

S7 PROFINET Communication Server for SIMATIC S7-300/400

for Microsoft Windows
and InTouch Applications

**User Manual
Ver 1.x Rev 1.0
DR 590 10
DR 590 11**

**KLINKMANN AUTOMATION
P.O. Box 38
FIN-00371 Helsinki Finland
Tel. int. + 358 9 5404940
Fax int. + 358 9 5413541
www.klinkmann.com**

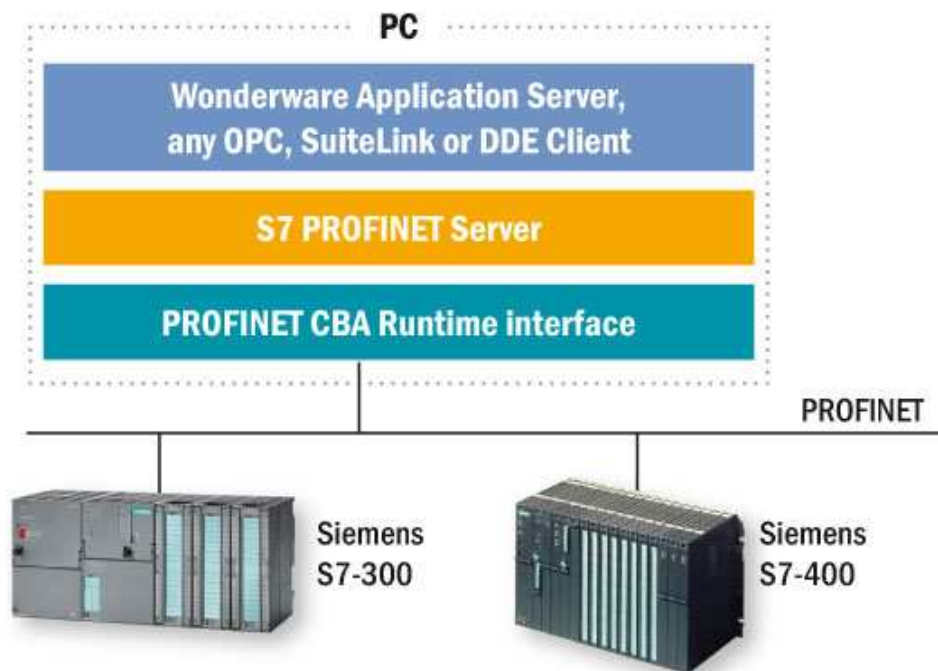
Table Of Contents

Overview.....	1
Communication Protocols.....	2
Accessing Remote Items via the Server.....	4
Installing the S7PROFINET Server	4
Installing the Server.....	4
Installing the I/O Server Infrastructure.....	6
DCOM configuration for PROFINET.....	7
Configuring the S7 PLC program to support PROFINET.....	9
Defining an existing data block as PROFINET interface data block.....	9
Configuring the S7PROFINET Server	27
Server Settings Command	27
Topic Definition Command.....	29
Saving S7PROFINET Configuration File.....	30
Configuration File Location.....	30
Editing S7PROFINET.INI File.....	31
Item Names	32
Monitoring and Controlling Communication with a PLC	33
Using the S7PROFINET Server with Suite Link and DDE Clients.....	35
Using the S7PROFINET Server with InTouch.....	35
Defining the Access Names	35
Defining the Tag names.....	37
Monitoring the Status of Communication with InTouch.....	39
Notes on Using Microsoft Excel.....	39
Reading Values into Excel Spreadsheets	39
Writing Values to S7PROFINET Points	39
Using the S7PROFINET Server with OPC Clients	40
Configuring DCOM	41
Firewall.....	41
S7PROFINET OPC Server settings.....	42
OPCEnum settings.....	44
OPC Client side settings	45
Running S7PROFINET “OPC & DDE” version as Windows Service.....	47
Using S7PROFINET with OPCLink Server.....	47
OPCLink Topic Definition	48
Accessing S7PROFINET Items via the OPCLink Server	48
Error messages	49
Troubleshooting.....	50
WIN.INI entries.....	50
Troubleshooting menu.....	52
Internal Logger	52

S7 PROFINET Communication Server for SIMATIC S7-300/400

Overview

The **SIEMENS S7 PROFINET Server** (hereafter referred to as the “S7PROFINET Server” or “S7PROFINET” or “Server”) is a Microsoft Windows application program that acts as a communication protocol Server and enables other Windows application programs to access the data from Siemens Simatic S7-300/400 controllers via the PROFINET interface. The S7 PROFINET Server provides access to Siemens S7 PLCs through an off-the-shelf standard Ethernet network interface card in the computer, based on PROFINET specification V2.02 and using the PROFINET CBA Runtime Software version 2.02:



The **main advantage** of S7 PROFINET Server is a **very fast communication speed** if compared with other Ethernet based software used for communication with Siemens S7 controllers: for example, only 15 milliseconds read (polling) cycle is needed to read 1400 consecutive bytes from controller.

The S7 PROFINET Server can communicate with any S7-300/400 CPU supporting the PROFINET interface.

Any Microsoft Windows program that is capable of acting as a DDE, FastDDE, SuiteLink or **OPC Client** may use the S7PROFINET Server.

With S7 PROFINET Server faster communication speed can be achieved if compared with other Ethernet based software used for communication with Siemens S7 controllers: usually about 15 milliseconds read (polling) cycle is needed to read 1400 consecutive bytes and about 45 milliseconds read (polling) cycle is needed to read 3999 consecutive bytes.

The S7 PROFINET Server requires the PROFINET communication support is added to S7 PLC program by using STEP7 programming software: setting a checkbox in S7 CPU configuration, defining that the CPU is used for PROFINET CBA communication and creating a PROFINET interface data block.

The maximum amount of consecutive data accessible from one S7 controller is 3999 bytes, which should start from the beginning of PROFINET interface data block.

The S7 PROFINET Server supports item/point names that are consistent with the addressing and point naming used in Siemens S7 PLCs for accessing the Data Blocks.

There are two different S7PROFINET Server versions described in this manual:

- Server version (ordering number DR 590 10), supporting SuiteLink, FastDDE and DDE protocols; this version hereafter is referred to as the “**Suite Link & DDE**” version.
- Server version (ordering number DR 590 11), supporting OPC and DDE protocols; this version hereafter is referred to as the “**OPC & DDE**” version;

The separate installation package is supplied for each version of the Server. In both cases, the name of Server executable file is **S7PROFINET.EXE**. All further information in this manual is same for all versions of the Server, with the exception of few points where communication protocol specific features are explained.

Communication Protocols

Dynamic Data Exchange (DDE) is a communication protocol developed by Microsoft to allow applications in the Windows environment to send/receive data and instructions to/from each other. It implements a client-server relationship between two concurrently running applications. The server application provides the data and accepts requests from any other application interested in its data. Requesting applications are called clients. Some applications such as Wonderware InTouch and Microsoft Excel can simultaneously be both a client and a server.

FastDDE provides a means of packing many proprietary Wonderware DDE messages into a single Microsoft DDE message. This packing improves efficiency and performance by reducing the total number of DDE transactions required between a client and a server. Although Wonderware's FastDDE has extended the usefulness of DDE for the industry, this extension is being pushed to its performance constraints in distributed environments. The S7PROFINET Server “Suite Link & DDE version” supports the FastDDE Version 3 - an extension to Wonderware's proprietary FastDDE Version 2. This extension supports the transfer of Value Time Quality (VTQ) information. The original DDE and FastDDE Version 2 formats are still supported, providing full backward compatibility with older DDE clients. FastDDE Version 3 works on Windows 9x systems as well as Windows NT systems.

NetDDE extends the standard Windows DDE functionality to include communication over local area networks and through serial ports. Network extensions are available to allow DDE links between applications running on different computers connected via networks or modems. For example, NetDDE supports DDE between applications running on IBM compatible computers connected via LAN or modem and DDE-aware applications running on non-PC based platforms under operating environments such as VMS and UNIX.

SuiteLink uses a TCP/IP based protocol and is designed by Wonderware specifically to meet industrial needs such as data integrity, high-throughput, and easier diagnostics. This protocol standard is only supported on Microsoft Windows NT 4.0 or higher. SuiteLink is not a replacement for DDE, FastDDE, or NetDDE. The protocol used between a client and a server depends on your network connections and configurations. SuiteLink was designed to be the industrial data network distribution standard and provides the following features:

- Value Time Quality (VTQ) places a time stamp and quality indicator on all data values delivered to VTQ-aware clients.
- Extensive diagnostics of the data throughput, server loading, computer resource consumption, and network transport are made accessible through the Microsoft Windows NT operating system Performance Monitor. This feature is critical for the scheme and maintenance of distributed industrial networks.
- Consistent high data volumes can be maintained between applications regardless if the applications are on a single node or distributed over a large node count.
- The network transport protocol is TCP/IP using Microsoft's standard WinSock interface.

OPC (OLE for Process Control) is an open interface standard to provide data from a data source and communicate the data to any client application in a common standard way. The OPC is based on Microsoft OLE, COM and DCOM technologies and enables simple and standardised data interchange between the industrial or office sector and the production sector. From general point of view many aspects of OPC are similar to DDE, but main difference is in the implementation by using Microsoft's COM (Component Object Model) technology. It enables fast exchange with process automation data and OPC open interface allows access to data from OPC Server in same standard way from OPC client applications supplied by different developers.

For more information on the basics of OPC, please refer to the **OPC Specification**. The OPC Data Access Custom Interface Specification is maintained by **OPC Foundation**, the current specification is 2.05A dated June 2002 (3.00 dated March 2003).

The OPC support for S7PROFINET Server "OPC & DDE" version is implemented based on **FactorySoft OPC Server Development Toolkit** and it conforms to OPC Data Access Custom Interface Specification 2.04. The S7PROFINET Server "OPC & DDE" version is tested for compliance and is compatible with OPC Foundation OPC Data Access Compliance Test Tool.

The Suite Link, FastDDE (Version 3) and DDE support for S7PROFINET Server "Suite Link & DDE" version is implemented by **Wonderware I/O Server Toolkit** ver. 7,2,1,6.

The FastDDE (Version 2) and DDE support for S7PROFINET Server “OPC & DDE” version is implemented by **Wonderware I/O Server Toolkit** ver. 5.0 (008).

Accessing Remote Items via the Server

The communication protocol addresses an element of data in a conversation that uses a three-part naming convention that includes the **application name**, **topic name** and **item name**. The following briefly describes each portion of this naming convention:

application name

The name of the Windows program (server) that will be accessing the data element. In the case of data coming from or going to Siemens Simatic S7-300 PLC via this Server, the application portion of the address is **S7PROFINET**.

topic name

Meaningful names are configured in the Server to identify specific devices. These names are then used as the topic name in all conversations to that device. For example, **S7300**. **Note!** You can define multiple topic names for the same device (PLC) to poll different items at different rates.

item name

A specific data element within the specified topic. For the **S7PROFINET** Server, an item is an individual data bit, byte, word, integer, string, etc., in the PLC. The term "point" is used interchangeably with the term "item" in this User Manual. For more information on item names, see the **Item Names** section later in this manual.

Installing the S7PROFINET Server

Installing the Server

The S7PROFINET Server installation package is supplied as a self-extracting archive 57010xxx.EXE for “Suite Link & DDE” version or 57011xxx.EXE for “OPC & DDE” version (the xxx is the current (latest) version of the Server).

To install the S7PROFINET Server, run the 57010xxx.EXE or 57011xxx.EXE and proceed as directed by the S7PROFINET Server Setup program.

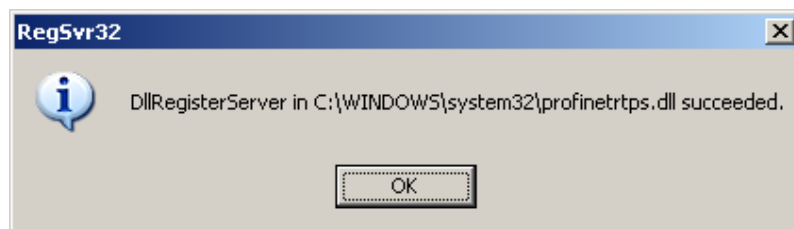
Note:

All MS Windows applications using Microsoft’s shared DLLs (e.g. MFC42.DLL and MSVCRT.DLL) must be closed before installing the S7PROFINET Server “OPC & DDE” version. Otherwise there can be problems with S7PROFINET Server registration as OPC server. If during the S7PROFINET Server “OPC & DDE” version installation some warning messages about shared DLLs are displayed, then it is quite possible the S7PROFINET Server registration as OPC server failed. In this case after system reboot the S7PROFINET Server registration as OPC server can be done by starting the S7PROFINET Server manually with special command line parameter added: “S7PROFINETI /Regserver”.

When installation is finished, the subdirectory specified as a folder where to install the S7PROFINET Server files will contain the following files:

S7PROFINET.EXE	The S7PROFINET Server Program. This is a Microsoft Windows 32-bit application program.
S7PROFINET.HLP	The S7PROFINET Server Help file.
S7PROFINET.CFG	An example configuration file.
S7PROFINET.INI	An example .ini file, containing the information for linking the PROFINET byte arrays with DBs.
LICENSE.TXT	Klinkmann Automation software license file.
PROFINETRTPS.DLL	PROFINET Runtime proxy/stub DLL (Dynamic Link Library).
REGPROFINETRTDLL.BAT	A .bat file for registering the PROFINET Runtime proxy/stub in Windows system.
UNREGPROFINETRTDLL.BAT	A .bat file for unregistering and removing the PROFINET Runtime proxy/stub from Windows system.
KLSERVER.DLL	Dynamic Link Library necessary only for “OPC & DDE” version of the Server.
WWDLG32.DLL	Dynamic Link Library necessary only for “OPC & DDE” version of the Server.
S7PROFINET-PLCDEMO.ZIP	Package with example S7-300 PLC demo programs explaining how to modify existing STEP 7 project to use some data block as a PROFINET interface data block.

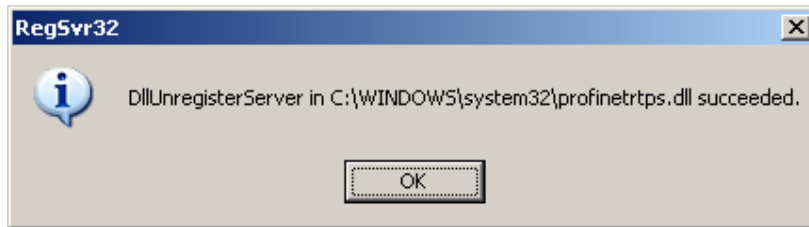
After S7PROFINET Server is installed, **register** the PROFINET Runtime proxy/stub in Windows system by running the **RegProfinetrtdll.bat** – the following message should be displayed:



Click OK. The **profinetrtps.dll** now is copied to Windows \system32 directory and registered in Windows system.

To **uninstall** the S7PROFINET Server:

1) At first, unregister the PROFINET Runtime proxy/stub from Windows system by running the **UnRegProfinetrtps.dll.bat** – the following message should be displayed:



Click OK. The **profinetrtps.dll** now is unregistered from in Windows system and removed from Windows \system32 directory.

2) Uninstall the S7PROFINET Server: start Control Panel, select “Add/Remove Programs” and select the “S7 PROFINET SuiteLink and DDE Server” or “S7 PROFINET OPC and DDE Server” from the list of available software products. Click on “Add/Remove...” and proceed as directed by the UnInstallShield program.

Notes:

1. The S7PROFINET Server “Suite Link & DDE” version is developed with Wonderware I/O Server Toolkit (ver 7.2.1.6) and needs the **Wonderware FS2000 Common Components** to be installed on computer where the S7PROFINET Server is running. The Wonderware FS2000 Common Components are installed automatically when any of Wonderware FS2000 Components (e.g. InTouch or some Wonderware I/O server) is installed.
2. If S7PROFINET Server “Suite Link & DDE” version will run on PC where Wonderware FS2000 Common Components are not installed then a special **I/O Server Infrastructure installation package** can be obtained from Klinkmann Automation (see **Installing the I/O Server Infrastructure** section below). This I/O Server Infrastructure installation package contains the minimum set of software needed to run the S7PROFINET Server “Suite Link & DDE” version and these infrastructure files must be install prior to executing the S7PROFINET Server.
3. The HASP key is needed for full time running of S7PROFINET Server. The HASP Driver setup is performed during the Server setup. Without HASP Driver installed and HASP key plugged into computer USB or parallel port, the S7PROFINET Server will run only 1 hour (with all features enabled).

Installing the I/O Server Infrastructure

The I/O Server Infrastructure installation package can be supplied as a self-extracting archive (IOServerInfrastructure.exe) or downloaded from Klinkmann’s web site (<http://www.klinkmann.com>).

To **install** the I/O Server Infrastructure from the self-extracting archive, run the IOServerInfrastructure.exe and proceed as directed by the I/O Server Infrastructure Setup program.

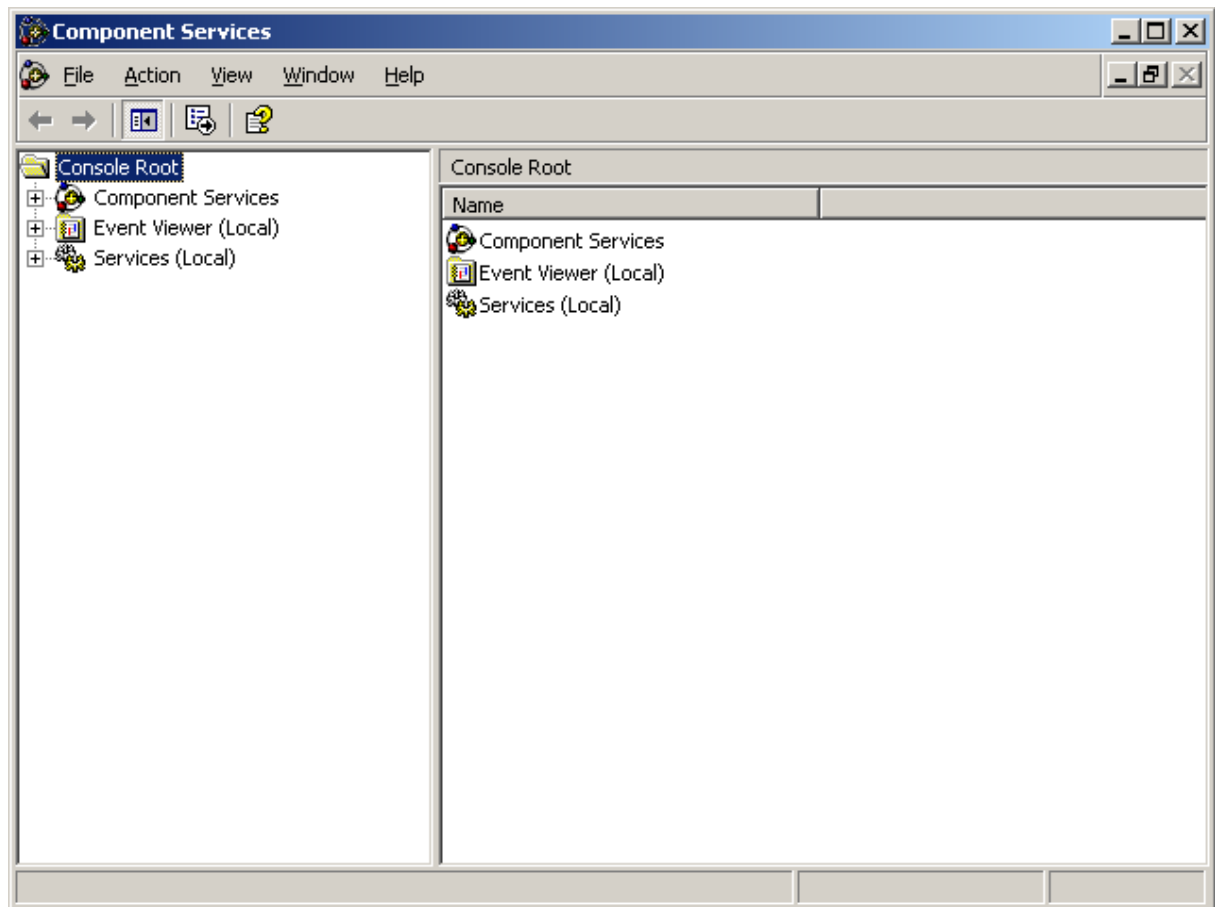
To **uninstall** the I/O Server Infrastructure, start Control Panel, select “Add/Remove Programs” and select the “IO Server Infrastructure” from the list of available software products. Click on “Add/Remove...” and proceed as directed by the UnInstallShield program.

Note: The I/O Server Infrastructure installation will be rejected if Wonderware FS2000 Common Components are already installed on same computer.

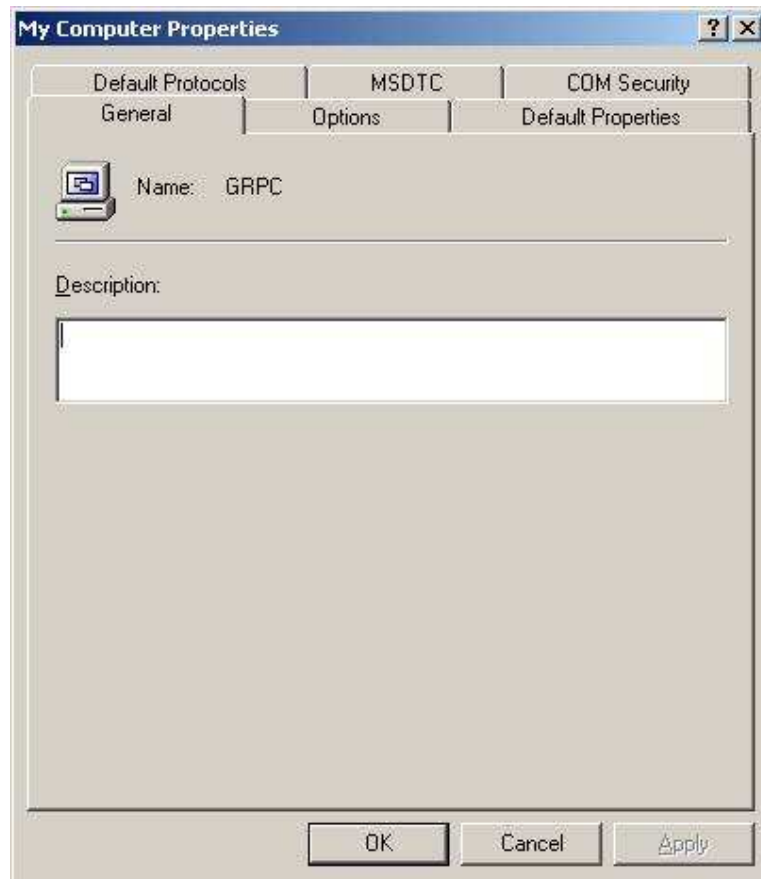
DCOM configuration for PROFINET

To use the S7PROFINET Server, it is necessary to check the **DCOM** configuration and modify the “**Default Authentication Level**” setting, the following sequence on Windows XP:

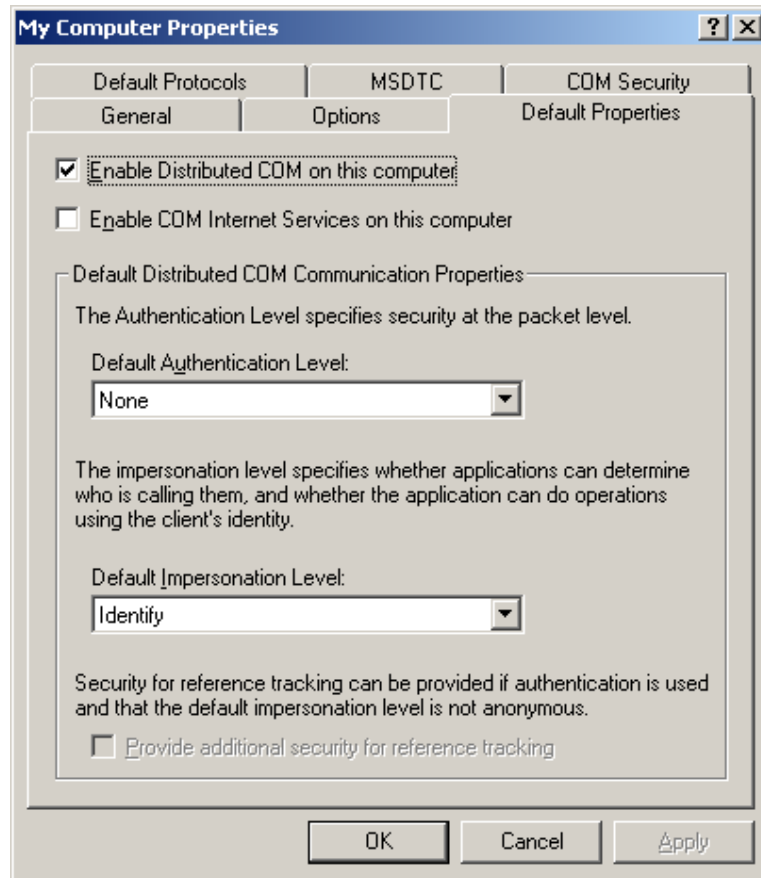
- from Control Panel, select Administrative Tools/Component Services:



- double-click on Component Services, double-click on on Computers and usin mouse right button select "Properties" for My Computer – "My Computer Properties" window will appear:



- select "Default Properties" and change the "Default Authentication Level" setting to **None**:



Click OK.

Configuring the S7 PLC program to support PROFINET

The S7 PROFINET Server requires the PROFINET communication support is added to S7 PLC program by using STEP7 programming software: setting a checkbox in S7 CPU configuration, defining that the CPU is used for PROFINET CBA communication and creating a PROFINET interface data block.

Defining an existing data block as PROFINET interface data block

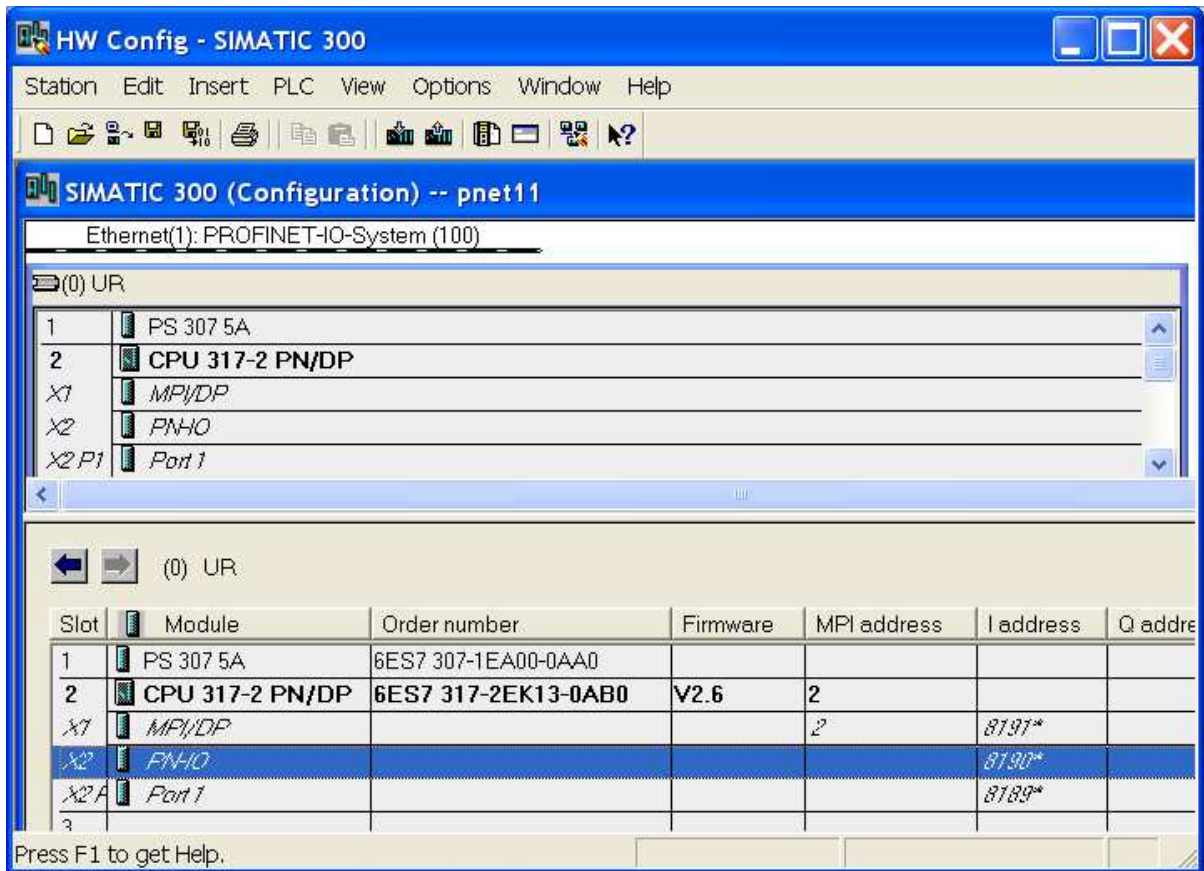
The following explanation in this section is based on two STEP 7 demo projects **pnet10** and **pnet11** included in **S7PROFINET-PLCDEMO.ZIP** package copied to subdirectory specified as a folder where to install the S7PROFINET Server files during the S7PROFINET Server installation.

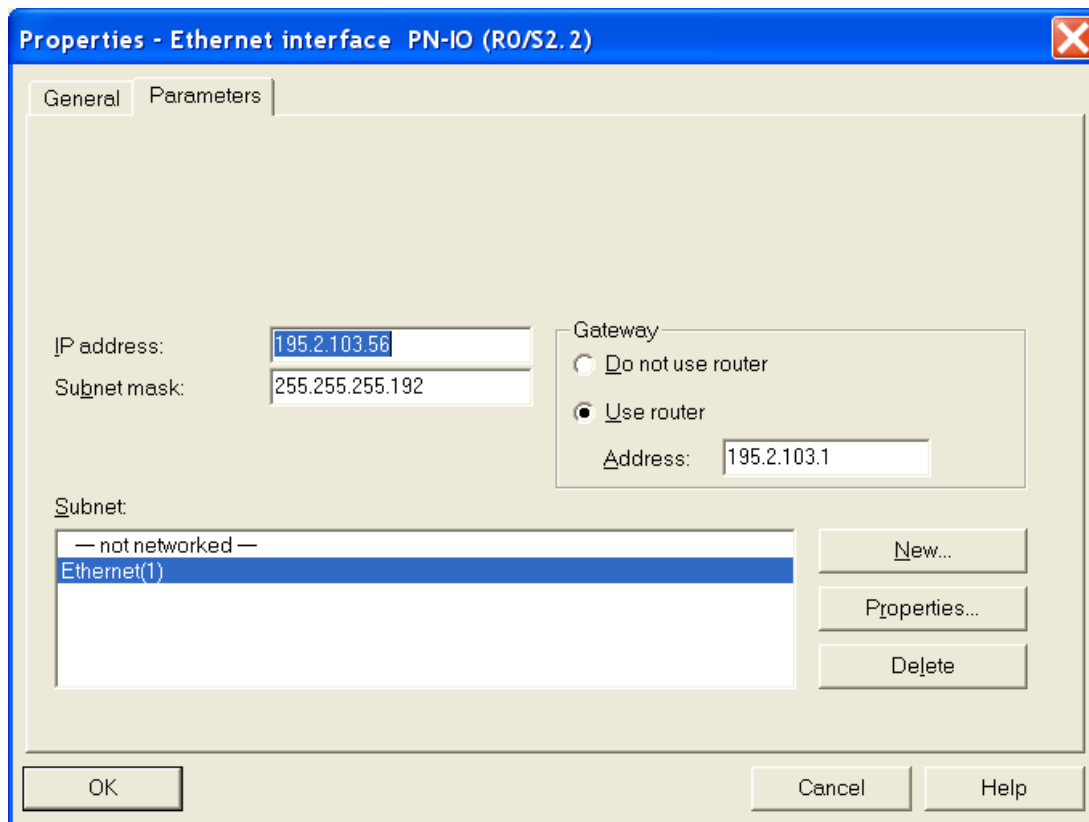
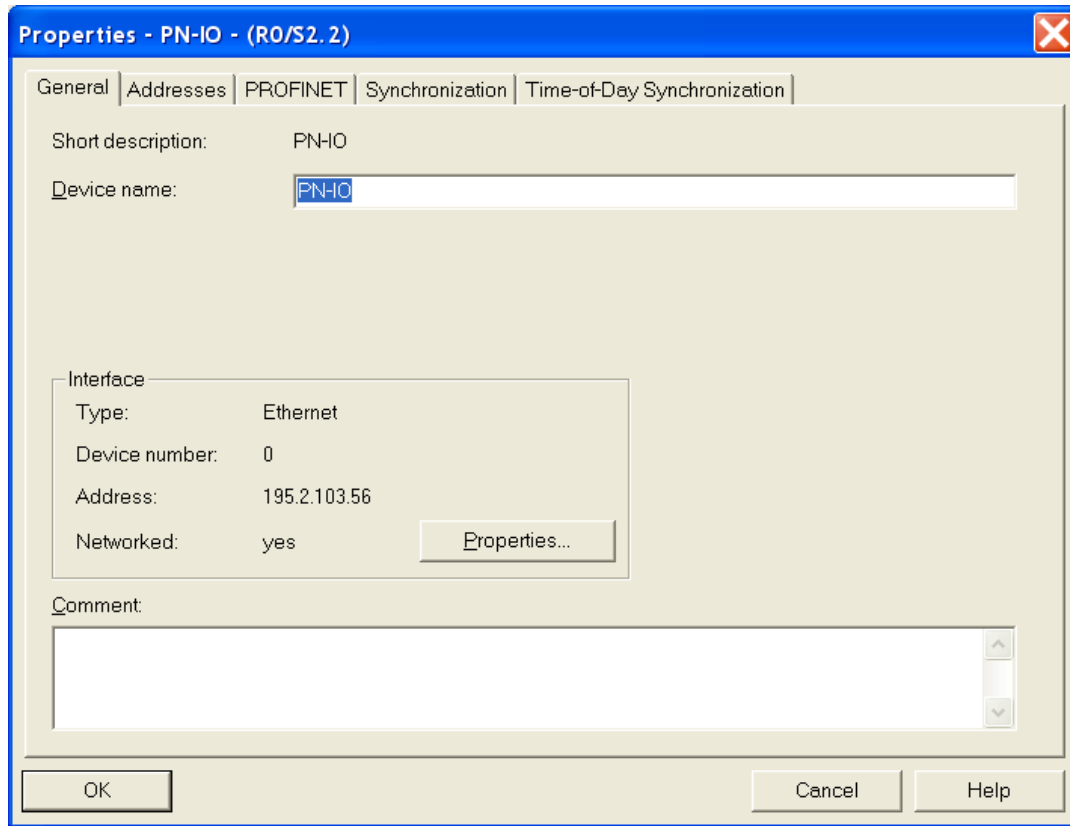
It is assumed that in an existing STEP 7 project there is a data block, which should be used as a PROFINET interface data block. There are two STEP 7 demo projects

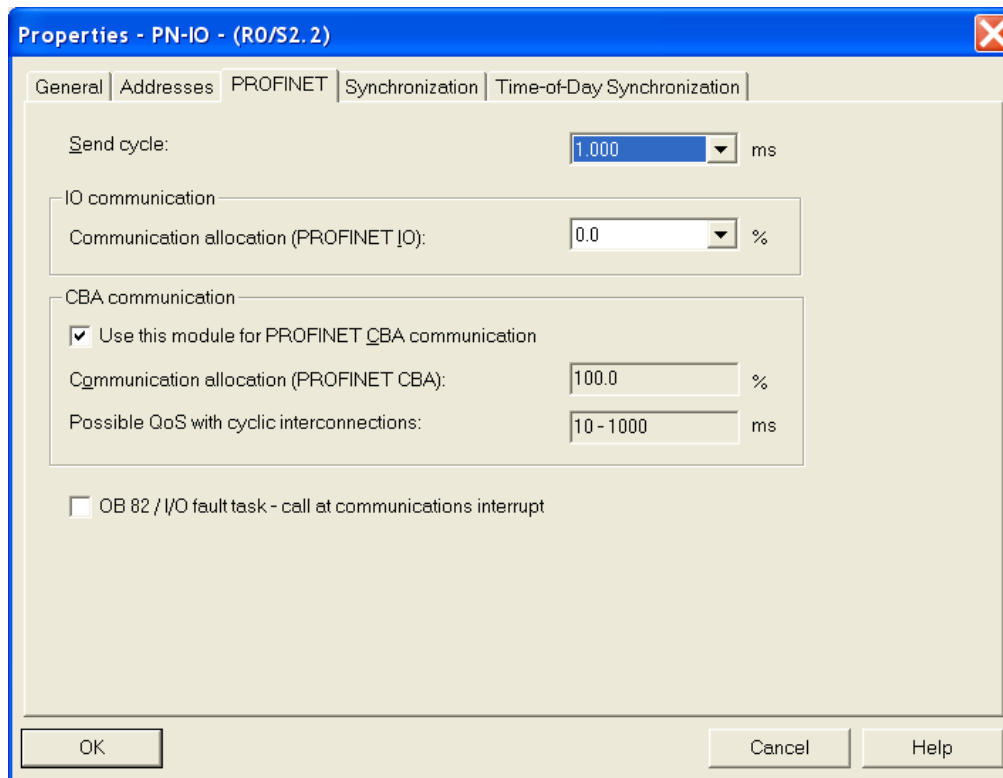
provided: folder **pnet10** contains the original STEP 7 project and folder **pnet11** contains the ready STEP 7 project with data block DB45 defined as a PROFINET interface data block.

The screenshots below demonstrate the sequence of steps for converting **pnet10** to **pnet11**:

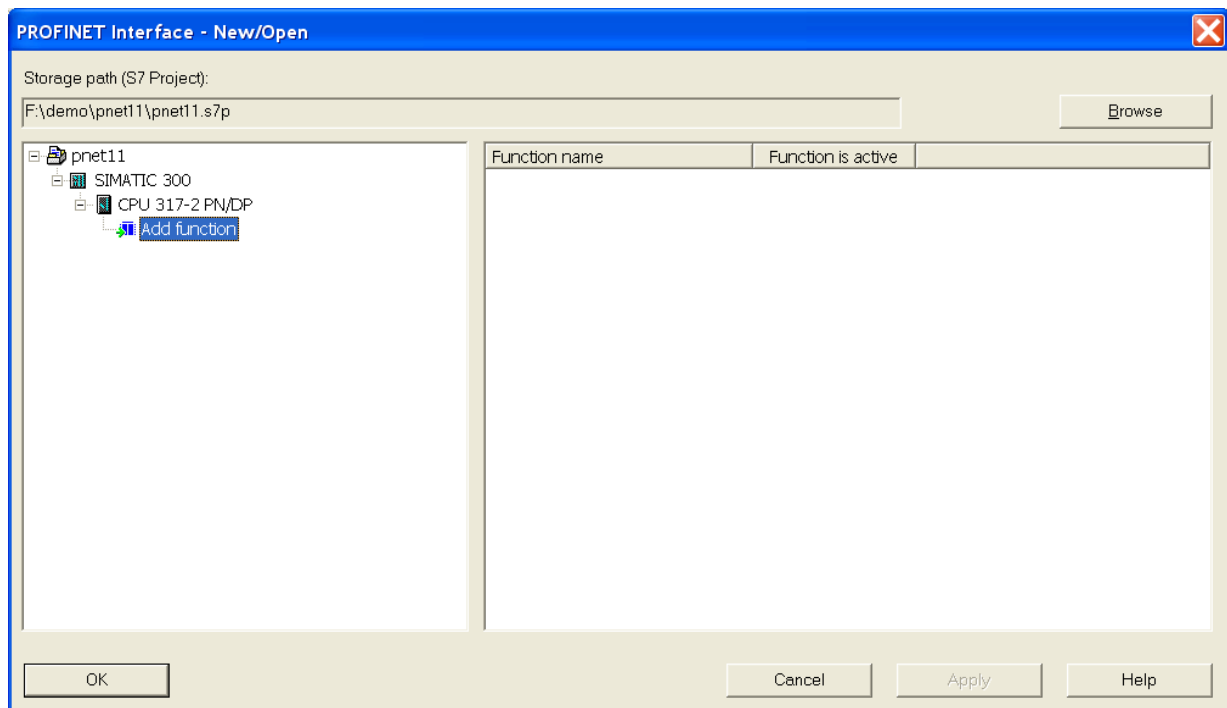
1. Open STEP 7 project in folder **pnet10**.
2. Save it in folder **pnet11**.
3. Check in the hardware configuration that the CPU has correctly configured Ethernet interface, matching to your environment (IP address), and the PROFINET CBA communication is enabled:



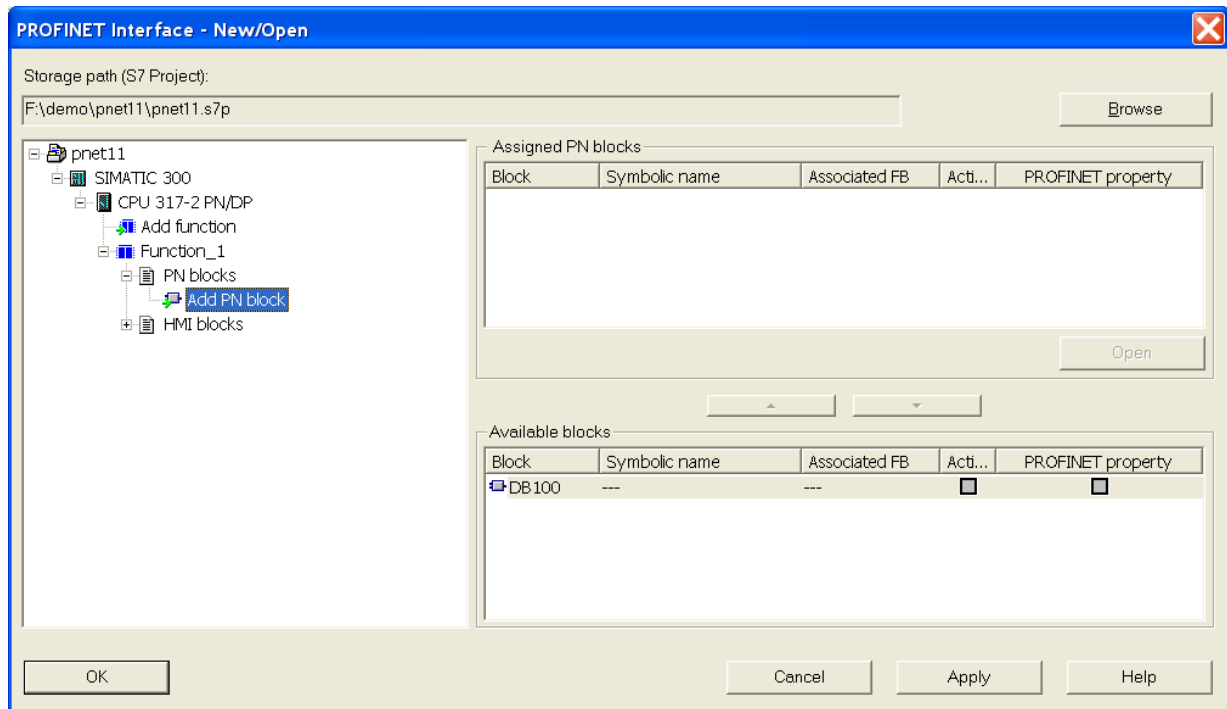




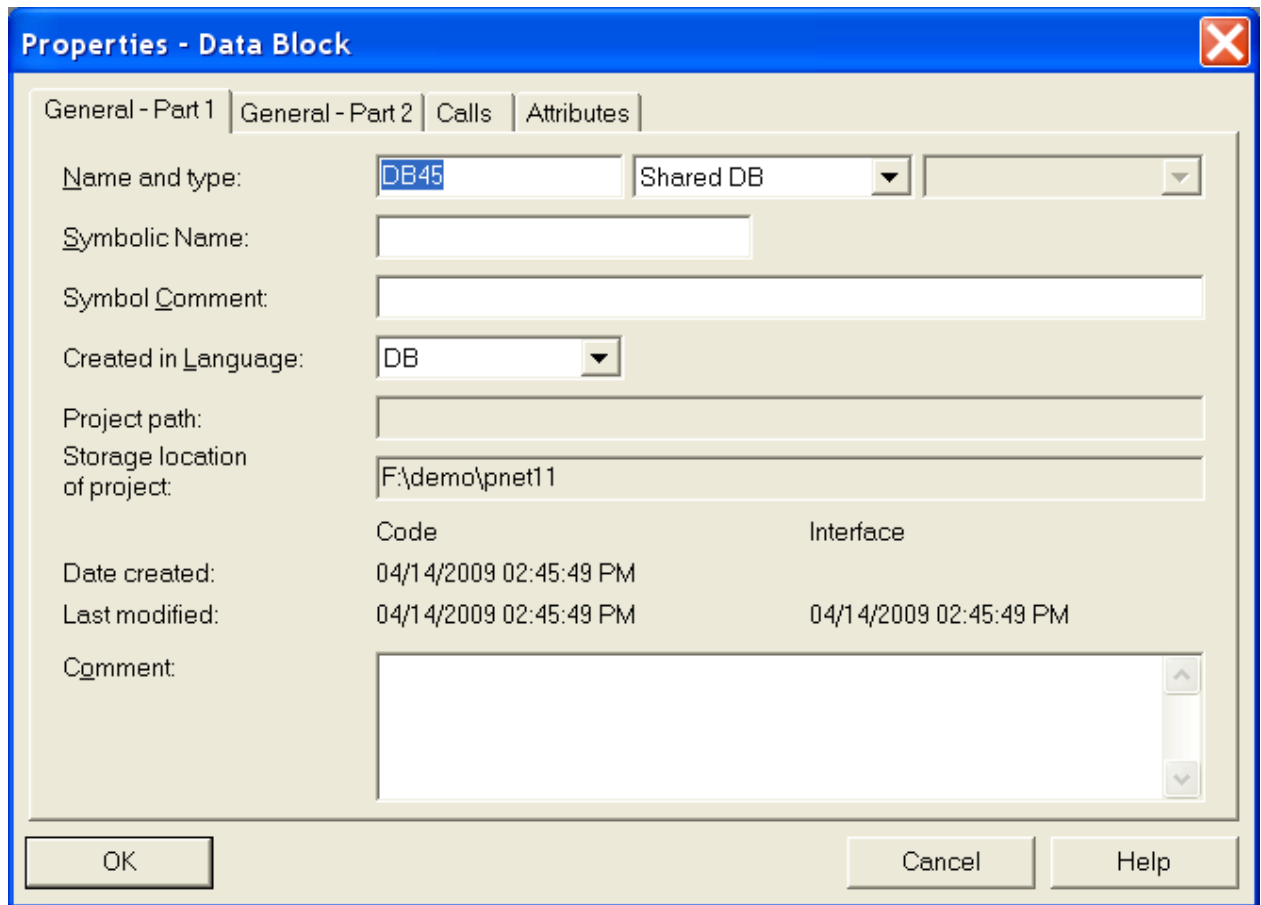
4. In the project tree open the Blocks folder, then right-click on DB45 and rename it to DB100. Note the length of an existing data block (1400 bytes in this case).
5. Select station **SIMATIC 300** and select menu command **Edit/Create PROFINET Interface**. The following dialog box will be displayed:



6. Click on **Add function**. Function_1 will be added:



7. Click on **Add PN block**.



Properties - Data Block

General - Part 1 | General - Part 2 | Calls | Attributes

Name and type: Shared DB

Symbolic Name:

Symbol Comment:

Created in Language:

Project path:

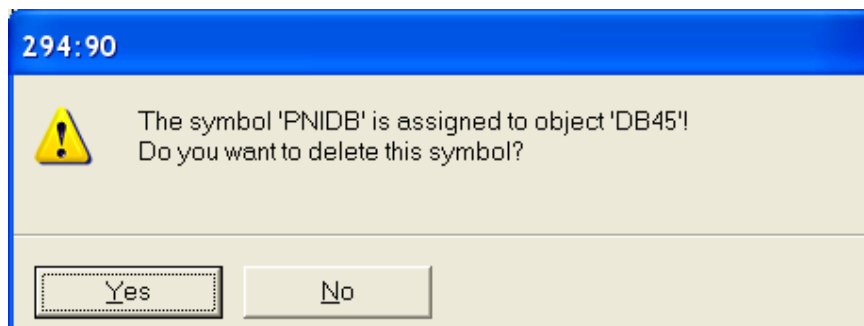
Storage location of project:

	Code	Interface
Date created:	04/14/2009 02:45:49 PM	
Last modified:	04/14/2009 02:45:49 PM	04/14/2009 02:45:49 PM


Comment:

OK Cancel Help

8. Enter name DB45 and click on **OK** button.

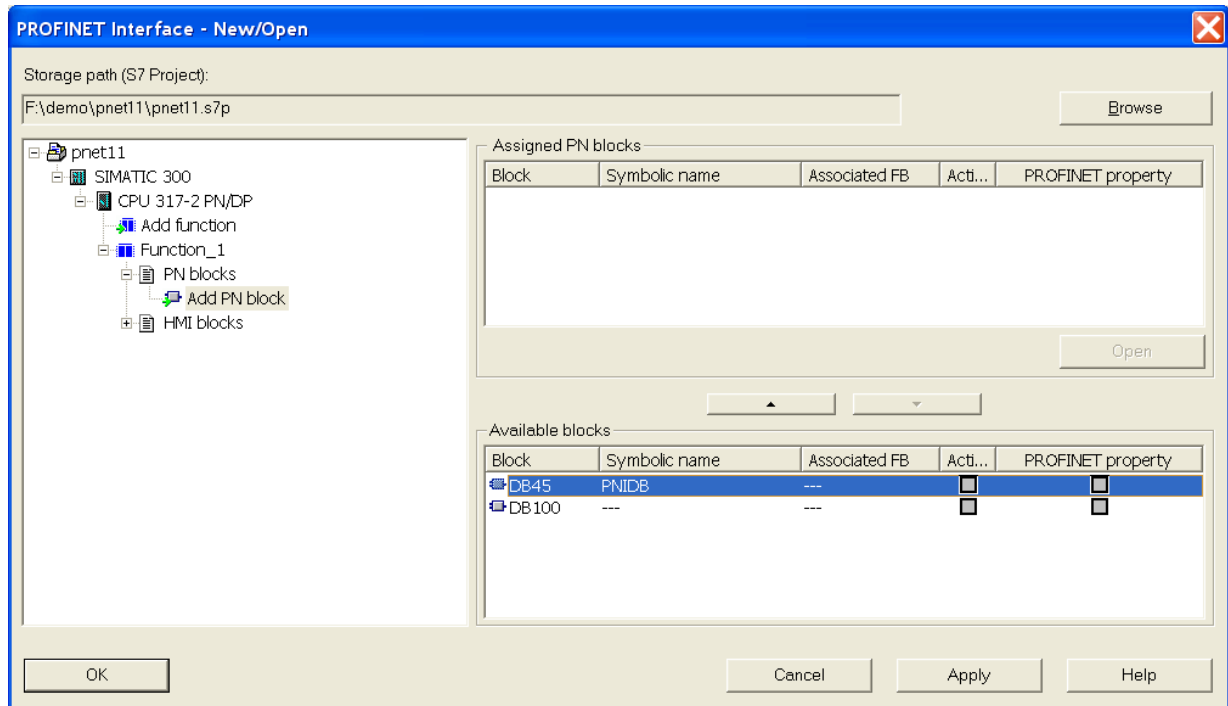


294:90

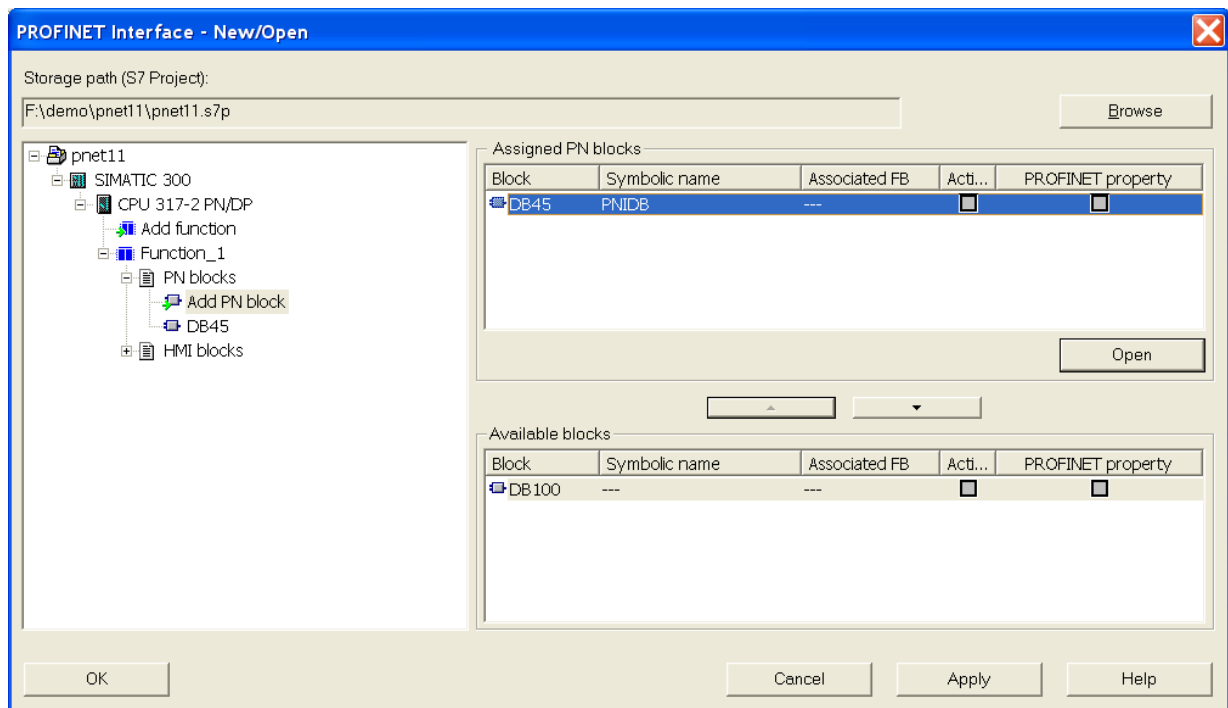
 The symbol 'PNIDB' is assigned to object 'DB45'!
Do you want to delete this symbol?

Yes No

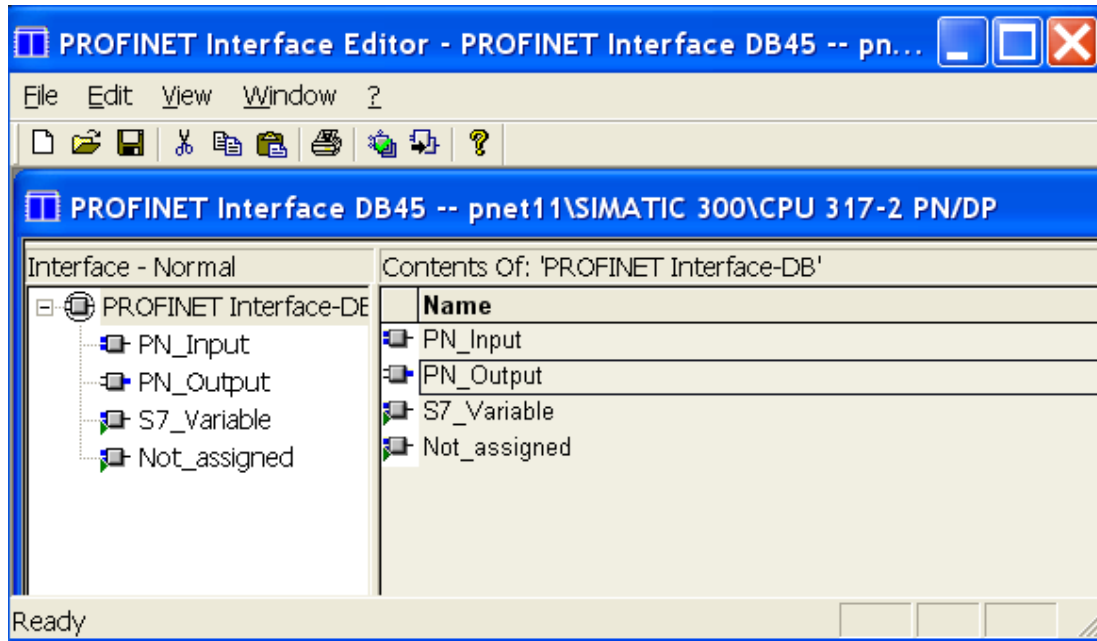
9. Click on **No** button to use an existing data block name.



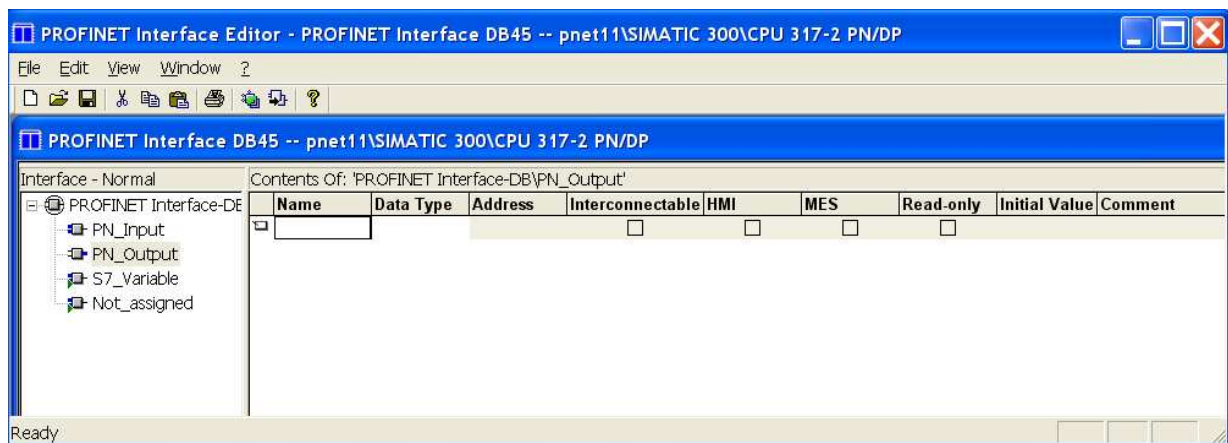
10. Select DB45 and click on “arrow up” button (button with a small upward directed triangle):



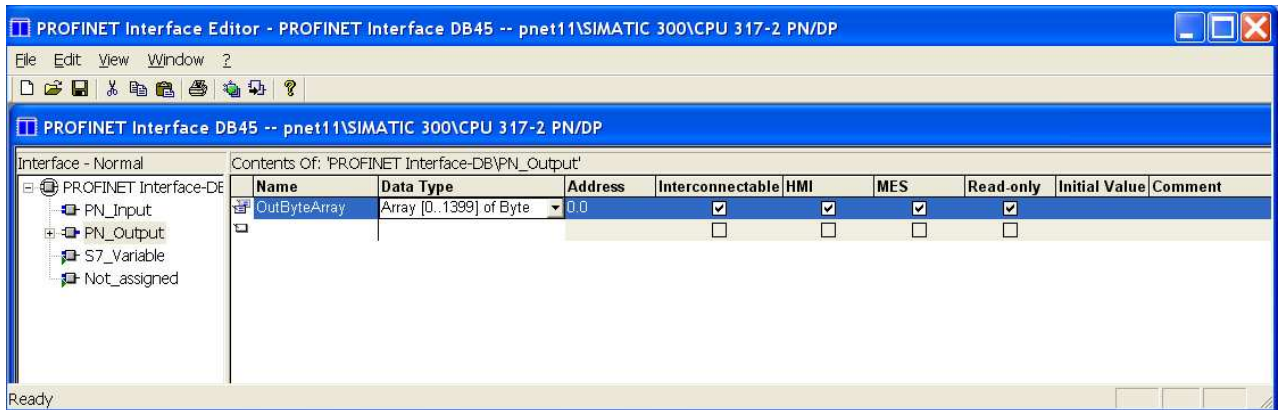
11. Select DB45 and click on **Open** button:



12. Double click on **PN_Output**:



13. Define a parameter OutByteArray as 1400 byte long byte array:



Notes:

1) If the length of the data you would like to read from the PLC exceeds 1400 bytes, then additional byte arrays should be defined. For example, to get the maximum length of PROFINET read data (3999 bytes) define 3 byte arrays: 1400, 1400 and 1199 bytes long. As well same byte array(s) should be specified in S7PROFINET.INI file – see *Editing S7PROFINET.INI File* section later in this manual.

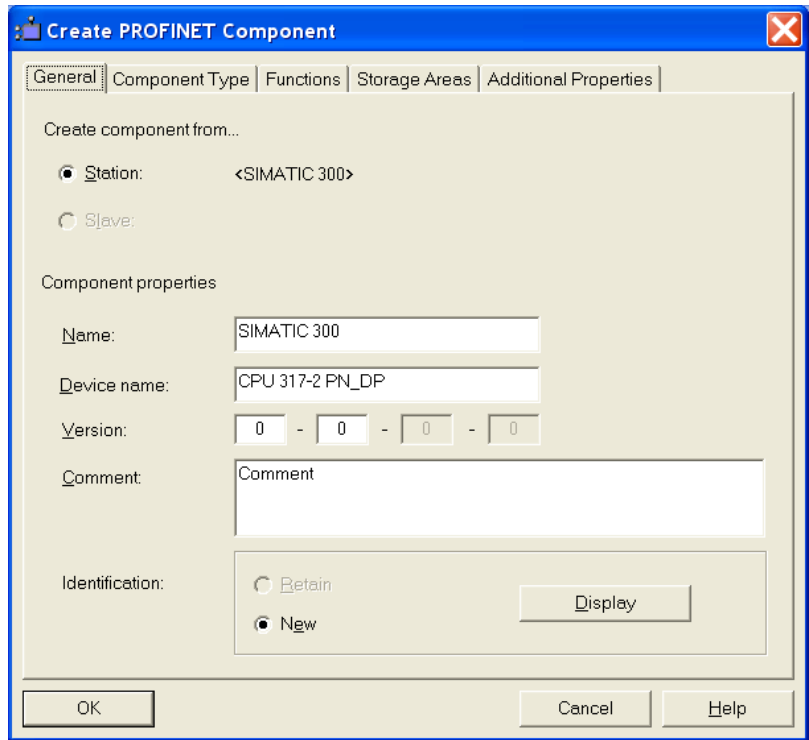
2) If it is necessary to write data to the PLC via PROFINET interface then define byte array(s) in **PN_Input section** (maximum total length up to 3999 bytes). The **pnet11** demo project assumes that 1400 bytes are read-only from the PLC data block DB45. As well same byte array(s) should be specified in S7PROFINET.INI file – see *Editing S7PROFINET.INI File* section later in this manual.

14. Select menu command **File/Save**.

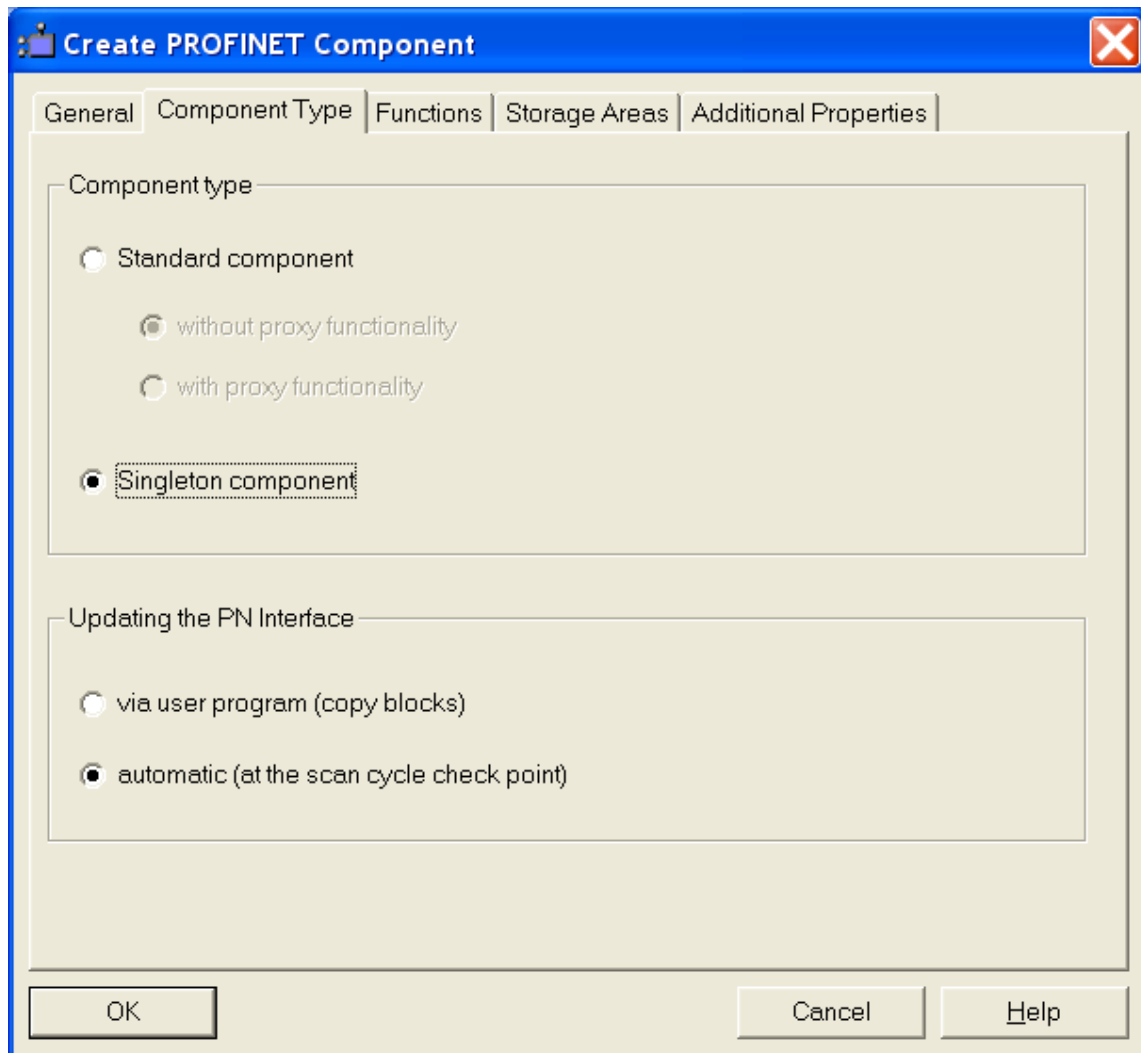
15. Select menu command **File/Close**.

16. Select menu command **File/Close**.

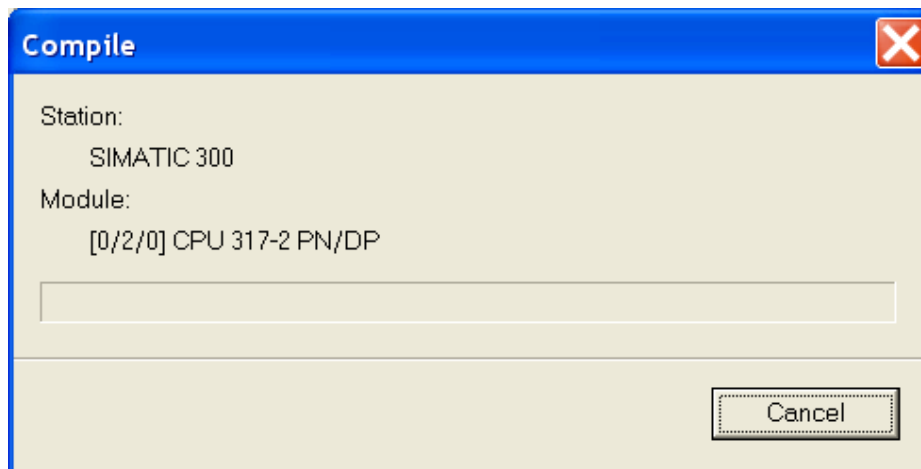
17. Select station **SIMATIC 300** and select menu command **Edit/Create PROFINET component**. The following dialog box will be displayed:



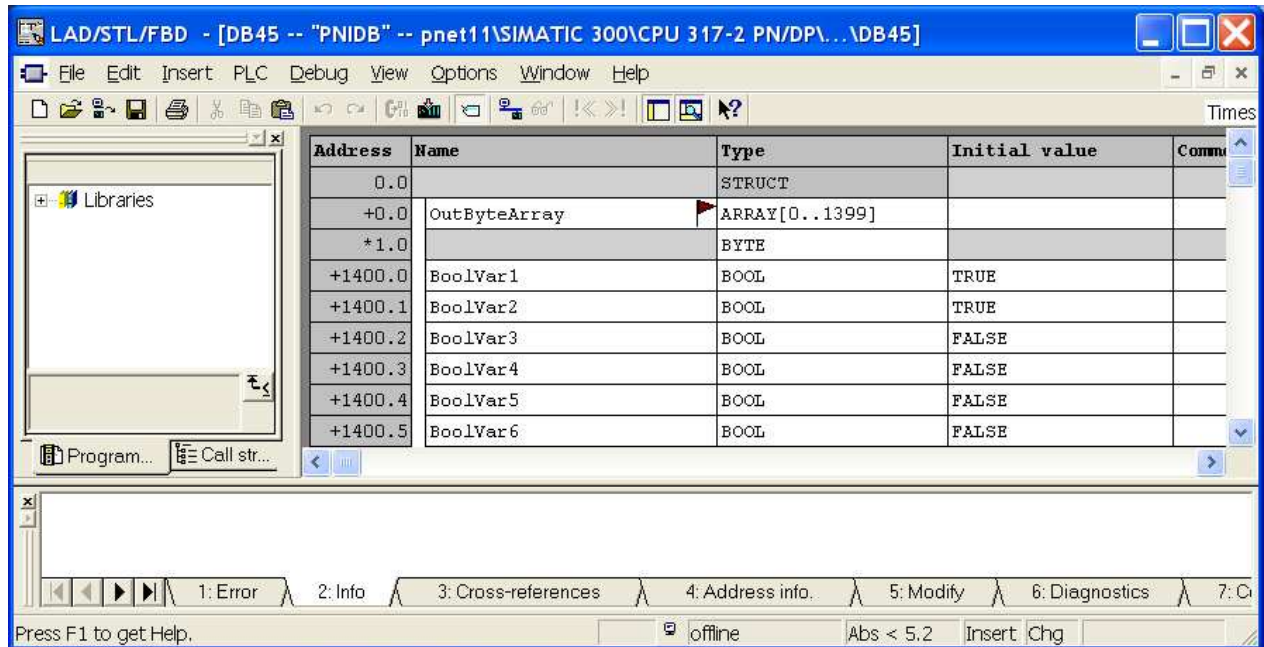
18. Click on the **Component Type** tab and set the parameters as shown below:



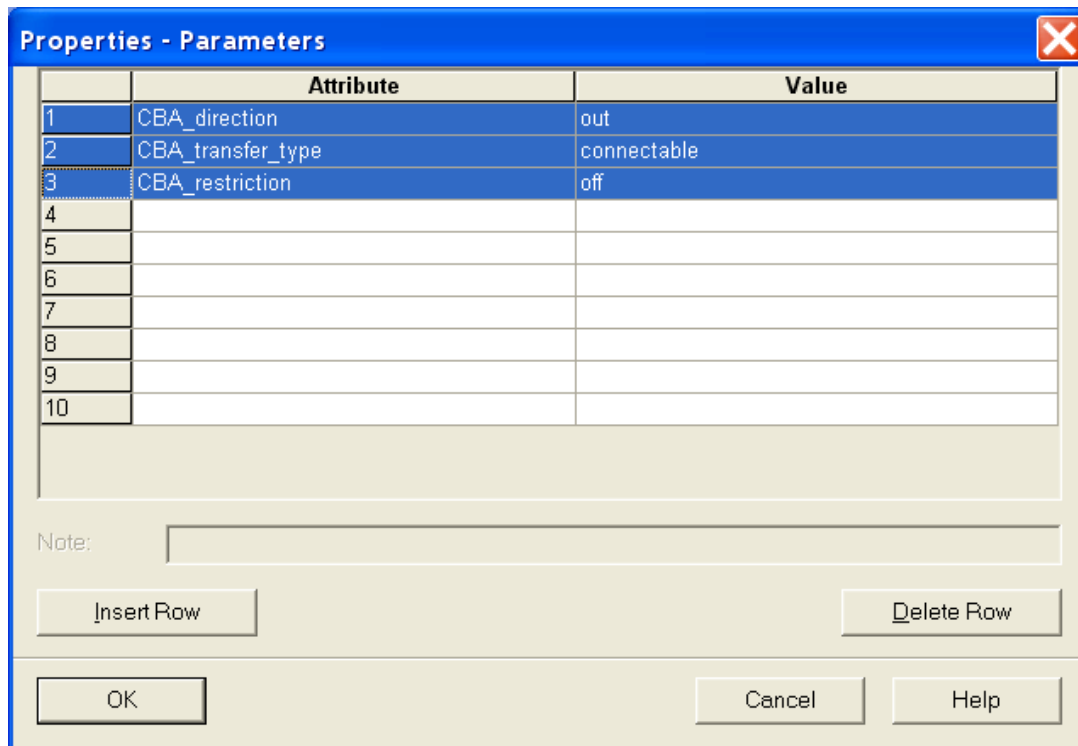
19. Click on **OK** button.



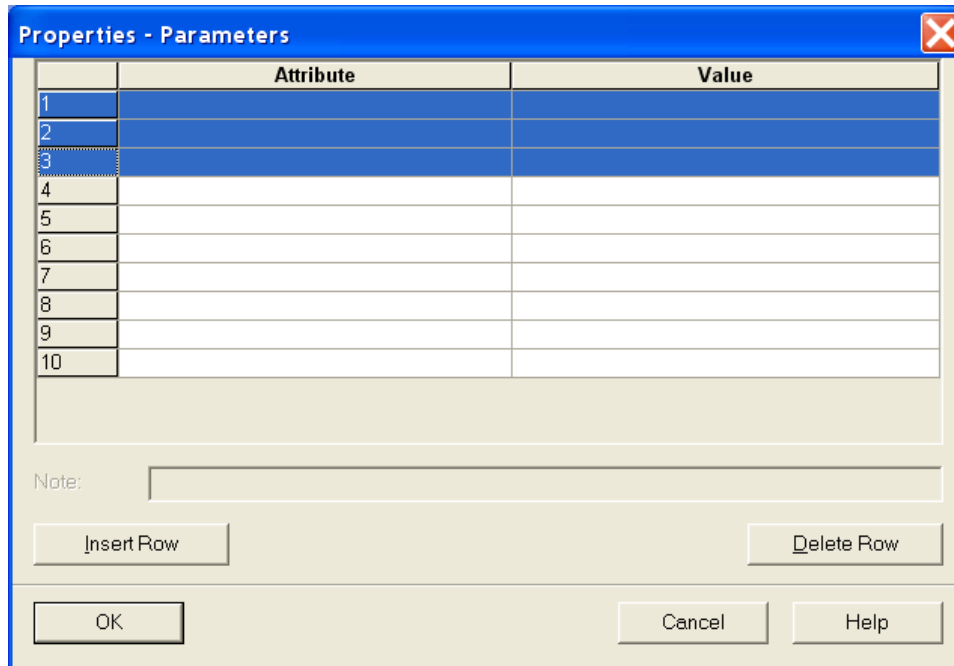
20. Wait until the PROFINET component is generated.
21. Open the DB100. Select all rows and copy to clipboard (Ctrl+C).
22. Select menu command **File/Exit**.
23. Open the DB45, and paste the declaration rows (Ctrl+V) from DB100 at the end of DB45:



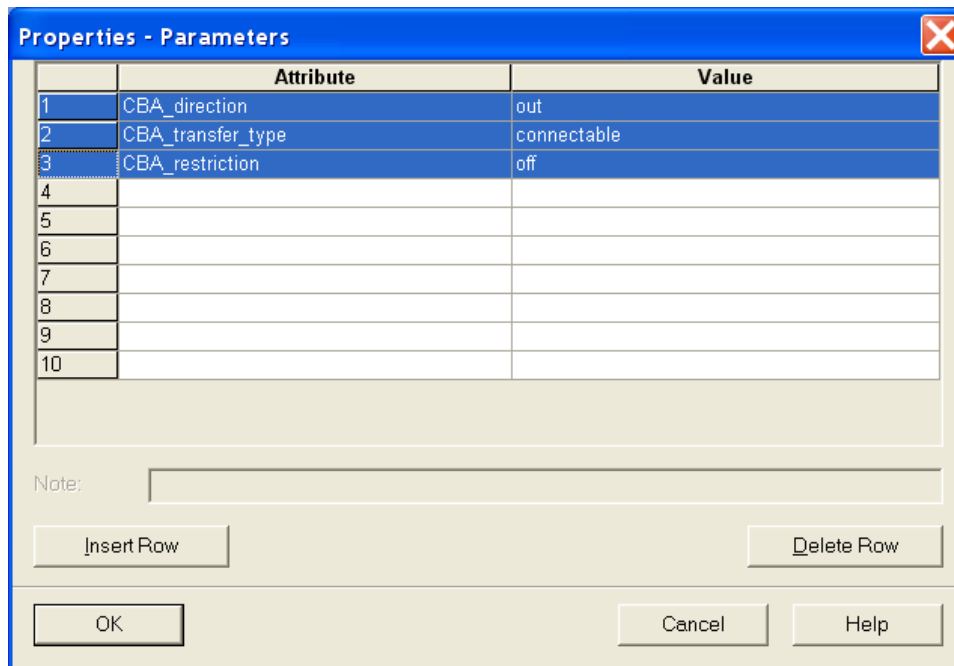
24. Right click on the **OutByteArray** and select **Object Properties**:



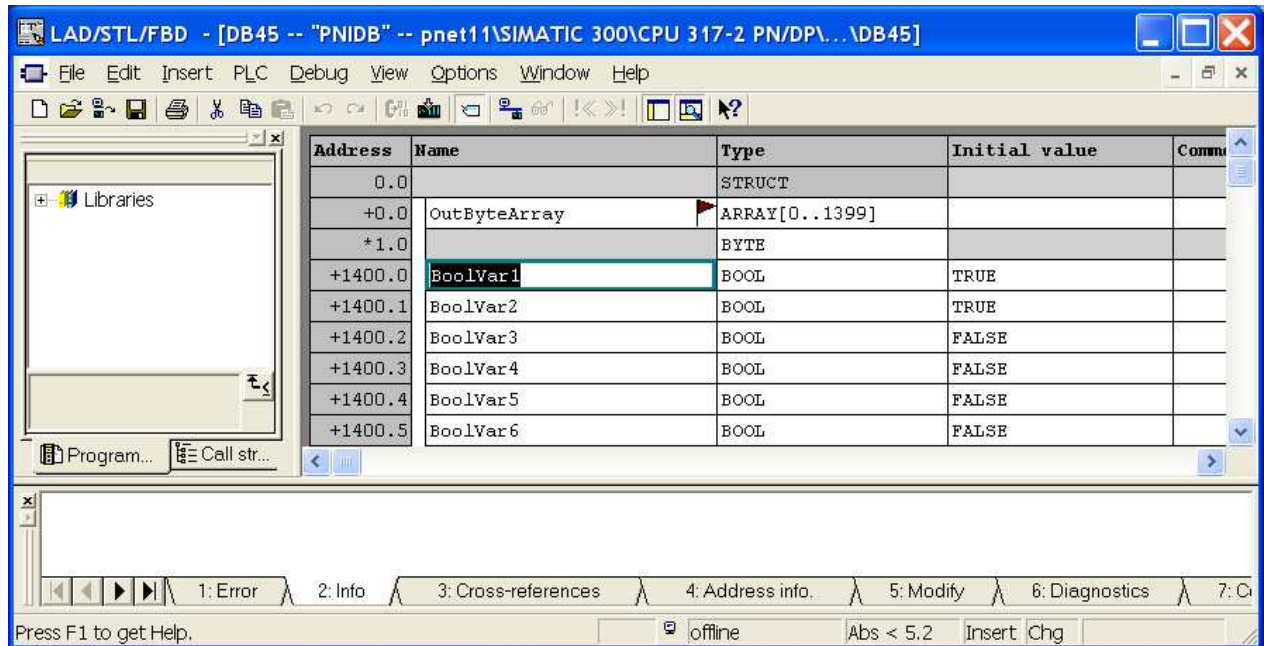
25. Select and copy properties to clipboard (Ctrl+C). Click on the **OK** button.
26. Right click on **BoolVar1** and select **Object Properties**. Select 3 rows in the Properties dialog box.



27. Paste the properties from clipboard (Ctrl+V):



28. Click on **OK** button.



29. Right-click on **OutByteArray** and delete it.

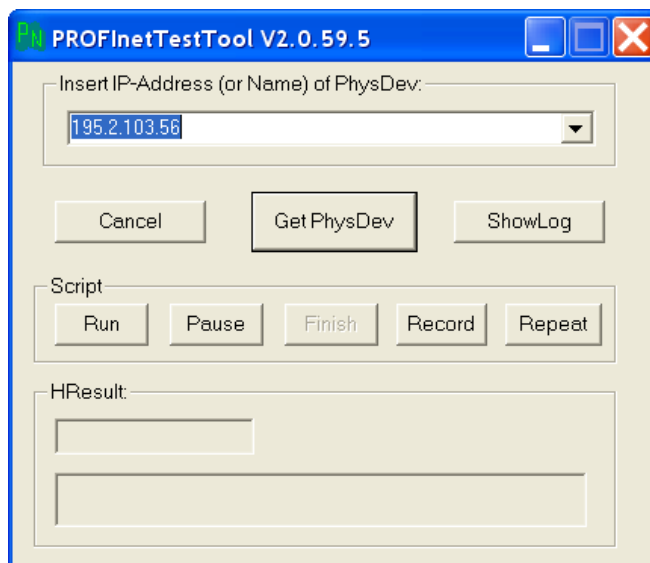
30. Select menu command **File/Save**.

31. Select menu command **File/Exit**.

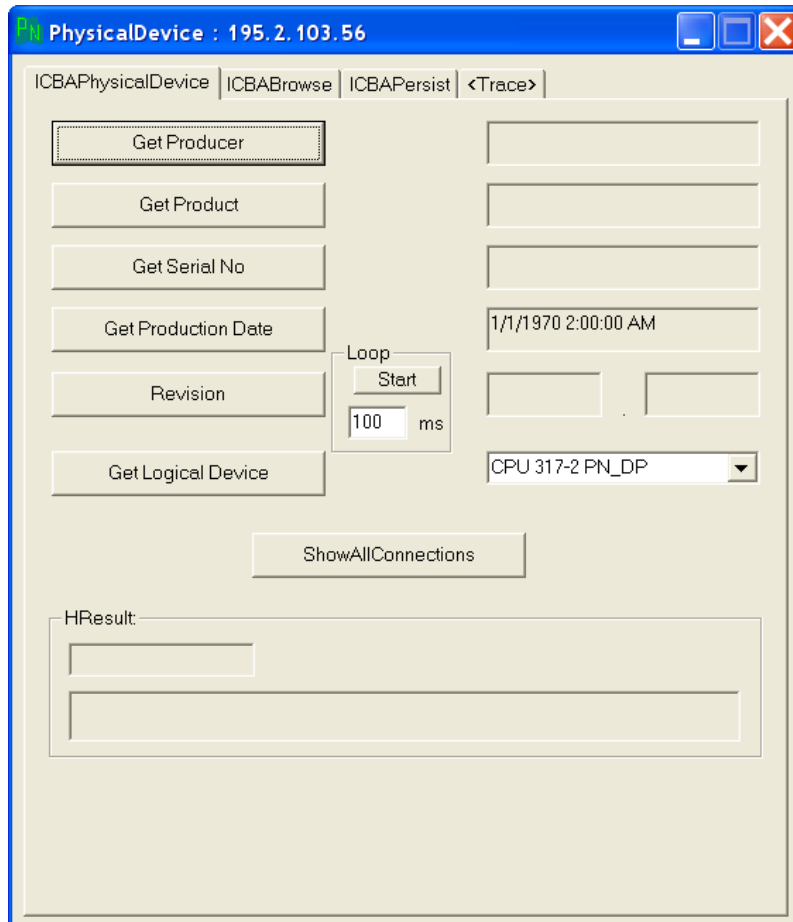
32. Delete DB100.

33. Download the project to the PLC.

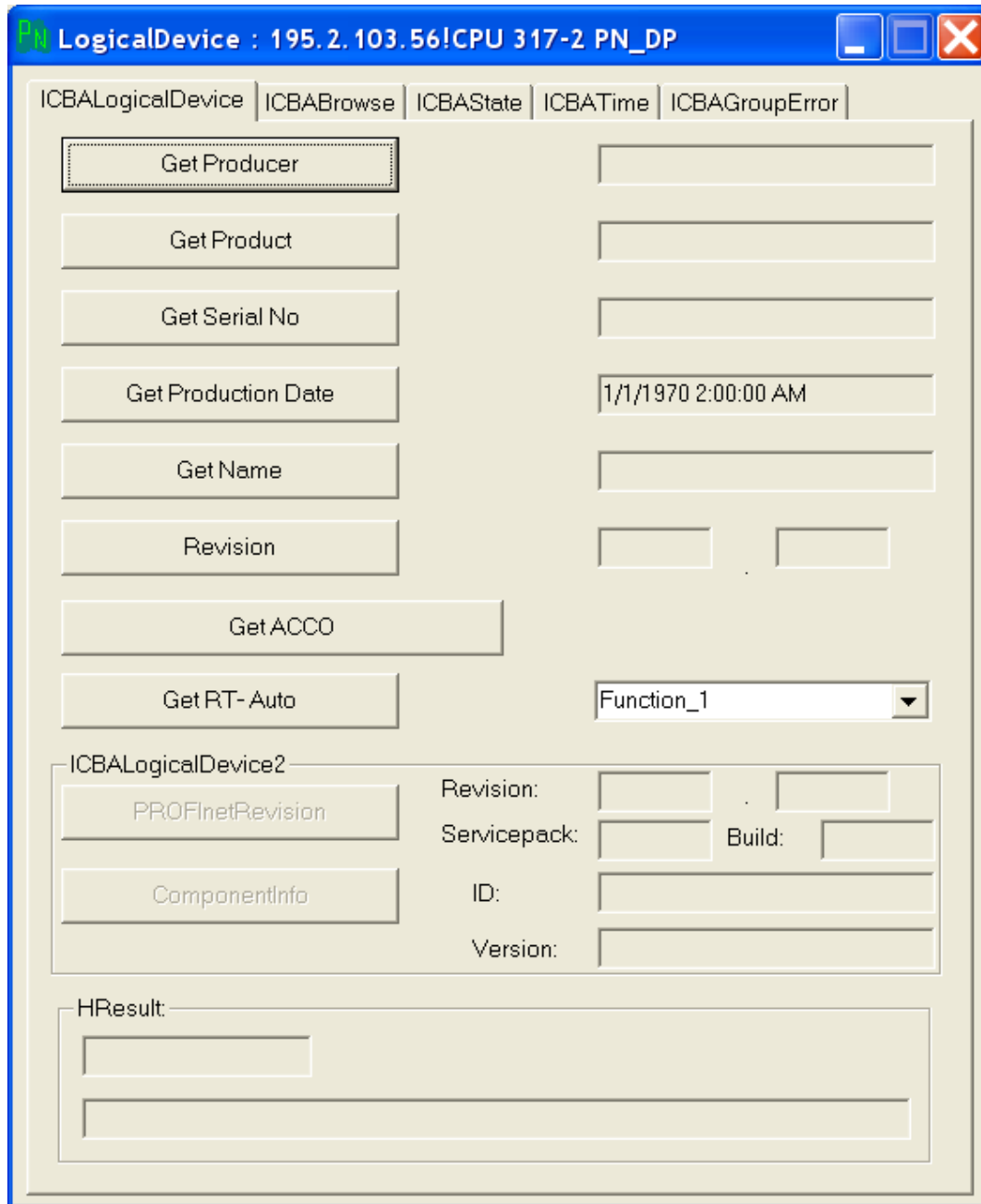
34. To test the PROFINET communication, start the PNTTestTool.exe (it is included in **S7PROFINET-PLCDEMO.ZIP** package). The following dialog box will be displayed:



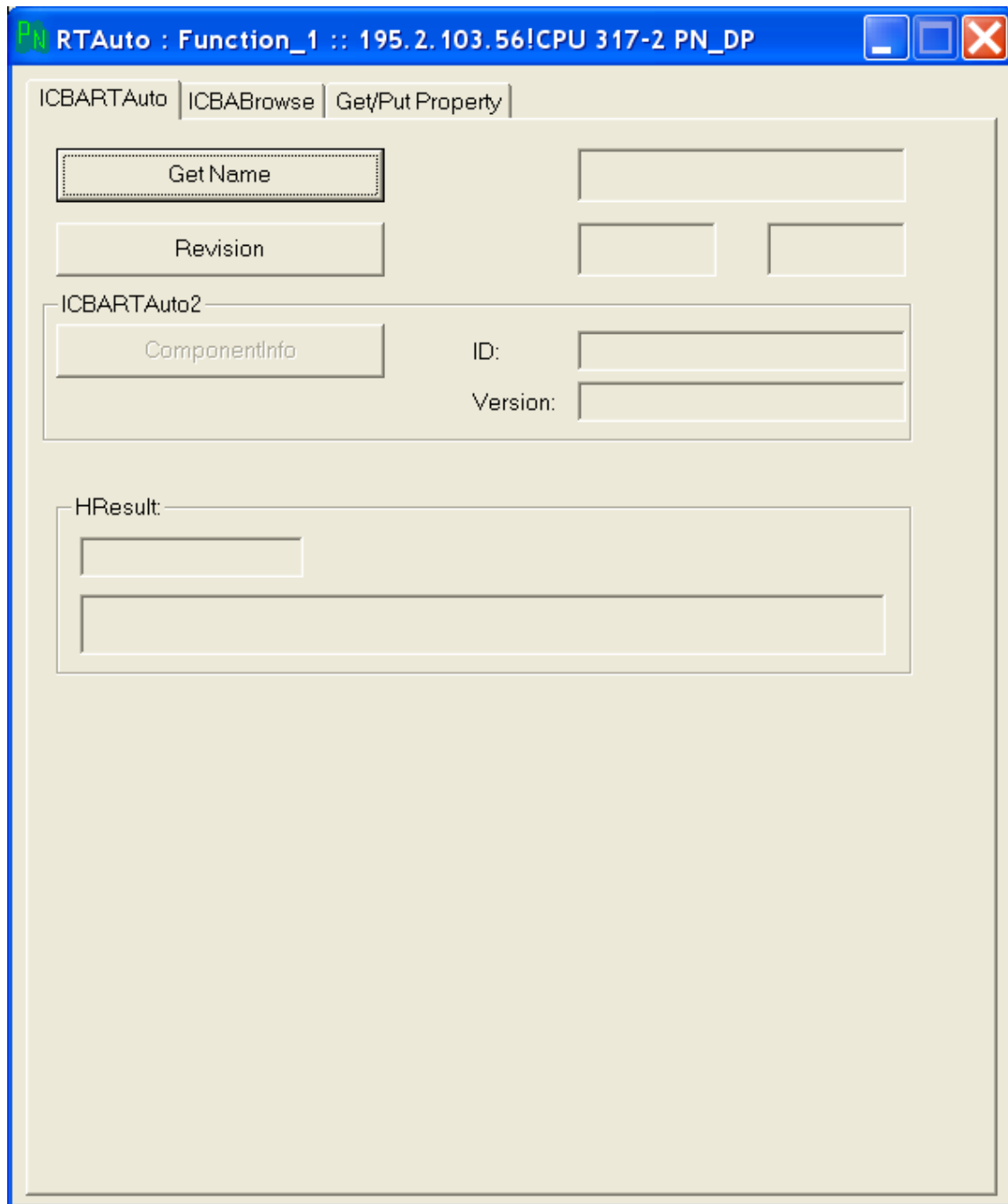
35. Enter the IP address of the PLC and click on **GetPhysDev** button.



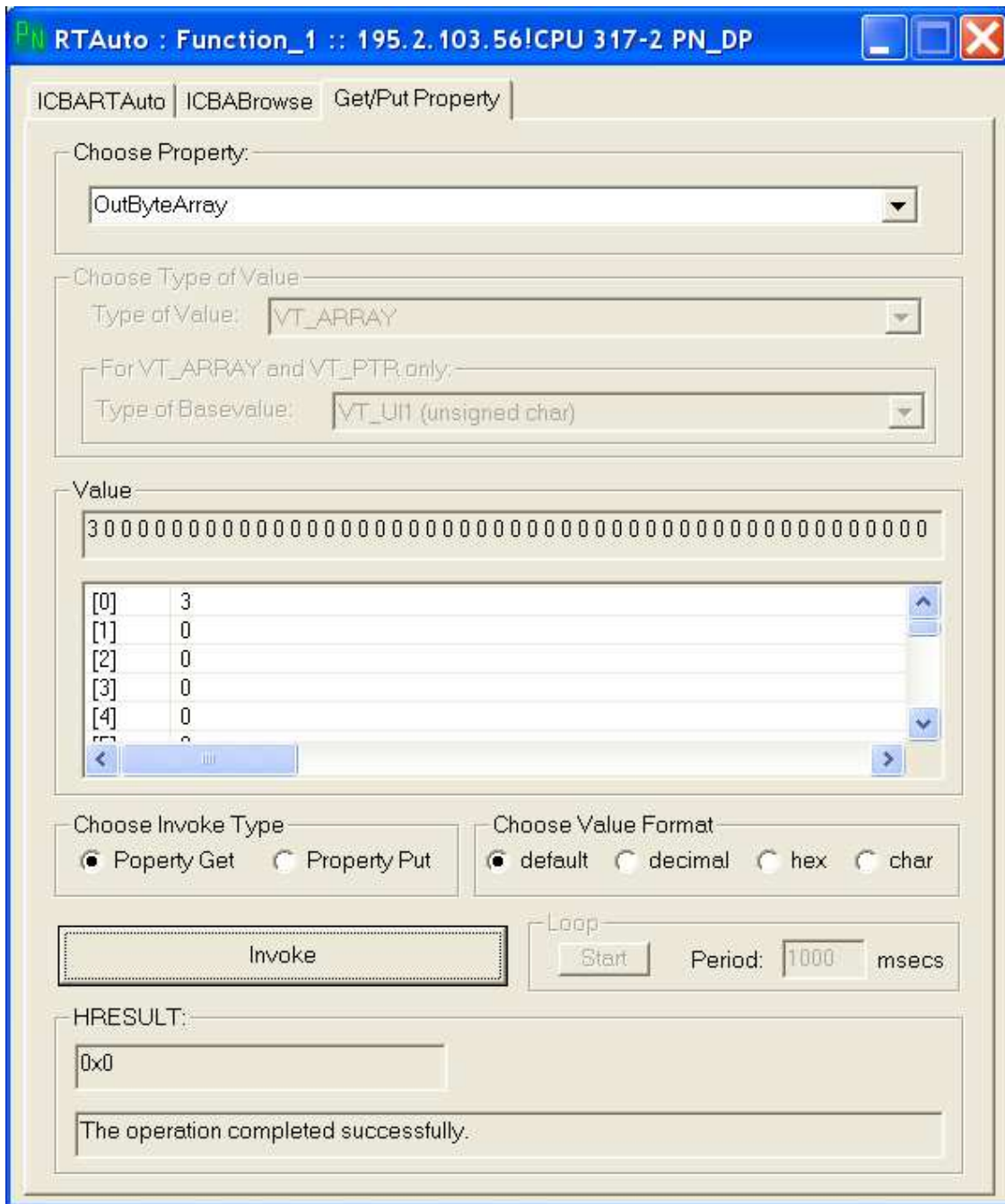
36. Click on **Get Logical Device** button.



37. Click on **Get RT – Auto** button.



38. Click on **Get/Put Property** tab.



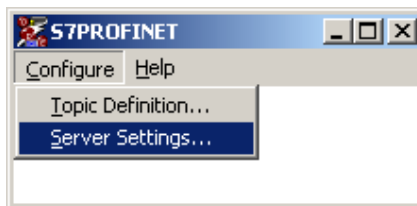
39. Select **OutByteArray** property and click on **Invoke** button to update the values.

Note: In order to maintain situation when DB45 is seen externally as homogenous 1400 byte array (allowing simpler and faster access to it) and internally as a data structure with different data types, DO NOT create PROFINET component (menu command **Edit/Create PROFINET component**), after DB45 is defined as a data structure with different data types. If it is necessary to change the data block DB45 (add/delete new

items) resulting in a changed data block length, then repeat the steps described above (create DB45 as homogenous byte array, create PROFINET component, create DB45 as a data structure containing required different data types).

Configuring the S7PROFINET Server

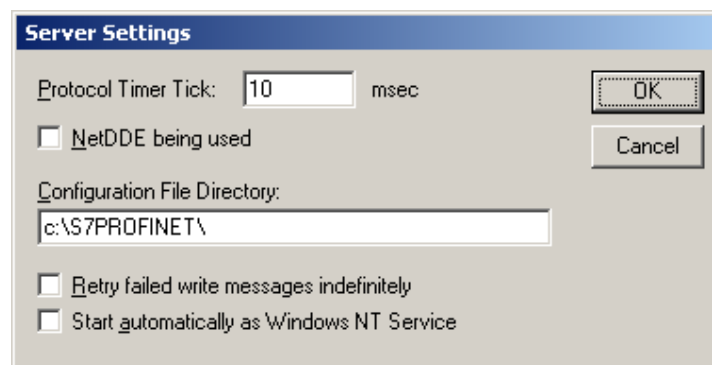
After the S7PROFINET Server is initially installed, a small amount of configuration is required. Configuring the Server automatically creates a **S7PROFINET.CFG** file that holds all of the topic definitions entered, as well as the communication port configurations. This file will automatically be placed in the same directory in which **S7PROFINET.EXE** is located unless the path where the configuration file will be placed is specified via the `/Configure/Server Settings...` command:



Server Settings Command

A number of parameters that control the internal operation of the Server can be set. In most cases, the default settings for these parameters provide a good performance and do not require changing. However, they can be changed to fine-tune the Server for a specific environment.

To change the Server's internal parameters, invoke the `Configure/Server Settings...` command. The "Server Settings" dialog box will appear:



The following describes each field in this dialog box:

Protocol Timer Tick

This field is used to change the frequency at which the Server checks for work to do. At this frequency, the Server tries to send one data request to PLC and receive one reply from PLC. If the send/response cycle is too long then more than one activation of Server is necessary to process it. If computer is very busy or some other MS Windows application is taking over the computer then the Server is activated rarely than setting in the **Protocol Timer Tick**.

Note: The default value is 50 milliseconds. The minimum and recommended value for achieving highest communication performance is 10 milliseconds.

NetDDE being used

Select this option if you are networking using NetDDE.

Configuration File Directory

This field is used to specify the path (disk drive and directory) in which S7PROFINET will save its current configuration file. The S7PROFINET Server will use this path to load the configuration file the next time it is started.

Note: Only the "path" may be modified with this field. The configuration file is always named **S7PROFINET.CFG**. There is no limit to the number of configuration files created, although each must be in a separate directory. When using the S7Ehernet Server with **InTouch**, it is good practice to place the configuration file in the application directory.

Retry failed write messages indefinitely

This field is used to disable the deleting of pending write messages when *slow poll mode* on some topic is started. As default all write messages for this topic are deleted when topic enters the slow poll mode.

Note: Be careful when using this setting if PLC is disconnected or switched off, but client application continues to generate new values to be written to this device - it can cause the computer memory overload with memory allocated for write messages.

Start automatically as Windows NT Service

Enabling this option will cause the S7PROFINET Server "Suite Link & DDE" version to start as a Windows NT service.

Windows NT offers the capability of running applications even when a user is not logged on to the system. This is valuable when systems must operate in an unattended mode. Enabling this option and rebooting the system will cause the Server to run as a Windows NT service. However, to view configuration information or to reconfigure the Server, the user must log on to the system. Any Server related problems that may arise such as missing adapter cards, licensing failures or device drivers not loading will not be visible to the user until a log on is performed. Disabling this option and rebooting the system will cause the Server to run as a Windows NT application program once again.

Notes:

1. The **Start automatically as Windows NT Service** feature can be activated only with S7Ehernet Server "Suite Link & DDE" version. To start the S7Ehernet Server "OPC & DDE" version as Windows NT Service, refer to **Running S7PROFINET "OPC & DDE" version as Windows NT Service** section of this manual.
2. The Service Startup configuration can be changed by MS Windows NT **Control Panel/Services** configuration dialogs. The **Allow Service to Interact with Desktop** checkbox in "Service" dialog box must be checked (the "Service" dialog box can be invoked by pressing the "Startup" button on "Services" dialog box when Service **S7PROFINET_IOserver** is selected). If **Allow Service to Interact with Desktop** is not selected then S7PROFINET Server full functionality is not ensured (e.g. the Server configuration can not be changed, no message boxes will be displayed, etc.).

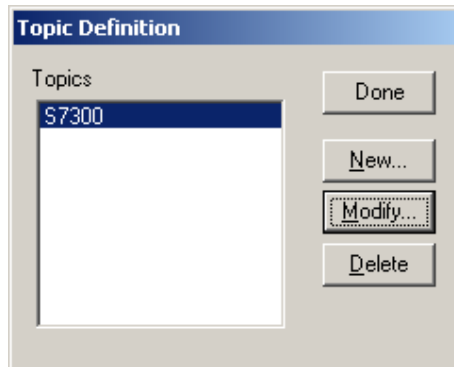
Once all entries have been made, click on **OK**.

Topic Definition Command

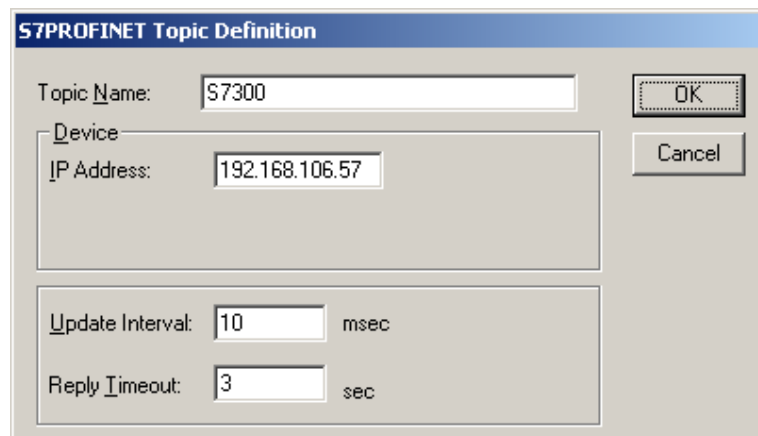
The user provides each connected Siemens S7-300 PLC with an arbitrary name that is used as the Topic Name for all references to this PLC.

The following steps are taken to define the Topic attached to the PLC:

1. Invoke the Configure/Topic Definition... The "Topic Definition" dialog box will appear:



2. To modify an existing topic, select the topic name and click on **Modify**. To define a new topic, click on **New**. The "S7PROFINET Topic Definition" dialog box will appear:



3. Enter the **Topic Name**.

Note: If using **InTouch** the same Topic Name is to be entered in the "Add Access Name" dialog box described in the **Using the S7PROFINET Server with InTouch** section.

4. Enter the **MPI Address** of S7-300 PLC to be accessed. This address must match with PLC address entered when configuring the PLC with Simatic STEP 7 software. (Default value is 2.)
5. Set the **Update Interval** field to indicate the frequency the items/points on this topic will be read (polled). Default value is 1000 milliseconds. The maximum performance

can be achieved by using the minimum value of 10 milliseconds – in this case the S7PROFINET Server will try to poll data as fast as possible.

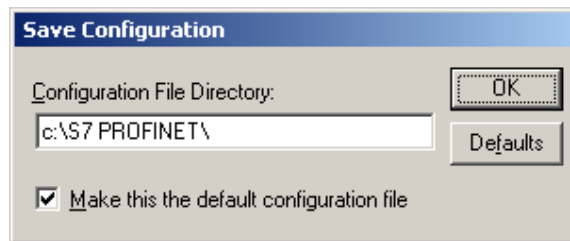
6. Set the **Reply Timeout** field to indicate the amount of time (in seconds) the Controller using the selected communication adapter-cable will be given to reply to commands from the Server. Default value is 3 seconds.

When all entries have been made, click on **OK** to process the configuration for this topic.

Select **Done** in "Topic Definition" dialog box when configuration for all Topics has been performed.

Saving S7PROFINET Configuration File

If the configuration file does not currently exist, or a new configuration path has been specified, the Server will display the "Save Configuration" dialog box:



This dialog box displays the path where the Server is going to save the current configuration file. The path may be changed if necessary. Also, the path can optionally be recorded in the **WIN.INI** file by selecting the "**Make this the default configuration file**" option. Doing so it will allow the S7PROFINET Server to find the configuration file automatically each time it is started.

Configuration File Location

When the S7PROFINET Server starts up, it first attempts to locate its configuration file by first checking the **WIN.INI** file for a path that was previously specified. If the path is not present in the **WIN.INI** file, the Server will assume that the current working directory is to be used.

To start the Server from an application directory configuration file other than the default configuration file a special switch (**/d:**) is used. For example, invoke the **Start/Run** command and enter the following:

S7PROFINET/d:c:\directoryname

Note: *There is no limit to the number of configuration files that may be created, although each must be in a separate directory.*

Editing S7PROFINET.INI File

The S7PROFINET.INI file contains the information for linking the S7 PLC PROFINET byte arrays with S7 PLC data blocks (DB), i.e. the S7PROFINET Server must know what exact data blocks in PLC are used for PROFINET communications. The general format of S7PROFINET.INI file is following:

[PLC IP Address]

PROFINET byte array name in PLC=Data Block in PLC:byte array start address

In case S7 PLC PROFINET byte array starts from S7 PLC data block beginning, the **:byte array start address** part can be omitted.

1) For example, the following S7PROFINET.INI file should be used with **pnet11** STEP 7 project (with data block DB45 defined as a PROFINET interface data block) provided within S7PRPFINET Server installation:

[192.168.106.57]

OutByteArray=DB45

2) The following is an example of S7PROFINET.INI file in case S7PROFINET Server will communicate with two S7 PLCs (with IP addresses 192.168.250.18 and 192.168.250.34), where in 1st PLC the maximum possible for PROFINET consecutive 3999 bytes (read-only) are configured starting from beginning of DB32 and in 2nd PLC up to 1400 bytes starting from beginning of DB55 are configured for read/write via PROFINET:

[192.168.250.18]

OutByteArray1=DB32

OutByteArray2=DB32:1400

OutByteArray3=DB32:2800

[192.168.250.34]

OutByteArray=DB55

InpByteArray=DB55

Item Names

The S7PROFINET Server supports item/point names that are consistent with the point naming for Siemens S7-300/400 Data Blocks. The tables below list the item/point names supported by the S7PROFINET Server:

Data Format	Items	Suffix	I/O Tag Type	Range
Bit	D<B,I>d,Xx.y		Discrete	0 or 1
String	D<B,I>d,Sx,v D<B,I>d,STRINGx,v D<B,I>d,Bx		Message Message Integer	String String 0 to 255
Byte	D<B,I>d,BYTEx	DT	Integer Message	0 to 255 1990-1-1-0:00:00.000 to 2089-12-31-23:59:59.999
Byte Array	D<B,I>d,Bx,v D<B,I>d,BYTEx,v		Message Message	Hex ASCII String Hex ASCII String
Char	D<B,I>d,CHARx	DT	Integer Message	-128 to 127 1990-1-1-0:00:00.000 to 2089-12-31-23:59:59.999
Char Array	D<B,I>d,CHARx,v		Message	Hex ASCII String
Word	D<B,I>d,Wn D<B,I>d,WORDn	BCD KT S5T TR D	Integer Integer Integer Message Message Real Message	0 to 65535 0 to 65535 0 to 9999 0.0 to 999.3 0 ms to 2 h 46 m 30 s 0.0 to 9990.0 (s) 1990-1-1 to 2168-12-31
Word Array	D<B,I>d,Wn,v D<B,I>d,WORDn,v		Message Message	Hex ASCII String Hex ASCII String
Integer	D<B,I>d,INTn	BCD D	Integer Integer Message	-32768 to 32767 -999 to 999 1990-1-1 to 2168-12-31
Integer Array	D<B,I>d,INTn,v		Message	Hex ASCII String
Double Word	D<B,I>d,Dm D<B,I>d,DWORDm	BCD TOD T	Integer Integer Integer Message Message Message	0 to 2147483647 0 to 2147483647 0 to 999999999 0:00:00.000 to 23:59:59.999 -24D_20H_31M_23S_648MS to 24D_20H_31M_23S_647MS
Double Word Array	D<B,I>d,Dm,v D<B,I>d,DWORDm,v		Message Message	Hex ASCII String Hex ASCII String
Double Integer	D<B,I>d,DINTm	BCD TOD T	Integer Integer Message Message	-2147483648 to 2147483647 -99999999 to 99999999 0:00:00.000 to 23:59:59.999 -24D_20H_31M_23S_648MS to 24D_20H_31M_23S_647MS
Double Integer Array	D<B,I>d,DINTm,v		Message	Hex ASCII String
Real	D<B,I>d,REALm		Real	±3.4e38
Real Array	D<B,I>d,REALm,v		Message	Hex ASCII String

Notes:

1. All Data Blocks are **Read/Write**, **d**=1...65535, **x**=0...65535, **n**=0...65534, **m**=0...65532, **y**=0...7, **v**=1...131/type size - this size may vary.
2. The longest string InTouch can process is 131 bytes, so the following maximum length of arrays (**v**) is supported: 131 for String, 65 for Byte Array and Char Array, 32 for Word Array and Integer Array and 16 for Double Word Array, Double Integer Array and Real Array. Arrays are converted into HEX ASCII strings representing the big endian format of the binary data.
3. The S7Ehernet Server will process a write (POKE) to a Data Block.

Examples:

DB123,W24 – Word starting from address 24 in Data Block 123, I/O Type: Integer

DB23,DINT10BCD - Double Integer starting from address 10 in Data Block 23, value interpreted as BCD, I/O Type: Integer

DI5,X3.0 - Bit 0 in byte with address 3 in Data Block 5, I/O Type: Discrete

DI6,BYTE5,10 - Byte Array with length 10 bytes starting from address 5 in Data Block 6, I/O Type: Message

Monitoring and Controlling Communication with a PLC

For each topic, there are following additional items offered by S7PROFINET Server to monitor and control the communication with PLC.

STATUS

For each topic, there is a built-in discrete item that indicates the state of communication with PLC. The discrete item (**STATUS**) is set to **0** when communication fails and set to **1** when communication is successful. The **STATUS** value is set to 0 after 3 consecutive unsuccessful retries to communicate with this PLC.

From **InTouch** the state of communication may be read by defining an I/O Discrete tagname and associating it with the topic configured for the PLC and using **STATUS** as the item name.

From **Excel**, the status of the communication may be read by entering the following formula in a cell:

=S7PROFINET|topic!STATUS

where **topic** is the name of topic (e.g. plc01) configured for PLC.

UPDATEINTERVAL

The **UPDATEINTERVAL** item is an Integer type Read/Write item used to access the currently set Update Interval (see *Topic Definition Command* section). It indicates the current requested update interval (in milliseconds). The value of this item can be read through DDE, Suite Link or OPC. Client can poke new values to this item. The range of valid values is from 10 to 2147483647 milliseconds. The value of zero indicates that no items on this topic are updated. The write commands are still executed (new values written to PLC) if **UPDATEINTERVAL** value is 0 (zero).

Note: By poking a value of zero to the **UPDATEINTERVAL** item, a client can stop all update activities on the corresponding topic without having to deactivate the items.

MAXINTERVAL

The **MAXINTERVAL** item is an Integer type Read Only item used to access the measured maximum update interval (in milliseconds) of all items for the corresponding topic for the last completed poll cycle. The range of valid values is from 0 to 2147483647 milliseconds.

The **UPDATEINTERVAL** and **MAXINTERVAL** items can be used to tune the performance of communication.

ITEMCOUNT

The **ITEMCOUNT** item is an Integer type Read Only item used to access the number of active items in the corresponding topic. The range of valid values is from 0 to 2147483647.

ERRORCOUNT

The **ERRORCOUNT** item is an Integer type Read Only item used to access the number of active items with errors in the corresponding topic. The range of valid values is from 0 to 2147483647.

ERRORITEMS

The **ERRORITEMS** item is an Integer type Read/Write Only (unique for each topic) used to access the total number of items with invalid item names (these items are rejected by Server). The **ERRORITEMS** value can be reset by writing 0 to this item. The range of valid values is from 0 to 2147483647.

WRITECOUNT

The **WRITECOUNT** item is an Integer type Read Only item used to access the number of write commands (messages) waiting for execution. The range of valid values is from 0 to 2147483647.

For example, in following way the **WRITECOUNT** item can be used to avoid the increasing of memory occupied by not executed write commands:

- activate the hot link with **WRITECOUNT** item and start to monitor it;
- activate new write command (by poking new value) only if value of **WRITECOUNT** becomes equal to 0, e.g. all previous write commands are executed and memory occupied by them is freed.

SUSPEND

Special Read/Write Discrete Item **SUSPEND** may be used to control the communication with a separate topic. If application changes **SUSPEND** value from 0 to 1 then communication with topic is suspended. If **SUSPEND** value is changed back to 0 then communication with this topic is resumed.

Note: If topic is suspended by setting **SUSPEND** value to 1, then Server rejects all new write values to this topic, i.e. no new write messages are created after **SUSPEND** value has changed from 0 to 1.

Using the S7PROFINET Server with Suite Link and DDE Clients

The “**Suite Link & DDE**” version of S7PROFINET Server is accessible from Suite Link clients (e.g. InTouch) and DDE clients (e.g. Excel). The “**OPC & DDE**” version of S7PROFINET Server is accessible from DDE clients.

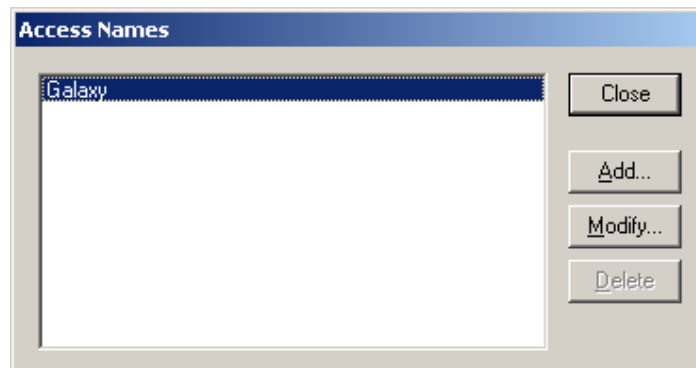
Using the S7PROFINET Server with InTouch

To access to data from Siemens S7 PLCs from **InTouch** by using S7PROFINET Server, the Access Names and Tag names should be defined in **WindowMaker**.

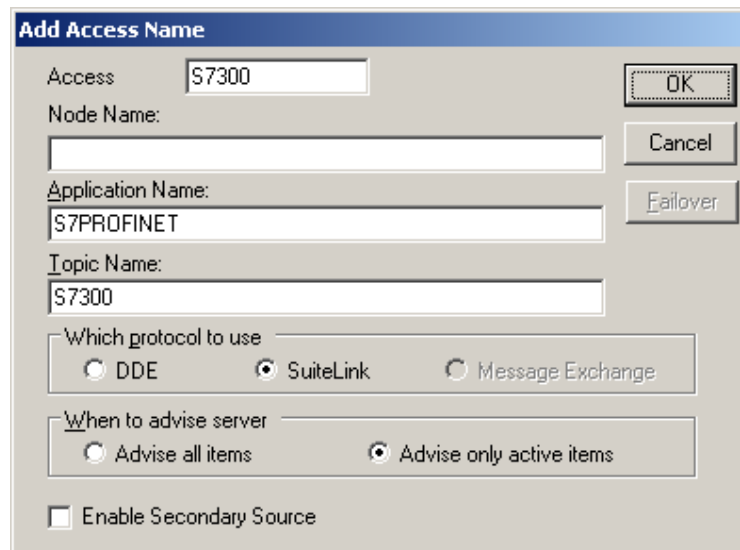
Defining the Access Names

InTouch uses **Access Names** to reference real-time I/O data. Each Access Name equates to an I/O address, which can contain a **Node**, **Application**, and **Topic**. In a distributed application, I/O references can be set up as global addresses to a network I/O Server or local addresses to a local I/O Server.

To define the Access Names in WindowMaker node invoke the */Special/Access Names...* command. The "Access Names" dialog box will appear:



Click on **Add....** The "Add Access Name" Dialog Box will appear:



Note: If **Add** is selected, this dialog box will be blank when it initially appears. Data has been entered here to illustrate the entries that are made.

The following fields are required entries when entering an Access Name Definition:

Access Name

In the Access Name box type the name you want InTouch to use to this Access Name. (For simplicity, use the same name that you will use for the **Topic Name** here.)

Node Name

If the data resides in a network I/O Server, in the Node Name box, type the remote node's name.

Application Name

In the Application Name box, type the actual program name for the I/O Server program from which the data values will be acquired. In case the values are coming from the S7PROFINET Server the "S7PROFINET" is used. Do not enter the .exe extension portion of the program name.

Topic Name

Enter the name defined for the topic in the S7PROFINET Server to identify the topic the S7PROFINET Server will be accessing.

The Topic Name is an application-specific sub-group of data elements. In the case of data coming from S7PROFINET Server program, the topic name is the exact same name configured for the topic in the S7PROFINET Server.

Note: This will usually be the same as the "Access Name", although, if desired, they may be different. However, it must be the same name used when the topics were configured in section **Configuring the S7Ehernet Server**.

Which protocol to use

Select the protocol (DDE or Suite Link) that you are using.

When to advise server

Select **Advise all items** if you want the Server program to poll for all data whether or not it is in visible windows, alarmed, logged, trended or used in a script. Selecting this option will impact performance, therefore its use is not recommended.

Select **Advise only active items** if you want the Server program to poll only points in visible windows and points that are alarmed, logged, trended or used in any script.

Enable Secondary Source

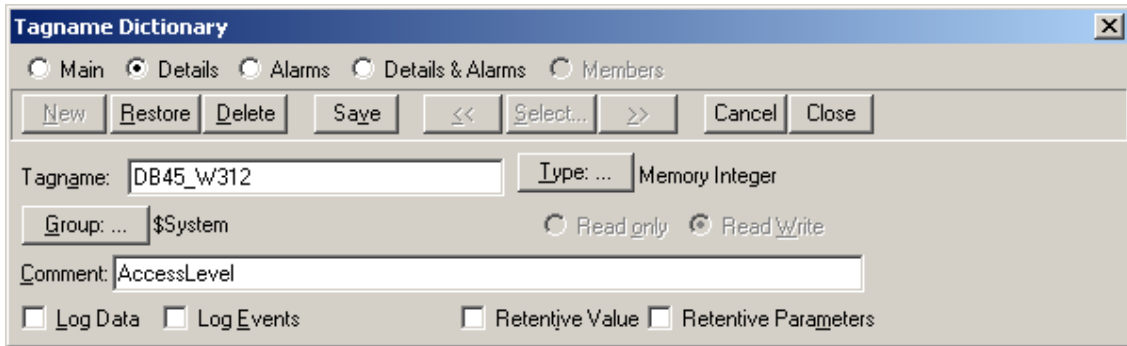
Click on this checkbox to enable the failover processing for this Access Name. See InTouch user documentation for Access Name failover setup details.

Click **OK** to accept the new Access Name and close the "Add Access Name" dialog box. The "Access Names" dialog box will reappear displaying the new Access Name selected in the list.

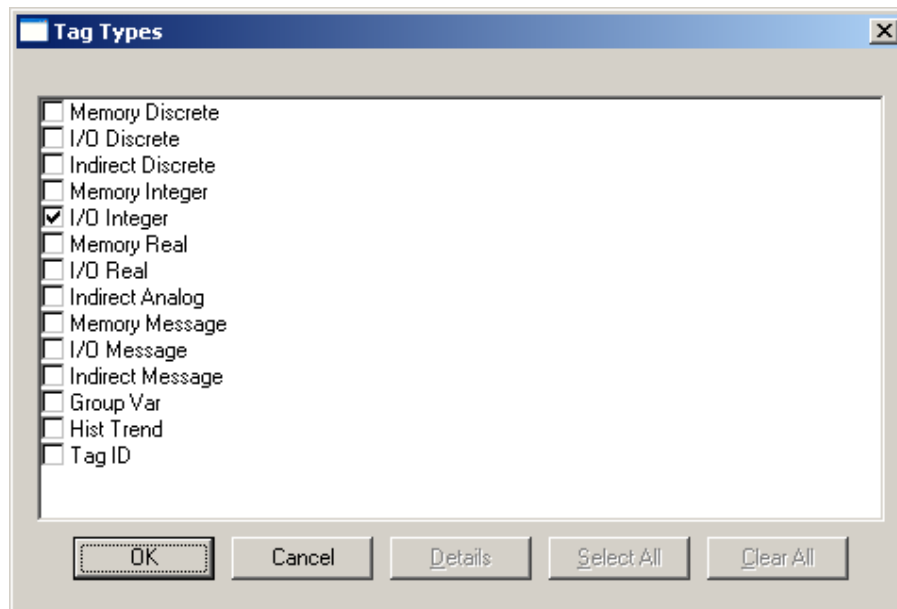
Click **Close** to close the "Access Names" dialog box.

Defining the Tag names

To define the Tag names associated with the new "Access Name", invoke the */Special/Tagname Dictionary...* command (in **WindowMaker**). The "Tagname Dictionary" dialog box will appear. Click on **New** and enter the **Tagname**. (The tagname defined here is the name **InTouch** will use. The S7PROFINET Server does not see this name.):

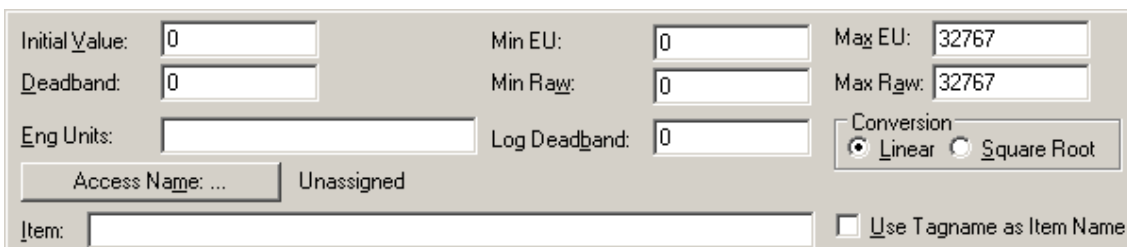


Select the tag type by clicking on the **Type:...** button. The "Tag Types" dialog box will appear:

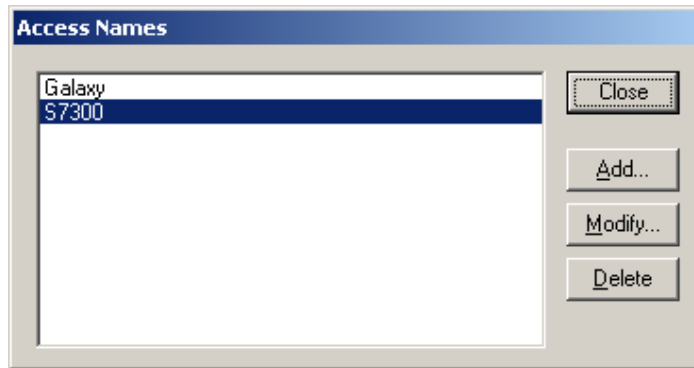


To access S7PROFINET items, the type must be **I/O Discrete**, **I/O Integer**, **I/O Real** or **I/O Message**. Select the Tag type.

The "Details" dialog box for the tag name will appear:



Select the Access name for S7PROFINET Server by clicking on the **Access Name:...** button. The "Access Names" dialog box will appear:



Select the appropriate Access Name and click on **Close**. (If the Access Name has not been defined as previously described, click on **Add** and define the Access Name now.)

The "Details" dialog box will appear displaying the selected Access Name:

For integers and reals fill in the **Min EU**, **Max EU**, **Min Raw** and **Max Raw** fields. These fields control the range of values that will be accepted from the Server and how the values are scaled. If no scaling is desired, **Min EU** should be equal to **Min Raw** and **Max EU** equal to **Max Raw**.

Enter the S7PROFINET item name to be associated with this tagname in the **Item:** field in the "Details" box:

(Refer to the **Item Names** section below for complete details.)

Where applicable, the **Use Tagname as Item Name** option may be selected to automatically enter the tag name in this field. **Note:** *The tag name can only be used if it follows the conventions listed in the **Item Names** section.*

Once all entries have been made, click on the **Save** button (in the top dialog box) to accept the new tag name. To define additional tag names click on the **New** button. To return to the **WindowMaker** main screen, select **Close**.

Monitoring the Status of Communication with InTouch

InTouch supports built-in topic names called **DDEStatus** and **IOStatus** that are used to monitor the status of communications between the Server and InTouch. For more information on the built-in topic names DDEStatus and IOStatus, see your online "InTouch User's Guide".

The status of communication between the Server and InTouch can be read into **Excel** by entering the following DDE reference formula in a cell on a spreadsheet (in following examples **S7300** is the Topic Name configured for S7PROFINET Server):

=view|DDEStatus!S7300

or

=view|IOStatus!S7300

Notes on Using Microsoft Excel

Data from the S7PROFINET topic (S7-300 PLC) may be accessed from Excel spreadsheets. To do so, enter a formula like the following into a cell on the spreadsheet.

= S7PROFINET|topic!item

Sometimes, Excel requires the **topic** and/or **item** to be surrounded by apostrophes.

In the formula, **topic** must be replaced with one of the valid topic names defined during the Server configuration process. Replace **item** with one of the valid item names described in the **Item Names** section.

Reading Values into Excel Spreadsheets

Values may be read directly into Excel spreadsheets by entering a DDE formatted formula into a cell, as shown in the following examples:

```
=S7PROFINET|'S7300'|'DB123,W24'
=S7PROFINET |'S7400'|' DB23,DINT10BCD'
=S7PROFINET |'PLC1'|'DI5,X3.0'
```

Note: Refer to the Microsoft Excel manual for complete details on entering Remote Reference formulas for cells.

Writing Values to S7PROFINET Points

Values may be written to the Server from Microsoft Excel by creating an Excel macro that uses the **POKE** command. The proper command is entered in Excel as follows:

```
channel=INITIATE("S7PROFINET ", "topicname")
=POKE(channel, "itemname", Data_Reference)
=TERMINATE (channel)
=RETURN()
```

The following describes each of the above **POKE** macro statements:

channel=INITIATE("S7PROFINET ", "topicname")

Opens a channel to a specific topic name (defined in the Server) in an application with name S7PROFINET (the executable name less the .EXE) and assigns the number of that opened channel to **channel**.

Note: By using the **channel=INITIATE** statement the word **channel** must be used in the **=POKE** statement instead of the actual cell reference. The **"applicationname"** and **"topicname"** portions of the formula must be enclosed in quotation marks.

=POKE(channel, "itemname", Data_Reference)

POKEs the value contained in the **Data_Reference** to the specified item name (actual location in the Siemens PLC) via the **channel** number returned by the previously executed **INITIATE** function. **Data_Reference** is the row/column ID of the cell containing the data value. For **"itemname"**, use some of the valid item names described in the **Item Names** section.

=TERMINATE(channel)

Closes the channel at the end of the macro. Some applications have a limited number of channels. Therefore they should be closed when finished. **Channel** is the channel number returned by the previously executed **INITIATE** function.

=RETURN()

Marks the end of the macro.

The following is an example of Excel macro used to poke value from cell B2 to topic **S7300** item **DB123,W24**:

```
PokeMacro -Ctrl a
=INITIATE("S7PROFINET ", "S7300")
=POKE(A2, "DB123,W24", B2)
=ON.TIME(NOW()+0.01, "TerminateDDEChannel")
=RETURN()
```

```
TerminateDDEChannel
=TERMINATE(A2)
=RETURN()
```

Note: Refer to the Microsoft Excel manual for complete details on entering Remote Reference formulas for cells.

Using the S7PROFINET Server with OPC Clients

The "OPC & DDE" version of S7PROFINET Server is accessible from OPC Clients.

There are following general steps needed to access an OPC item from S7PROFINET Server:

1. Run OPC Client application and select the “S7PROFINET OPC and DDE Server” from the list of available OPC Servers. If S7PROFINET Server currently is not running, it will start automatically.
2. Create a new group (or topic if Wonderware OPCLink application is used).
3. If OPC Client supports the validating of items, validate the item before adding it.
4. Add the item. Depending on OPC Client it can be done in several different ways, for example:
 - a) By entering separately the access path to topic name (valid topic name configured in S7PROFINET Topic definition) and separately the item name.
 - b) By entering the full path to item name in the format **TopicName.ItemName** where **TopicName** is the valid topic name configured in S7PROFINET Topic definition.
 - c) By browsing the server address space.

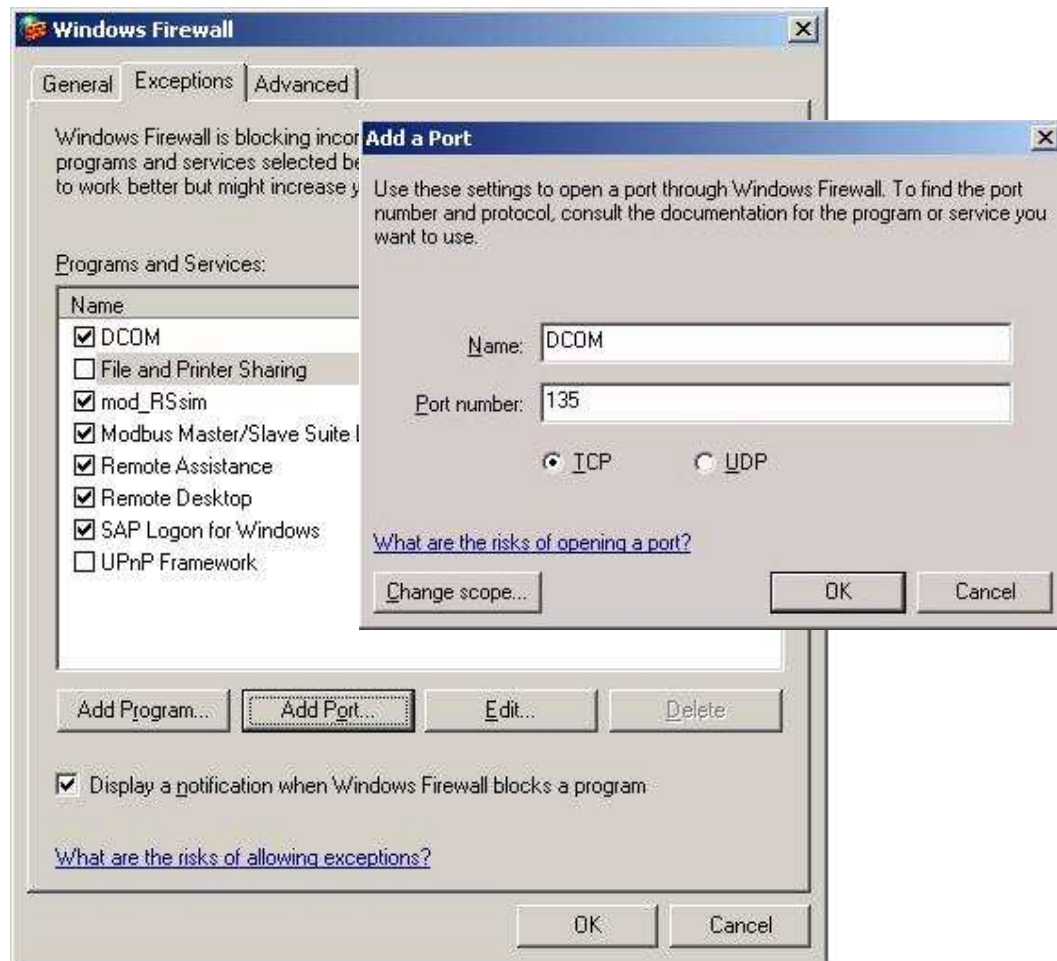
By default the S7PROFINET Server is installed and used as a local OPC Server - both OPC Server and OPC Client reside on same computer. The S7PROFINET Server can run also as a remote OPC Server - in this case OPC Server and OPC Client are located on separate computers. Accessing the remote OPC Server is same as for local OPC Server, but some DCOM (Distributed COM) configuration is required before accessing the remote OPC Server. The DCOM configuration must be done both on OPC Server and OPC Client computers.

Configuring DCOM

To access S7PROFINET Server as a remote OPC Server, it is necessary to do some changes in default security settings selected for the OPC Server's and Client's computers. The following Windows XP SP2 based explanation describes the necessary settings to be done for XP SP2 firewall, for OPC Server and for OPC Client computers.

Firewall

When setting up the OPC Server/Client, it is recommended initially to switch the firewall off. After the necessary configuration is done, the firewall should be restarted and the DCOM port added to the exception list – by selecting “Add Port...” in firewall “Exceptions” pane and adding TCP port 135 as it is needed to initiate DCOM communications:

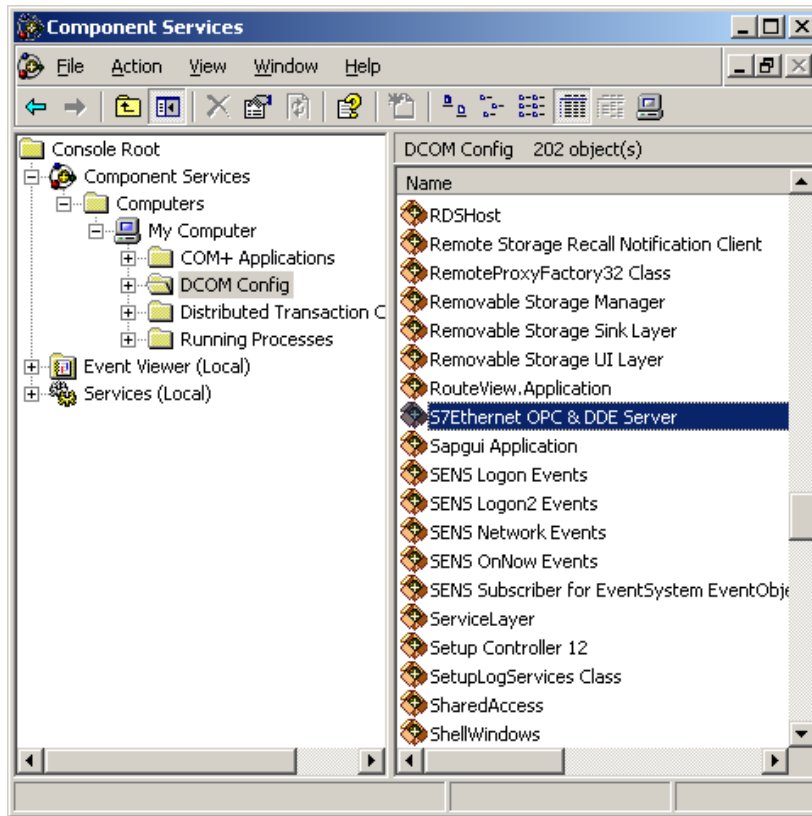


As well by selecting the "Add Program...", all necessary OPC Server and OPC Client programs should be added to the exception list.

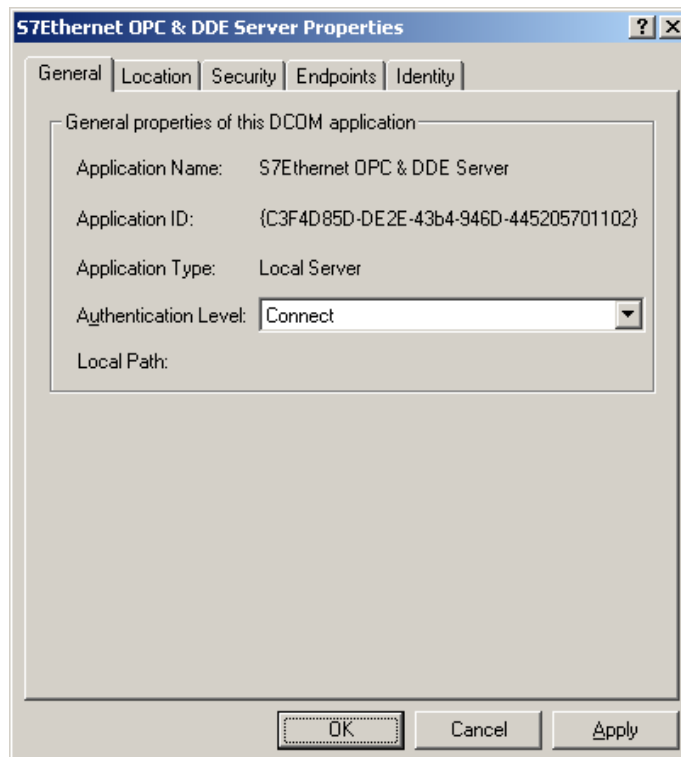
S7PROFINET OPC Server settings

After S7PROFINET Server "OPC & DDE" version installation, the System Administrator must configure DCOM by using the **dcomcnfg.exe** system utility, the following steps:

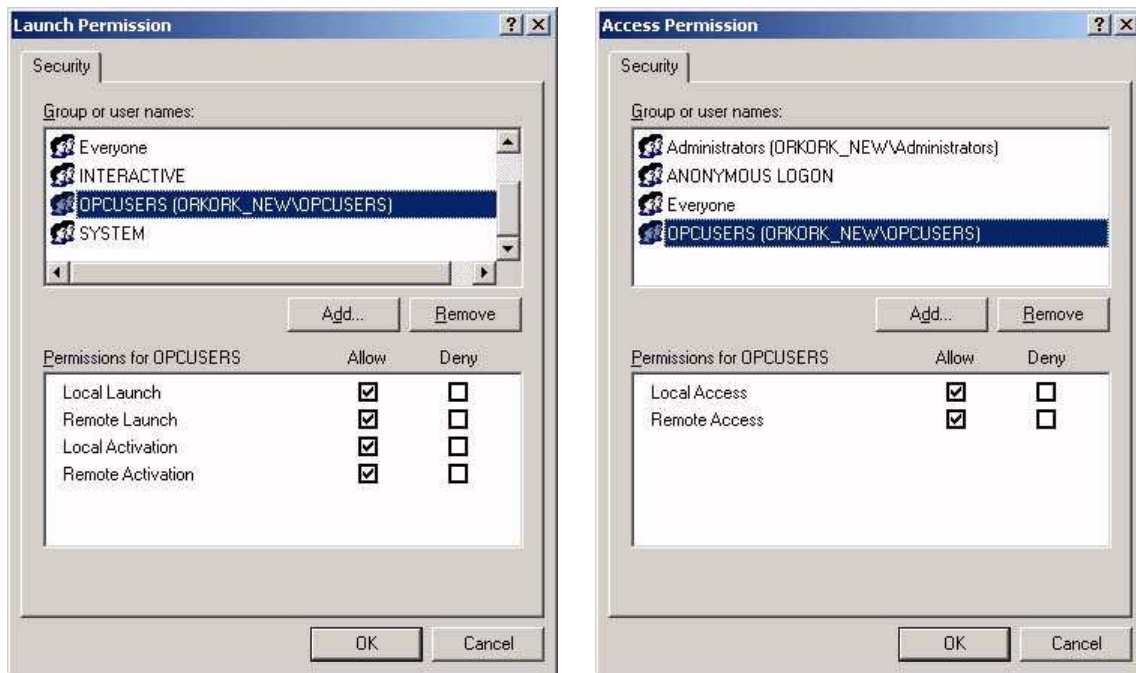
1. At first, it is recommended to create a local group (i.e. OPCUSERS) that contains a list of all the users who will have permission to access the S7PROFINET OPC server.
2. Start dcomcnfg.exe from Windows XP Start-Run line and select the "S7PROFINET OPC & DDE Server" from the list of DCOM entries:



3. Right click on “S7PROFINET OPC & DDE Server” and select the Properties item from the pull down menu that appears. In the window that appears select the **General** tab and make sure the “Authentication Level” field is set to “Connect”:



4. Select the **Security** tab and customize the **Launch and Activation** and **Access** permissions by adding the user group with user who will have permission to access the S7PROFINET OPC server. Give all permissions to that group:

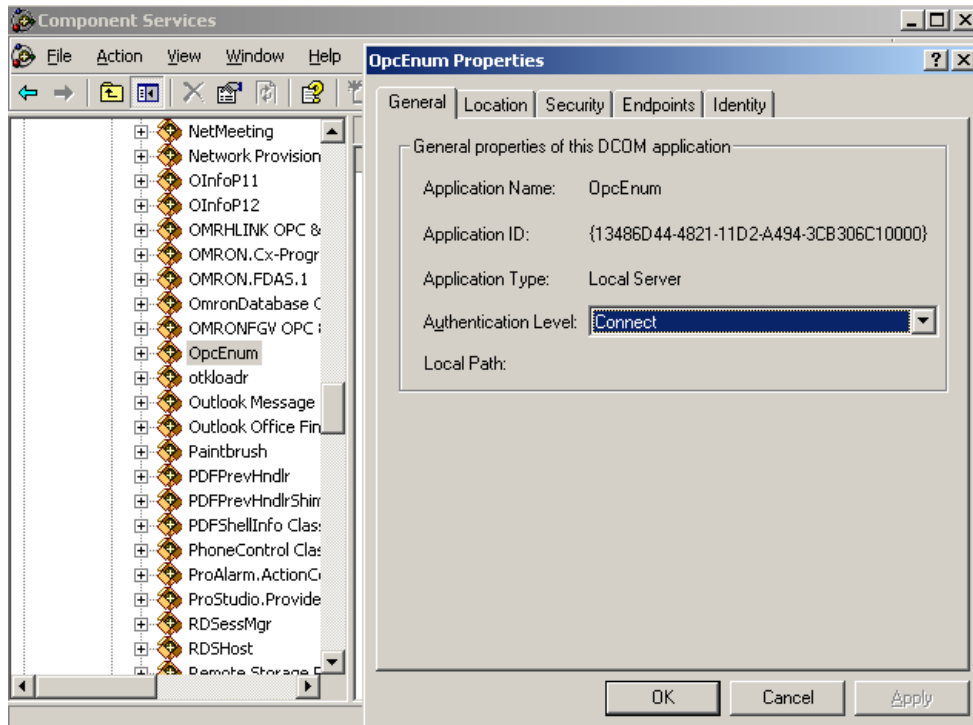


5. Now the configuration of OPC Server is completed – close the dcomcnfg program and restart the S7PROFINET OPC Server to put new settings into effect.

OPCEnum settings

OPCEnum (OPC Enumeration Service) is OPC standard component that allows remote OPC Client to browse the local machine to identify OPC Servers that are installed on it.

To configure OPCEnum settings, start dcomcnfg.exe from Windows XP Start-Run line and select the "OPCEnum" from the list of DCOM entries. Right click on "OPCEnum" and select the Properties item from the pull down menu that appears. In the window that appears select the **General** tab and make sure the "Authentication Level" field is set to "Connect":

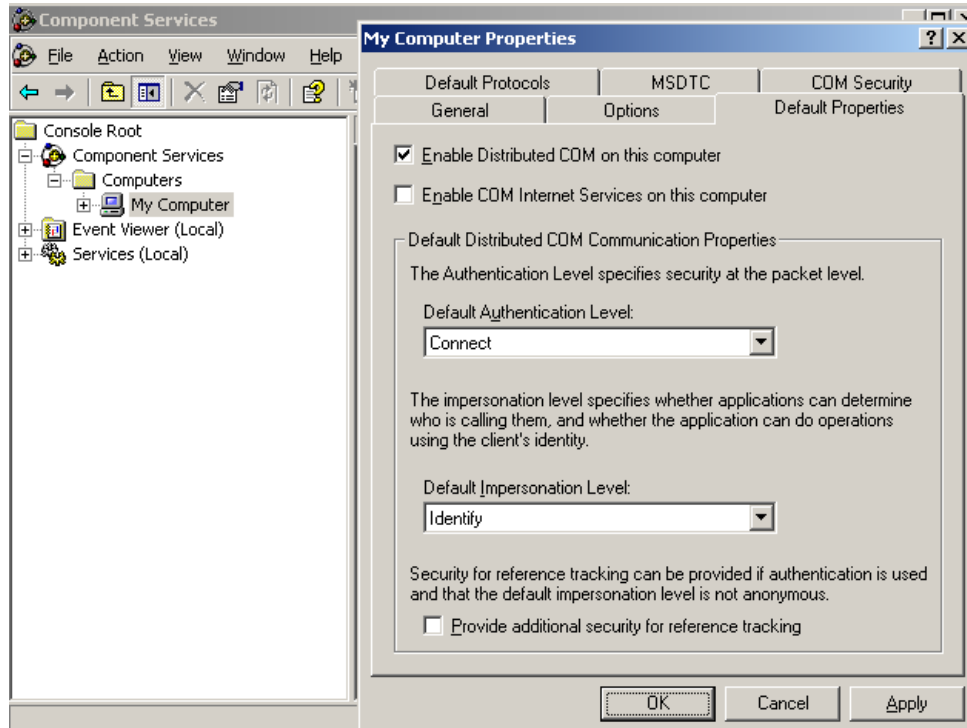


Select the **Security** tab and customize the **Launch and Activation** and **Access** permissions by adding the user group OPCUSERS same way like for “S7PROFINET OPC & DDE Server”. Give all permissions to that group.

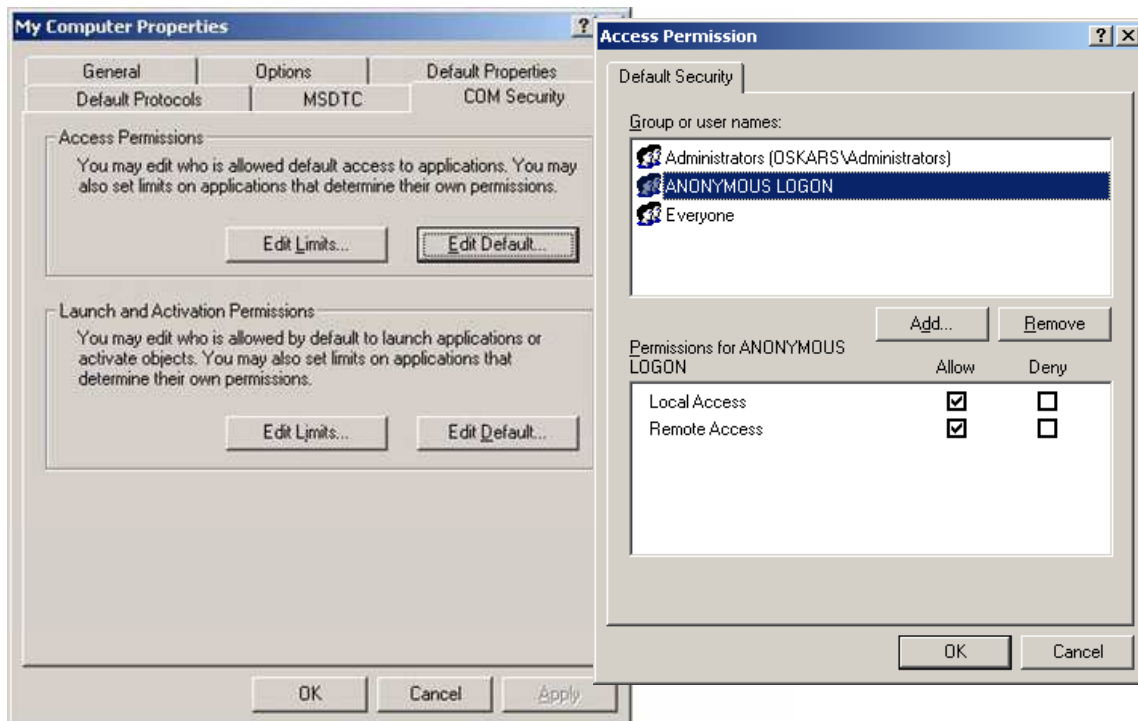
OPC Client side settings

To configure necessary settings on OPC Client computer:

1. Start dcomcnfg.exe from Windows XP Start-Run line, navigate to and right click on “My Computer” and select Properties item from the pull down menu that appears. In the window that appears select the **Default Properties** tab and make sure the settings there are filled like as shown below:



2. Select the **Com Security** tab and edit the Default settings for **Access Permissions** by adding (if not yet added) ANONYMOUS LOGON and giving it all access permissions. Do the same also for "Edit Limits":



3. Edit the Default settings for **Launch and Activation Permissions** by adding (if not yet added) ANONYMOUS LOGON and giving it all all access permissions. Do the same also for "Edit Limits".

Note!

In case the "Edit Limits" selections are not available (grayed) that would mean the DCOM Security Options for some reason have Security Setting other than "Not defined". To correct that: select *Control Panel/ Administrative Tools/Local Security Policy* and select *Local Policies/Security Options* in "Local "Security Settings" dialog box; select, right click and invoke Properties for "DCOM: Machine Access Restrictions..." and "DCOM: Machine Launch Restrictions..." and change their "Security Setting" to "Not defined".

4. Now the configuration of OPC Client side is completed – close the dcomcnfg program and restart the OPC Client.

Running S7PROFINET "OPC & DDE" version as Windows Service

To install S7PROFINET Server "OPC & DDE" version to run as **Windows Service**, the S7PROFINET Server must be started with command line parameter `"/Service"`:

S7PROFINET /Service

After this the "S7PROFINET OPC & DDE Server" Service will be installed with Startup type "Manual". The Service Startup configuration can be changed by MS Windows XP *Control Panel/Administrative Tools/Services* configuration. The **Allow service to interact with desktop** checkbox in "Log On" tab must be checked (the "Log On" tab can be invoked from Properties item from the pull down menu that appears when right clicking on **S7PROFINET OPC & DDE Server** Service). If **Allow service to interact with desktop** is not selected then S7PROFINET Server full functionality is not ensured (e.g. the Server configuration can not be changed, no message boxes will be displayed, etc.).

To uninstall "S7PROFINET OPC & DDE Server" Service, at first the Service must be stopped by *Control Panel/ Administrative Tools/Services/Stop* and then S7PROFINET Server must be started manually with command line parameter `"/DelService"`:

S7PROFINET /DelService

After this the S7PROFINET Server "OPC & DDE" version will be still registered and accessible to OPC Clients.

Using S7PROFINET with OPCLink Server

The Wonderware OPCLink I/O Server (hereafter referred to as "OPCLink") is a Microsoft Windows application program that acts as a communication protocol converter and allows other Windows application programs access to data from local or remote OPC servers. OPCLink connects to OPC servers, converts client commands to OPC protocol and transfers data back to clients using DDE, FastDDE, or Suite Link protocols.

Please refer to ***Wonderware OPCLink Server and OPC Browser User's Guide*** for details how to install, start and use the OPCLink Server. The following information in this section covers only the most important points about using "OPC & DDE" version of S7PROFINET Server with OPCLink Server.

OPCLink Topic Definition

The **Topic Definition** option from OPC Link Configure menu is used to create, modify, or delete OPCLink topic definitions. If OPC Link will communicate with S7PROFINET Server then there must exist one or more topics defined for S7PROFINET Server. There are following important fields on the “OPCLink Topic Definition” dialog box:

Topic Name

Enter a unique name (e.g. **Controller1**) for the PLC in this field. If using InTouch then same Topic Name is to be entered in the "Add Access Name" dialog box when defining the Access Names for OPCLink Server in InTouch WindowMaker.

OPC Server Name

Select the name of the OPC server (**S7PROFINET.OPC_Server**) that will be used by this topic. The list box shows the registered OPC servers in the system.

OPC Path

Enter the name of the OPC path (e.g. **S7300.**) used by this topic. This OPC path is the first part of a full OPC item name string common to all items that will be used in this topic. The available OPC paths for S7PROFINET Server can be obtained by clicking on “Browse” button (this allows to view the S7PROFINET Server’s exposed address space).

Update Interval

Enter the frequency (in milliseconds) that the server will acquire data for the items/points associated with this topic. If 0 (zero) is entered here, OPCLink will not gather data from S7PROFINET Server.

Browse

Clicking on this button initiates the browsing through exposed address space of S7PROFINET Server. The starting addresses of each available data area and names of pre-defined (additional) items will appear on “Browse OPC items:” window in alphabetical order.

Accessing S7PROFINET Items via the OPCLink Server

The communication protocol addresses an element of data in a conversation that uses a three-part naming convention that includes the **application name**, **topic name** and **item name**. The following briefly describes each portion of this naming convention:

application name

The name of the Windows program (server) that will be accessing the data element. In the case of data coming from or going to S7PROFINET Server “OPC & DDE” version, the application portion of the address is **OPCLINK**.

topic name

Meaningful names are configured to identify specific devices (PLCs). These names are then used as the topic name in all conversations to that device (PLC). This must be same name as **Topic Name** entered in the “OPCLink Topic Definition” dialog box, for example, **Controller1**.

Note! You can define multiple topic names for the same PLC to poll different points at different rates.

item name

A specific data element within the specified topic. The OPCLink Server item syntax follows the following rules. The item names must start with:

- d – discrete value
- i – integer value
- r – real value
- m – message (string)

The item name added to the OPC path of the topic (without the heading type letter) must give a fully qualified OPC item name for the S7PROFINET Server. Some examples of possible item names acceptable by OPCLink Server/ S7PROFINET Server connection:

- iDB123,W24** - word starting from address 24 in Data Block 123
- dDI5,X3.0** - bit 0 in byte with address 3 in Data Block 5

Error messages

The messages about errors detected by the S7PROFINET Server are displayed on the Wonderware Logger or S7PROFINET Internal Logger main window and saved to log file.

Below are listed the possible error messages detected directly by S7PROFINET Server or detected by PROFINET CBA Runtime Software PROFINET interface (in the texts of messages the **%Fs** is replaced with some string and **%0x** is replaced with hexadecimal error code):

S7PROFINET Server errors:**"Putting of new value(s) for property \"%Fs\" failed: 0x%0x."**

PROFINET property (some items belonging to byte array defined in S7 PLC **PN_Input section**) has write access, but attempt to change the value(s) was rejected by S7 PLC.

"Incorrect array type 0x%x for the property \"%Fs\"."

PROFINET property (some items belonging to byte array defined in S7 PLC) was defined as a general array (VT_ARRAY), not as a byte (VT_UI1) array.

"No property find for the item \"%Fs\"."

An error occurred after reconnecting to PLC if list of properties (some items belonging to byte array defined in S7 PLC) was changed at PLC side.

"Connection error to IP %Fs."

Network connection to PLC is lost or PLC is no more running or wrong IP address is specified.

"Item \"%Fs\" on the topic \"%Fs\" can not be accessed for reading."

An item has write-only access.

"Item \"%Fs\" on the topic \"%Fs\" can not be accessed for writing."

An item has read-only access or write attempt was rejected by S7 PLC.

"Logical Device is not operating: state 0x%0x."

S7 PLC is not running.

"Reconnecting to the PLC, IP address \"%Fs\"."

Attempt to restore connection with PLC. This is informative message (not an error).

PROFINET CBA Runtime Software PROFINET interface errors:

Listed below error messages are detected by PROFINET CBA Runtime Software PROFINET interface. Most probable reason of errors is wrong CBA Runtime Software and/or wrong PROFINET interface configuration at PLC side:

"CoCreateInstanceEx() failed: 0x%0x."
"ICBAPhysicalDevice2 is not supported."
"BrowseItems2() of the Physical Device failed: 0x%0x."
"get_Count2() of the Physical Device failed: 0x%0x."
"BrowseItems() of the Physical Device failed: 0x%0x."
"get_Count() of the Physical Device failed: 0x%0x."
"QueryInterface(IID_ICBABrowse) of the Physical Device failed: 0x%0x."
"get_Product() of the Physical Device failed: 0x%0x."
"get_Producer() of the Physical Device failed: 0x%0x."
"get_LogicalDevice(%Fs) failed: 0x%0x."
"BrowseItems() of the Logical Device failed: 0x%0x."
"get_Count() of the Logical Device failed: 0x%0x."
"get_RTAuto(%Fs) failed: 0x%0x."
"BrowseItems() of the RTAuto failed: 0x%0x."
"get_Count() of the RTAuto failed: 0x%0x."

Troubleshooting

WIN.INI entries

The first time you run the S7PROFINET Server configuration, most of the items in the following list will automatically appear in the WIN.INI file, located in the MS Windows system directory (e.g. C:\WINDOWS). It is an ASCII file and can be altered manually if you wish with any text editor, e.g., MS Windows Notepad (*do not use a program that formats text, such as MS Word or Write unless the file is saved as a DOS text*). The following is a typical entry for the S7PROFINET Server:

```
[S7PROFINET]  
WinIconic=0  
WinFullScreen=0  
WinTop=112  
WinLeft=0  
WinWidth=200
```

WinHeight=168
ProtocolTimer=10
ConfigurationFile=C:\S7PROFINET
ShowSend=0
ShowReceive=0
ShowErrors=1

There are following additional WIN.INI entries available for S7PROFINET Server:

SlowPollRetries and SlowPollInterval

The **SlowPollRetries** entry is used to enter the number of consecutive error retries for one topic (PLC). If after **SlowPollRetries** there is still no successful response from PLC, then this topic is changed to *slow poll mode*. The WIN.INI file **SlowPollInterval** entry is used to enter the slow poll mode update interval (in seconds).

The default values (they are used if WIN.INI file does not contain these entries) are **SlowPollRetries** equal to 3 and **SlowPollInterval** equal to 60 seconds.

For example, the following entries can be used to specify that slow poll mode 2 minutes will start after 5 consecutive unsuccessful retries:

SlowPollRetries =5
SlowPollInterval=120

Entering into slow poll mode is reported to WWLogger or to S7PROFINET Internal Logger by following string:

"Entering slow poll mode on topic <TOPICNAME>."

If all topics connected to same adapter-cable are in slow poll mode then after 5 full slow poll cycles (all topics are at least 5 times polled) the connection to this adapter-cable is closed and then reopened again.

Leaving the slow poll mode is reported to Wonderware Logger or to S7PROFINET Internal Logger by following string:

"Leaving slow poll mode on topic <TOPICNAME>."

ShowRejectedWrites

The **ShowRejectedWrites** entry is used to enable the logging of rejected write messages. This option can be useful when communication with a separate topic (PLC) is suspended by SUSPEND item (see *Item Names* section) and the Server rejects each write to this topic (PLC). If **ShowRejectedWrites=1** then information about each rejected write value is reported to WWLogger or to S7PROFINET Internal Logger. If **ShowRejectedWrites=0** (default) then Server rejects each write to suspended topic(s) without logging any information.

Troubleshooting menu

The following debugging choices are appended to the Server's System Menu (the menu that appears when you click on the Server icon in the upper left hand corner of the Server's window):

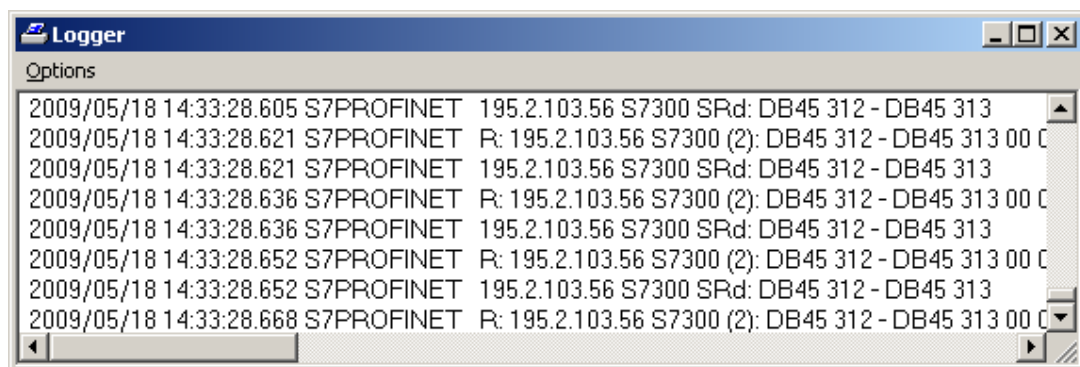
- Suspend Protocol/Resume Protocol** - these choices permit you to turn protocol processing on and off, what means that you can suspend access to PLC(s).
- Show Send** - if checked then all outgoing data (data provided for Libnodave interface) is logged.
- Show Receive** - if checked then all incoming data (data received from Libnodave interface) is logged.
- Show Errors** - if checked then all information about errors is logged.
- Show Logger** - this option is available only for "OPC & DDE" version of S7PROFINET Server - if checked then S7PROFINET Internal Logger is activated/deactivated (see *Internal Logger* section below).
- Dump** - all information about topics, messages and data items is logged. This can be used for debugging purposes.
- Dump Screen** - if checked then information about active messages is displayed on the S7PROFINET main window.

All debug information (except **Dump Screen**) is displayed through the Wonderware Logger or S7PROFINET Internal Logger depending on **Show Logger** option state and settings on the S7PROFINET Internal Logger "Disk Options" dialog box - see *Internal Logger* section below.

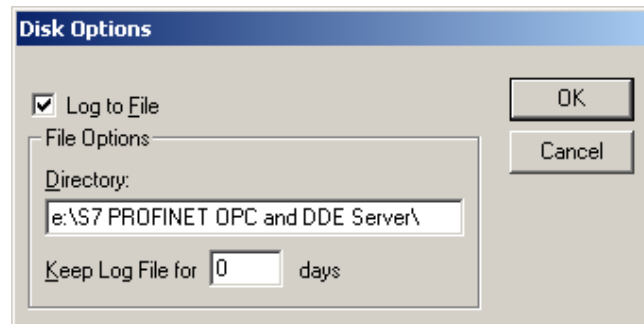
Note: If you check **Show Send** and/or **Show Receive** debug output grows very fast and it is possible that computer can become very slow.

Internal Logger

Internal Logger is available only for "OPC & DDE" version of S7PROFINET Server. To enable the S7PROFINET Internal Logger, check the **Show Logger** option at the S7PROFINET Server System Menu (see *Troubleshooting menu* section above) - this command can be used to start/stop Internal Logger. The Internal Logger window looks like following:



To save Internal Logger information to file, select *Options/Disk Options...* from Internal Logger main menu – the “Disk Options” dialog box will appear:



The following can be entered in this dialog box:

Log to File

If checked then Internal Logger information will be saved to Internal Logger File. The S7PROFINET Internal Logger file name is created in the following format:

S7Ehernet_YYYYMMDD.logn

where **YYYY** is a year, **MM** is a month, **DD** is a day and **n** is a order number of consecutive S7PROFINET Internal Logger file, starting from 1. The S7PROFINET Internal Logger file maximum size is 16 MB; if there is more information logged then next consecutive file is created, e.g. there can be consecutive files S7PROFINET_20021205.log1, S7PROFINET_20021205.log2, etc.

Directory

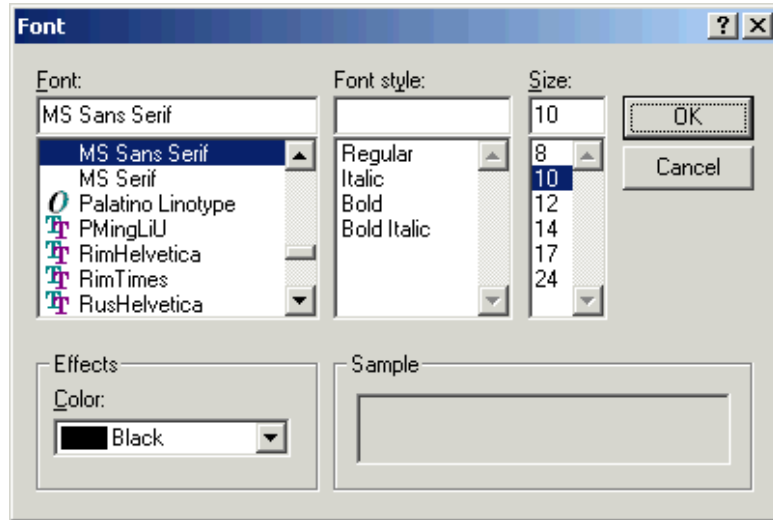
Enter the path where to keep the Internal Logger File.

Keep Log File for

Here the number of days how long to keep the Internal Logger File can be entered. After this number of days expires, the corresponding Internal Logger File will be automatically deleted. The default value **0** keeps Internal Logger Files forever - in this case they can be deleted manually.

Options/Font

To configure the font used by Internal Logger, select *Options/Font...* from Internal Logger main menu - the “Font” dialog box will appear:



KLINKMANN AUTOMATION
S7PROFINET Communication Server
Revision History

May 2008

Rev 1.0

First Release