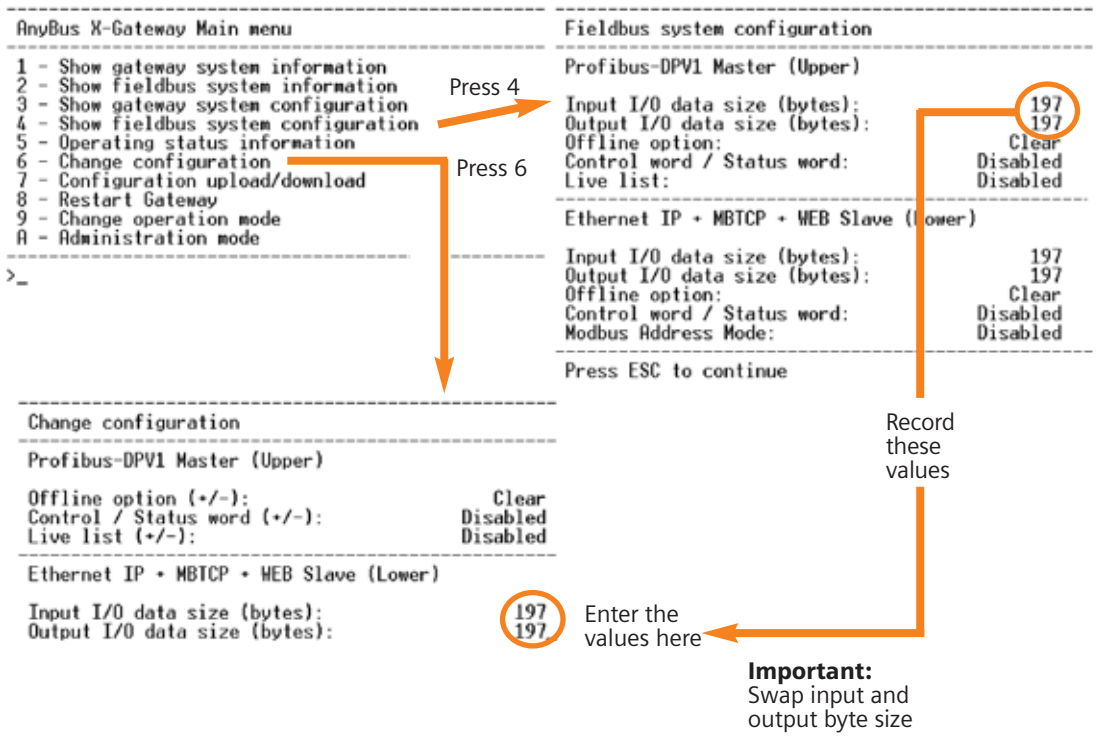


4.4.2. Configure the Ethernet Gateway Fieldbus

Using hyperterminal (for windows), and connect to the gateway configuration port with a null modem cable.

Press <ESC> to display the configuration menu interface for the gateway. Sometimes it may be necessary to cycle power to the gateway to allow hyperterminal to properly work with the gateway.

Press option 4 to get the PROFIBUS configuration size, then press 6 to set the I/O size to the same values for the Ethernet interface, as shown in the example below.



After pressing "6" for changing the configuration, and entering the I/O size as shown in the example above, it is important to keep the "**Modbus Address Mode**"as "**Disabled**"

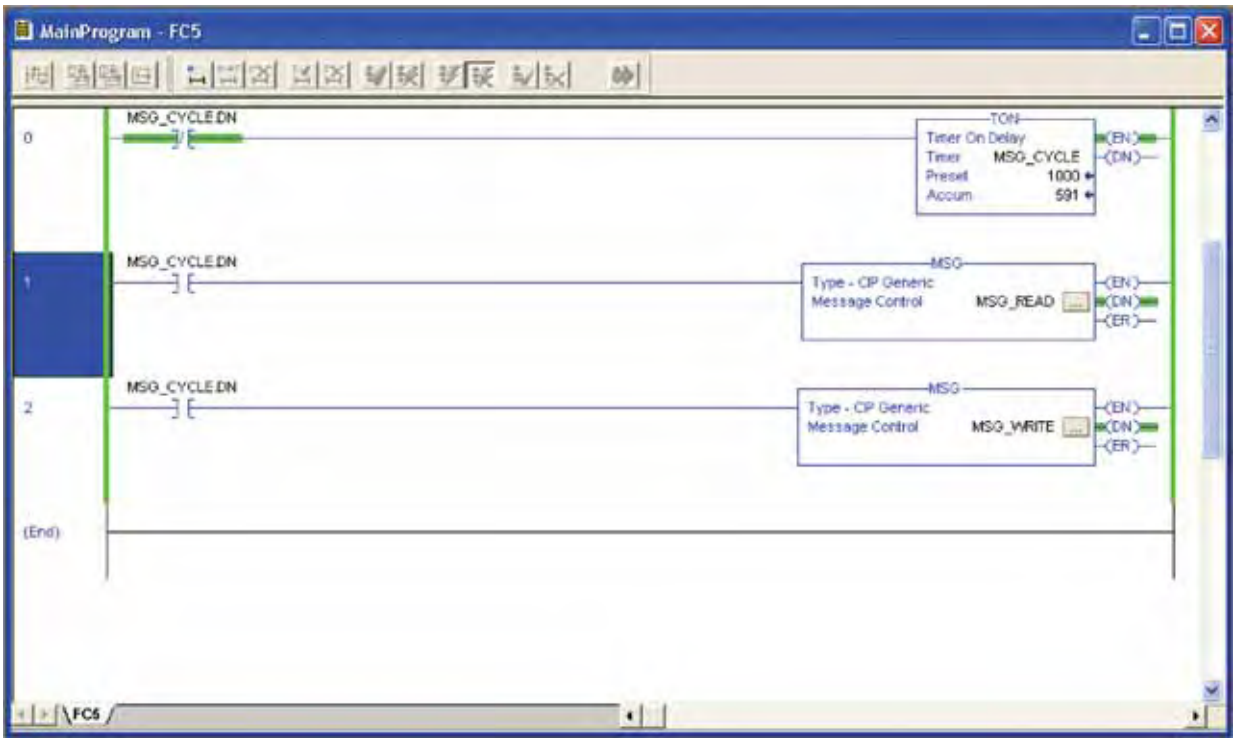
4.4.3. Add Ethernet / IP Gateway to I/O Configuration

The next step is to add the HMS Ethernet/IP gateway to the PLC I/O configuration so that the instructions can be crafted to read and write the data to the modules.

Add an Ethernet bridge to the PLC I/O configuration and give it the IP address set above in the web page (10.0.2.11 in this example.)

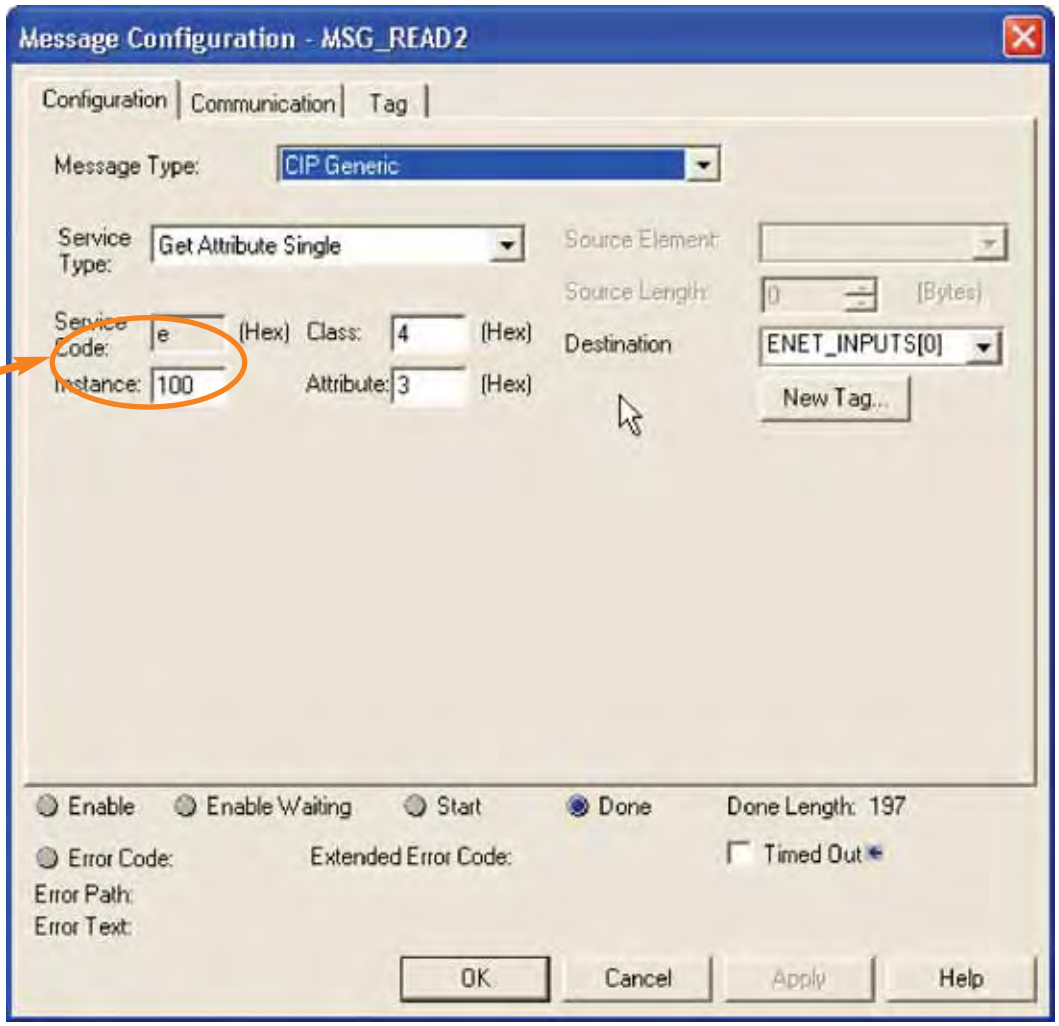
4.4.4. Add PLC Program MSG Instructions

We need to add the message instructions to read and write the Ethernet/IP data to the gateway. The message instructions are executed every 1000ms in this example.



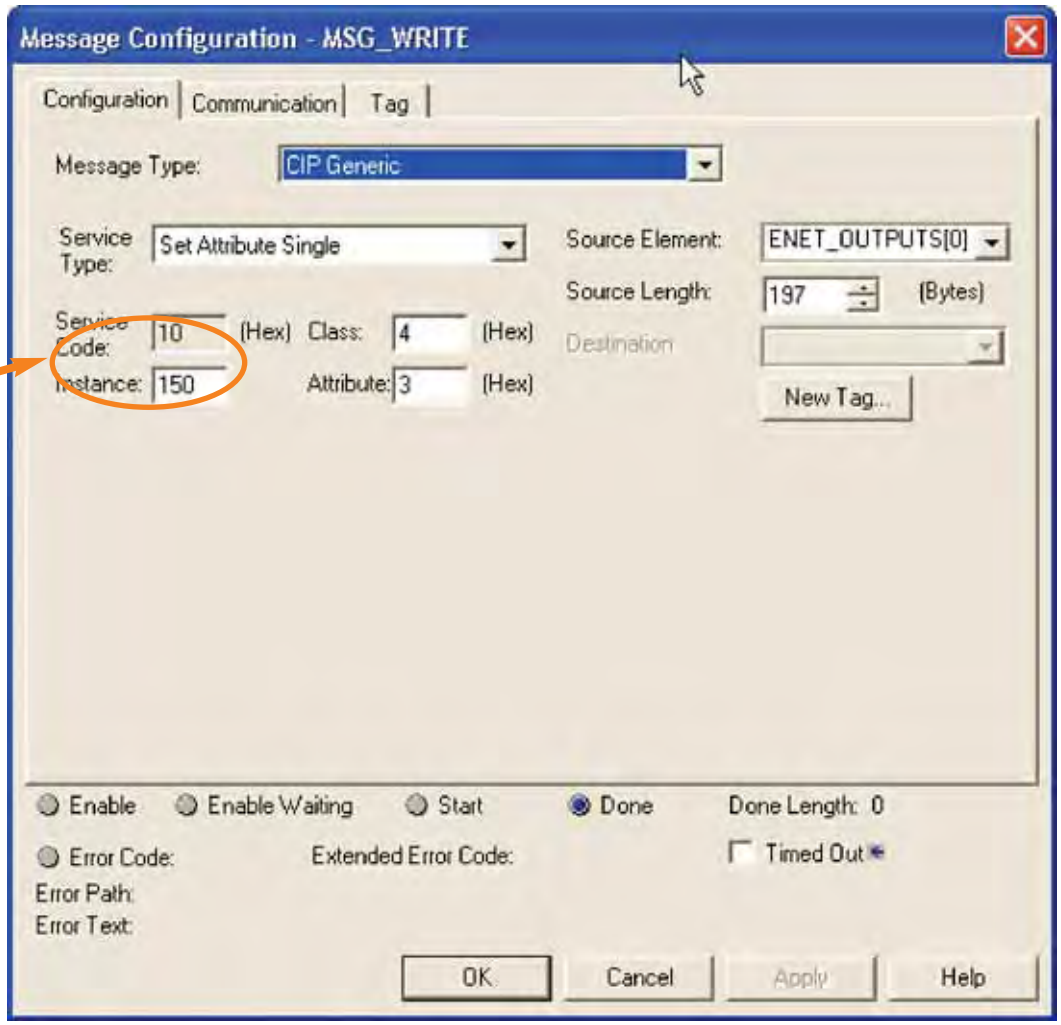
CIP message read configuration

Input Instance
of 64 hex equals
100 decimal



CIP message write configuration

Output Instance of 96 hex equals 150 decimal



4.4.5. Ethernet / IP Interface Notes

Implemented Objects — EtherNet/IP requires some mandatory objects; these are implemented as well as some vendor specific objects. The mandatory objects are the ones in the specification from ODVA.

The following vendor specific objects are implemented:
I/O Data Representation

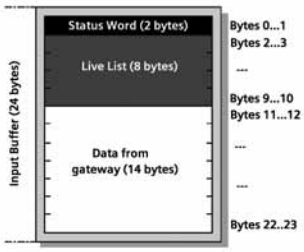
The Input and Output buffers can be accessed from EtherNet/IP via the Assembly Object, instances 64h (Input) and 96h (Output). For more information, see 6-3 "Assembly Object, Class 04h." Note that this data can also be accessed via Modbus/TCP, the email client, or the built in web server.

Class	Name	Contents
01h	Identity Object	Holds general information and status about the interface
04h	Assembly Object	Holds the Input and Output data buffers
AAh	Diagnostic Object	Contains diagnostic information about the ethernet interface
F5h	TCP/IP Interface Object	Holds the IP settings of the interface
F6h	Ethernet Link Object	Holds the low level communication properties of the interface

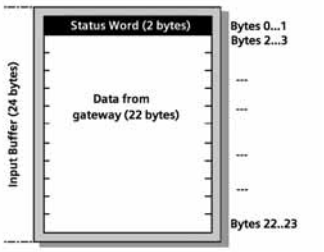
Instance Attributes, Instance 64th

#	Access	Name	Type	Value	Description
3	Get	Input Buffer	Array of BYTE	—	Mapped to Input Buffer

Depending on the type of gateway and how it has been set up to operate, up to 10 bytes (bytes 0...9) may be occupied by the Status Word and the Live List, see below. (For further information about the Status Word and the Live List, consult the main user manual).



Example A:
I/O Data Size = 24 bytes
Live List = Enabled
Control and Status Word = Enabled

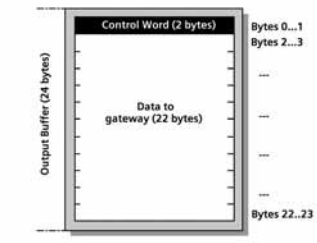


Example B:
I/O Data Size = 24 bytes
Live List = Disabled
Control and Status Word = Enabled

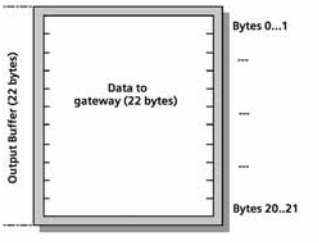
Instance Attributes, Instance 96th

#	Access	Name	Type	Value	Description
3	Get	Output Buffer	Array of BYTE	—	Mapped to Output Buffer

Depending on how the gateway is set to operate, the first 2 bytes (bytes 0...1) may be occupied by the Control Word, see below. (For more information about the Control Word, consult the main user manual.)



Example A:
I/O Data Size = 24 bytes
Control Word = Enabled



Example B:
I/O Data Size = 22 bytes
Control Word = Disabled

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