

Siemens TCP/IP Slave Ethernet Driver Help

© 2012 Kepware Technologies

Table of Contents

Table of Contents	2
Siemens TCP/IP Slave Ethernet Driver Help	3
Overview	3
Channel Setup	4
Device Setup	5
Cable Diagrams	5
CPU Settings	5
Master Device Configuration	6
Configuring Connections Using the SIMATIC Manager	7
Step One: Creating a New Project	7
Step Two: Configuring the Master and PC Station	10
Step Three: Connecting the Master and the Slave Driver	23
Step Four: Inserting Function Blocks	29
Step Five: Creating the DB3 Data Block	37
Step Six: Inserting PUT FB	40
Step Seven: Downloading to the PLC	45
Data Types Description	52
S7-300 Address Descriptions	53
Error Descriptions	57
Address Validation	57
Address '<address>' is out of range for the specified device or register.....	57
Array size is out of range for address '<address>'.....	57
Array Support is not available for the specified address: '<address>'.....	57
Data Type '<type>' is not valid for device address '<address>'.....	58
Device address '<address>' contains a syntax error.....	58
Device address '<address>' is Read Only.....	58
Missing address.....	58
Driver Error Messages	58
Failure to start unsolicited communications on Port n.....	58
Winsock initialization failed (OS Error=n).....	59
Winsock V1.1 or higher must be installed to use the Siemens TCP/IP Slave Ethernet device driver.....	59
Index	60

Siemens TCP/IP Slave Ethernet Driver Help

Help version 1.019

CONTENTS

[Overview](#)

What is the Siemens TCP/IP Slave Ethernet Driver?

[Channel Setup](#)

How do I configure a channel?

[Device Setup](#)

How do I configure a device for use with this driver?

[Configuring Connections Using the SIMATIC Manager](#)

How do I configure connections using the SIMATIC Manager?

[Data Types Description](#)

What data types does this driver support?

[Address Descriptions](#)

How do I address a data location on a Siemens TCP/IP Slave Ethernet device?

[Error Descriptions](#)

What error messages does the Siemens TCP/IP Slave Ethernet Driver produce?

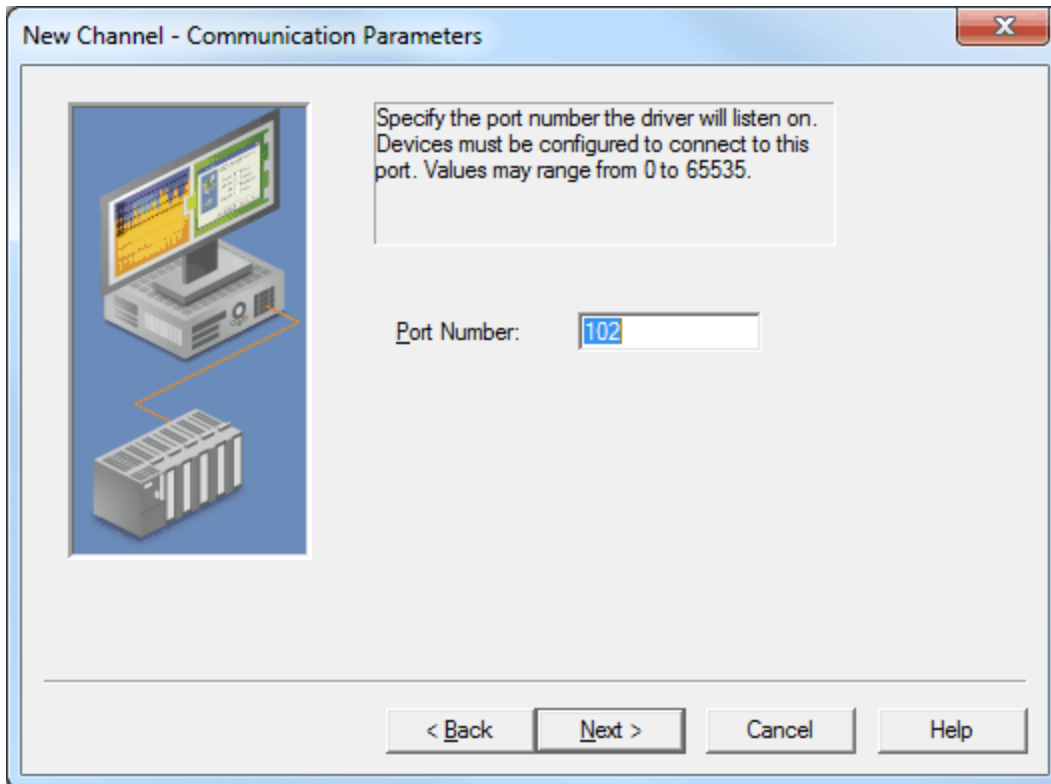
Overview

The Siemens TCP/IP Slave Ethernet Driver provides an easy and reliable way to connect Siemens TCP/IP Slave Ethernet devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. This driver will act as a simulated Siemens PLC. It is intended for simulation of Siemens S7-300.

See Also: [Master Device Configuration](#)

Channel Setup

Communications Parameters



Description of the parameter is as follows:

- **Port Number:** This parameter specifies the port number on which the driver will listen. Devices must be configured to connect to this port: messages sent to all other ports will be ignored by the driver. The valid range is 0 to 65535. The default setting is IE TCP/IP: 102 (TSAP).

Note: Non-standard values may be necessary due to routing and firewall issues.

Device Setup

Supported Protocols

S7 Messaging on Industrial Ethernet (ISO 8073 Class 0) over TCP/IP. This is defined in RFC1006.

Supported PLC

S7-300

Supported Commands

SFB14-GET
SFB15-PUT

Maximum Number of Supported Channels and Devices

The Siemens TCP/IP Slave Ethernet Driver supports one channel and 256 virtual devices.

Libraries

This driver requires a standard Ethernet card. No special libraries or hardware are needed.

Note: In order to communicate with this driver, devices require specialized ladder programming.

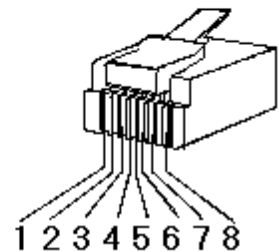
Cable Diagrams

Patch Cable (Straight Through)

TD + 1	OR/WHT	OR/WHT	1 TD +
TD - 2	OR	OR	2 TD -
RD + 3	GRN/WHT	GRN/WHT	3 RD +
4	BLU	BLU	4
5	BLU/WHT	BLU/WHT	5
RD - 6	GRN	GRN	6 RD -
7	BRN/WHT	BRN/WHT	7
8	BRN	BRN	8

RJ45 RJ45

10 BaseT



Crossover Cable

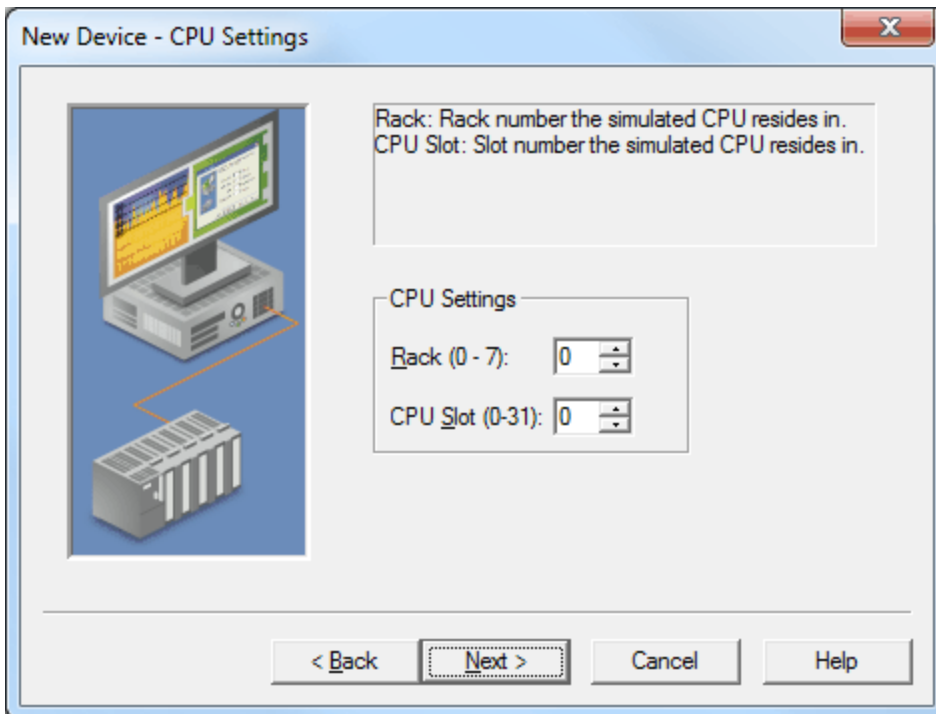
TD + 1	OR/WHT	GRN/WHT	1 TD +
TD - 2	OR	GRN	2 TD -
RD + 3	GRN/WHT	OR/WHT	3 RD +
4	BLU	BLU	4
5	BLU/WHT	BLU/WHT	5
RD - 6	GRN	OR	6 RD -
7	BRN/WHT	BRN/WHT	7
8	BRN	BRN	8

RJ45 RJ45

8-pin RJ45

CPU Settings

The CPU Settings dialog is used to specify the rack and slot values that will be associated with the device.



Descriptions of the parameters are as follows:

- **Rack:** This parameter specifies the number of the rack in which the simulated CPU of interest resides. The valid range is 0 to 7. The default setting is 0.
- **CPU Slot:** This parameter specifies the number of the slot in which the simulated CPU of interest resides. The valid range is 0 to 31. The default setting is 0.

Note: Devices must have unique rack/slot values.

Master Device Configuration

Siemens PLCs must be programmed to issue read and write commands to the driver and to handle returned data. For more information, refer to the Siemens PLC programming documentation. For information on preparing the Master Device and the unsolicited driver for communications, refer to [Configuring Connections Using the SIMATIC Manager](#).

Messages must be sent to the IP address of the selected Ethernet adapter of the host computer running the unsolicited driver. To do so, click **Channel Properties | Network Interface**. For more information concerning the port number configured for the simulated device, refer to [Channel Setup](#).

Configuring Connections Using the SIMATIC Manager

Connections are configured using the SIMATIC Manager software. The following topics provide information on configuring the Siemens TCP/IP Slave Ethernet Driver to run in unsolicited mode, and demonstrate a basic setup using the S7-300 PLC as the active partner and the Siemens TCP/IP Slave Ethernet Driver as the passive partner.

Note: The Siemens TCP/IP Slave Ethernet Driver can configure 256 devices, each with an associated slot/rack. When the active partner (master) communicates with the passive partner (unsolicited driver), it directs its requests to a specific device in the unsolicited driver. Multiple remote partners can talk to the same device.

To jump to a specific section, select a link from the list below.

[Step One: Creating a New Project](#)

[Step Two: Configuring the Master and PC Station](#)

[Step Three: Connecting the Master and the Slave Driver](#)

[Step Four: Inserting Function Blocks](#)

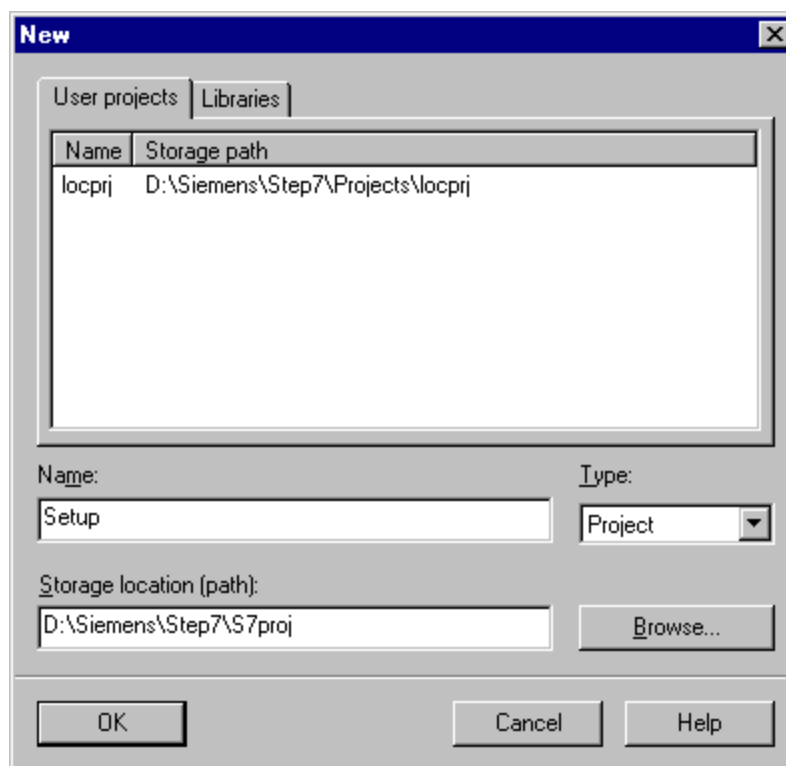
[Step Five: Creating the DB3 Data Block](#)

[Step Six: Inserting PUT FB](#)

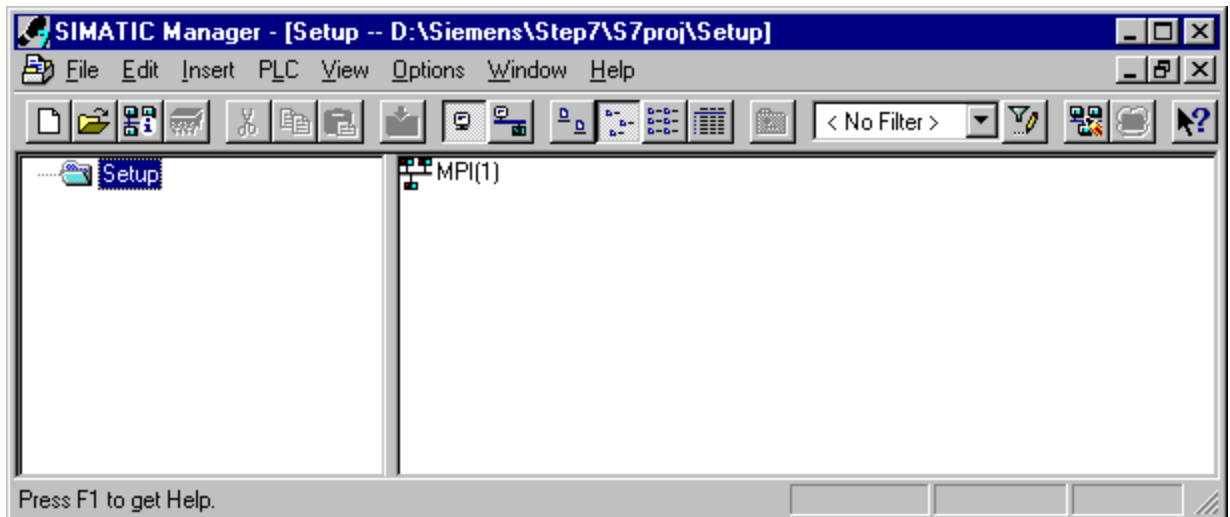
[Step Seven: Downloading to the PLC](#)

Step One: Creating a New Project

1. To start, open the SIMATIC Manager software and then create a new project. In this example, the project being used is "Setup".

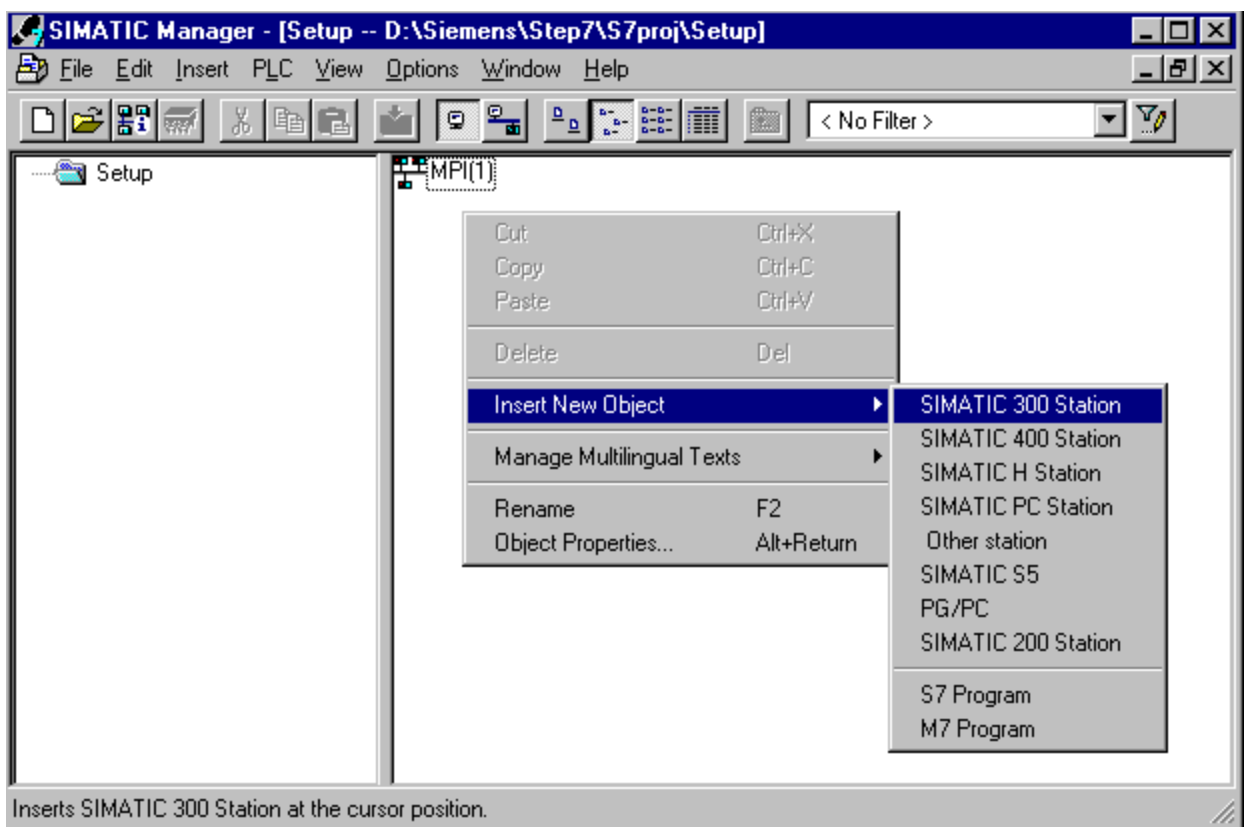


Note: The project's main window should appear as shown below.

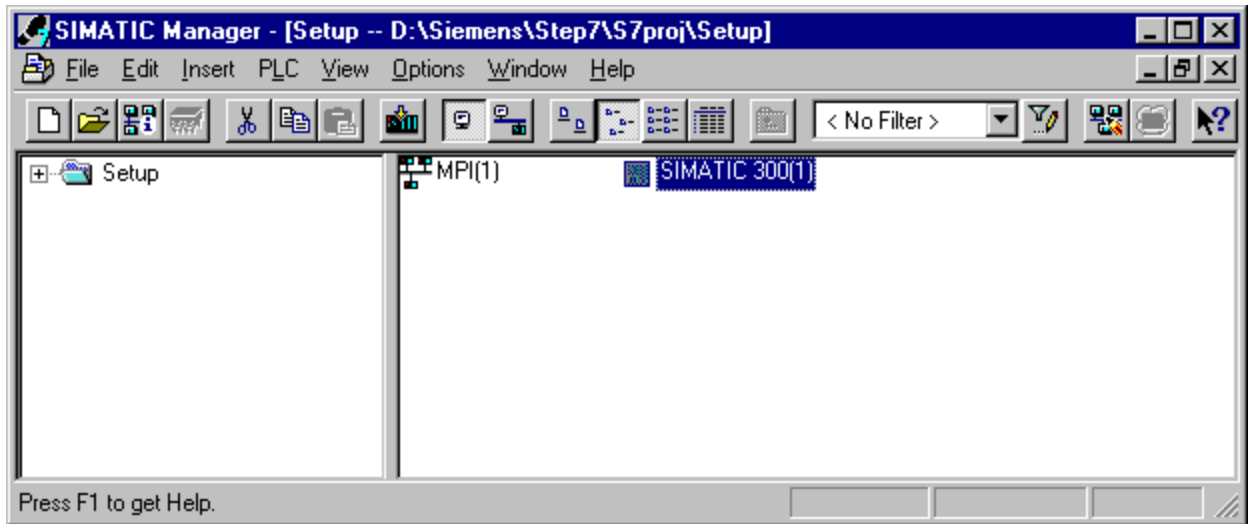


- Next, create the Master and PC Station. To do so, right-click in the right pane of the window and then select **Insert New Object | SIMATIC 300 Station**.

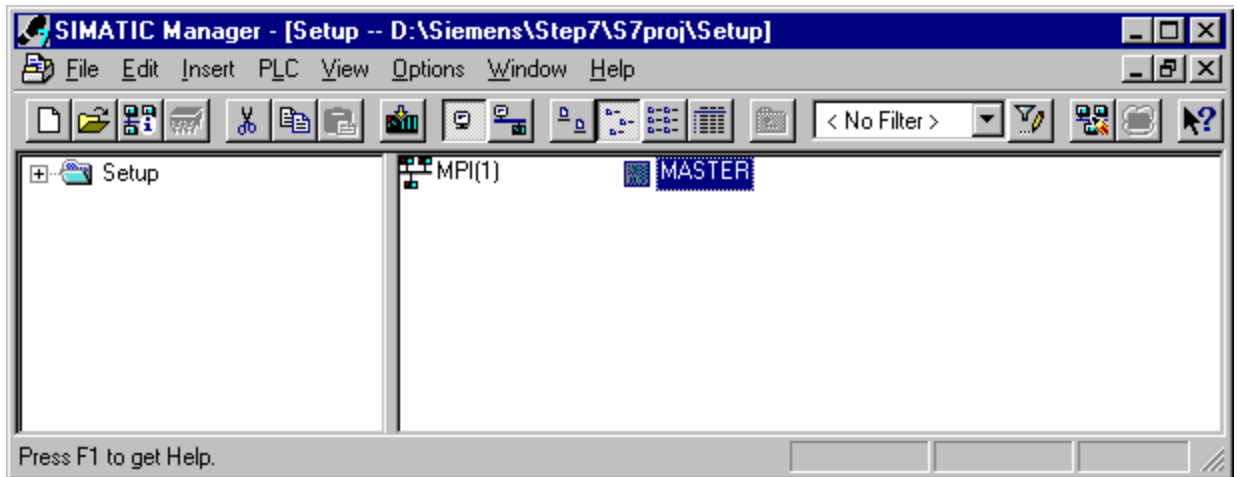
Note: The Master unit is the active partner or the image of the actual PC. The PC Station is the PC on which the SIMATIC Manager software is running.



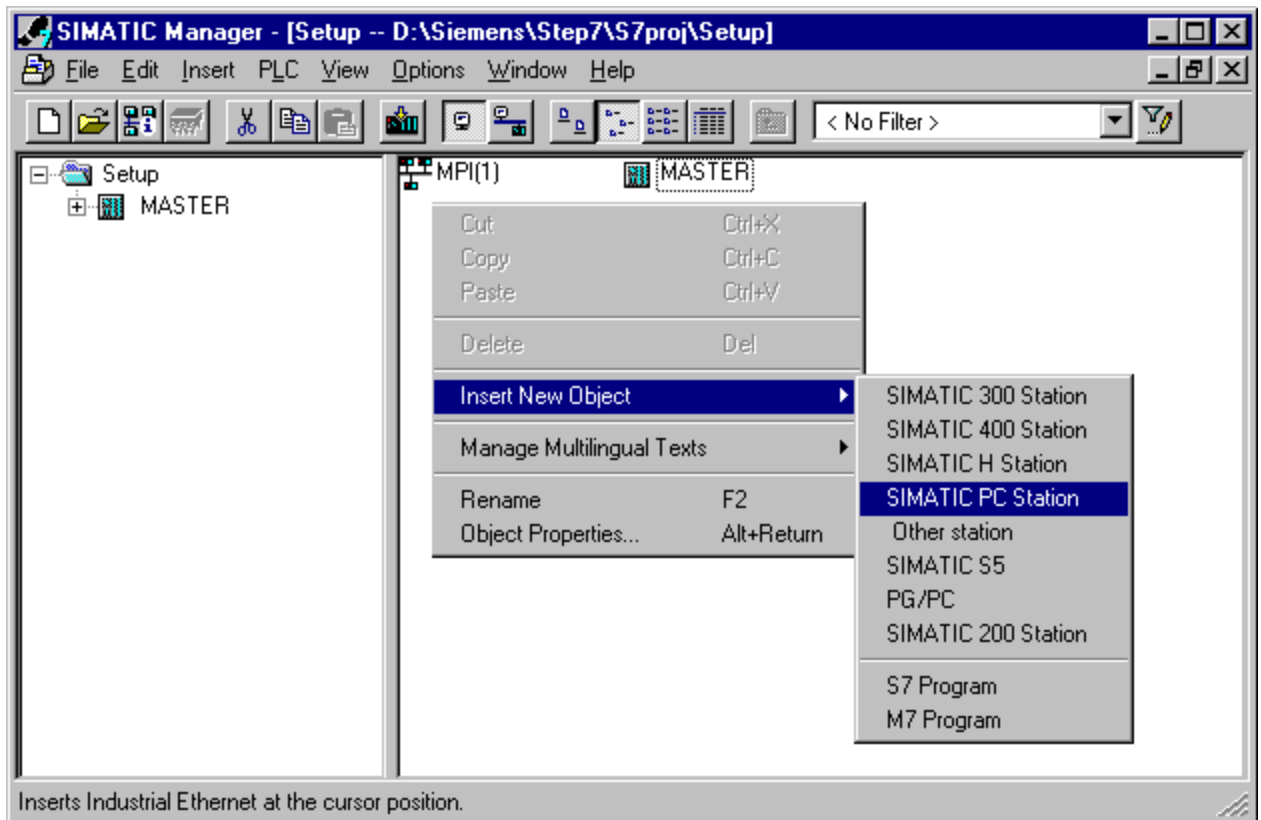
Note: The SIMATIC 300 station should appear as shown below.



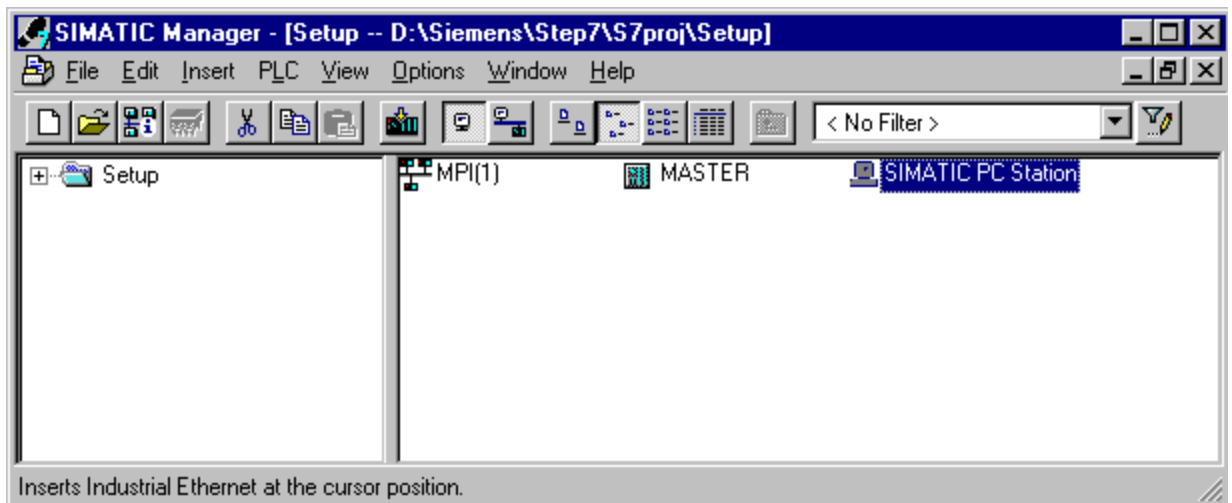
3. Name the new station "MASTER," because it represents the communication's active partner.



4. Next, right-click in the right pane of the window and then select **Insert New Object | SIMATIC PC Station**.



Note: The SIMATIC PC Station should appear as shown below.

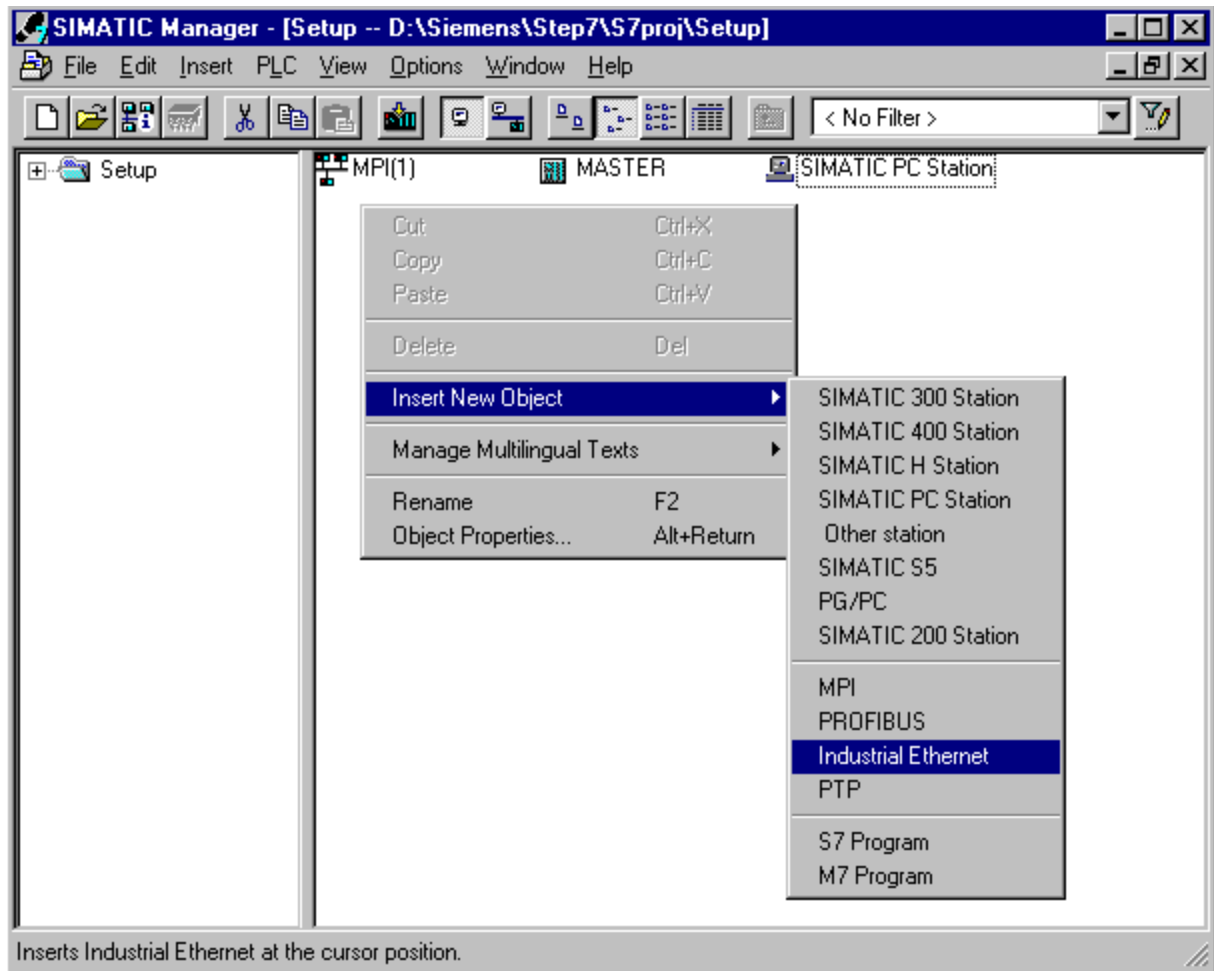


Note: For more information, refer to [Step Two: Configuring the Master and PC Station](#).

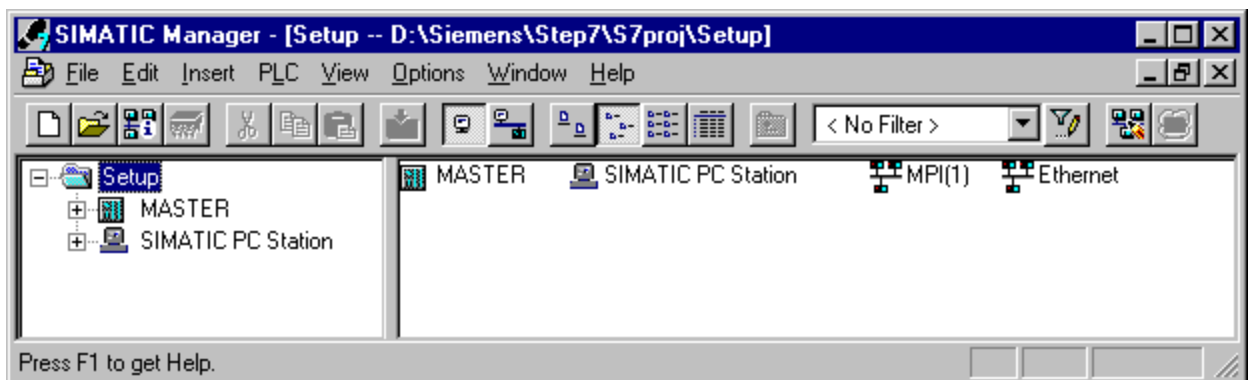
Step Two: Configuring the Master and PC Station

Industrial Ethernet (IE) is the protocol used for communication.

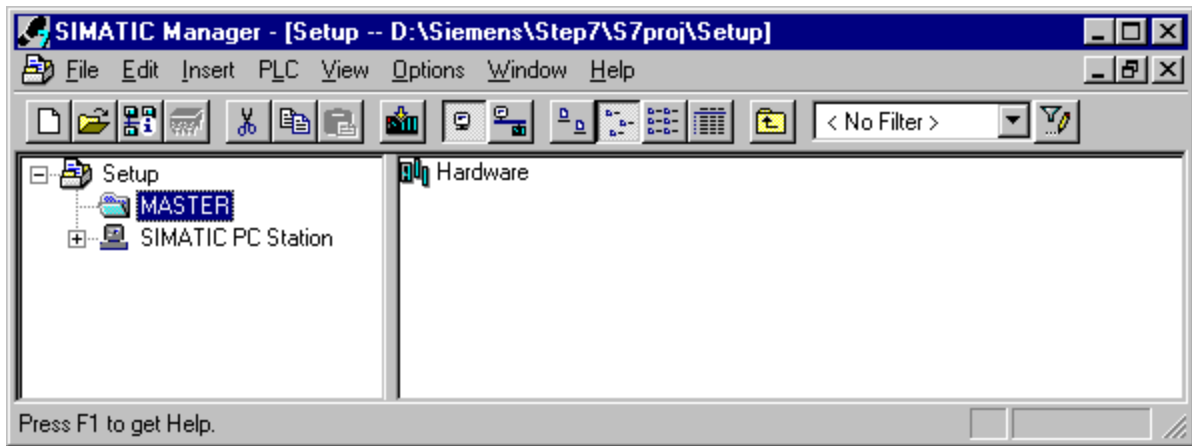
1. To start, right-click in the right pane of the SIMATIC Manager window. Then, select **Insert New Object | Industrial Ethernet**.



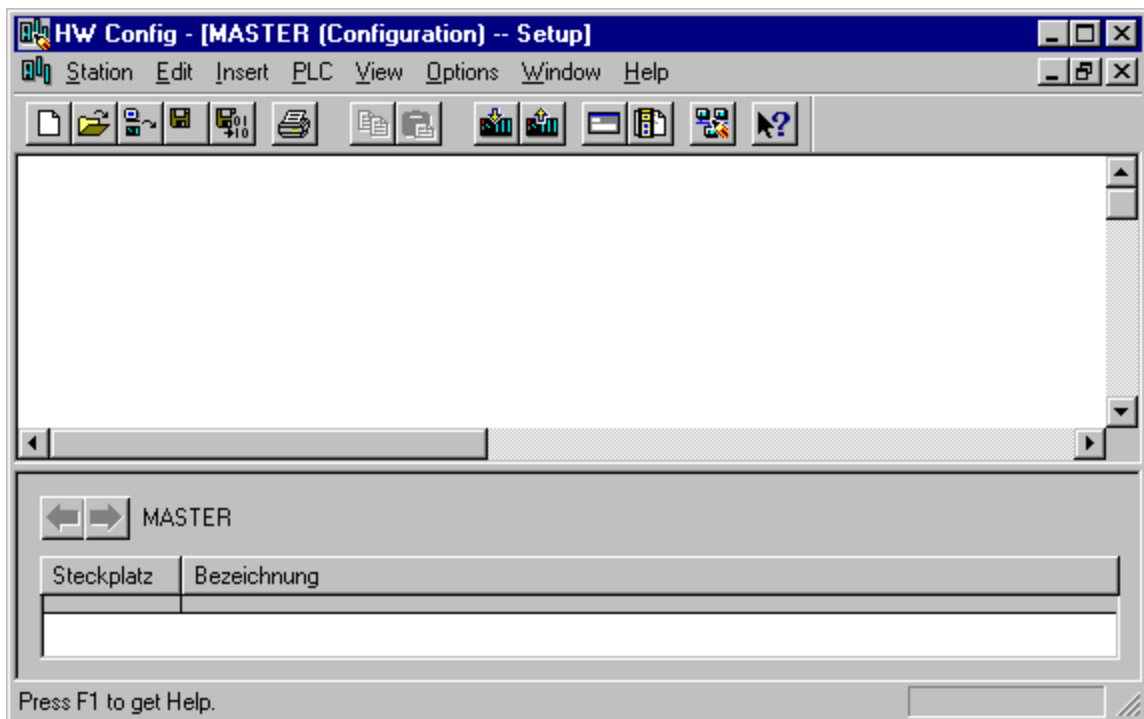
Note: The main window should now display an Ethernet icon.



- Next, select the MASTER icon in the left pane of the window. Then, double-click on **Hardware**.

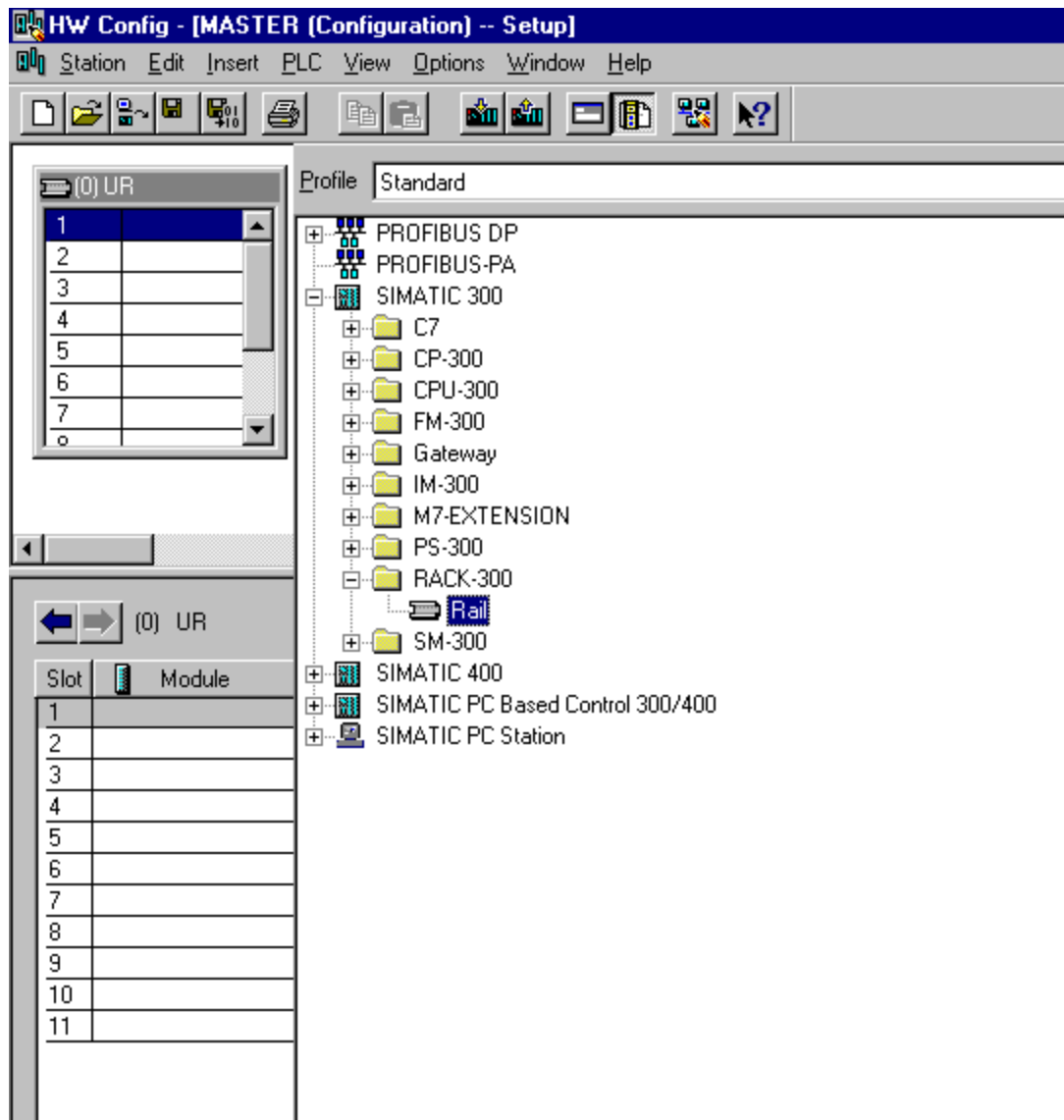


Note: The HW Config window should appear as shown below.

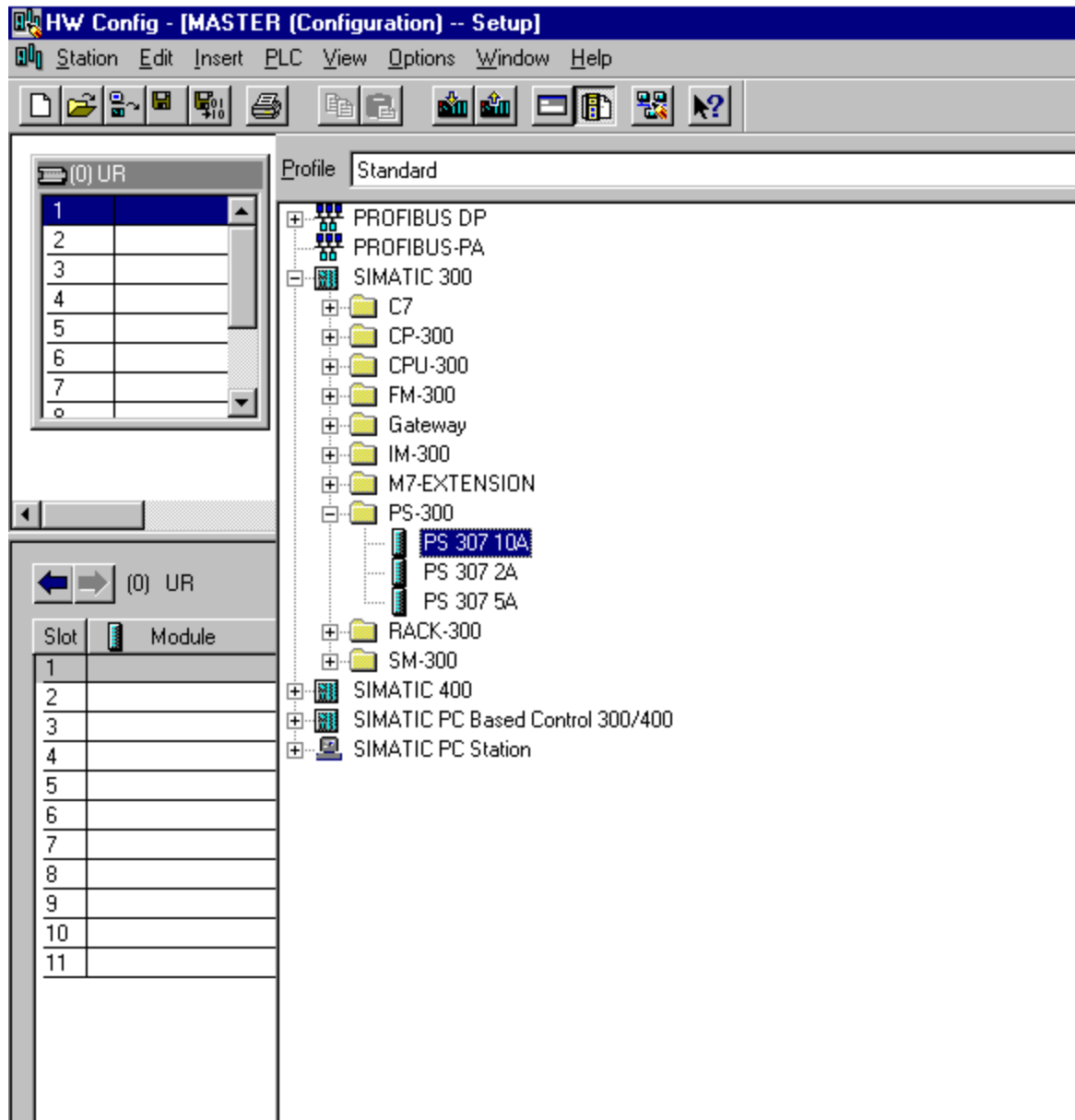


3. Next, open the **View** tab and select **Catalog**. Then, expand the **SIMATIC 300** menu and the **Rack 300** menu.

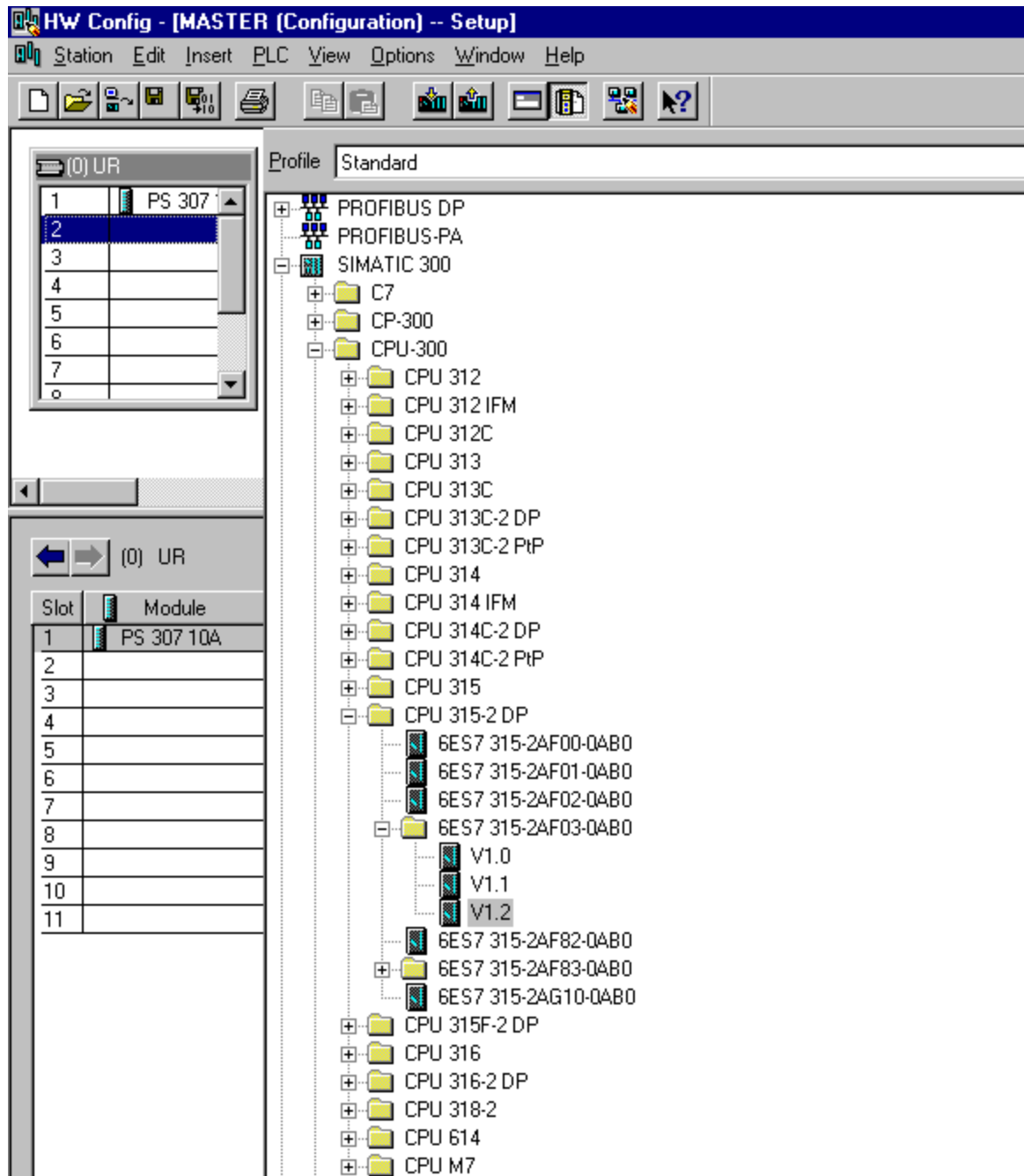
4. To insert the racks, double-click on **Rail**.



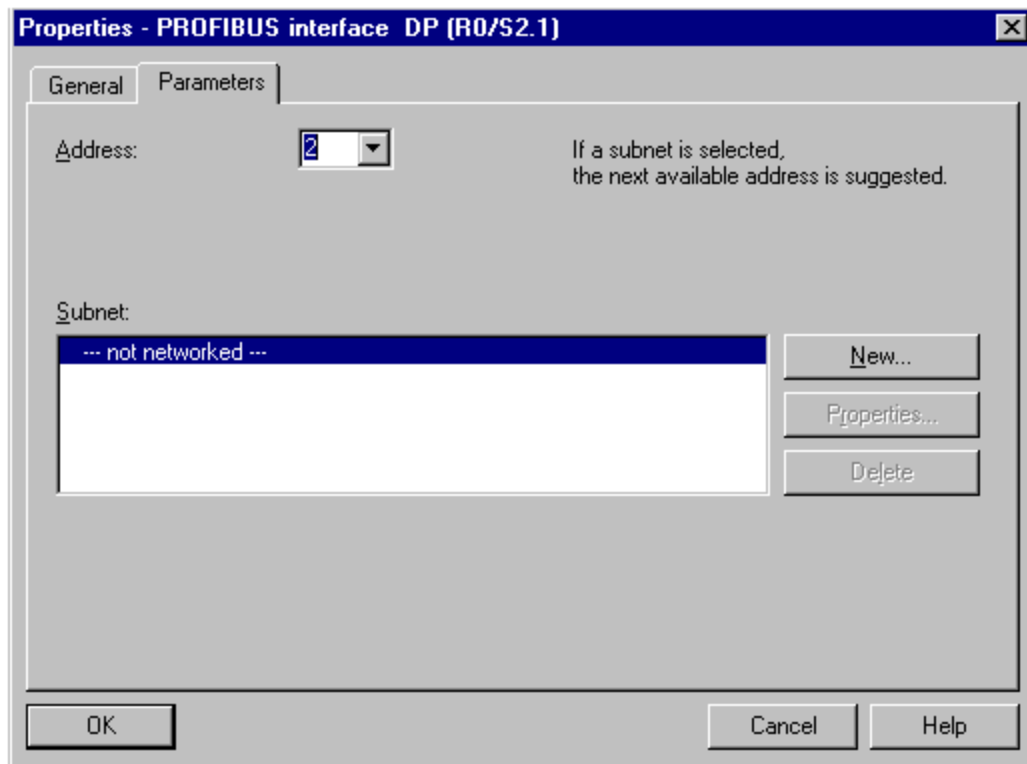
5. Next, expand the **PS 300** menu. Double-click on **PS 307 10A** or any other suitable option to insert the power supply into slot 1.



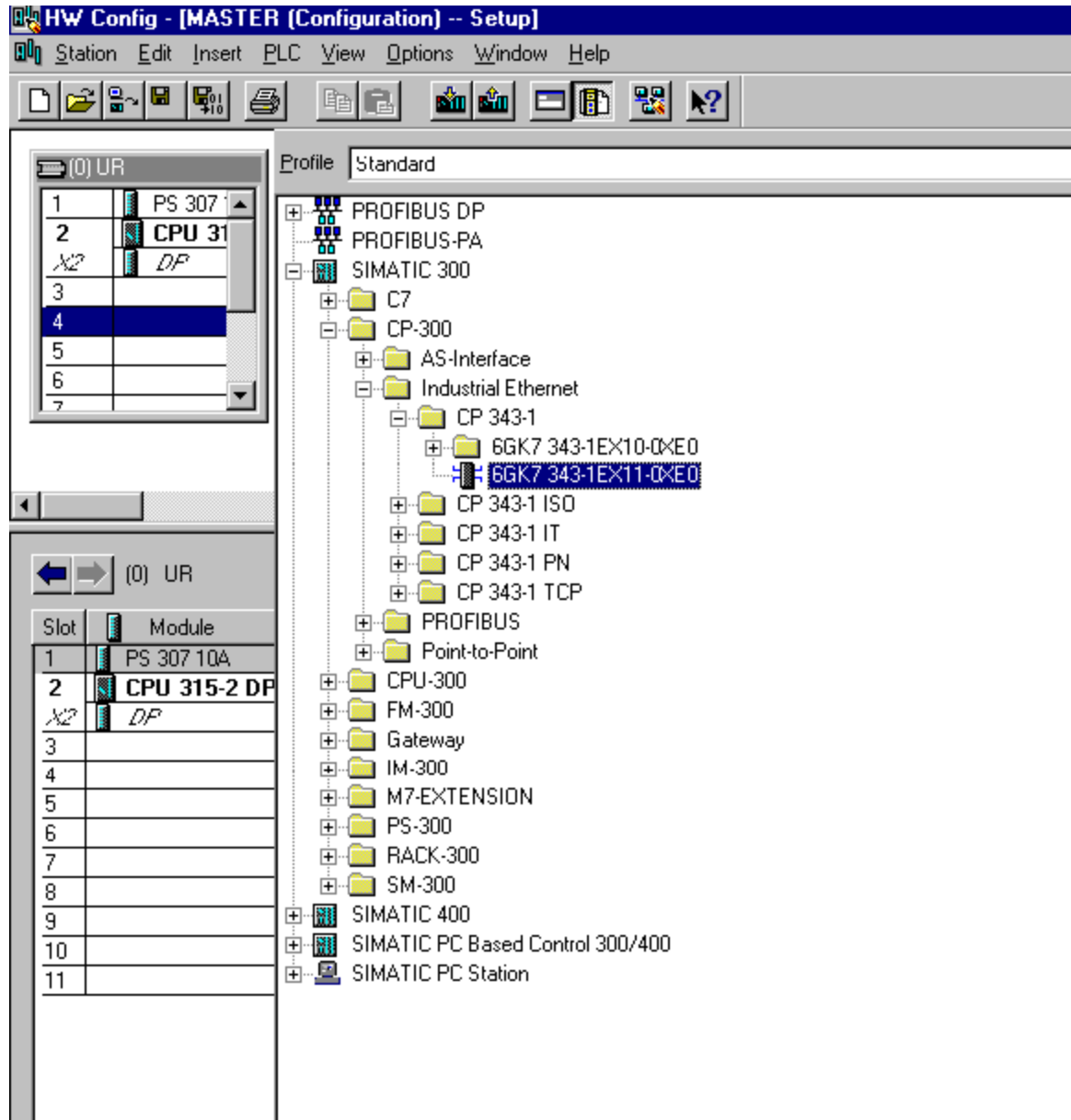
6. To insert the CPU, expand both the **CPU 300** menu and the **CPU 315-2 DP** menu. Then, double-click on the CPU that matches the hardware.



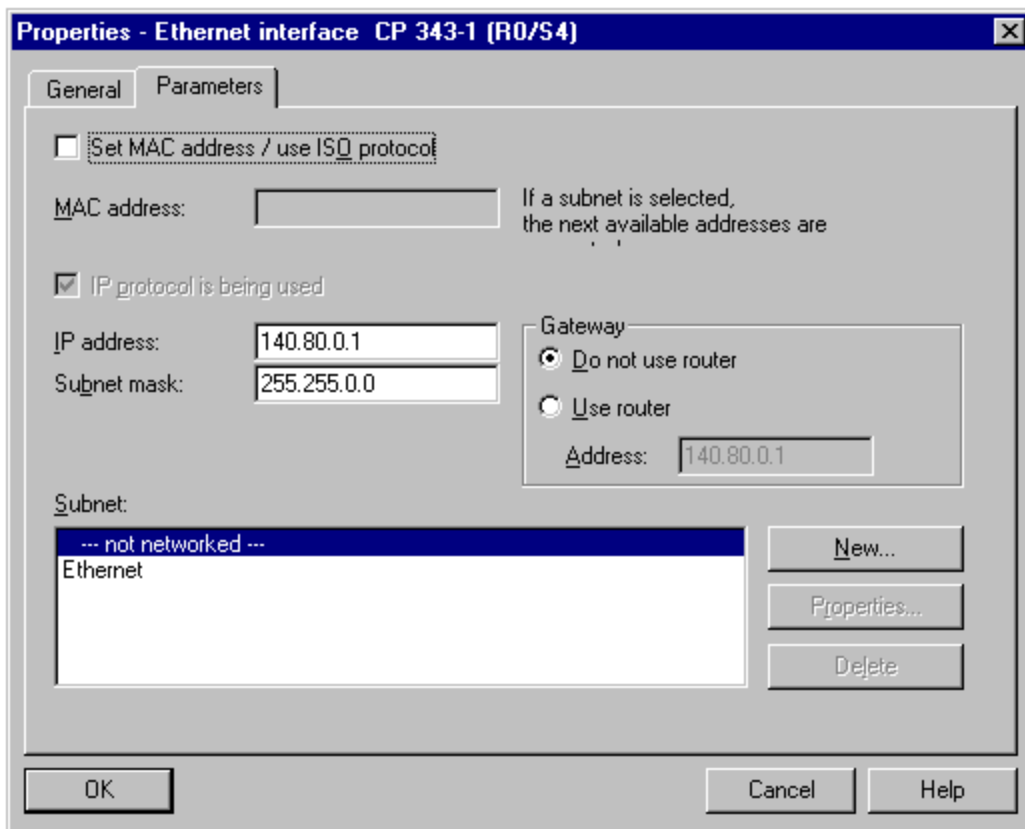
7. To insert the CPU into slot 2, click **OK**.



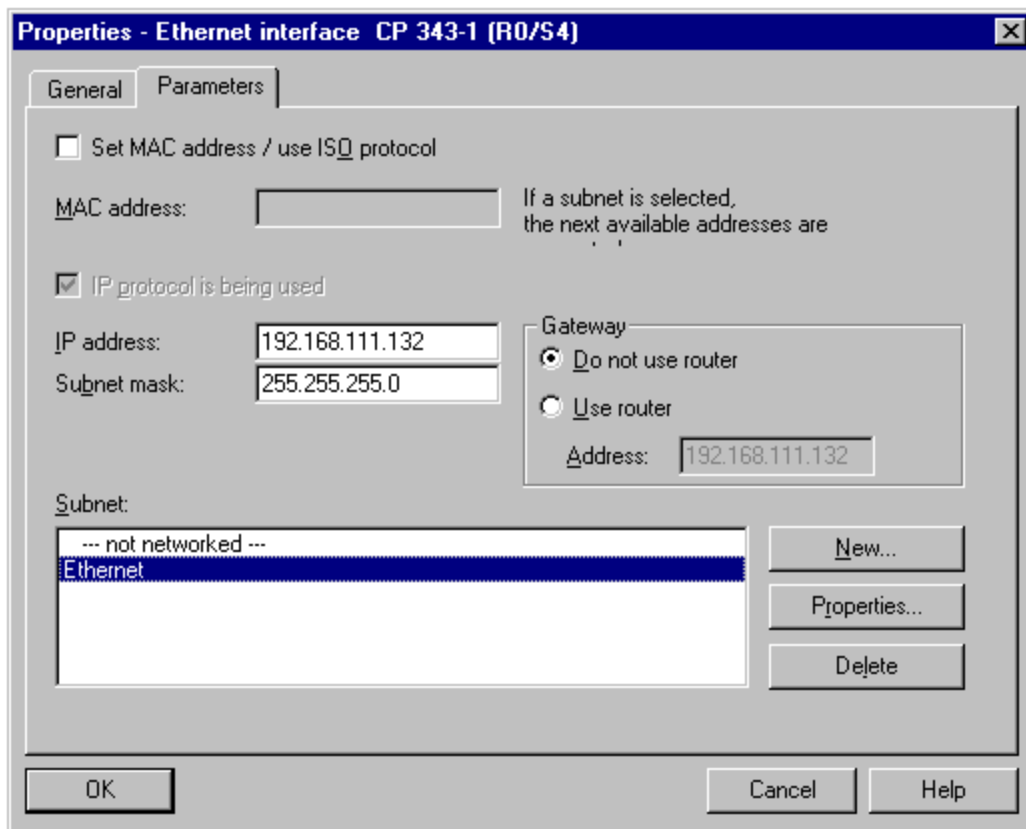
8. To insert the CP, leave slot 3 empty and then click on slot 4 in the racks.
9. Next, expand both the **CP 300** menu and the **Industrial Ethernet** menu. Then, double-click on the CP that matches the hardware.



Note: The window should appear as shown below.

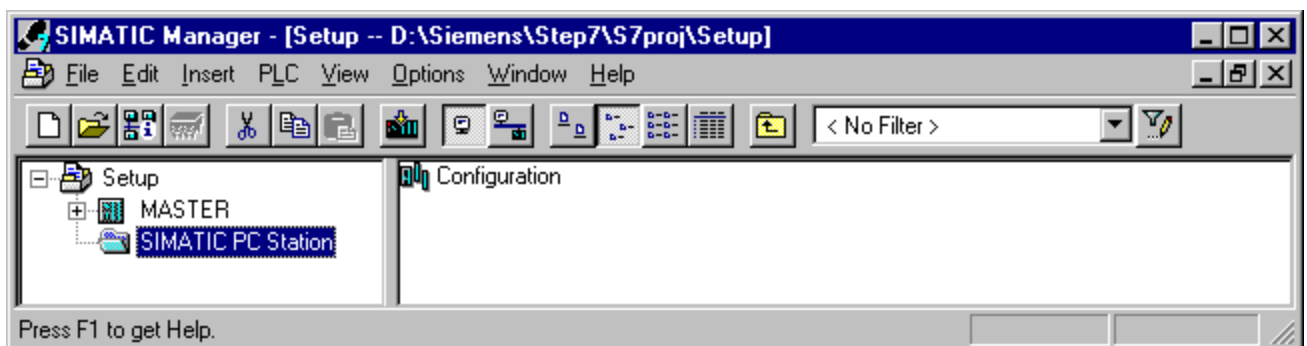


10. Next, enter the PLC's IP address and subnet mask. Then, select **Ethernet** from the subnet box.
11. Click **OK** to configure the Master.

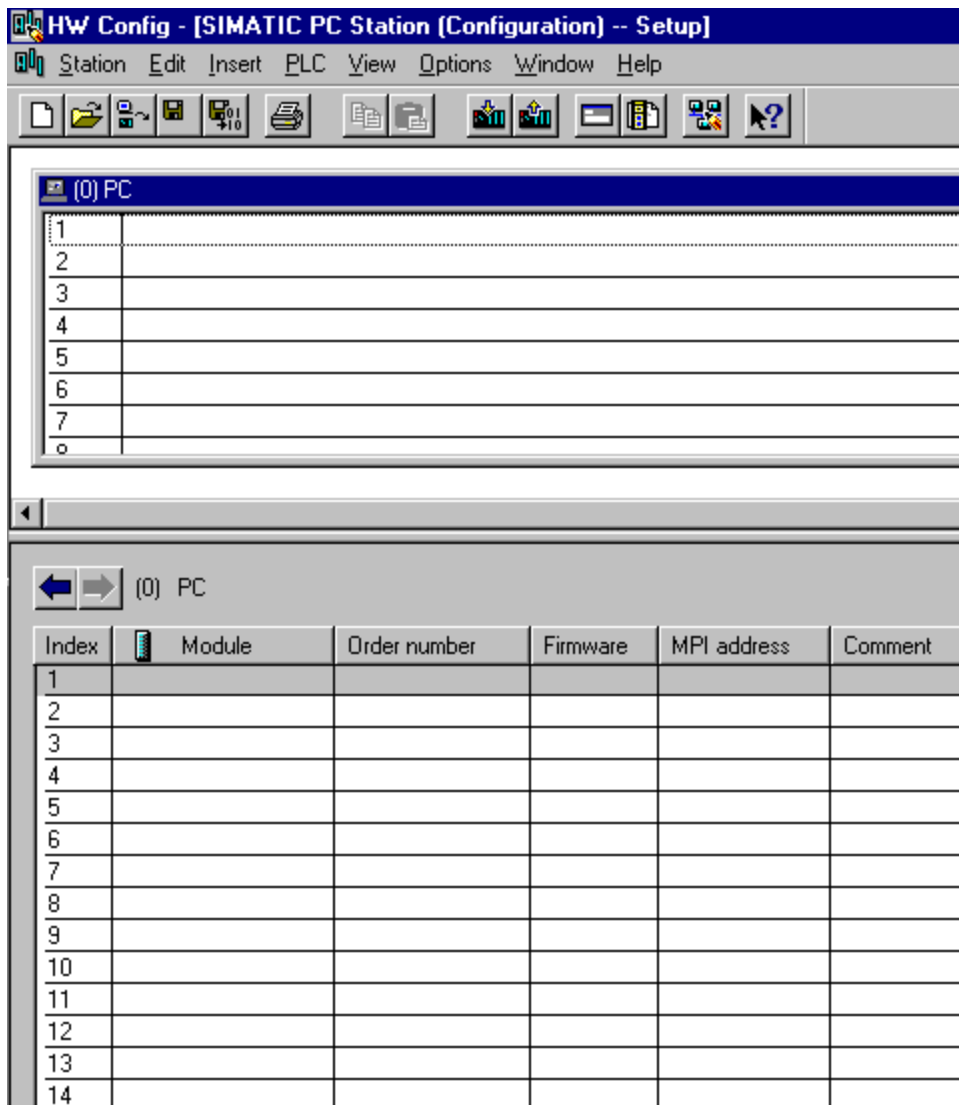


Note: Once finished, open the **View** tab and then select **Catalog** to hide the catalog window.

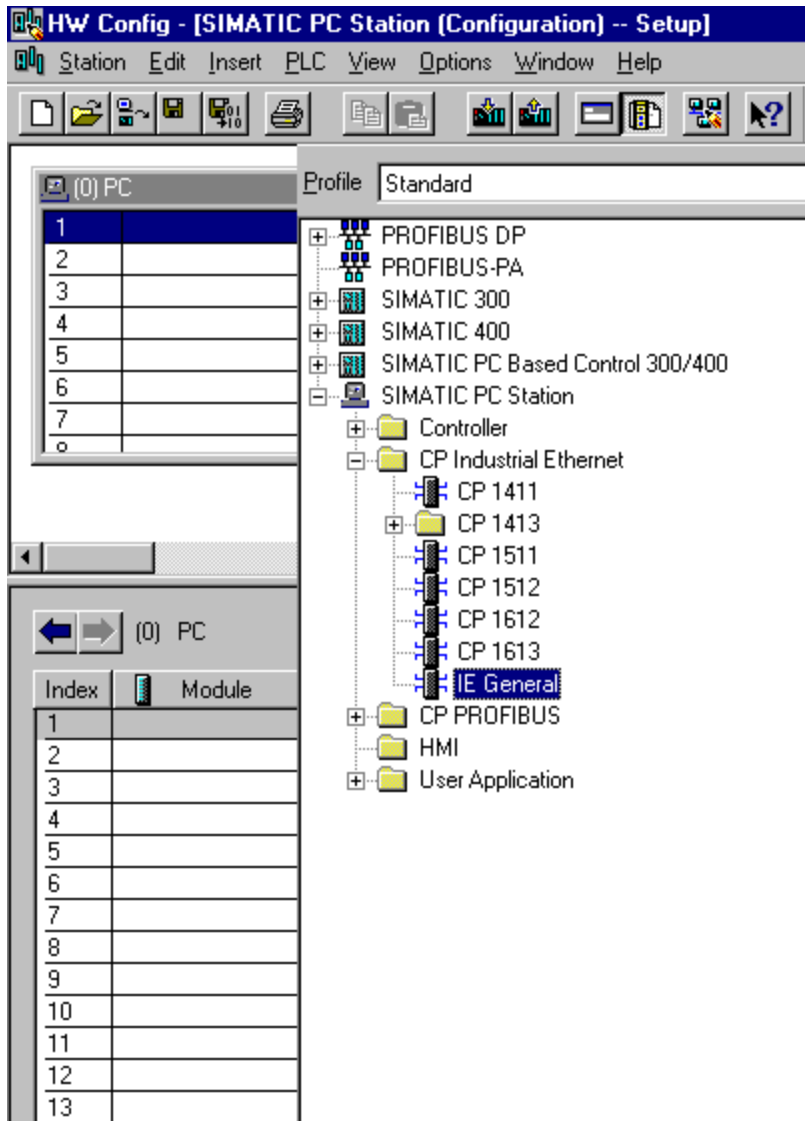
12. Save and exit the HW Configuration window.
13. To configure the PC station, click on the SIMATIC PC Station in the left pane of the SIMATIC Manager window. Then, double-click on **Configuration**.



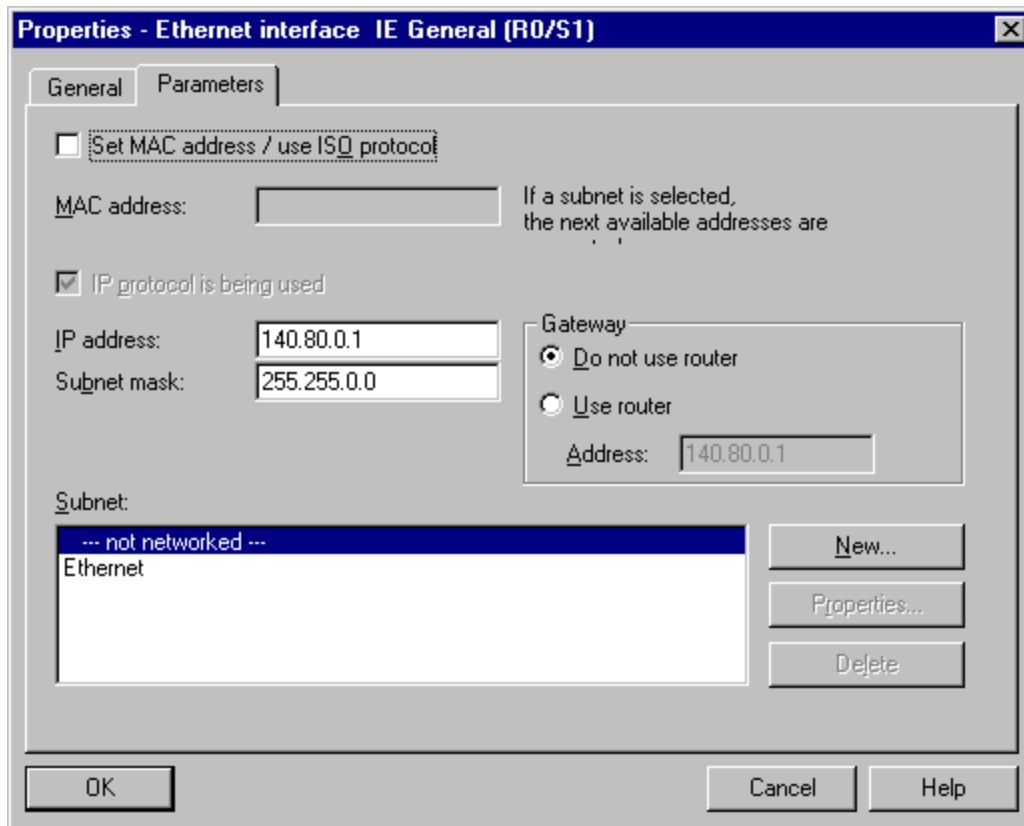
14. Next, click on the **View** tab and select **Catalog**.



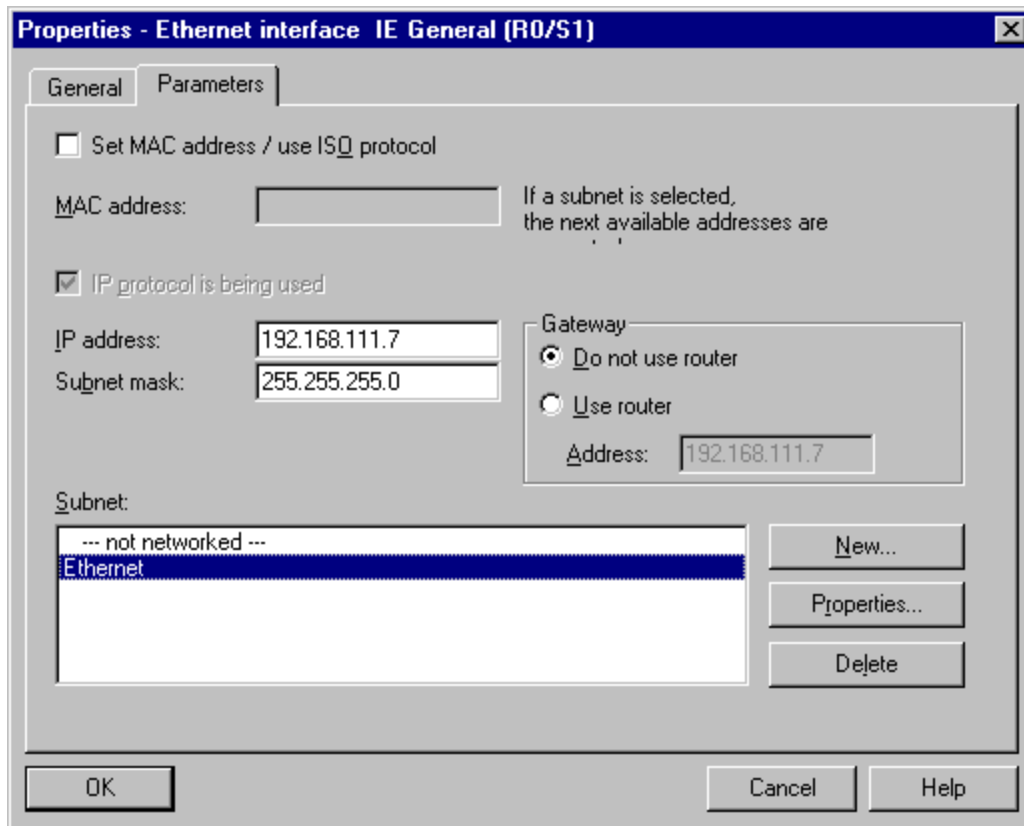
15. Expand both the **SIMATIC PC Station** menu and the **CP Industrial Ethernet** menu. Then, double-click on **IE General** or any other suitable option.



Note: The window should appear as shown below.



16. Enter the IP address of the PC running the SIMATIC Manager software, in addition to the correct subnet mask.
17. Next, select **Ethernet** from the subnet box. Then, click **OK** to configure the PC station.



Note: Once finished, open the **View** tab and then select **Catalog** to hide the catalog window.

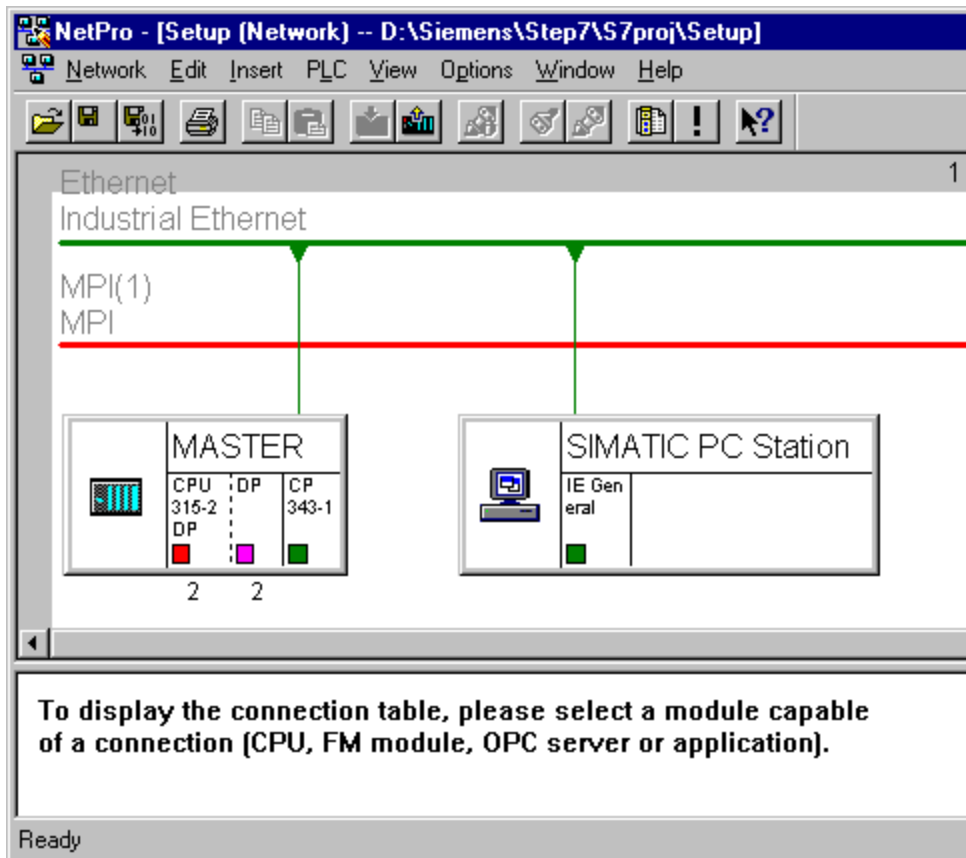
18. Save and exit the HW Configuration window.

Note: For more information, refer to [Step Three: Connecting the Master and the Slave Driver](#).

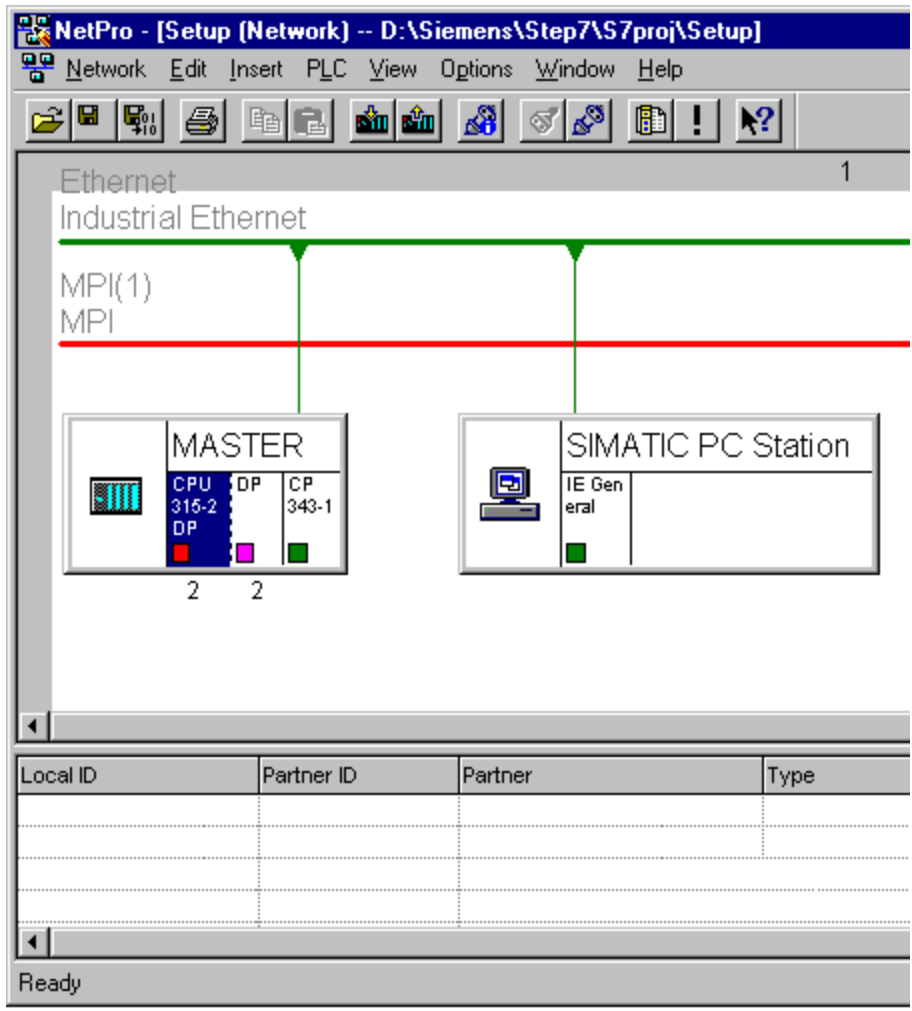
Step Three: Connecting the Master and the Slave Driver

Once the Master and the PC Station have been successfully configured, the Master and the Slave Driver must be connected.

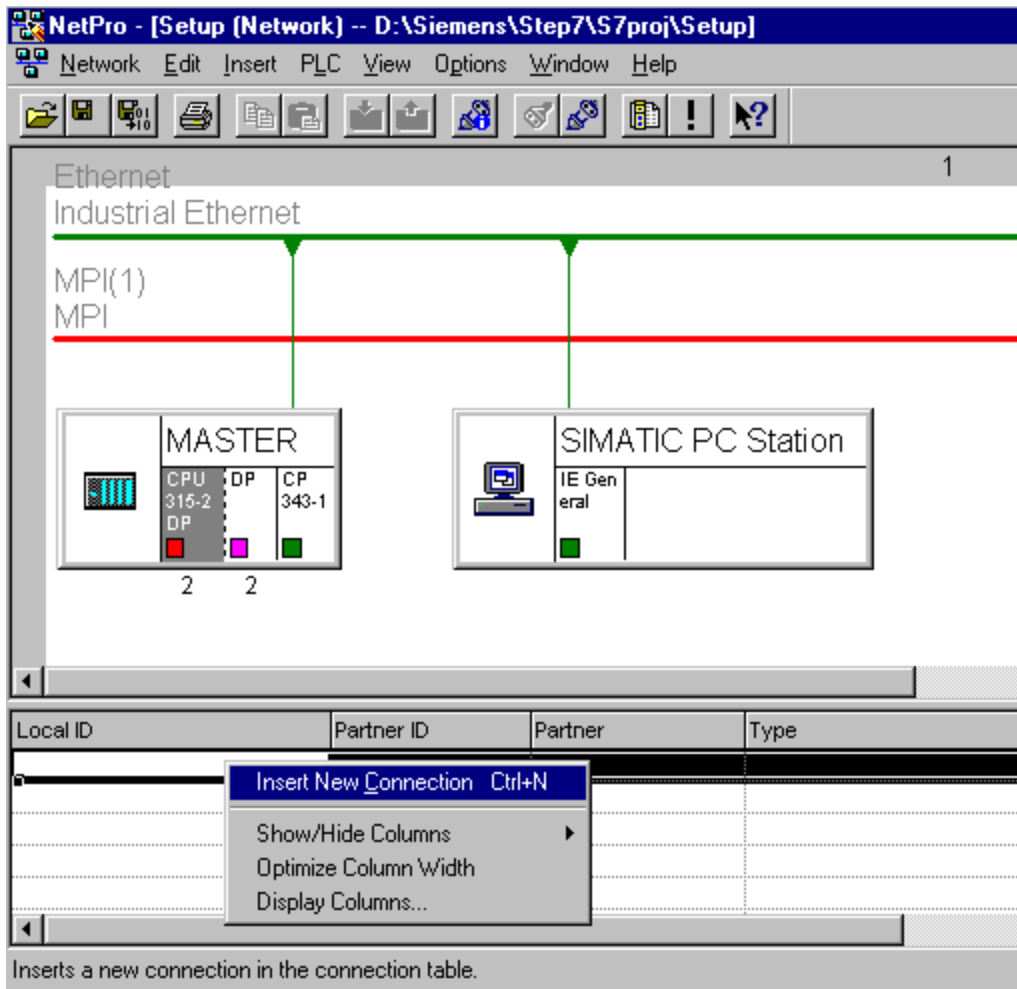
1. To start, open the **Options** tab in the SIMATIC Manager window and then select **Configure Network**.



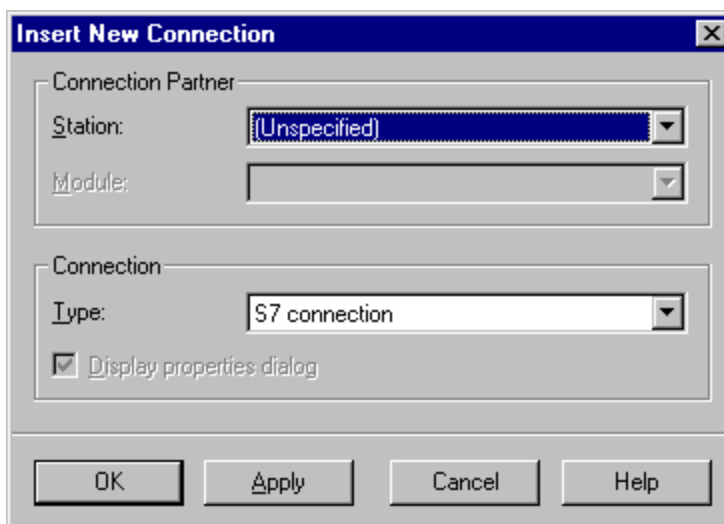
- Next, click on the Master's **CPU 315-2 DP** block. A series of rows should be displayed in the lower half of the window.



3. Right-click on the first row and select **Insert New Connection**.



4. Then, click **OK**.



Note: The window should appear as shown below.

Properties - S7 connection

General | Status Information

Local Connection End Point

Fixed configured dynamic connection

One-way

Establish an active connection

Send operating mode messages

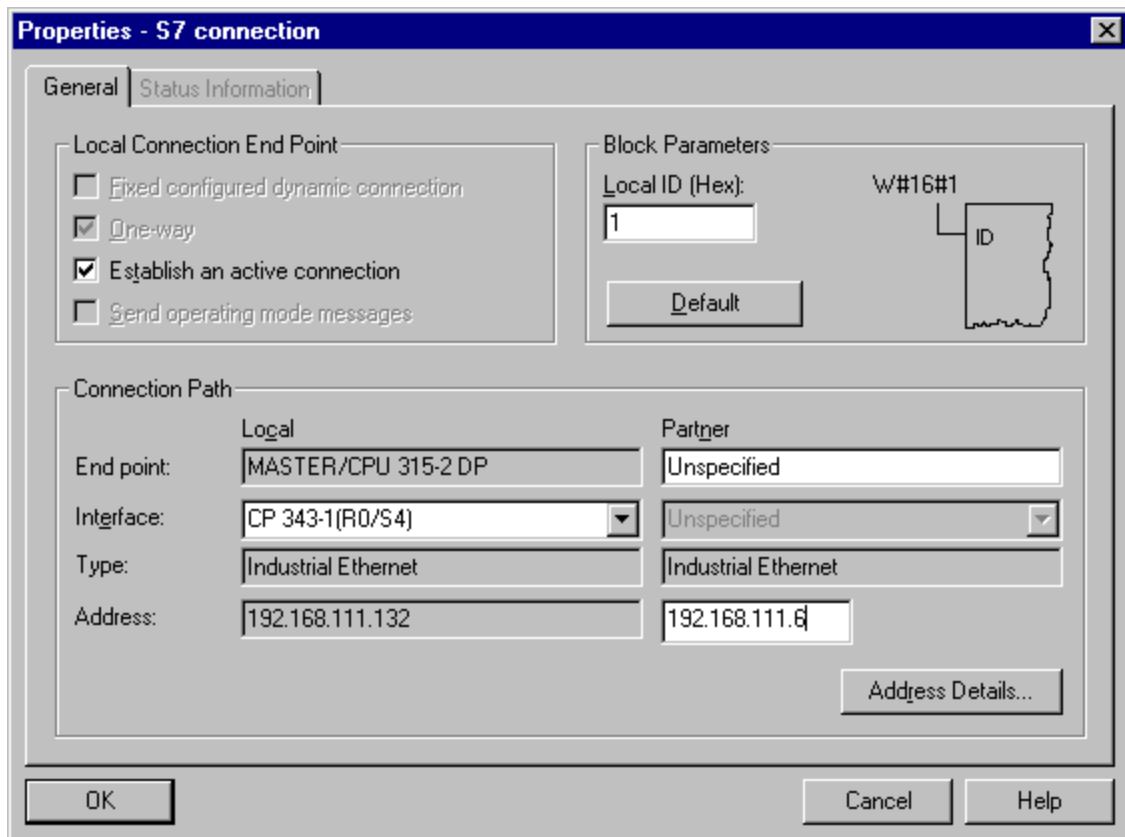
Block Parameters

Local ID (Hex): W#16#1

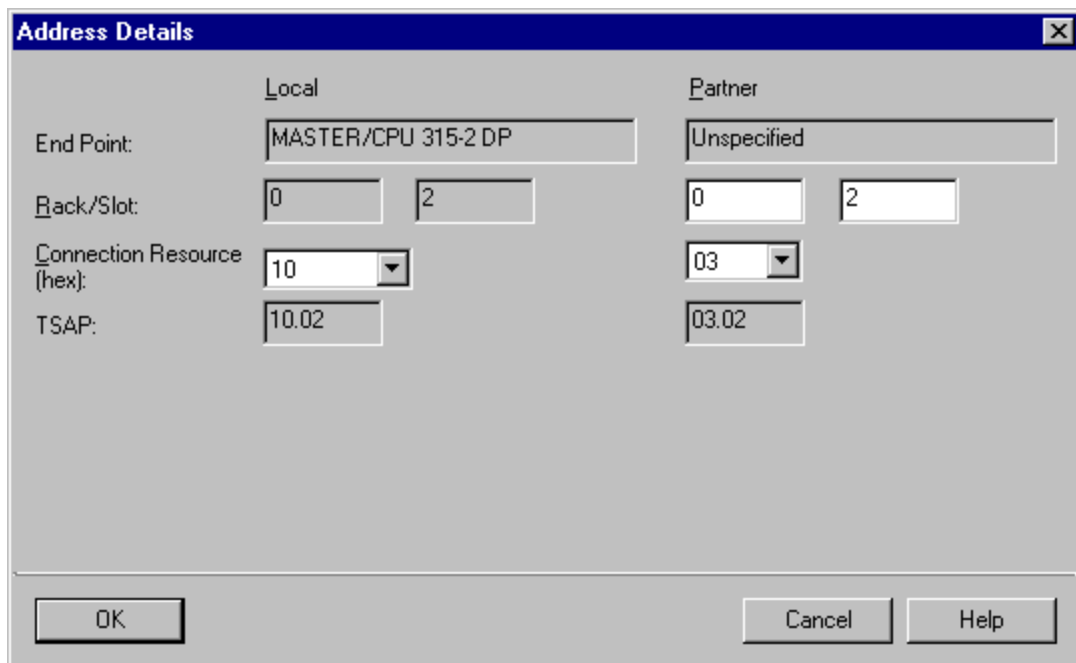
Connection Path

	Local	Partner
End point:	<input type="text" value="MASTER/CPU 315-2 DP"/>	<input type="text" value="Unspecified"/>
Interface:	<input type="text" value="CP 343-1(R0/S4)"/>	<input type="text" value="Unspecified"/>
Type:	<input type="text" value="Industrial Ethernet"/>	<input type="text" value="Industrial Ethernet"/>
Address:	<input type="text" value="192.168.111.132"/>	<input type="text" value=""/>

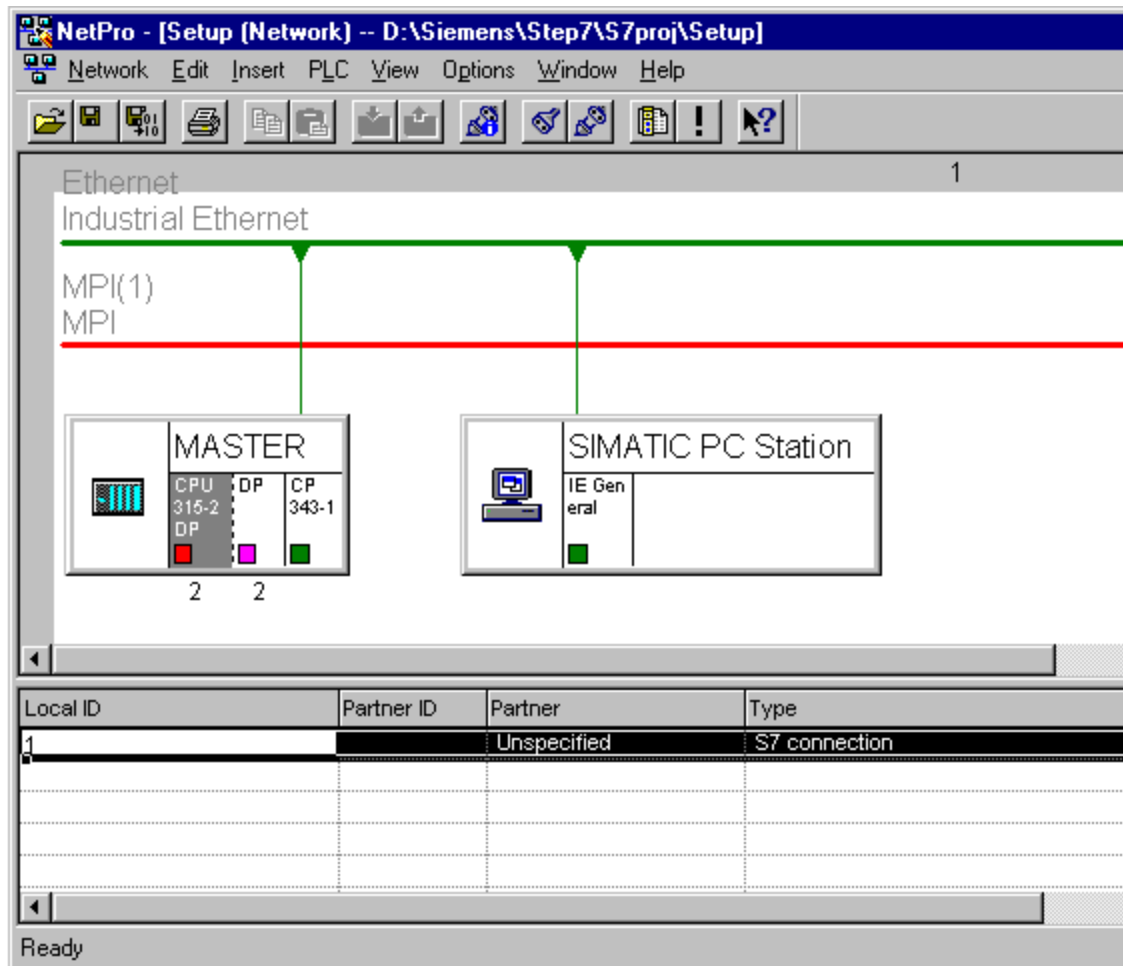
- Next, enter the IP address of the machine on which the Siemens TCP/IP Slave Ethernet Driver will be running.



- Next, click **Address Details** and enter the rack/slot values of the device in the unsolicited driver with which the Master will be communicating.



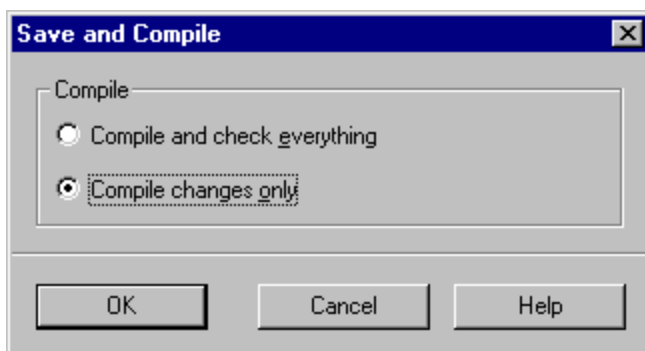
- Once finished, click **OK** twice to successfully connect the master and slave drivers. The master will use these settings to communicate with the destination device at rack 0 and slot 2.



Note: The Local ID number (=1) identifies the connection between the two partners. This number will be used later when creating function blocks for reading and writing data.

- To finish, save and compile the data by opening the **Network** tab and selecting **Save and Compile**. Then, click **OK**.

Note: There should be no errors on compilation.

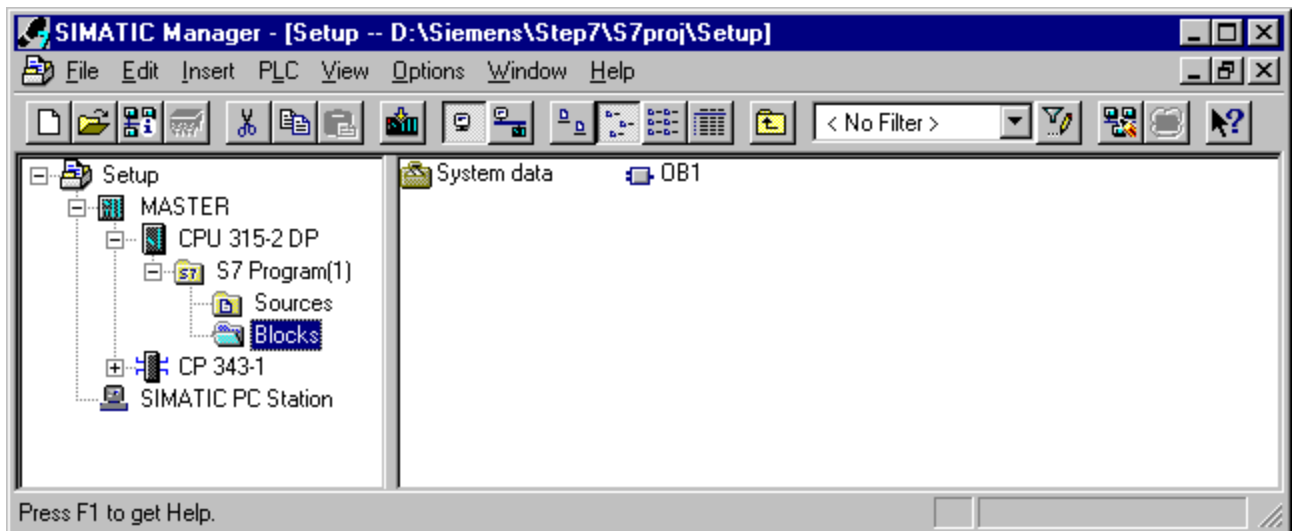


Note: For more information, refer to [Step Four: Inserting Function Blocks](#).

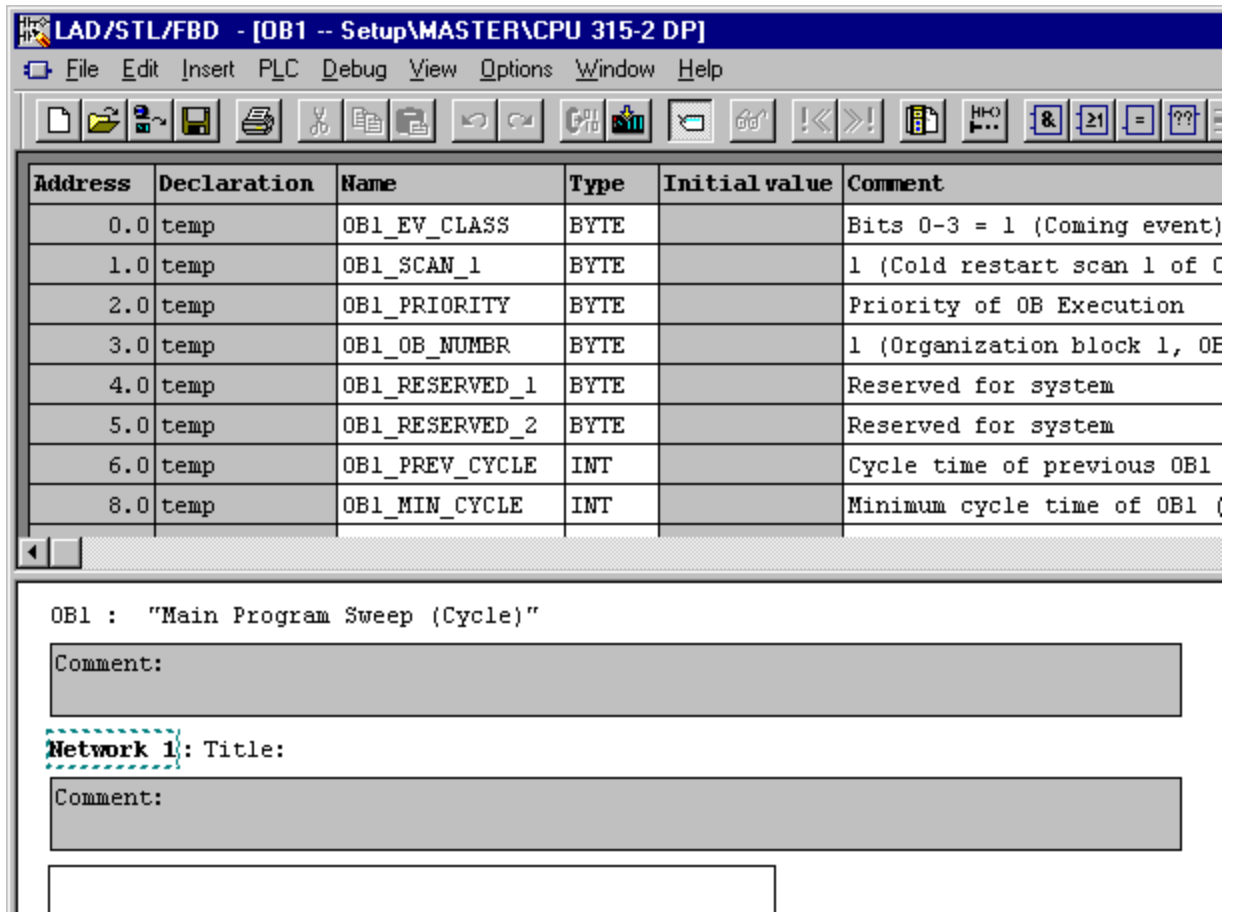
Step Four: Inserting Function Blocks

Once the master has been configured and connected with the unsolicited driver, it must also be prepared to generate requests for the unsolicited partner. This is done by creating function blocks, which can be used to read data from or write data to an unsolicited driver. The function block (FB) used for reading data in this example is FB14 (GET). The function block (FB) for writing data is FB15 (PUT).

1. To start, expand the Master menu, the **CPU 315-2 DP** menu, and the **S7 Program[1]** menu.
2. Next, double-click on **Blocks** and **OB1**.



3. LAD, STL, or FBD can be used to create function blocks. In this example, FBD is used. In the LAD/STL/FBD window, click on the **Insert** menu.



4. Then, click **Program Elements**.

The screenshot shows the SIMATIC Manager interface for OB1. The top part displays a table of variable declarations. The 'Program Elements' menu item is highlighted in the 'Insert' menu. Below the table, the network editor shows 'Network 1' with a title and comment field.

Address	D	Type	Initial value	Comment
0.0	t	BYTE		Bits 0-3 = 1 (Coming even
1.0	t	BYTE		1 (Cold restart scan 1 of
2.0	t	BYTE		Priority of OB Execution
3.0	t	BYTE		1 (Organization block 1,
4.0	t	BYTE		Reserved for system
5.0	temp	BYTE	OB1_RESERVED_2	Reserved for system
6.0	temp	INT	OB1_PREV_CYCLE	Cycle time of previous OB
8.0	temp	INT	OB1_MIN_CYCLE	Minimum cycle time of OB1

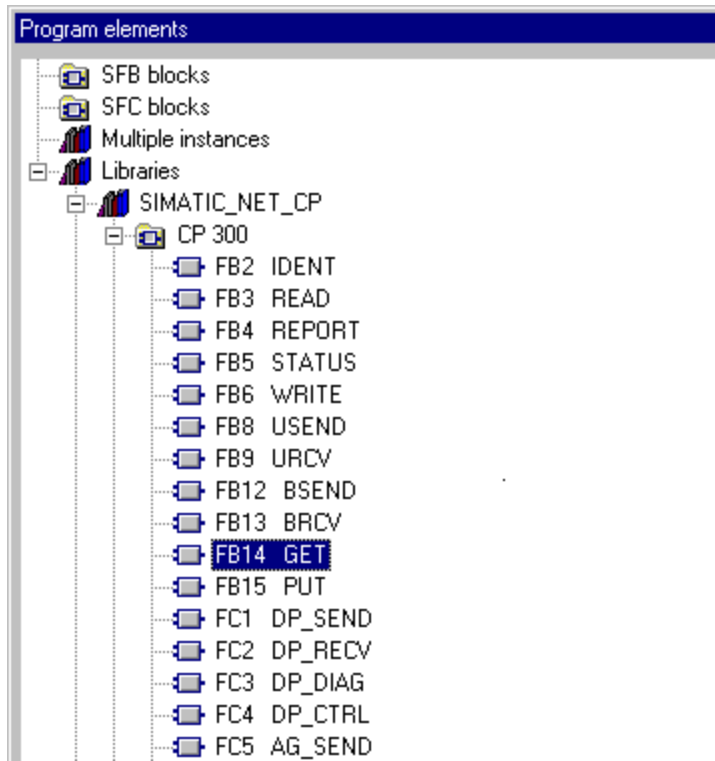
OB1 : "Main Program Sweep (Cycle)"

Comment:

Network 1: Title:

Comment:

5. Next, expand the **Libraries**, **SIMATIC_NET_CP**, and **CP 300** menu. Then, double-click on **FB14 GET** to insert a function block to read data.



6. Close the **Program Elements** window. "FB14" should be inserted as shown below.

The screenshot shows the SIMATIC Manager interface with the following components:

Address	Declaration	Name	Type	Initial value	Comment
0.0	temp	OB1_EV_CLASS	BYTE		Bits 0-3 = 1 (Comi
1.0	temp	OB1_SCAN_1	BYTE		1 (Cold restart sc
2.0	temp	OB1_PRIORITY	BYTE		Priority of OB Exe
3.0	temp	OB1_OB_NUMBR	BYTE		1 (Organization bl
4.0	temp	OB1_RESERVED_1	BYTE		Reserved for syste
5.0	temp	OB1_RESERVED_2	BYTE		Reserved for syste
6.0	temp	OB1_PREV_CYCLE	INT		Cycle time of prev
8.0	temp	OB1_MIN_CYCLE	INT		Minimum cycle time

Below the table, the OB1 block is titled "Main Program Sweep (Cycle)". It has a "Comment:" field.

Network 1: Title: []
Comment: []

The function block diagram for "GET" (FB14) is shown with three red question marks above it. The block has the following ports:

- EN (Enable)
- REQ (Request)
- ID (Identifier)
- ADDR_1 (Address 1)
- RD_1 (Read Data 1)
- NDR (Not Done)
- ERROR (Error)
- STATUS (Status)
- ENO (Enable Done)

Symbol information:

FB14	GET	Read Data From a Remote CPU
------	-----	-----------------------------

7. Next, associate a data block (DB) with the function block (FB). To do so, click above the FB where there are three red question marks.

8. Enter the name of a data block. In this example, it is "DB2".

LAD/STL/FBD - [OB1 -- Setup\MASTER\CPU 315-2 DP]

File Edit Insert PLC Debug View Options Window Help

Address	Declaration	Name	Type	Initial value	Comment
0.0	temp	OB1_EV_CLASS	BYTE		Bits 0-3 = 1 (Coming event), Bits 4
1.0	temp	OB1_SCAN_1	BYTE		1 (Cold restart scan 1 of OB 1), 3
2.0	temp	OB1_PRIORITY	BYTE		Priority of OB Execution
3.0	temp	OB1_OB_NUMBR	BYTE		1 (Organization block 1, OB1)
4.0	temp	OB1_RESERVED_1	BYTE		Reserved for system
5.0	temp	OB1_RESERVED_2	BYTE		Reserved for system
6.0	temp	OB1_PREV_CYCLE	INT		Cycle time of previous OB1 scan (mi
8.0	temp	OB1_MIN_CYCLE	INT		Minimum cycle time of OB1 (millisec

OB1 : "Main Program Sweep (Cycle)"

Comment:

Network 1: Title:

Comment:

DB2

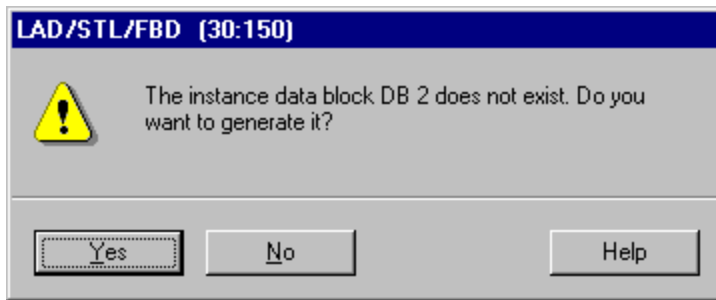
"GET"

... — EN		
... — REQ	NDR	... —
... — ID	ERROR	... —
... — ADDR_1	STATUS	... —
... — RD_1	ENO	—

Symbol information:

FB14	GET	Read Data From a Remote CPU
------	-----	-----------------------------

9. Next, click **Yes** to create the data block.



10. Next, fill in the other details as appropriate for the fields in the function block. Users should consider the following:
- "ADDR_1" is the address on the destination device in the unsolicited driver.
 - "RD_1" is the address local to the PLC.
 - The value at the remote address specified by "ADDR_1" is written (GET) to the local address specified by "RD_1".
 - Enter the Local ID number that was generated when setting up the connection between the Master and the Slave Driver in the **ID** field. In this example, the Local ID number is 1.

Important: The number of bytes in both the "ADDR_1" and "SD_1" fields should be same in order for the unsolicited driver to respond correctly. Otherwise, an error message will be sent.

LAD/STL/FBD - [OB1 -- Setup\MASTER\CPU 315-2 DP]

File Edit Insert PLC Debug View Options Window Help

Address	Declaration	Name	Type	Initial value	Comment
0.0	temp	OB1_EV_CLASS	BYTE		Bits 0-3 = 1 (Coming even
1.0	temp	OB1_SCAN_1	BYTE		1 (Cold restart scan 1 of
2.0	temp	OB1_PRIORITY	BYTE		Priority of OB Execution
3.0	temp	OB1_OB_NUMBR	BYTE		1 (Organization block 1,
4.0	temp	OB1_RESERVED_1	BYTE		Reserved for system
5.0	temp	OB1_RESERVED_2	BYTE		Reserved for system
6.0	temp	OB1_PREV_CYCLE	INT		Cycle time of previous OB
8.0	temp	OB1_MIN_CYCLE	INT		Minimum cycle time of OB1
10.0	temp	OB1_MAX_CYCLE	INT		Maximum cycle time of OB1
12.0	temp	OB1_DATE_TIME	DATE AND TIME		Date and time OB1 started

OB1 : "Main Program Sweep (Cycle)"

Comment:

Network 1: Title:

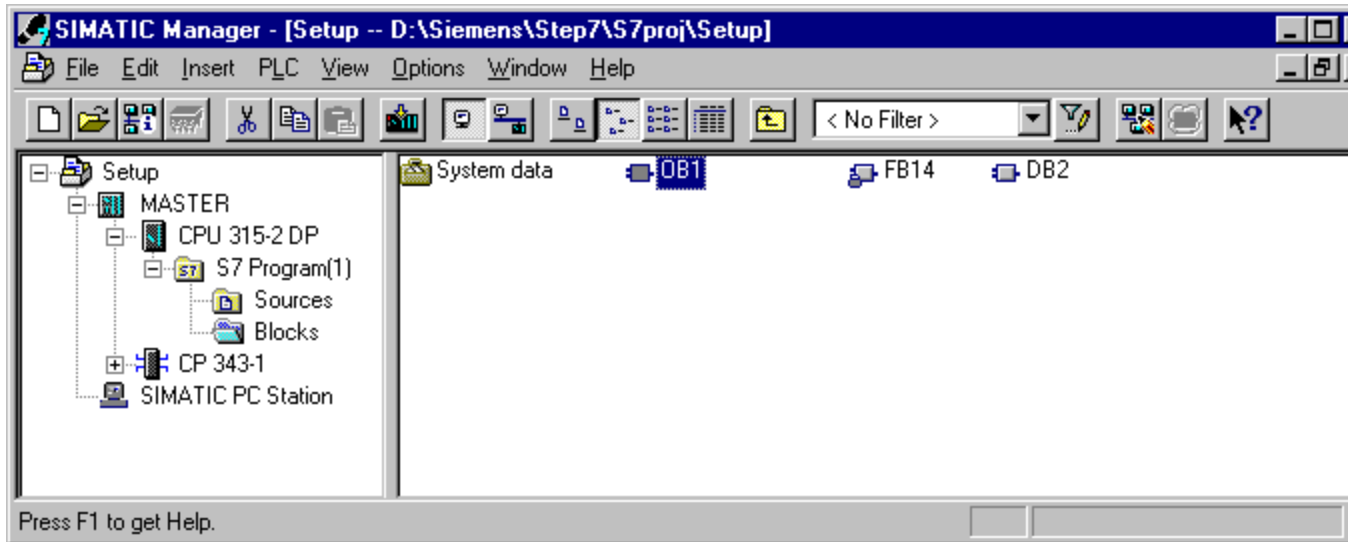
Comment:

Symbol information:

FB14	GET	Read Data From a Remote CPU
------	-----	-----------------------------

Note: Now that the GET function block has been created successfully, users must remember that the block gets executed/triggered only on a rising edge (REQ).

11. To finish, click **Save** and then close the **LAD/STL/FBD** window.

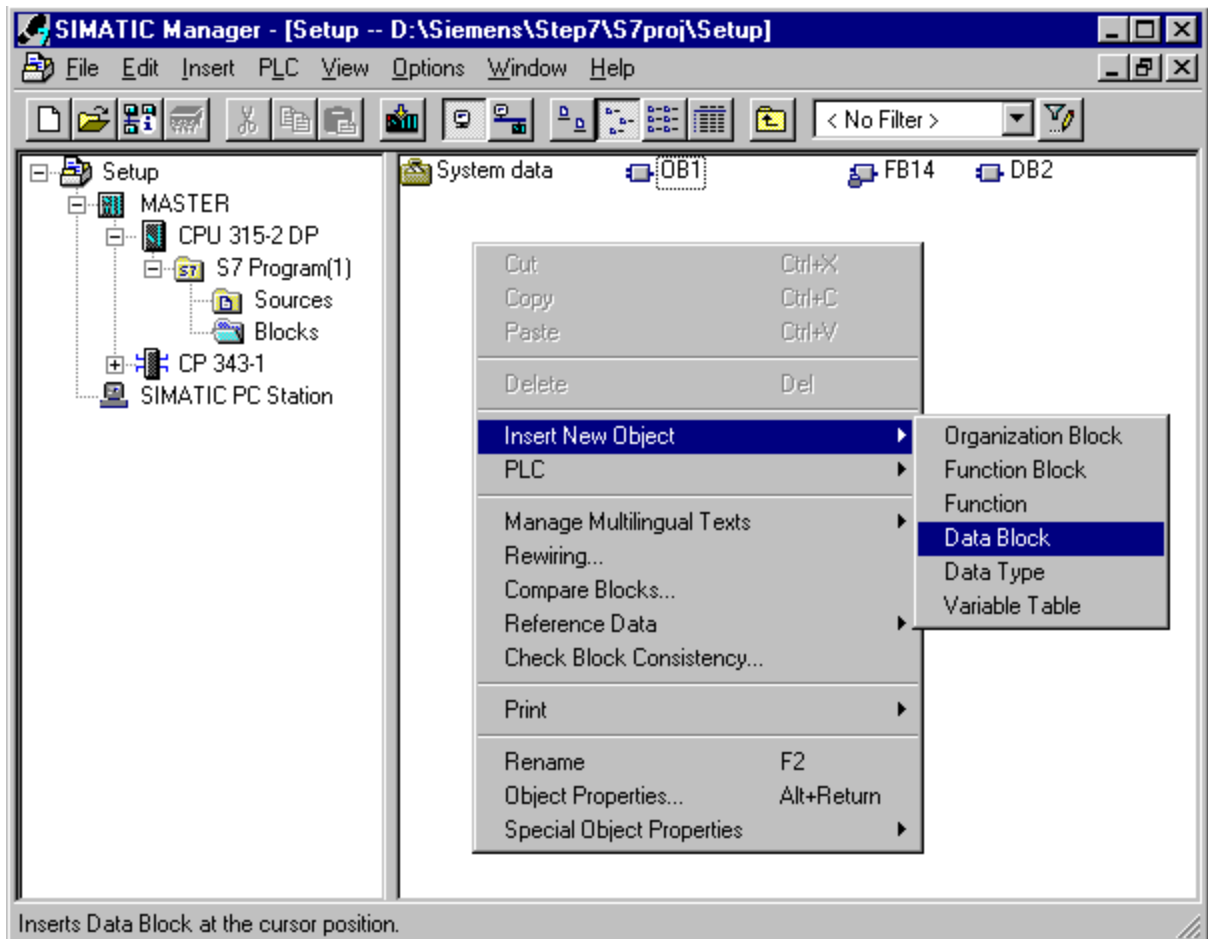


Note: For more information, refer to [Step Five: Creating the DB3 Data Block](#).

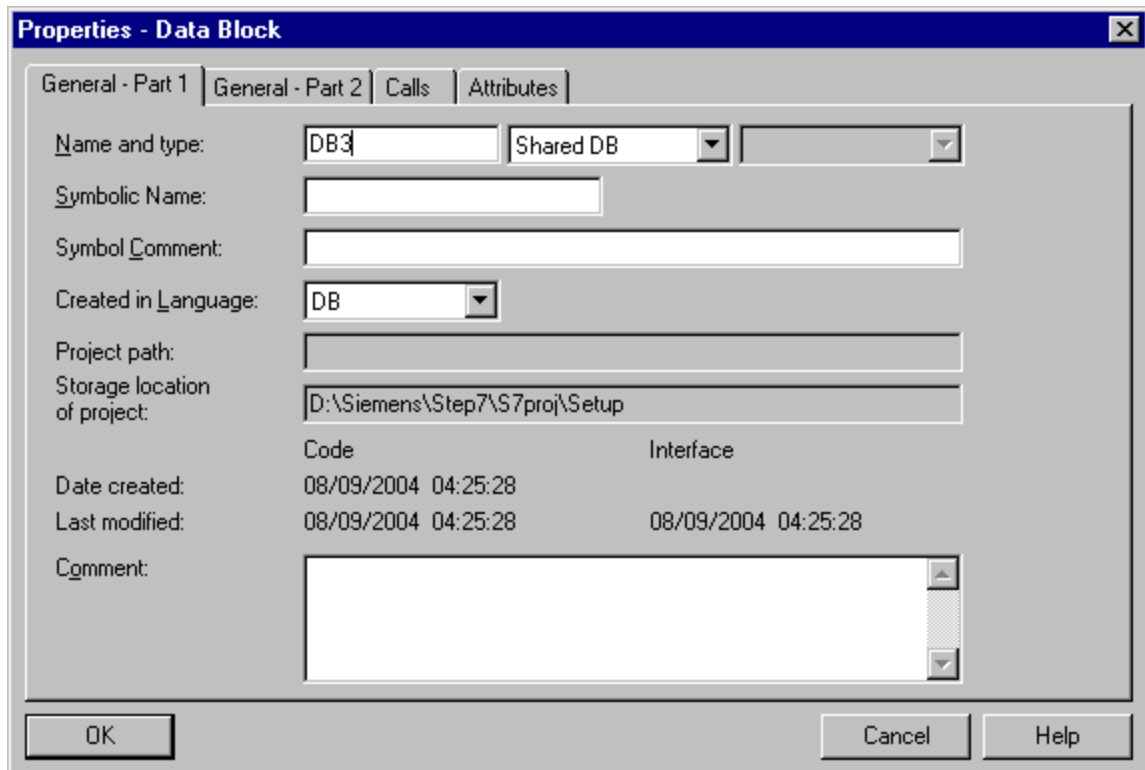
Step Five: Creating the DB3 Data Block

While configuring GET FB, the data block "DB3" was used for the "RD_1" field. This is the data block that will store read values.

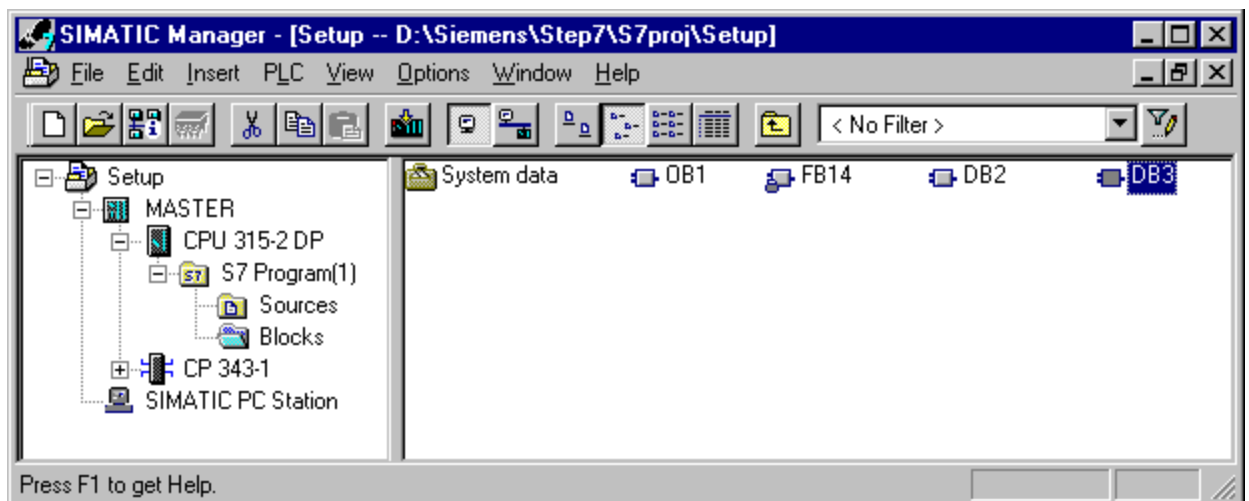
1. To start, right-click in the right pane of the SIMATIC Manager window and then select **Insert New Object | Data Block**.



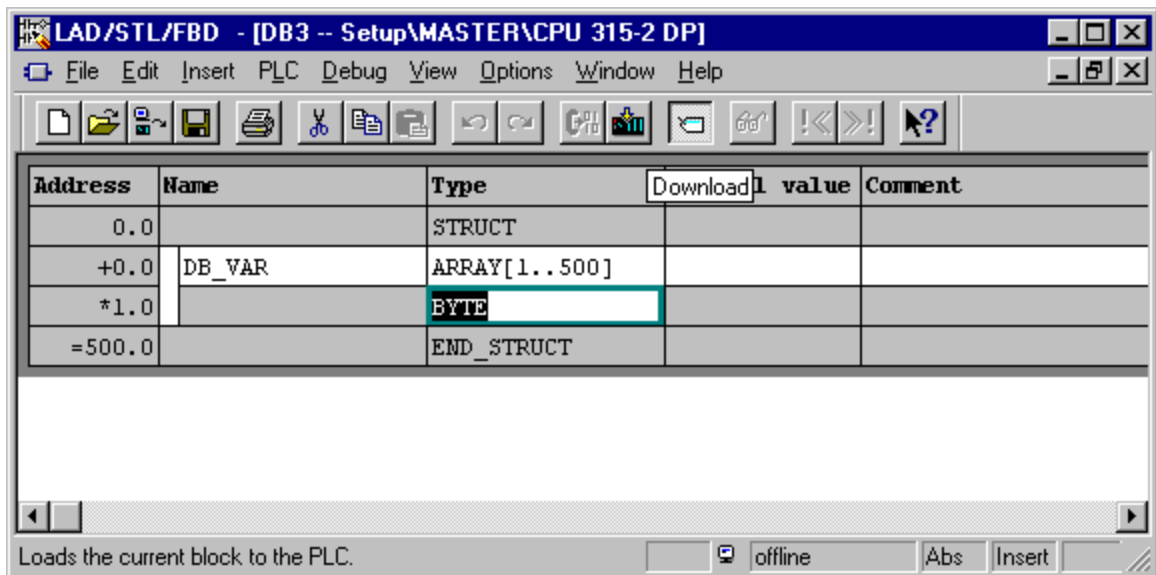
- Next, change the name to "DB3."



Note: The window should appear as shown below.



- Next, double-click on **DB3**. In order to assign some memory to the data block, users can make changes similar to those shown in the window below. Although the array size in this example was chosen arbitrarily, values should be specified to fit a particular need.

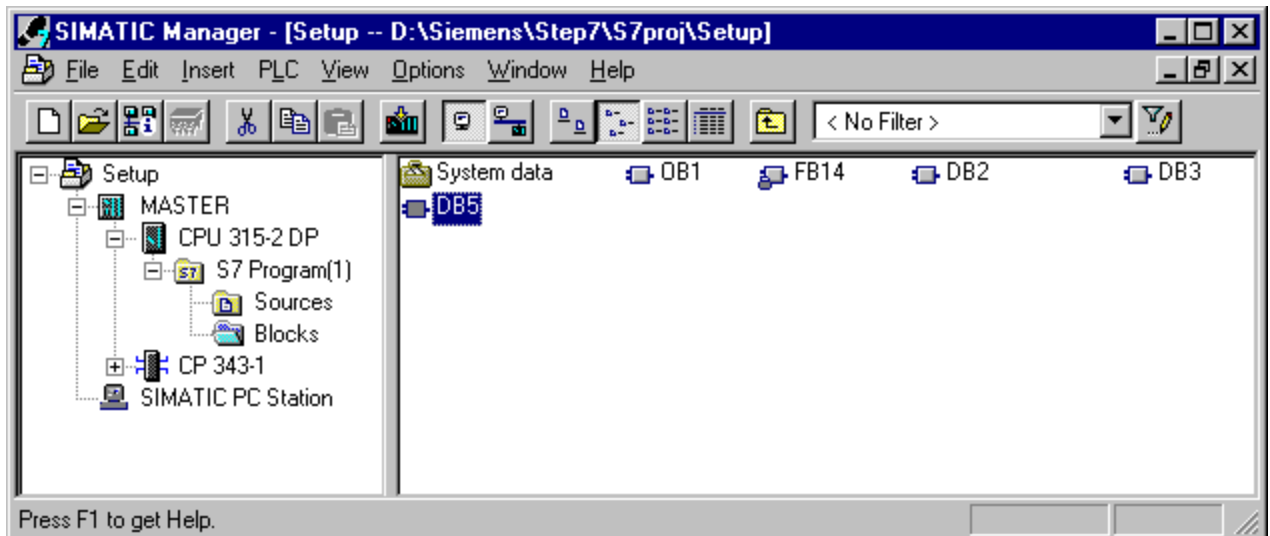


- Once finished, save and close the **LAD/STL/FBD** window.

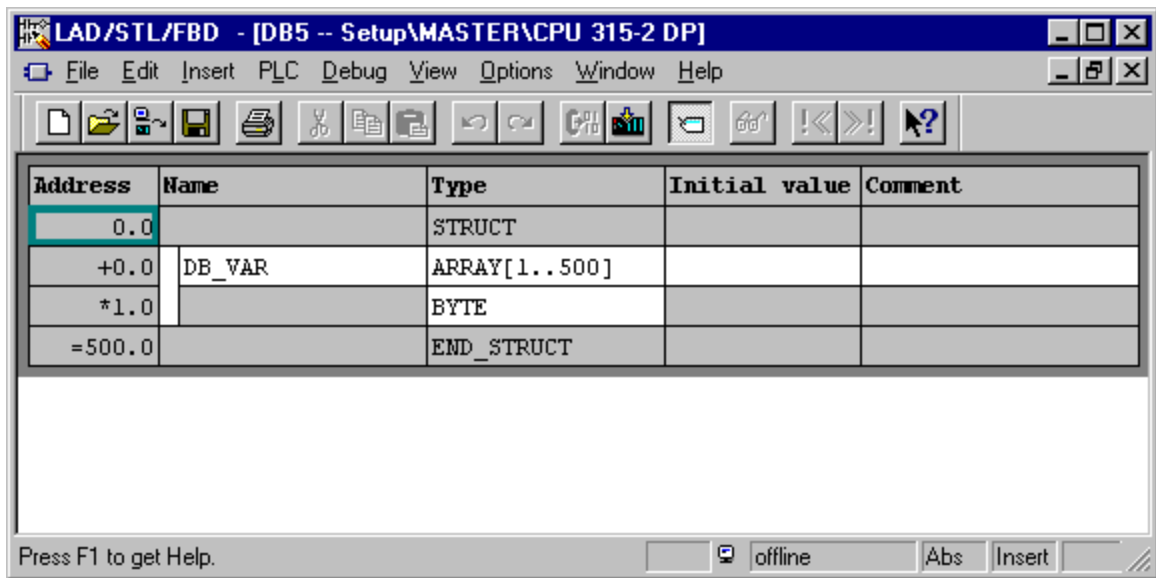
Note: For more information, refer to [Step Six: Inserting PUT FB](#).

Step Six: Inserting PUT FB

- Next, create a separate data block for the PUT FB, which holds the data that is written to the remote partner. To insert this new data block, follow the steps in [Step Five: Creating the DB3 Data Block](#) but name it "DB5."



- Double-click on **DB5**, and then specify a memory size. Although the array size in this example was chosen arbitrarily, the values should be specified to fit a particular need.



3. To insert the PUT FB, double-click on **OB1** in the SIMATIC Manager window. In **LAD/STL/FBD**, right-click in the blank space below **GET FB**.

- Next, click **Insert Network** and then select the blank space below.

The screenshot shows the SIMATIC Manager interface with a variable declaration table and a ladder logic network diagram.

Address	Declaration	Name	Type	Initial value	Comment
0.0	temp	OB1_EV_CLASS	BYTE		Bits 0-3 = 1 (Coming event),
1.0	temp	OB1_SCAN_1	BYTE		1 (Cold restart scan 1 of OB
2.0	temp	OB1_PRIORITY	BYTE		Priority of OB Execution
3.0	temp	OB1_OB_NUMBR	BYTE		1 (Organization block 1, OB1
4.0	temp	OB1_RESERVED_1	BYTE		Reserved for system
5.0	temp	OB1_RESERVED_2	BYTE		Reserved for system
6.0	temp	OB1_PREV_CYCLE	INT		Cycle time of previous OB1 s
8.0	temp	OB1_MIN_CYCLE	INT		Minimum cycle time of OB1 (m
10.0	temp	OB1_MAX_CYCLE	INT		Maximum cycle time of OB1 (m
12.0	temp	OB1_DATE_TIME	DATE_AND_TIME		Date and time OB1 started

The ladder logic network diagram shows a function block call for 'GET' (FB14) within a data block 'DB2'. The inputs and outputs are as follows:

- Inputs:**
 - EN: M0.0
 - REQ: M0.1
 - ID: W#16#1
 - ADDR_1: P#I 0.0 BY TE 10
 - RD_1: P#DB3.DBX0 .0 BYTE 10
- Outputs:**
 - NDR: M0.2
 - ERROR: M0.3
 - STATUS: MW1
 - ENO: (unlabeled output)

Symbol information:

FB14	GET	Read Data From a Remote CPU
------	-----	-----------------------------

Network 2: Title:
 Comment:

- Next, click **Insert | Program Elements**. Then, expand the **Libraries, SIMATIC_NET_CP,** and **CP 300** menus.

6. To insert a function block to write data, double-click on **FB15 PUT**. Then, close the **Program Elements** window.

LAD/STL/FBD - [OB1 -- Setup\MASTER\CPU 315-2 DP]

File Edit Insert PLC Debug View Options Window Help

Address	Declaration	Name	Type	Initial value	Comment
0.0	temp	OB1_EV_CLASS	BYTE		Bits 0-3 = 1 (Coming event),
1.0	temp	OB1_SCAN_1	BYTE		1 (Cold restart scan 1 of OB
2.0	temp	OB1_PRIORITY	BYTE		Priority of OB Execution
3.0	temp	OB1_OB_NUMBR	BYTE		1 (Organization block 1, OB1
4.0	temp	OB1_RESERVED_1	BYTE		Reserved for system
5.0	temp	OB1_RESERVED_2	BYTE		Reserved for system
6.0	temp	OB1_PREV_CYCLE	INT		Cycle time of previous OB1 s
8.0	temp	OB1_MIN_CYCLE	INT		Minimum cycle time of OB1 (m
10.0	temp	OB1_MAX_CYCLE	INT		Maximum cycle time of OB1 (m
12.0	temp	OB1_DATE_TIME	DATE_AND_TIME		Date and time OB1 started

.0 BYTE 10 — RD_1 ENO —

Symbol information:

FB14	GET	Read Data From a Remote CPU
------	-----	-----------------------------

Network 2: Title:

Comment:

7. Next, associate a data block (DB) with the function block (FB). To do so, click above the FB where there are three red question marks. Then, specify a name. In this example, "DB4" is used.

Note: A window prompt will ask for confirmation of data block creation. Click **Yes**.

8. Fill in the other details as appropriate. Users should consider the following:
- "ADDR_1" address is on the destination device in the unsolicited driver.
 - "SD_1" is the address local to the PLC.

- The value at the local address specified by "SD_1" is written (PUT) to the remote address specified by "ADDR_1".
- Enter the Local ID number that was generated when setting up the connection between the Master and the Slave Driver in the **ID** field. In this example, the Local ID number is 1.

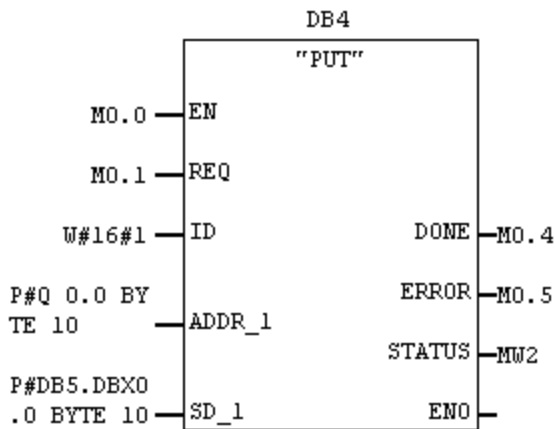
Important: The number of bytes in both the "ADDR_1" and "SD_1" fields should be same in order for the unsolicited driver to respond correctly. Otherwise, an error message will be sent.

LAD/STL/FBD - [OB1 -- Setup\MASTER\CPU 315-2 DP]

File Edit Insert PLC Debug View Options Window Help

Address	Declaration	Name	Type	Initial value	Comment
0.0	temp	OB1_EV_CLASS	BYTE		Bits 0-3 = 1 (Coming ev
1.0	temp	OB1_SCAN_1	BYTE		1 (Cold restart scan 1
2.0	temp	OB1_PRIORITY	BYTE		Priority of OB Executio
3.0	temp	OB1_OB_NUMBR	BYTE		1 (Organization block 1
4.0	temp	OB1_RESERVED_1	BYTE		Reserved for system
5.0	temp	OB1_RESERVED_2	BYTE		Reserved for system
6.0	temp	OB1_PREV_CYCLE	INT		Cycle time of previous
8.0	temp	OB1_MIN_CYCLE	INT		Minimum cycle time of 0
10.0	temp	OB1_MAX_CYCLE	INT		Maximum cycle time of 0
12.0	temp	OB1_DATE_TIME	DATE_AND_TIME		Date and time OB1 start

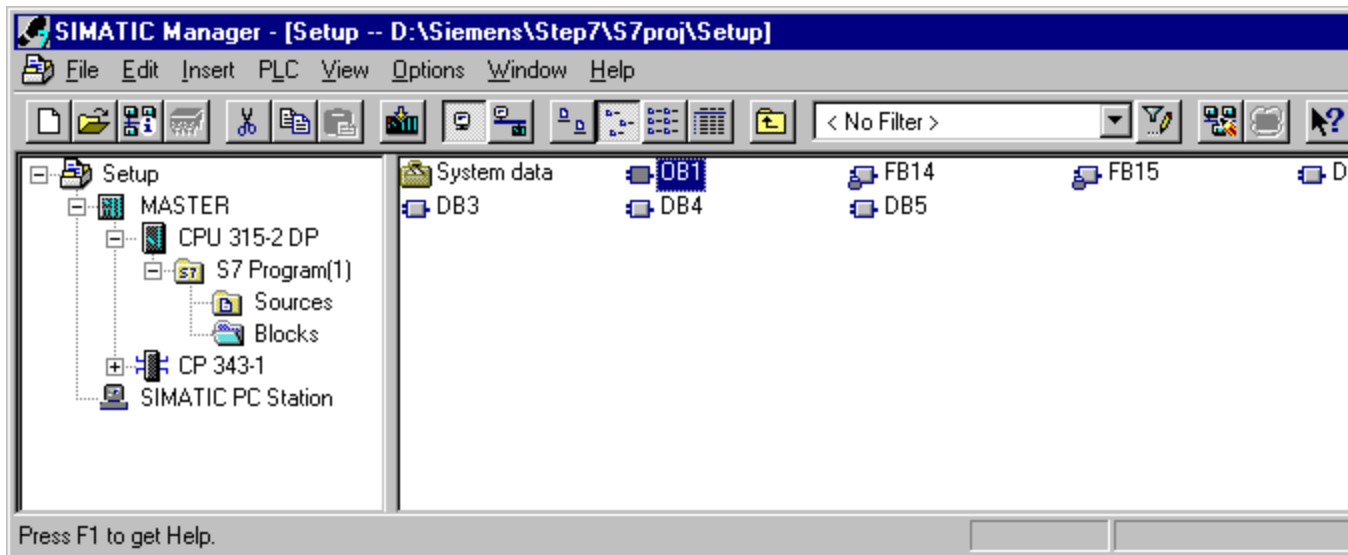
Comment:



Symbol information:

FB15	PUT	Write Data to a Remote CPU
------	-----	----------------------------

9. To finish, click **Save** and then close **LAD/STL/FBD**.

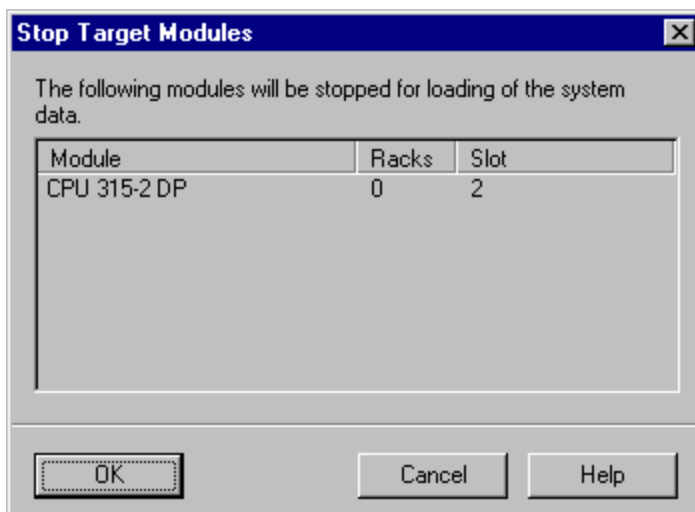


Note: For more information, refer to [Step Seven: Downloading to the PLC](#).

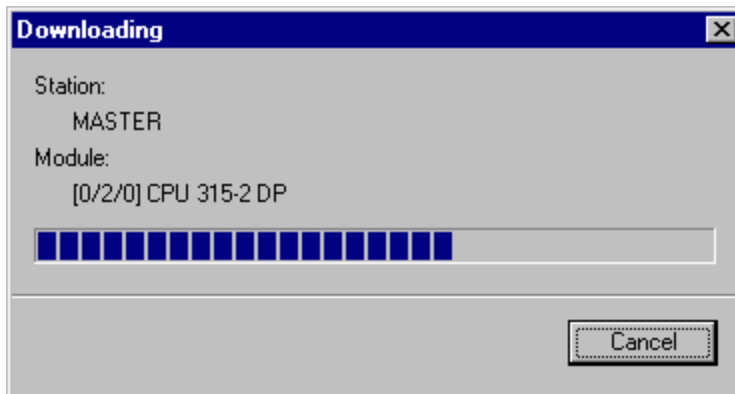
Step Seven: Downloading to the PLC

Once the Master has been prepared to generate Read/Write requests for the remote unsolicited partner, the information must be downloaded to the PLC.

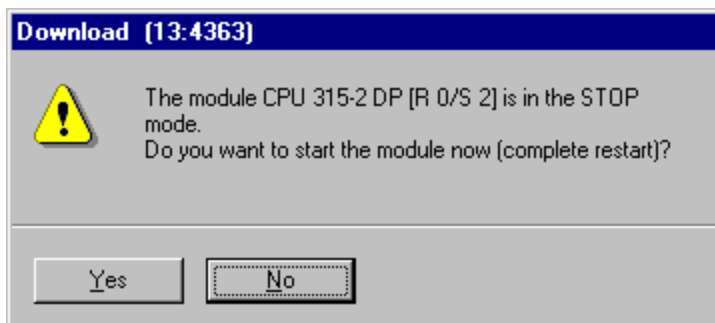
1. To start, click **Master** in the left pane of the SIMATIC Manager window. Then, select the **PLC** menu.
2. Next, select **Download** to begin downloading the project to the PLC.



- Click **OK**.

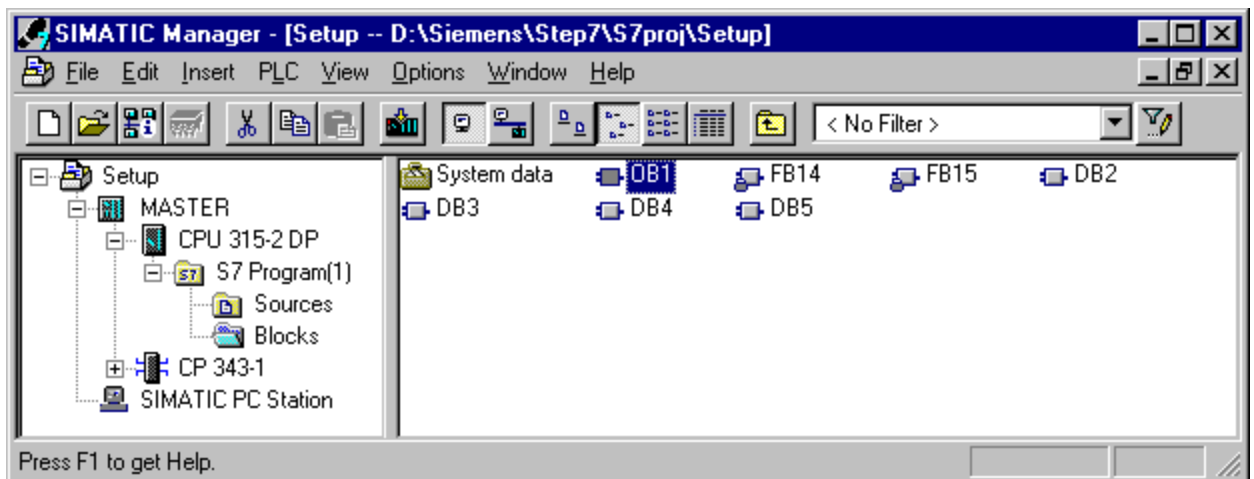


- Then, click **Yes**.



Note: The master must be run in order to trigger the function blocks that generate Read/Write requests.

- Double-click on **OB1** in the SIMATIC Manager window.



- In **LAD/STL/FBD**, click **Debug | Monitor**.

The screenshot shows the Siemens LAD/STL/FBD editor interface. The title bar reads "LAD/STL/FBD - [OB1 -- Setup\MASTER\CPU 315-2 DP]". The menu bar includes File, Edit, Insert, PLC, Debug, View, Options, Window, and Help. The toolbar contains icons for file operations and execution. A "Monitor" menu is open, showing options like "Monitor (Ctrl+F7)", "Call Environment...", "Operation...", "Modify Address...", "Set Breakpoint (Ctrl+H)", "Delete All Breakpoints (Ctrl+Shift+H)", "Breakpoints Active (F4)", "Show Next Breakpoint", "Resume (Ctrl+F8)", "Execute Next Statement (Ctrl+F9)", and "Execute Call (Ctrl+F12)".

The main workspace displays a ladder logic network diagram for "Network 1". The network title is "Network 1: Title:". Below the title is a comment field. The diagram shows a function block "GET" (FB14) with the following connections:

- EN: MO.0
- REQ: MO.1
- ID: W#16#1
- ADDR_1: P#I 0.0 BY TE 10
- RD_1: P#DB3.DBX0 .0 BYTE 10
- MDR: MO.2
- ERROR: MO.3
- STATUS: MW1
- ENO: (unconnected)

Below the diagram is the "Symbol information:" section, which shows:

FB14	GET	Read Data From a Remote CPU
------	-----	-----------------------------

Note: LAD/STL/FBD should appear in Online Mode as shown below.

LAD/STL/FBD - [@OB1 -- Setup\MASTER\CPU 315-2 DP] ONLINE

File Edit Insert PLC Debug View Options Window Help

Address	Declaration	Name	Type	Initial value
0.0	temp	OBI_EV_CLASS	BYTE	
1.0	temp	OBI_SCAN_1	BYTE	
2.0	temp	OBI_PRIORITY	BYTE	
3.0	temp	OBI_OB_NUMBR	BYTE	
4.0	temp	OBI_RESERVED_1	BYTE	
5.0	temp	OBI_RESERVED_2	BYTE	
6.0	temp	OBI_PREV_CYCLE	INT	
8.0	temp	OBI_MIN_CYCLE	INT	

OBI : "Main Program Sweep (Cycle)"

Comment:

Network 1: Title:

Comment:

Symbol information:

FB14	GET	Read Data From a Remote CPU
------	-----	-----------------------------

Press F1 to get Help. ▶ RUN Abs

- To execute **GET/PUT FBs**, change the **REQ** value to 0 and then 1 to indicate the rising edge. To do so, right-click on the **REQ** field and select **Modify to 0** to force a zero to the field.

The screenshot shows the SIMATIC Manager interface for a PLC project. At the top, a table lists variable declarations:

Address	Declaration	Name	Type	Initial value
0.0	temp	OB1_EV_CLASS	BYTE	
1.0	temp	OB1_SCAN_1	BYTE	
2.0	temp	OB1_PRIORITY	BYTE	
3.0	temp	OB1_OB_NUMBR	BYTE	
4.0	temp	OB1_RESERVED_1	BYTE	
5.0	temp	OB1_RESERVED_2	BYTE	
6.0	temp	OB1_PREV_CYCLE	INT	
8.0	temp	OB1_MIN_CYCLE	INT	

Below the table, the network diagram for OB1 is shown. The network title is "Main Program Sweep (Cycle)". A context menu is open over the REQ field, with "Modify to 1" selected. The menu options are:

- Copy (Ctrl+C)
- Insert Empty Box (Alt+F9)
- Modify to 0
- Modify to 1
- Go to Location... (Ctrl+Alt+Q)
- Edit Symbols... (Alt+Return)
- Special Object Properties

The status bar at the bottom indicates "The statements are not being processed." and the mode is set to "RUN".

- Next, right-click on the **REQ** field and select **Modify to 1** to force a value of one to the field.

The screenshot shows the SIMATIC Manager interface for editing a function block (FB14) in Ladder Logic (LAD). The title bar indicates the project is '@OB1 -- Setup\MASTER\CPU 315-2 DP' and it is in 'ONLINE' mode. The menu bar includes File, Edit, Insert, PLC, Debug, View, Options, Window, and Help. The toolbar contains various editing tools.

A table at the top lists variable declarations:

Address	Declaration	Name	Type	Initial value
0.0	temp	OB1_EV_CLASS	BYTE	
1.0	temp	OB1_SCAN_1	BYTE	
2.0	temp	OB1_PRIORITY	BYTE	
3.0	temp	OB1_OB_NUMBR	BYTE	
4.0	temp	OB1_RESERVED_1	BYTE	
5.0	temp	OB1_RESERVED_2	BYTE	
6.0	temp	OB1_PREV_CYCLE	INT	
8.0	temp	OB1_MIN_CYCLE	INT	

Below the table, the network is titled 'OB1 : "Main Program Sweep (Cycle)"'. A comment field is present. The network itself is titled 'Network 1: Title:' and has a comment field. The ladder logic shows a network with two normally open contacts: 'MO.0' and 'MO.1'. The 'MO.1' contact is highlighted with a blue box, and a context menu is open over it. The menu options are: Copy (Ctrl+C), Insert Empty Box (Alt+F9), Modify to 0, Modify to 1 (highlighted), Go to Location... (Ctrl+Alt+Q), Edit Symbols... (Alt+Return), and Special Object Properties. The network is connected to a function block 'FB14 GET' (Read Data From a Remote CPU) with a 'REQ' input and an 'EN' output. The output 'EN' is connected to a coil 'DB2 "GET"'. The status bar at the bottom shows 'Modifies the selected address once to 1.' and a 'RUN' button.

Note: Both of the FBs must next be configured to respond to the same rising edge in order for the SIMATIC Manager's variables to be locally monitored and modified.

9. In **LAD/STL/FBD**, click on **PLC** and then select **Monitor/Modify Variables**.
10. Enter the variables that will be monitored. To view the changes made to this window, execute the function blocks.

Note: Remember that the slot/rack value of the remote device with which the master is communicating is "rack:0 slot:2". The values can be changed from the NetPro window. Users must make sure that the unsolicited driver on the other end has a device with these values and is running.

Data Types Description

Data Type	Description
Boolean	Single bit
Byte	Unsigned 8 bit value
Char	Signed 8 bit value
Word	Unsigned 16 bit value bit 0 is the low bit bit 15 is the high bit
Short	Signed 16 bit value bit 0 is the low bit bit 14 is the high bit bit 15 is the sign bit
DWord	Unsigned 32 bit value bit 0 is the low bit bit 31 is the high bit
Long	Signed 32 bit value bit 0 is the low bit bit 30 is the high bit bit 31 is the sign bit
BCD	Two byte packed BCD Value range is 0-9999. Behavior is undefined for values beyond this range.
LBCD	Four byte packed BCD Value range is 0-99999999. Behavior is undefined for values beyond this range.
Float	32 bit floating point value. The driver interprets two consecutive registers as a floating point value by making the second register the high word and the first register the low word.
String	NULL Terminated ASCII String

S7-300 Address Descriptions

The default data types for dynamically defined tags are shown in **bold**.

Address Type	Range	Type	Access
Discrete Inputs	I0.b-I4095.b* .b is Bit Number 0-7	Boolean	Read/Write
	IB0-IB4095	Byte , Char, String**	Read/Write
	IW0-IW4094	Word , Short, BCD	Read/Write
	IW:KT0-IW:KT4094	DWord, Long	Read/Write
	IW:KC0-IW:KC4094	Word , Short	Read/Write
	ID0-ID4092	DWord , Long, LBCD, Float	Read/Write
Discrete Inputs	E0.b-E4095.b* .b is Bit Number 0-7	Boolean	Read/Write
	EB0-EB4095**	Byte , Char, String**	Read/Write
	EW0-EW4094	Word , Short, BCD	Read/Write
	EW:KT0-EW:KT4094	DWord, Long	Read/Write
	EW:KC0-EW:KC4094	Word , Short	Read/Write
	ED0-ED4092	DWord , Long, LBCD, Float	Read/Write
Note: I and E access the same memory area.			
Discrete Outputs	Q0.b-Q4095.b* .b is Bit Number 0-7	Boolean	Read/Write
	QB0-QB4095	Byte , Char, String**	Read/Write
	QW0-QW4094	Word , Short, BCD	Read/Write
	QW:KT0-QW:KT4094	DWord, Long	Read/Write
	QW:KC0-QW:KC4094	Word , Short	Read/Write
	QD0-QD4092	DWord , Long, LBCD, Float	Read/Write
Discrete Outputs	A0.b- A4095.b* .b is Bit Number 0-7	Boolean	Read/Write
	AB0-AB4095	Byte , Char, String**	Read/Write
	AW0-AW4094	Word , Short, BCD	Read/Write
	AW:KT0-AW:KT4094	DWord, Long	Read/Write
	AW:KC0-AW:KC4094	Word , Short	Read/Write
	AD0-AD4092	DWord , Long, LBCD, Float	Read/Write
Note: Q and A access the same memory area.			

Internal Memory	F0.b-F4095.b* .b is Bit Number 0-7	Boolean	Read/Write
	FB0-FB4095	Byte , Char, String**	Read/Write
	FW0-FW4094	Word , Short, BCD	Read/Write
	FW:KT0-FW:KT4094	DWord, Long	Read/Write
	FW:KC0-FW:KC4094	Word , Short	Read/Write
	FD0-FD4092	DWord , Long, LBCD, Float	Read/Write
Internal Memory Note: F and M access the same memory area.	M0.b-M4095.b* .b is Bit Number 0-7	Boolean	Read/Write
	MB0-MB4095	Byte , Char, String**	Read/Write
	MW0-MW4094	Word , Short, BCD	Read/Write
	MW:KT0-MW:KT4094	DWord, Long	Read/Write
	MW:KC0-MW:KC4094	Word , Short	Read/Write
	MD0- MD4092	DWord , Long, LBCD, Float	Read/Write
Data Block Boolean	DB1-N:KM0.b-KM4094.b* 1-N is Block Number .b is Bit Number 0-15	Boolean	Read/Write
	<i>Alternates</i> DB1DBX0.b-DBNDBX4094.b* 1-N is Block Number .b is Bit Number 0-15	Boolean	Read/Write
	DB1D0.b-DBND4094.b* 1-N is Block Number .b is Bit Number 0-15	Boolean	Read/Write
Data Block Left Byte	DB1-N:KL0-KL4095 1-N is Block Number	Byte , Char, String**	Read/Write
	<i>Alternates</i> DB1DBB0-DBNDBB4095 1-N is Block Number	Byte , Char, String**	Read/Write
	DB1DL0-DBNDL4095 1-N is Block Number	Byte , Char, String**	Read/Write
Data Block Right Byte	DB1-N:KR0-KR4094 1-N is Block Number	Byte , Char, String**	Read/Write
	<i>Alternates</i> DB1DR0-DBNDR4094 1-N is Block Number	Byte , Char, String**	Read/Write
Data Block Unsigned Word	DB1-N:KH0-KH4094 1-N is Block Number	Word , Short, BCD	Read/Write
Data Block Signed Word	DB1-N:KF0-KF4094 1-N is Block Number	Word, Short , BCD	Read/Write
	<i>Alternates</i> DB1DBW0-DBNDBW4094 1-N is Block Number	Word, Short , BCD	Read/Write

	DB1DW0-DBNDW4094 1-N is Block Number	Word, Short , BCD	Read/Write
Data Block Signed Long	DB1-N:KD0-KD4092 1-N is Block Number	DWord, Long , LBCD, Float	Read/Write
	<i>Alternates</i>		
	DB1DBD0-DB1DBD4092 1-N is Block Number	DWord, Long , LBCD, Float	Read/Write
	DB1DD0-DB1DD4092 1-N is Block Number	DWord, Long , LBCD, Float	Read/Write
Data Block Float	DB1-N:KG0-KG4092 1-N is Block Number	Float	Read/Write
Data Block BCD	DB1-N:BCD0-BCD4094 1-N is Block Number	Word , Short	Read/Write
Data Block S5 Timer as DB	DB1-N:KT0-KT4094 1-N is Block Number	DWord, Long	Read/Write
Data Block S5 Counter as DB	DB1-N:KC0-KC4094 1-N is Block Number	Word , Short	Read/Write
Data Block String	DB1:S0.n-DB1:S4095.n* .n is string length. 0<n<=218.	String	Read/Write

*These memory types/subtypes do not support arrays.

**Byte memory types (MB) support strings. The syntax for strings is <address>.<length> where 0<length<=218.

Note 1: All offsets for memory types I, Q, and F represent a byte starting location within the specified memory type.

Note 2: Use caution when modifying Word, Short, DWord, and Long types. For I, Q and F, each address starts at a byte offset within the device. Therefore, Words FW0 and FW1 overlap at byte 1. Writing to FW0 will also modify the value held in FW1. Similarly, DWord, and Long types can also overlap. It is recommended that these memory types be used so that overlapping does not occur. For example, when using DWords, FD0, FD4, FD8 and so on should be used in order to prevent overlapping bytes.

Arrays

All memory types/subtypes support arrays (excepting those discussed above). The valid syntax for declaring an array is described below. If no rows are specified, row count of 1 is assumed.

```
<address>[rows][cols]
<address>.rows.cols
<address>,rows,cols
<address>_rows_cols
```

For Word, Short, BCD and "KT" arrays, the base address+(rows*cols*2) cannot exceed 4096. The elements of the array are words, and are located on a word boundary. For example, IW0[4] would return IW0, IW2, IW4 and IW6. "KT" subtypes fall into the 16-bit category because the data stored in the PLC is contained within a Word.

For Float, DWord, Long and Long BCD arrays (excluding "KT" subtypes), the base address+(rows*cols*4) cannot exceed 4096. Keep in mind that the elements of the array are DWords, located on a DWord boundary. For example, ID0[4] will return ID0, ID4, ID8 and ID12.

For all arrays, the total number of bytes being requested cannot exceed the internal block size of 218 bytes.

KL vs. KR vs. DBB

KL and KR determine whether the left byte or right byte of the data block word is returned.

Value	8	9	A	B	C
Byte	0	1	2	3	4

Example 1

```
DB1:KH0=0x89
DB1:KL0=0x8
```

DB1:KR0=0x9
DB1:DBB0=0x8

Example 2

DB1:KH1=0x9A
DB1:KL1=0x9
DB1:KR1=0xA
DB1:DBB1=0x9

Examples

1. To access bit 3 of Internal Memory F20, declare an address as follows:
F20.3
2. To access Data Block 5 as word memory at byte 30, declare an address as follows:
DB5:KH30
3. To access Data Block 2 byte 20 and bit 7, declare an address as follows:
DB2:KM20.7
4. To access Data Block 1 as left byte memory at byte 10, declare an address as follows:
DB1:KL10
5. To access Internal Memory F20 as a DWord, declare an address as follows:
FD20
6. To access Input Memory I10 as a Word, declare an address as follows:
IW10

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Address '<address>' is out of range for the specified device or register](#)

[Array size is out of range for address '<address>'](#)

[Array support is not available for the specified address: '<address>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' contains a syntax error](#)

[Device address '<address>' is Read Only](#)

[Missing address](#)

Driver Error Messages

[Failure to start unsolicited communications on Port n](#)

[Winsock initialization failed \(OS Error = n\)](#)

[Winsock V1.1 or higher must be installed to use the Siemens TCP/IP Slave Ethernet device driver](#)

Address Validation

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Address '<address>' is out of range for the specified device or register](#)

[Array size is out of range for address '<address>'](#)

[Array support is not available for the specified address: '<address>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' contains a syntax error](#)

[Device address '<address>' is Read Only](#)

[Missing address](#)

Address '<address>' is out of range for the specified device or register

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:

Verify that the address is correct; if it is not, re-enter it in the client application.

Array size is out of range for address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically is requesting an array size that is too large for the address type or block size of the driver.

Solution:

Re-enter the address in the client application to specify a smaller value for the array or a different starting point.

Array Support is not available for the specified address: '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically contains an array reference for an address type that doesn't support arrays.

Solution:

Re-enter the address in the client application to remove the array reference or correct the address type.

Data Type '<type>' is not valid for device address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has been assigned an invalid data type.

Solution:

Modify the requested data type in the client application.

Device address '<address>' contains a syntax error

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically contains one or more invalid characters.

Solution:

Re-enter the address in the client application.

Device address '<address>' is Read Only

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has a requested access mode that is not compatible with what the device supports for that address.

Solution:

Change the access mode in the client application.

Missing address

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has no length.

Solution:

Re-enter the address in the client application.

Driver Error Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Driver Error Messages

[Failure to start unsolicited communications on Port n](#)

[Winsock initialization failed \(OS Error = n\)](#)

[Winsock V1.1 or higher must be installed to use the Siemens TCP/IP Slave Ethernet Driver](#)

Failure to start unsolicited communications on Port n

Error Type:

Fatal

Possible Cause:

The driver was not able to create a listen socket for unsolicited communications. This is most often due to another application using the port specified. Much less likely causes are related to low system resources.

Solution:

Use network monitor software to check if any other application is using the port. If so, shut down the conflicting application and restart the OPC Server. In many cases, the conflicting application is free to pick any available port. If this is the case, make sure the server is always started first so that it may claim the required port. If both the PLC programming software and this driver use the same port, they may not be able to be used simultaneously.

See Also:

[Channel Setup](#)

Winsock initialization failed (OS Error=n)

Error Type:

Fatal

OS Error	Indication	Possible Solution
10091	Indicates that the underlying network subsystem is not ready for network communication.	Wait a few seconds and restart the driver.
10067	Limit on the number of tasks supported by the Windows Sockets implementation has been reached.	Close one or more applications that may be using Winsock and restart the driver.

Winsock V1.1 or higher must be installed to use the Siemens TCP/IP Slave Ethernet device driver

Error Type:

Fatal

Possible Cause:

The version number of the Winsock DLL found on the system is less than 1.1.

Solution:

Upgrade Winsock to version 1.1 or higher.

Index

A

Address '<address>' is out of range for the specified device or register.....	57
Address Validation.....	57
Array size is out of range for address '<address>'.....	57
Array support is not available for the specified address: '<address>'.....	57

B

BCD.....	52
Boolean.....	52

C

Cable Diagrams.....	5
Channel Setup.....	4
Configuring Connections Using the SIMATIC Manager.....	7
CPU Settings.....	5

D

Data Type '<type>' is not valid for device address '<address>'.....	58
Data Types Description.....	52
Device address '<address>' contains a syntax error.....	58
Device address '<address>' is Read Only.....	58
Device ID.....	5
Device Setup.....	5
Driver Error Messages.....	58
DWord.....	52

E

Error Descriptions.....	57
-------------------------	----

F

Failure to start unsolicited communications on Port n.....	58
--	----

Float	52
 H	
Help Contents	3
 L	
LBCD	52
Long	52
 M	
Master Device Configuration	6
Missing address	58
 N	
Network	5
 O	
Overview	3
 S	
S7-300 Address Descriptions	53
Short	52
Step Five	
Creating the DB3 Data Block	37
Step Four: Inserting Function Blocks	29
Step One	
Creating a New Project	7
Step Seven: Downloading to the PLC	45
Step Six/	
Inserting PUT FB	40
Step Three	
Connecting the Master and the Slave Driver	23

Step Two
Configuring the Master and PC Station 10

W

Winsock initialization failed (OS Error = n)..... 59
Winsock V1.1 or higher must be installed to use the Siemens TCP/IP Slave Ethernet device . 59
driver.....
Word..... 52