

SIEMENS

SIMATIC

Process Control System PCS 7 TeleControl DBA User Guide


Function Manual

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 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.

 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

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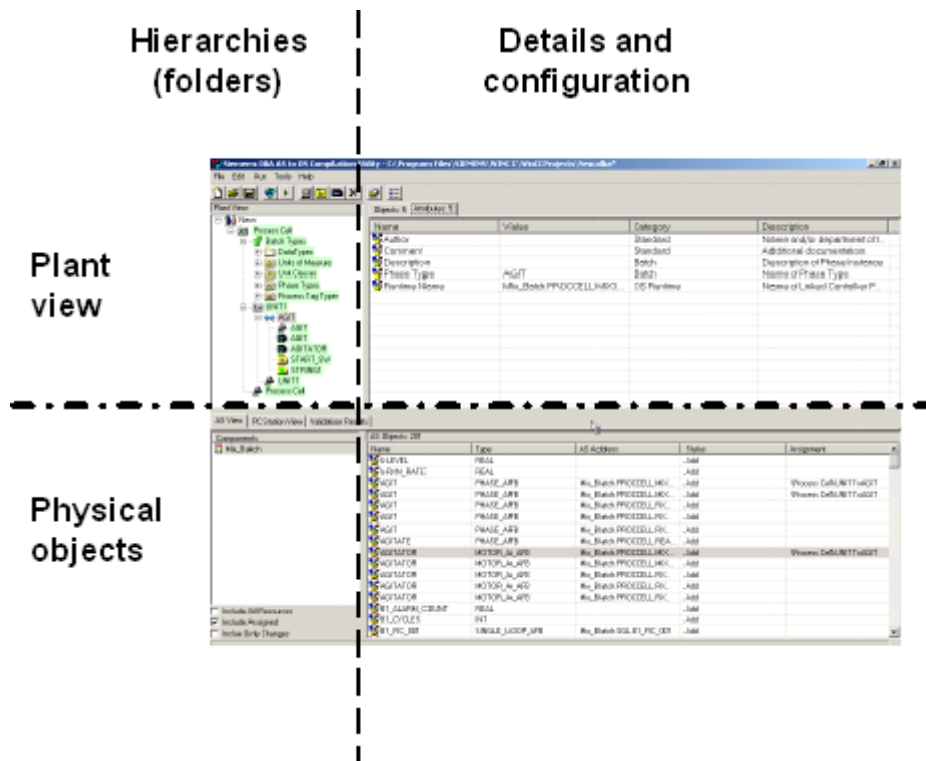
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Quick Start

2.1 Program Operation and Conventions

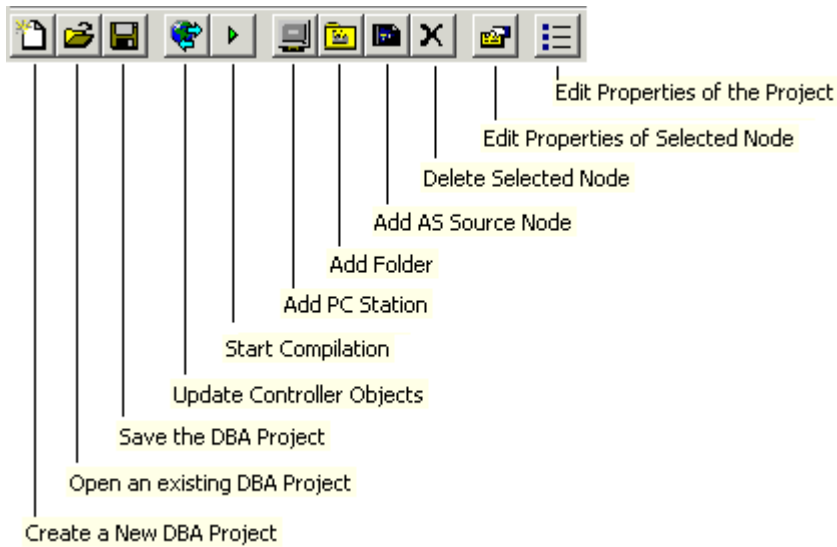
Primary GUI Quadrants or Panes

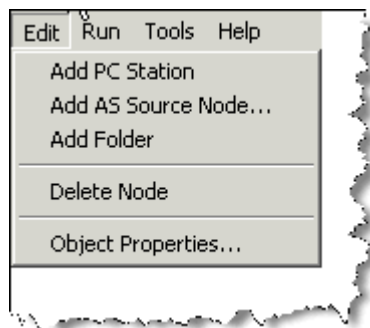
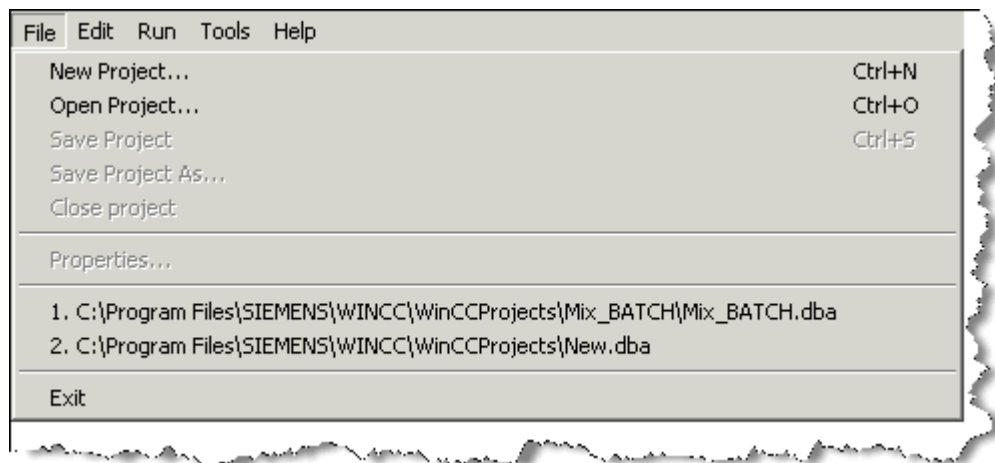
The DBA utility opens to a graphical user interface (GUI) window that comprises four distinct panes or quadrants:



- **Plant view:** the upper panes of the window depict the plant view. The upper left pane, sometimes called the technological view, provides the hierarchical plant view, where objects are represented as folders that can be expanded to reveal their contents or closed to show uncluttered hierarchical relationships. The upper right pane typically shows details about objects selected in the left pane. Tabs on the right pane switch between general characteristics of the selected objects' attributes, some of which are subject to editing and selection.
- **Physical objects:** the lower panes provide hierarchies and details associated with the physical equipment that makes up the automation system (AS), such as controllers and I/O modules, and the PCs that provide the data collection, monitoring, operator interfaces, and data storage. When a controller has been selected in the left pane, for example, the right pane displays the function blocks that make up the controller.
- **Dragging and Dropping Objects:** the program supports moving objects between the lower-right quadrant and upper-left quadrant by dragging and dropping.

Menus and Toolbar



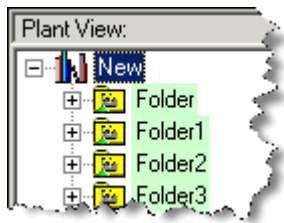




Unique Naming

The DBA utility requires objects to have unique names. The name of an object is its complete hierarchy name. The DBA utility enforces this requirement by adding a suffix to a name that would otherwise not be unique.

If you create a folder, for example, its default name is *Folder*. If you create another, its default name is *Folder1*, and so forth:



Renaming Objects

Objects can be renamed by right-clicking and selecting **Rename** from a context menu.

Colors

- Blue--a read-only value, object or attribute cannot be edited.
- Green--an object has changed and will not be updated in the target OS until the change has been compiled. Process Cell objects that are green will not be updated in the batch server process cell until changes have been compiled.

Unsaved Changes in a Project

An asterisk follows the project name on the title bar of a project that contains unsaved changes:



Invalid Characters in Folder and Picture Names

Do not use the following character (vertical bar) in folder or picture names: |

Blank spaces are not allowed in pictures names. The filename of a picture tree file (**.pdl**) may begin with an ampersand (&), but if it does, the picture is not available in a PCS 7 OS area's drop-down picture tree list.

In addition, folder and picture names must use characters that are valid in Microsoft file names. The DBA utility prevents you from naming folders and pictures with the following invalid characters:

\ / : * ? " < >

2.2 Quick Start Steps

Using the DBA Utility

The quick-start procedures follow a general path for integrating TeleControl RTUs and their corresponding connecting devices to a PCS 7 OS HMI. The purpose of the Quick Start procedures is to impart a sense of the operations and considerations involved and to serve as an introduction to the Advanced Topics.

The quick-start procedures do not address considerations related to preparing the source AS application for migration. These are covered in Project Setup (Page 17).

Note

This documentation often refers to an AS (Automation System). In the context of TeleControl, an AS refers to an RTU or an RTU connecting device (such as a SINAUT TIM).

Steps

1. Creating a New PCS 7 Project (Page 17)
2. Creating or Opening a DBA Project (Page 17)
3. Adding SINAUT Devices to a Project (Page 23)
4. Adding Modbus Devices to a Project (Page 36)
5. Adding IEC 60870 Devices (Page 46)
6. Adding EDC Devices (Page 69)
7. Adding a PC Station (Page 189)
8. Adding PC Station Applications (Page 190)
9. Creating the Plant View (Page 203)
10. Assigning an OS to a Plant View Folder (Page 229)
11. Compiling (Start Compile) (Page 230)
12. Running the OS in Runtime (Page 237)

Project Setup

3.1 Creating a New PCS 7 Project

Each operator's station (OS) exists as a separate PCS 7 OS project, so you must create a separate project for each OS to which you wish to map automation system (AS) tags. Instructions for creating a WinCC project with SIMATIC Manager are available in the publication *PCS 7/ TeleControl Installation and Configuration manual for V9.1*. This documentation is included in the scope of delivery of the software for V9.1.

3.2 Creating or Opening a DBA Project

To create a new project:

1. Select **Start > Simatic > DBA > PCS 7 DBA**.

The DBA Utility starts.

2. Select **File > New Project**.

A blank project opens in four distinct windows. The caption bar indicates that the project is new:



Continue to build and run your automation project by following the basic steps described in Quick Start Steps (Page 15).

You may save the new project at any time, and close it and re-open at any later time to resume building it.

3.3 Opening, Saving, and Closing a DBA Utility Project

Opening

The utility opens by default to the most recently closed project. No project is displayed when the utility is first run.

To open another existing project from the DBA utility program:

1. Select **File > Open Project**.

An **Open** dialog box appears.

2. Browse as necessary and select the project of interest (DBA Utility projects have the file extension **.dba**).

To open a recently opened project from the DBA utility program:

1. Select **File**, then select the description of a recently opened file, as shown below:

```
1. C:\SIEMENS\WINCC\winccprojects\I3\Test.dba
2. C:\Test_Configs\Ext505\data\st_lite\New.dba
```

To open an existing project from Windows Explorer:

1. Open the folder containing the project of interest (DBA Utility projects have the file extension **.dba**).
2. Select and double-click the project name or right-click and select **Open**.

Saving

A project can be saved while underway by any of the following actions:

Select **File > Save Project**.

or

Press the **Ctrl + S** keys.

or

Click the save button from the toolbar:



A project must be saved before the first compile to an OS. The **Save Project As** window appears if you attempt to compile a project that has not been saved.

Saving Project As

This function saves the current project under a different name at a specified location.

Select **File > Save Project As** and select an appropriate location. Note that the utility supplies the filename extension **.dba**.

Siemens recommends saving projects in the SIMATIC Manager Project folder to simplify backups.

Closing

Select **File > Close** to close a project. If any changes were made since the project was last opened, the utility gives you an opportunity to save your work before it closes.

Exiting

Select **File > Exit** to leave the utility completely. If you try to exit from a project with unsaved changes, the utility cautions you and gives you an opportunity to save your changes before exiting.

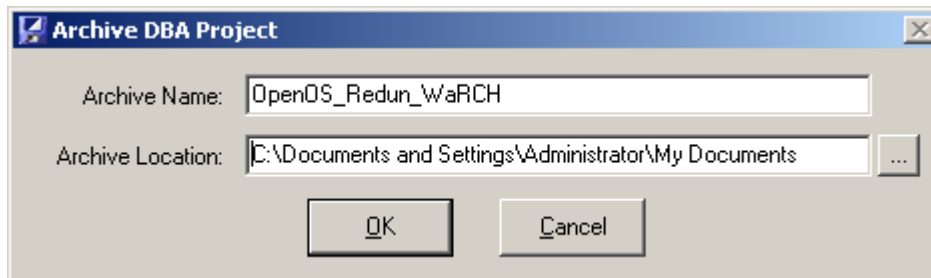
3.4 Archiving and Restoring a DBA project

Archiving

To archive the currently open DBA project:

Select **File > Archive project...**

The **Archive DBA Project** dialog box appears.



Select an appropriate archive name and location. Note that the utility supplies the filename extension **.zip**.

Special Considerations for the Archiving Process:

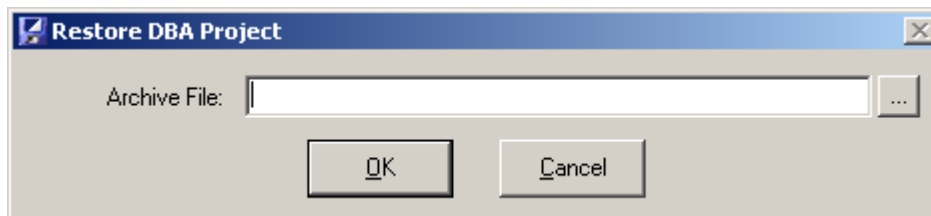
Note that archiving DBA projects which have dependent files located in the user's "private" folders (e.g. Administrator\My Documents) may cause problems during the restore process if the user who initiates the process does not have the requisite rights to access these folders. To ensure that project archives can be transferred between nodes and users, it is recommended to store all dependent files in a neutral folder with universal access rights (e.g. SIEMENS \STEP7\IS7Proj) or in one of its subfolders.

Restoring

To restore an archived DBA project:

Select **File > Restore Project...**

The **Restore DBA Project** dialog box appears.



Browse to the appropriate location and select the required project (archived DBA projects have the file extension **.zip**).

The archived DBA project is restored and loaded into DBA.

Special Considerations for Restoring Projects:

Note that restoring a DBA project from an archive restores all data relevant for the DBA project itself, along with some system level settings relevant for all DBA projects on that engineering node. This includes "System Name" and other system level settings configured using the "AS Node Wizard". This is beneficial for transferring system level settings from one DBA project to another DBA project on a given engineering node, or from one engineering node to another engineering node.

This means that restoring a DBA project may affect other DBA projects on that engineering node if these projects use the same "System Name". Take special care not to unintentionally revert to previous settings for a given "System Name", or to overwrite settings if different systems have the same "System Name" on different engineering nodes.

In some cases you may be requested to exit DBA and restart in order to complete the restore process.

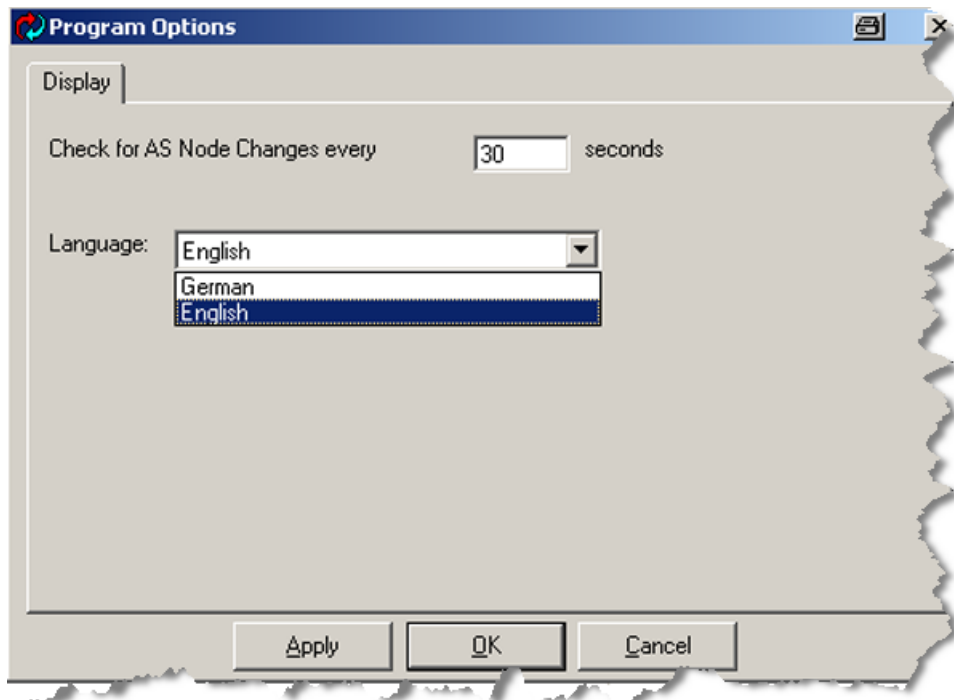
3.5 Selecting language

Selecting the interface language

The default language used by DBA is based on the language selected during installation. This can be changed, however, by selecting Tools > Options from the DBA Main Menu:



The current language is shown on the Language drop-down menu. To change the language select the menu and pick a different language:



Note

The **Check for AS Node changes** setting only applies to AS Nodes that have been configured to reference an engineering database for object instances. For AS Nodes associated with a protocol that requires the manual creation of object instances, this setting is ignored.

AS View

4.1 General Notes

Note

When adding a new kind of devices (e.g Sinaut RTU) to your project for the first time, a full compile of your DBA project will be necessary.

See also

Loading (Updating) Controller Objects (Page 115)

4.2 Adding SINAUT Devices to a Project

Note

When using SINAUT RTU's that are connected via SINAUT DNP3 TIM devices, follow the instructions in section Adding DNP Devices to a Project (Page 74).

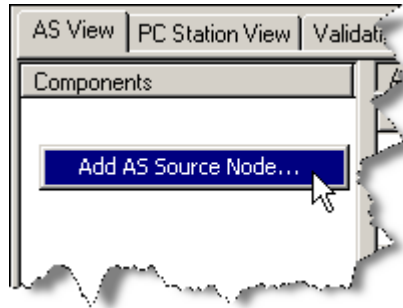
The following sections describe how to add SINAUT RTUs and SINAUT TIMs to your project. Note that all SINAUT RTU's must be connected via a SINAUT TIM. There are two ways that an RTU can be connected to a TIM:

- **Local TIM**
In this case, there is one TIM that is dedicated to the RTU and directly connected to the PCS 7 system. The Local TIM is defined (subscriber number, etc.) in DBA as part of the RTU.
- **Central TIM**
In this case, one Central TIM is directly connected to the PCS 7 system and is connected to the Local TIM of one or more RTU's. The Central TIM is defined in DBA once. When an RTU is defined that is connected to a Central TIM, the definition includes the selection of which Central TIM it is connected to.

4.2.1 Adding a PCS 7/TeleControl Central TIM Node to a Project

To add a central TIM node to your TeleControl project, follow these steps:

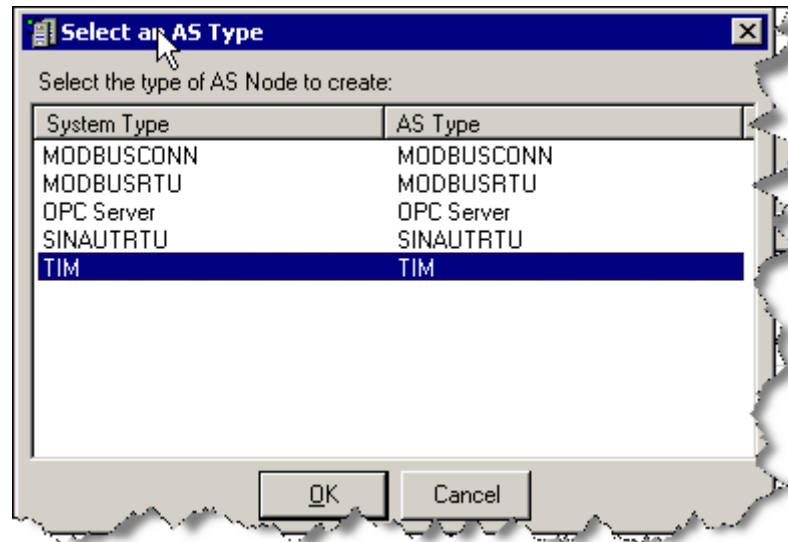
1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node** from the context menu.



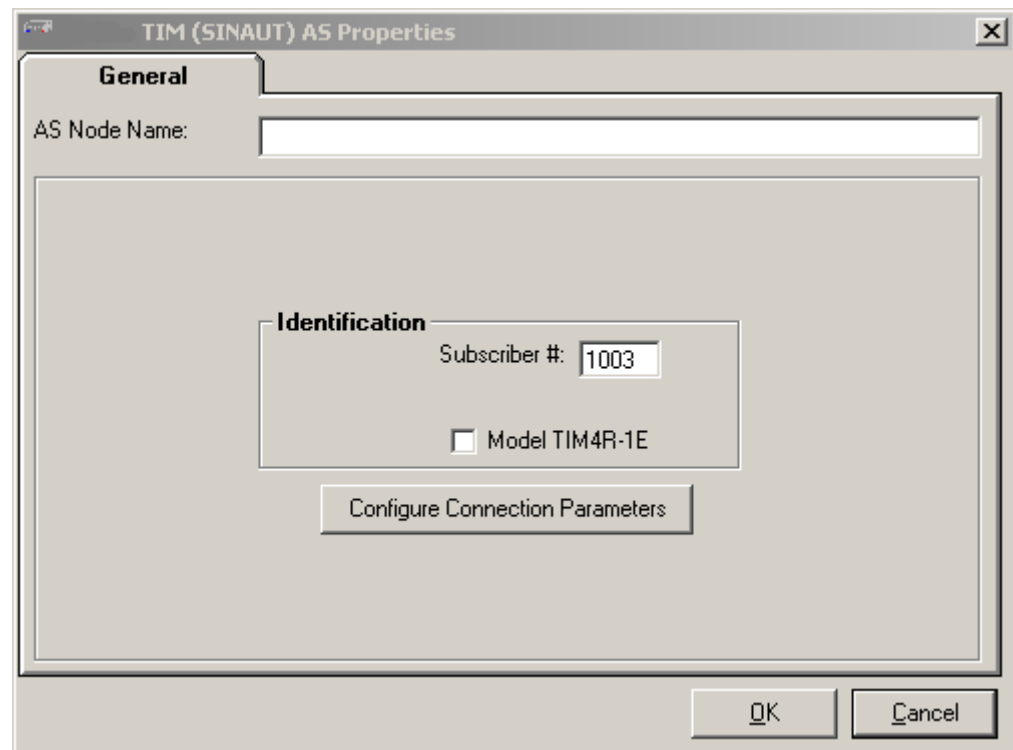
The **Select an AS Type** dialog appears.

3. In the dialog, select **TIM**, and click **OK**.

Note: Which AS Types are available depends on which OS options are installed.

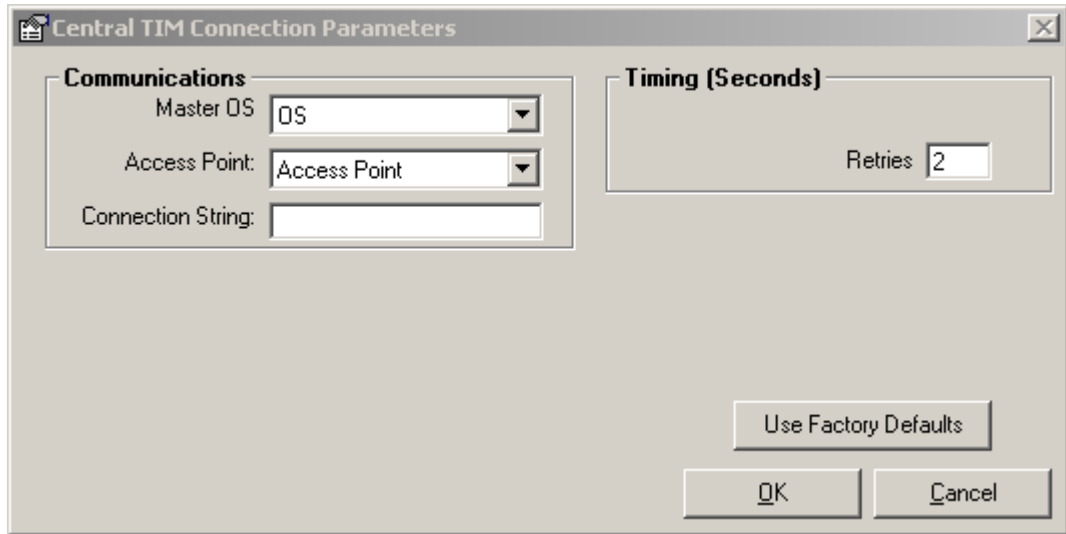


The **TIM AS Properties** dialog appears.



4. In the **AS Node Name** field, specify a name for the TIM node.
5. Specify the **Subscriber Number** in the box provided.
6. If this TIM is model TIM4R-1E, click the check box. Otherwise, leave it unchecked.

7. Click the **Configure Connection Parameters** button.
The **Central TIM Connection Parameters** dialog appears.



8. On the left side of the dialog, specify the communications parameters.
 - **Master OS** - This is the name of the Master OS that will be used to communicate with this TIM. A dropdown list shows all of the Master OS nodes that have been configured in DBA. (See Adding a PC Station (Page 189))
 - **Access Point** - This is the Access Point that will be used to communicate with this TIM. A dropdown list shows all of the Access Points that have been configured in DBA
 - **Connection String** - This is the name of the connection string, as configured in SIMATIC NET, that will be used to communicate with this TIM. Enter the name of the connection string exactly as it was configured in SIMATIC NET.

Note

When creating Named Connections in Simatic NET, be sure that the connection name does not include a space. If a space is used in a connection name, it will not be possible for PCS 7 TeleControl OS Server to properly communicate on the SINAUT network. Use of spaces in the connection string will result in a validation error upon compilation and compilation will not proceed.

Note

If you change the connection string, there will be no indication in DBA that a recompilation of your project is necessary. Be sure to recompile your DBA project in this case, as the new setting will not be recognized by the system until the project is recompiled.

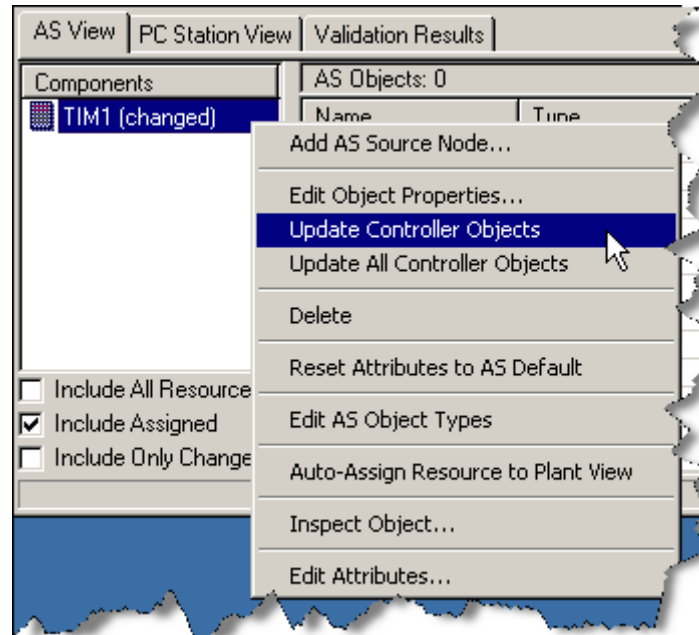
9. On the right side of the dialog, specify the timing parameter.
 - **Retries** - The number of retries that will be attempted when communication to the TIM fails.

10. Click Cancel to discard any changes and return to the AS Properties dialog. Click OK to save any changes and return to the AS Properties dialog.

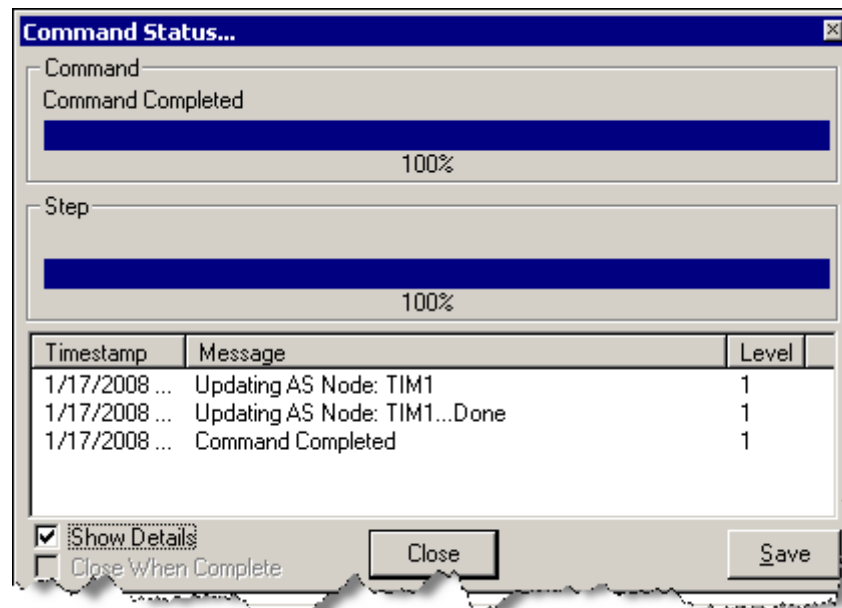
Note

You can reset all parameters to their factory defaults by clicking the Use Factory Defaults button.

11. In the lower left pane of the DBA Utility, right-click the TIM node, and select **Update Controller Objects** from the context menu.



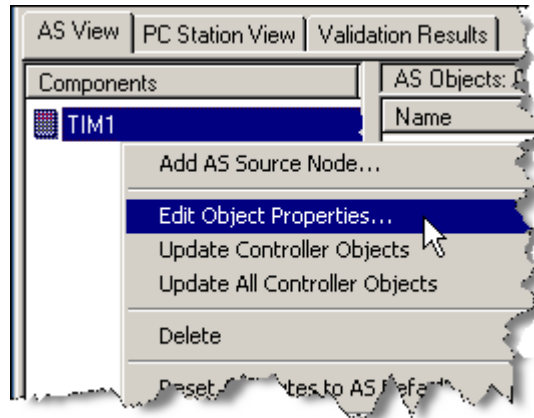
The **Command Status** dialog appears.



12. When the update process is complete, click **Close**.
13. Repeat this procedure to add and configure additional central TIM nodes.

Note

To make changes to a TIM that has already been created, right-click on the TIM and select **Edit Object Properties** from the right-click menu.



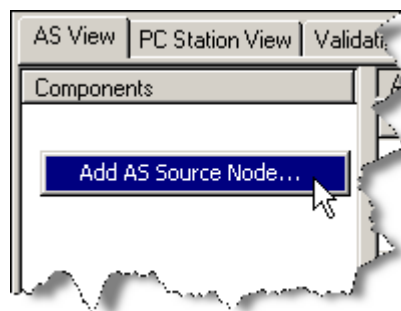
4.2.2 Adding a PCS 7/TeleControl Sinaut RTU Node to a Project

Adding a Local TIM-Connected RTU

Remote Terminal Units in your TeleControl project can be either local TIM-connected or central TIM-connected.

To add and configure direct-connected RTUs to your TeleControl project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node** from the context menu.

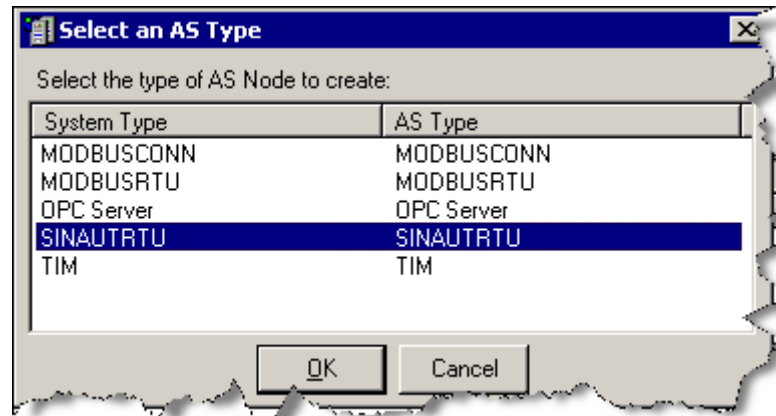


The **Select an AS Type** dialog appears.

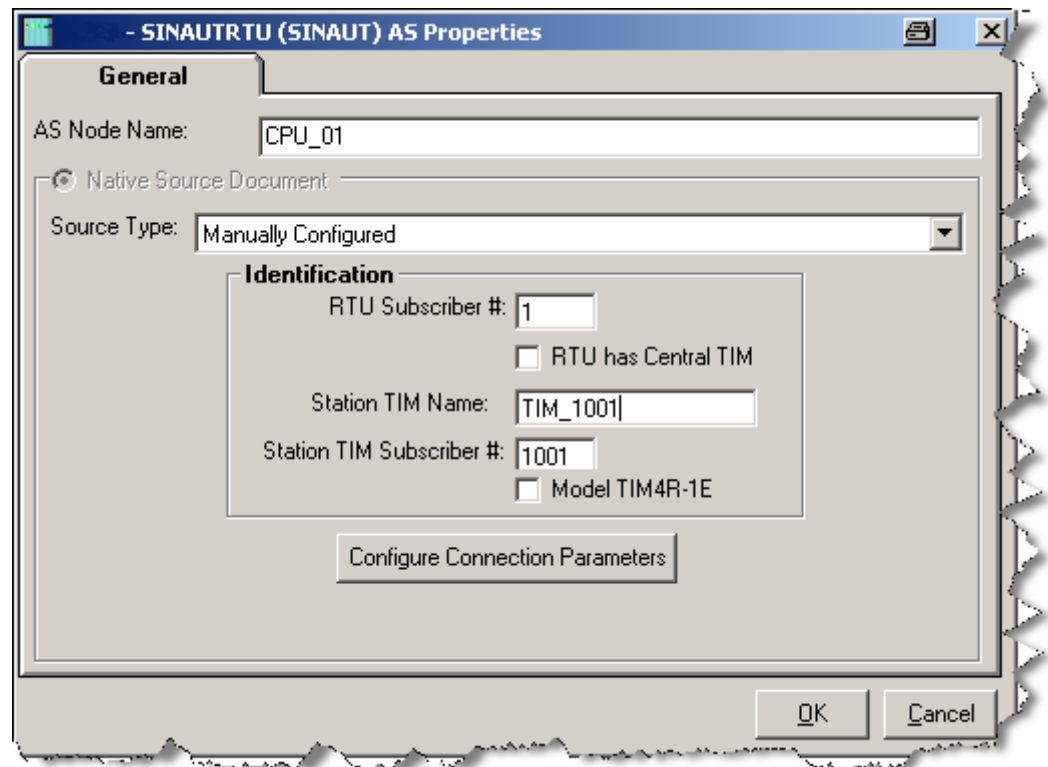
3. Select **SINAUTRTU**, and click **OK**.

Note

Which AS Types are available depends on which OS options are installed.

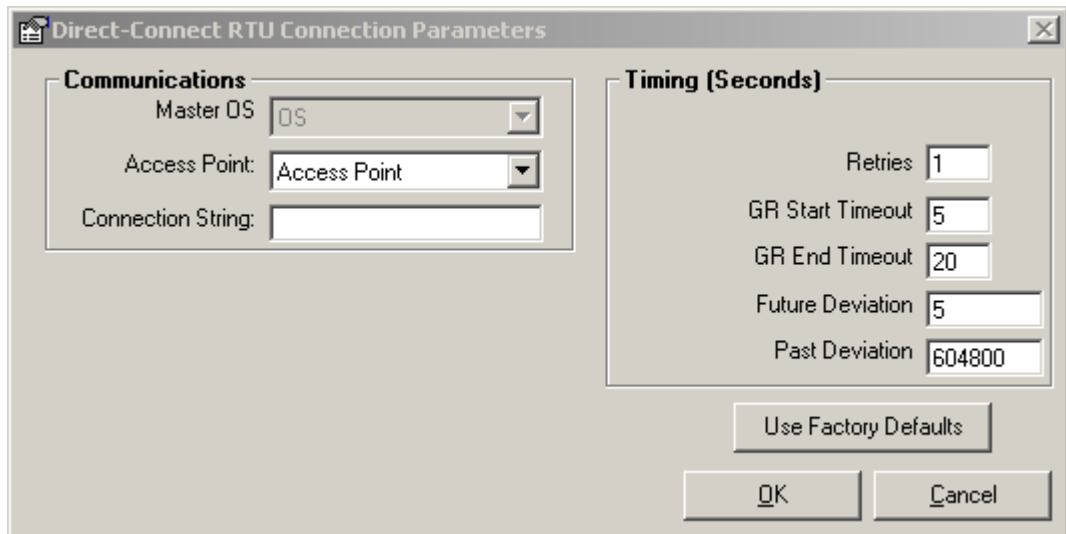


The **SINAUTRTU (SINAUT) AS Properties** dialog appears.



4. In the **AS Node Name** field, enter a unique name for the RTU.
5. Specify the **RTU Subscriber Number** in the box provided.
6. Enter the **Station TIM Name** and the **TIM Subscriber Number** in the appropriate fields.
7. Use the pull-down list to identify the Sinaut RTU type (ST1, ST1_AE1, or ST7).

8. If this TIM is model TIM4R-1E, click the check box. Otherwise, leave it unchecked.
9. Make sure that the **RTU has Central TIM** is deselected (unchecked).
10. Click the **Configure Connection Parameters** button.
The **Local TIM-Connect RTU Connection Parameters** dialog appears.



11. On the left side of the dialog, specify the communications parameters.
 - **Master OS** - This is the name of the Master OS that will be used to communicate with this TIM. A dropdown list shows all of the Master OS nodes that have been configured in DBA. (See Adding a PC Station (Page 189).)
 - **Access Point** - This is the Access Point that will be used to communicate with this TIM. A dropdown list shows all of the Access Points that have been configured in DBA.
 - **Connection String** - This is the name of the connection string, as configured in SIMATIC NET, that will be used to communicate with this TIM. Enter the name of the connection string exactly as it was configured in SIMATIC NET.

Note

When creating Named Connections in Simatic NET, be sure that the connection name does not include a space. If a space is used in a connection name, it will not be possible for PCS 7 TeleControl OS Server to properly communicate on the SINAUT network. Use of spaces in the connection string will result in a validation error upon compilation and compilation will not proceed.

Note

If you change the connection string, there will be no indication in DBA that a recompilation of your project is necessary. Be sure to recompile your DBA project in this case, as the new setting will not be recognized by the system until the project is recompiled.

12. On the right side of the dialog, specify the timing parameters.
- **Retries** - The number of retries that will be attempted when communication to the TIM fails.
 - **GR Start Timeout** - Timeout (in seconds) when an RTU has not responded to a General Request start command, before a failed General Request will be reported.
 - **GR End Timeout** - Timeout (in seconds) when an RTU has not completed a General Request, before a failed General Request will be reported for the RTU.
 - **Future Deviation** - Future time deviation (in seconds) between the RTU and the connected TIM before a Time Deviation error will be reported for the RTU.
 - **Past Deviation** - Past time deviation (in seconds) between the RTU and the connected TIM before a Time Deviation error will be reported for the RTU.

Note

When creating Named Connections in Simatic NET, be sure that the connection name does not include a space. If a space is used in a connection name, it will not be possible for PCS 7 TeleControl OS Server to properly communicate on the SINAUT network. Use of spaces in the connection string will result in a validation error upon compilation and compilation will not proceed.

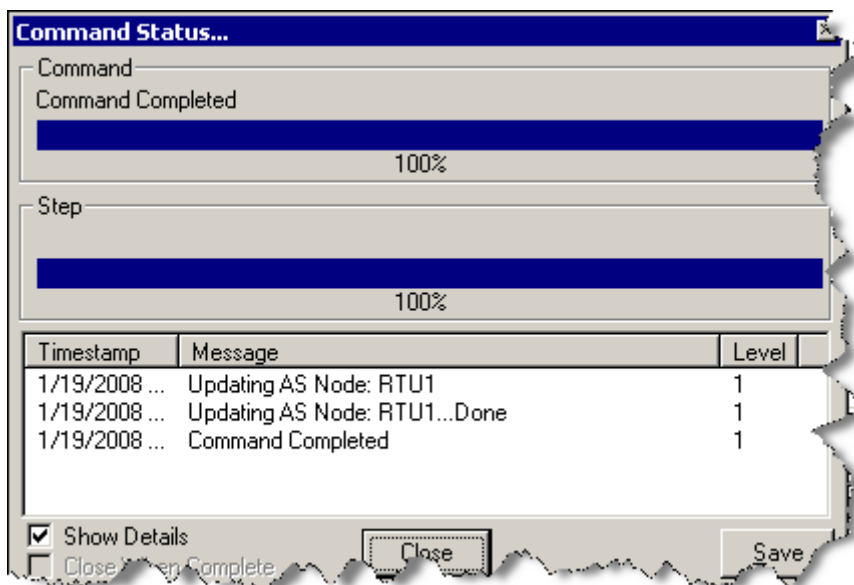
13. Click Cancel to discard any changes and return to the **AS Properties** dialog. Click **OK** to save any changes and return to the AS Properties dialog.

Note

You can reset all parameters to their factory defaults by clicking the Use Factory Defaults button.

14. In the lower left pane of the DBA Utility, right-click the RTU, and select **Update Controller Objects** from the context menu.

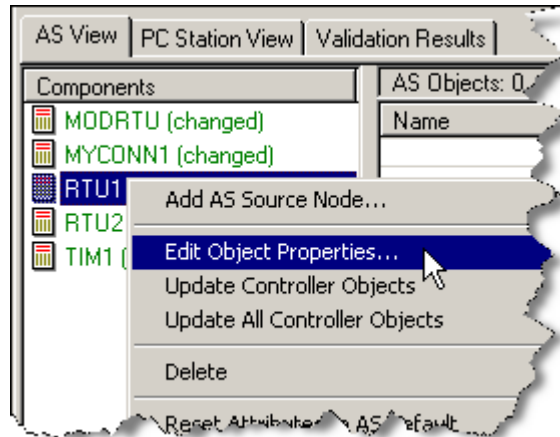
The **Command Status** dialog appears.



15. When the update process is complete, click **Close**.
16. Repeat this procedure to add and configure additional local TIM-connected RTUs.

Note

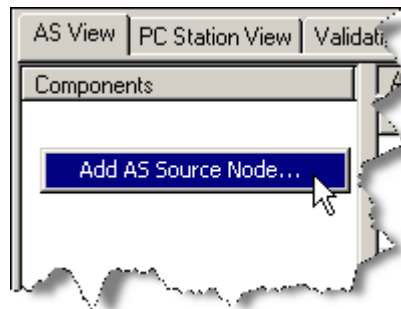
To make changes to an RTU that has already been created, right-click on the RTU and select **Edit Object Properties** from the right-click menu.



Adding a Central TIM-Connected RTU

To add and configure central TIM-connected RTUs to your TeleControl project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node** from the context menu.

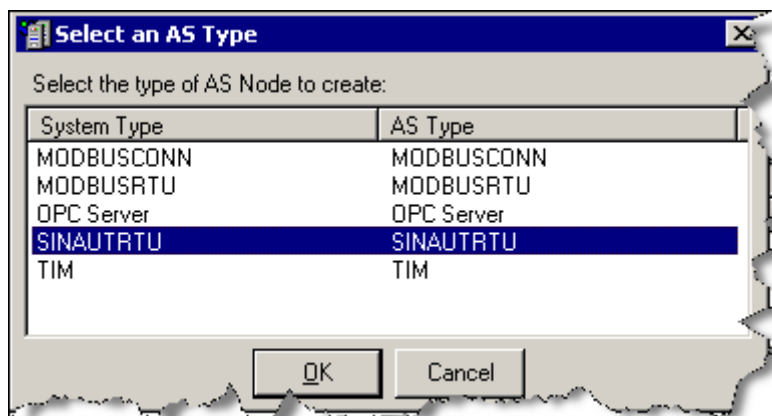


The **Select an AS Type** dialog appears.

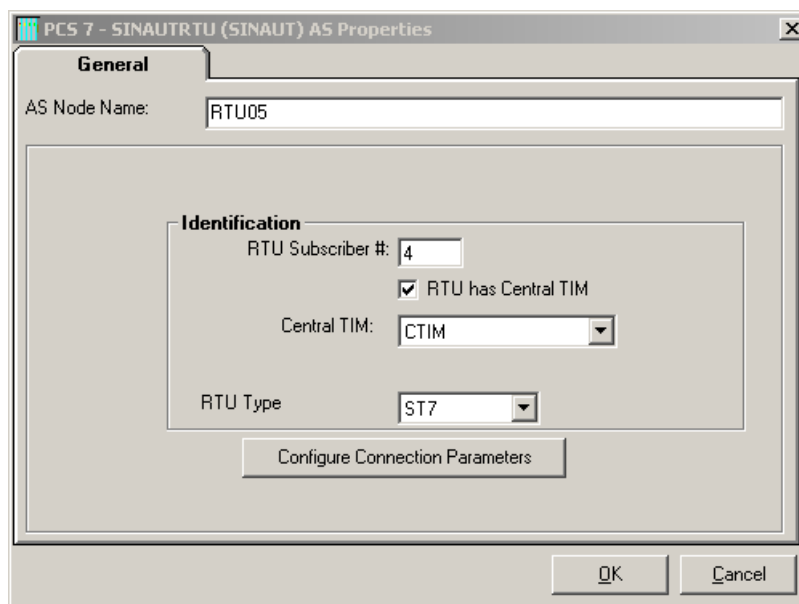
3. Select **SINAUTRTU**, and press **OK**.

Note

AS Types are available depends on which OS options are installed.

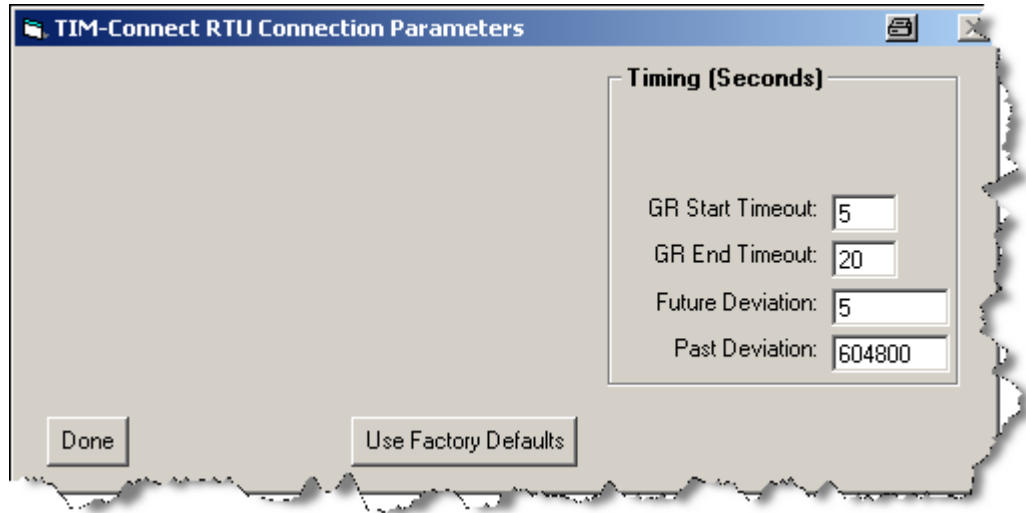


The **SINAUTRTU (SINAUT) AS Properties** dialog appears.



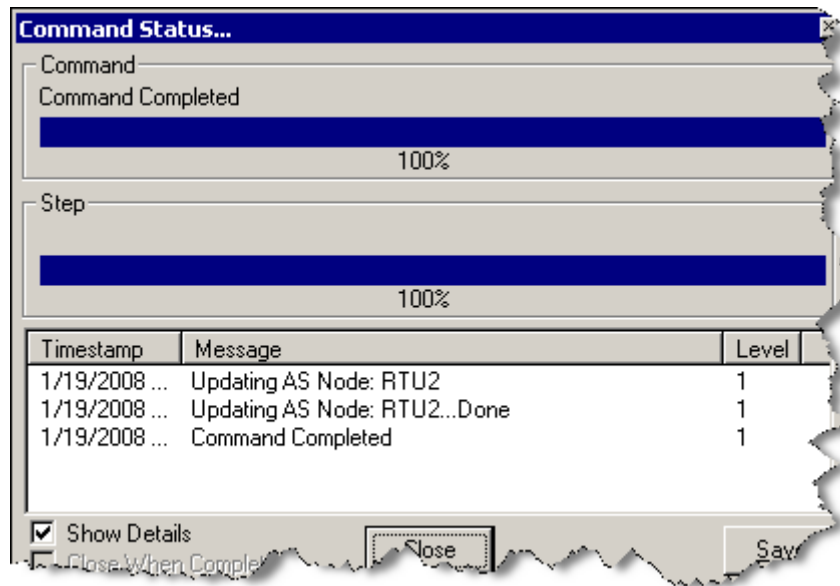
4. In the **AS Node Name** field, enter a unique name for the RTU.
5. Specify the **RTU Subscriber Number** in the box provided.
6. Check the box that says **RTU has Central TIM**.
7. Select a **Central TIM**. A dropdown list shows all of the Central TIM AS Nodes that have been configured in DBA.
8. Use the pull-down list to identify the Sinaut RTU type (ST1, ST1_AE1, or ST7).

9. Click the **Configure Connection Parameters** button.
The **TIM-Connect RTU Connection Parameters** dialog appears.



10. On the right side of the dialog, specify the timing parameters.
 - **Retries** - The number of retries that will be attempted when communication to the TIM fails.
 - **GR Start Timeout** - Timeout (in seconds) when an RTU has not responded to a General Request start command, before a failed General Request will be reported.
 - **GR End Timeout** - Timeout (in seconds) when an RTU has not completed a General Request, before a failed General Request will be reported for the RTU.
 - **Future Deviation** - Future time deviation (in seconds) between the RTU and the connected TIM before a Time Deviation error will be reported for the RTU.
 - **Past Deviation** - Past time deviation (in seconds) between the RTU and the connected TIM before a Time Deviation error will be reported for the RTU.
11. Click **Done**, and then click **OK**.

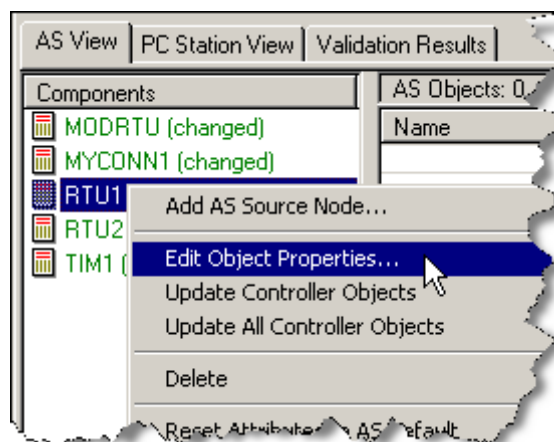
12. In the lower left pane of the DBA Utility, right-click the RTU, and select **Update Controller Objects** from the context menu.
The **Command Status** dialog appears.



13. When the update process is complete, click **Close**.
14. Repeat this procedure to add and configure additional TIM-connected RTUs.

Note

To make changes to an RTU that has already been created, right-click on the RTU and select **Edit Object Properties** from the right-click menu.



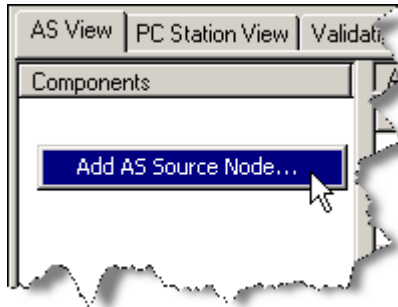
4.3 Adding Modbus Devices to a Project

The following sections describe how to add Modbus Connections and Modbus RTU's to a project. Note that all Modbus RTU's must be connected via one or two Modbus Connections (MODBUSCONN). You should configure Modbus Connection (MODBUSCONN) devices first, followed by Modbus RTU's (MODBUSRTU).

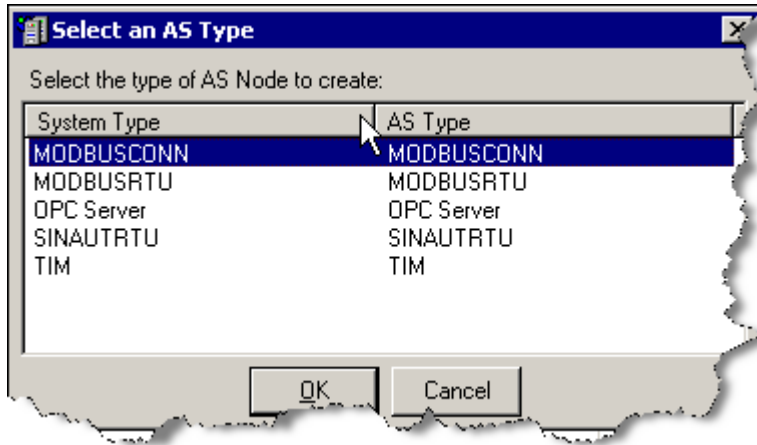
4.3.1 Adding a PCS 7/TeleControl Modbus Connection to a Project

To add a PCS 7/TeleControl Modbus connection to your project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node** from the context menu.

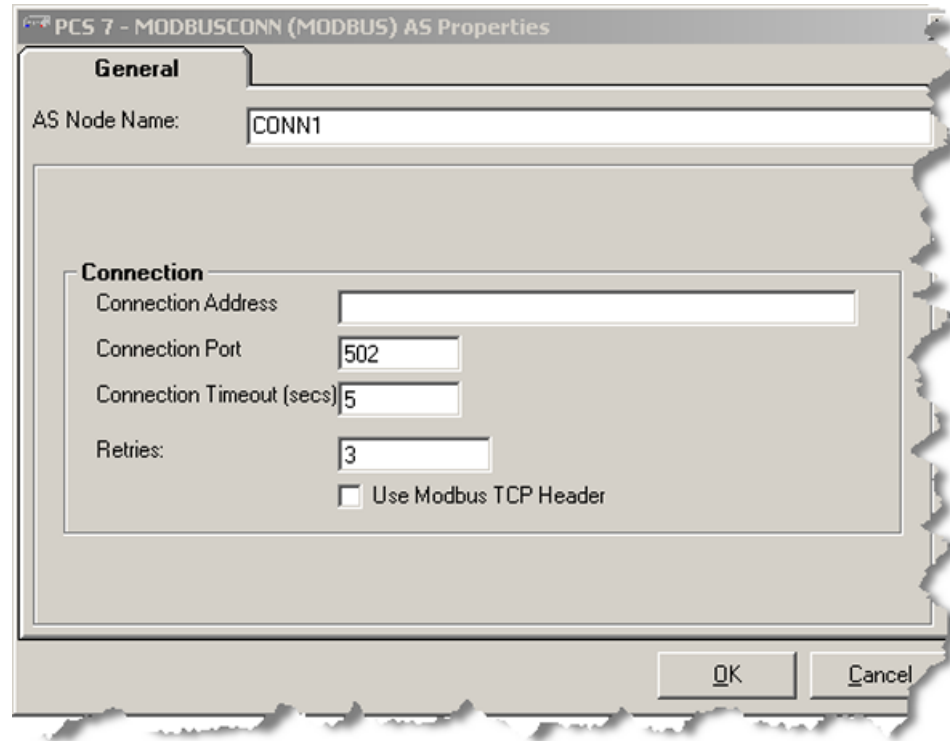


The **Select an AS Type** dialog appears.



3. In the dialog, select **MODBUSCONN**, and click **OK**.

Note: Which AS Types are available depends on which OS options are installed. The **MODBUSCONN AS Properties** dialog appears.



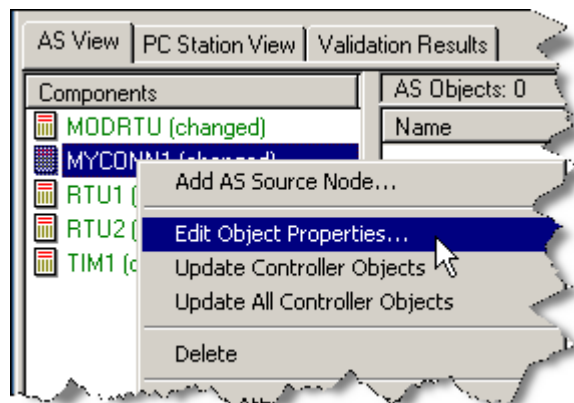
4. In the **AS Node Name** field, specify a name for the Modbus connection.
5. Specify the connection parameters:
 - **Connection Address** - TCP/IP connection address
 - **Connection Port** - TCP/IP connection port number
 - **Connection Timeout (secs)** - Timeout (in seconds) when a Connection has not responded before the connection will be reported as failed
 - **Retries** - The number of retries that will be attempted when communication to the Connection fails
 - **Use Modbus TCP Header** - If the connection device has been configured to use the Modbus TCP Header in its communication, click the checkbox. Otherwise, leave it unchecked.

4.3 Adding Modbus Devices to a Project

- When you have completed the configuration of the Modbus connection, click **OK**.
- Repeat this procedure to add and configure additional Modbus connections.

Note

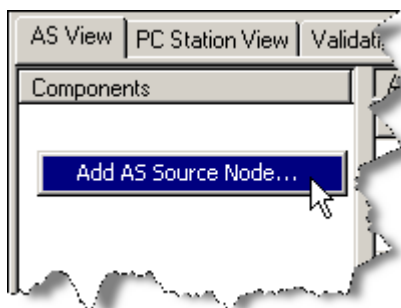
To make changes to a Modbus Connection that has already been created, right-click on the Connection and select **Edit Object Properties** from the right-click menu.



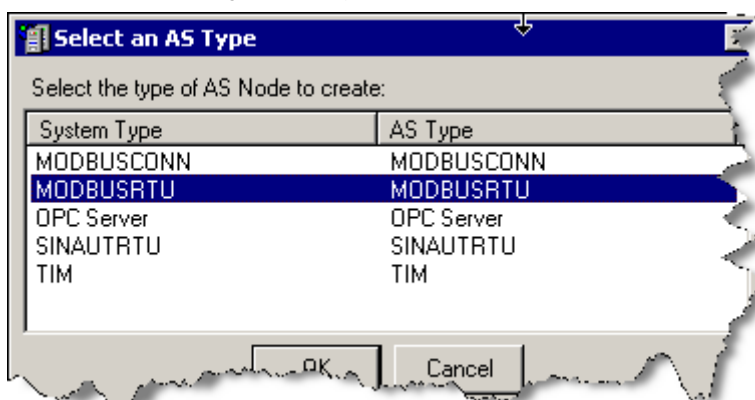
4.3.2 Adding a PCS 7/TeleControl Modbus RTU to a Project

To add a Modbus RTU to your PCS 7/TeleControl project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node** from the context menu.

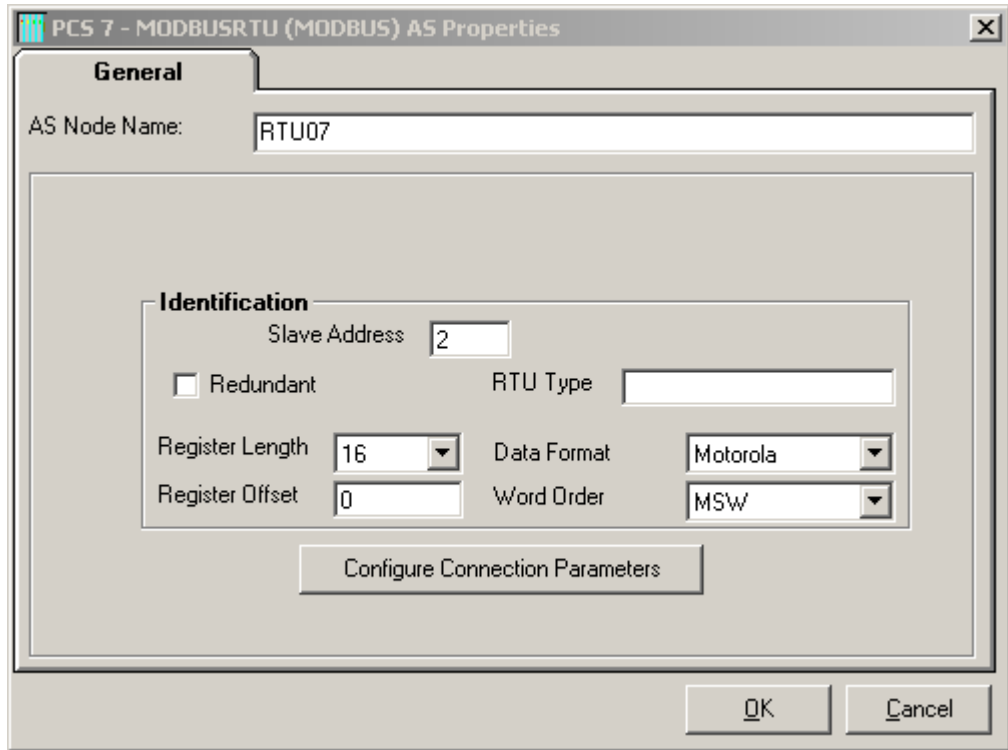


The **Select an AS Type** dialog appears.



4.3 Adding Modbus Devices to a Project

- In the dialog, select **MODBUSRTU**, and click **OK**.
Note: Which AS Types are available depends on which OS options are installed. The **MODBUSRTU AS Properties** dialog appears.



- In the **AS Node Name** field, specify a unique name for the Modbus RTU.
- Specify the RTU Slave Address, the RTU Type, Register Length (16 or 32), Data Format (Intel or Motorola), and the Word Order (LSW or MSW first) in the appropriate fields.
- Use the checkbox to indicate whether the RTU is redundant.
- Enter any freeform text as the RTU Type.
- Select the default register length (in bits) for the RTU. A dropdown list allows either 16 or 32 to be selected.

9. Click the **Configure Connection Parameters** button.
The **Connection Parameters** dialog appears.

10. On the left side of the dialog, configure the connection parameters.
- **Master OS** – This is the name of the Master OS that will be used to communicate with this RTU. A dropdown list shows all of the Master OS nodes that have been configured in DBA. (See Adding a PC Station (Page 189).)
 - **Connection 1** – First of up to two connection devices (select from pull-down list of all configured Modbus connections)
 - **Connection 2** – Second of up to two connection (select from pull-down list)
 - **Default Connection** – indicate if first or second connection is the default connection
 - **Protocol Type** – select from RTU, ASCII, Modbus TCP

11. On the right side of the dialog, configure the communications parameters.
 - **Load Balanced** - check this box to use load balancing; valid only for redundant connections to redundant RTUs or Multi-port RTUs. (This does not mean that the poll requests are split over two servers. The requests are split over the two connections on one server.)
 - **Alternate Connection** - check this box to use alternate connection for poll requests; valid only for redundant connections. (This does not mean that the poll requests are alternated over two servers. The requests are alternated between the two connections on one server.)
 - **Request Timeout** - The poll request timeout in milliseconds.
 - **GR Start Timeout** - Timeout (in seconds) when an RTU has not responded to a General Request start command, before a failed General Request will be reported.
 - **GR End Timeout** - Timeout (in seconds) when an RTU has not completed a General Request, before a failed General Request will be reported for the RTU.
 - **Number of Register Gaps** - The number of tolerated register gaps in one poll request. This is the maximum number of consecutive registers that are not requested but are included in a poll request for optimization. Enter 0 if no gaps are allowed.
 - **Lifebeat Poll Group** - Use the pull-down menu to select the poll group identifier for lifebeat request. A dropdown list shows all of the Modbus Polling Groups that have been configured in DBA. (The polling group LIFEBEAT is a default polling group that always exists.) See Managing Modbus Polling Groups (Page 43) for more details.

Note

Although checkboxes are provided for both Load Balanced and Alternate Connection redundancy, only one of these settings can be applied for a given RTU. If both are specified, only Load Balanced redundancy will be used.

12. Click Cancel to discard any changes and return to the AS Properties dialog. Click OK to save any changes and return to the AS Properties dialog.

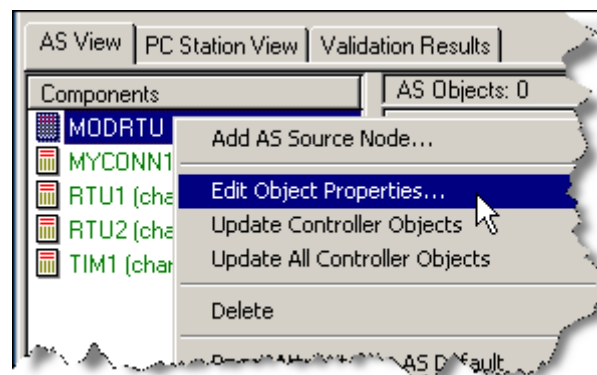
Note

You can reset all parameters to their factory defaults by clicking the Use Factory Defaults button.

13. Repeat this procedure to add and configure additional Modbus RTUs.

Note

To make changes to a Modbus RTU that has already been created, right-click on the Connection and select **Edit Object Properties** from the right-click menu.



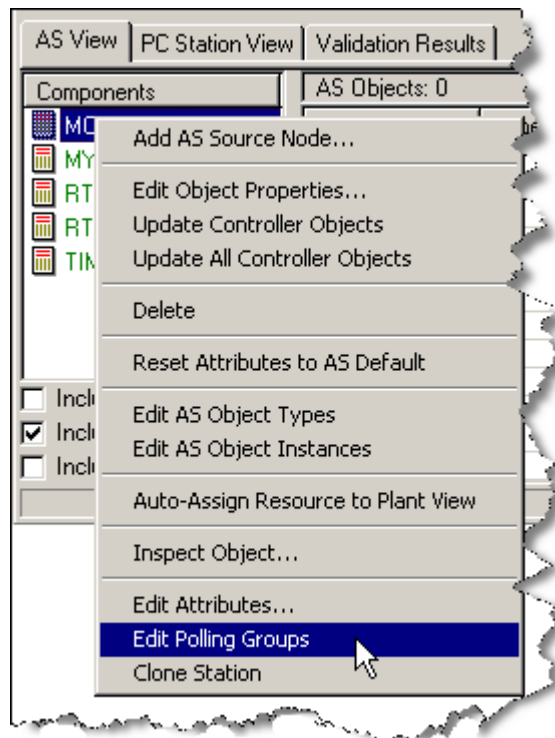
4.3.3 Managing Modbus Polling Groups

Modbus communication is organized around the concept of polling groups.

- Different groups can be defined with different scanning cycles.
- Each tag that is to be read by PCS 7/TeleControl must be associated with a specific polling group.
- A polling group editor is incorporated into DBA.

To add a new Modbus polling group, follow these steps:

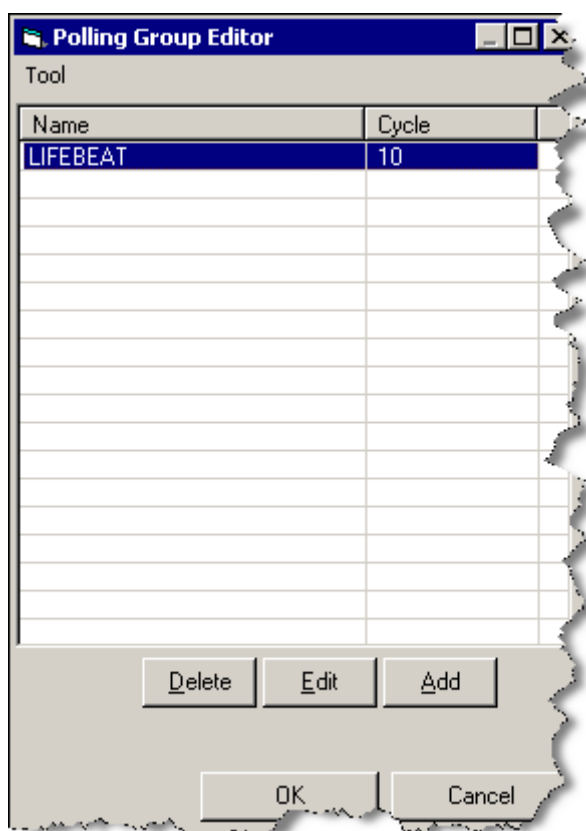
1. In the left pane of the AS View, right-click a Modbus RTU, and select **Edit Polling Groups**.



The **Polling Group Editor** appears.

Note

LIFEBEAT is a system polling group that is created automatically.



2. In the **Polling Group Editor**, click the **Add** button. The **Edit Polling Group** dialog appears.



3. Specify a unique name for the new polling groups in the **Name** field.
4. Specify a polling cycle in seconds in the **Cycle** field, and click **OK**.

To change the name of a polling group, delete the group and then add it again with the new name.

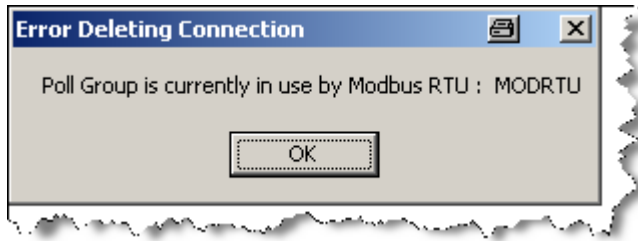
To change the polling group cycle, follow these steps:

1. In the Polling Group Editor, click the **Edit** button.
2. In the Edit Polling Group dialog, specify the new polling cycle in seconds in the **Cycle** field.
3. Click **OK**.

To delete a polling group, select the group name in the Polling Group Editor, and click the **Delete** button.

Note

You cannot delete a polling group that is being used by an RTU. An attempt to do so will result in the following error dialog:



4.4 Adding IEC 60870 Devices to a Project

The following sections describe how to add **IEC RTUs** (IECRTU), **IEC Gateways** (IECGATEWAY) and **IEC Connections** (IECCONN) to your project.

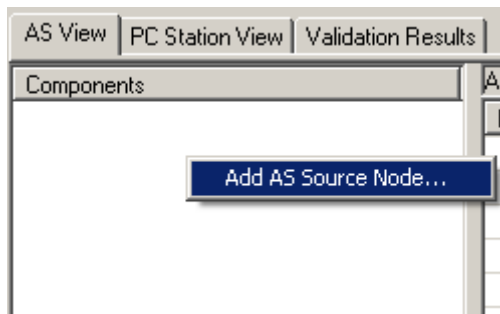
Note that all IEC RTU's must be connected via one or two IEC Gateways, or one or two IEC Connections, and all Gateways need to be connected via one or two IEC Connections.

You should configure IEC Connections (IECCONN) first, followed by IEC Gateways (IECGATEWAY) – if applicable, followed by IEC RTUs (IECRTU).

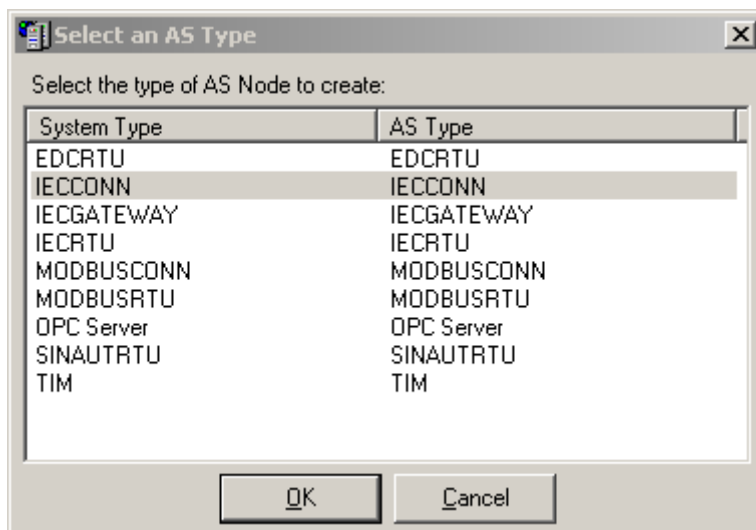
4.4.1 Adding a PCS 7/Telecontrol IEC Connection Node to a Project

To add an IEC Connection node to your Telecontrol project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node...** from the **context** menu.



The **Select an AS Type** dialog appears.

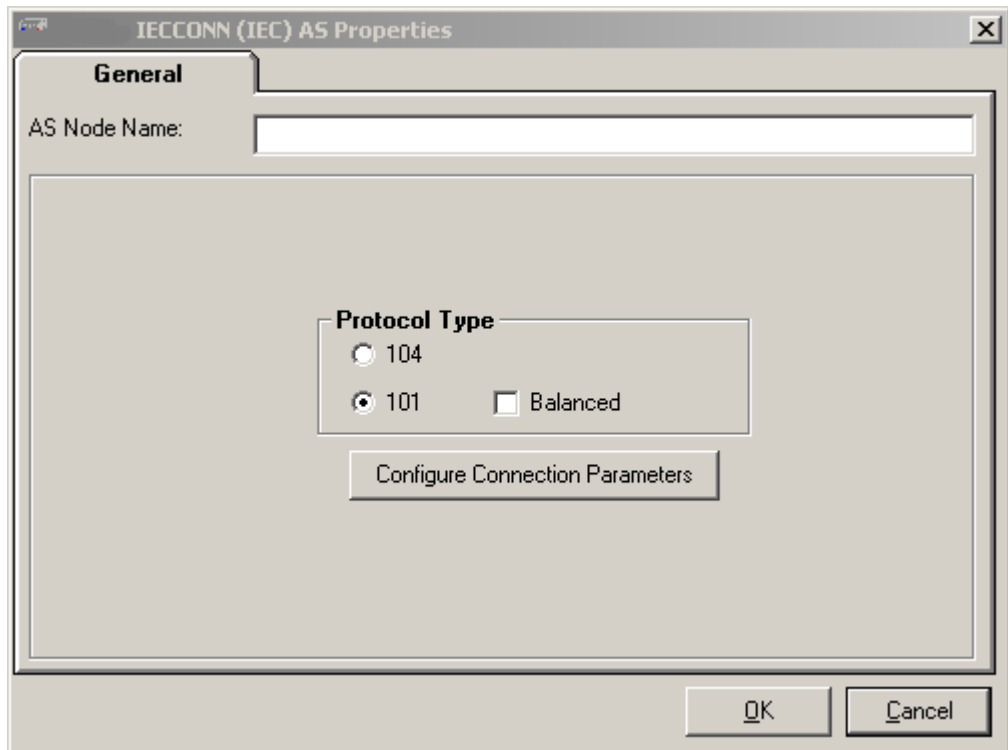


3. In the dialog, select IECCONN, and click **OK**.

Note

Which AS Types are available depends on which OS options are installed.

The **IECCONN AS Properties** dialog appears.



4. In the **AS Node Name** field, specify a name for the IEC Connection node.
5. Select **Protocol Type**, which indicates whether your connection will use 101 or 104 protocol, by clicking the appropriate radio button.

Note

104 protocol is a TCP connection to the RTU and 101 protocol is a serial connection to the RTU.

6. If you have selected the 101 protocol, a checkbox is shown allowing selection of **Balanced** protocol. If this connection uses balanced 101 protocol, check the **Balanced** checkbox. Otherwise leave it unchecked.
7. Click the **Configure Connection Parameters** button.

The **IECCONN Connection Parameters** dialog appears.

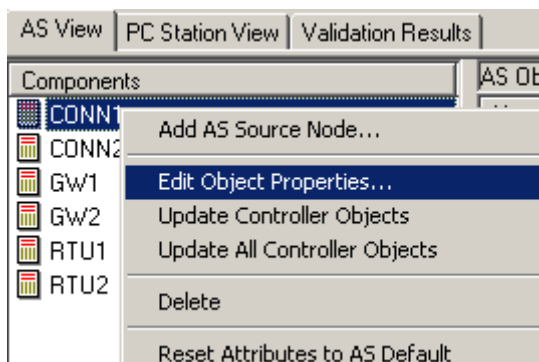
Note

Which parameters are available to be configured is determined by whether you chose 104, 101 unbalanced, or 101 balanced protocol in the **AS Properties** dialog. The sections below describe how to configure connection parameters for each of these three types of protocols.

8. When you have completed the configuration of the IEC connection, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.
9. Repeat this procedure to add and configure additional IEC connections.

Note

To make changes to an IECConnection that has already been created, right-click on the Connection in the AS view and select **Edit Object Properties** from the right-click menu.



Configuring Connection Parameters for the IEC 104 Protocol

The dialog below shows the configuration parameters that can be configured if you have selected the 104 protocol and have clicked the **Configure Connection Parameters** button.

The dialog box is titled 'Configure Connection that uses 104 protocol'. It is divided into three main sections: 'TCP Addressing', 'Parameters', and 'Timeouts'.
 - **TCP Addressing:** 'Connection Address' is an empty text field. 'Connection Port' is set to '2404'.
 - **Parameters:** 'Max UnAcked Transmitted APDUs' is '12 k'. 'Max UnAcked Received APDUs' is '8 w'. 'Common Address of ASDU Size' is '2 Octets'. 'Information Object Address Size' is '3 Octets'. 'Information Object Address Structure' is 'Structured'. 'Cause of Transmission Size' is '2 Octets'.
 - **Timeouts:** 'TCP Connection' is '15 sec'. 'Offline Poll Period' is '10000 ms'. 'Timer t1' is '15000 ms'. 'Timer t2' is '10000 ms'. 'Timer t3' is '30000 ms'.
 At the bottom, there are three buttons: 'Use Factory Defaults', 'Cancel', and 'OK'.

To configure the connection parameters:

1. Configure **TCP Addressing**:

- **Connection Address** - Type in a valid TCP address or the valid name of a TCP host node that will be used when addressing the RTU's and Gateways that are configured to use this connection
- **Connection Port** - Specifies the TCP port that will be used when addressing the RTU's and Gateways that are configured to use this connection. Specify a number between 1 and 65535.

2. Configure **Protocol Parameters**:

- **Max UnAcked Transmitted APDUs** – configure the IEC protocol parameter 'k', the maximum number allowed of unacknowledged transmitted APDUs (in the range of 1 to 99)
- **Max UnAcked Received APDUs** – configure the IEC protocol parameter 'w', the maximum number allowed of unacknowledged received APDUs (in the range of 1 to 99)
- **Common Address of ASDU Size** - Specifies the size in octets for the common portion of the address of the RTU. For the IEC 104 protocol, the parameter is fixed at 2 octets and cannot be changed
- **Information Object Address Size** - Specifies the number of octets (1 to 3) that are used to specify the address of external tags communicating through this connection. For the IEC 104 protocol, this is fixed at 3 octets and cannot be changed.
- **Information Object Address Structure** - Specifies whether the information object address for external tags communicating through this CONN are specified in octet notation (structured) or as a single number (unstructured). A pull down list allows the selection of "Structured" or "Unstructured".
- **Cause of Transmission Size** - Specifies the size of the Cause of Transmission (COT) in octets (1 or 2). For the IEC 104 protocol, this parameter is fixed at 2 octets and cannot be changed.

3. Configure Timeouts:

- **TCP Connection** – Specifies the number of seconds the system can take to recognize a failure in the TCP connection to this IEC Connection. Enter a value in the range of 5 seconds to 60 seconds
 - **Offline Poll Period** – Specifies how often, in units of milliseconds, this connection will reattempt connection when offline. Enter a value in the range of 0 to 120000
 - **Timer t1** - Specifies the maximum amount of time, in units of milliseconds, to wait for the acknowledgement of a transmitted APDU. Enter a value in the range of 0 to 120000
 - **Timer t2** - Specifies the time, in units of milliseconds, to wait before sending Supervisory acknowledgement APDUs. Enter a value in the range of 0 to 120000
 - **Timer t3** - Specifies how much idle time, in units of milliseconds, should elapse before sending a test APDU. . Enter a value in the range of 0 to 120000
4. When you have completed the configuration of the connection parameters, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

Note

To restore all parameters to their factory default settings, select the **Use Factory Defaults** button.

Configuring Connection Parameters for the IEC 101 Protocol (Unbalanced)

The dialog below shows the configuration parameters that can be configured if you have selected the **101 protocol**, with the **Balanced** checkbox unchecked, and have clicked the **Configure Connection Parameters** button.

Configure Connection that uses unbalanced 101 protocol

TCP Addressing

Connection Address

Connection Port

Parameters

Link Address Size

Link Address Structure

Common Address of ASDU Size

Information Object Address Size

Information Object Address Structure

Cause of Transmission Size

Timeouts

TCP Connection sec

Offline Poll Period ms

Confirmation ms

Retries

Unbalanced Parameters

Class 1/2 Max Pending Requests Count

Class 1 Max Poll Requests Count

Class 1 Pending Requests Delay ms

Class 1 Poll Requests Delay ms

Class 2 Pending Requests Delay ms

Class 2 Poll Requests Delay ms

OK Cancel Use Factory Defaults

To configure the connection parameters:

1. Configure **TCP Addressing**:

- **Connection Address** - Type in a valid TCP address or the valid name of a TCP host node that will be used when addressing the RTU's and Gateways that are configured to use this connection
- **Connection Port** - Specifies the TCP port that will be used when addressing the RTU's and Gateways that are configured to use this connection. Specify a number between 1 and 65535.

2. Configure **Protocol Parameters**

- **Link Address Size** – Specifies whether the link address for this Connection, when connected to an RTU or Gateway, will be specified as a single or dual octet address. A pull-down list allows the selection of **1 octet or 2 octets**.
- **Link Address Structure** – Specifies whether the link address for this Connection is specified in octet notation (structured) or as a single number (unstructured). A pull down list allows the selection of "Structured" or "Unstructured".
- **Common Address of ASDU Size** - Specifies the size in octets for the common portion of the address of the RTU. A pull-down list allows the selection of **1 octet or 2 octets**.
- **Information Object Address Size** - Specifies the number of octets (1 to 3) that are used to specify the address of external tags communicating through this connection. . A pull-down list allows the selection of **1, 2 or 3 octets**.
- **Information Object Address Structure** - Specifies whether the information object address for external tags communicating through this CONN are specified in octet notation (structured) or as a single number (unstructured). A pull down list allows the selection of "Structured" or "Unstructured".
- **Cause of Transmission Size** - Specifies the size of the Cause of Transmission (COT) in octets (1 or 2). For the IEC 104 protocol, this parameter is fixed at 2 octets and cannot be changed.

3. Configure **Timeouts**

- **TCP Connection** – Specifies the number of seconds the system can take to recognize a failure in the TCP connection to this IEC Connection. Enter a value in the range of 5 seconds to 60 seconds
- **Offline Poll Period** – Specifies how often, in units of milliseconds, this connection will reattempt connection when offline. Enter a value in the range of 0 to 120000
- **Confirmation** - Specifies the maximum amount of time, in units of milliseconds, to wait for a link level confirmation, if requested. Enter a value in the range of 0 to 120000
- **Retries** - Specifies the maximum number of link layer retries if a link layer confirmation times out. Enter a value between 0 and 10.

4. Configure **UnbalancedParameters**

- **Class 1 / 2 Max Pending Requests Count** – Specifies the total number of Class1 and Class 2 request frames that may be sent to one device when an application layer response message is pending from the device before moving on to the next device in a multidrop network. Note: This number has no effect in a single drop network. Enter a value in the range 0 to 10000.
 - **Class 1 Max Poll Requests Count** – Specifies the total number of consecutive Class 1 request frames that may be sent to one device before moving on to the next device in a multidrop network. This parameter has no effect on a single drop network. Enter a value in the range 0 to 10000.
 - **Class 1 Pending Requests Delay** – Specifies the minimum delay in milliseconds before a Class 1 request will be sent. This parameter along with the Class 1 Poll Delay, Class2 Pending Delay, and the Class 2 Poll Delay parameters can be used to limit bandwidth on shared media such as Ethernet, or to prevent taxing the target device with unnecessary communication overhead. Enter a value in the range 0 to 60000.
 - **Class 1 Poll Requests Delay** - Specifies how often in milliseconds a Class 1 request will be sent. This parameter along with the Class 1 Pending Delay, Class2 Pending Delay, and the Class 2 Poll Delay parameters can be used to limit bandwidth on shared media such as Ethernet, or to prevent taxing the target device with unnecessary communication overhead. Enter a value in the range 0 to 60000.
 - **Class 2 Pending Requests Delay** – Specifies the minimum delay in milliseconds before a Class 1 request will be sent. This parameter along with the Class 2 Poll Delay, Class1 Pending Delay, and the Class 1 Poll Delay parameters can be used to limit bandwidth on shared media such as Ethernet, or to prevent taxing the target device with unnecessary communication overhead. Enter a value in the range 0 to 60000.
 - **Class 2 Poll Requests Delay** - Specifies how often in milliseconds a Class 2 request will be sent. This parameter along with the Class 2 Pending Delay, Class1 Pending Delay, and the Class 1 Poll Delay parameters can be used to limit bandwidth on shared media such as Ethernet, or to prevent taxing the target device with unnecessary communication overhead. Enter a value in the range 0 to 60000.
5. When you have completed the configuration of the connection parameters, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.
-

Note

To restore all parameters to their factory default settings, select the **Use Factory Defaults** button.

Configuring Connection Parameters for the IEC 101 Protocol (Balanced)

The dialog below shows the configuration parameters that can be configured if you have selected the **101 protocol**, with the **Balanced** checkbox checked, and have clicked the **Configure Connection Parameter** button.

Configure Connection that uses balanced 101 protocol

TCP Addressing

Connection Address

Connection Port

Parameters

Link Address Size

Link Address Structure

Common Address of ASDU Size

Information Object Address Size

Information Object Address Structure

Cause of Transmission Size

Timeouts

TCP Connection sec

Offline Poll Period ms

Confirmation ms

Retries

Balanced Parameters

Test Frame Period ms

1. Configure **TCP Addressing**:

- **Connection Address** - Type in a valid TCP address or the valid name of a TCP host node that will be used when addressing the RTU's and Gateways that are configured to use this connection
- **Connection Port** - Specifies the TCP port that will be used when addressing the RTU's and Gateways that are configured to use this connection. Specify a number between 1 and 65535.

2. Configure **Protocol Parameters**

- **Link Address Size** – Specifies whether the link address for this Connection, when connected to an RTU or Gateway, will be specified as a single or dual octet address. A pulldown list allows the selection of **0, 1 or 2 octets**.
- **Link Address Structure** – Specifies whether the link address for this Connection is specified in octet notation (structured) or as a single number (unstructured). A pull down list allows the selection of "Structured" or "Unstructured".
- **Common Address of ASDU Size** - Specifies the size in octets for the common portion of the address of the RTU. A pulldown list allows the selection of **1 octet or 2 octets**.
- **Information Object Address Size** - Specifies the number of octets (1 to 3) that are used to specify the address of external tags communicating through this connection. . A pulldown list allows the selection of **1, 2 or 3 octets**.
- **Information Object Address Structure** - Specifies whether the information object address for external tags communicating through this CONN are specified in octet notation (structured) or as a single number (unstructured). A pull down list allows the selection of "Structured" or "Unstructured".
- **Cause of Transmission Size** - Specifies the size of the Cause of Transmission (COT) in octets (1 or 2). For the IEC 104 protocol, this parameter is fixed at 2 octets and cannot be changed.

3. Configure **Timeouts**

- **TCP Connection** – Specifies the number of seconds the system can take to recognize a failure in the TCP connection to this IEC Connection. Enter a value in the range of 5 seconds to 60 seconds
- **Offline Poll Period** – Specifies how often, in units of milliseconds, this connection will reattempt connection when offline. Enter a value in the range of 0 to 120000
- **Confirmation** - Specifies the maximum amount of time, in units of milliseconds, to wait for a link level confirmation, if requested. Enter a value in the range of 0 to 120000
- **Retries** - Specifies the maximum number of link layer retries if a link layer confirmation times out. Enter a value between 0 and 10.

4. Configure **Balanced Parameters**
 - **Test Frame Period** - Specifies how often (in units of milliseconds) to transmit a test frame to verify if a remote device is still online. Zero disables this feature. Enter a value in the range 0 to 60000.
5. When you have completed the configuration of the connection parameters, click **OK** To exit the configuration dialog without saving your changes, select the **Cancel** button.

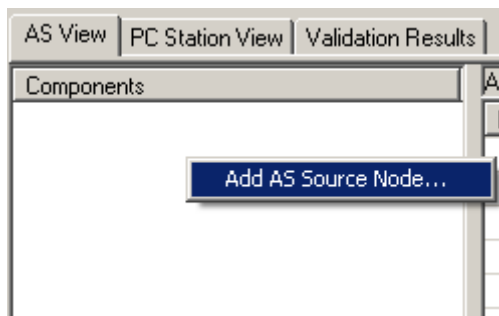
Note

To restore all parameters to their factory default settings, select the **Use Factory Defaults** button.

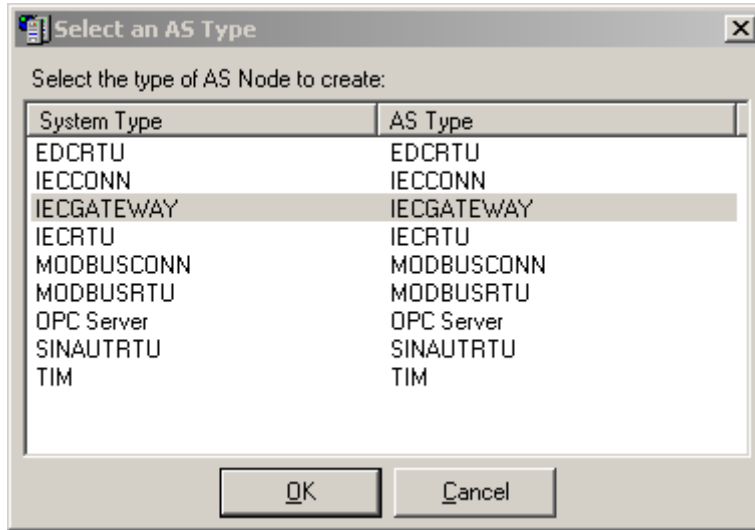
4.4.2 Adding a PCS 7/Telecontrol IEC Gateway Node to a Project

To add an IEC Gateway to your PCS 7/TeleControl project, follow these steps:

1. In the lower pane of the DBA Utility, select the AS View tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node** from the context menu.



The **Select an AS Type** dialog appears.

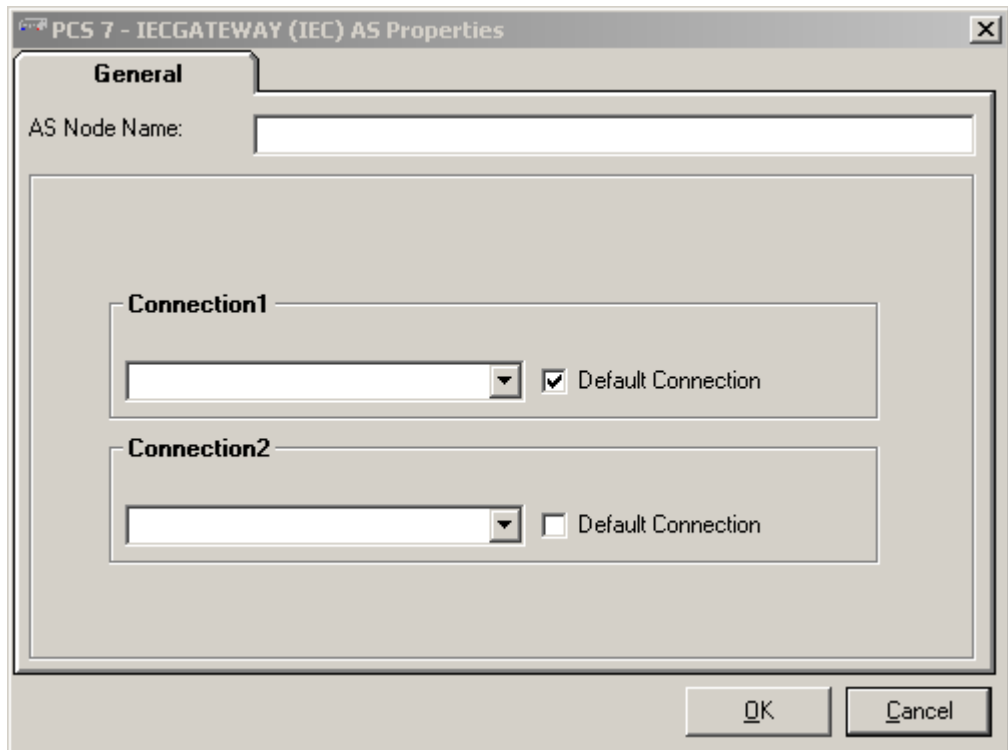


- In the dialog, select IECGATEWAY, and click **OK**.

Note

Which AS Types are available depends on which OS options are installed.

The **IECGATEWAY AS Properties** dialog appears.



- In the **AS Node Name** field, specify a name for the IEC Gateway node.
- Use the pull-down list under the heading **Connection1** to select an IEC connection to be used by this gateway to communicate with the PCS 7 servers

Note

The ASDU address can be entered in octal or decimal format. In the event that the common address of the **ADSU** parameter for the connection associated with the RTU corresponds with the value "2", the ASDU address can be entered either in octal or decimal format. Use the syntax "x.y" to enter the address in octal format. Enter a decimal number without a dot in order to enter in decimal format.

In the event that the common address of the **ADSU** parameter for the connection associated with the RTU corresponds with the value "1", the address must be entered either in octal format.

6. If the selected connection was configured for the IEC 101 Protocol, an additional field is shown, **Link Address**.

Enter a link address in dotted octet notation, according to the link address size configured for the connection.

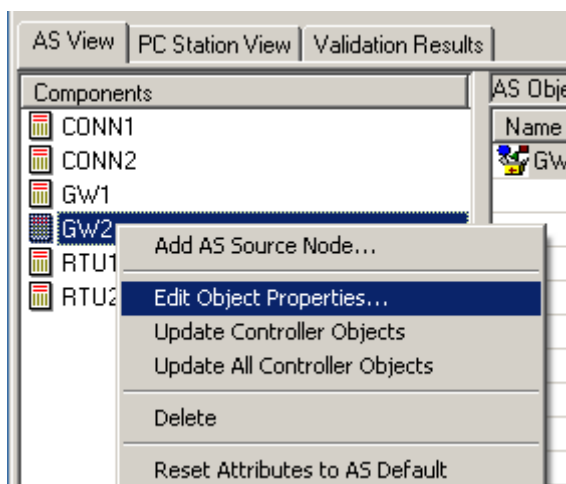
7. If the Gateway requires two connections, use the pulldown list under **Connection2** to select an additional IEC connection to be used by this gateway to communicate with the PCS 7 servers.
8. If 2 connections are being used, and the selected 2nd connection was configured for the IEC 101 Protocol, an additional field is shown under **Connection 2 Link Address**.

Enter a link address in dotted octet notation, according to the link address size configured for the connection.

9. By default, the first connection is selected as the **default connection**. If you are working with two connections you may also assign the standard connection to the second connection. Select the "Standard connection" checkbox under "Connection 2" for this.
10. When you have finished configuring the IEC Gateway click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.
11. Repeat this procedure to add and configure additional IEC Gateways.

Note

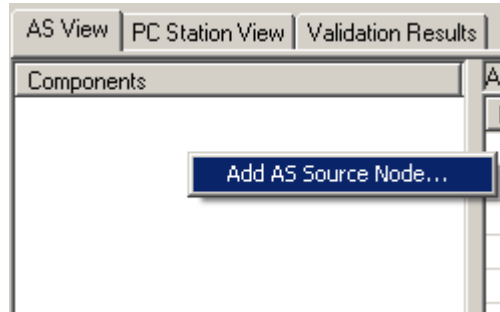
To make changes to an IEC Gateway that has already been created, right-click on the Connection and select **Edit Object Properties** from the right-click menu.



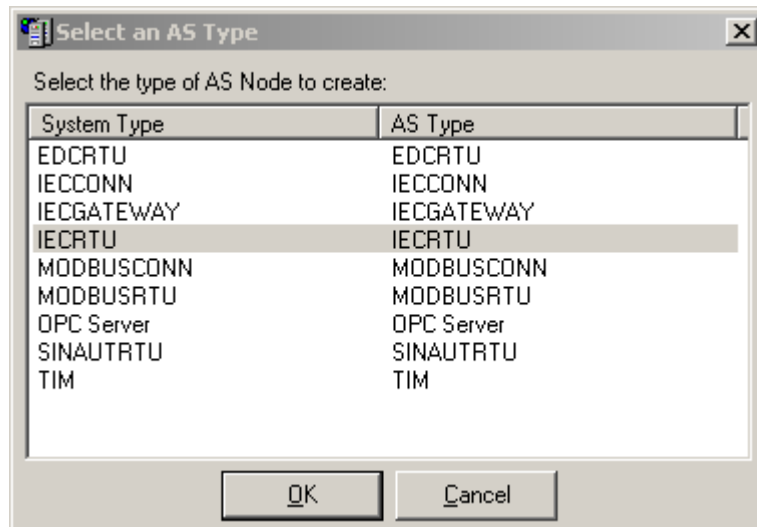
4.4.3 Adding a PCS 7/Telecontrol IEC RTU Node to a Project

To add an IEC RTU node to your PCS 7/TeleControl project, follow these steps:

1. In the bottom pane of the DBA user interface, select the **AS View** tab.
2. Right-click in an empty area in the left bottom pane and select **Add AS Source Node** from the context menu.



The **Select AS Type** dialog box is displayed.

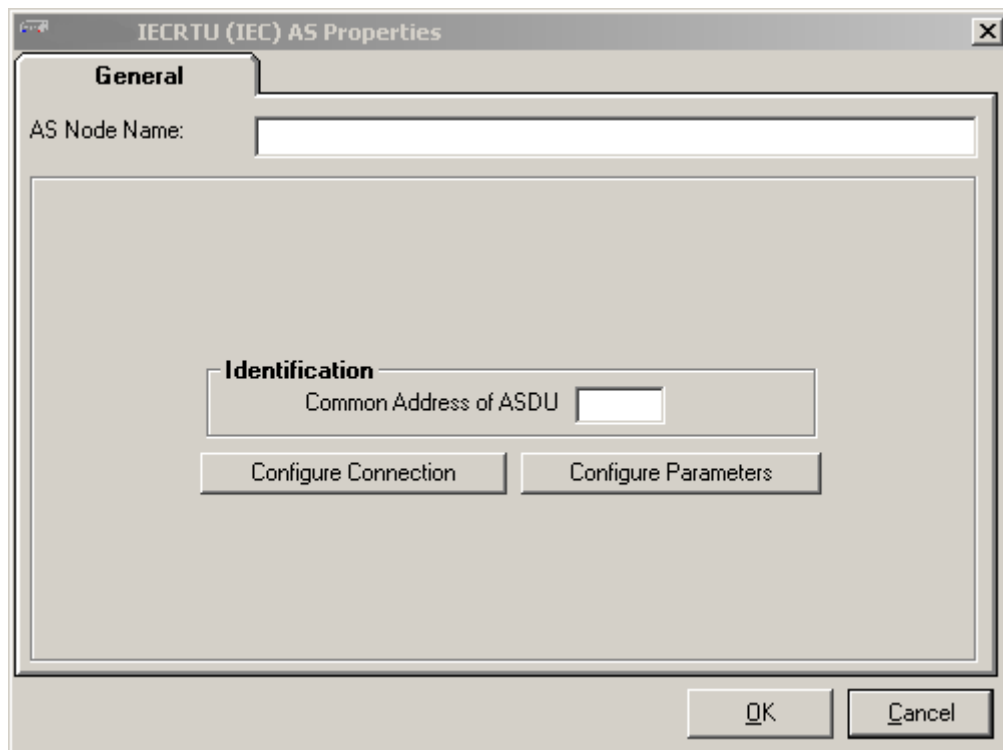


3. In the displayed dialog, select IECRTU and click **OK**.

Note

The AS types that are available depend on the OS options that were installed.

The IECRTU (IEC) AS Properties dialog box is displayed.

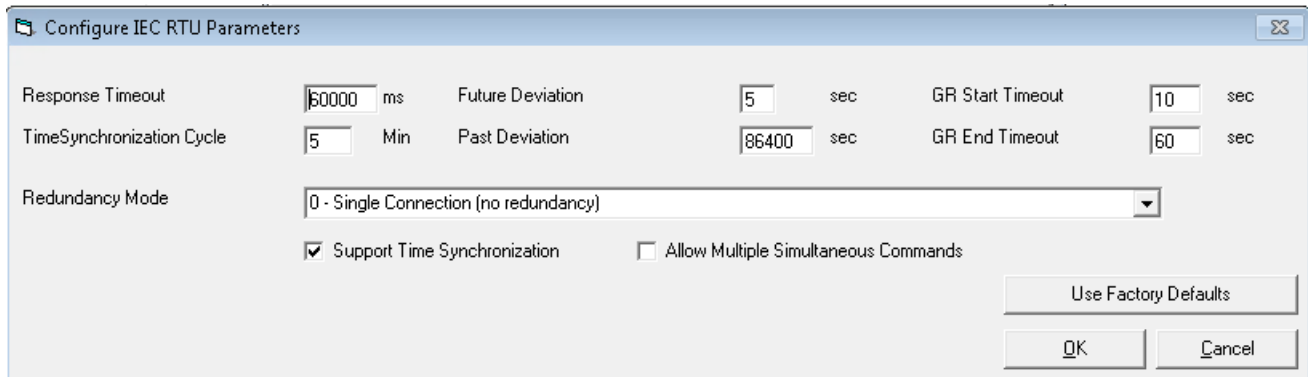


4. In the **AS Node Name** box, enter a name for the IEC RTU node.
5. In the **Common Address of ASDU** box, enter an address for the RTU.

Note

The ASDU address must be entered in octet notation with dots, that is with one or two octets depending on how the number of octets was specified during configuration of the octet number for the ASDU address of the IEC connection over which this RTU communicates with the PCS 7 servers.

- Click **Configure Parameters** to configure the parameters of the RTU. The **Configure IEC RTU Parameters** dialog appears.



The screenshot shows the 'Configure IEC RTU Parameters' dialog box with the following settings:

Parameter	Value	Unit
Response Timeout	60000	ms
TimeSynchronization Cycle	5	Min
Future Deviation	5	sec
Past Deviation	86400	sec
GR Start Timeout	10	sec
GR End Timeout	60	sec
Redundancy Mode	0 - Single Connection (no redundancy)	

Additional options:

- Support Time Synchronization
- Allow Multiple Simultaneous Commands

Buttons: Use Factory Defaults, OK, Cancel

7. Configure the RTU **parameters**.

- **Response Timeout** – Here you specify how long (in milliseconds) to wait for execution of the RTU request. Enter a value of between 0 and 600000.
- **Time Synchronization Cycle** – To specify the expected duration (in milliseconds) in which the time synchronization should be completed. Enter a value of between 0 and 1440.
- **Future deviation** - Future time deviation (in seconds) between the RTU and the PCS 7 OS server before a time deviation error is signaled for the RTU. Enter a value of between 0 and 60.
- **Past deviation** - Past time deviation (in seconds) between the RTU and the PCS 7 OS server before a time deviation error is signaled for the RTU. Enter a value of between 0 and 608400.
- **Redundancy Mode** – To specify the redundancy mode for the RTU. Select a value between 0 and 4 from the drop-down list and orientate yourself using the descriptions listed below.
- **GR Start Timeout** – Timeout (in seconds) for situation in which an RTU has not responded to the "General Request" starting command before a failure of "General Request" is signaled for the RTU. Enter a value of between 0 and 999.
- **GR End Timeout** – Timeout (in seconds) for situation in which an RTU has not executed a "General Request" command before a failure of "General Request" is signaled for the RTU. Enter a value of between 0 and 999.
- **Support Time Synchronization** – It enables the time synchronization with the device to process the Organizational messages and Data messages. Data messages are discarded in case the time stamp is implausible, except within a configurable time interval related to the current time.
- **Allow Multiple Simultaneous Commands** - Makes it possible for multiple commands of the same type to be sent within short periods of time. Please note that not all of the devices support parallel processing of commands.

For the IEC 60870-5-101 protocol (serial connections), the "Redundancy Mode" parameter has the following values and meanings:

Settings of the redundancy mode for IEC 60870-5-101 (serial)	
0	Single connection, no redundancy function
1	Redundant connection, 2 serial interfaces in the RTU, sending and receiving of data works only at one end of the redundant line (active line). During the start, the standard connection simultaneously becomes the active line. The backup line is active in ready mode; only test telegrams are sent over this line. Data received over the backup line is discarded. When the active line fails, switch to the backup line but do not switch back: Commands are only sent once on the active line.
2	Redundant connection, 2 serial interfaces in the RTU, sending and receiving of data works only at one end of the redundant line (active line). During the start, the standard connection simultaneously becomes the active line. The backup line is inactive. Do not send data or test telegrams over the backup line if the standard line/active line works without problems. Switch back to the backup line if the standard line/active line fails and check the status of the standard line regularly. Switch back to the standard line as soon as it works without problems once again and deactivate the backup line. Commands are only sent once on the active line.

Settings of the redundancy mode for IEC 60870-5-101 (serial)	
3	Redundant connection, 1 serial interface in the RTU, sending and receiving of data works only at one end of the redundant line (active line). During the start, the standard connection simultaneously becomes the active line. The backup line is inactive. Do not send data or test telegrams over the backup line. When the current active line fails, switch to the backup line but do not switch back and deactivate the failed connection. Do not send data or test telegrams over the inactive/deactivated line. Commands are only sent once on the active line.
4	Redundant connection, 2 serial interfaces in the RTU, complete data exchange functions on both lines and in both directions. This is the "normal" redundancy mode. We highly recommend it. During the start, the standard connection simultaneously becomes the active line. The data received on the active line is processed. Data received on the backup line is discarded. Commands are sent at both ends.

For the IEC 60870-5-104 protocol (TCP connections), the "Redundancy Mode" parameter has the following values and meanings:

Settings of the redundancy mode for IEC 60870-5-104 (TCP)	
0	Single connection, no redundancy function
1	Redundant connection, 2 TCP interfaces in the RTU, sending and receiving of data works only at one end of the redundant line (active line). During the start, the standard connection simultaneously becomes the active line. The backup line is active in ready mode; only connection or test telegrams are sent over the backup line. Data received over the backup line is discarded. When the active line fails, switch to the backup line but do not switch back: Commands are only sent once on the active line.
2	Redundant connection, 2 TCP interfaces in the RTU, sending and receiving of data works only at one end of the redundant line (active line). During the start, the standard connection simultaneously becomes the active line. The backup line is inactive. Do not send data, connection or test telegrams over the backup line if the standard line/active line works without problems. Switch back to the backup line if the standard line/active line fails and check the status of the standard line regularly. Switch back to the standard line as soon as it works without problems once again and deactivate the backup line. Commands are only sent once on the active line.
3	Redundant connection, 2 TCP interfaces in the RTU, sending and receiving of data works only at one end of the redundant line (active line). During the start, the standard connection simultaneously becomes the active line. The backup line is inactive. Do not send data or test telegrams over the backup line. When the current active line fails, switch to the backup line but do not switch back and deactivate the failed connection. Do not send data, connection or test telegrams over the inactive/deactivated line. Commands are only sent once on the active line.
4	Redundant connection, 2 TCP interfaces in the RTU, complete data exchange functions on both lines and in both directions. This is the "normal" redundancy mode. We highly recommend it. During the start, the standard connection simultaneously becomes the active line. The data received on the active line is processed. Data received on the backup line is discarded. Commands are sent at both ends.

8. By clicking **Cancel**, you discard all changes and return to the **AS Properties** dialog. By clicking **OK**, you save all changes and return to the **AS Properties** dialog.

Note

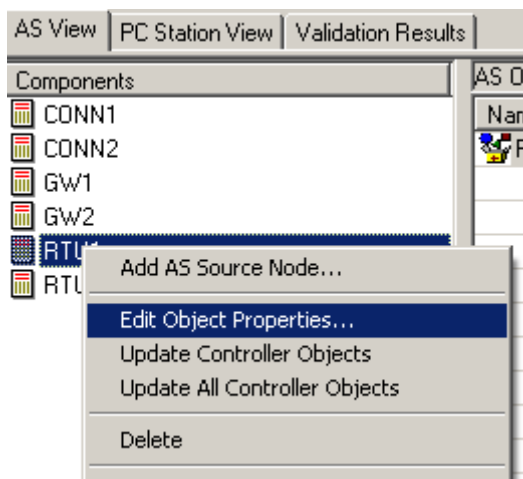
You can reset all parameters back to the default values set at the factory except "Allow Multiple Simultaneous Commands" parameter. To do this, select the **Use Factory Defaults** button.

9. Click "Configure Parameters" to configure the connection to the RTU. You can configure two types of connections here: Direct connections and IEC Gateway connections. The following sections describe how these two types of connections are configured with an RTU.

10. Once you have completed the IEC RTU configuration, click **OK**. To exit the configuration dialog without saving the changes, select **Cancel**.
11. Repeat this procedure to add and configure additional IEC RTUs.

Note

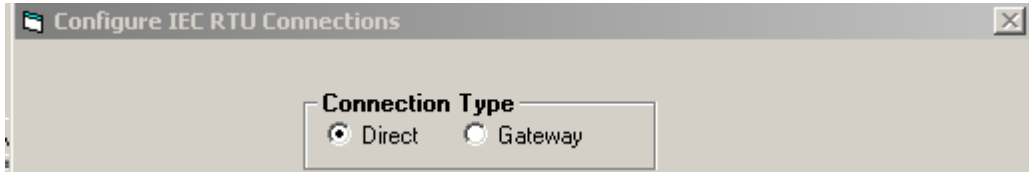
To make changes to an existing IEC RTU, right-click the connection and select **Edit Object Properties** from the context menu.



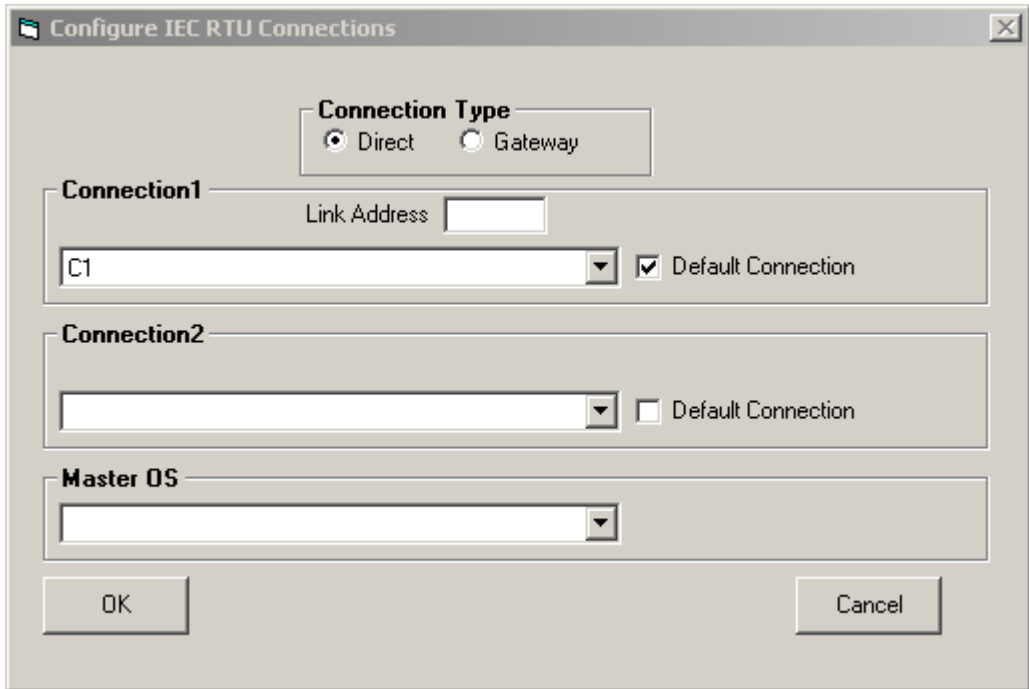
Configuring a Direct Connection to an IEC RTU

To configure a direct connection to an RTU, from the **Configure IEC RTU Connections** dialog, perform the following steps:

1. Select **Connection Type** of **Direct** (default).



The **Configure IEC RTU Connection** dialog will appear as shown below:



2. Use the pulldown list under **Connection1** to select an IEC connection to be used for this be used by this gateway to communicate with the PCS 7 servers

Note

If one or more IEC Connections were configured prior to configuring this RTU, the first connection will be preconfigured with first IEC Connection in the list.

3. If the selected connection was configured for the IEC 101 Protocol, an additional field is shown, **Link Address**.



Enter a link address in dotted octet notation, according to the link address size configured for the connection.

4. If the RTU requires two connections, use the pulldown list under **Connection 2** to select an additional IEC connection to be used by this RTU to communicate with the PCS 7 servers.
5. If 2 connections are being used, and the selected 2nd connection was configured for the IEC 101 Protocol, an additional field is shown under **Connection 2, Link Address**.



The screenshot shows a configuration window titled "Connection2". It contains a "Link Address" text input field. Below it is a dropdown menu with "C1" selected. To the right of the dropdown is a checkbox labeled "Default Connection".

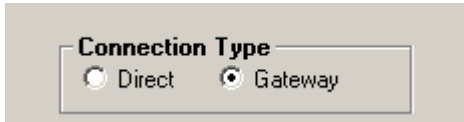
Enter a link address in dotted octet notation, according to the link address size configured for the connection.

6. By default, the first connection is selected as the default connection. If 2 connections are being used, this can be changed by checking the Default Connection checkbox shown under **Connection 2**.
7. Use the pulldown list under the heading Master OS to identify the OS that will be communicating with this RTU. A dropdown list shows all of the Master OS nodes that have been configured in DBA (see Adding a PC Station (Page 189)). If one or more Master OS stations were configured prior to configuring this RTU, the Master OS will be preconfigured with the first Master OS from the dropdown list.
8. When you have finished configuring the IEC RTU direct connection, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

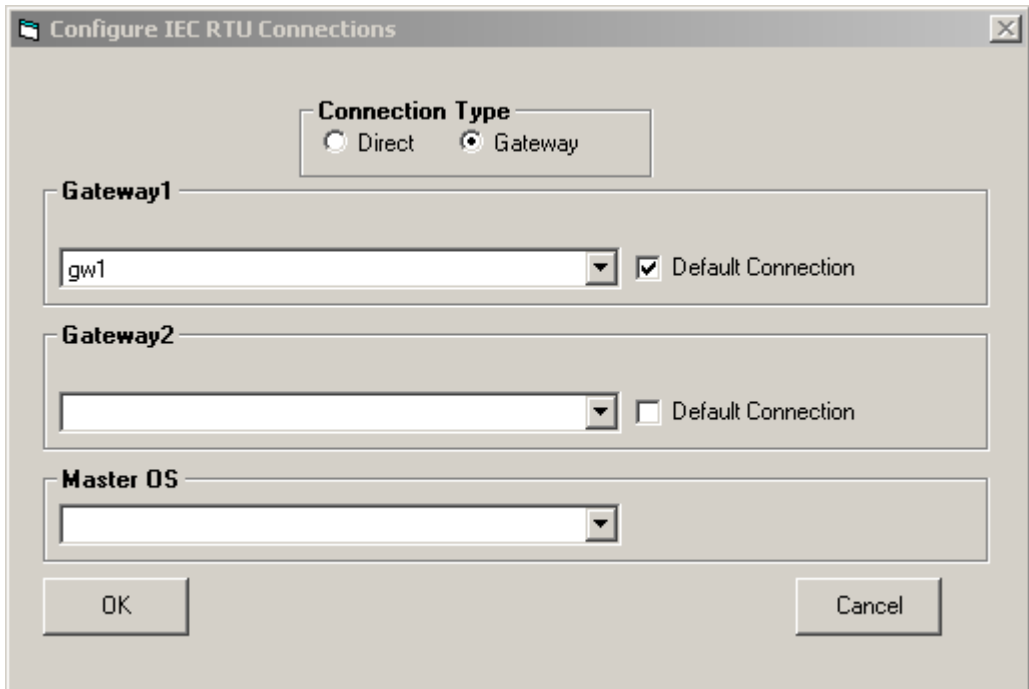
Configuring a Gateway Connection to an IEC RTU

To configure a gateway connection to an RTU, from the **Configure IEC RTU Connections** dialog, perform the following steps:

1. Select **Connection Type** of **Gateway**.



The **Configure IEC RTU Connections** dialog will appear as shown below:



2. Use the pulldown list under **Gateway 1** to select an IEC connection to be used for this be used by this gateway to communicate with the PCS 7 servers.

Note

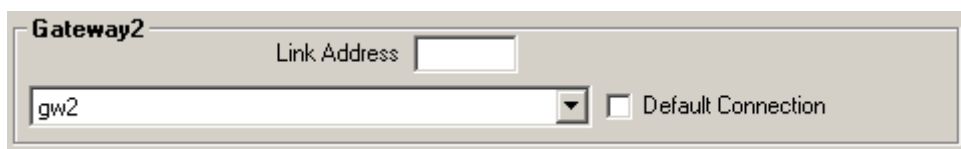
If one or more IEC Connections were configured prior to configuring this RTU, the first connection will be preconfigured with first IEC Connection in the list.

3. If the selected gateway was configured with a connection that uses the IEC 101 Protocol, an additional field is shown, **Link Address**.



Enter a link address in dotted octet notation, according to the link address size configured for the connection(s) that are associated the selected Gateway.

4. If the RTU requires two gateways, use the pulldown list under Gateway 2 to select an additional IEC Gateway to be used by this RTU to communicate with the PCS 7 servers.
5. If 2 gateways are being used, and the selected 2nd gateway was configured with a connection that uses the IEC 101 Protocol, an additional field is shown under Gateway 2, Link Address.



The screenshot shows a configuration window titled "Gateway2". It contains a "Link Address" text input field. Below it is a dropdown menu with "gw2" selected. To the right of the dropdown is a checkbox labeled "Default Connection".

Enter a link address in dotted octet notation, according to the link address size configured for the connection(s) that are associated the selected Gateway.

6. By default, the first gateway is selected as the **default gateway**. If 2 gateways are being used, this can be changed by checking the Default Gateway checkbox shown under **Gateway 2**.
7. Use the pulldown list under the heading Master OS to identify the OS that will be communicating with this RTU. A dropdown list shows all of the Master OS nodes that have been configured in DBA (see Adding a PC Station (Page 189)). If one or more Master OS stations were configured prior to configuring this RTU, the Master OS will be preconfigured with the first Master OS from the dropdown list.
8. When you have finished configuring the IEC RTU gateway connection, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

4.5 Adding EDC Devices to a Project

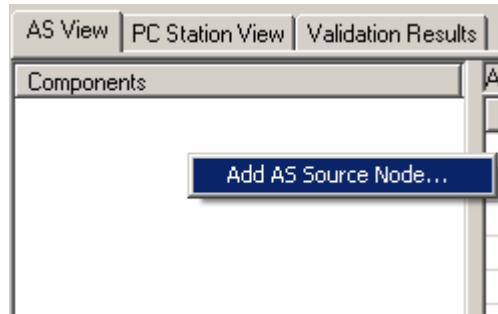
The following section describes how to add EDC RTUs to your project.

4.5.1 Adding a PCS 7/Telecontrol EDC RTU Node to a Project

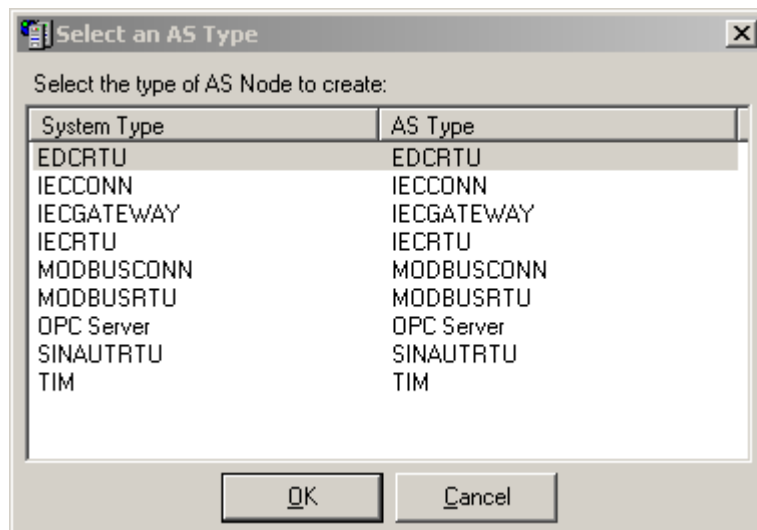
Adding a PCS 7/Telecontrol EDC RTU Node to a Project

To add an EDC RTU (EDCRTU) node to your Telecontrol project, follow these steps:

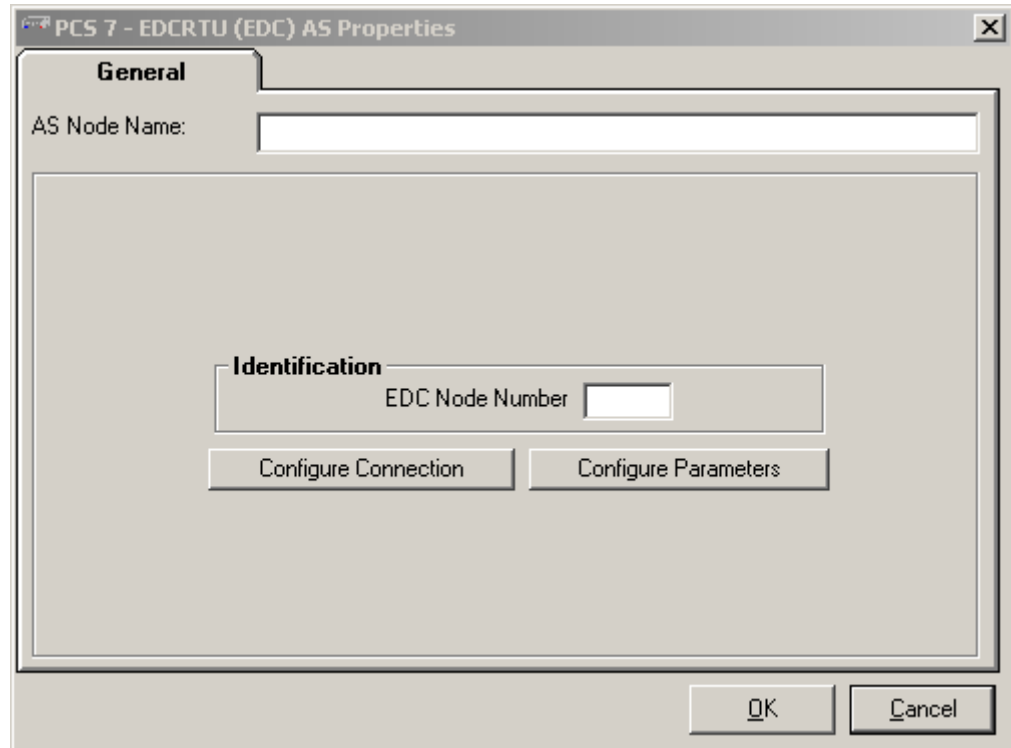
1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node...** from the context menu.



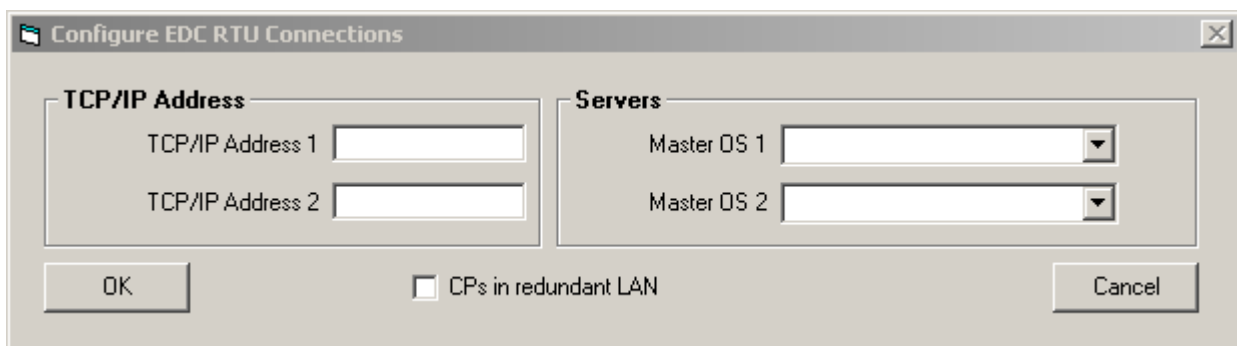
The **Select an AS Type** dialog appears.



- In the dialog, select EDCRTU, and click **OK**.
The **EDC RTU AS Properties** dialog appears.



- In the **AS Node Name** field, specify a name for the EDCRTU node.
- In the **EDC Node Number** field enter a unique number for this RTU. EDC Node numbers must be unique for all RTUs and OSs in this project.
- Click the **Configure Connection** button to configure how this RTU will communicate to the PCS 7 servers.
The **Configure EDC RTU Connections** dialog appears.



- Type in a valid TCP address in the **TCP/IP Address 1** and **TCP/IP Address 2** fields.

Note

You will not be able to compile your project to WinCC if you do not have at least one TCP/IP address configured.

4.5 Adding EDC Devices to a Project

8. Select the Master OSs to which this RTU will communicate using the **Master OS 1** and **Master OS 2** pull-down lists.

Note

Your RTU will not be included in any compiles if you do not have any Master OSs configured.

9. If the CP modules in this RTU form a single redundant LAN, check the **CPs** in Redundant LAN checkbox. Otherwise leave it unchecked.
10. Click **Cancel** to discard any changes and return to the **AS Properties** dialog. Click **OK** to save any changes and return to the **AS Properties** dialog.
11. Click the **Configure Parameters** button to configure this RTU's parameters. The **Configure EDC RTU Parameters** dialog appears.

The screenshot shows the 'Configure EDC RTU Parameters' dialog box. It has a title bar with a close button. The dialog is organized into three main sections:

- Client Parameters:** Contains three input fields: 'TSAP' with the value 'AS01CLIE', 'Ack Time' with the value '5' and 'sec' to its right, and 'Alive Time' with the value '15' and 'sec' to its right.
- Server Parameters:** Contains three input fields: 'TSAP' with the value 'AS01SERV', 'Ack Time' with the value '5' and 'sec' to its right, and 'Alive Time' with the value '15' and 'sec' to its right.
- Timing (Seconds):** Contains four input fields: 'GR Start Timeout' with the value '10', 'GR End Timeout' with the value '120', 'Future Deviation' with the value '10', and 'Past Deviation' with the value '604800'.

At the bottom right of the dialog, there are three buttons: 'Use Factory Defaults', 'Cancel', and 'OK'.

12. Configure the **Client Parameters**

- **TSAP** - Specifies the name of the TSAP for the client (this RTU). Enter a free-format name string.
- **Ack Time** - Specifies how long (in units of seconds) to wait for a message before declaring the connection dead. Enter a value in the range of 1 to 60.
- **Alive Time** - Specifies how long (in units of seconds) to wait for a message before declaring the connection dead. Enter a value in the range of 1 to 60.

13. Configure the **Server Parameters**

- **TSAP** - Specifies the name of the TSAP for the server . Enter a free-format name string.
- **Ack Time** - Specifies how long (in units of seconds) to wait for a message before declaring the connection dead. Enter a value in the range of 1 to 60.
- **Alive Time** - Specifies how long (in units of seconds) to wait for a message before declaring the connection dead. Enter a value in the range of 1 to 60.

14. Configure the **Timing Parameters**

- **Future Deviation** – Future time deviation (in seconds) between the RTU and the PCS 7 OS Server before a Time Deviation error will be reported for the RTU. Enter a value between 0 and 60.
- **Past Deviation** – Past time deviation (in seconds) between the RTU and the PCS 7 OS Server before a Time Deviation error will be reported for the RTU. Enter a value between 0 and 608400.
- **GR Start Timeout** – Timeout (in seconds) when an RTU has not responded to a General Request start command, before a failed General Request will be reported for the RTU. Enter a value between 0 and 999.
- **GR End Timeout** – Timeout (in seconds) when an RTU has not completed a General Request, before a failed General Request will be reported for the RTU. Enter a value between 0 and 999.

15. Click **Cancel** to discard any changes and return to the **AS Properties** dialog. Click **OK** to save any changes and return to the **AS Properties** dialog.

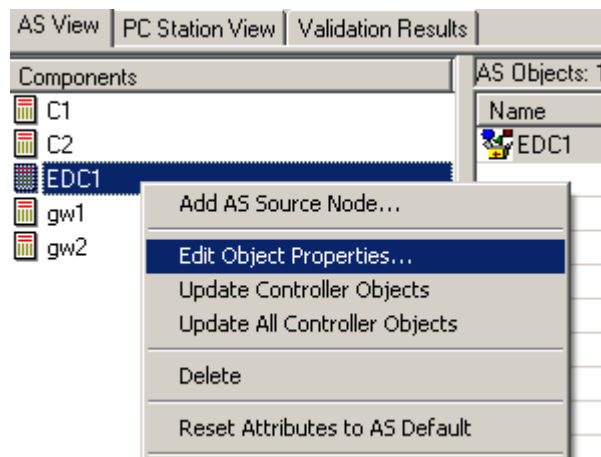
Note

You can reset all parameters to their factory defaults by clicking the **Use Factory Defaults** button.

16. When you have finished configuring the EDC RTU click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button. Repeat this procedure to add and configure additional EDC RTUs Connection and select **Edit Object Properties** from the right-click menu.

Note

To make changes to an EDC RTU that has already been created, right-click on the RTU and select **Edit Object Properties...** from the context menu.



4.6 Adding DNP Devices to a Project

The following sections describe how to add **DNP RTUs** (DNPRTU), **DNP Gateways** (DNP GATEWAY) and **DNP Connections** (DNP CONN) to your project.

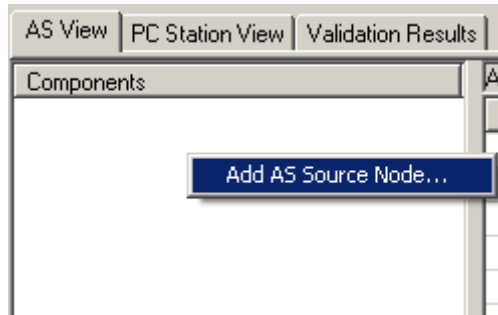
Note that all DNP RTU's must be connected via one or two DNP Gateways, or one or two DNP Connections, and all Gateways need to be connected via one or two DNP Connections.

You should configure DNP Connections (DNP CONN) first, followed by DNP Gateways (DNP GATEWAY) – if applicable, followed by DNP RTUs (DNP RTU).

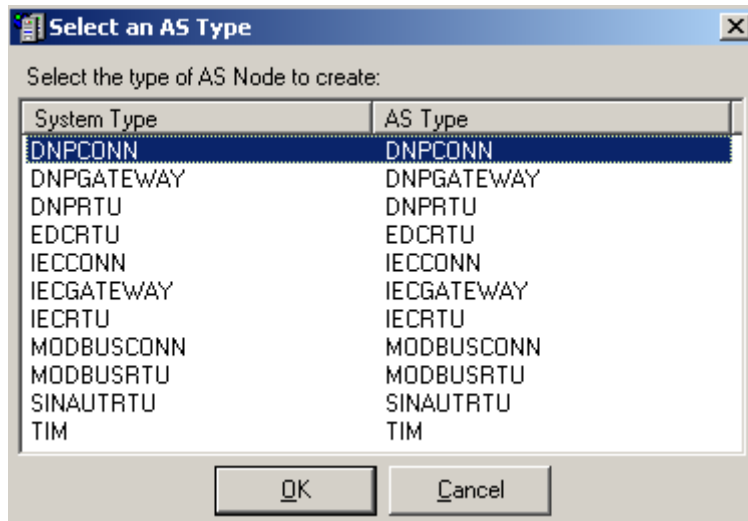
4.6.1 Adding a PCS 7/Telecontrol DNP Connection Node to a Project

To add a DNP Connection node to your Telecontrol project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node...** from the context menu.



The **Select an AS Type** dialog appears.

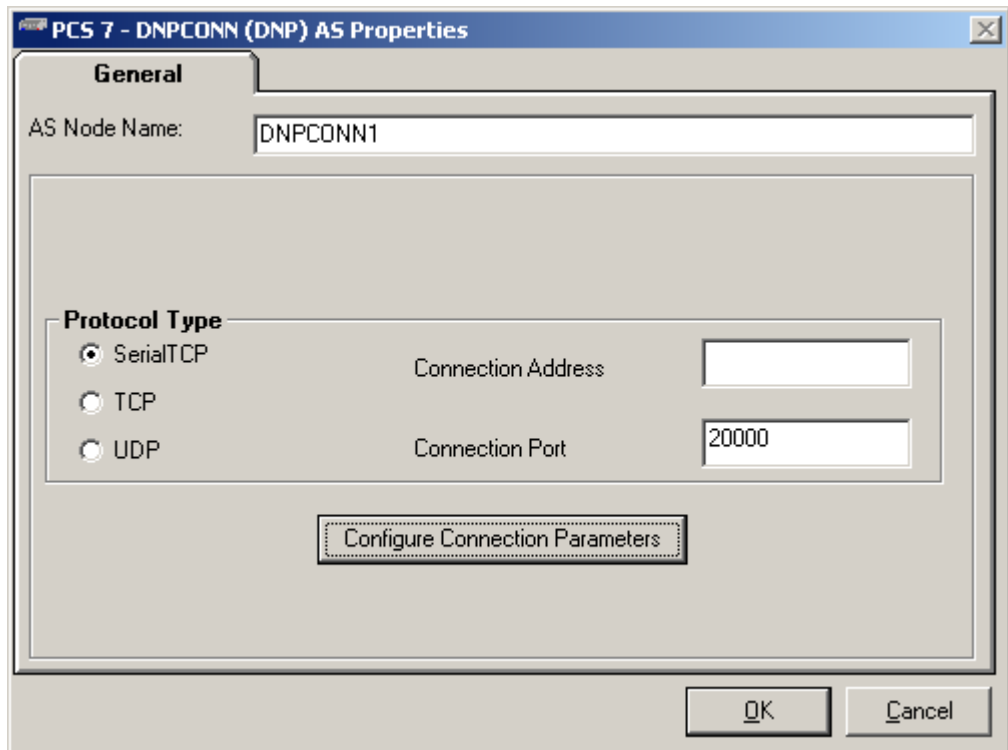


- In the dialog, select DNPCONN, and click **OK**.

Note

Which AS Types are available depends on which OS options are installed.

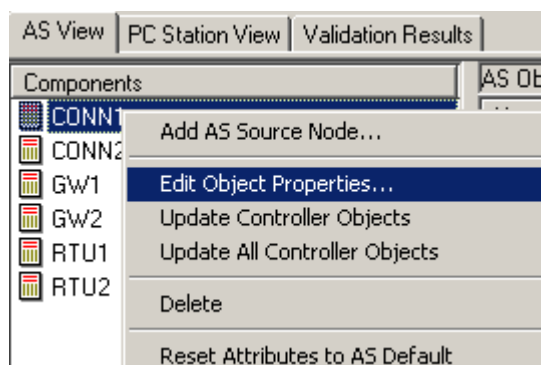
The **DNPCONN AS Properties** dialog appears.



- In the **AS Node Name** field, specify a name for the DNP Connection node.
- Select **Protocol Type**, which indicates whether your connection will use Serial TCP, TCP or UDP protocol, by clicking the appropriate radio button.
- Type in the Connection Address field a valid TCP address or a valid name of a TCP host that will be used addressing the RTUs and gateways that are configured to use this connection.
- Specify the TCP port in the Connection Port field that will be used addressing the RTUs and gateways that are configured to use this connection. Select a number between 1 and 65535.
- Click the **Configure Connection Parameters** button.
The **DNPCONN Connection Parameters** dialog appears.
- When you have completed the configuration of the DNP connection, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button
- Repeat this procedure to add and configure additional DNP connections.

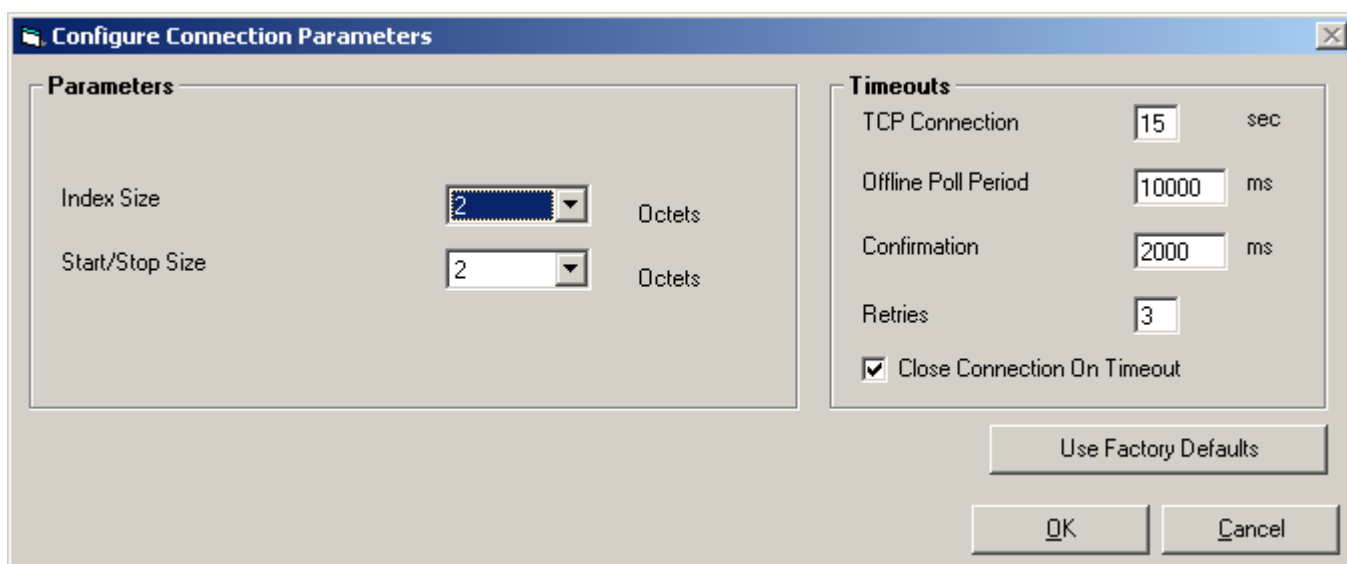
Note

To make changes to a DNP Connection that has already been created, right-click on the Connection in the AS view and select **Edit Object Properties** from the right-click menu.



4.6.2 Configuring Connection Parameters for the DNP Protocol

The dialog below shows the configuration parameters that can be configured if you have clicked the **Configure Connection Parameters** button.



To configure the connection parameters:

Configure **Protocol Parameters**:

- **Index Size** defines the Size of the Index number in octets
- **Start/Stop Size** defines the Size of Start/Stop Field in octets
- **TCP Connection Timeout** - the connection request timeout of a TCP/IP connection in seconds. The allowable range is 5 – 60 seconds and the default is 15 seconds.
- **Offline Poll Period** - specifies how often (in ms), for a session (RTU connection), that is offline, an attempt is made to re-establish communication. This includes attempting to open/reopen a channel and/or issuing request status messages as appropriate for the current configuration. The range is 0 – 120000 ms, and the default is 10000 ms.
- **Confirmation** - Maximum amount of time (in ms) to wait for a link level confirm if requested. The range is 0 – 120000 ms, and the default is 2000 ms.

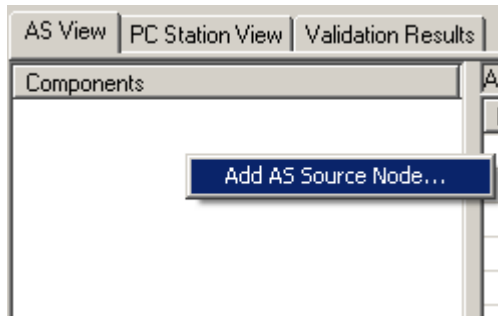
4.6 Adding DNP Devices to a Project

- **Retries** - Maximum number of link layer retries if link layer confirm times out. Range is 0 – 10. After pressing the **Use Factory Defaults**, the Retries parameter is set to 2.
- **Close Connection On Timeout** - When checked, the connection will be closed when a timeout using the connection occurs. If unchecked, the connection will remain open when a timeout occurs.

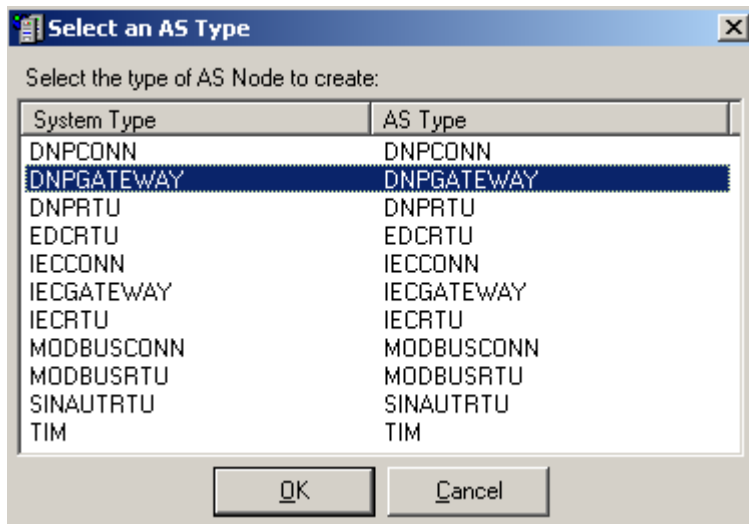
4.6.3 Adding a PCS 7/Telecontrol DNP Gateway Node to a Project

To add a **DNP Gateway** to your PCS 7/TeleControl project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node...** from the context menu.



The **Select an AS Type** dialog appears.

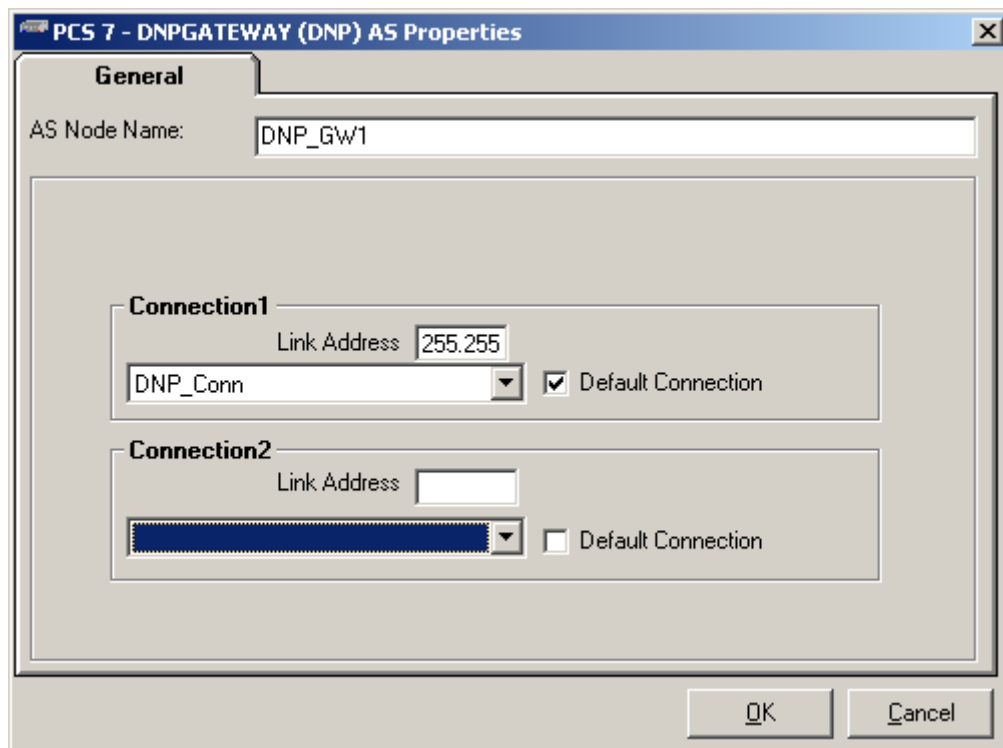


- In the dialog, select **DNPGATEWAY**, and click **OK**.

Note

Which AS Types are available depends on which OS options are installed.

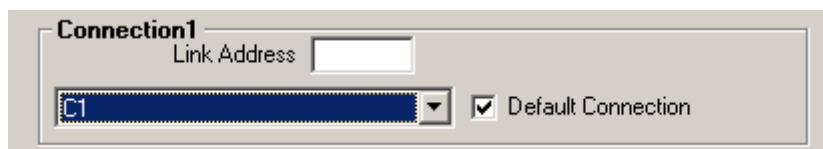
The **DNPGATEWAY (DNP) AS Properties** dialog appears.



- In the **AS Node Name** field, specify a name for the IEC Gateway node.
- Use the pulldown list under the heading **Connection1** to select an DNP connection to be used by this gateway to communicate with the PCS 7 servers.

Note

If one or more DNP Connections were configured prior to configuring this gateway, **Connection1** will be preconfigured with first DNP Connection in the list.



Enter a link address in dotted octet notation, according to the link address size configured for the connection.

4.6 Adding DNP Devices to a Project

- If the Gateway requires two connections, use the pulldown list under **Connection2** to select an additional DNP connection to be used by this gateway to communicate with the PCS 7 servers.

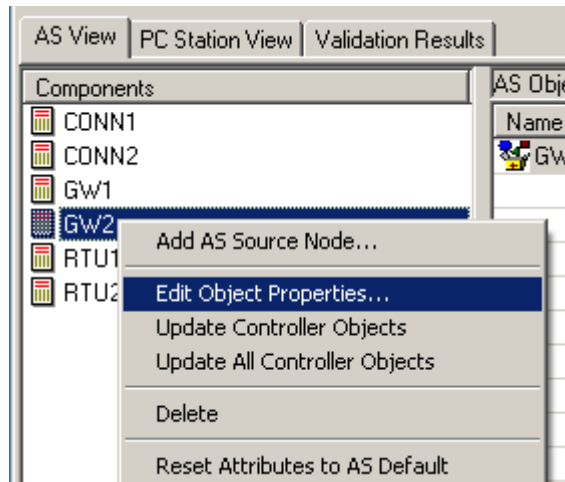


Enter a link address in dotted octet notation, according to the link address size configured for the connection.

- By default, the first connection is selected as the **Default Connection**. If 2 connections are being used, this can be changed by checking the **Default Connection** checkbox shown under connection 2.
- When you have finished configuring the DNP Gateway click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.
- Repeat this procedure to add and configure additional DNP Gateways.

Note

To make changes to a DNP Gateway that has already been created, right-click on the Connection and select **Edit Object Properties** from the right-click menu.

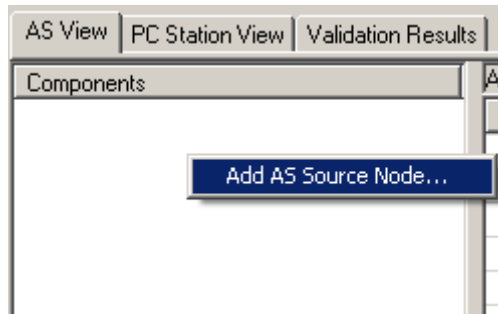


4.6.4 Adding a PCS 7/Telecontrol DNP RTU Node to a Project

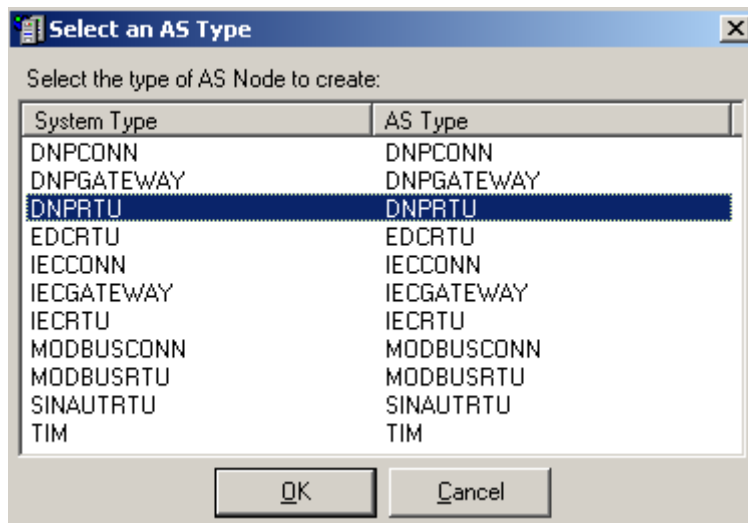
4.6.4.1 Adding a RTU Node to a Project

To add an DNP RTU node to your PCS 7/Telecontrol project, follow these steps:

1. In the lower pane of the DBA Utility, select the **AS View** tab.
2. Right-click in the blank area of the lower left pane, and select **Add AS Source Node...** from the context menu.



The **Select an AS Type** dialog appears.

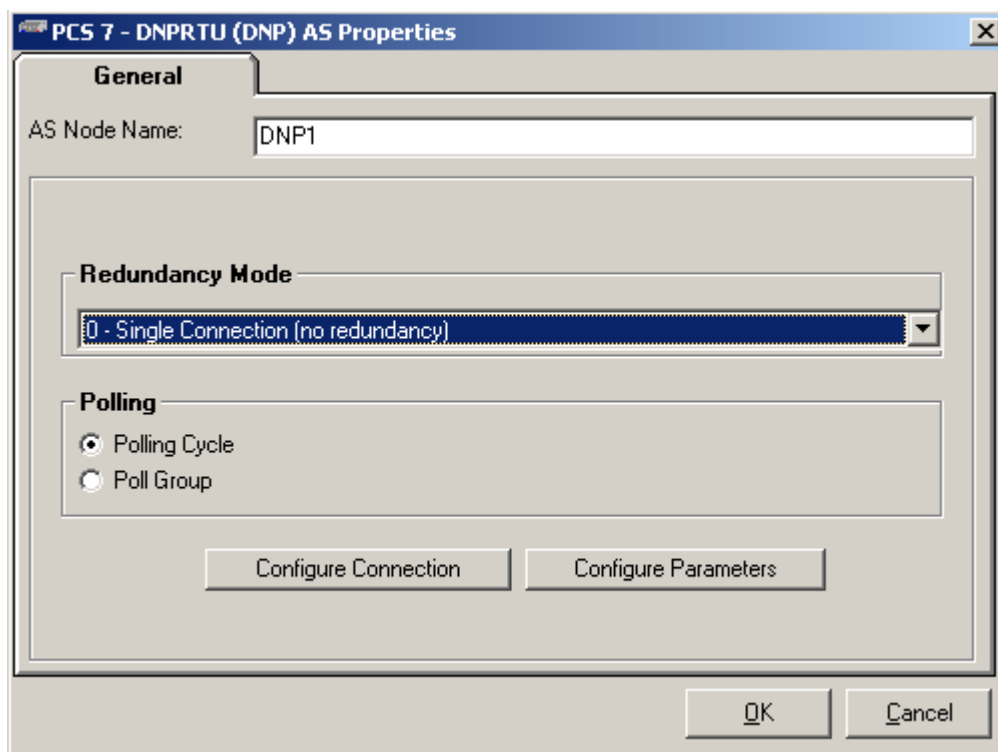


3. In the dialog, select **DNPRTU**, and click **OK**.

Note

Which AS Types are available depends on which OS options are installed.

The **DNPRTU AS Properties** dialog appears.



4. In the **AS Node Name** field, specify a unique name for the DNP RTU node.

5. Define **Redundancy mode**

You can choose between 4 different redundancy modes for accessing the RTU.

For the DNP protocol the Redundancy Mode parameter has the following values and meanings:

Redundancy Mode Settings for DNP	
0	Single connection , no redundancy function
1	Redundant connection, 2 interfaces in the RTU , sending and receiving data is only working on one side of the redundant line (active line). On Start-up the default connection becomes active line. Backup line is active in standby; on backup line only test frames are sent. Data received on backup line are discarded. Switch to backup line, if active line fails, and do not switch back; Commands are only sent once on active line.
2	Redundant connection, 2 interfaces in the RTU , sending and receiving data is only working on one side of the redundant line (active line). On Start-up the default connection becomes active line. Backup line is inactive ; do not send on backup line any data or test frames, if default/active line is healthy. Switch to backup line, if default/active line fails, and check cyclically the status of the default line. Switch back to default line, as soon as default line is healthy again, and deactivate the backup line. Commands are only sent once on active line.
3	Redundant connection, 2 serial interface in the RTU , sending and receiving data is only working on one side of the redundant line (active line). On Start-up the default connection becomes active line. Backup line is inactive ; do not send on backup line any data or test frames. Switch to backup line, if current active line fails; do not switch back and deactivate the failed link; do not send any data or test frames on inactive/deactivated line. Commands are only sent once on active line.
4	Redundant connection, 2 serial interfaces in the RTU , on both lines and in both directions are fully data interchange. This is the normal highly recommended redundancy mode. On Start-up the default connection becomes active line. The data received on active line are processed; data received on backup line are discarded. Commands are sent on both sides.

6. Select the **polling mode** to be used when communicating with the RTU.

- Polling Cycle is based on a **fixed cycle**
- Polling is based on a **configured schedule**.

Note

For the description of the polling concept please refer to the advanced section "**Configuring DNP Polling Schedules**". Refer to Configuring DNP Polling Schedules (Page 323) for details regarding how to configure a schedule by using polling groups, chains and clusters. The section below (see Managing DNP Polling Groups (Page 325)) describes the steps for configuring the polling mechanisms.

- Click the **Configure Connections** button to configure the connection to the RTU. There are two kinds of connections that can be configured, direct connections and DNP Gateway connections. The sections below describe the steps for configuring each of these types of connections to an RTU.

The Configure DNP RTU Connections dialog appears.

The screenshot shows the 'Configure DNP RTU Connections' dialog box. It features a 'Connection Type' section with radio buttons for 'Direct' (selected) and 'Gateway'. Below this are three sections: 'Connection1' with a 'Link Address' field containing '45', a dropdown menu showing 'CONN1', and a checked 'Default Connection' checkbox; 'Connection2' with an empty 'Link Address' field, an empty dropdown menu, and an unchecked 'Default Connection' checkbox; and 'Master OS' with a dropdown menu showing 'OS'. At the bottom right are 'OK' and 'Cancel' buttons.

- Click on the **Configure Parameter** button to configure various parameters for connecting with this RTU. There are two different parameter sets that can be shown depending on the polling mechanism selected in step 6. The section below describes the steps for configuring the parameters for each of the two polling mechanism.
- When you have finished configuring the DNP RTU, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.
- Repeat this procedure to add and configure additional DNP RTUs.

Note

To make changes to a DNP RTU that has already been created, right-click on the Connection and select **Edit Object Properties** from the right-click menu.

4.6.4.2 Configuring a Direct Connection to a DNP RTU

To configure a direct connection to an RTU, from the DNP RTU Connections dialog, perform the following steps:

1. Select **Connection Type** of **Direct** (default)

Connection Type

Direct Gateway

The **Configure DNP RTU Connections** dialog appears as shown below:

Configure DNP RTU Connections

Connection Type

Direct Gateway

Connection1

Link Address

DNP_Conn Default Connection

Connection2

Link Address

Default Connection

Master OS

Delta_OS

OK Cancel

2. Use the pulldown list under **Connection1** to select a DNP connection to be used for the RTU to communicate with the PCS 7 servers

Note

If one or more DNP Connections were configured prior to configuring this RTU, the first connection will be preconfigured with first DNP Connection in the list.

Connection1

Link Address

C1 Default Connection

3. Enter a link address in dotted octet notation, according to the link address size configured for the connection.

4.6 Adding DNP Devices to a Project

4. If the RTU requires two connections, use the pulldown list under **Connection 2** to select an additional DNP connection to be used by this RTU to communicate with the PCS 7 servers.



The screenshot shows a configuration window titled "Connection2". Inside the window, there is a "Link Address" label followed by a text input field. Below the input field is a dropdown menu with a blue background and a white border, currently displaying "C1". To the right of the dropdown menu is a checkbox labeled "Default Connection".

5. Enter a link address in dotted octet notation, according to the link address size configured for the connection.
6. By default, the first connection is selected as the default connection. If 2 connections are being used, this can be changed by checking the Default Connection checkbox shown under **Connection 2**.
7. Use the pulldown list under the heading Master OS to identify the OS that will be communicating with this RTU. A dropdown list shows all of the Master OS nodes that have been configured in DBA (see Adding a PC Station (Page 189)). If one or more Master OS stations were configured prior to configuring this RTU, the Master OS will be preconfigured with the first Master OS from the dropdown list.
8. When you have finished configuring the DNP RTU direct connection, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

4.6.4.3 Configuring a Gateway Connection to a DNP RTU

To configure a gateway connection to an RTU, from the DNP RTU Connections dialog, perform the following steps:

1. Select **Connection Type** of Gateway

Connection Type
 Direct Gateway

The **Configure DNP RTU Connections** dialog appears as shown below:

Configure DNP RTU Connections

Connection Type
 Direct Gateway

Gateway1
 Link Address
 DNP_GW Default Connection

Gateway2
 Link Address
 Default Connection

Master OS
 OS

OK Cancel

2. Use the pulldown list under **Gateway1** to select a DNP gateway to be used for this be used for the RTU to communicate with the PCS 7 servers

Note

If one or more DNP Connections were configured prior to configuring this RTU, the first connection will be preconfigured with first DNP Connection in the list.

Connection1
 Link Address
 C1 Default Connection

3. Enter a link address in dotted octet notation, according to the link address size configured for the connection.

4.6 Adding DNP Devices to a Project

4. If the RTU requires two gateways, use the pulldown list under **Gateway2** to select an additional DNP connection to be used by this RTU to communicate with the PCS 7 servers.



The screenshot shows a configuration window titled "Connection2". It contains a "Link Address" text box, a dropdown menu with "C1" selected, and a "Default Connection" checkbox that is not checked.

5. Enter a link address in dotted octet notation, according to the link address size configured for the connection.
6. By default, the first gateway is selected as the default gateway. If 2 connections are being used, this can be changed by checking the Default Connection checkbox shown under **Gateway2**.
7. Use the pulldown list under the heading Master OS to identify the OS that will be communicating with this RTU. A dropdown list shows all of the Master OS nodes that have been configured in DBA (see Adding a PC Station (Page 189)). If one or more Master OS stations were configured prior to configuring this RTU, the Master OS will be preconfigured with the first Master OS from the dropdown list.
8. When you have finished configuring the DNP RTU direct gateway, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

4.6.4.4 Configuring DNP RTU Parameters using Polling Cycle

The dialog seen below shows the configuration parameters that can be configured after selection of the polling cycle and clicking the **Configure DNP RTU Parameters** button.

Configure DNP RTU Parameters

Integrity Poll

General Request (GR) 1 2 3 Class

Class

Integrity Poll on Startup

Integrity Poll on Restart Bit set

Integrity Poll on Overflow Bit set

Integrity Poll on Class x Data Bit set

Integrity Poll on Local Bit set/reset

Options

Automatic Class Assignment

Automatic Read of Dataset structures

Automatic Time Sync if NeedTime Bit set

Use Secure Authentication

Authorization

Username

Password

Time Stamp Mode

2 - Use RTU Time (UTC Format)

Polling Cycle

Poll Cycle (Event Class data) sec

Poll Cycle (Static Class data) sec

Event Poll Object Limit (Serial)

Event Poll Object Limit (TCP/IP)

Unsolicited Responses

Unsolicited Responses 1 2 3 Class

Class

Automatic Read Current Value After CMD/SP

Timing (Seconds)

Response Timeout

GR Start Timeout

GR End Timeout

Future Deviation

Past Deviation

Time Sync Cycle (minutes)

Link Test Cycle

Link Test Timeout

Time Delay Measurement

Follow these steps to configure the parameters:

1. Configure the **Integrity Poll**:

The integrity poll defines which data is polled (Class 0 - 3) and under which conditions it is polled:

- **Integrity Poll on Startup** activates the GR/Integrity Poll for all classes on startup.
- **Integrity Poll on Restart Bit set** activates the automatic GR when the "IIN Bit Restart" is set.
- **Integrity Poll on Overflow Bit set** activates the automatic GR when the "IIN Bit Buffer Overflow" is set.
- **Integrity Poll on Class X Data Bit set** activates the automatic GR when the "IIN Bit Class x Data" is set.
- **Integrity Poll on Local Bit set/reset** activates the automatic GR when the "IIN Bit Local" is set.

2. Configure the **Options**:

- **Automatic Class Assignment** defines the behavior during assignment of the object class, activates automatic class assignment during startup of the DNP3 master and when class changes are detected during complete download or downloading changes of WinCC tags.
- **Automatic Read....** activates automatic reading of the dataset descriptors/prototypes from the RTU during startup of the server or the RTU.
- **Automatic Time Sync...** activates the automatic time synchronization when the "IIN Bit Need Time" is set (active by default).
- **Use Secure Authentication** activates an authentication procedure according to IEC 62351. Configuring enables an additional configuration, for example, the selection of the authentication key.

3. Configure the **Authorization**:

Enables setting of user name and password if these are required for the authorization.

4. Configure the **Time Stamp Mode**:

- This setting enables definition of source and format for the time stamp of the RTU tags.
- With **Use OS Server Time** the time is derived from the time of the OS server.
- With **Use RTU Time (Local standard time)** the time is derived from the device, and it is assumed that the time of the device is the standard local time (not daylight saving time).
- With **Use RTU Time (UTC Format)** the time is derived from the device, and it is assumed that the time of the device is UTC (default).

5. Configure the **Polling Cycle**:
 - **Poll Cycle (Event Class data)**: Polling time in seconds for polling the events 1 - 3. The range is 0 to 100000 and the default value is 10.
 - **Poll Cycle (Static Class data)**: Polling cycle factor for polling of Class 0 (static class). The static class (Class 0) is only polled every Nth cycle for polling of the normal event class 1 - 3. The range is 0 to 100000 and the default value is 600. Note that the "Static Class data" is always polled with a General Request. To deactivate cyclic polling of this data, this value must be set to 0.
 - **Event Poll Object Limit (Serial)** – Enter the limit for the number of objects requested in an integrity poll for event data (Class 1 - 3) for serial connections with this RTU. The range is 0 to 100000 and the default value is 100.
 - **Event Poll Object Limit (TCP)** – Enter the limit for the number of objects requested in an integrity poll for event data (Class 1 - 3) for TCP connections with this RTU. The range is 0 to 100000 and the default value is 500.
6. Configure "Unsolicited Responses":
 - **Unsolicited Responses** activates unsolicited responses for the classes 1, 2 or 3.
 - **Automatic Read Current Value** activates automatic reading of the current command/setpoint after delivery of the command/setpoint.
7. Configure the **Timing**:
 - **Response Timeout** is the time for ending the entire command.
 - **GR Start Timeout** is the time period in seconds that is waited for the start of a General Request before a timeout is signaled.
 - **GR End Timeout** is the time period in seconds that is waited for the end of a General Request before a timeout is signaled.
 - **Future Deviation** specifies the permitted time deviation in the future.
 - **Past Deviation** specifies the permitted time deviation in the past.
 - The **Time Sync Cycle** is specified here (in minutes).
 - The **Link Test Cycle** specifies the keep-alive/link test cycle.
 - **Link Test Timeout** – Enter the number of seconds for the timeout of the link test in a range from 1 to 300. The default setting is 5 seconds.
 - **Time Delay Measurement** activates the automatic time delay measurement for serial connections.

4.6.4.5 Configuring Secure Authentication

DNP3 Secure Authentication offers increased plant security by classifying specific telegrams as time-critical, which forces an authentication of the sender. This restricts unauthorized access to the RTU. "Writing" telegrams are usually classified as being critical, for example, setting analog value or start/stop commands.

When opening a DNP3 session, the master generates session keys that are transmitted encrypted to the slave. By using the symmetrical key that is stored in the master as well as the slave during configuration, the slave can decode the encrypted session key.

If the DNP3 slave receives a critical telegram, it sends a challenge to the master; the master replies with an encrypted transmission of a special message authentication code (MAC). This MAC can only be resolved through a combination from the previously exchanged session key and data from the received challenge. This means the identity of the master that sent the critical telegram can be verified.

If the **Use Secure Authentication** check box described in section Configuring DNP RTU Parameters using Polling Cycle (Page 89) is selected, you can open an additional menu by clicking **Configure**.

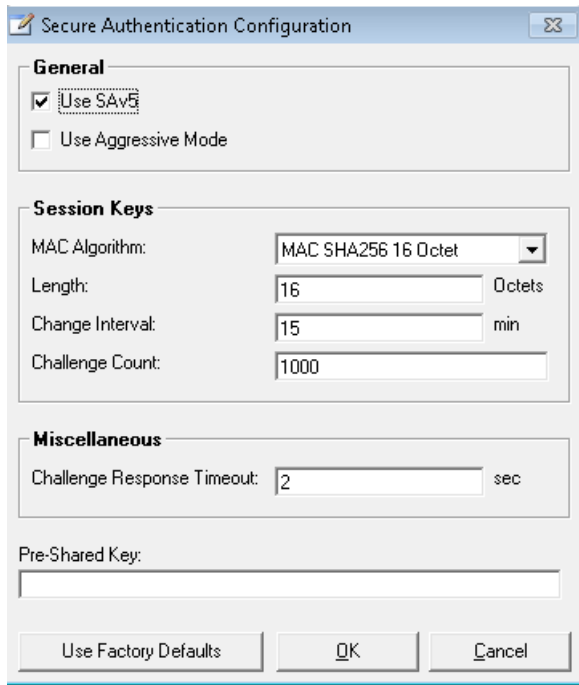


Figure 4-1 DNP_AuthConfig

General

- **Use SAV5:** Enables the use of DNP3 Secure Authentication Version 5 (recommended). By deselecting the check box, you force the use of DNP3 Secure Authentication Version 2, which offers a lower security standard.
- **Use Aggressive Mode:** Enables the use of Aggressive Mode, which shortens the Challenge-Reply method and thus speeds up authentication and reduces the telegram load.

Session key

- **MAC Algorithm:** Configures the hash algorithm according to which the message authentication code is formed.
- **Length:** Specifies the length of the generated session key.
- **Duration of validity:** Specifies how long a session key is valid before a new key must be generated.
- **Number of challenges:** Specifies for how many authentication requests a session key is valid. If the configured value is exceeded before the duration of validity has expired, a change of the key is forced.

Miscellaneous

- **Challenge Response Timeout:** Time period during which a reply telegram must have been received by the station that has output the authentication challenge. Otherwise authentication is declared as failed.

Symmetrical key: The (secret) key that must be stored in the server as well as in the RTU. Unique identification is only possible by means of this key. It cannot be replaced during runtime. A key consists of 32 or 64 hexadecimal characters (0..9, a..f).

4.6.4.6 Configuring DNP RTU Parameters using Polling Group

The dialog below shows the configuration parameters that can be configured if you have selected the Poll Group and have clicked the **Configure DNP RTU Parameters** button.

Note

Refer to the Advanced Topic Configuring DNP Polling Schedules (Page 323) for details regarding how to use DNP polling groups with DNP RTUs.

Configure DNP RTU Parameters

Integrity Poll

General Request (GR) 1 2 3 Class

Integrity Poll on Startup
 Integrity Poll on Restart Bit set
 Integrity Poll on Overflow Bit set
 Integrity Poll on Class x Data Bit set
 Integrity Poll on Local Bit set/reset

Options

Automatic Class Assignment
 Automatic Read of Dataset structures
 Automatic Time Sync if NeedTime Bit set
 Use Secure Authentication

Authorization

Username
 Password

Time Stamp Mode

2 - Use RTU Time (UTC Format)

Poll Group

Poll Group
 Max. Poll Time (ms)
 Event Poll Object Limit (Serial)
 Event Poll Object Limit (TCP/IP)

Timing (Seconds)

Response Timeout
 GR Start Timeout
 GR End Timeout
 Future Deviation
 Past Deviation
 Time Sync Cycle (minutes)
 Link Test Cycle
 Link Test Timeout
 Time Delay Measurement

Configuration of Integrity poll, Options, Authorization, Time Stamp Mode, and Timing are identical to configuration with Poll Cycle. Refer to previous section for details regarding configuration DNP RTU parameters.

- Use **Poll Group** for defining in which poll group the RTU is part of
- **Max. Poll time** is the max time slot in msec the RTU gets assigned to be used for polling RTU data

4.7 Cloning Stations

Any AS that has been configured can be "cloned". This is useful in an installation where many identical ASs are distributed throughout.

Cloning ASs can be a real time-saver, as in addition to automatically creating the AS Node, cloning also does the following:

- Clones all object instances, including all external tag addresses (with the AS-identifying portion correctly adjusted)
- Copies all object attributes (e.g., operational attributes) configured for the source AS objects to the destination AS objects
- Stores "Plant View" hints that allow the Auto-Assign Feature to automatically assign objects to a plant view structure "alongside" the structure already existing created for the source AS

Thus, it is possible to create an AS, create the object instances of the AS, parameterize the addressing of the object instances, configure the behavior of the instances, and assign the instance to a Plant View organization. Once all of this has been done, Clone Station can be used to quickly create an exact copy of the source AS to a destination AS.

Note

In cases where the object names and hierarchical structure of similar or identical ASs will be the same, it is generally necessary to use configure the use of hierarchy settings in the OS Object Names to ensure unique object names. Refer to section Ensuring Unique Object Names (Page 294) for more details.

Note

This feature is a convenient way to save many engineering hours by automatically creating and configuring process objects, assigning objects to the Plant View and creating pictures for a new AS that might be the same or similar to another AS in your project. The process is a "one-time" process designed to save time. Before the cloning process is started, be sure that the AS selected as the AS to be cloned is "complete" in terms of engineering. There is no mechanism provided for "delta cloning": future changes to an AS that has been cloned will not be carried forth automatically in AS's that have been cloned.

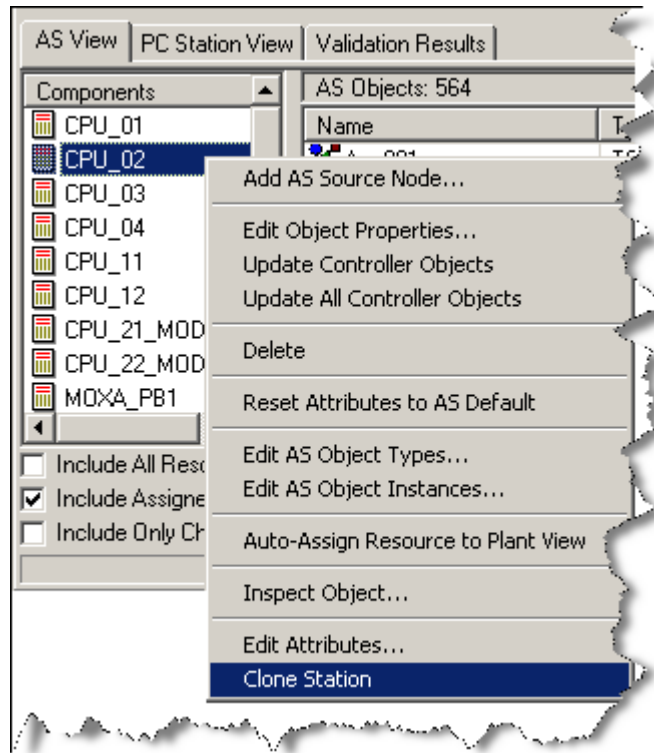
4.7.1 Cloning a SINAUT RTU

The cloning process is slightly different based on whether you are cloning an RTU that is connected to Central TIM or a Local TIM.

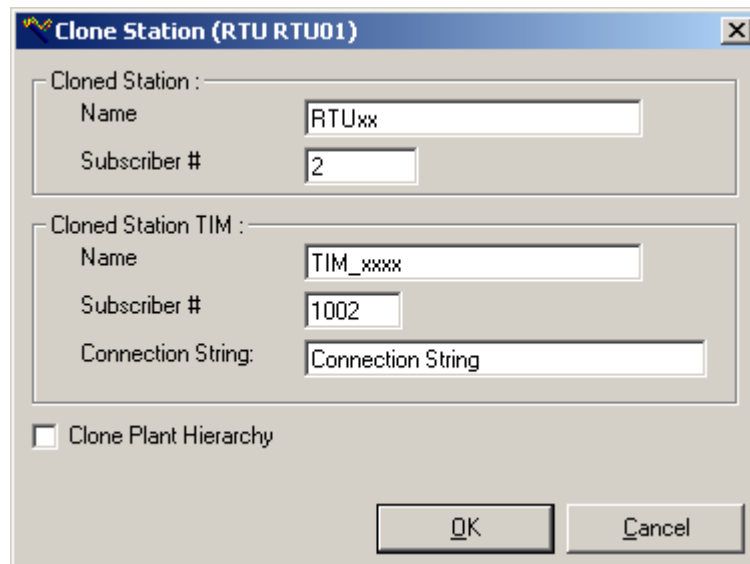
4.7.1.1 Cloning a Central TIM-Connected SINAUT RTU

To clone an RTU that is connected to a Central TIM:

1. Right-click on the RTU to be cloned in the AS View and select **Clone Station** from the right-click menu.



A simple dialog appears:

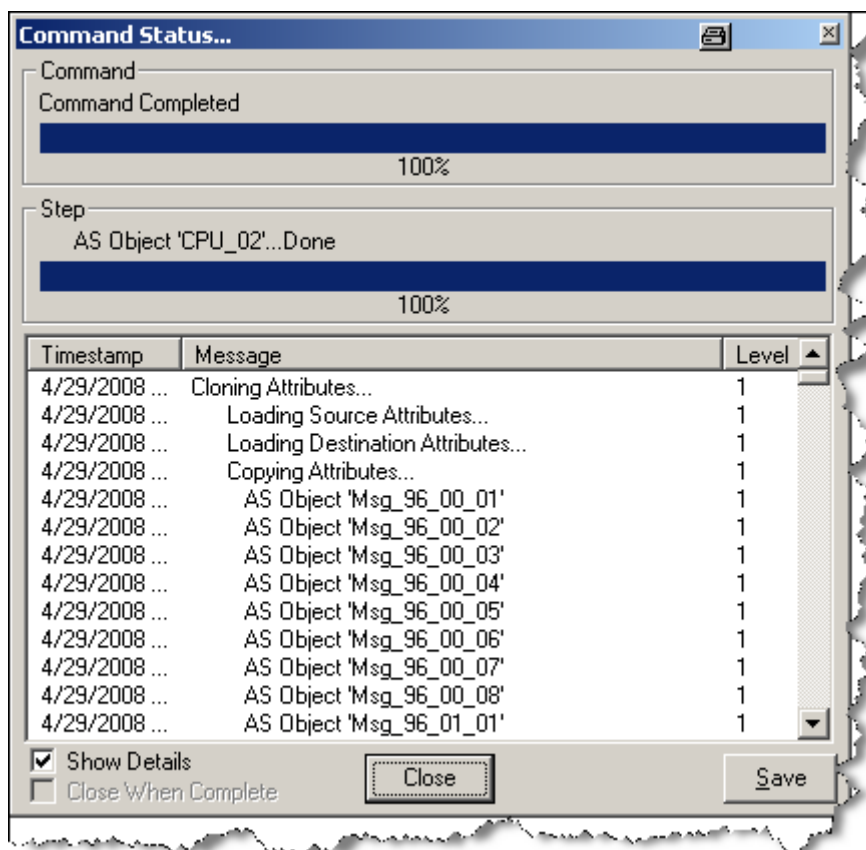


2. Identify the new RTU.

Name Enter an RTU name. (As a hint, if the RTU being cloned contained the same name is pre-filled with the numeric portion replaced by x).

Subscriber Number Enter a Subscriber Number for the cloned RTU. A unique subscriber number is pre-filled in, but this probably will need to be changed based on your network configuration.

- If the instances of the RTU being cloned have been organized under a common root folder in the Plant View, the checkbox Clone Plant Hierarchy can be checked. With this checked, the placement of instances in the Plant Hierarchy and even the Pictures associated with the station being cloned can be cloned, too. Refer to section Cloning Plant View (Page 111) , for more details.
- Click **OK**. A progress dialog is shown that details all of the cloning steps that are being done.



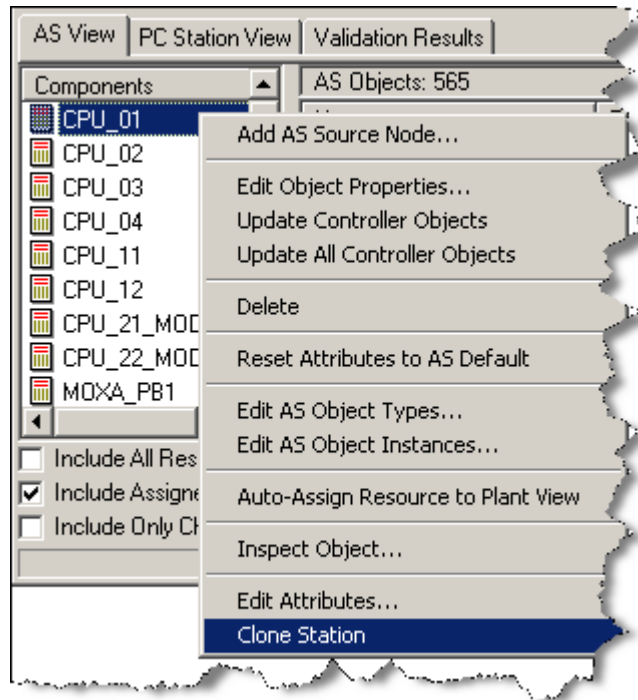
Note

All other parameters of the RTU (communication parameters, etc) are copied from the RTU being cloned. If necessary, after the cloning is done, right-click on the new RTU in the AS View and select **Edit Object Attributes** to change any of these parameters.

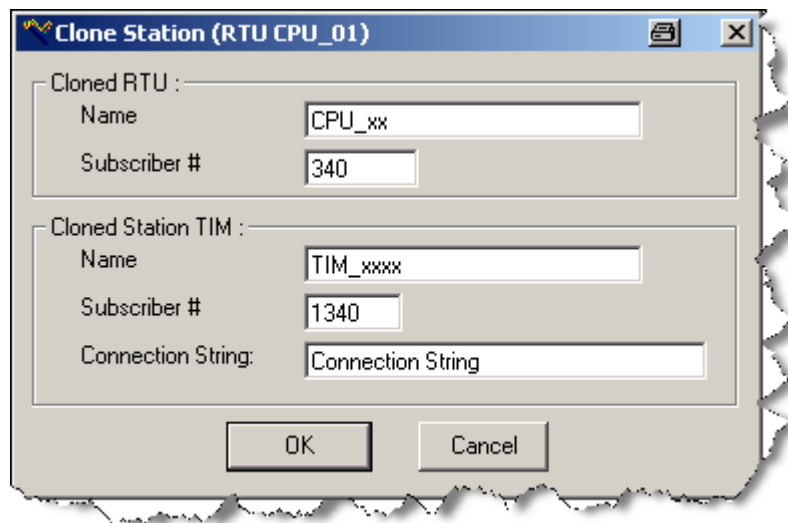
4.7.1.2 Cloning a Local TIM-Connected SINAUT RTU

To clone an RTU that is connected to a Local TIM:

1. Right click on the RTU to be cloned in the AS View and select **Clone Station** from the right-click menu.



A simple dialog appears:



2. Identify the new RTU.
Name Enter an RTU name. (As a hint, if the RTU being cloned contained the same name is pre-filled with the numeric portion replaced by x).

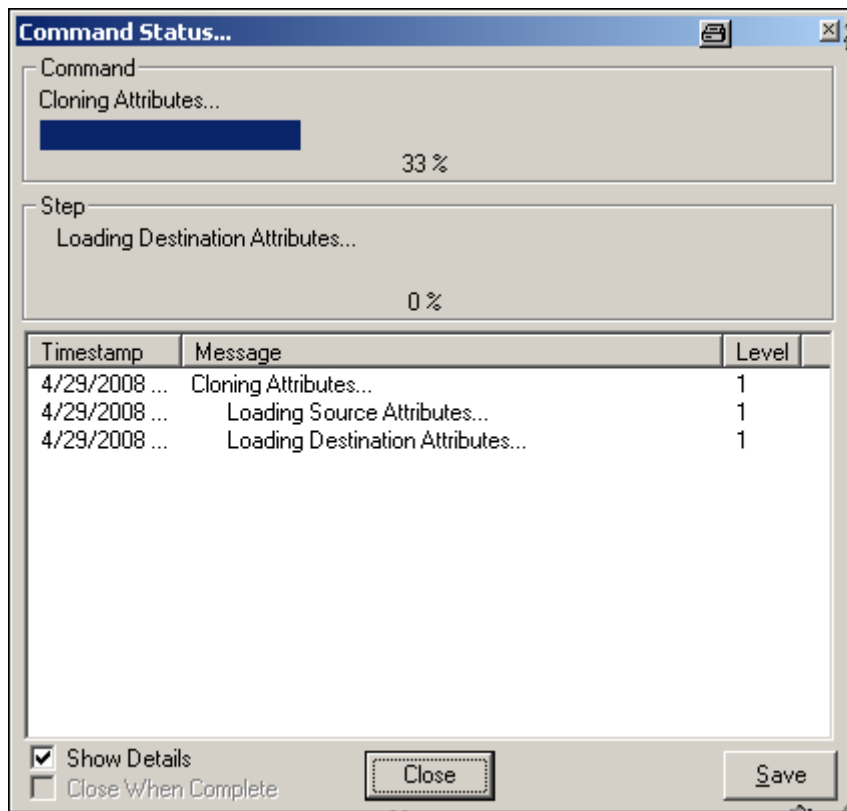
Subscriber Number Enter a Subscriber Number for the cloned RTU. A unique subscriber number is pre-filled in, but this probably will need to be changed based on your network configuration.

- Identify a Local TIM to be connected to the cloned RTU.

Name Enter a Local TIM name. (As a hint, if the TIM connected to the RTU being cloned contained the same name is pre-filled with the numeric portion replaced by x).

Subscriber Number Enter a subscriber number for the TIM. A unique subscriber number is pre-filled in, but this probably will need to be changed based on your network configuration.

- Click **OK**. A progress dialog is shown that details all of the cloning steps that are being done.



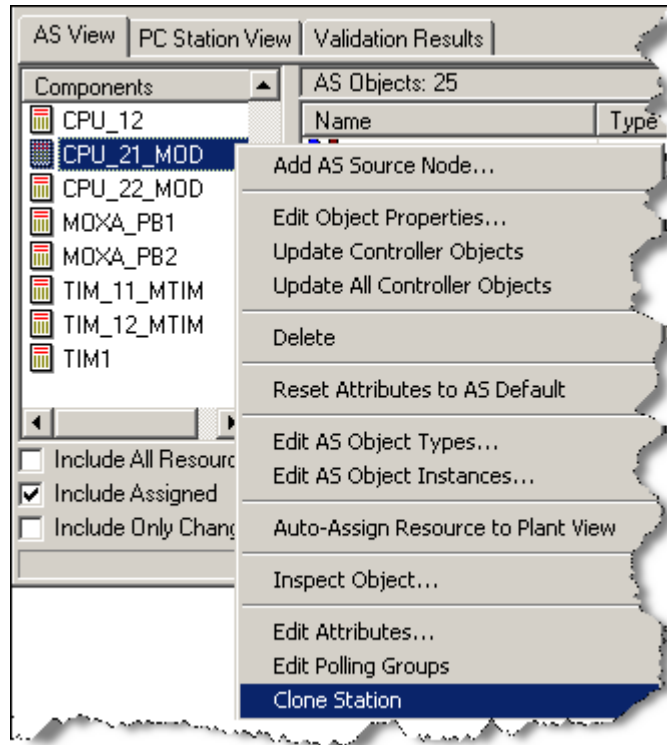
Note

All other parameters of the RTU (communication parameters, etc) are copied from the RTU being cloned. If necessary, after the cloning is done, right-click on the new RTU in the AS View and select **Edit Object Attributes** to change any of these parameters.

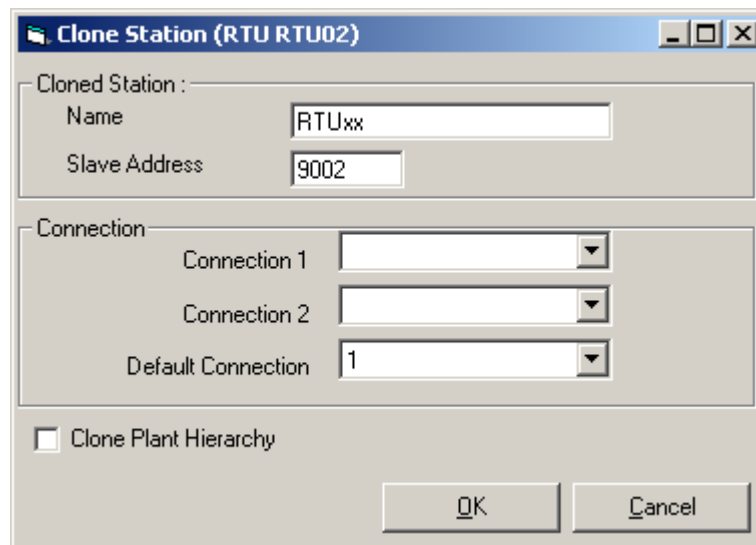
4.7.2 Cloning a Modbus RTU

To clone a MODBUS RTU:

1. Right-click on the RTU to be cloned in the AS View and select **Clone Station** from the right-click menu.



A simple dialog appears:



2. Identify the new RTU.
Name Enter an RTU name. (As a hint, if the RTU being cloned contained the same name is pre-filled with the numeric portion replaced by x).

Slave Address Enter a Slave Address for the cloned RTU. A unique slave address is pre-filled in, but this probably will need to be changed based on your network configuration.

- Specify Connection information for the new RTU.

Note

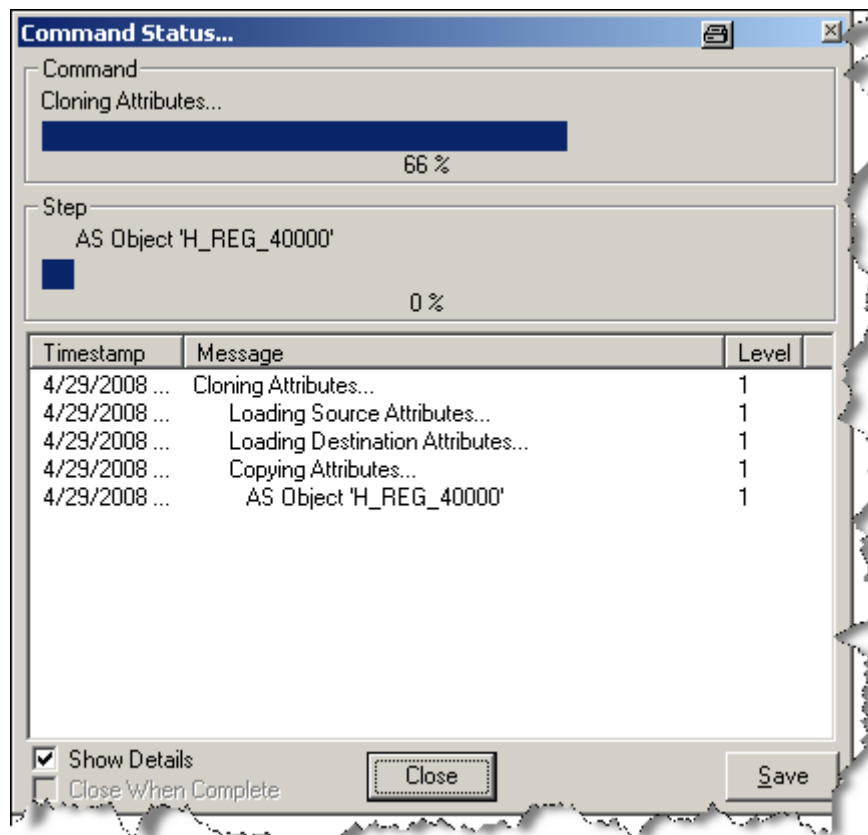
Data is pre-filled based on the connection information of the RTU being cloned. If you are using multi-drop connections, it may be possible to use the same connection information as for the RTU being cloned. If not, it will be necessary to create a new Modbus Connection node in the AS before proceeding with the clone operation.

Connection 1 Select a Modbus Connection for the primary connection. A dropdown list shows all of the Modbus Connections that have been configured in DBA.

Connection 2 Select a Modbus Connection for the secondary connection. A dropdown list shows all of the Modbus Connections that have been configured in DBA.

Default Connection Specify which of the two connections is to be used as the default connection. Select 1 or 2 from the dropdown list.

- If the instances of the RTU being cloned have been organized under a common root folder in the Plant View, the checkbox Clone Plant Hierarchy can be checked. With this checked, the placement of instances in the Plant Hierarchy and even the Pictures associated with the station being cloned can be cloned, too. Refer to section Cloning Plant View (Page 111) , for more details.
- Click **OK**. A progress dialog is shown that details all of the cloning steps that are being done.



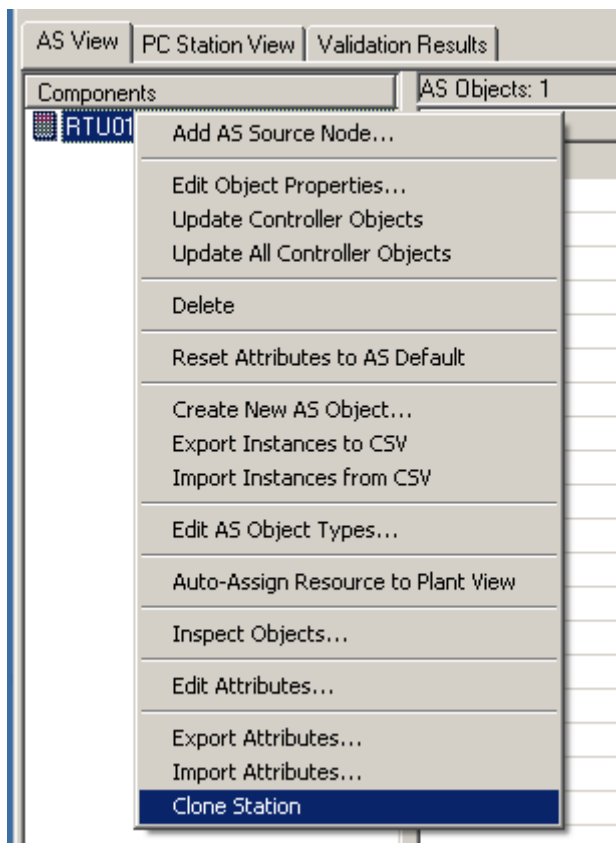
Note

All other parameters of the RTU (communication parameters, etc) are copied from the RTU being cloned. If necessary, after the cloning is done, right-click on the new RTU in the AS View and select **Edit Object Attributes** to change any of these parameters.

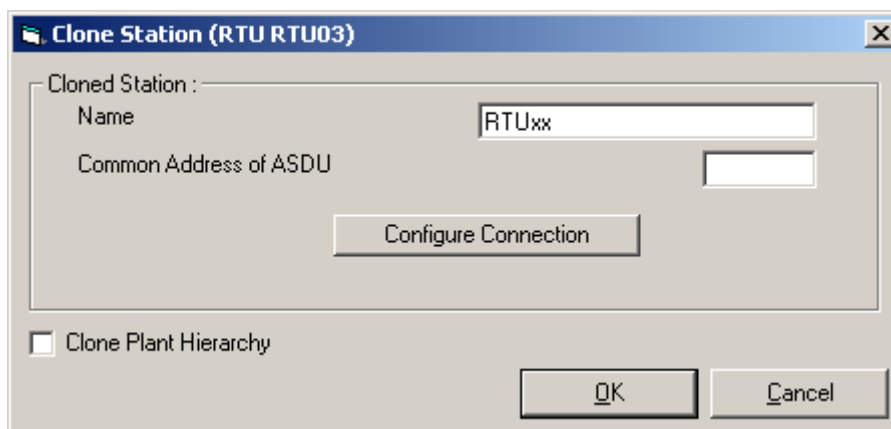
4.7.3 Cloning an IEC 60870 RTU

To clone an IEC RTU follow the steps below. Note that all IEC RTU's must be connected either through a direct connection or a Gateway connection. You should be sure that your connections and/or IEC Gateway's exist prior to cloning an RTU.

1. Right-click on the RTU to be cloned in the AS View and select **Clone Station** from the right-click menu.



A simple dialog appears:



2. Identify the new RTU.

- Name – Enter an RTU name. (As a hint, if the RTU being cloned contained numbers, the same name is pre-filled with the numeric portion replaced by x).
- Common Address of ASDU - specify an address for the RTU.

Note

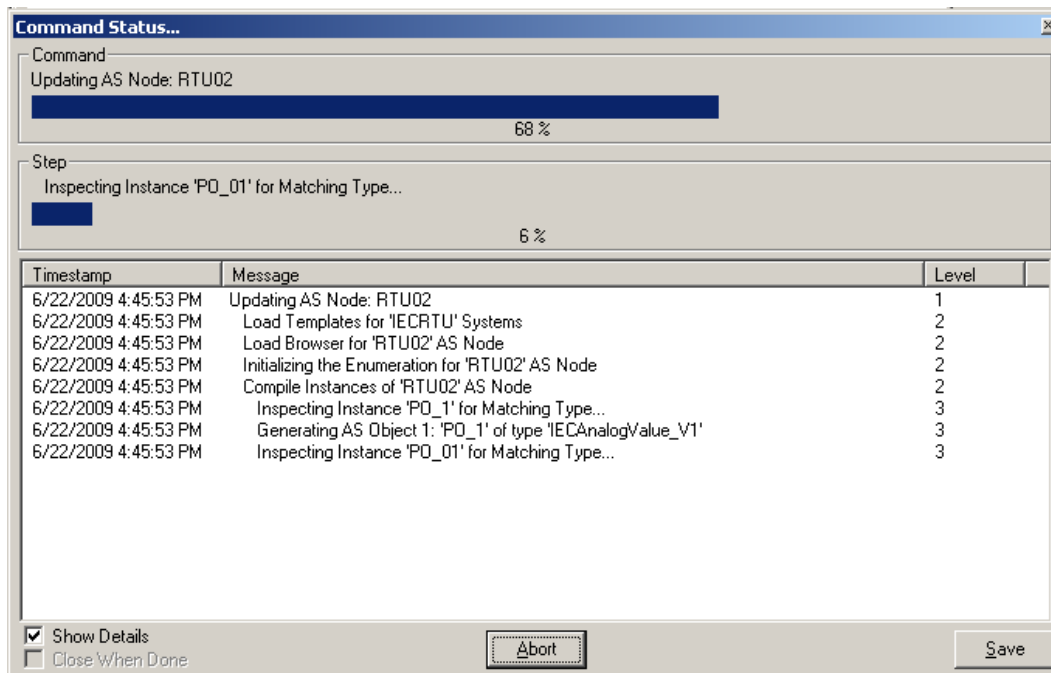
The ASDU address should be in dotted octet notation, either one or two octets, based on the configuration of ASDU Address Size of the IEC Connection through which this RTU will communicate to the PCS 7 servers.

3. If you have already created the IEC device through which this RTU is created, you can select the Configure Connection button and complete the RTU configuration. The connection dialog appears. If you are configuring a direct connection to the RTU, refer to section Adding a PCS 7/Telecontrol IEC Connection Node to a Project (Page 47) for the steps required to complete the connection configuration. If you are configuring a gateway connection to the RTU, refer to section Adding a PCS 7/Telecontrol IEC Gateway Node to a Project (Page 57) for the steps required to complete the connection configuration.

The screenshot shows a dialog box titled "Configure IEC RTU Connections". At the top, there is a "Connection Type" section with two radio buttons: "Direct" (which is selected) and "Gateway". Below this, there are three main sections: "Connection1", "Connection2", and "Master OS". Each of these sections contains a dropdown menu. To the right of the "Connection1" dropdown is a checked checkbox labeled "Default Connection". To the right of the "Connection2" dropdown is an unchecked checkbox labeled "Default Connection". At the bottom of the dialog are two buttons: "OK" and "Cancel".

To complete the connection configuration at a later time, complete the steps below, and, after you have completed the Clone operation select the cloned RTU from the AS View and select **Edit AS Properties** as described in Section Adding IEC 60870 Devices to a Project (Page 46).

4. If the instances of the RTU being cloned have been organized under a common root folder in the Plant View, the checkbox Clone Plant Hierarchy can be checked. With this checked, the placement of instances in the Plant Hierarchy and even the Pictures associated with the station being cloned can be cloned, too. Refer to section Cloning Plant View (Page 111) , for more details.
5. Click **OK**. A progress dialog is shown that details all of the cloning steps that are being done.



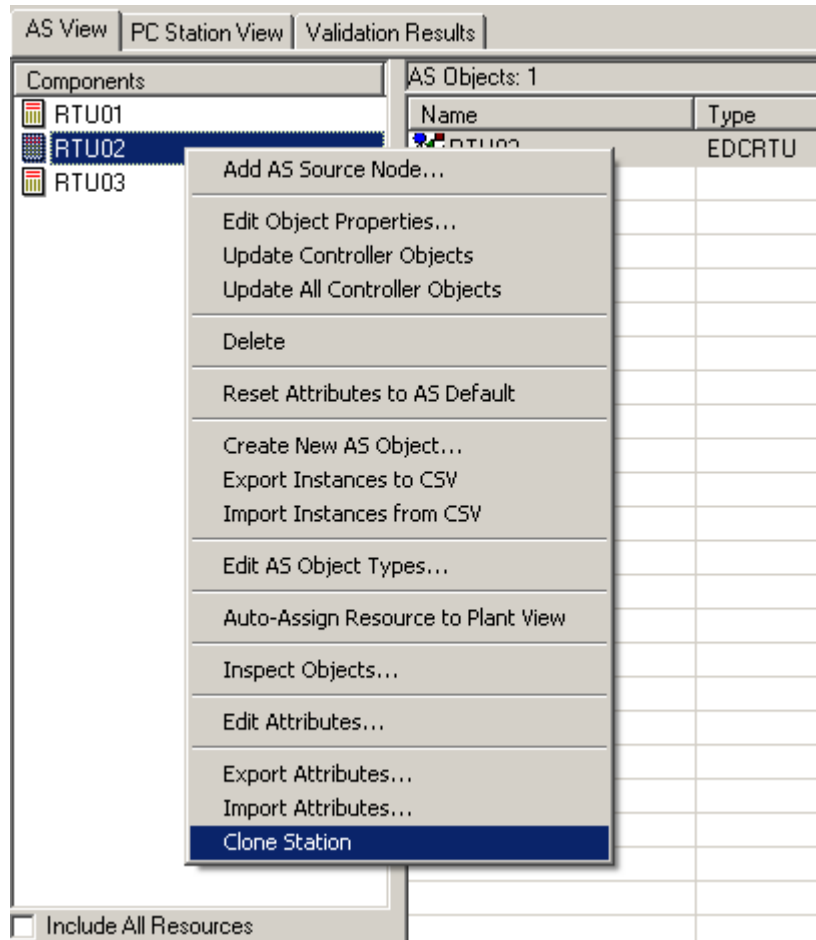
Note

The cloning feature is intended to provide a simple mechanism to create many RTU's that are almost identical within your project. Therefore, only those RTU properties that must be different for every RTU are configured at the time of cloning. All other RTU properties are taken from the RTU that the clone is being created from. If you later wish to vary some of these properties, select the cloned RTU from the AS View and select **Edit AS Properties** as described in Section Adding EDC Devices to a Project (Page 69).

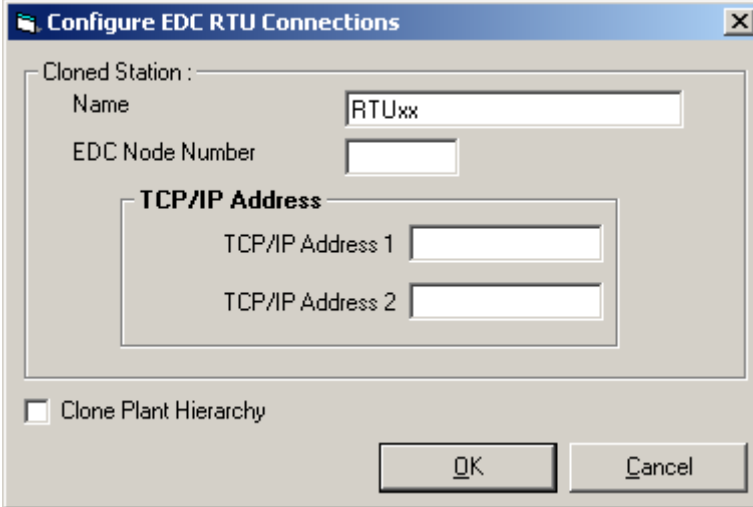
4.7.4 Cloning an EDC RTU

To clone an EDC RTU follow the steps below.

1. Right-click on the RTU to be cloned in the AS View and select **Clone Station** from the right-click menu.



A simple dialog appears:



The screenshot shows a dialog box titled "Configure EDC RTU Connections". It contains the following fields and controls:

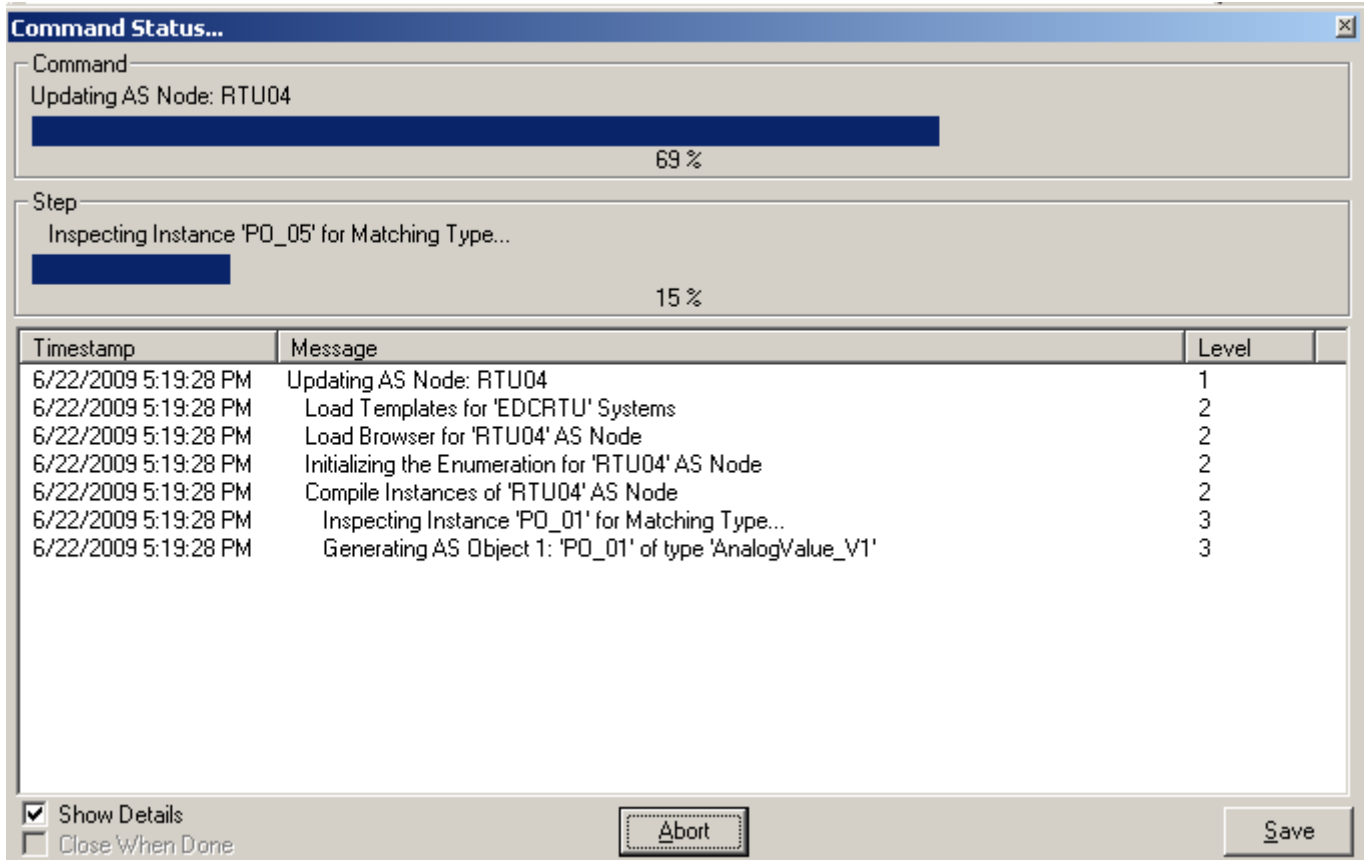
- Cloned Station :**
 - Name:** A text box containing "RTUxx".
 - EDC Node Number:** An empty text box.
- TCP/IP Address:** A sub-section containing two text boxes:
 - TCP/IP Address 1:** An empty text box.
 - TCP/IP Address 2:** An empty text box.
- Clone Plant Hierarchy**
- OK** and **Cancel** buttons.

2. Identify the new RTU.

- Name – Enter an RTU name. (As a hint, if the RTU being cloned contained numbers, the same name is pre-filled with the numeric portion replaced by x).
- TCP/IP Address 1 – Type in a valid TCP address.
- TCP/IP Address 2 – If you have redundant TCP connections to this RTU, type a valid TCP address

4.7 Cloning Stations

3. If the instances of the RTU being cloned have been organized under a common root folder in the Plant View, the checkbox **Clone Plant Hierarchy** can be checked. With this option checked, the placement of instances in the Plant Hierarchy and even the Pictures associated with the station being cloned can be cloned, too. Refer to section Cloning Plant View (Page 111) , for more details.
4. Click **OK**. A progress dialog is shown that details all of the cloning steps that are being done.

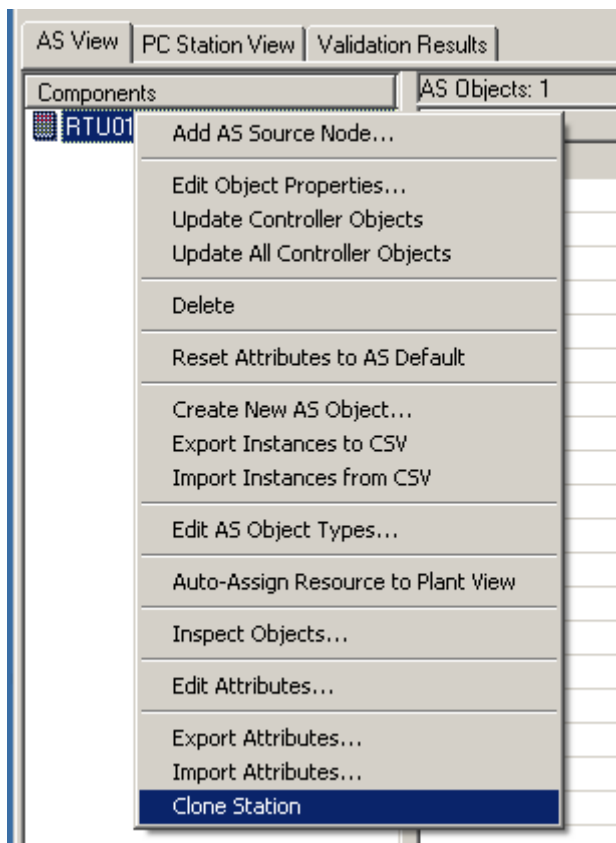
**Note**

The cloning feature is intended to provide a simple mechanism to create many RTU's that are almost identical within your project. Therefore, only those RTU properties that must be different for every RTU are configured at the time of cloning. All other RTU properties are taken from the RTU that the clone is being created from. If you later wish to vary some of these properties, select the cloned RTU from the AS View and select **Edit AS Properties** as described in Section Adding EDC Devices to a Project (Page 69).

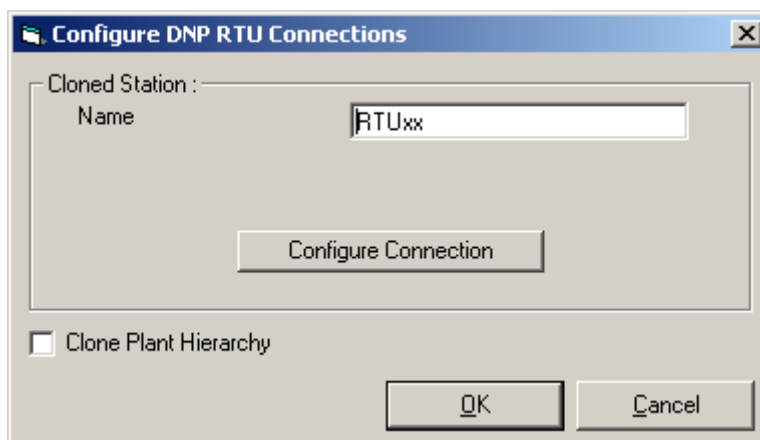
4.7.5 Cloning a DNP RTU

To clone a DNP RTU follow the steps below. Note that all DNP RTUs must be connected either through a direct connection or a Gateway connection. You should be sure that your connections and/or DNP Gateway's exist prior to cloning an RTU.

1. Right-click on the RTU to be cloned in the AS View and select **Clone Station** from the right-click menu.



A simple dialog appears:



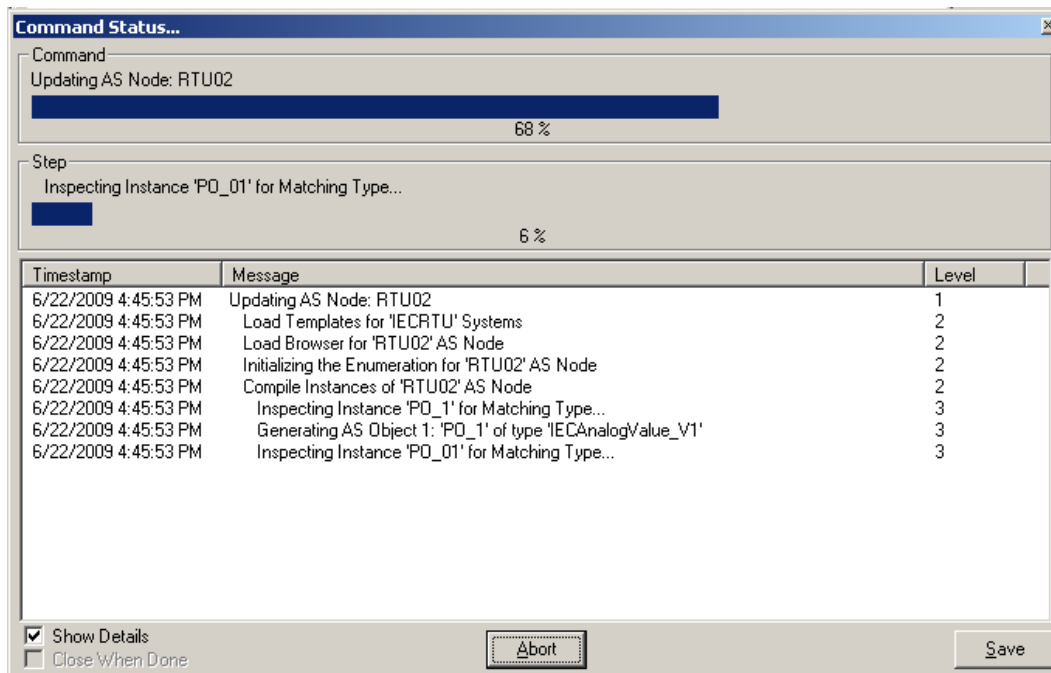
2. Identify the new RTU.

- **Name** – Enter an RTU name. (As a hint, if the RTU being cloned contained numbers, the same name is pre-filled with the numeric portion replaced by x).
3. If you have already created the DNP device through which this RTU is created, you can select the Configure Connection button and complete the RTU configuration. The connection dialog appears. If you are configuring a direct connection to the RTU, refer to section "Configuring a Direct Connection to a DNP RTU (Page 85)" for the steps required to complete the connection configuration. If you are configuring a gateway connection to the RTU, refer to "Configuring a Gateway Connection to a DNP RTU (Page 87)" for the steps required to complete the connection configuration.

The screenshot shows a dialog box titled "Configure DNP RTU Connections". At the top, there is a "Connection Type" section with two radio buttons: "Direct" (which is selected) and "Gateway". Below this are two sections for configuring connections: "Connection1" and "Connection2". Each section contains a "Link Address" text box, a dropdown menu, and a "Default Connection" checkbox. In the "Connection1" section, the "Default Connection" checkbox is checked. In the "Connection2" section, it is unchecked. At the bottom of the dialog, there is a "Master OS" dropdown menu currently showing "OS". Finally, there are "OK" and "Cancel" buttons at the bottom of the dialog.

To complete the connection configuration at a later time, complete the steps below, and, after you have completed the Clone operation select the cloned RTU from the AS View and select **Edit Object Properties** as described in "AUTOHOTSPOT".

4. If the instances of the RTU being cloned have been organized under a common root folder in the Plant View, the checkbox Clone Plant Hierarchy can be checked. With this checked, the placement of instances in the Plant Hierarchy and even the Pictures associated with the station being cloned can be cloned, too. Refer to section Cloning Plant View (Page 111) , for more details.
5. Click **OK**. A progress dialog is shown that details all of the cloning steps that are being done.



Note

The cloning feature is intended to provide a simple mechanism to create many RTU's that are almost identical within your project. Therefore, only those RTU properties that must be different for every RTU are configured at the time of cloning. All other RTU properties are taken from the RTU that the clone is being created from. If you later wish to vary some of these properties, select the cloned RTU from the AS View and select **Edit AS Properties** as described in Section Adding DNP Devices to a Project (Page 74).

4.7.6 Cloning Plant View

4.7.6.1 Overview

The cloning stations can be used to provide a clone of all of the AS settings and process objects for an AS. If the process objects of the AS being cloned have been assigned to the Plant View, and they are all found to be contained within a common root folder, it is also possible to automatically assign the cloned objects to the plant view and/or clone the pictures that contain the cloned objects.

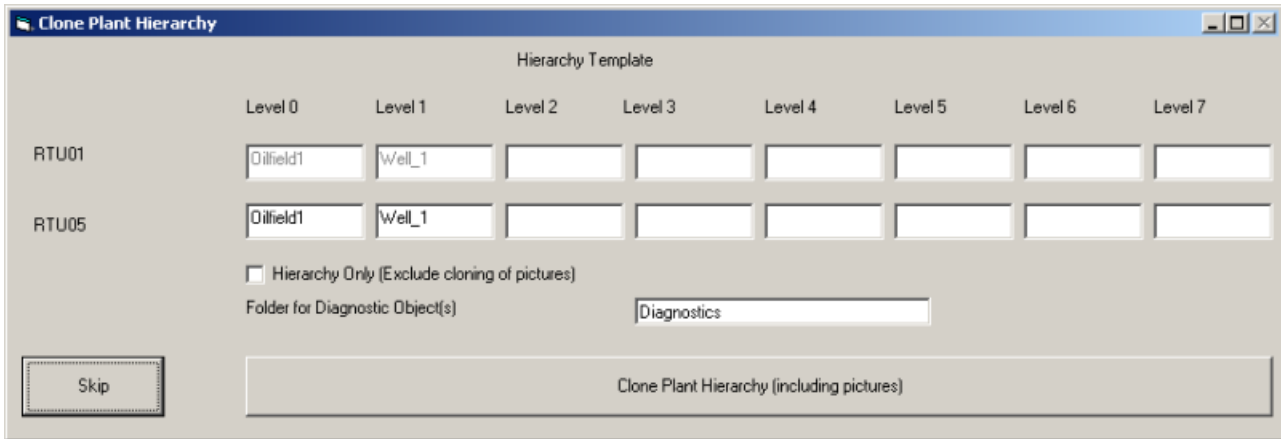
Clone Station dialog

The Clone Station dialog includes a checkbox to specify whether the Plant View should be cloned.

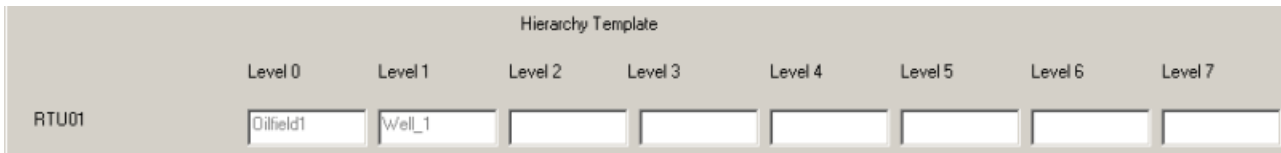


This checkbox is only enabled, however, in cases where the station being cloned has process objects assigned to the Plant View and they are all contained within a common root folder.

If this checkbox has been checked, after the cloning of the process objects is completed, a second dialog is defined how the Plant View should be cloned. For example, the names of the cloned folders and whether or not the pictures are to be clone in addition to the hierarchy can be specified.



In order to properly assign the objects from the new AS Station to the plant hierarchy, it is necessary to provide a starting path for the objects. The assignments of the process objects of AS Station that is being cloned will be examined to find the highest path in the hierarchy under which all of the process objects of the AS have been assigned. This path will serve as a "source AS hierarchy template" for identifying the starting point for the placement process objects in the new AS station. This path is shown in the Clone Plant Hierarchy dialog. For example, if all of the Process Objects for Well_1 are beneath the path "Oilfield1\Well_1", "Oilfield1\Well_1" is the source AS hierarchy template shown in the dialog.



Destination AS Hierarchy Template

It is then necessary to use the Clone Plant Hierarchy dialog to provide a similar template, a Destination AS Hierarchy Template, to show exactly where the objects from the new AS station should be placed. For convenience, the original template from the Source AS is shown as a starting point for the Destination AS, and if the name of the AS is included in any of the levels of the Source AS Hierarchy Template, it will automatically be substituted with the name of the new AS.

These templates will be used to formulate the locations of all of the cloned process objects. These templates form the basis for name substitution rules in determining where to place objects in the Plant Hierarchy, the names to use for object on pictures, and for creating unique display names.

Diagnostic objects

There is special handling for diagnostic objects. Diagnostic objects for a station are not "cloned" objects, since they are an intrinsic part of the AS station, creating automatically when the station is created. In addition, it is common that such objects will be organized into a special folder along with all other station diagnostics, instead of within a common root folder as the process objects might be organized.

4.7.6.2 Plant Hierarchy assignment and Picture Creation

Following results

Based on the options selected, the following results can be expected once the cloning process has been completed.

Plant Hierarchy assignment (in all cases)

Each process object in the new AS will be placed in the Plant Hierarchy in a parallel location in the plant hierarchy to the location where the object from which it was cloned has been placed. For example, with the templates specified in the example above, any objects that are found in the AS being cloned that have been placed under "Oilfield1\Well_1\Drilling" will, in the new AS, be placed under "Oilfield1\Well_99\Drilling".

Picture Creation (unless picture creation has been excluded)

Any picture that is existing in a position below the hierarchy template of the Source RTU will be copied in the same relative position in the destination hierarchy. For example, consider the following picture:

- Oilfield1\Well1\Drilling\Well_1Drilling.PDL

Based on the Hierarchy Template specified, this picture will be copied also to:

- Oilfield1\Well_99\Drilling\Well_99Drilling.PDL

Note

Since all picture names must be unique in the system, the same name substitution rules implied by the Source and Destination Hierarchy templates will be used to attempt to make display names unique.

4.7 Cloning Stations

After copying a picture, the picture will be modified again based on the name substitution rules implied by the Source and Destination Hierarchy templates:

- All block icons will be changed to match the object name of the destination AS object instead of the name of the source AS object. For example, if a block icon is assigned to "Oildfield1\Well_1\Drilling\TIC101", in the copied picture the block icon will be assigned to "Oilfield1\Well_99\Drilling\TIC101".
- All I/O fields that are bound to individual tags will also be changed. For example, if an IOField is assigned to "Oilfield` \Well_1\Drilling\TIC101.PV" will be changed to "Oilfield` 1\Well_99\Drilling\TIC101.PV".

Note

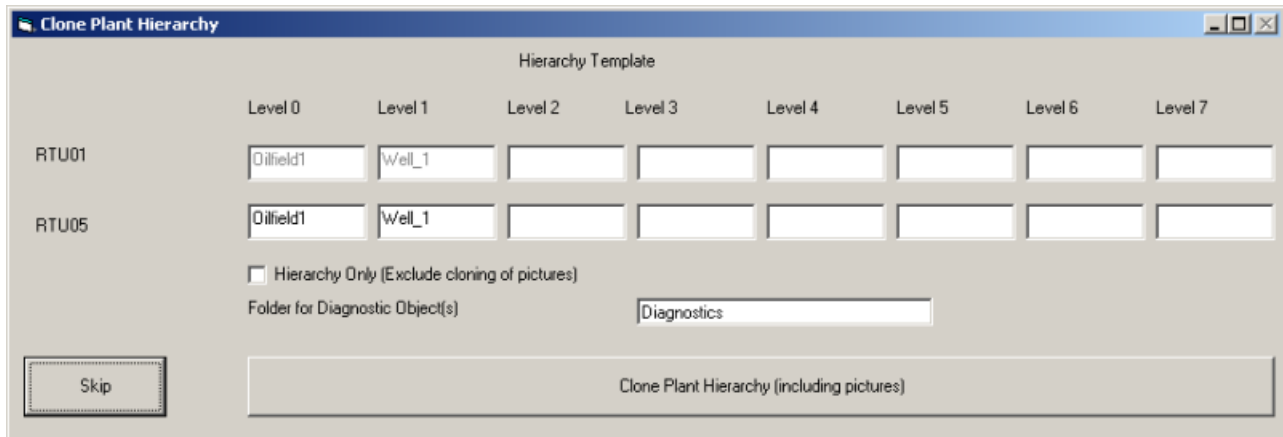
Within each copied picture, the following will not be changed:

- Static Text
- Hard-coded tag name references in Dynamic Dialogs
- Hard-coded Tag name references in C-Script or VBScript

4.7.6.3 Steps to clone the Plant Hierarchy

Overview

If the Clone Plant View checkbox has been checked when Cloning a station, the following dialog will appear after the cloned AS station has been created and all process objects have been cloned.



Follow these steps to clone the Plant Hierarchy

1. Specify the folder names for the Destination AS (the new AS being created). All folder names from the Source AS (the AS being cloned) from the common root folder to the lowest path containing process objects will be shown in both the Source and Destination templates. Any folder name in the destination can be changed. (For convenience, if the name of the AS is included in any of the levels of the Source AS Hierarchy Template, it will automatically be substituted with the name of the new AS)
2. If the hierarchy only is to be cloned, without cloning pictures, select the **Hierarchy Only** checkbox.
3. If the source AS (the AS being cloned) includes diagnostic objects that have been assigned to a folder outside of the common root folder under which all process objects have been found, an additional entry field appears allowing the specification of where diagnostic objects for the destination AS are to be placed. By default, this field will show the folder where the source AS diagnostic objects were found. Leave the default or change to another folder name.

The image shows a software interface with a label 'Folder for Diagnostic Object(s)' and a text input field containing the word 'Diagnostics'.

4. Select the **Clone Plant Hierarchy** button to start the cloning process. To proceed without cloning the hierarchy select the Skip button. A log window appears showing the progress of the cloning. The process can take some time based on the number of pictures being cloned. An abort button in the progress dialog can be used to stop further cloning before completion.

4.8 Loading (Updating) Controller Objects

Loading and Updating refer to translating controller tags and other data structures from AS nodes into the DBA environment. The first translation is loading; subsequent iterations are updating. If the controller's objects change in any way (this includes the addition or deletion of controller objects), use the procedure below to update the DBA Project.

After controller objects have been loaded or updated, they appear individually in a list in the Controller Objects quadrant of the DBA Utility program's main window. If the project contains more than one controller, the list displayed corresponds to the selected controller. The process is iterative, and the procedure for initial loading and subsequent updating is the same.

As you add instances to your project, they are automatically loaded. As you modify instances in your project, they are automatically updated.

However, if you make a change to a type using the DBA Type Editor, all instances of that type may be changed. Therefore, after you have changed a type, all AS nodes that contain that type show as "Changed" and you are required to initiate the step of "Update Controller Objects" on each affected AS to modify the instances of the type in your project.

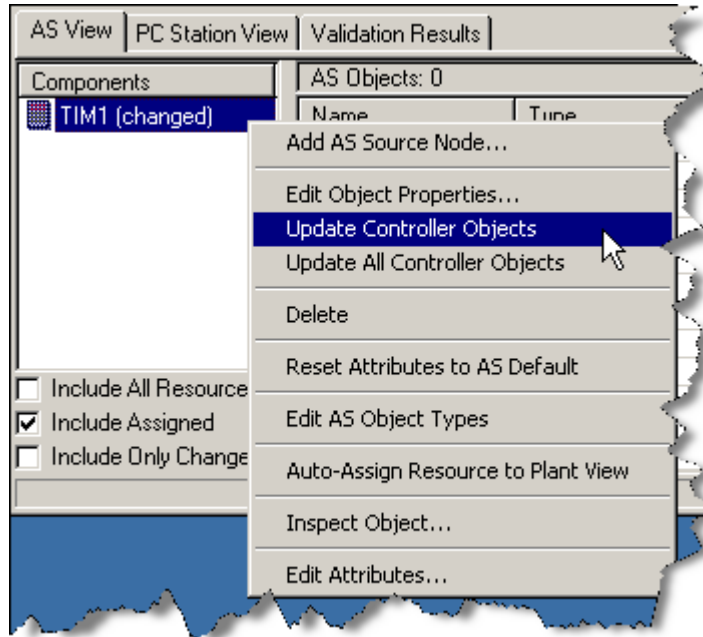
4.8.1 How do you load or update controller objects?

The Update Controller Objects procedure requires that

- The project has been created.
- At least one AS node has been added.

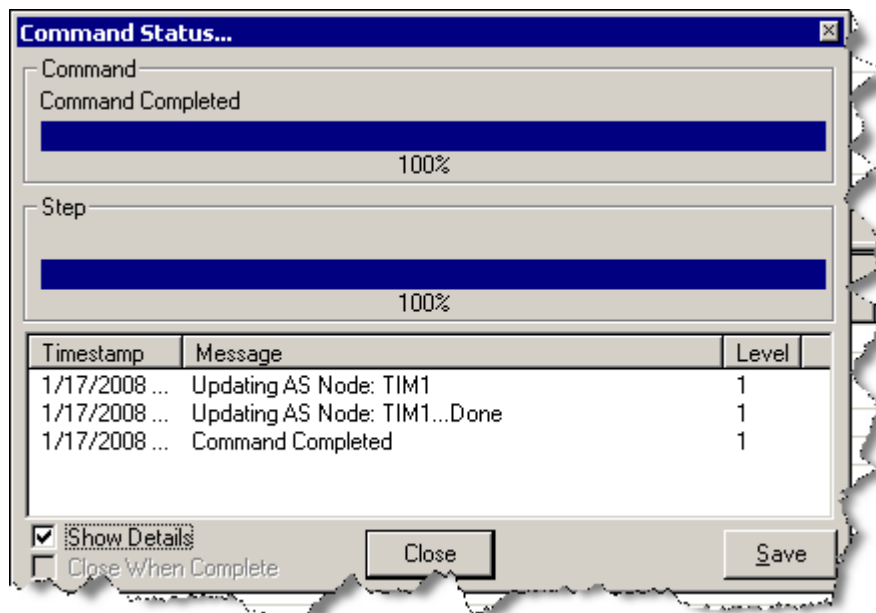
To update controller objects, follow these steps:

1. Select and right-click an AS Node.
A context menu of commands appears.



2. Select **Update Controller Objects** from this menu to perform the operation on the selected AS node.
or
Select **Update All Controller Objects** from this menu to perform the operation on all AS nodes, even those not marked as being changed.
or
To change only those AS nodes that have been marked as changed, you can do this operation from the DBA main menu command Run>Update Controller Objects, or by using the toolbar button.

The DBA utility responds by displaying a Command Status window, which includes two progress bars, one labeled **Command**, the other labeled **Step**. When the procedure finishes, the Command portion indicates this with the notation **Done**. The illustration below is typical, but can vary according to type of AS node:



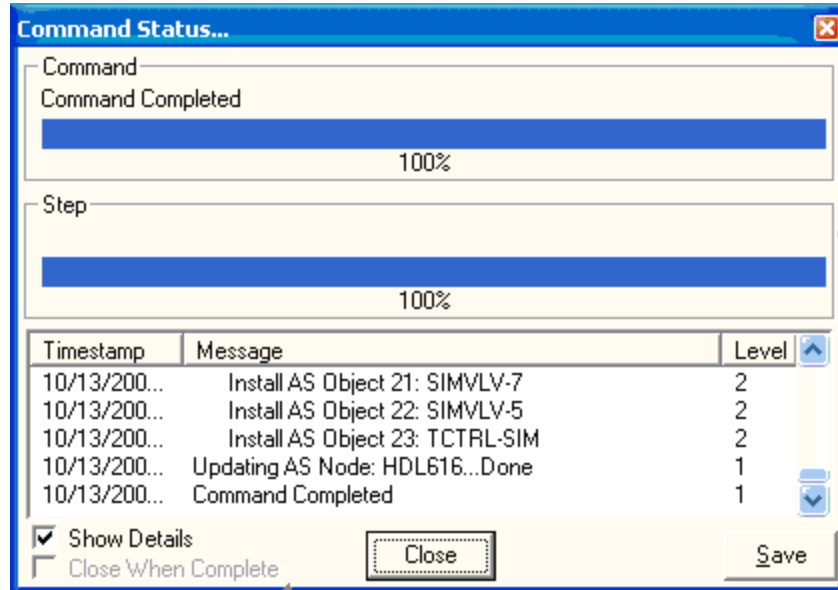
4.9 Saving Loading (Updating) Details to a Log File

After you have selected **Update Controller Objects**, a log is available showing the results of the update. This log can be saved to a file for future reference.

To save the update log, follow these steps:

1. Select the **Show Details** button during the load or update while the **Command Status** window is still open.

The **Command Status** window extends:



2. Select the **Save** button.

A **Save As** window opens for entering a filename (the default filename extension **.log** is provided).

Note

If **Close When Complete** is enabled, the **Command Status** window automatically closes, unless the **Show Details** box is checked or there are errors or warnings.

Automatically Saved Logs

Even if you don't save log files, they are automatically saved to the WinCC\diagnose directory (in the path where WinCC has been installed).

Each time a DBA project is opened, a new log is created in this directory. The name of the log is DBACompileLog_ with the project name appended, followed by an underscore and a number between 1 and 10. The most recent log is saved with the name "_1" and the next 9 most recent logs are saved as "_2" through "_10".

4.10 AS View Fields

The fields in the AS View are described below:

Name: The name of the object in the OS. This is the name configured in the DBA Instance Editor.

Type: The type of the object. This is the type that was selected when the object was configured in the DBA Instance Editor.

AS Address: The address of the object in the AS. This is the OPC path to an object in the controller.

Assignment: Plant view folder to which the object is currently assigned. If blank, it is not assigned.

AS Objects: 11			
Name	Type	AS Address	Assignment
CTIM	TIM	CTIM	\Folder
MYC	TC_Counter_V1	RTU01.MYC	\Folder
RTU01	SINAUTRTU	RTU01	\Folder
RTU02	SINAUTRTU	RTU02	\Folder
RTU03	SINAUTRTU	RTU03	\Folder
RTU04	MODBUSRTU	RTU04	\Folder
TIC101	SINAUT_	RTU01.TIC101	\Folder
TIC102	SINAUT_	RTU01.TIC102	\Folder
TIM_1001	TIM	TIM_1001	\Folder
TIM_1002	TIM	TIM_1002	\Folder
TIM_1003	TIM	TIM_1003	\Folder

Note

Finding an object selected in the AS View

Whenever an object is selected in the AS View, you can easily find its location in the Plant View by pressing Ctrl + G.

Managing Object Instances

5.1 Adding Objects to a Project

5.1.1 Overview

To add instances of Telecontrol types to your projects, follow the workflow described in the sections that follow.

5.1.2 Purpose of Instances

Overview

Instances of Telecontrol object types created with DBA can be assigned to a folder (Area) in the Plant View of the DBA. When the DBA project is compiled to the Operation Station (OS), all data tags, alarms, and tag logging attributes for the instance are created in the OS. All tags are also correctly connected to an HMI symbol and faceplate in the OS for operator monitoring and control.

DBA provides the following operations for creating instances and their associated attributes:

- Bulk import of instances from .CSV files (for many instances)
- Manual creation of an instance (for few instances)
- Cloning of an instance (for few instances)
- Cloning of an RTU and all its instances (for many instances)
- Editing the addresses and linkages for tags of an instance
- Exchanging instances between DBA projects by export/import of .XML files.

5.1.3 Required Data for Tags of Instances

After an instance of a type is created, the complete address must be specified for some tags of the instance. The tags that are part of an instance depend on the type of the instance.

There are three kinds of tags that may be part of an instance:

Internal Tags

Internal tags are tags that are part of the HMI, and are not read from an RTU nor written to an RTU. They are often used, for example, to hold data that is calculated by scripts that are configured for a type. For example, a type that consists of a calculated measured value might include internal tags that contain the current average of the measured value over an interval, the

current high value over the interval, etc. Internal tags do not require addressing information to be configured.

External Tags

External tags are tags that are either read from an RTU or written to an RTU. They represent an addressable atom of data in an RTU. Therefore, after an instance is created, all external tags must be given the appropriate address information. The format of the addressing information that needs to be specified varies depending on the RTU type. For example, for a SINAUT RTU, each tag in an instance must have a unique "telegram number" and "telegram offset" field so that it can be addressed. This is the minimal information that must be entered using either the OS Details View of DBA or the Attribute Editor, although there are other kinds of optional addressing information that may be necessary for specific instances.

Indirect Tags

Indirect tags are tags that are linked to other tags in the system. For example, an interlock for a setpoint is specified in terms of another tag in the system. If a type includes tags that are indirect tags, the name of the other tag in the system must be specified.

5.1.4 Workflow Considerations

Manual creation and configuration of instances can be very labor-intensive: you must manually enter the addressing information of each of its indirect and external member tags, and configure each of its attributes and alarms (if the default values are not appropriate). Therefore, you should only create small numbers of instances manually.

For larger numbers of instances consider the following approaches:

- **Bulk Import of Instances:** Instances can be completely specified in CSV files and easily edited with text editors and spreadsheets. Since an instance and all its attributes are specified in the CSV file, instance creation and configuration is complete upon successful importation.
- **Instance "Cloning":** You can choose "Clone Object" or "Clone AS Object" from one of the DBA menus and create a replica of an instance.
- **RTU "Cloning":** If you are adding an RTU whose instances are the same or very similar to the instances of another RTU, then it is possible to right-click on an already-configured RTU with a complete set of instances and "clone" the RTU. All the existing instances for that RTU, including their addressing information, are "cloned" into the new RTU. See the topics under the heading "Cloning Stations (Page 94)" for further details.

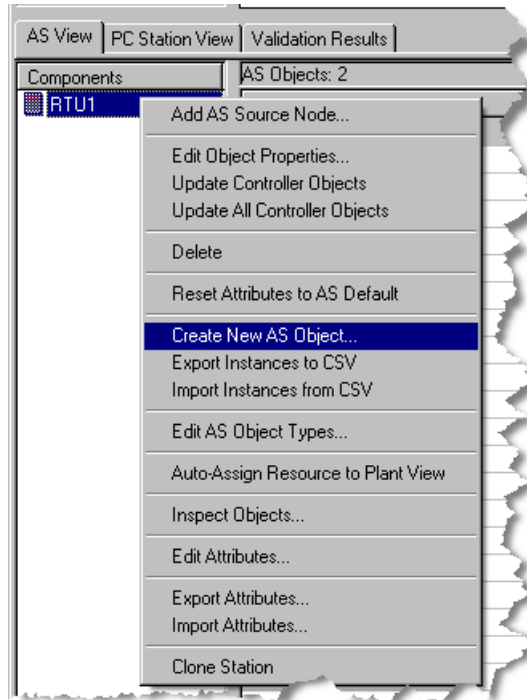
5.2 Manual Creation and Configuration of Instances

Instances can be created from the AS View or from the Plant View

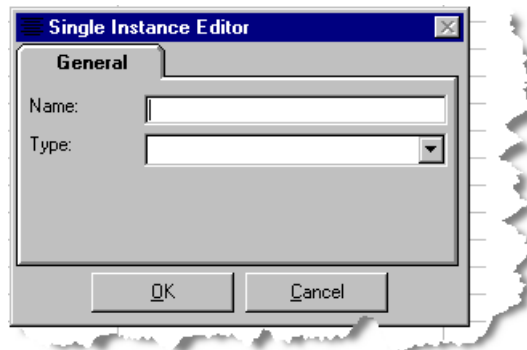
5.2.1 Initial Instance Creation

Creating an instance initially from the AS view

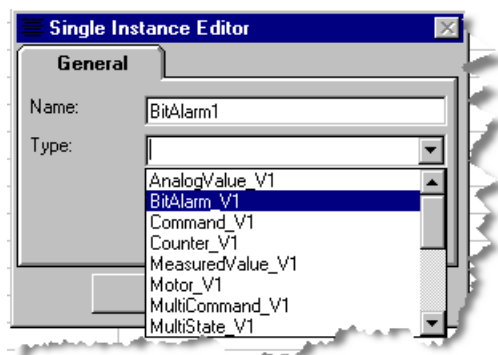
1. In the AS View, right-click an AS Node that is an RTU and select "Create New AS Object...."



The **Single Instance Editor** opens.



2. Specify the instance name by typing it into the name field. Specify the instance's type by pulling down the type list and selecting the desired type.

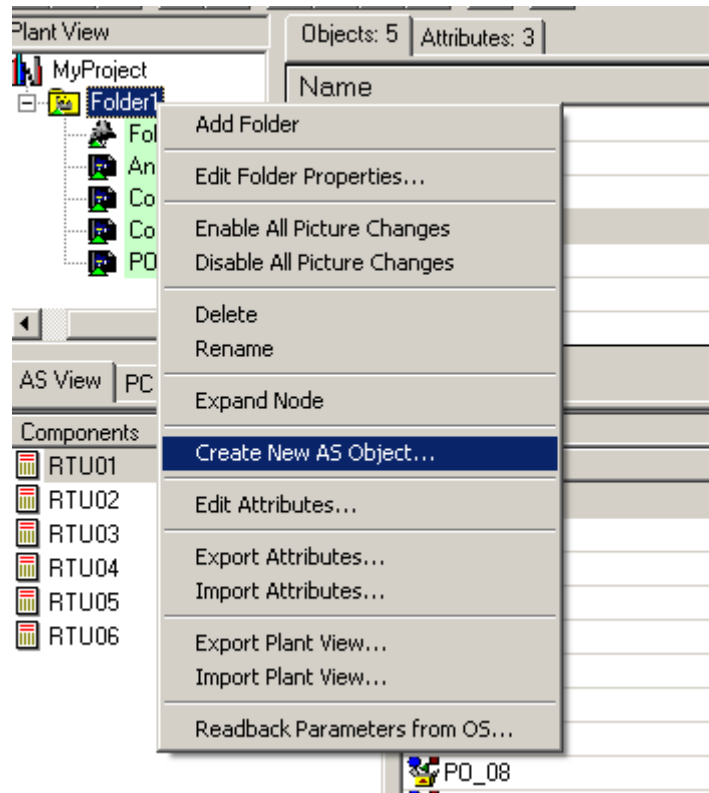


3. Press the "OK" button to save your choice or the "Cancel" button to abort the creation of this instance.

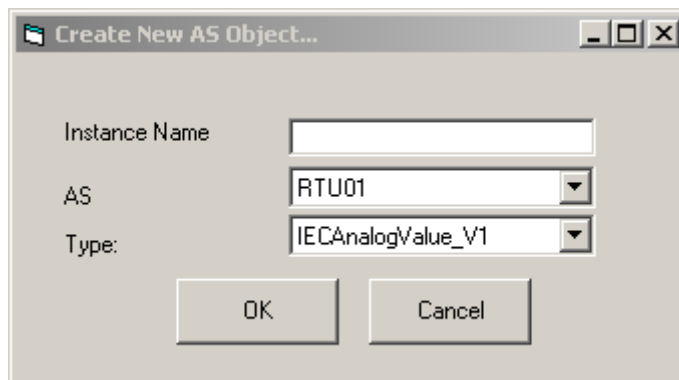
Creating an instance initially from the Plant View

When you create an instance in the Plant View, the instance is created and assigned to a Plant View folder in a single step.

1. In the Plant View, right-click on the folder that is to contain the instance and select "Create New AS Object...."

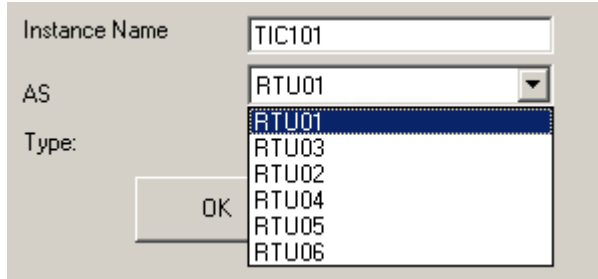


A dialog opens allowing you to identify the instance and its AS

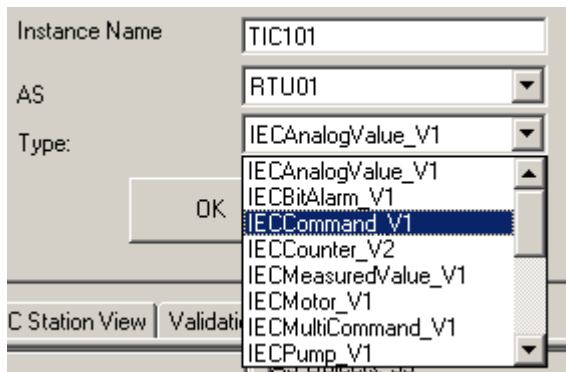


2. Specify the instance name by typing it into the name field.

3. Select an AS that is to be the owner of the instance by using the dropdown list provided.



4. Select an object type for the instance by using the dropdown list provided. The types shown in the dropdown list will match the types that are available based on the AS Type of the selected AS.



5. Press the "OK" button to save your choice or the "Cancel" button to abort the creation of this instance. The instance is created in the AS specified, and automatically assigned to the selected folder.

5.2.2 Configuring a Newly Created Instance

Default and required configurations

After an instance has been created it must be configured. The Single Instance Editor creates instances whose user-specified address components are blank and whose user-modifiable address components, attributes and alarms are set to default values.

You must at a minimum configure the addresses of external tags before you can compile your project to WinCC. (When compiling, a validation error is reported if you have improperly configured the addresses of external tags.)

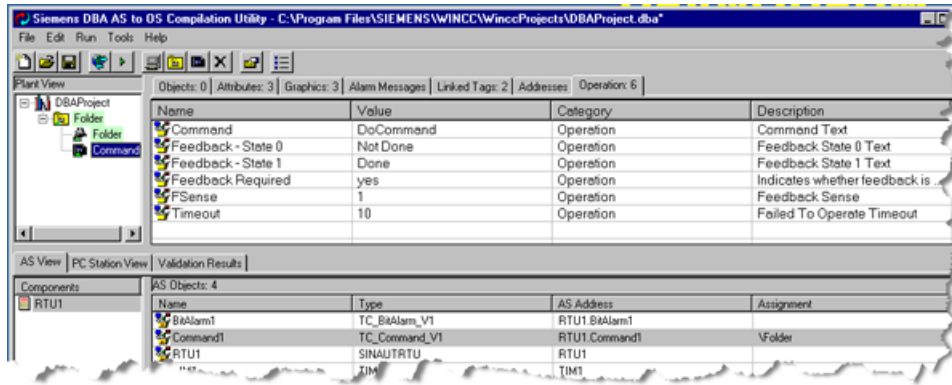
An instance can be configured in two ways:

- From the Details Pane of the OS View
- From the Details Pane of the AS View

Generally using the Details Pane of the OS View is more convenient because the attributes of the instance are presented in a tabbed view that simplifies editing.

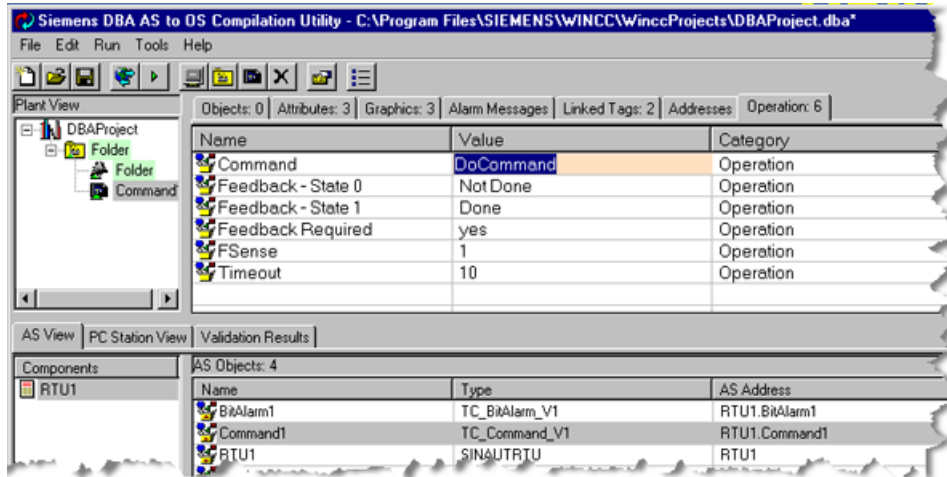
5.2.2.1 Configuring an Instance from the Details Pane of the OS View

When you click an object in the plant view hierarchy, the details pane displays the list of attributes for that object. The attributes are organized in categories that are each displayed as separate tabs.

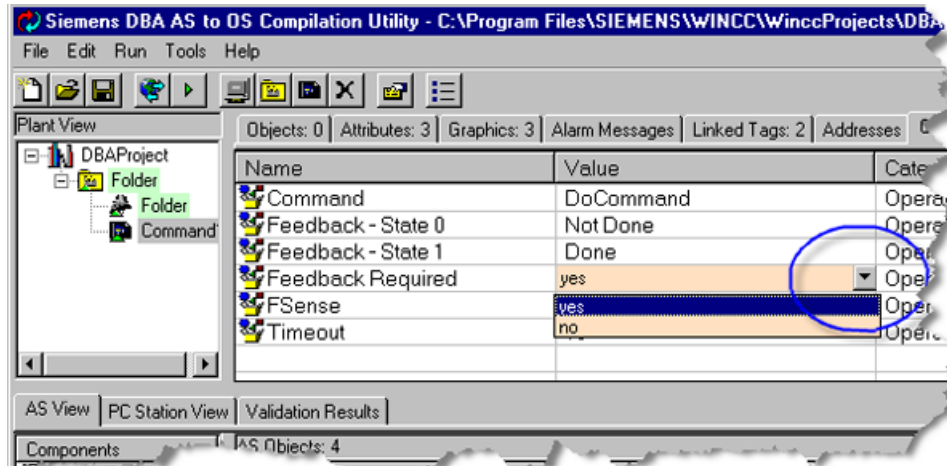


Modifying attributes

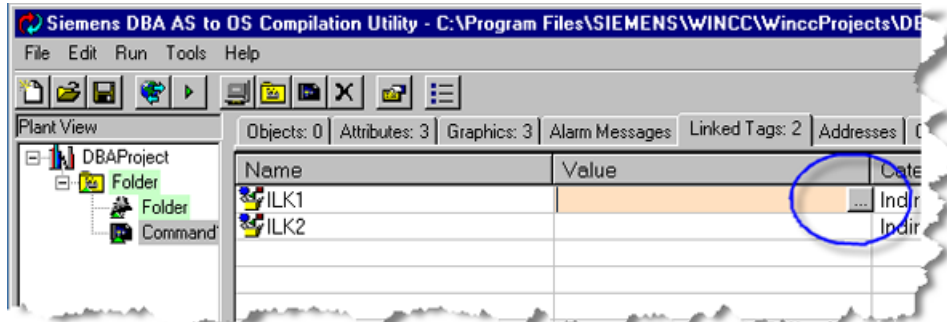
1. Click a row to modify one of the attributes and change its value:

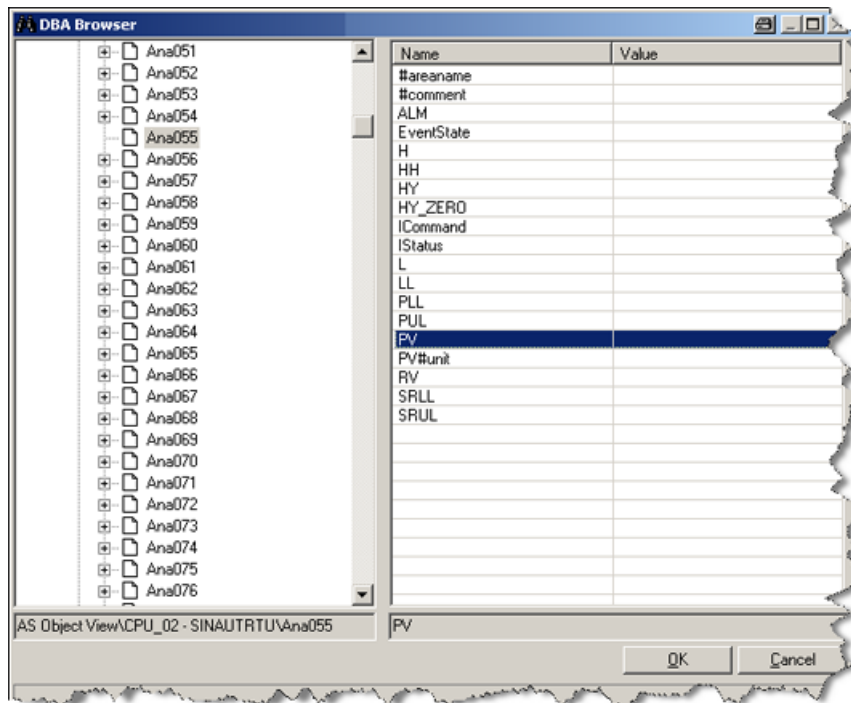


2. If after clicking the row, a downward arrowhead is displayed next to the value field, select it to display a list of possible values from which to select.



3. If after clicking the row, an ellipsis button is displayed next to the value field, select it to invoke the tag browser from which you can select a tag. This primarily used to specify a tag as the address of an indirect tag.



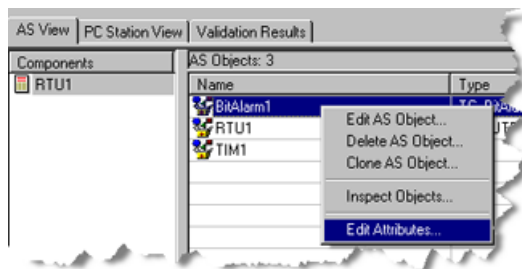


See the topics in the section titled "Object Attributes (Page 239)" for information on how to configure alarms and attributes that are not external or indirect addresses. For configuring addresses see the topics in the section titled "Configuring Address" (Page 133).

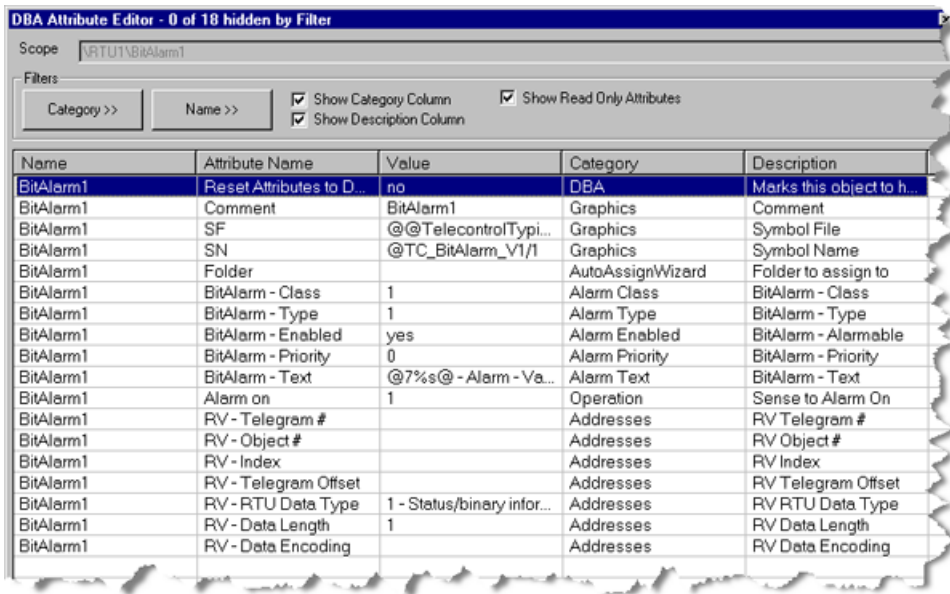
5.2.2.2 Configuring an Instance from the Details pane of the AS View

Procedure

1. Right-click a row.
2. select "Edit AS Object":



The **DBA Attribute Editor** window opens with all the editable attributes of the selected object: address, alarms, configuration attributes, one per row:



For configuring addresses see the topics in the section titled Configuring Addresses (Page 133).

5.2.2.3 Attribute Editor Elements

Attribute Editor Columns

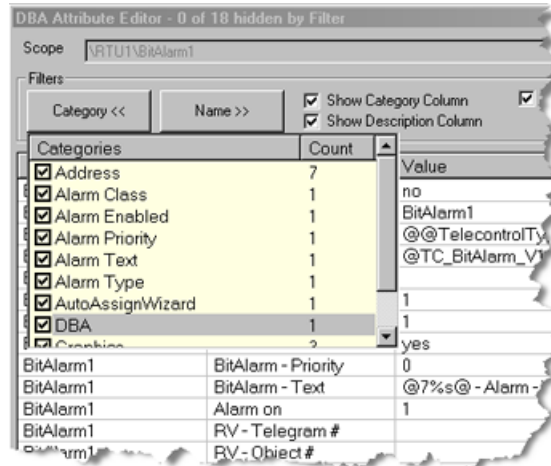
Column names and descriptions

- Name** The name of the object to which the attribute belongs.
- Attribute Name** The name of the attribute.
- Value** The current value of the attribute.
- Category** The name of the category to which the attribute belongs. This category corresponds to the name of the tab in the Details pane of the OS view where that attribute is displayed. The name can be edited there and can be used to filter the list.
- Description** The text description of the attribute

Attribute Editor Controls

Filtering and sorting controls

Filters - Two filter buttons are available at the top of the form to display a subset of the attributes with which you wish to work. You can filter by category or by name or both. When you press the "Category>>" or "Name>>" button, a list appears. Initially all categories and names are selected. To toggle the selection of entire categories of attributes or individually named attributes, select or clear the check boxes next to the items. Only selected items are displayed.



You can further filter the display to show only writable attributes by clicking the "Show read-only attributes" checkbox to clear it. If the box is selected, both read-only and writable attributes are displayed.

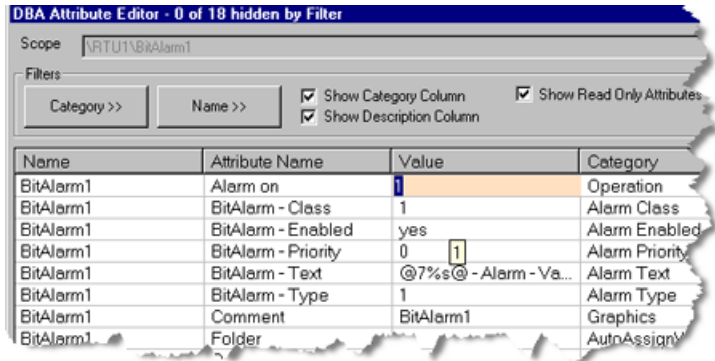
You can also suppress the display of the category and description columns by selecting the "Show category column" and the "Show description column" checkboxes. The checkboxes must be selected to display the columns.

Sorting - You can sort any column by clicking the column heading. Click a second time to reverse the sort order.

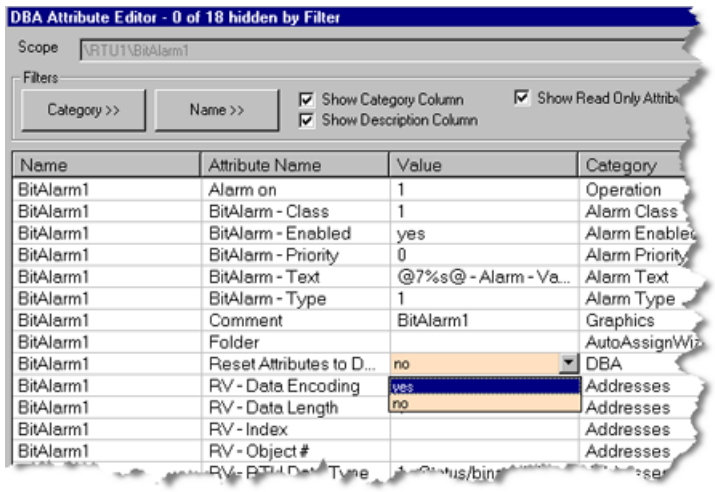
Modifying Attributes

Changing the value of an attribute

- 1. Click a row to modify one of the attributes.



- 2. If the value is appears in a drop down list box, to display a list of possible values, click the downward arrowhead next to the value field:



5.2.3 Configuring Addresses

How external tag addresses are specified

Each object’s external tags must have their addresses configured. To configure the external address for an object, select the object in the plant view and then select the Addresses tab. A list of all external tags for that object are shown. Each row represents a different external tag. The first column shows the Tag Name, and the other columns show the configurable elements of the address for each tag. The columns that are shown will depend upon the AS type of object being configured. The sections below describe how to configure external addresses for each possible Telecontrol AS type.

Tag Name	Telegram #	Object #	Index	Telegram Offset	RTU Data Type	Data Length	Data Enc
FV					1 - Status/binary info...	1	
R					5 - Byte commands ...	1	
RV					1 - Status/binary info...	4	

5.2.3.1 Configuring External SINAUT ST7/ST1 Addresses

The address components you can modify for the external tags of a SINAUT object are the telegram number, the offset number, the data type, the data length, and the data encoding. When the object’s type was defined in the DBA Type Editor, suitable defaults were chosen for the RTU data type, data length, and data encoding.

In most cases you only need to configure the Telegram and Offset numbers. This indicates that the data will be returned in the telegram number specified. The offset specified indicates precisely where the data will reside within the telegram. The telegram and offset numbers are mandatory; if not specified, the project fails to compile and a validation error is generated.

Tag Name	Telegram #	Telegram Offset	RTU Data Type	Data Length
F			1 - Status/binary inf...	1
RCmd			5 - Byte commands...	1

You can change the RTU Data Type by selecting a new data type from the drop-down list.

Telegram Offset	RTU Data Type	Data Length
	1 - Status/binary information	1
	2 - Analog values 16 bit integ	1

You can change the Data Length by typing in a new value in the Data Length field.

5.2 Manual Creation and Configuration of Instances

Addresses		Operation: 6	
Tag	RTU Data Type	Data Length	Data Encoding
	1 - Status/binary inf...	1	
	5 - Byte commands...	1	

You can change the Data Encoding by typing in a new value in the Data Encoding field. The data encoding represents a bit-mask to be applied to the data represented by this tag. When the object's type was defined in the Type Editor, a default bit-mask was specified (which could be blank) for each external tag. When the value is blank, no bit mask is applied and the entire value is used as is.

Addresses		Operation: 6	
Tag	RTU Data Type	Data Length	Data Encoding
	1 - Status/binary inf...	1	00000001
	5 - Byte commands...	1	

Configuring Sinaut ST1_AE1 External Addresses

Sinaut ST1_AE1 addresses are configured as described in section Configuring Sinaut ST7/ST1 External Addresses (Page 133). However, there are two additional components need to be configured, **Object Number** and **Index**, as shown below. The Object Number and Index are additional addressing elements that have been configured in the RTU, in addition to Telegram number and offset.

Objects: 0		Attributes: 3		Graphics: 3		Alarm Messages		Logged Tags		Addresses		Operation: 11	
Tag Name	Telegram #	Object #	Index	Telegram Offset	RTU Data Type								
RV					15 - Analog value								

You can change the Object Number by entering a numeric value in the entry field provided.

Addresses		Operation: 6	
Object #	Index		

You can change the Index by entering a numeric value in the entry field provided.

Addresses		Operation: 11	
Index	Telegram #		

5.2.3.2 Configuring External Modbus Addresses

The address components you can modify for the external tags of a Modbus object are the polling group, the function code, the start register, the number of data objects to be returned, the register length, the RTU data type, the data length and the data encoding. When the object's type was defined in the DBA Type Editor, suitable defaults were chosen for the function code, number of data objects to be returned, register length, RTU data type, data length and data encoding. In most cases you will only need to specify the poll group and the start register.

The name of the Poll Group in which the tag is to be returned must be specified. For read-only tags, a poll group configured in the project (see Managing Modbus Polling Groups (Page 320)) is specified by selecting one from the pull-down list. For write-only tags, "0" should be specified. A default of "0" may already have been specified when the object's type was defined. A poll group is mandatory; if not specified, the project fails to compile and a validation error is generated.

Attributes: 3 Graphics: 3 Alarm Messages Linked Tags: 2 Add				
Tag Name	Polling Gro...	Function C...	Start Regist...	#
		1 - Read m...		1
LIFEBEAT	PG1	5 - Write sin...		1
	PG2			

The Function Code to be used can be modified by selecting one from the pull-down list. In most cases the default function code for that tag is suitable.

Note: If you change the function code from read-only to write-only, you will need to change the poll group to "0".

Objects: 0 Attributes: 3 Graphics: 3 Alarm Messages Linked Tag				
Tag Name	Polling Gro...	Function C...	Start Regist	
F	PG1	1 - Read multip		
RCmd	0	1 - Read multiple c 2 - Read multiple in		

The Starting Register in the Modbus RTU with which this tag is to be associated must be specified. This can be done by typing in a value in the "Start Register" field. A starting register is mandatory; if not specified, the project fails to compile and a validation error is generated.

Objects: 0 Attributes: 3 Graphics: 3 Alarm Messages Linked Tags: 2				
Tag Name	Polling Gro...	Function C...	Start Regist...	
F	PG1	1 - Read m...	1	
RCmd	0	5 - Write sin...		

The Number of Data Objects that are to be returned can be modified by typing in a number in the "#" field. The default value is usually 1 and this value usually does not need to be modified. This number generally refers to the number of coils or registers to be associated with this tag.

5.2 Manual Creation and Configuration of Instances

Calling Gro...	Function C...	Start Regist...	#	P
31	1 - Read m...	1	1	
	5 - Write sin...		1	

The Register Length that was defined for the RTU is usually the appropriate register length. When left blank, that is the value that is used. You can override this by specifying a different register length for this tag of this instance by typing in a value in the "Register Length" field.

Function C...	Start Regist...	#	Register Le...	P
Read m...	1	1		1
Write sin...		1	16	2
			32	

You can change the RTU Data Type by selecting a new data type from the drop-down list.

Register...	#	Register Le...	RTU Data ...	D
	1	16	1 - Status/binar	1
	1		2 - Status/binary in	1

You can change the Data Length by typing in a new value in the Data Length field.

Register Le...	RTU Data ...	Data Length
16	1 - Status/bi...	1
	2 - Bit Com...	1

You can change the Data Encoding by typing in a new value in the Data Encoding field. The data encoding represents a bit-mask to be applied to the data represented by this tag. When the object's type was defined in the Type Editor, a default bit-mask was specified (which could be blank) for each external tag.

Register Le...	RTU Data ...	Data Length	Data Enco...
16	1 - Status/bi...	1	00000000000001
	2 - Bit Com...	1	

5.2.3.3 Configuring IEC External Addresses

The address components you can modify for the external tags of an IEC object are

- **Object Address** – IEC Object Information Address of the tag
- **RTU Data Type** - IEC Data type of tag
- **Flag** - For some RTU Data Types, a flag can be specified further describing the kind of data associated with the tag
- **Mode** - For some RTU Data Type/Flag combinations, a mode can be specified that further describes the kind of data associated with the tag.
- **Data Encoding** – Optionally can be used to specify a bit pattern.

If you have selected an IEC Counter, for example, external address configuration is as shown below:

When the object’s type was defined in the DBA Type Editor, suitable defaults were chosen for the RTU data type, Flag, Mode, and data encoding.

In most cases you only need to configure the Object Address, which is used to identify the data within the RTU. The object address is mandatory; if not specified, the project fails to compile and a validation error is generated.

Tag	Object Address	RTU Data Type	Flag	Mode	Data Encoding
BCR		15 - Counter value: Integr...	BCR_CY - Binary Counter Reading - Overflow Indicator		
FV		15 - Counter value: Integr...	BCR_CA - Binary Counter Reading - Adjustment Indicator		
R		45 - Single command	QOC_OU1 - Qualifier of Command - Short Pulse Duration	AU - Select Followed By Execute	
RV		15 - Counter value: Integr...	VALUE - Value		

To configure the **Object Address**, enter a numeric value. If the connection of the RTU that is associated with the object is configured for Structured Object addressing, octet notation should be used. The number of octets should correspond to the Object Information Address Size configured for the connection that is associated with the RTU. During compilation, a validation warning is shown in cases where the object address specified does not match the structured/unstructured and size attributes configured for the RTU’s connection.

Object Address	RTU Data Type	Flag
	15 - Counter value: Integrate...	Bi
	15 - Counter value: Integrate...	Bi

To configure the **RTU Data Type**, use the pulldown list to select a type. The types shown will depend on whether the tag has been configured as a read/write tag, and based on the WinCC Data Type of the tag.

5.2 Manual Creation and Configuration of Instances

Address	RTU Data Type	Flag
	15 - Counter value: Integrated totals	BCR_CA
	15 - Counter value: Integrated totals	BCR_CY
	16 - Counter value: Integrated totals with time tag	QOC_QU1
	30 - Single-point information with time tag CP56Time2a	VALUE
	31 - Double-point information with time tag CP56Time2A	
	32 - Step position information with time tag CP56Time2A	
	33 - Bit pattern of 32 Bits with time tag CP56Time2A	
	34 - Measured value: normalized value with time tag CP56Time2A	
	35 - Measured value: scaled value with time tag CP56Time2A	

To configure the **Flag**, use the pulldown list to select a flag type. The flag types shown will depend on the **RTU Data Type** selected. Note that not all RTU Data Types allow for the configuration of a Flag, in which case the pulldown list is not selectable.

RTU Data Type	Flag
Counter value: Integrated totals	BCR_CA - Binary Counter Reading - Adjustment Indicator
Counter value: Integrated totals	BCR_CY - Binary Counter Reading - Overflow Indicator
Qualifier of command	BCR_CY - Binary Counter Reading - Overflow Indicator
Counter value: Integrated totals	BCR_CA - Binary Counter Reading - Adjustment Indicator
	BCR_IV - Binary Counter Reading - Validation Status

To configure the **Mode**, use the pulldown list to select a mode. The modes shown will depend on the **RTU Data Type** and **Flag** selected. Note that most RTU Data Type/Flag combinations do not require the configuration of a Mode, in which case the pulldown list is not selectable.

Flag	Mode
BCR_CA - Binary Counter Reading - Adjustment Indicator	
BCR_CY - Binary Counter Reading - Overflow Indicator	
QOC_QU1 - Qualifier of Command - Short Pulse Duration	AU - Select Followed By Execute
VALUE - Value	EX - Execute Only
	SE - Select Only
	AU - Select Followed By Execute
	DS - Deselect

You can change the Data Encoding by typing in a new value in the Data Encoding field. The data encoding represents a bit-mask to be applied to the data represented by this tag. When the object's type was defined in the Type Editor, a default bit-mask was specified (which could be blank) for each external tag. When the value is blank, no bit mask is applied and the entire value is used as is.

Mode	Data Encoding
Counter Reading - Overflow Indicator	

5.2.3.4 Configuring DNP External Addresses

The address components you can modify for the external tags of a DNP object are

- **Index** – Index number of data point
- **Group** - DNP group of the tag
- **Variation** - DNP variation of tag
- **Class** - Class number (0 - 4)
- **Flag** - For some RTU Data Types, a flag can be specified further describing the kind of data associated with the tag
- **Mode** - For some RTU Data Type/Flag combinations, a mode can be specified that further describes the kind of data associated with the tag.
- **Data Encoding** – Optionally can be used to specify a bit pattern.

If you have selected a DNP Counter, for example, external address configuration is as shown below:

When the object’s type was defined in the DBA Type Editor, suitable defaults were chosen for the Group, Variation, Class, Flag, Mode, and data encoding.

In most cases you only need to configure the Object Address, which is used to identify the data within the RTU. The object address is mandatory; if not specified, the project fails to compile and a validation error is generated.

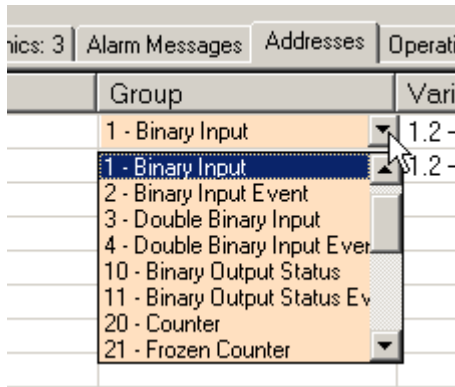
Tag Name	Index	Group	Variation	Class	Flag	Mode	Element	Data Encoding
FLAG		22 - Counter E...	22.5 - 32-Bit ...	0	FLAG			
FV		1 - Binary Input	1.2 - With Flags	0	VALUE			
R		12 - Binary Co...	12.1 - Control ...	0	CMD	DA - Direct Operate with Acknowle...		
RV		22 - Counter E...	22.5 - 32-Bit ...	0	VALUE			

To configure the **Index**, enter a numeric value. DNP3 uses index numbers to identify points having the same point type. Index numbers are equivalent to array element numbers. DNP3 indexes are zero-based, that is, the lowest element is always zero.

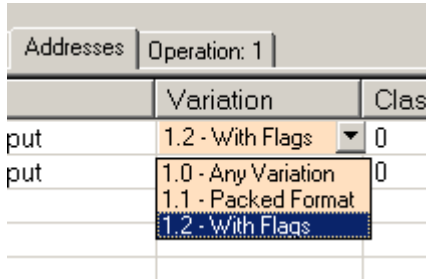
Tag Name	Index	Group
RV		
FLAG		

To configure the **Group**, use the pulldown list to select a group. Groups provide a means of classifying the type or types of data within a message. Each group number shares a common point type and method of data generation or creation.

5.2 Manual Creation and Configuration of Instances

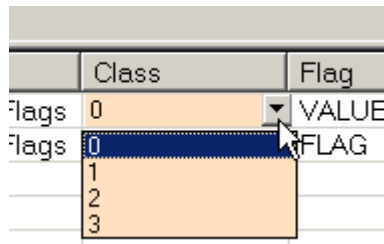


To configure the **Variation**, use the pulldown list to select a type. DNP3 offers a choice of encoding formats for many of the data types. The choices are known as variations. Every group number has an independent set of variations.

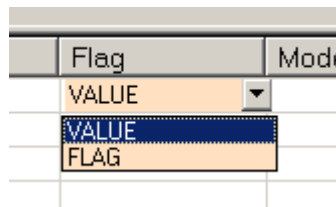


To configure the **Class**, use the pulldown list to select a class. DNP3 uses the concept of classes to organize static data and events into several categories:

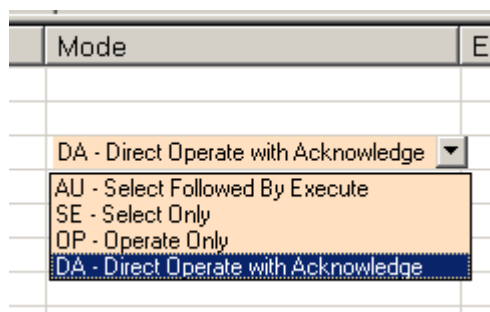
- Class 0: Static data (may be a subset of the outstation’s total static data)
- Classes 1, 2, 3: Events



To configure the **Flag**, use the pulldown list to select a flag type. The flag refers to supplementary data that indicates conditions such as the source being on-line, the source device having restarted or the value being outside of the measurement range.



To configure the **Mode**, use the pulldown list to select a mode. The modes shown will depend on the object type selected. Note that most RTU Data Type/Flag combinations do not require the configuration of a Mode, in which case the pulldown list is not selectable. Mode is used e.g for commands and counters.



You can change the **Data Encoding** by typing in a new value in the Data Encoding field. The data encoding represents a bit-mask to be applied to the data represented by this tag. When the object's type was defined in the Type Editor, a default bit-mask was specified (which could be blank) for each external tag. When the value is blank, no bit mask is applied and the entire value is used as is.

Note

For File Control Variables (Group 50), the name of the file being controlled should be entered as the Data Encoding. If the file name requires the use of a colon (e.g. c:\myfile.txt), use the "|" character in place of the colon (e.g. c|myfile.txt).

Addresses	Operation: 20	Mode	Data Encoding
Counter Reading - Overflow Indicator			

Configuring Control Parameters for Output Parameters

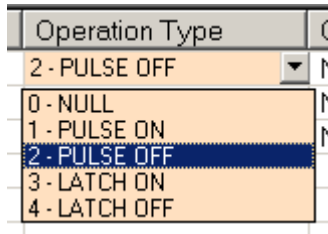
For parameters that have been configured as Data Processing Mode "WP" (Write Process), an additional tab is shown that allows you to change the configuration of parameters that determine how control operations (e.g. commands and setpoints) will be executed. For standard PCS 7/TeleControl DNP library objects, default values are usually suitable, but this tab allows you to change the configured defaults.

This tab appears as shown below:

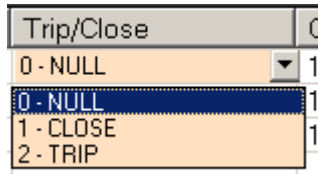
Tag Name	Operation Type	Clear	Trip/Close	Count	On Time	Off Time
RSEL	0 - NULL	No	0 - NULL	1	0	0
RSP	0 - NULL	No	0 - NULL	1	0	0
RSPEX	0 - NULL	No	0 - NULL	1	0	0

The control components you can modify for external "WP" tags of a DNP object are

- Operation Type** – Indicates the kind of control operation to be performed when writing to the variable. A value can be selected from the pulldown list as shown below:



- Clear** – Indicates whether the device will remove pending control commands for the index and stop any control operation that is in progress for the index. Select **Yes** if Clear is required, **No** otherwise.
- Trip/Close** – used in conjunction with Operation Type to indicate the kind of control operation to be performed. A value can be selected from the pulldown list as shown below:



- Count** – the number of times the outstation shall execute the operation. Counts greater than 1 generate a series of pulses or repeated operations. Both On-time and Off-time values are observed, subject to the comments regarding timing in section 3.3 of the DNP3 Object Library standard document (Volume 6, part 2). A count value of 0 indicates that the output operation shall not be executed (if supported by the device). The allowed values are 0 – 255.
- On Time** – This is the duration, expressed as the number of milliseconds, that the output drive remains active. It is a 32 bit unsigned integer value, the allowed values are 0 – 232-1.
- Off Time** - This is the duration, expressed as the number of milliseconds, that the output drive remains non-active. It is a 32 bit unsigned integer value, the allowed values are 0 – 232-1.

5.2.3.5 Configuring EDC External Addresses

Configuring EDC External Addresses

EDC external address configuration is identical to the configuration of external addresses for Sinaut ST1_AE1, as described above.

However, when configuring Telegram Offset's, the following hex values are recognized as valid offsets in addition to any numeric decimal integer:

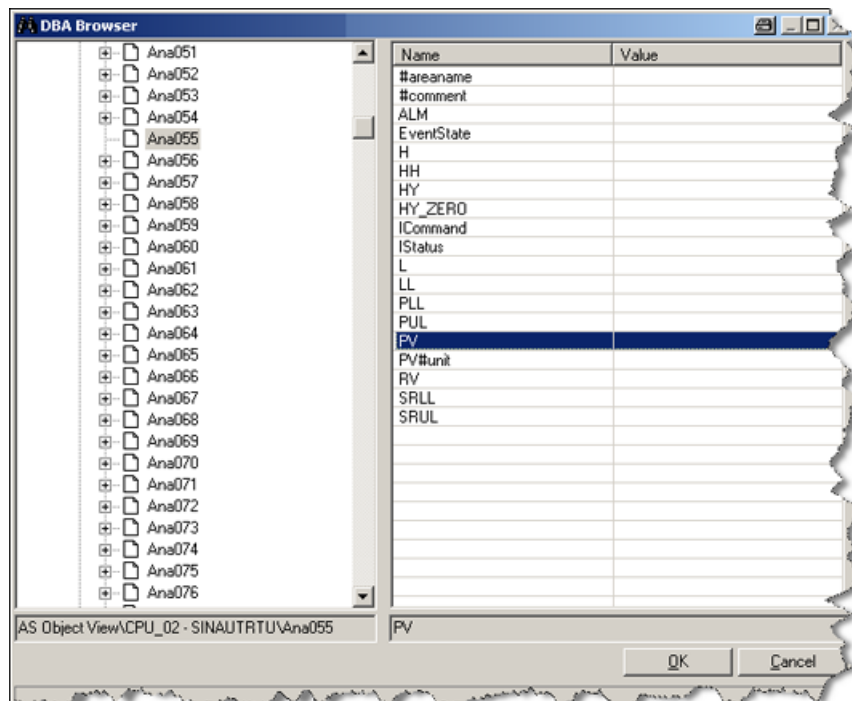
- FF02
- FF04
- FF06
- FF08

5.2.3.6 Configuring Indirect Tags

Specifying the tag whose value is used by the object

Indirect tags are configured by specifying the tag whose value will be used by the object. You can type in the full specification for the tag you want or you can select it from a list of tags in the tag browser. If you type in the tag's name, you must make sure you have the appropriate hierarchy prefix to specify the tag fully as it is specified in WinCC Explorer. Selecting the tag in the tag browser ensures that the correct specification is used.

You launch the browser by pressing the ellipsis button next to the Value field of the tag.



Note

The tag browser is only available from the Details Pane

The tag browser is only available from the Details Pane of the OS View. It is not available from the Attribute Editor.

5.3 Deleting Instances

Deleting individual instances from AS View

1. Right-click the instance in the details pane of the AS View
2. Selecting "Delete AS Object."
A prompt asks you to confirm the deletion.
3. Press the "Yes" button to delete the instance, or the "No" button to cancel the deletion.

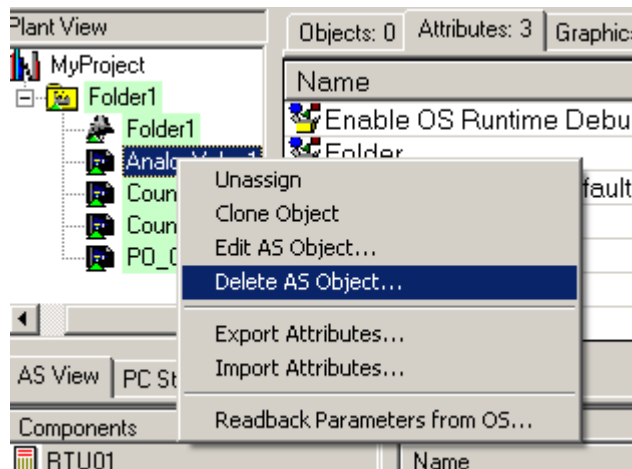


Deleting multiple instances

1. To delete multiple instances simultaneously, select multiple instances in the details pane of the AS View,
2. Right-click and select "Delete AS Objects".
As with deleting a single instance, you will be asked to confirm the deletion.
3. Press the "Yes" button to delete the instance, or the "No" button to cancel the deletion.

Deleting individual instances from the Plant View

1. Right-click the instance in Plant View



2. Selecting "Delete AS Object."
A prompt asks you to confirm the deletion.
3. Press the "Yes" button to delete the instance, or the "No" button to cancel the deletion.

5.4 Cloning an Instance

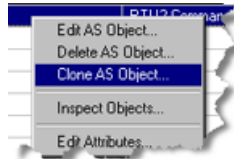
If you need to create a new instance that is the same or similar to another instance, you can create a clone of the other instance and then modify the few attributes that are different.

5.4.1 Cloning from an AS view

Procedure

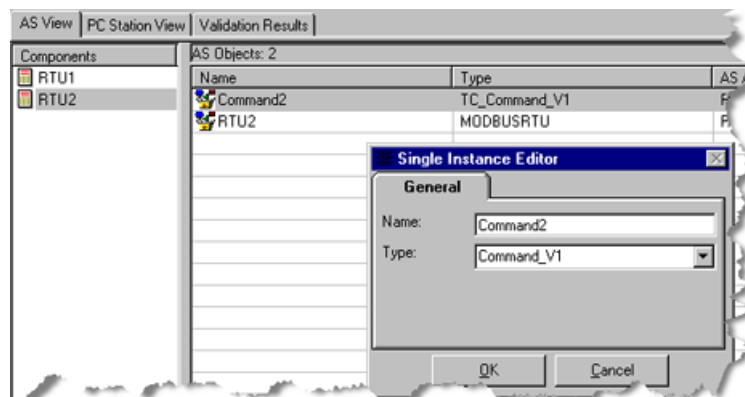
Cloning an instance from the AS View produces a new instance that is not yet assigned to any plant view folder and allows you to change its type but not the RTU to which it belongs.

1. Right-click the instance in the details pane of the AS View and select "Clone AS Object":



The Single Instance Editor is launched with the Name field filled in with the source instance's name suffixed with "_1" and the type field filled in with the source instance's type.

2. Change the name to the name of the new instance (if the displayed name is not appropriate). A new instance is created with the new name and all attributes including the tag addresses will be exactly the same as the original instance.



Note

Changing and instance's type

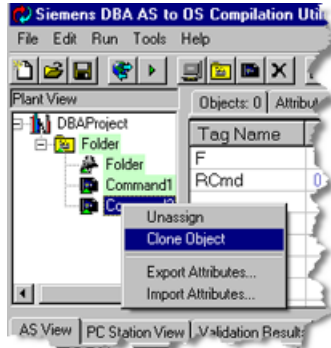
If you change an instance's type, the instance's attributes will be replaced by new attributes appropriate for the new type. Any attributes that are common with the instance's original type will retain their original values.

5.4.2 Cloning from the Plant View

Procedure

Cloning an instance from the Plant View produces a new instance that is assigned to same folder as the original and allows you to change the new instance's RTU but not its type. The instance's type can be changed later by following the steps in the topic titled "Modifying Instances (Page 170)".

1. Right-click the instance in the Plant View and select "Clone Object":



The **Clone Object** dialog is launched with the **Instance Name** field filled in with the source instance's name suffixed with "_1" and the RTU field filled in with the source instance's RTU.

2. Change the name to the name of the new instance (if the displayed name is not appropriate).
3. Use the pull-down list associated with the RTU field to select the new destination RTU.
4. Save the new instance by clicking the "OK" button.

A new instance is created with the new name, the type of the original instance and all attributes including the tag addresses are exactly the same as the original instance. It may also be in a different RTU.



Note

Restrictions on cloning instances

You cannot clone instances from an RTU of one type to an RTU of another type. The drop-down list of RTUs in the Clone Object dialog only displays RTUs of the same type as the RTU of the original instance.

5. Use the Attribute Editor or the Details Pane of the OS View to change those attributes (and addresses) that differ from those of the original instance.

5.5 Bulk Export and Import of Instances

5.5.1 The Processing of Exporting and Importing

Exporting and importing instances create, update, and save instances using more efficient tools than the manual features of DBA. Export/import is the recommended method when working with more than a few instances.

Typically, you define your instances in CSV files and import them into DBA. Later, any changes you made or new instances you added from DBA can be written back to your CSV files.

Main activities

There are two main activities:

- Exporting Instances
 - Creates an initial set of CSV files
 - Backs up your entire project's instances separately from DBA
 - Exchange instances with another project
 - Synchronizes your CSV files to incremental changes you made with DBA
- Importing Instances
 - Initially instantiates instances
 - Restores or resets all existing instances back to a known state
 - Use instances from another project that are already proven and tested
 - Synchronizes DBA instances with changes you made in the CSV files

Five use cases

- Exporting to create an initial set of CSV files
- Importing all Instances – allows you to work with your instances on a project-wide basis such as for restoration/reset or import from another project
- Importing one RTU's Instances – allows you to work with one RTU at a time while working out any anomalies in your instance configurations
- Exporting all Instances – this is meant to allow you to work with your instances on a project-wide basis such as for backup or export to another project
- Exporting one RTU's Instances – allows you to work with one RTU at a time while working out any anomalies in your instance configurations

General work flow

1. Creating the CSV files.
2. Defining the instances.

3. Importing the instances into DBA.
4. Testing/debugging the instances in DBA/WinCC.
5. Exporting the instances to the CSV files to synchronize any incremental changes made in DBA to the instances in the files.
6. Making any bulk changes that were identified during testing/debugging.
7. Reimporting instances to synchronize changes made to the CSV files with the instances in DBA.
8. Repeating until your project has all the instances needed and they are configured properly. Step 1 is repeated if you add new types or RTUs. Step 2 is repeated if you discover new instances that need to be added.

5.5.2 Exporting to Create an Initial Set of CSV Files

Creating instance CSV files manually is tedious and error-prone. The recommended method is to have DBA initially create them for you.

Note

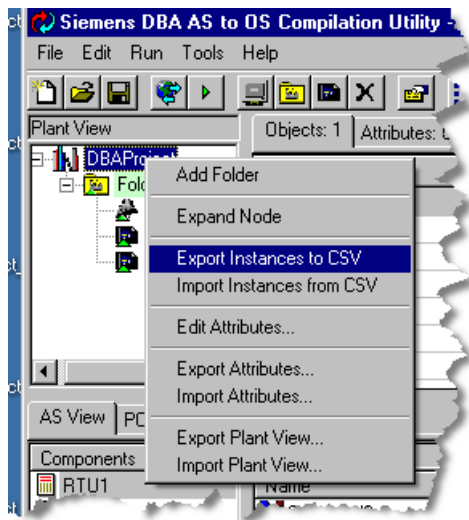
Creating CSV files without instances

You do not need to have any instances created in DBA to create the initial set of CSV files. The files will be created with no instances but with headers that indicate how the instances should be defined.

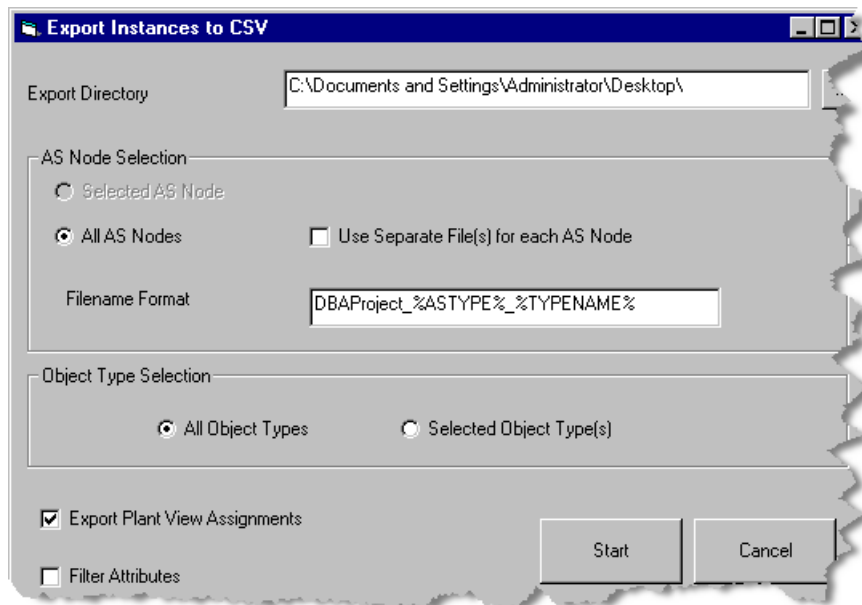
Before starting the export process, decide where you want the export files to reside. Typically, this is a folder dedicated to contain these files. You can create this folder in advance or during the export process.

Exporting the initial set of files

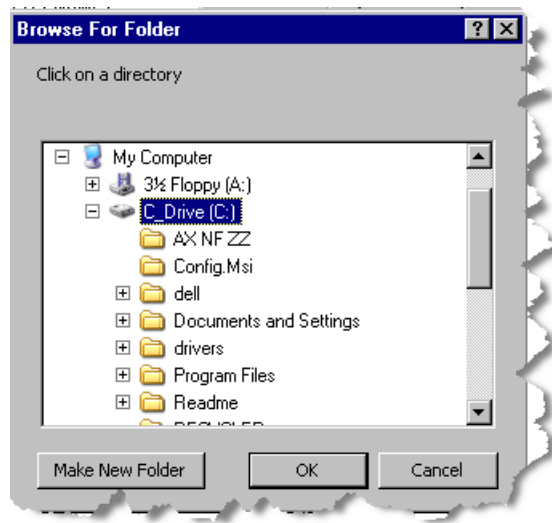
1. Right-click the root of the Plant View Hierarchy to launch the "Export Instances to CSV" dialog:



The "Export Instances to CSV" dialog is launched.



2. To create the files, begin by choosing a destination folder. Enter the folder name where you want the CSV files to be created in the "Export Directory" field, or press the ellipsis button next to the field to navigate the file system to select/create a folder:



3. Indicate whether you want the instances to be in files by type, or files by type and by AS. You do this by selecting or clearing the "Use Separate File(s) for each AS Node" checkbox.
4. Determine the format of the names of the CSV files. The export feature creates one file per type and per AS if indicated. A suitable default name format is in the "Filename Format" field. You can overwrite the default. Three variables may be included in the format of the filename to identify their content. These are as follows:
 - "%TYPENAME%" – the name of the type
 - "%ASNAME%" – the name of the AS
 - "%ASTYPE%" – the type of AS (for example, SINAUT, MODBUS, etc.)

Note: that "%ASNAME" and "%ASTYPE%" may be specified if even if you are not exporting the instances to separate files per AS.

If you do not specify "%ASNAME%" in the format and you are exporting the instances to separate files by AS, it is added to the specified format as a suffix.

If you do not specify "%TYPENAME" in the format, it is added to the specified format as a suffix.

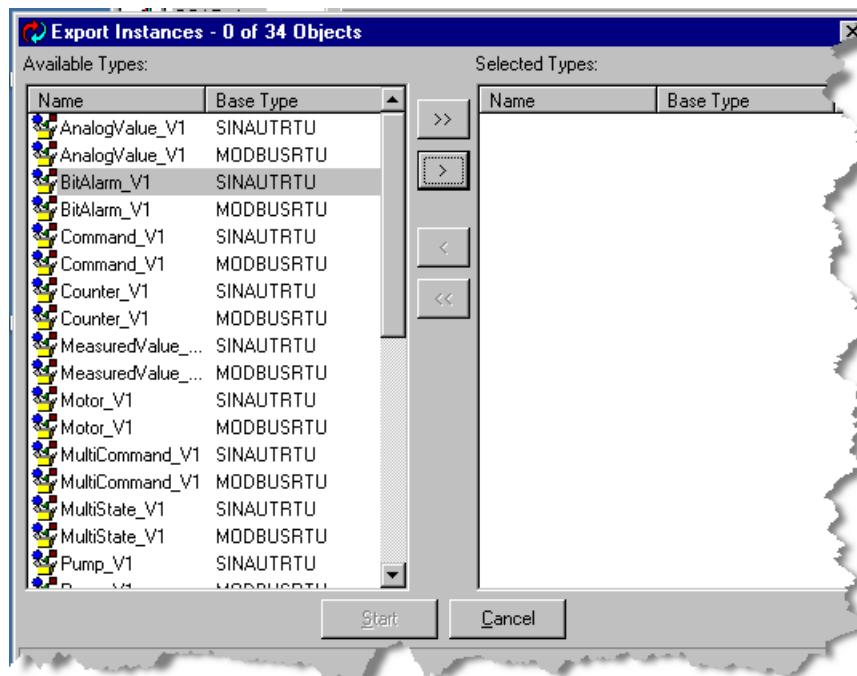
Examples:

 - (1) You specified the file format to be "MyInstances," and they are from one AS, then counter instances are exported to a file called "MyInstances_Counter_V1.csv."
 - (2) You specified the file format to be "MyInstances_%ASNAME%_%TYPENAME%," then counter instances from an AS called "AS1" are exported to a file named "MyInstances_AS1_Counter_V1.csv."
5. Indicate whether you want all instance types or some instance types by selecting either the "All Object Types" or "Selected Object Type(s)" button. You are given an opportunity to select the object types to be exported when the export process is started.
6. Indicate whether you want an Instance's Plant View assignment included in the export by selecting the "Include Plant View Assignments" checkbox.

7. Indicate whether you want to export all or some of the instances' attributes by selecting the "Filter Attributes" checkbox. Selecting the box allows you to select the attributes you want exported for each type when the export process begins.
8. Press the "Start" button to begin the export process or "Cancel" to cancel the process altogether.

"Selected Object Types(s)" options

If had you selected the "Selected Object Types(s)" radio button you will be given the opportunity to select which types you want in the export files. "Selected Object Types(s)"



The type selection dialog allows you to select the types individually to be exported or to select all.

Note

Duplicate types

Some types may be in the list twice because they appear for different type ASs. This can happen if you are exporting the instances for more than one AS.

1. To select individual types for export, click a type in the left-hand pane and then click the right-arrowhead button between the left and right-hand panes. To select all the types, click the double-arrowhead button between the panes.
2. To continue the export process, press the "Start" button. To cancel the process, press the "Cancel" button.

"Filter Attributes" options

If you had checked the "Filter Attributes" checkbox, you will be given the opportunity to select which attributes for each type to be exported you want in the export files.



The attribute selection dialog allows you to select the attributes individually to be exported or to select all.

1. To select individual attributes for export, click an attribute in the left-hand pane and then click the right-arrowhead button between the left and right-hand panes. To select all the attributes, click the double-arrowhead button between the panes.
2. To complete the export process, press the "Start" button. To cancel the process, press the "Cancel" button.

5.5.3 Defining Instances

Use the file's header as a model

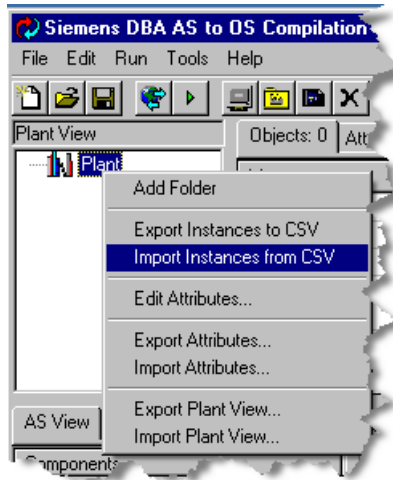
Each file that you export defines the instances for a single object type. These could be further divided into files by AS and AS type.

Using a text editor or a spreadsheet, define new instances by adding lines to each file following the model provided for you in the file's header.

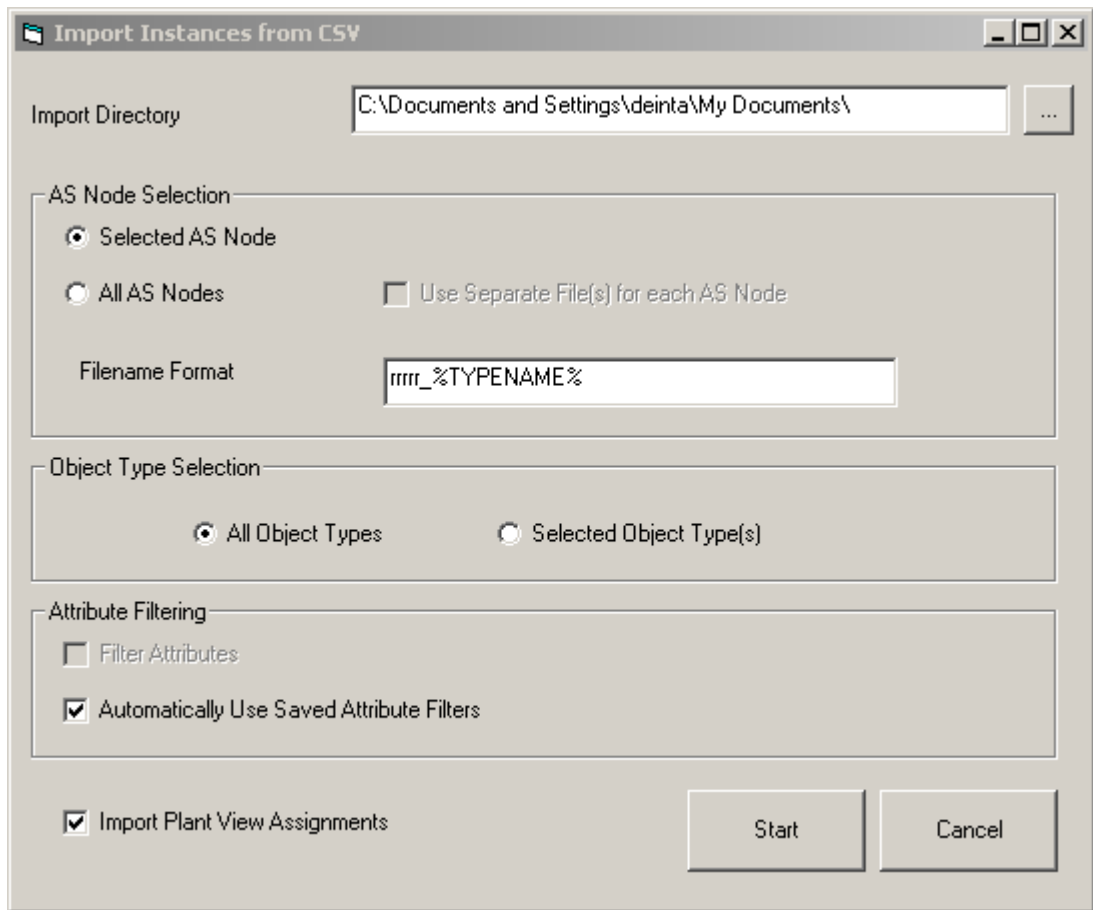
5.5.4 Importing all Instances

Bulk importing all instances

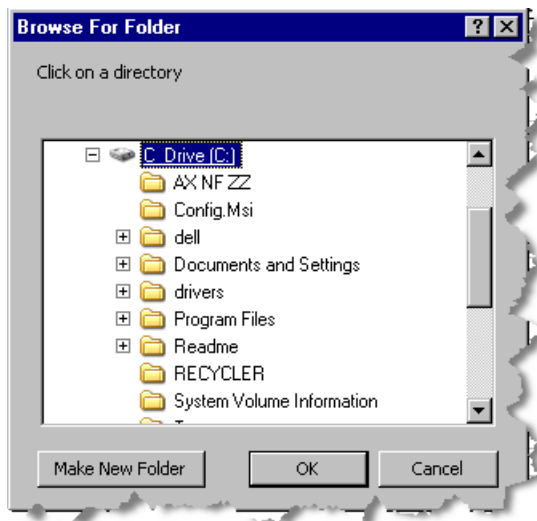
1. Right-click the root of the Plant View hierarchy.



The "Import Instances from CSV" dialog is launched.



2. Choose a source folder. Type the name of the folder where the CSV files reside in the "Import Directory" field, or press the ellipsis button next to the field to navigate the file system to select a source folder.

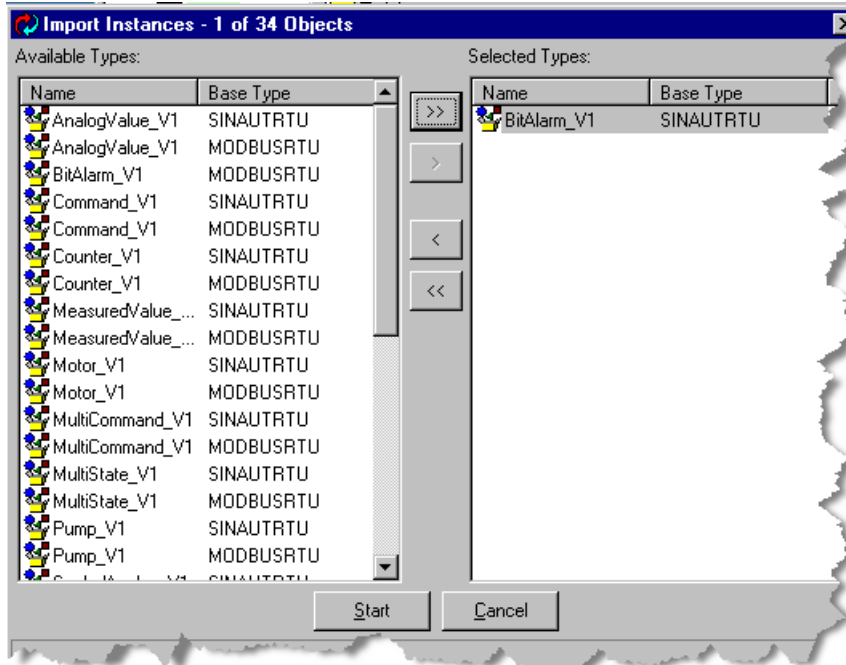


3. Indicate whether the instances are in files by type, or files by type and by AS. You do this by selecting or clearing the "Use Separate File(s) for each AS Node" checkbox.

4. Specify the format of the name of the CSV files. A candidate format will already be in the "Filename Format" field, which you can accept or overwrite with the one already defined if it is different. See step 4 in the in the topic titled "Exporting to Create an Initial Set of CSV Files (Page 148)" for details of the format. If any or all files that are expected to match the import format are not found, the import completes with one or more messages in the details pane of the import process indicating that the import process could not find such files. Only instances in files found are imported.
5. Indicate whether you want to import all instance types or some instance types by selecting either the "All Object Types" or "Selected Object Type(s)" radio button. You are given an opportunity to select the object types to be imported when the import process is started.
6. Indicate whether you want an instance's Plant View assignment included in the import by checking the "Include Plant View Assignments" checkbox.
If no import file has any plant view assignment data and you checked the "Include Plant View Assignments" checkbox, you will not be informed and no plant view assignments will be made as a consequence of the import. If you did not check the "Include Plant View Assignments" checkbox, and the import files contain plant view assignment data, that data is ignored.
7. Specify Attribute Filtering options as described below in the section "Filtering Options" below. This allows you to work with a subset of attributes, which can result in more manageable CSV files, especially if the default values of many attributes do not generally need to be changed.
8. Press the "Start" button to begin the import process or "Cancel" to cancel the process altogether.

"Selected Object Types(s)" options

If you checked the "Selected Object Types(s)" radio button, you have an opportunity to select which types you want to import.



The type selection dialog allows you to individually select the types to be imported or to select all.

Note

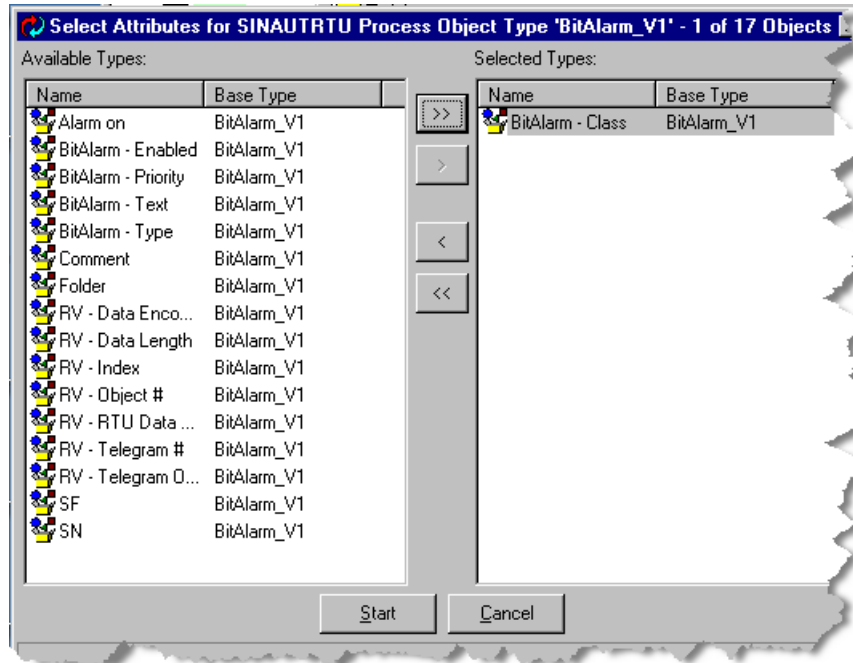
Duplicate types

Some types may be in the list twice because they appear for different type ASs. This can happen if you are importing the instances for more than one AS.

1. To select individual types for import, click a type in the left-hand pane and then click the right-arrowhead button between the left and right-hand panes. To select all the types, click the double-arrowhead button between the panes.
2. To continue the import process, press the "Start" button. To cancel the process, press the "Cancel" button.

"Filter Attributes" options

If you checked the "Filter Attributes" checkbox, you have the opportunity to select which attributes for each type to be imported you want to import.



The attribute selection dialog allows you to individually select the attributes to be imported or to select all.

1. To select individual attributes for import, click an attribute in the left-hand pane and then click the right-arrowhead button between the left and right-hand panes. To select all the attributes, click the double-arrowhead button between the panes.
2. To complete the import process, press the "Start" button. To cancel the process, press the "Cancel" button.

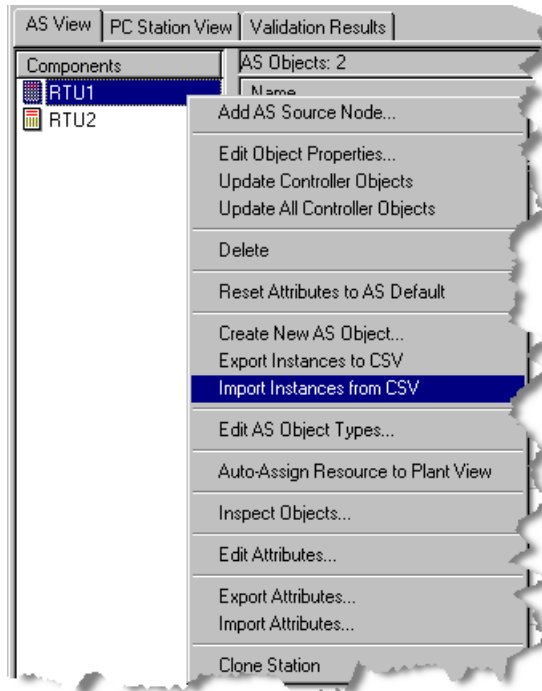
Note

Replacement of existing instances

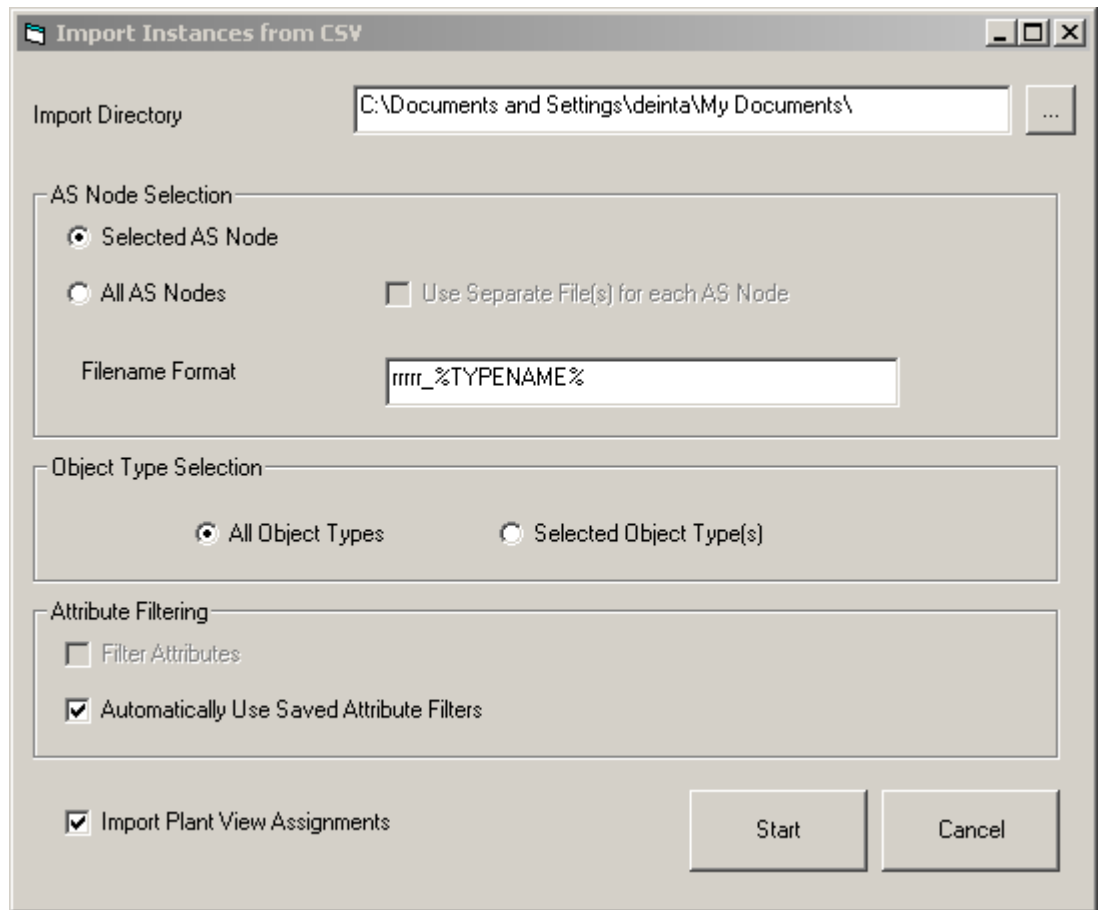
Any instances that are being imported and already exist in the project will be automatically replaced by the imported data. The details pane of the import process will indicate which instances were "updated" upon import.

5.5.5 Importing Instance from a single AS

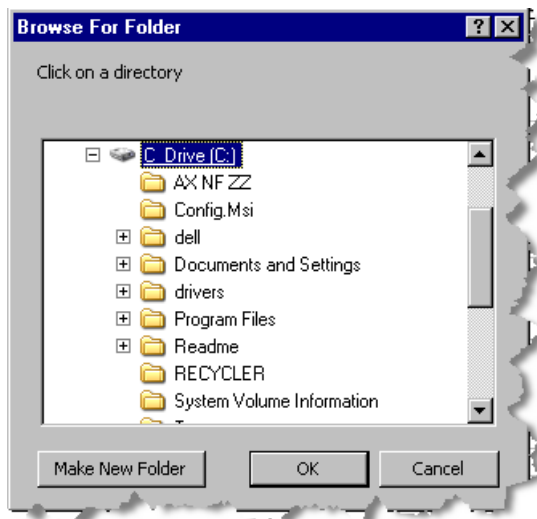
1. Right-click the AS in the AS View.



The "Import Instances from CSV" dialog is launched.



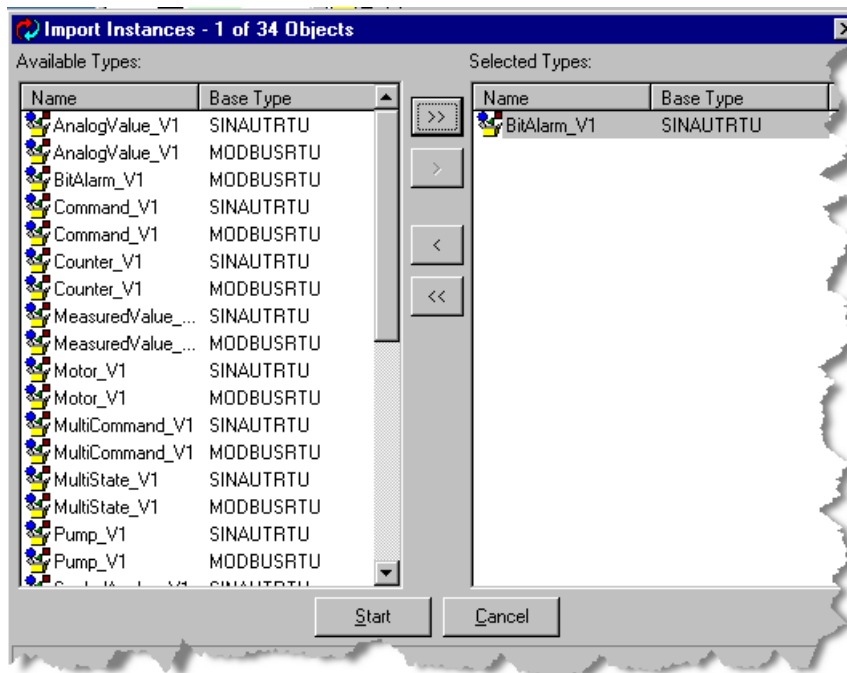
2. Choose a source folder. Enter the name of the folder where the CSV files reside in the "Import Directory" field, or press the ellipsis button next to the field to navigate the file system to select a source folder.



3. Specify the format of the name of the CSV files. A candidate format will already be in the "Filename Format" field, which you can accept or overwrite with the one already defined if it is different. See step 4 in the in the topic titled "Exporting to Create an Initial Set of CSV Files (Page 148)" for details of the format. If any or all files that are expected to match the import format are not found, the import completes with one or more messages in the details pane of the import process indicating that the import process could not find such files. Only instances in files found are imported.
4. Indicate whether you want to import all instance types or some instance types by selecting either the "All Object Types" or "Selected Object Type(s)" radio button. You are an opportunity to select the object types to be imported when the import process is started.
5. Indicate whether you want an instance's Plant View assignment included in the import by checking the "Import Plant View Assignments" checkbox. If no import file has any plant view assignment data and you selected the "Import Plant View Assignments" checkbox, you are not informed and no plant view assignments are made as a consequence of the import. If you do not select the "Import Plant View Assignments" checkbox, and the import files contain plant view assignment data, that data is ignored.
6. Specify Attribute Filtering options as described below in the section "Filtering Options" of section Importing all Instances (Page 153). This allows you to work with a subset of attributes, which can result in more manageable CSV files, especially if the default values of many attributes do not generally need to be changed.
7. Press the "Start" button to begin the import process or "Cancel" to cancel the process altogether.

"Selected Object Types(s)" options

If checked the "Selected Object Types(s)" radio button you have an opportunity to select which types you want to import.



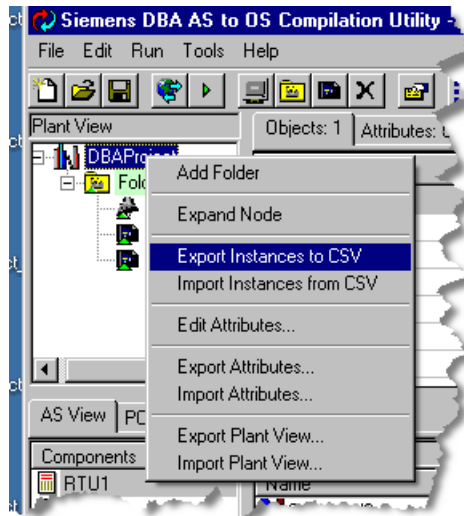
The type-selection dialog allows you to select the types to be imported individually or to select all.

1. To select individual types for import, click a type in the left-hand pane and then click the right-arrowhead button between the left and right-hand panes. To select all the types, click the double-arrowhead button between the panes.
2. To continue the import process, press the "Start" button. To cancel the process, press the "Cancel" button.

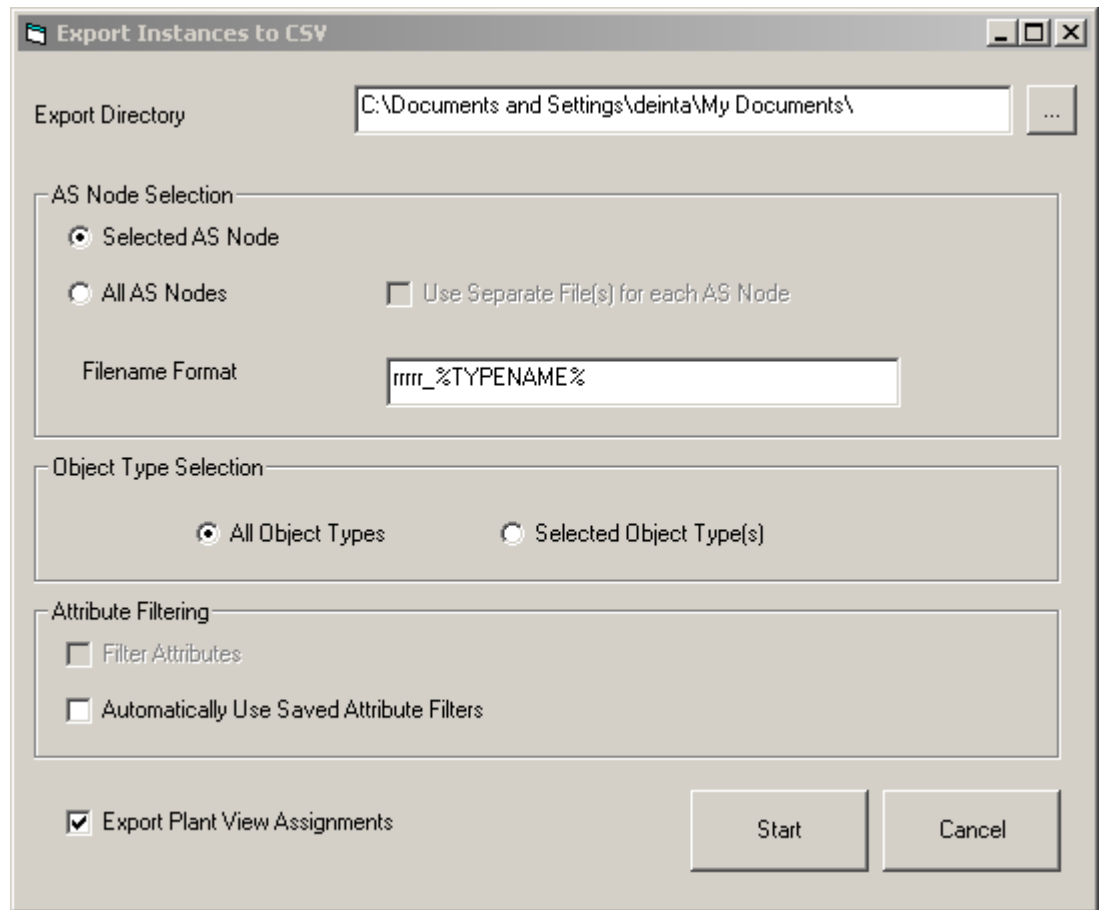
5.5.6 Exporting all Instances

Bulk exporting all instances

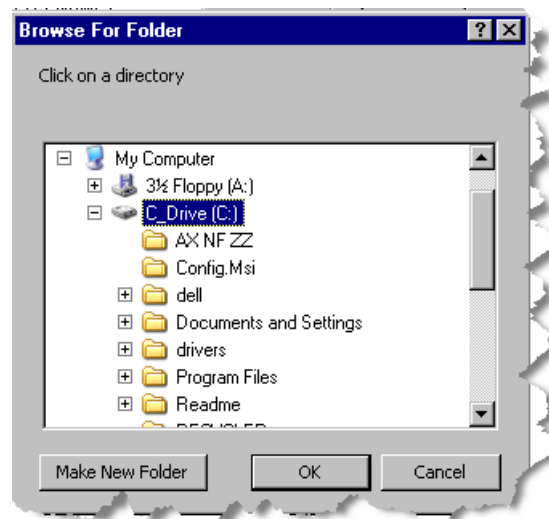
1. Right-click the root of the Plant View and select "Export Instances to CSV."



The "Export Instances to CSV" dialog is launched.



2. Choose a destination folder. Enter the folder name where you want the CSV files to be created in the "Export Directory" field, or press the ellipsis button next to the field to navigate the file system to select or create a folder.



3. Indicate whether the instances should be exported to files by type, or files by type and by AS. You do this by selecting or clearing the "Use Separate File(s) for each AS Node" checkbox.

4. Determine the format of the names of the CSV files. The export feature creates one file per type and per AS if indicated. A suitable default name format is in the "Filename Format" field, or you can specify your own by overwriting the default. Three variables may be included in the format of the filename to identify their content:
 - "%TYPENAME%" – the name of the type
 - "%ASNAME%" – the name of the AS
 - "%ASTYPE%" – the type of AS (e.g. SINAUT, MODBUS, etc.)

Note

"%ASNAME%" and "%ASTYPE%" may be specified if even if you are not exporting the instances to separate files per AS

If you do not specify "%ASNAME%" in the format and you are exporting the instances to separate files by AS, it will be added to the specified format as a suffix.

If you do not specify "%TYPENAME" in the format, it will be added to the specified format as a suffix.

Examples:

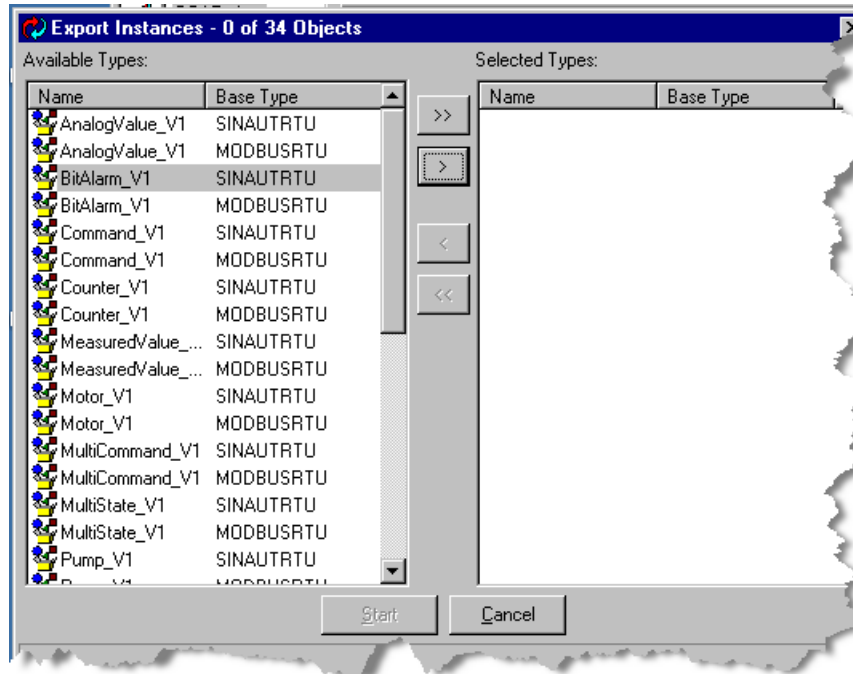
You specified the file format to be "MyInstances," then counter instances will be exported to a file called "MyInstances_Counter_V1.csv."

You specified the file format to be "MyInstances_%ASNAME%_%TYPENAME%," then counter instances from an AS called "AS1" will be exported to a file named "MyInstances_AS1_Counter_V1.csv."

5. Indicate whether you want all instance types of some instance types by selecting either the "All Object Types" or "Selected Object Type(s)" radio button. You will be given an opportunity to select the object types to be exported when the export process is started.
6. Indicate whether you want an Instance's Plant View assignment included in the export by checking the "Export Plant View Assignments" checkbox.
7. Specify Attribute Filtering options as described below in the section "Filtering Options" of section filter (Page 153). This allows you to work with a subset of attributes, which can result in more manageable CSV files, especially if the default values of many attributes do not generally need to be changed.
8. Press the "Start" button to begin the export process or "Cancel" to cancel the process altogether.

Selected Object Types(s) option

If had you checked the "Selected Object Types(s)" radio button you will be given the opportunity to select which types you want in the export files.



The type selection dialog allows you to select the types to be exported individually or to select all.

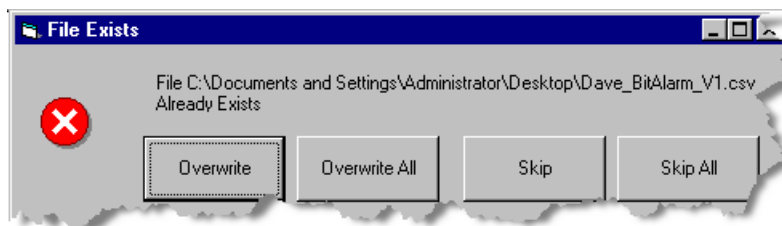
Note

Duplicate types

Some types may be in the list twice because they appear for different type ASs. This can happen if you are exporting the instances for more than one AS.

1. To select individual types for export, click a type in the left-hand pane and then click the right-arrowhead button between the left and right-hand panes. To select all the types, click the double-arrowhead button between the panes.
2. To continue the export process, press the "Start" button. To cancel the process, press the "Cancel" button.

If a type file of the designated name for any selected type already exists in the destination folder you are asked if you want to overwrite the existing file with a new file, or skip the export of that type. You can also indicate that all such filename collisions should result in an overwrite or a skipping of the affected types.

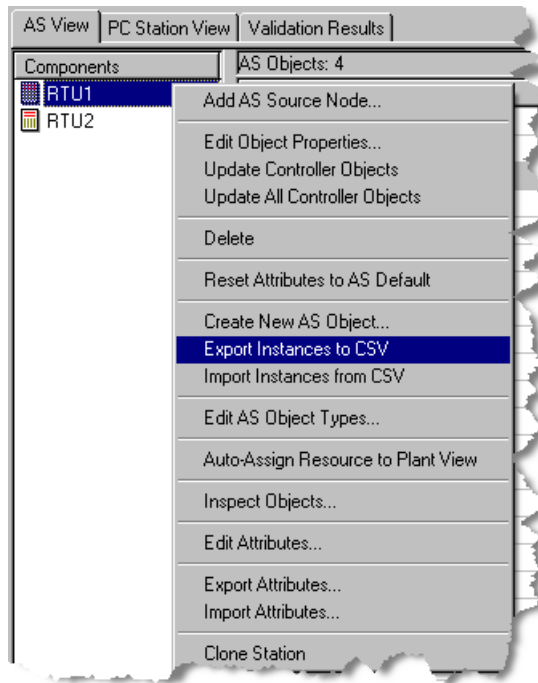


For using filter attributes see filter (Page 153)

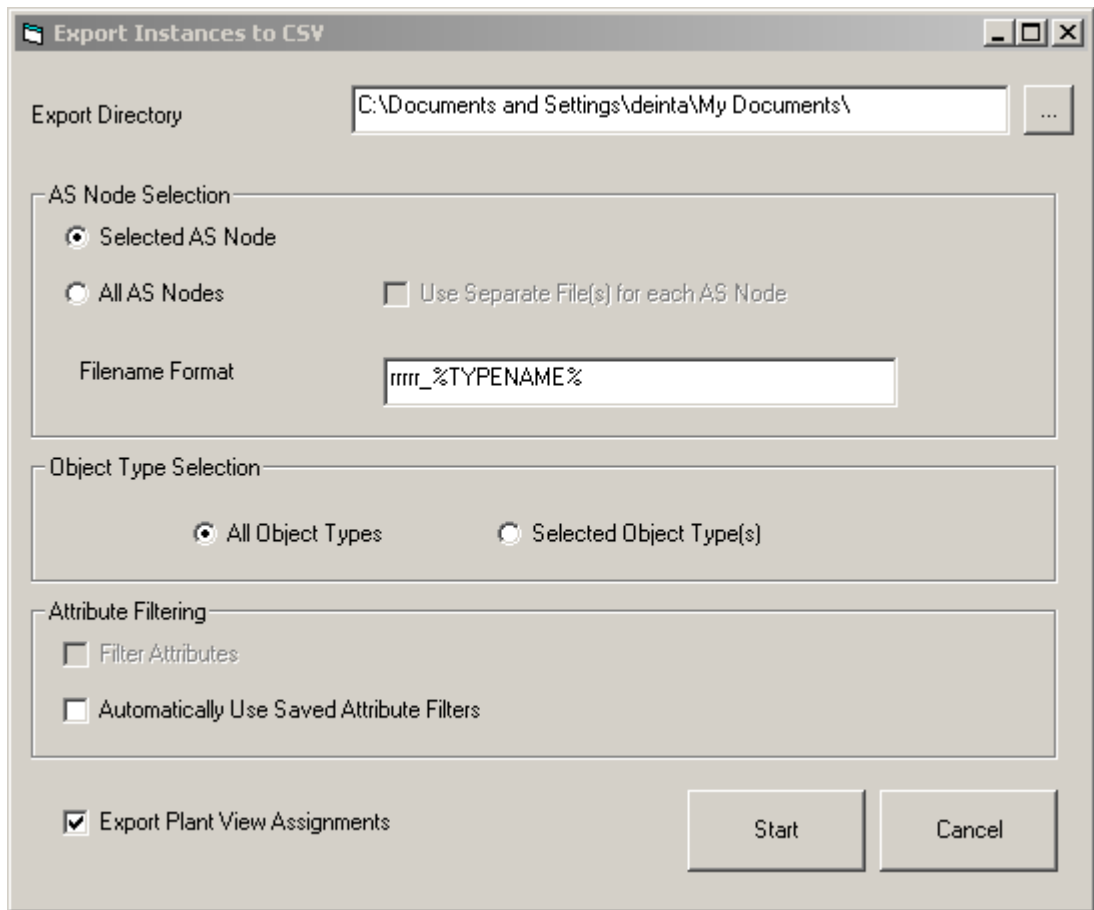
5.5.7 Exporting Instances from a single AS

Bulk exporting instances from a single AS

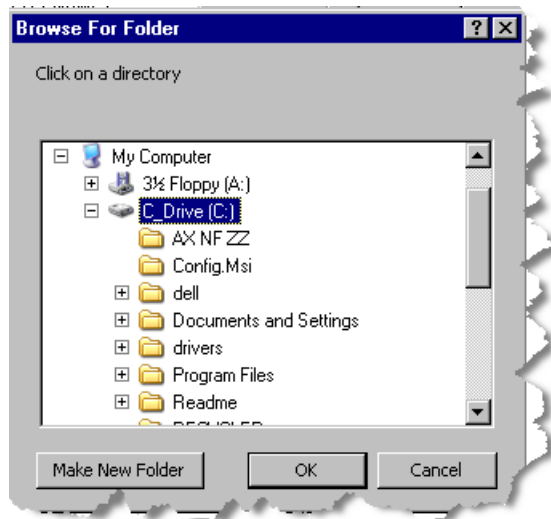
1. Right-click the AS in the AS View, and select "Export Instances to CSV."



The "Export Instances to CSV" dialog is launched.



2. Choose a destination folder. Enter the folder name where you want the CSV files to be created in the "Export Directory" field, or press the ellipsis button next to the field to navigate the file system to select or create a folder.



- Determine the format of the names of the CSV files. The export feature creates one file per type and per AS if indicated. A suitable default name format will already be chosen for you in the "Filename Format" field, or you can specify your own by overwriting the default. Three variables may be included in the format of the filename to identify their content. These are:
 - "%TYPENAME%" – the name of the type
 - "%ASNAME%" – the name of the AS
 - "%ASTYPE%" – the type of AS (e.g. SINAUT, MODBUS, etc.)"%ASNAME" and "%ASTYPE%" may be specified if even though you are not exporting the instances to separate files by AS.

Note**Specifying %ASNAME" and "%ASTYPE%"**

"%ASNAME" and "%ASTYPE%" may be specified if even though you are not exporting the instances to separate files by AS.

Note**When "%TYPENAME is not specified**

If you do not specify "%TYPENAME in the format, it will be added to the specified format as a suffix.

Examples:

You specified the file format to be "MyInstances". Counter instances are exported to a file called "MyInstances_Counter_V1.csv."

You specified the file format to be "MyInstances_%ASNAME%_%TYPENAME%," and they are from an AS called "AS1". Counter instances are exported to a file named "MyInstances_AS1_Counter_V1.csv."

- Indicate whether you want all instance types or some instance types by selecting either the "All Object Types" or "Selected Object Type(s)" radio button. You have an opportunity to select the object types to be exported when the export process is started.
- Indicate whether you want an Instance's Plant View assignment included in the export by checking the "Export Plant View Assignments" checkbox.
- Specify Attribute Filtering options as described below in the section "Filtering Options" of section Exporting to Create an Initial Set of CSV Files (Page 148). This allows you to work with a subset of attributes, which can result in more manageable CSV files, especially if the default values of many attributes do not generally need to be changed.
- Press the "Start" button to begin the export process or "Cancel" to cancel the process altogether.

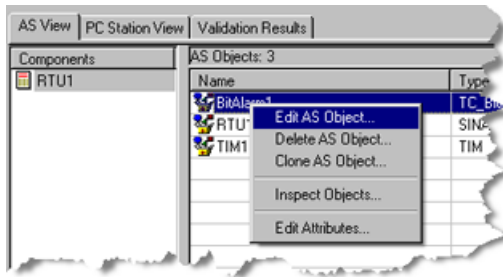
For using filter attributes see "Filtering Options".

5.6 Modifying Instances

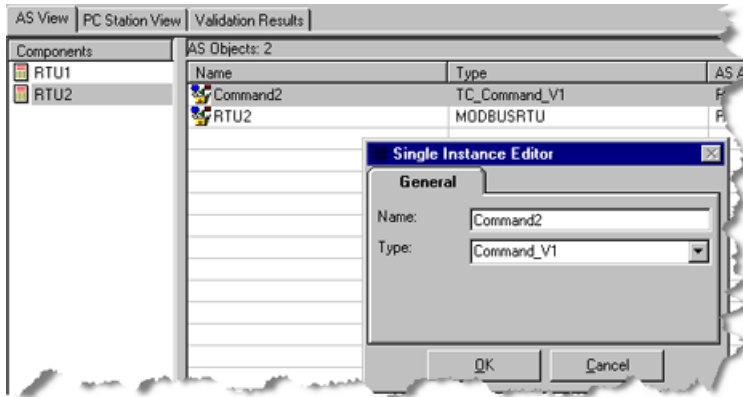
5.6.1 Modifying Instances

Launching the Single Instance Editor

You can modify the name and type of an instance by right-clicking the instance in the details pane of the AS View or Plant View and selecting "Edit AS Object."



The Single Instance Editor is launched with the Name and Type fields filled in with this instance's current data:



Note

Changing an instance's type

If you change an instance's type, the instance's attributes are replaced by new attributes appropriate for the new type. Any attributes that are common with the instance's old type retain whatever value they previously had.

5.6.2 Modifying Instance Attributes

Where and when instance attributes can be modified

Instance attributes can be modified at any time using the Attribute Editor or the Details pane of the OS View. For details, see the topic titled "Modifying Instances (Page 170)".

5.7 Instantiating Standard TeleControl Objects

There are three ways to instantiate an object:

- Create an instance of the desired type by following the steps in the topic titled "Manual Creation and Configuration of Instances (Page 122)".
- Clone an object by cloning an instance or an entire RTU. See the topic titled "Configuring a Newly Created Instance (Page 126)".
- Bulk import objects as described in the topic titled "Bulk Export and Import of Instances (Page 147)".

5.7.1 Required versus Optional Tags

All instantiated objects require some member tags to be configured. Some of these are given suitable defaults by the type definition. If the instantiation occurred by cloning or import, all of these tags should have some suitable value. These values can be configured or changed in the Attribute Editor or the Details pane of the OS View.

All standard Telecontrol objects contain external tags whose addresses are configurable. Some objects also contain indirect tags to be configured.

Some of the external and indirect tags are required and must be configured before your project can be successfully compiled to WinCC. The remaining external and indirect tags are optional and whether you configure them depends on the behavior and features you want to use in each object. If you fail to configure the required tags, the validation portion of the compile will fail.

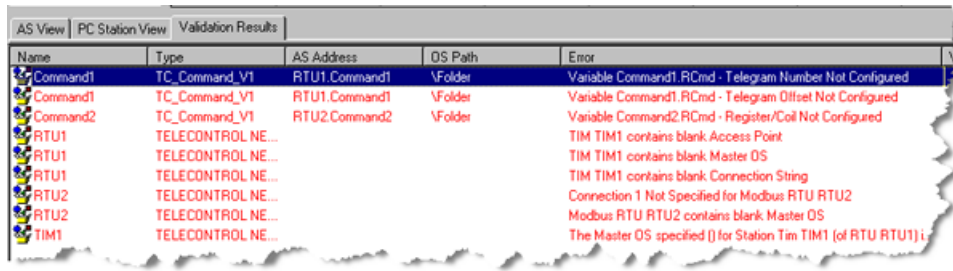
Validating required tags

You can check whether you have configured all the required tags before compiling by manually invoking the validation step.

1. Go to the "Validation Results" tab of the AS View.
2. Press the "Validate" button.

Any messages displayed in the validation pane prior to pressing the button are the result of a previous validation invoked either manually or invoked automatically in a previous compile. If you made changes since the last validation, you will need to press the Validate button to cause the old messages to be cleared.

If a validation is successful, the pane is empty. The illustration below shows errors:



Validation Warnings

There are some address configuration anomalies that are reported as warnings instead of errors. Warnings do not stop the compilation from proceeding. An example is when the number of octets for an IEC Object Address is inconsistent with the number of octets configured for the connection associated with the RTU that owns the object.

Validation warnings appear in the validation window in blue:



5.7.2 Required and Optional Tags by Type

Tables of required or optional tag for standard TeleControl types

The following are tables indicating which external and indirect tags are required or optional for each of the standard Telecontrol types. For details on configuring addresses, see the topic titled "Configuring Addresses (Page 133)".

Analog Value

Tag	External or Indirect	Required or optional	Description
RV	External	R	Raw value from RTU

For IEC Analog Values, the following additional tag is available.

Tag	External or Indirect	Required or optional	Description
QDS	External	Optional	Quality Descriptor

For DNP Analog Values, the following additional tag is available:

Tag	External or Indirect	Required or optional	Description
FLAG	External	Optional	Quality Descriptor

Bit Alarm

Tag	External or Indirect	Required or optional	Description
RV	External	R	Raw value from RTU

For IEC Bit Alarms, the following additional tag is available.

Tag	External or Indirect	Required or optional	Description
QDS	External	Optional	Quality Descriptor

For DNP Bit Alarms, the following additional tag is available.

Tag	External or Indirect	Required or optional	Description
FLAG	External	Optional	Quality Descriptor

Command

Tag	External or Indirect	Required or optional	Description
RCmd	External	R	Commands the RTU
F	External	See below*	Feedback from RTU
ILK1	Indirect	O	Interlock 1
ILK2	Indirect	O	Interlock 2

* Commands have an operational parameter called **Feedback Required** that indicates whether feedback is required. If **Feedback Required** is set to False, the F tag is considered optional. If **Feedback Required** is True, the F tag is required.

For IEC Commands, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
SIQ	External	Optional	Single-Point Information Quality
CB	External	See below**	Check Back Information
RCmdEX	External	See below**	Command Execute
RSEL	External	See below**	Command Select
RDSEL	External	See below**	Command Deselect

** These tags are related to IEC Select-Execute behavior. IEC Commands have an operational parameter, **Auto**. When **Auto** is configured as True, select-before-execute is disabled and these tags are optional. When **Auto** is configured as False, select-before-execute is enabled and these tags are required.

For DNP Commands, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
FLAG	External	Optional	Single-Point Information Quality
STATUS	External	See below***	Check Back Information

5.7 Instantiating Standard TeleControl Objects

Tag	External or Indirect	Required or optional	Description
RCmdEX	External	See below***	Command Execute
RSEL	External	See below***	Command Select

*** These tags are related to DNP Select-Execute behavior. DNP Commands have an operational parameter, Automatic Mode. The selection you make for Automatic Mode will determine which of these tags are optional and which are required.

Counter

Tag	External or Indirect	Required or optional	Description
FV	External	R	First value flag
MV	Indirect	R	Measured value – only required if RV not configured
RV	External	R	Raw RTU value – only required if MV not configured
CALC	Indirect	O	Calculate
R	External	O	Reset RTU counter

For IEC Counters, the following additional tag is available.

Tag	External or Indirect	Required or optional	Description
BCR	External	Optional	Binary Counter Reading Overflow Indicator

For DNP Counters, the following additional tag is available.

Tag	External or Indirect	Required or optional	Description
BCR	External	Optional	Binary Counter Reading Overflow Indicator

Note

Either the RV or the MV must be configured

Only one of RV or MV may be left blank. In certain modes RV is used, in others MV is used, and in yet others both are used. Refer to the Telecontrol Library Reference for details of which is needed in which mode and how these modes behave.

Measure value

Tag	External or Indirect	Required or optional	Description
RV	External	R	Raw RTU value – only required if IV not configured
IV	Indirect	R	Raw RTU value - only required if RV not configured

For IEC Measured Value, the following additional tag is available.

Tag	External or Indirect	Required or optional	Description
QDS	External	Optional	Quality Descriptor

For DNP Measured Value, the following additional tag is available.

Tag	External or Indirect	Required or optional	Description
FLAG	External	Optional	Quality Descriptor

Note

Either the RV or the IV must be configured

Only one of RV or IV may be left blank. Refer to the Telecontrol Library Reference for details of which is needed when and how these behave.

Motor

Tag	External or Indirect	Required or optional	Description
Auto	External	R	Auto mode indicator
Manual	External	See below*	Manual mode indicator (2 bit operation only)
DeviceOn	External	R	Motor is on indicator
DeviceOff	External	See below*	Motor is off indicator (2 bit operation only)
StartingUp	External	R	Motor is starting up indicator
Stopping	External	R	Motor is stopping indicator
RCmdAuto	External	R	Commands the motor to Auto mode
RCmdManual	External	See below*	Commands the motor to Manual mode
RCmdOn	External	R	Commands the motor on
RCmdOff	External	See below*	Commands the motor off
RCmdReset	External	O	Commands the motor to reset
Maintenance	External	O	Indicates that the motor is in a "maintenance" mode
NotControllable	External	O	Indicates that an attempt was made to control the motor when not in a controllable state
OverTemp	External	O	Indicates that the motor has overheated
ProtectionFault	External	O	Indicates that the motor has detected a protection fault

5.7 Instantiating Standard TeleControl Objects

Tag	External or Indirect	Required or optional	Description
ILK1	Indirect	O	Interlock 1
ILK2	Indirect	O	Interlock 2

* Motors have an operational parameter called **NumBits** that indicates whether the motor is controlled and indicated by 1 bit or 2 bits. If **NumBits** is set to 2, these tags are all required, since there are separate bits to indicate on and off and separate bits to indicate auto and manual. If **NumBits** is set to 1, these tags are optional since only one bit in the RTU is used to convey on versus off and only one bit in the RTU is used to convey auto versus manual. (The operational parameter, **OnSense** is used to distinguish on versus off. The operational parameter **AutoSense** is used to distinguish auto versus manual).

For IEC Motors, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
SIQOFF	External	Optional	Quality Descriptor – Off Indicator
SIQON	External	Optional	Quality Descriptor – On Indicator
CBOff	External	See below* **	Checkback for turning Motor off
CBOn	External	See below**	Checkback for turning Motor on
RCmdOffEX	External	See below* **	Execute Command for turning Motor off
RCMDOnEX	External	See below**	Execute Command for turning Motor on
RSELOff	External	See below* **	Select Command for turning Motor off
RSELOn	External	See below**	Select Command for turning Motor on
RDSELOff	External	See below* **	Deselect Command for turning Motor off
RDSELOn	External	See below**	Deselect Command for turning Motor on

* As described above for tags such as **RCmdOff**, These tags are optional if the operational parameter called **NumBits** is set to 1, and are required if this parameter is set to 2.

** These tags are related to IEC Select-Execute behavior. IEC Motors have an operational parameter, **Auto**. When **Auto** is configured as True, select-before-execute is disabled and these tags are optional. When **Auto** is configured as False, select-before-execute is enabled and these tags are required.

For DNP Motors, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
FLAGOFF	External	Optional	Quality Descriptor – Off Indicator
FLAGON	External	Optional	Quality Descriptor – On Indicator
STATUSOff	External	See below* ***	Checkback for turning Motor off
STATUSOn	External	See below***	Checkback for turning Motor on
RCmdOffEX	External	See below* ***	Execute Command for turning Motor off
RCMDOnEX	External	See below***	Execute Command for turning Motor on
RSELOff	External	See below* ***	Select Command for turning Motor off
RSELOn	External	See below***	Select Command for turning Motor on

*** These tags are related to DNP Select-Execute behavior. DNP Motors have an operational parameter, Automatic Mode. The selection you make for Automatic Mode will determine which of these tags are optional and which are required.

MultiCommand

Tag	External or Indirect	Required or optional	Description
F	External	R	Feedback from RTU
RCmd	External	See below*	Commands the RTU
ILK1	Indirect	O	Interlock 1
ILK2	Indirect	O	Interlock 2

* MultiCommands have an operational parameter called **FeedbackValues** that indicates the expected feedback required for each multicommand state. If **Feedback Values** is left blank, the F tag is considered optional. If **Feedback Values** is non-blank, the F tag is required.

For IEC MultiCommands, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
QDS	External	Optional	Quality Descriptor
CB	External	See below**	Check Back Information
RCmdEX	External	See below**	Command Execute
RSEL	External	See below**	Command Select
RDSEL	External	See below**	Command Deselect

** These tags are related to IEC Select-Execute behavior. IEC Commands have an operational parameter, **Auto**. When **Auto** is configured as True, select-before-execute is disabled and these tags are optional. When **Auto** is configured as False, select-before-execute is enabled and these tags are required.

For DNP MultiCommands, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
FLAG	External	Optional	Quality Descriptor
STATUS	External	See below***	Check Back Information
RCmdEX	External	See below***	Command Execute
RSEL	External	See below***	Command Select

** These tags are related to DNP Select-Execute behavior. DNP MultiCommands have an operational parameter, Automatic Mode. The selection you make for Automatic Mode will determine which of these tags are optional and which are required.

MultiState

Tag	External or Indirect	Required or optional	Description
Tag	External or Indirect	Required or Optional	Description
RV	External	R	Raw value from RTU

Pump

Tag	External or Indirect	Required or optional	Description
Tag	External or Indirect	Required or Optional	Description
Auto	External	R	Auto mode indicator
Manual	External	See below*	Manual mode indicator (2 bit operation only)
DeviceOn	External	R	Pump is on indicator
DeviceOff	External	See below*	Pump is off indicator (2 bit operation only)
StartingUp	External	R	Pump is starting up indicator
Stopping	External	R	Pump is stopping indicator
RCmdAuto	External	R	Commands the pump to Auto mode
RCmdManual	External	See below*	Commands the pump to Manual mode
RCmdOn	External	R	Commands the pump on
RCmdOff	External	See below*	Commands the pump off
RCmdReset	External	O	Commands the pump to reset
Maintenance	External	O	Indicates that the pump is in a "maintenance" mode
NotControllable	External	O	Indicates that an attempt was made to control the pump when not in a controllable state
OverTemp	External	O	Indicates that the pump has overheated
ProtectionFault	External	O	Indicates that the pump has detected a protection fault
ILK1	Indirect	O	Interlock 1
ILK2	Indirect	O	Interlock 2

* Pumps have an operational parameter called **NumBits** that indicates whether the pump is controlled and indicated by 1 bit or 2 bits. If **NumBits** is set to 2, these tags are all required, since there are separate bits to indicate on and off and separate bits to indicate auto and manual. If **NumBits** is set to 1, these tags are optional since only one bit in the RTU is used to convey on versus off and only one bit in the RTU is used to convey auto versus manual. (The operational parameter, **OnSense** is used to distinguish on versus off. The operational parameter **AutoSense** is used to distinguish auto versus manual).

For IEC Pumps, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
SIQOFF	External	Optional	Quality Descriptor – Off Indicator
SIQON	External	Optional	Quality Descriptor – On Indicator
CBOff	External	See below* **	Checkback for turning Pump off
CBOn	External	See below**	Checkback for turning Pump on
RCmdOffEX	External	See below* **	Execute Command for turning Pump off
RCMDOnEX	External	See below**	Execute Command for turning Pump on

Tag	External or Indirect	Required or optional	Description
RSELOff	External	See below* **	Select Command for turning Pump off
RSELOn	External	See below**	Select Command for turning Pump on
RDSELOff	External	See below* **	Deselect Command for turning Pump off
RDSELOn	External	See below**	Deselect Command for turning Pump on

* As described above for tags such as **RCmdOff**, These tags are optional if the operational parameter called **NumBits** is set to 1, and are required if this parameter is set to 2.

** These tags are related to IEC Select-Execute behavior. IEC Pumps have an operational parameter, **Auto**. When **Auto** is configured as True, select-before-execute is disabled and these tags are optional. When **Auto** is configured as False, select-before-execute is enabled and these tags are required.

For DNP Pumps, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
FLAGOFF	External	Optional	Quality Descriptor – Off Indicator
FLAGON	External	Optional	Quality Descriptor – On Indicator
STATUSOff	External	See below* ***	Checkback for turning Pump off
STATUSOn	External	See below***	Checkback for turning Pump on
RCmdOffEX	External	See below* ***	Execute Command for turning Pump off
RCMDOnEX	External	See below***	Execute Command for turning Pump on
RSELOff	External	See below* ***	Select Command for turning Pump off
RSELOn	External	See below***	Select Command for turning Pump on

*** These tags are related to DNP Select-Execute behavior. DNP Pumps have an operational parameter, Automatic Mode. The selection you make for Automatic Mode will determine which of these tags are optional and which are required.

Scaled Analog

Tag	External or Indirect	Required or optional	Description
RF	External	R	Feedback from RTU
RSP	External	R	The setpoint value sent to the RTU

Setpoint

Tag	External or Indirect	Required or optional	Description
RSP	External	R	The setpoint value sent to the RTU
ILK1	Indirect	O	Interlock 1
ILK2	Indirect	O	Interlock 2

5.7 Instantiating Standard TeleControl Objects

Tag	External or Indirect	Required or optional	Description
RF	External	See below*	Feedback from RTU
RTU_LOCAL	External	O	Indicates that the setpoint is being set from a local source

* Setpoints have an operational parameter called **Feedback Required** that indicates whether feedback is required. If **Feedback Required** is set to False, the **RF** tag is considered optional. If **Feedback Required** is True, the **RF** tag is required.

For IEC Setpoints, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
QDS	External	Optional	Quality Descriptor
CB	External	See below**	Check Back Information
RSPEX	External	See below**	Setpoint Execute
RSEL	External	See below**	Setpoint Select
RDSEL	External	See below**	Setpoint Deselect

** These tags are related to IEC Select-Execute behavior. IEC Setpoints have an operational parameter, **Auto**. When **Auto** is configured as True, select-before-execute is disabled and these tags are optional. When **Auto** is configured as False, select-before-execute is enabled and these tags are required.

For DNP Setpoints, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
FLAG	External	Optional	Quality Descriptor
STATUS	External	See below***	Check Back Information
RSPEX	External	See below***	Setpoint Execute
RSEL	External	See below***	Setpoint Select

*** These tags are related to DNP Select-Execute behavior. DNP Setpoints have an operational parameter, Automatic Mode. The selection you make for Automatic Mode will determine which of these tags are optional and which are required.

Simple Analog

Tag	External or Indirect	Required or optional	Description
RF	External	R	Feedback from RTU
RSP	External	R	The value sent to the RTU

Simple Measured Value

Tag	External or Indirect	Required or optional	Description
RV	External	R	Raw value from RTU

Status Display

Tag	External or Indirect	Required or optional	Description
RV	External	R	Raw value from RTU

Toggle Command

Tag	External or Indirect	Required or optional	Description
F	External	R	Feedback from RTU
RCmd	External	R	The command to the RTU

Valve

Tag	External or Indirect	Required or optional	Description
Tag	External or Indirect	Required or Optional	Description
Auto	External	R	Auto mode indicator
Manual	External	See below*	Manual mode indicator (2 bit operation only)
DeviceOn	External	R	Valve is open indicator
DeviceOff	External	See below*	Valve is closed indicator (2 bit operation only)
StartingUp	External	R	Valve is closing up indicator
Stopping	External	R	Valve is opening indicator
RCmdAuto	External	R	Commands the valve to Auto mode
RCmdManual	External	See below*	Commands the valve to Manual mode
RCmdOn	External	R	Commands the valve open
RCmdOff	External	See below*	Commands the valve closed
RCmdReset	External	O	Commands the valve to reset
Maintenance	External	O	Indicates that the valve is in a "maintenance" mode
NotControllable	External	O	Indicates that an attempt was made to control the valve when not in a controllable state
OverTemp	External	O	Indicates that the valve has overheated
ProtectionFault	External	O	Indicates that the valve has detected a protection fault
ILK1	Indirect	O	Interlock 1
ILK2	Indirect	O	Interlock 2

* Valves have an operational parameter called **NumBits** that indicates whether the valve is controlled and indicated by 1 bit or 2 bits. If **NumBits** is set to 2, these tags are all required, since there are separate bits to indicate open and closed and separate bits to indicate auto and manual. If **NumBits** is set to 1, these tags are optional since only one bit in the RTU is used to

5.7 Instantiating Standard TeleControl Objects

convey open versus closed and only one bit in the RTU is used to convey auto versus manual. (The operational parameter, **OnSense** is used to distinguish open versus closed. The operational parameter **AutoSense** is used to distinguish auto versus manual).

For IEC Valves, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
SIQOFF	External	Optional	Quality Descriptor – Off Indicator
SIQON	External	Optional	Quality Descriptor – On Indicator
CBOff	External	See below* **	Checkback for closing valve
CBOOn	External	See below**	Checkback for opening valve
RCmdOffEX	External	See below* **	Execute Command for closing valve
RCMDOnEX	External	See below**	Execute Command for opening valve
RSELOff	External	See below* **	Select Command for closing valve
RSELOn	External	See below**	Select Command for opening valve
RDSELOff	External	See below* **	Deselect Command for closing valve
RDSELOn	External	See below**	Deselect Command for opening valve

* As described above for tags such as **RCmdOff**, These tags are optional if the operational parameter called **NumBits** is set to 1, and are required if this parameter is set to 2.

** These tags are related to IEC Select-Execute behavior. IEC Valves have an operational parameter, **Auto**. When **Auto** is configured as True, select-before-execute is disabled and these tags are optional. When **Auto** is configured as False, select-before-execute is enabled and these tags are required.

For DNP Valves, the following additional tags are available.

Tag	External or Indirect	Required or optional	Description
FLAGOFF	External	Optional	Quality Descriptor – Off Indicator
FLAGON	External	Optional	Quality Descriptor – On Indicator
STATUSOff	External	See below* ***	Checkback for closing valve
STATUSOn	External	See below***	Checkback for opening valve
RCmdOffEX	External	See below* ***	Execute Command for closing valve
RCMDOnEX	External	See below***	Execute Command for opening valve
RSELOff	External	See below* ***	Select Command for closing valve
RSELOn	External	See below***	Select Command for opening valve

*** These tags are related to DNP Select-Execute behavior. DNP Valves have an operational parameter, Automatic Mode. The selection you make for Automatic Mode will determine which of these tags are optional and which are required.

5.8 Upgrading Versions of Instances

The standard HMI Library types are identified by a name combined with a version number. For example, MeasuredValue_V1 represent Version 1 of Measured Value type. New versions that become available may include new versions of one or more types. New versions are identified by a change to the version number – for example, a new version of the MeasuredValue type might have a type name of "MeasuredValue_V2", indicating Version 2.

When versions are upgraded, you may optionally choose to update your project to take advantages of new features of types. You may wish to "upgrade" instances of a type to a newer version. In some cases, you may wish to upgrade only a subset of your instances, or not upgrade any instances, but rather, use the new type for any new instances.

The Instance Upgrade Wizard provides a simple way to upgrade the instances of Library types when new versions become available. Several options are provided to allow complete control of exactly when specific instances are upgraded.

Note

The basis of the Instance Upgrade Wizard are types following the type name format "name_Vx", where "x" is a version number. When using the DBA Type Editor to create a custom type library, you are encouraged to use the same version naming conventions. This allows the Instance Upgrade Wizard to be used to manage the versions of instances of custom types as well as standard Library types. Refer to the topic "Managing Multiple Versions of Types" in the DBA Type Editor Guide" for more details.

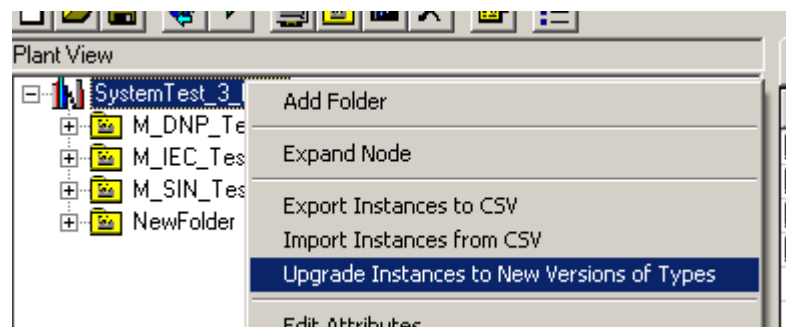
Note

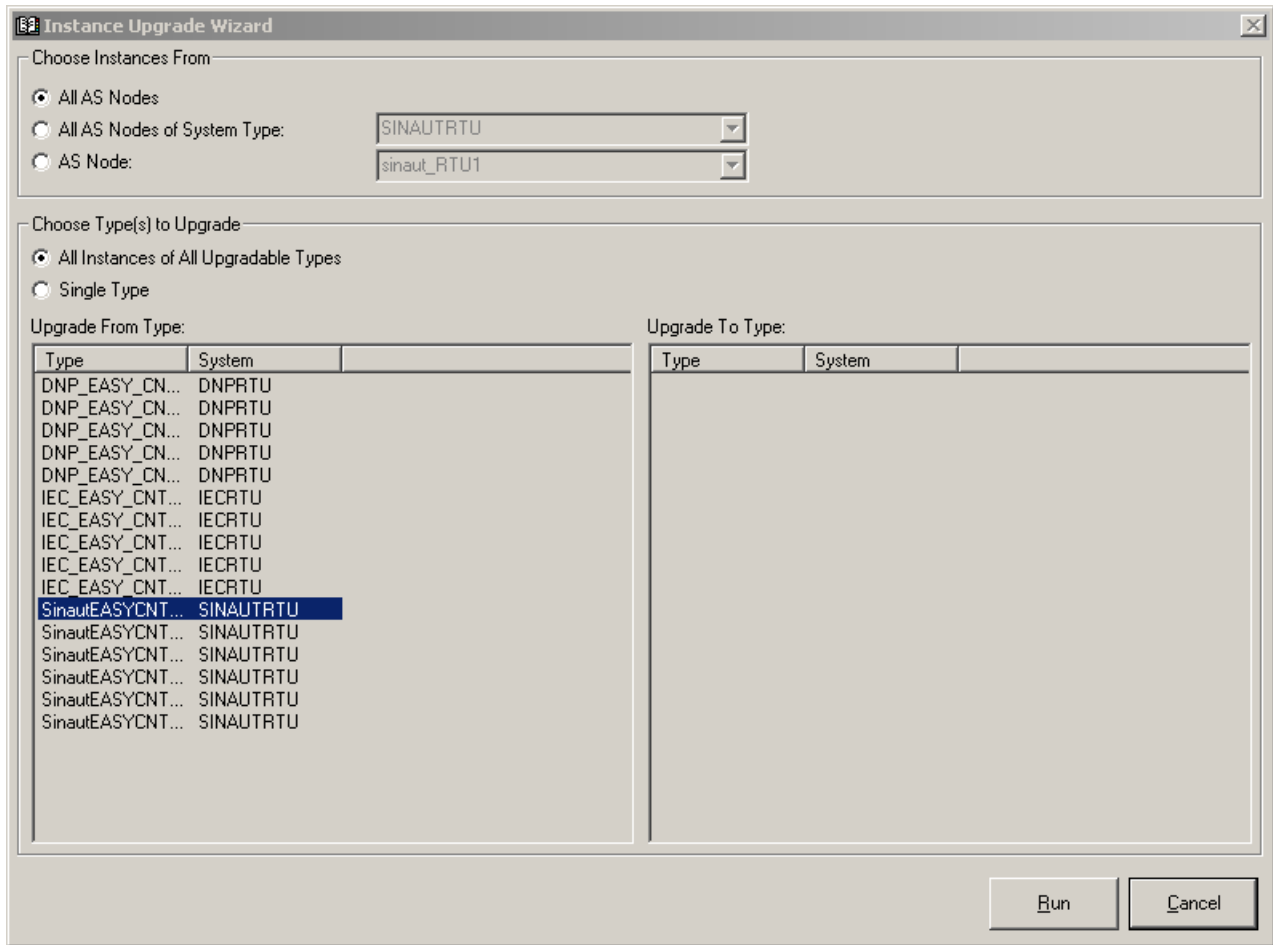
If you upgrade instances that have already been compiled in your project, a full compile will be necessary. You will be asked to confirm that you would like to complete an instance upgrade if a full compile will be necessary.

5.8.1 Using the Instance Upgrade Wizard

To upgrade instances, follow these steps:

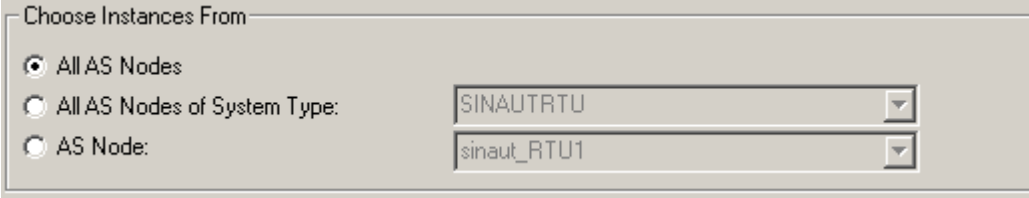
1. Launch the Instance Upgrade Wizard by right clicking on the root node of the Plant View:





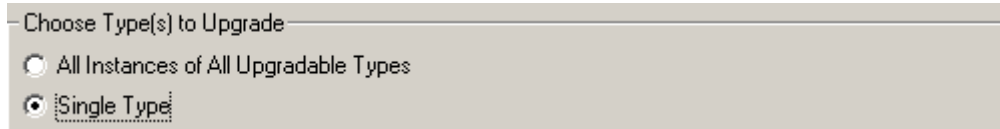
2. Select the candidate instances that you would like to consider for upgrade.

Three options are available:

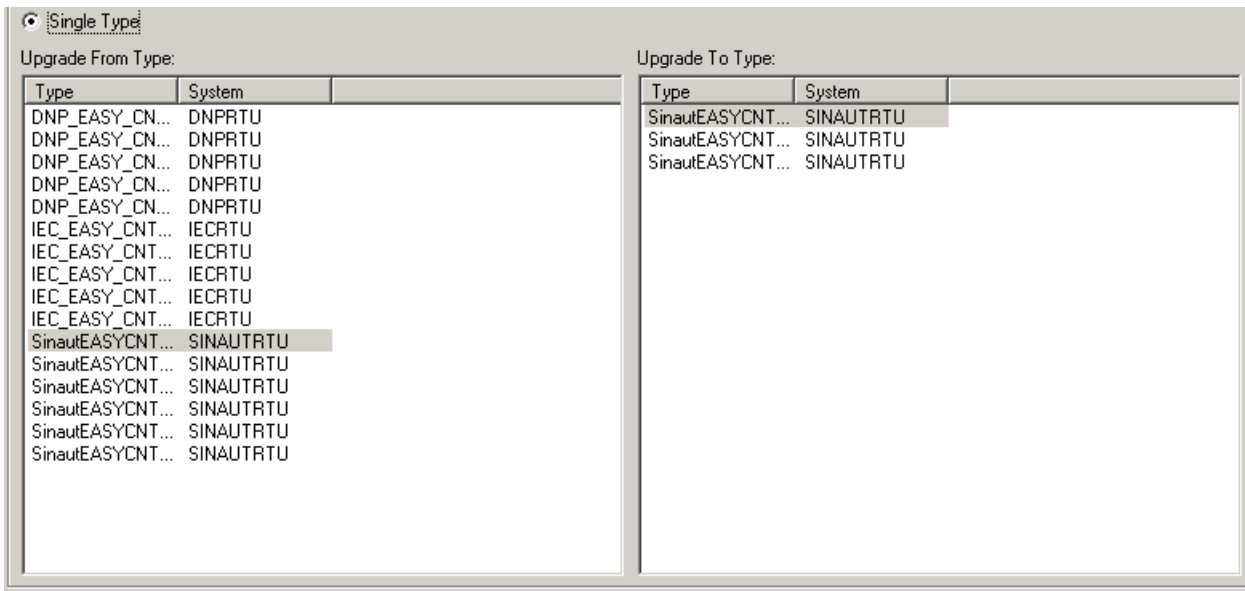


1. All AS Nodes – if you select this option, all instances from all of the AS Nodes in your project can be selected for upgraded.
2. All AS Nodes of System Type : If you have configured AS Nodes that use different protocols (System Types), then you can restrict the instances to a specific System Type. When this option is selected, an additional drop down list is enabled showing all of the various system types in your project. So, for example, if you have AS Nodes of type Modbus and DNP, you can select this option and the pull down "DNP" to only consider instances of DNP AS Nodes for upgrade.

3. AS Node – select this option if you would like to only consider the instances of one specific AS in project for upgrade.
4. Select the types that you would like to consider for upgrade. There are two choices available:

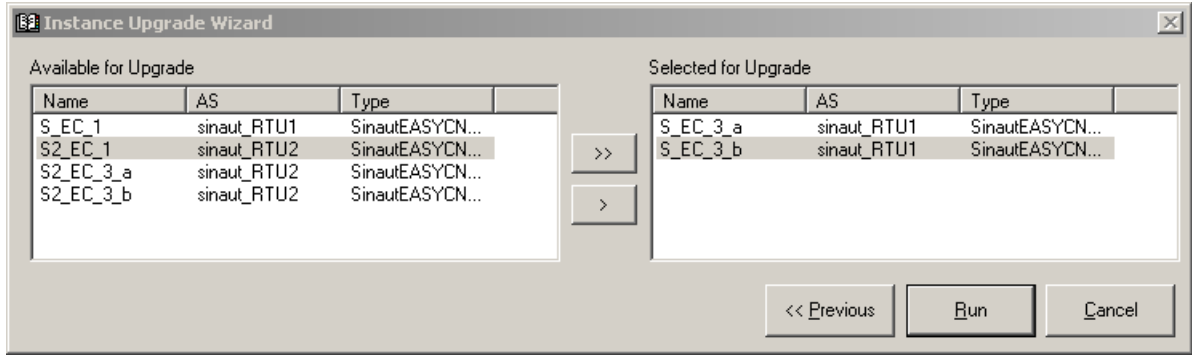


- a. All Instances of All Upgradeable Types – select this option if you would like the wizard to find all types that are upgradeable – that is all types that have a version installed that is higher than the version of one or more existing instances. All instances of such upgradeable types will be automatically selected when you select "Run" – no further selection of instances is necessary.
- b. Single Type – when this option is selected, type selection windows are enabled that allow you to select an individual upgradeable type that you would like to upgrade from, as well as which version of the type to upgrade to.



Select a type to upgrade from using the selection window on the left side. The right side will be updated to show all of the types that the selected type can be upgraded to.

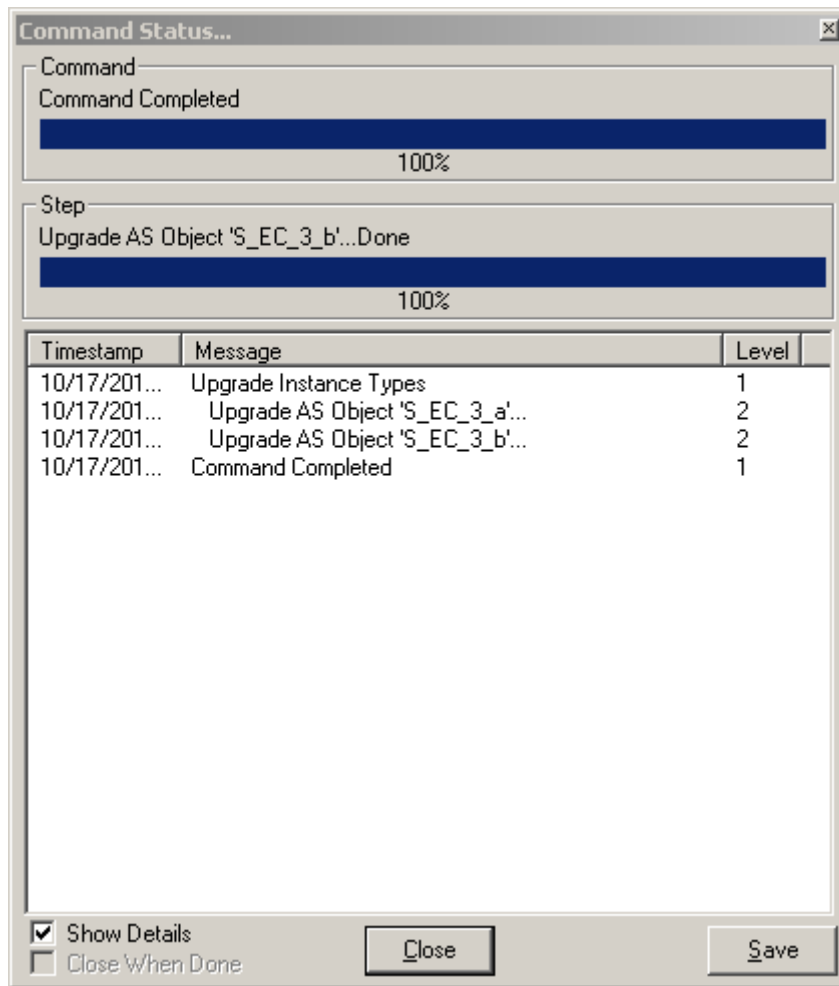
- 5. If you have chosen to upgrade a "Single Type", click "Next" and another screen is shown that allows you to select the instances to be upgraded.



The left hand side shows all instances of the selected "From" type. Use the arrows in the middle of the window to select specific instances to be upgraded. The double arrows can be used to move all instances.

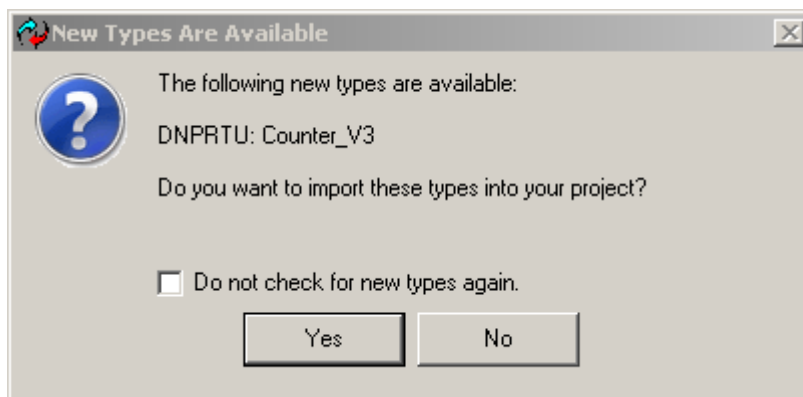
Use the "Previous" button to return to update your type selection.

- 6. Click **Run** to initiate the upgrade. A progress window appears indicating which instances are being upgraded. (When the upgrade is completed, you can save the progress report as a log if you wish to retain a record of the upgrade process).



5.8.2 Importing new versions of Standard Library Types

When upgrading versions, new type versions might become available. If new type versions have been provided, the first time a DBA project is opened after the upgrade, the following dialog will be changed.



5.8 Upgrading Versions of Instances

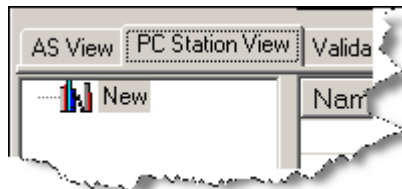
If you select **"Yes"**, new versions of the type will be included in your project. This will allow you to use the new versions when creating instances. In addition, if you have used older versions of the types, you can then use the Instance Upgrade Wizard to upgrade your existing instances.

You can select **"No"**, and you will be continued to be ask this question each time you open your project. If you know that you don't have a need to use the new versions, you can select the checkbox "Do Not Ask Me Again" and you will not be asked again.

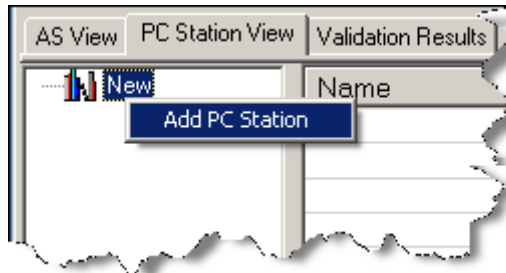
PC Station View

6.1 Adding a PC Station

1. Start the DBA Utility and open an existing DBA project or create and open a new project. See *Creating or Opening a DBA Project* (Page 17) and *Opening, Saving and Closing a DBA Project* (Page 17).
2. Select the **PC Station View** tab in the bottom pane. A node named **New** appears in the window:



3. Right-click the **New** node and select **Add PC Station**:



4. Enter a meaningful name for the Master PC Station. The bottom right pane provides a Value column for entering the PC station name, **Node_052** in the example below:

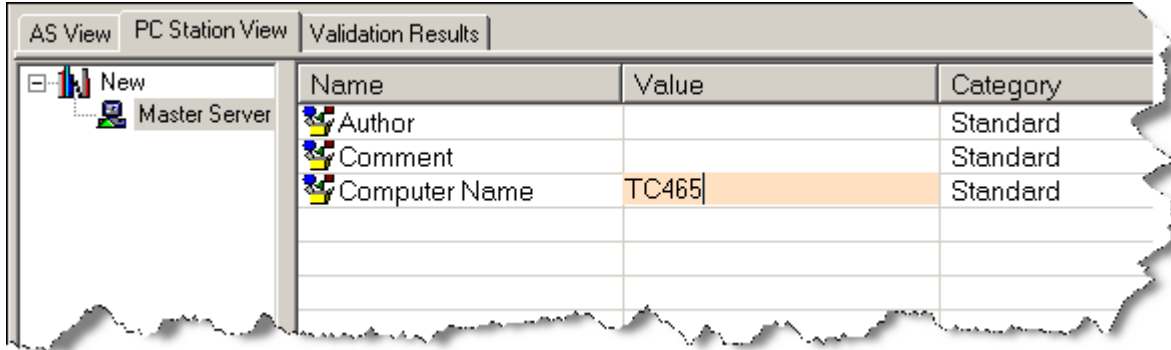
Name	Value	Category	Description
Author		Standard	Name and/or department ...
Comment		Standard	Additional documentation.
Computer Name	Node_052	Standard	Name of the Computer.

5. Repeat steps 2-4 to insert a Standby PC Station. After a PC station is added, you can add an application to it.

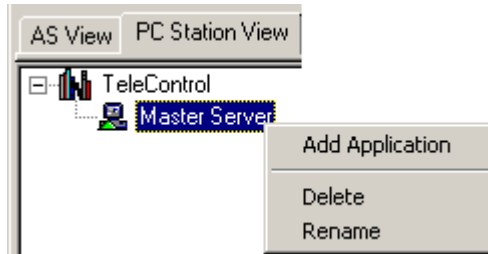
6.2 Adding PC Station Applications

Within the context of the DBA utility program, to add an application to a PC station is to specify or determine its function within a system architecture.

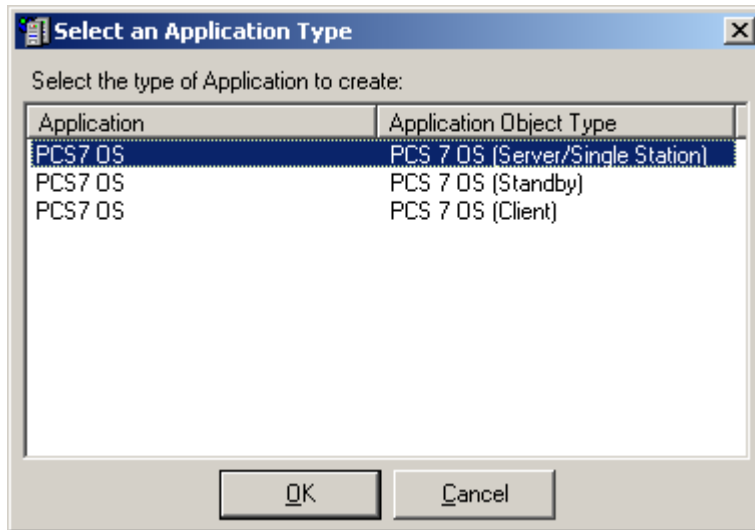
1. Using the procedure in Adding a PC Station (Page 189), add a master PC station for the OS single station. In the illustration below, this PC station has been added and its name has been changed to **Master Server**.
2. With the Master PC Station selected in the left pane, enter the computer name in the **Value** column in the right pane.



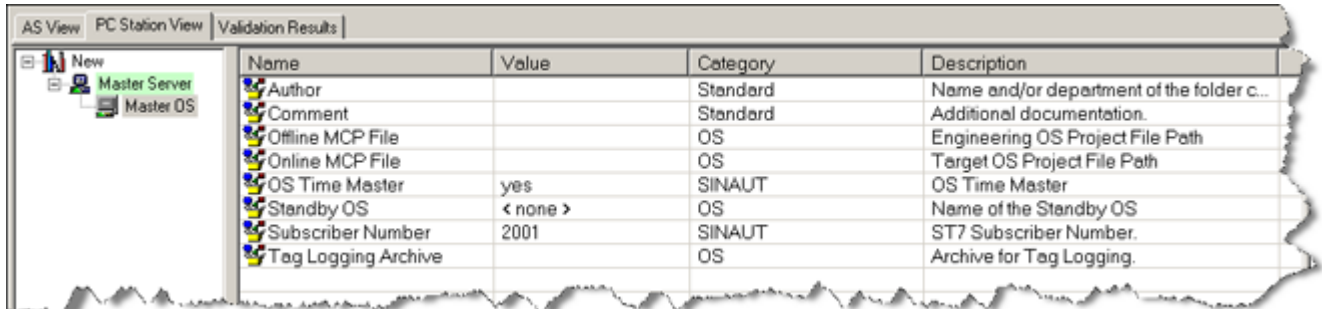
3. Right-click the PC station and select **Add Application** from the context menu:



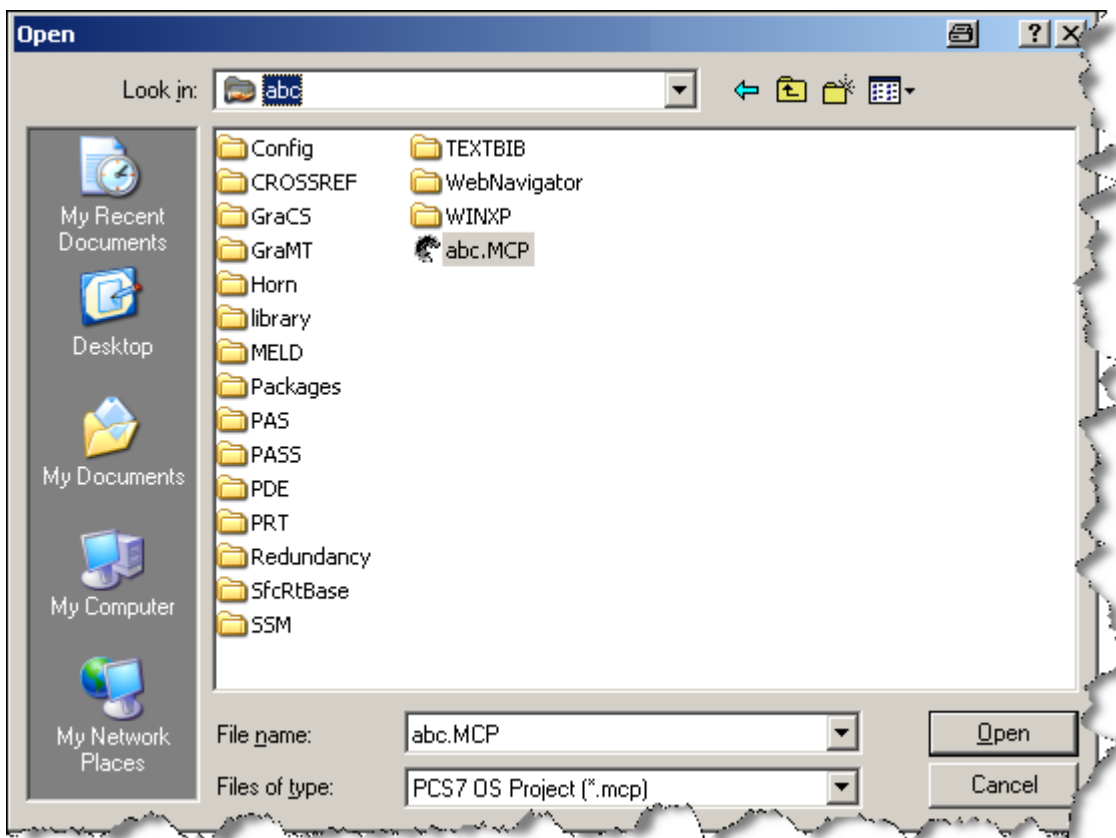
The **Select an Application Type** window appears:



4. Select **PCS 7 OS (Server/Single Station)** and click the **OK** button.
A properties window opens:



5. In the **Offline MCP File** Value field, use the browse button **...** to find the name of the current PCS 7 OS project. This project resides on the system performing engineering functions. A dialog box is displayed for opening files. You can search for and select the **.MCP** file assigned to the project here:



6.2 Adding PC Station Applications

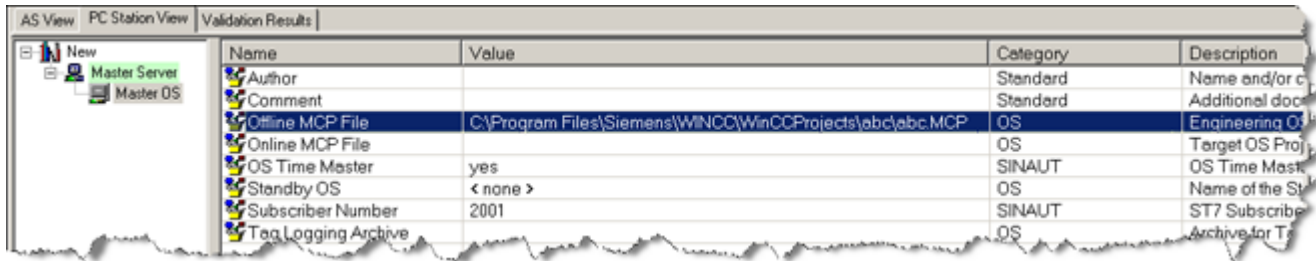
- 6. In the **Online MCP File** value field, browse to or enter the network address of the online or target .MCP file.

Note

This field is optional, but it is necessary if you plan to use the Parameter Readback feature of DBA, as this identifies the online WinCC project that will be used when reading back parameters from the online system into the DBA project.

If your WinCC Application is a Single Station project, if you plan to use the Parameter Readback feature of DBA, leave this field blank.

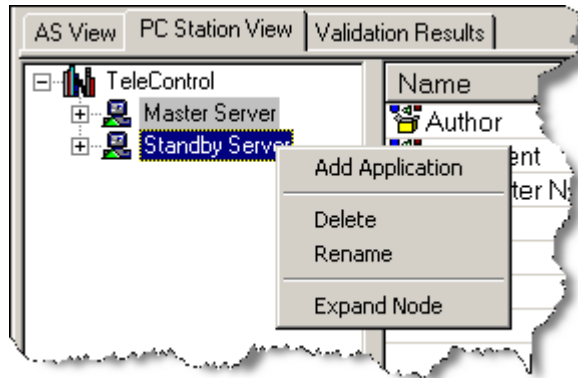
- 7. After you click the **OPEN** button, the **Offline MCP File** value field contains the filename and path of the .MCP file:



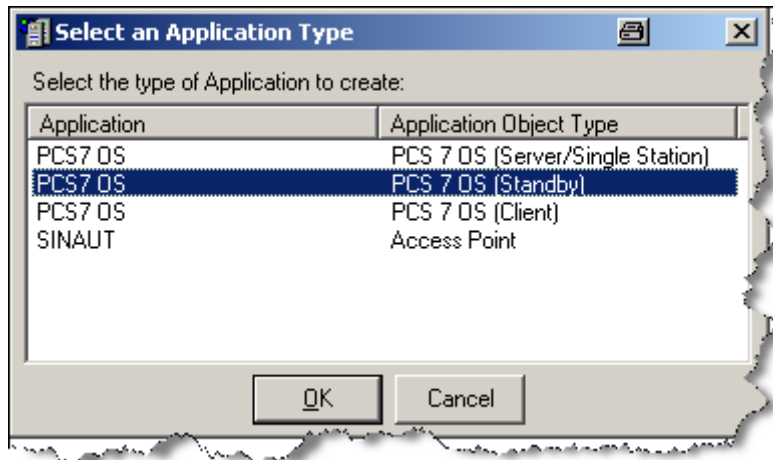
Note

Multiple OS nodes can not be assigned to the same .MCP file.

- 8. To configure a standby PC station first of all add a standby server as follows: Right-click in the left pane and select **Add application**.

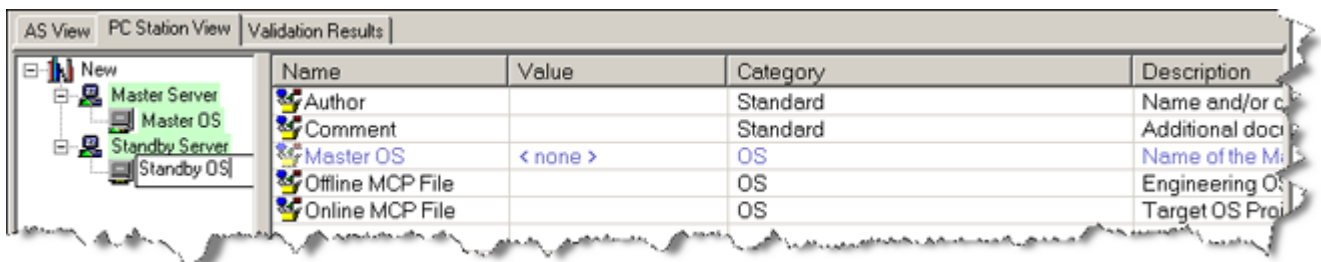


- In the **Select an Application Type** dialog, select **PCS 7 OS (Standby)**, and click **OK**.



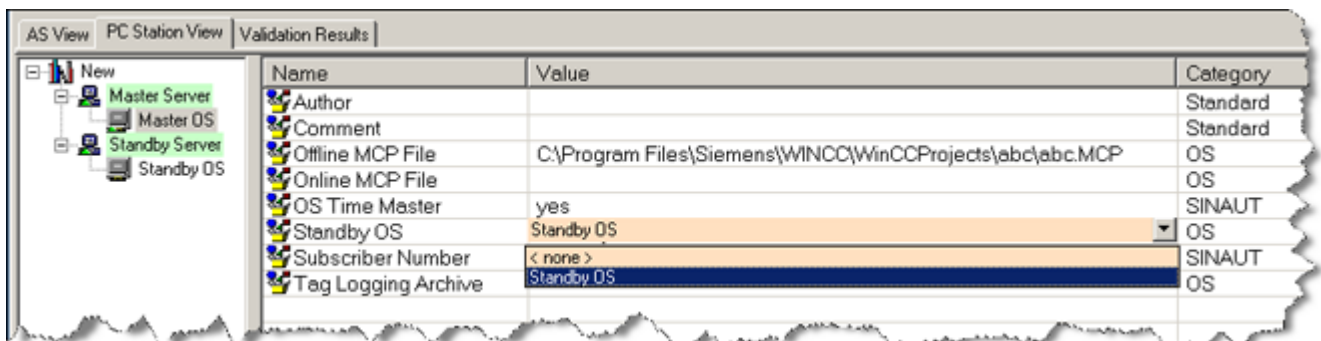
- Click the + icon to the left of the Standby Station to expand the browser tree.

- Enter a meaningful name for the Standby OS.



- Repeat these steps for every OS server or OS server pair in your system.
An alternate method to specify PC station application properties is available. See *Editing Application Properties* (Page 199).

- If a Standby has been defined, the Standby OS Attribute for the Master OS will have a drop-down list in the **Value** field with the standby OS available as a selection. Any time after the standby has been defined, you can return to the Master OS Standby OS attribute field to link the Master with the appropriate standby server.



6.2.1 Configuring Tag Logging

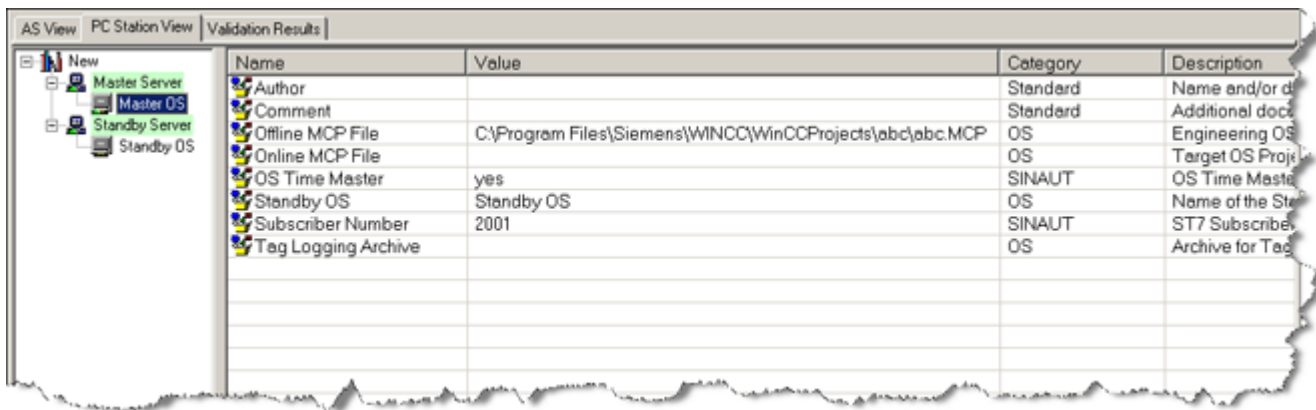
To use the integrated feature of automatically creating Archive tags in PCS 7 OS, follow these steps:

1. Use the Tag Logging Editor in WinCC Explorer to create one or more Tag Archives. These can be created via the WinCC-integrated wizard or manually. Refer to WinCC documentation for details regarding these features.

Note

When using the Tag Logging Wizard, it is recommended that you name the archive SystemArchive for compatibility with PCS 7 trending faceplates.

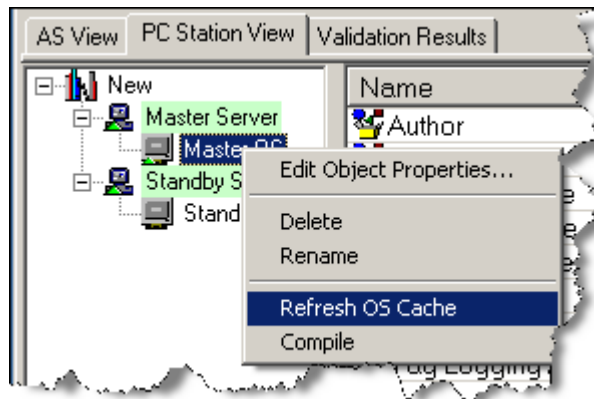
2. Click on the OS Server node in the PC Station view to display the OS Server attributes.



3. Right-click on the OS Server node and select **Refresh OS Cache**. (Refer to the section titled Updating OS Cache (Page 200) for details regarding this step.)
4. Click in the **Value** field of the Tag Logging Archive attribute to display a list of the archives configured in WinCC. Select the appropriate archive for your application.

Note

If the drop-down list remains empty or incomplete after you have created one or more Tag Archives in WinCC, right-click on the OS Server in the PC Station view and choose the context command, **Refresh OS Cache** (see Updating OS Cache (Page 200)).

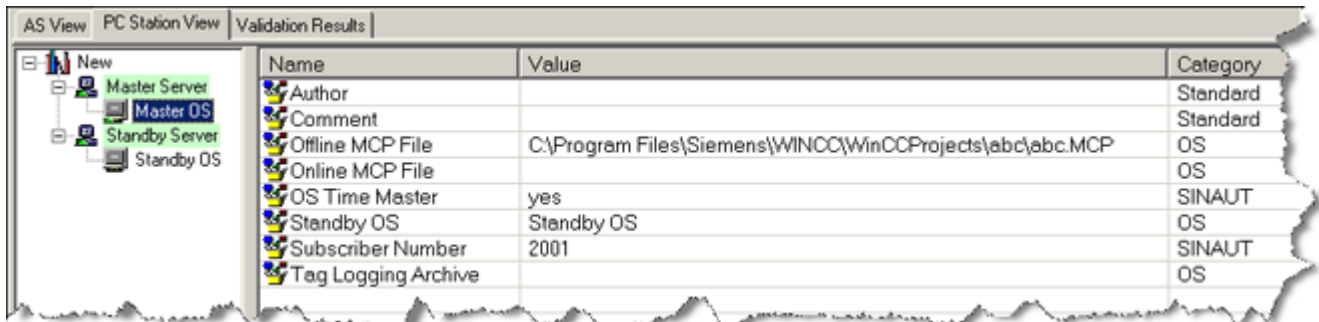


6.2.2 Configuring SINAUT OS Parameters

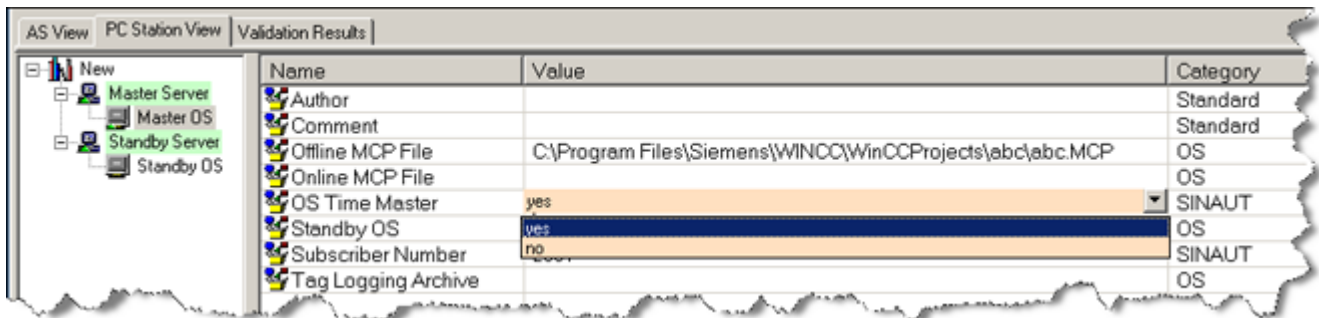
If an OS is being used to communicate with SINAUT devices, 2 additional parameters must be configured in the PC Server application. (Note: It is only necessary to configure these parameters for the Master OS. The Standby OS does not require configuration of these parameters.)

To configure the SINAUT OS parameters:

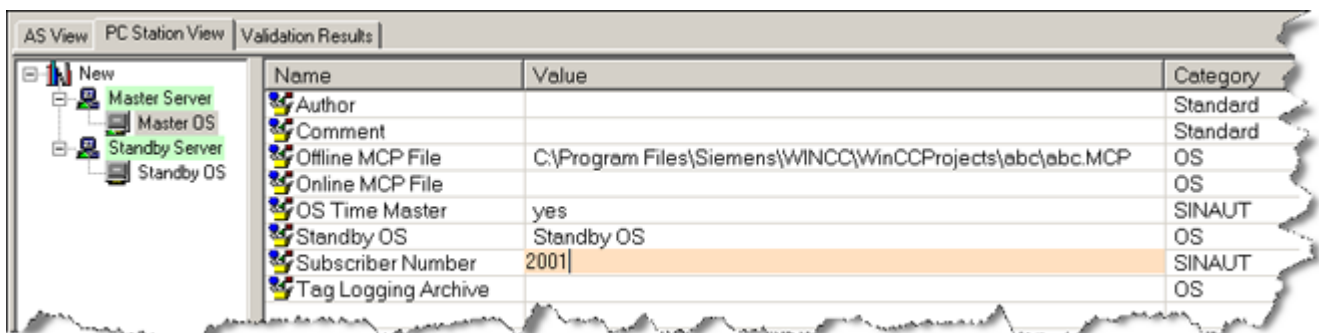
1. Select an OS Server application under a PC Station node:



2. In the attribute view to the left, indicate whether or not the OS Server is to be the time master for connected devices. A drop down list allows **Yes** or **No** to be selected.



3. Specify the subscriber number of the OS.



6.2.3 Configuring IEC 60870 OS Properties

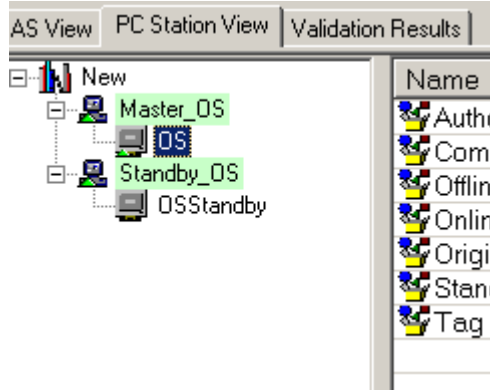
If an OS is being used to communicate with IEC devices, an additional parameter may be configured for this in the PC Server application. It is possible, and may be necessary, to configure this parameter for both the Master OS and the standby OS.

6.2 Adding PC Station Applications

This parameter is the originator address. It is generally only required when multiple OS systems (including other non-PCS 7 systems) will be communicating with the same IEC devices. Otherwise, it is possible to leave this setting at its default value, 0.

To configure the IEC OS parameters:

1. Select an OS Server application under a PC Station node:



2. In the attribute view to the left, specify the originator address of the OS.

Name	Value	Category	Description
Author		Standard	Name and/or department of t
Comment		Standard	Additional documentation.
Offline MCP File		OS	Engineering OS Project File F
Online MCP File		OS	Target OS Project File Path
Originator Address		IEC	Originator Address
Standby OS	< none >	OS	Name of the Standby OS
Tag Logging Archive		OS	Archive for Tag Logging

3. Repeat these steps for every relevant Master and Backup OS server.

6.2.4 Configuring EDC OS Properties

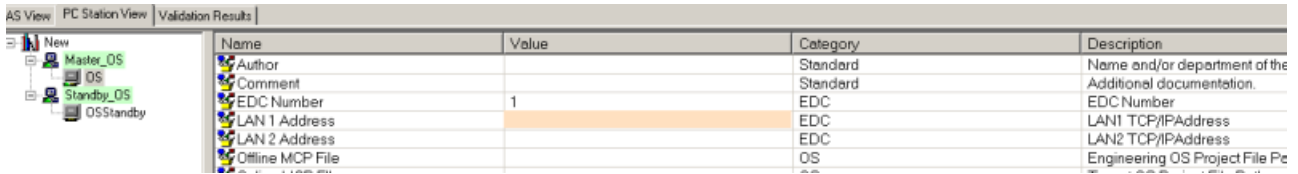
If an OS is being used to communicate with EDC devices, additional parameters must be configured in the PC Server application. (Note: In redundant server architectures, it is necessary to configure these parameters for both Master and Standby OS's.)

To configure the EDC parameters:

1. Select an OS Server application under a PC Station node:
2. In the attribute view to the left, specify the EDC Number of the OS.

Name	Value	Category	Description
Author		Standard	Name and/or department of
Comment		Standard	Additional documentation.
EDC Number	1	EDC	EDC Number
LAN 1 Address		EDC	LAN1 TCP/IPAddress
LAN 2 Address		EDC	LAN2 TCP/IPAddress

- Specify the TCP/IP addresses for LAN1, and in the case of redundant connections, LAN2.



Name	Value	Category	Description
Author		Standard	Name and/or department of the
Comment		Standard	Additional documentation.
EDC Number	1	EDC	EDC Number
LAN 1 Address		EDC	LAN1 TCP/IPAddress
LAN 2 Address		EDC	LAN2 TCP/IPAddress
Offline MCP File		OS	Engineering OS Project File Pe

- Repeat these steps for every relevant Master and Backup OS server.

6.2.5 Configuring DNP OS Properties

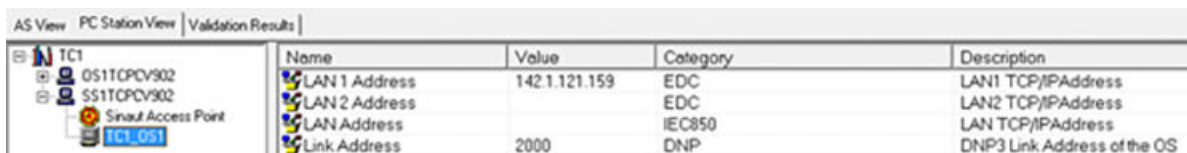
If an OS is being used to communicate with DNP devices, additional parameters must be configured in the PC Server application.

Note

In redundant server architectures, it is necessary to configure these parameters for both Master and Standby OS's.

To configure the DNP parameters:

- Select an OS Server application under a PC Station node:
- In the attribute view to the left, specify the DNP Number of the OS.



Name	Value	Category	Description
LAN 1 Address	142.1.121.159	EDC	LAN1 TCP/IPAddress
LAN 2 Address		EDC	LAN2 TCP/IPAddress
LAN Address		IEC850	LAN TCP/IPAddress
Link Address	2000	DNP	DNP3 Link Address of the OS

- Specify the TCP/IP addresses for LAN1, and in the case of redundant connections, LAN2.
- Specify the link address of the OS.
- Repeat these steps for every relevant Master and Backup OS server.

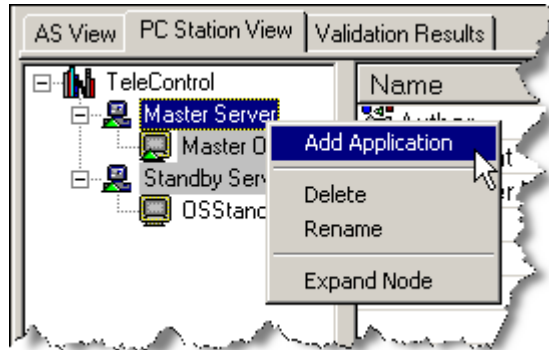
6.3 Adding Sinaut Access Points

For accessing SINAUT networks, Access Points must be configured to match the access points that have been configured for your network in SIMATIC Net. When configuring a SINAUT TIM, it is necessary to specify the Access Point that will be used to communicate with the TIM.

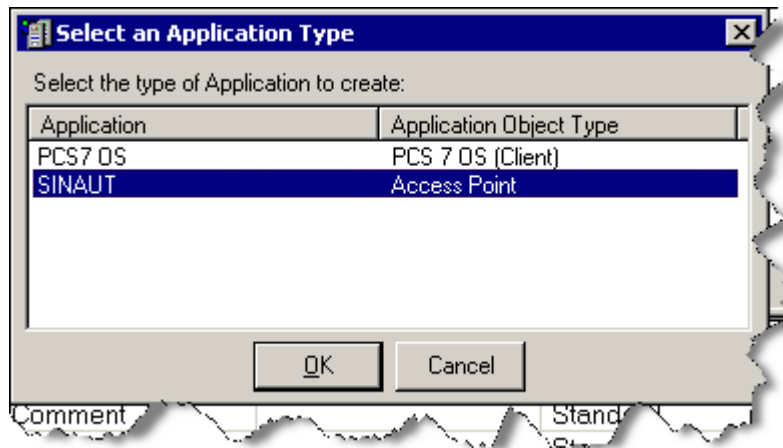
6.3 Adding Sinaut Access Points

To add an access point to a PC Station, follow these steps:

1. In the lower pane of the DBA Utility, right-click the Master PC Station.
2. From the context menu, select **Add Application**.

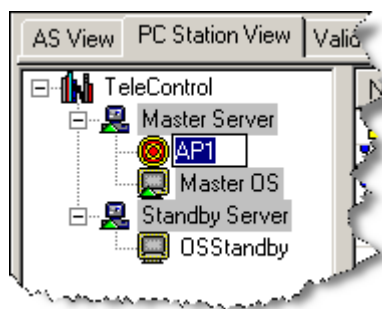


3. In the dialog, select **Access Point**, and click **OK**.

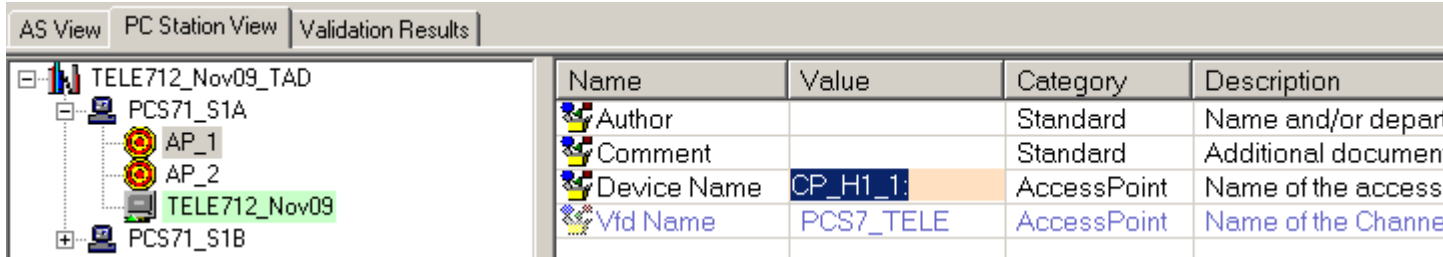


The access point appears under the Master PC Station in the lower left pane.

4. Enter a unique name for the access point.



- With the access point selected in the lower left pane, specify the **Device Name** in the **Value** column in the lower right pane.

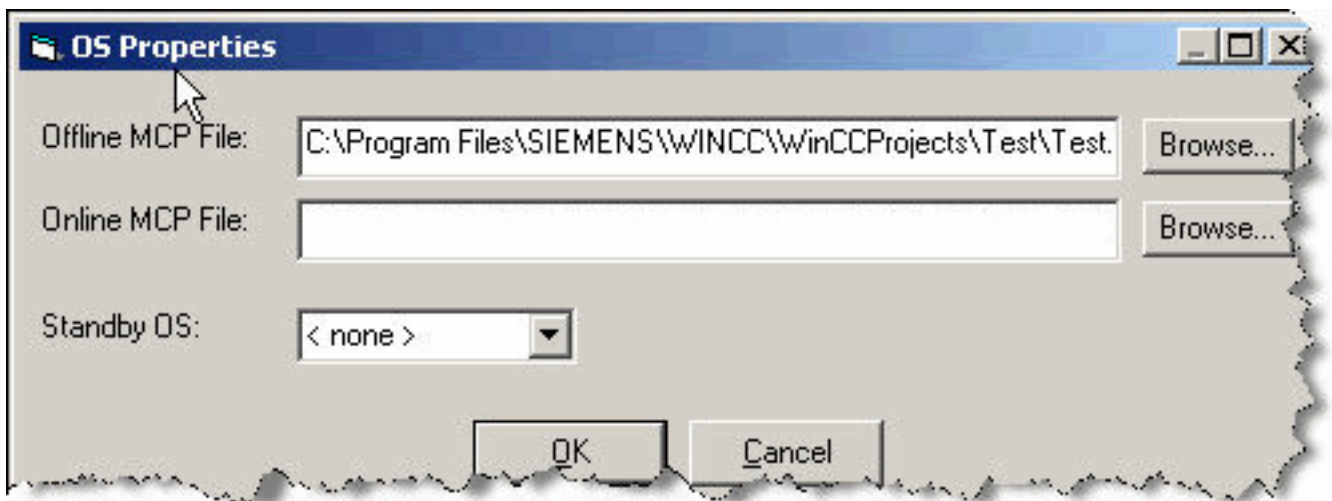


- Repeat steps 1-5 to add and configure additional access points.

6.4 Editing Application Properties

After an application has been assigned to a PC station, it is possible to change any of the application's primary attributes through this procedure:

- Expand the PC station hierarchy containing the application.
The assigned application or applications are listed.
- Right-click the application of interest.
A context menu appears.
- Select **Edit Object Properties...** from the context menu.
A window opens containing fields for the configurable attributes. The following window is for an OS application:



- Use the **Browse** button if it is available or enter information directly. Click the **OK** button to register any changes.

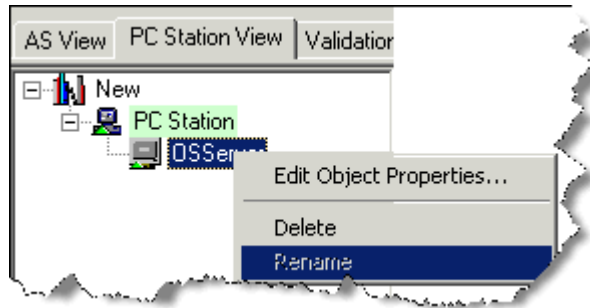
Note

Multiple OS nodes cannot be assigned to the same **.mcp** file.

6.5 Renaming or Deleting an Application from a PC Station

Be sure you understand the automated capabilities of the utility, described in Auto-Assigning AS Objects to the Plant View (Page 216), before performing the following manual procedure:

1. Select the application in the PC Station View
2. Right-click and select **Rename** or **Delete** from the menu:



3. If you click **Rename**, the application name becomes selected, editable text. Type the desired name and press the **Enter** key or move the cursor off the edit box and click.

Note

It is not possible to delete an OS if it is currently assigned to a folder in the Plant View or if it has configured for use with a TeleControl device (e.g., TIM, Modbus RTU). It is not possible to delete an Access Point if it has configured for use with a TeleControl TIM or Sinaut RTU

6.6 Updating OS Cache

To simplify the browsing for information stored in the WinCC database, DBA provides a caching feature.

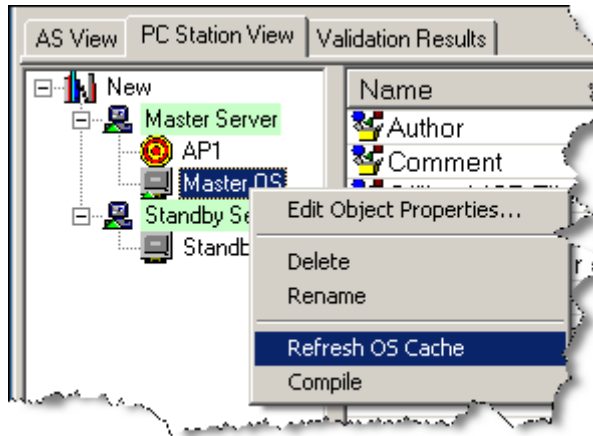
This cache stores alarm class and alarm type information, which is needed when a new alarm class or type is added. Having this information cached permits alarm type and class parameter editing within DBA prior to the first compile.

The cache also stores the names of all Tag Logging archives configured in WinCC.

A cache is maintained for each OS in the DBA project, and it is updated by DBA automatically every time an OS is compiled. It is also possible to update this cache manually.

To update the cache manually:

1. Locate the PC station containing the OS of interest.
2. Right-click the OS application.
3. Select the **Refresh OS Cache** option.



Note

When updating the OS Cache, only standard PCS 7 Alarms Types and Classes, consistent standard PCS 7 OS Alarm Group Display handling as described in PCS 7 Operator Station documentation will be recognized by DBA, and therefore available for use when configuring alarms.

Plant View

7.1 Creating the Plant View

Picture trees in PCS 7 OS are created automatically based on the plant view created in the DBA Utility.

Defining a plant view with the DBA Utility is an interactive process, and the order of steps required varies depending upon whether you are creating a new plant view or modifying an existing one.

You can also use right-click functions to delete plant-view elements and start over without significant additional effort.

Considerations:

- Any folder in a plant view can be assigned an OS.
- After a folder is assigned to an OS, all subordinate folders are assigned to the same OS.
- The structure created in the plant view is reflected in the creation of .pdl graphics and the navigation scheme of active OS projects.
- Tags are automatically translated to the PCS 7 OS environment if they are unique. If they are not unique, the tags cannot be created. The DBA utility displays a validation error upon compilation. See Ensuring Unique Object Names (Page 294).

There are two ways to generate a plant view hierarchy, an automated method and a manual method, which can be used together.

- A manual way to create subordinate structures (folders) in a folder is to select it and use the right-click, create-folder functions to create a hierarchical picture tree (at a maximum of 8 folders deep). The default name is Folder. You can rename these folders with a maximum of 24 characters (unless the permissible size of folders is fewer than 24 characters. See Ensuring Unique Object Names (Page 294)). You can return to this step any time before compiling the database to create or modify the structures.
- Use Plant View Import as described in the Section Plant View Import/Export (Page 207) .
- If you are using Clone Stations (Page 94) you may also be able to Clone the Plant View based on the Plant View assignments of all of the objects in the station being cloned. Refer to Cloning the Plant View (Page 111).

Note

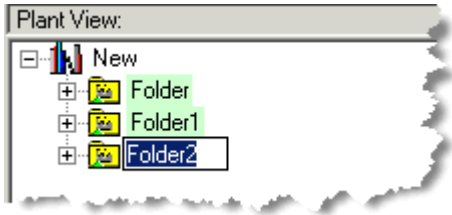
Every folder, or one of its ancestors, should be assigned to an OS in order for its contained tags, messages and pictures to be seen in the Runtime operation. See Assigning an OS to a Plant View Folder (Page 229).

Creating a Plant View

1. In the Plant View quadrant, right-click the root-node icon labeled **New**.
2. Click Add Folder.

7.1 Creating the Plant View

An icon representing a folder appears. (**Folder** is the default name of the first folder created in this way; **Folder_n** is the default name for subsequent folders (where n is incremented.) You can select a folder and right-click to change its name (subject to some restrictions; see Ensuring Unique Object Names (Page 294)). Repeat for each folder you wish to create. In the following illustration, three folders have been created:

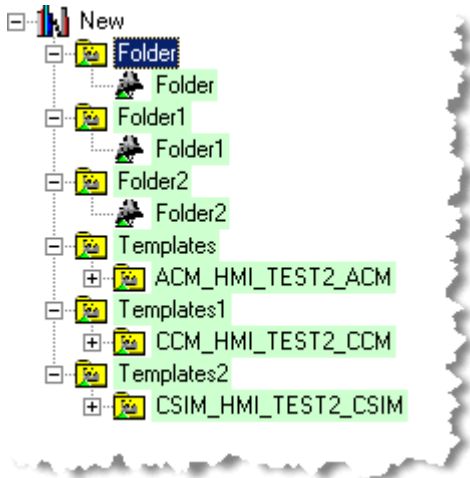


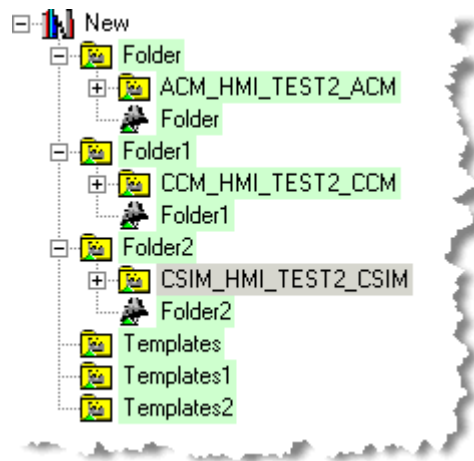
You can combine the automated and manual methods, renaming as necessary.

The illustrations below show three folders created manually (*Folder*, *Folder1* and *Folder2*) and below them three folders created by the Auto-Assign function (*Templates*, *Templates1* and *Templates2*).

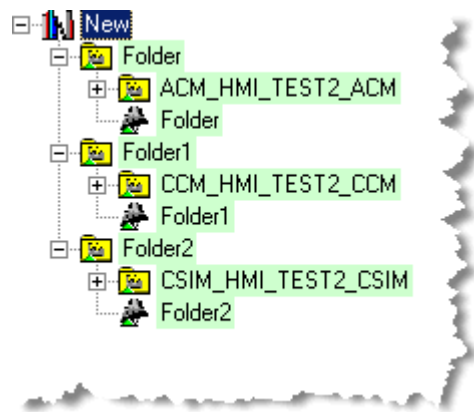
In the first illustration below, the Auto-Assign function has assigned all the AS objects to the templates folders, while the manually created folders remain unpopulated.

In the second illustration below, you see the result of drag-drop of the contents of the templates into the manually created folders, so that the templates are empty and can be deleted.





The illustration below shows the same plant view after the empty templates have been deleted.



A folder can be assigned to an actual OS by right clicking on the folder and selecting **Edit Folder Properties**. See [Assigning an OS to a Plant View Folder](#) (Page 229) for more information.

Note

To drag and drop a folder to re-order the hierarchy, hold down the **CTRL** key while dragging and dropping. Doing so prevents the dropped folder from being assigned as a subfolder.

The DBA utility program creates a picture for each folder, which by default is named Picture. This picture can be deleted or renamed. When you change the name of the folder from the default name to another name, the name of the picture will be automatically changed to match the new folder name. But you can also change the picture name independent of the folder name. If you have renamed the picture name so that it no longer matches the folder name, then the picture name will not be changed upon further changes to the folder name. This can be useful if you have existing pictures (.pdl files) from another source that you would like to assign to a folder in the Plant View, for example.

If the **Create/Update Block Icons** option is set in the Compile dialog box, the DBA utility will create a new picture if the picture does not exist.

See also

Cloning Stations (Page 94)

Auto-Assigning AS Objects to the Plant View (Page 216)

7.2 Adding a Plant View Folder

The plant view is organized into folders. During compilation, a **.pdl** graphics file is created for every folder in the plant view. For every controller object that is assigned to a folder, a block icon for that controller object's type is automatically added to the **.pdl** file that corresponds to that folder, greatly simplifying the process of creating process graphics.

The organization of folders in the picture tree defines the navigation scheme for an OS. The folder names at the level which you designate as the "OS Area" level are seen in the main navigation buttons at the top of the WinCC Runtime window. And the subfolder names of these Area folders are seen when you expand any of the main navigation buttons there.

Procedure

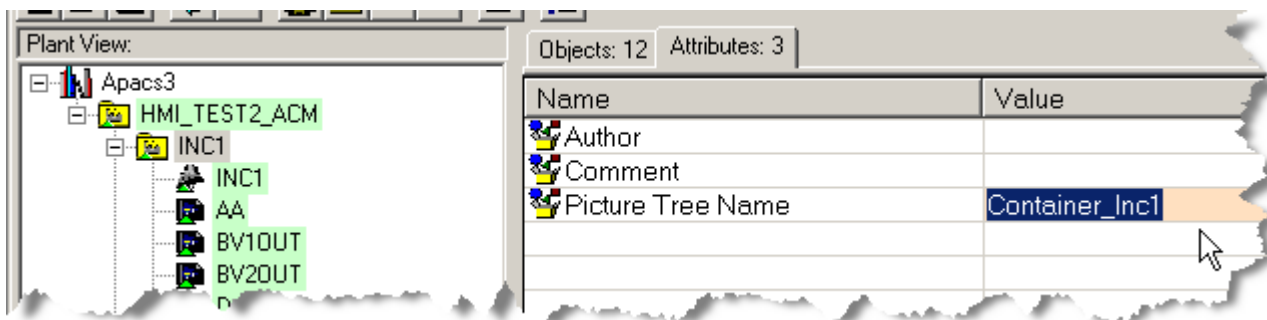
1. Select a folder in the plant view.
2. Select **Edit > Add Folder** (or right-click a folder and select **Add Folder**).
A new folder appears in the plant view.

A folder's default name **Folder** is editable immediately after it has been added. To change the name later, select the folder, right-click, and select **Rename**. If the entered name is not unique, the change is rejected and the old name is restored.

You can add folders eight deep.

PCS 7 OS Picture Tree

When you perform the OS Compile operation in the DBA project, a compile option can include the building of the PCS 7 OS Picture Tree. The Picture Tree can be viewed from the Picture Tree Editor in WinCC Explorer. The folder names you choose in the DBA OS view become the Container names of the Picture Tree by default. But you may override these default names by explicitly naming the "Picture Tree Name" attribute in the OS Details:



In this example, the SIMATIC picture tree acquires a container name "Container_Inc1" in place of the folder name "INC1".

See also

Auto-Assigning AS Objects to the Plant View (Page 216)

7.3 Plant View Import/Export

The Plant View Import/Export feature uses a CSV file, which can be created and edited in Excel, for bulk assignment of AS objects to folders.

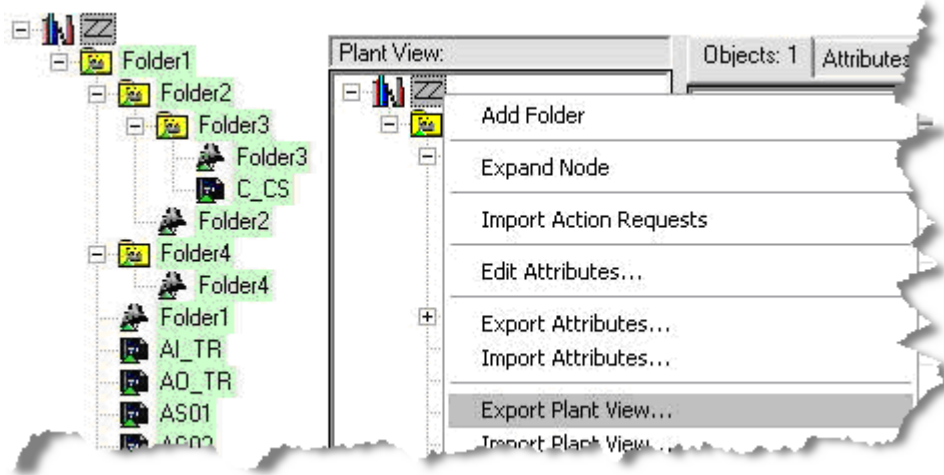
Each line of the CSV file specifies a single AS object from a specific AS and a folder where it should be assigned. Since all lines of the CSV file must specify an AS object, empty leaf folders cannot be created. Empty intermediate folders are, however, permitted.

The Plant View Import/Export feature is accessed using the context menu of any folder node of the Plant View tree view. The feature always exports the entire list of assigned AS Objects and folders regardless of the folder from which the command is invoked. There is no way to export only part of a plant view.

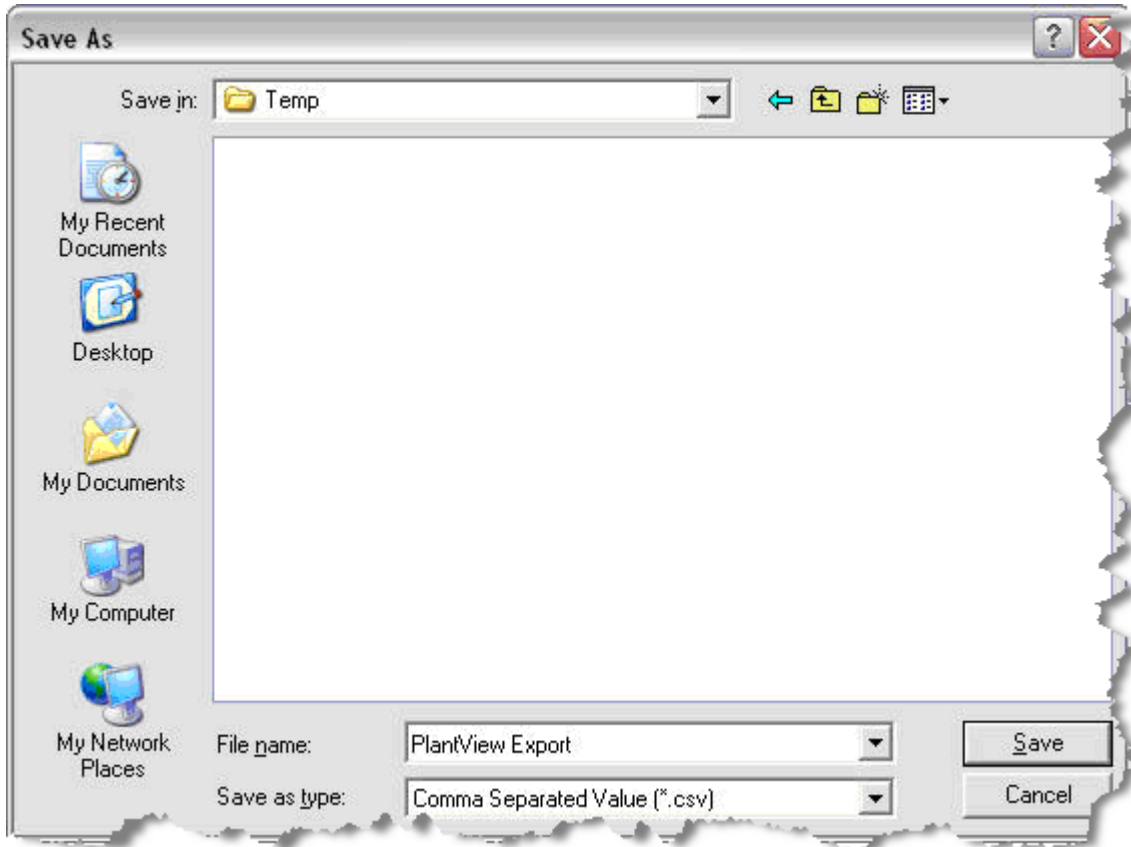
The following illustration shows an existing plant view that contains an empty leaf folder (Folder4) and an empty intermediate folder (Folder2). The **Export Plant View...** context menu is selected from the root node of the Plant View.

Exporting a Plant View

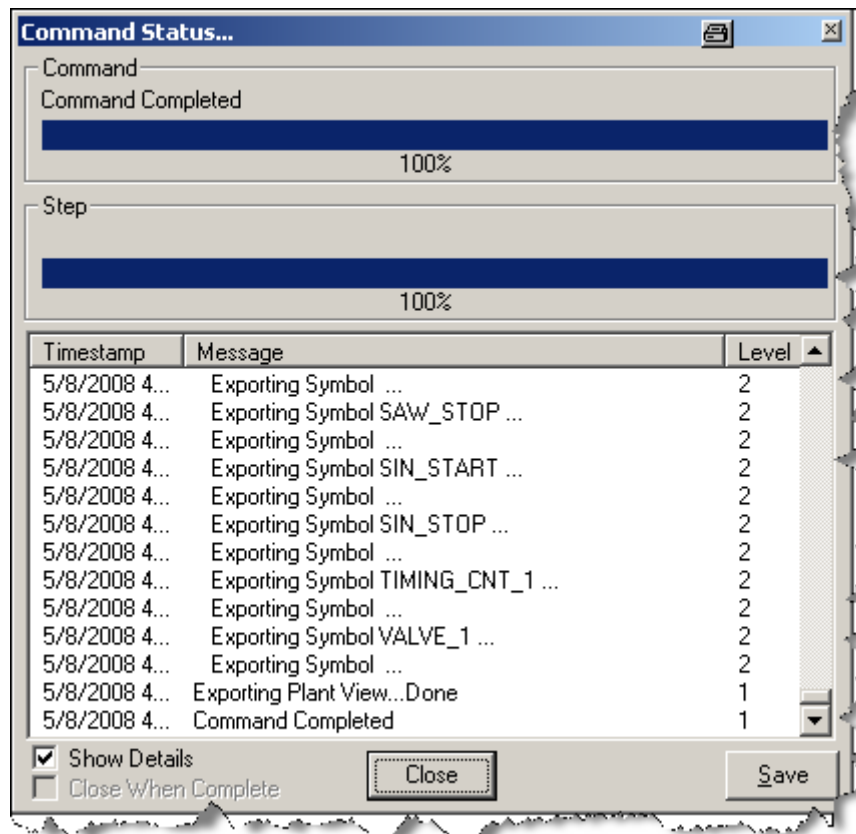
1. Select the root node and right-click.



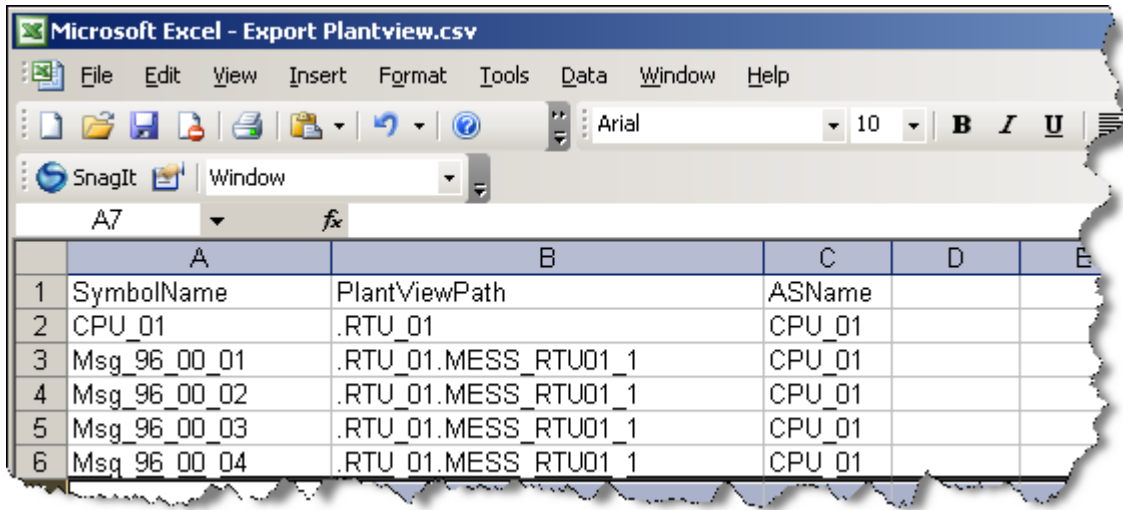
2. Select **Export Plant View**.
A Save As... window appears:



- Specify the destination of the export and click the **Save** button. A Command Status window appears. While the export is underway, an **Abort** button is available to halt the operation. After the export has finished, the Abort button becomes a **Close** button, which closes the window. The **Save** button stores a log of the command status messages:



- Click the **Close** button. The resulting CSV file can be inspected and modified in Excel. The first line of the CSV must contain the fields SymbolName, PlantViewPath, and ASName. The remaining lines represent the assignment of AS Objects to a folder. As shown below, the PlantViewPath column contains dot (.) delimited strings which represent the full path of the folder where the AS objects are to be assigned. The dot (.) is used to separate a parent folder from its child folders.



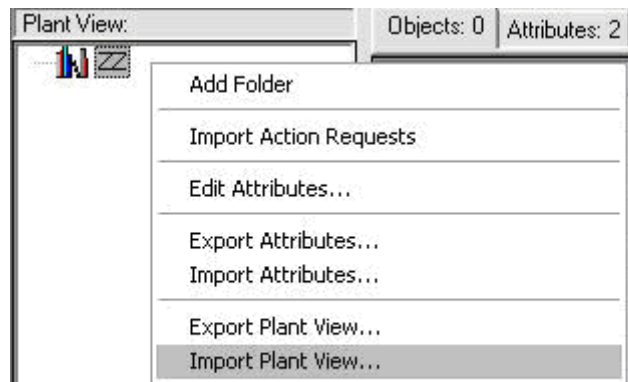
If a new DBA project were created and the referenced AS nodes were added and updated to create the AS objects, then the exported Plant View CSV file could be imported to re-assign the AS objects to folders.

Importing a Plant View

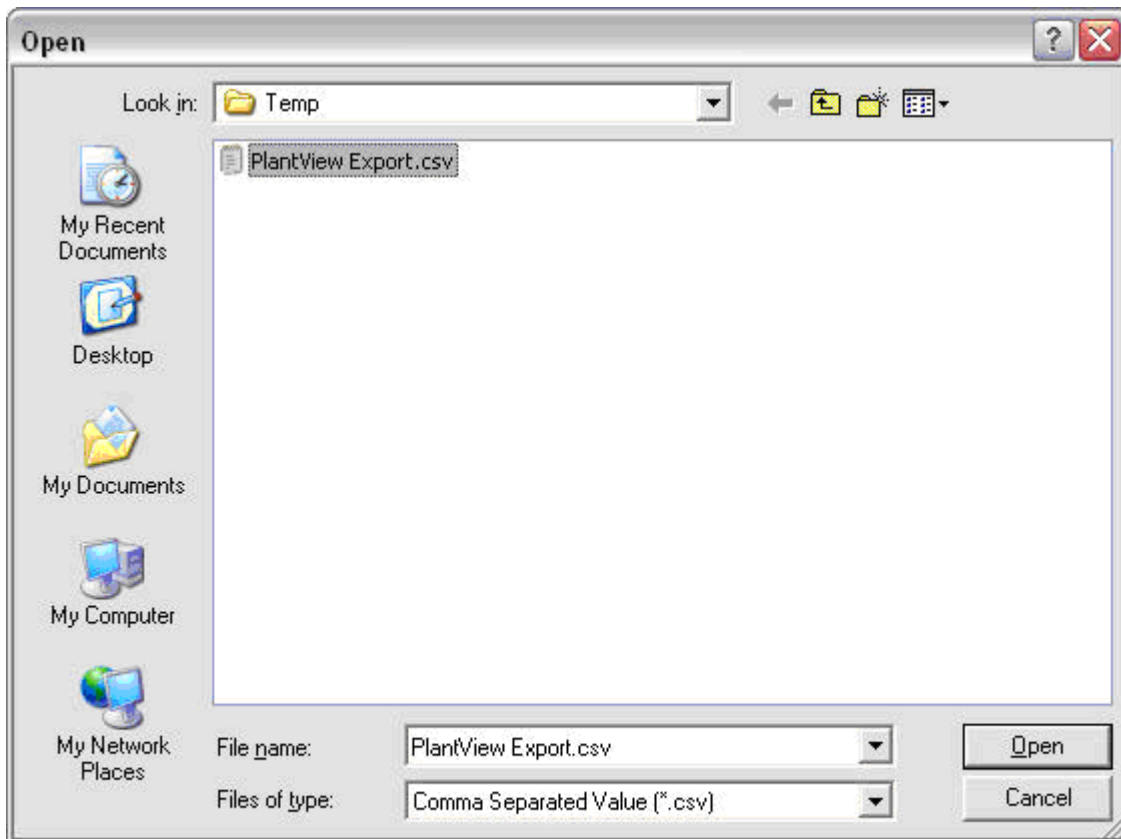
Note

When importing a CSV file into the Plant View, be sure that your project’s hierarchy setting (include link to Hierarchy Settings in section Checking for Duplicate and Missing Symbols (Page 292) are compatible with the entries in the CSV file. Any CSV entries that would result in a violation of the project’s hierarchy setting will be discarded during import; any discarded entries are logged in the import log. For example, if the maximum hierarchy level configured in your project is 5 and an entry in the CSV file would result in a hierarchy level of 6, the entry will be discarded during import.

1. Right-click the root node of the plant view and select **Import Plant View...**:

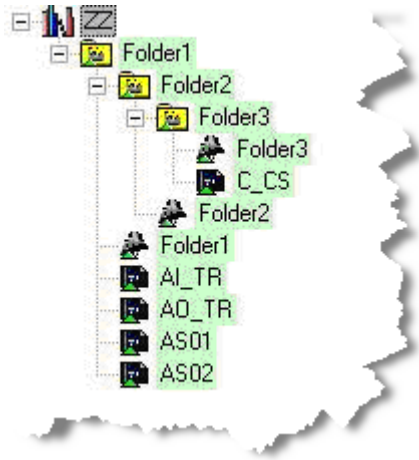


2. When an Open window appears, select the desired CSV file and click the **Open** button.



3. A Command Status... window opens. While the import is underway, an **Abort** button is available to halt the operation. After the import has finished, the **Abort** button becomes a **Close** button, which closes the window. The **Save** button stores a log of the command status messages.

The resulting Plant View contains folders as defined by the CSV file including empty intermediate folders, but not any empty leaf folders. Notice in the following illustration that the empty leaf folder Folder4 was not restored.



The Plant View Import/Export feature assigns all AS objects that are defined in the CSV file even if they are already assigned to another folder. If a referenced AS object is assigned to a folder, it will be moved to the folder defined in the CSV file.

7.3.1 Plant View Import/Export CSV File Format

The Plant View Import/Export CSV file has a format as shown in the diagram below:

	A	B	C
1	SymbolName	PlantViewPath	ASName
2		RIC_01	FOLDER-ONLY
3	Msg_1000	RIC_01	RIC_01_C
4	Msg_1001	RIC_01	RIC_01_C
5	MV_3000	RIC_01	RIC_01_C
6	MOXA_1012	RIC_01	MOXA_1012
7	MOXA_1112	RIC_01	MOXA_1112
8	Cmd_2000_OFF	RIC_01	RIC_01_C
9	Cmd_2000_ON	RIC_01	RIC_01_C
10	RIC_01_C	RIC_01	RIC_01_C
11	TOGGLE_1	RIC_01	RIC_01_C
12		RTU_01	FOLDER-ONLY
13	CPU_01	RTU_01	CPU_01
14		RTU_01.MESS_RTU01_1	FOLDER-ONLY
15	Msg_96_00_01	RTU_01.MESS_RTU01_1	CPU_01
16	Msg_96_00_02	RTU_01.MESS_RTU01_1	CPU_01
17	Msg_96_00_03	RTU_01.MESS_RTU01_1	CPU_01

The following columns are recognized:

- **SymbolName**
Name of the object that is to be assigned to the plant view. If the line represents a folder that is to contain no objects, leave this field blank and specify the text **FOLDER-ONLY** in the ASName column.
- **PlantViewPath**
Full path of the plant view node which is to contain the object or folder being created. Each segment of the path is separated by a dot.
- **ASName**
Name of the AS that contains the object that is being assigned to the plant view. If the line represents a folder that is to contain no objects, the Symbol Name column should be left blank and the specific text **FOLDER-ONLY** must be specified in this column.

7.4 Assigning Controller Objects to the Plant View

Each controller object in the AS Object list in the lower right pane can be assigned to a folder in the OS View in the upper left pane of DBA. In this way, the tags and messages of each object can be grouped into areas and sub-areas for control at runtime.

Note

Finding an object selected in the AS View

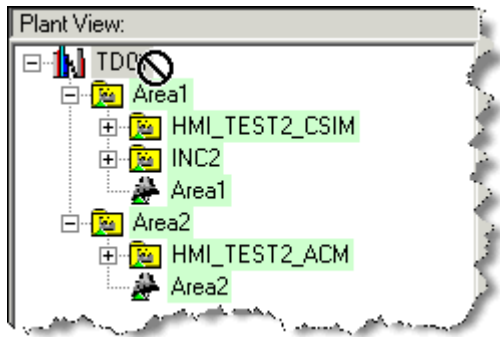
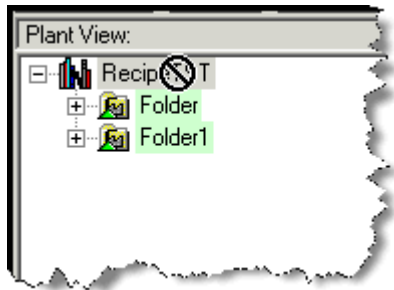
Whenever an object is selected in the AS View, you can easily find its location in the Plant View by pressing Ctrl + G.

See also

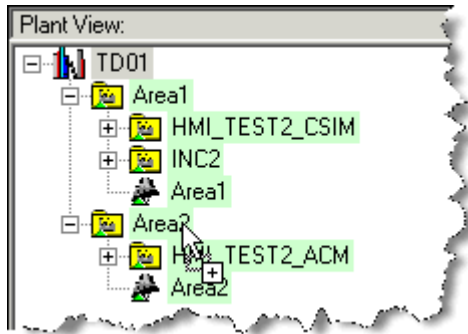
Cloning Stations (Page 94)

7.4.1 Assigning Single Objects

To assign a single object, select a single object from the AS object view in the lower right pane and drag the item onto a folder in the Plant View. The "prohibited" icon is shown if it is dragged over a Plant View object that is not a folder, as shown in the image below.

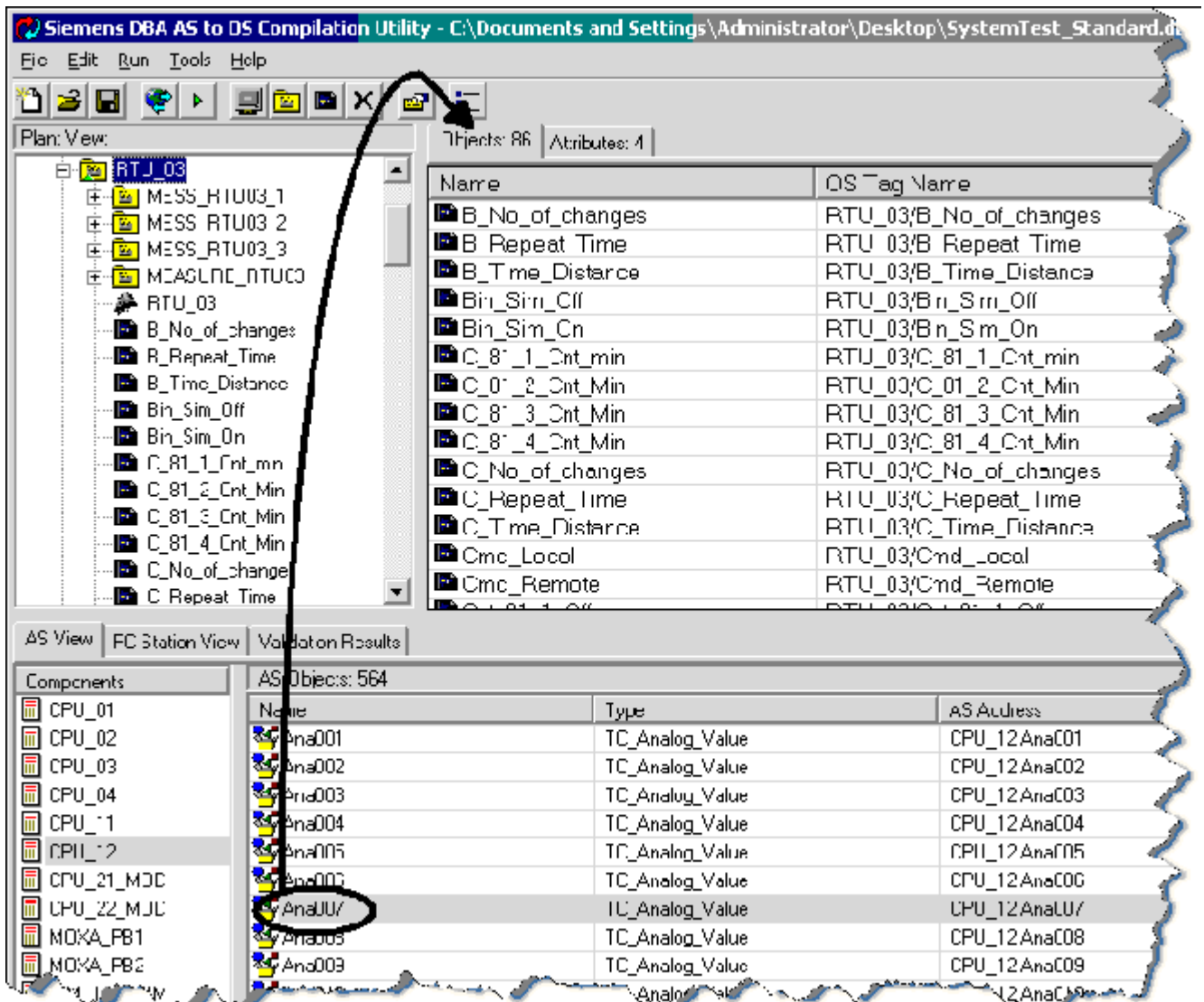


The drop operation is permitted only on a folder.



Note

In addition to dragging items to the plant view directly, it is possible to select an object in the physical view (an AS object in the lower right pane) and drag the item to the **Objects** tab to the right of the **Plant View** as shown below. This has the same effect as dragging the object or objects directly to the plant view folder.



7.4.2 Assigning Multiple Objects

It is possible to drag and drop multiple controller objects in a single operation. Windows list-selection techniques apply in the list of controller objects (shift-click to select continuous objects, control-click to add objects). In addition, if the cursor is in the list of controller objects, the conventional select-all key code (Ctrl + A pressed simultaneously) selects the entire list.

7.4.3 Manually Assigning an Entire AS Node to the Plant View

Procedure

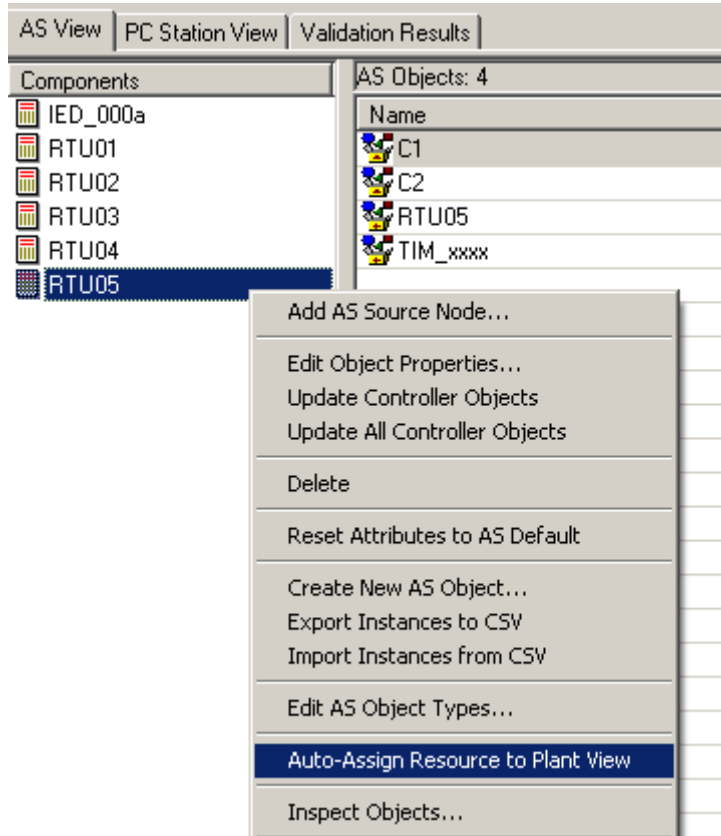
1. Create a DBA project.
2. From the AS view, select the AS of interest, right-click, and select **Update Controller Objects**. See Loading (Updating) Controller Objects (Page 115).
3. If the folder you need to contain the AS objects does not yet exist, create it in the Plant View.
4. Select a controller object in the **AS Objects** pane.
5. Drag and drop the controller object onto a folder in the plant view. The cursor becomes a "not" icon if it hovers over a picture tree object that is not a folder. The drop operation is permitted only on a folder.

7.4.4 Auto-Assigning AS Objects to the Plant View

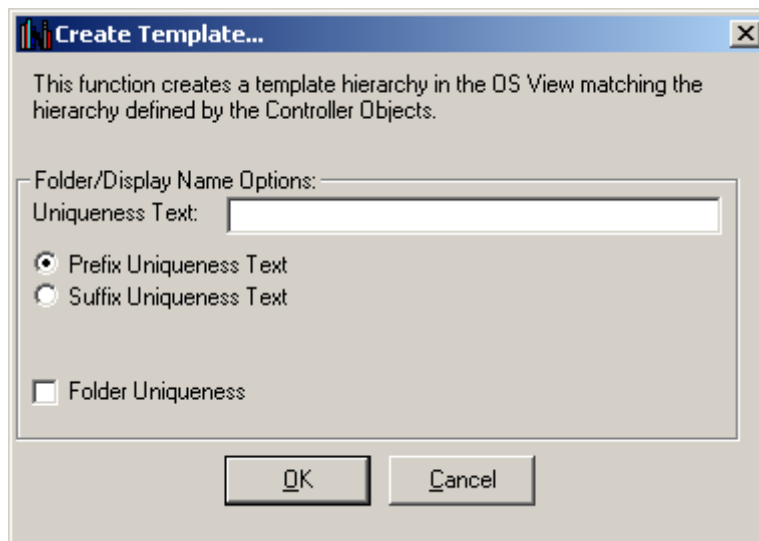
If object instances have been configured with a Folder attribute that contains a path name within the Plant View (see section "Attributes Tab (Page 241)"), then it can be useful to use an Auto Assignment wizard to quickly assign all instances to the Plant View.

To automatically assign the object instances of an AS to the Plant View, follow these steps:

1. Right-click on the AS and select the **Auto Assign resource to Plant View** from the context menu.



The following dialog appears:



2. In some special circumstances, you might want to add "uniqueness" text to the beginning or end of each folder that is created. (For example, in some cases where you have many AS's that

contain the same folder path). If so, specify a uniqueness text and use the radio buttons to indicate whether or not the uniqueness should be applied as a suffix or prefix.

3. If you want to make sure that each folder created by the Wizard is unique, check the Folder Uniqueness checkbox. When trying to create a folder, if it already exists, a numeric suffix will be added to ensure that it is unique.
4. Select OK to continue with auto assignment, or cancel to exit. A log window will appear showing the progress of the operation.

Note

If there are any objects that contain blank text in the Folder attribute, a special folder will be created called UnassignedArea; all such objects will be placed in this folder

See also

Plant View Import/Export (Page 207)

Ensuring Unique Object Names (Page 294)

7.4.5 Result of Assigning Objects to the Plant View

Results

When assigning of AS objects to the OS is complete, the OS View appears like the following example:

The screenshot displays the Plant View interface with the following components:

- Plant View:** A tree view showing the hierarchy of objects under 'Apacs3'. The 'HMI_TEST2_ACM' folder is expanded, showing sub-folders 'INC1' and 'INC2'. Under 'INC1', there are objects AA, BV1OUT, BV2OUT, DA, M1OUT, M2OUT, MA, MALM, SS1, VA, and VALM. Under 'INC2', there are two 'HMI_TEST2_ACM' objects.
- Assigned Objects Table:** A table with columns 'Name', 'OS Tag Name', and 'Status'. It lists the following objects:

Name	OS Tag Name	Status
HMI_TEST2_ACM		Changed
HMI_TEST2_ACM	HMI_TEST2_ACM	Changed
INC1		Changed
INC2		Change
- AS Objects Table:** A table with columns 'Name', 'Type', 'AS Address', and 'Status'. It lists 18 objects:

Name	Type	AS Address	Status
AA	ANALOG_ALM_AFB	HMI_TEST2_ACM.INC1.AA	Add
BV1OUT	BLK_VLV_1OUT_AFB	HMI_TEST2_ACM.INC1.BV1OUT	Add
BV2OUT	BLK_VLV_2OUT_AFB	HMI_TEST2_ACM.INC1.BV2OUT	Add
CAS	CASCADE_AFB	HMI_TEST2_ACM.INC2.CAS	Add
DA	DISCRETE_ALM_AFB	HMI_TEST2_ACM.INC1.DA	Add
ES	EXT_SET_AFB	HMI_TEST2_ACM.INC2.ES	Add
HMI_TEST2_ACM	RESOURCE_STATUS_AFB	HMI_TEST2_ACM.RESOURCE...	Add
M1OUT	MOTOR_1OUT_AFB	HMI_TEST2_ACM.INC1.M1OUT	Add
M2OUT	MOTOR_2OUT_AFB	HMI_TEST2_ACM.INC1.M2OUT	Add
- Components:** A list showing 'HMI_TEST2_ACM' as the selected component.

Each AS object in the lower right pane is typically assigned to an OS folder, where it appears as a symbol with the name of the AS object. However, you may leave an AS object unassigned, or unassign it later, if you want to omit it from the OS Runtime.

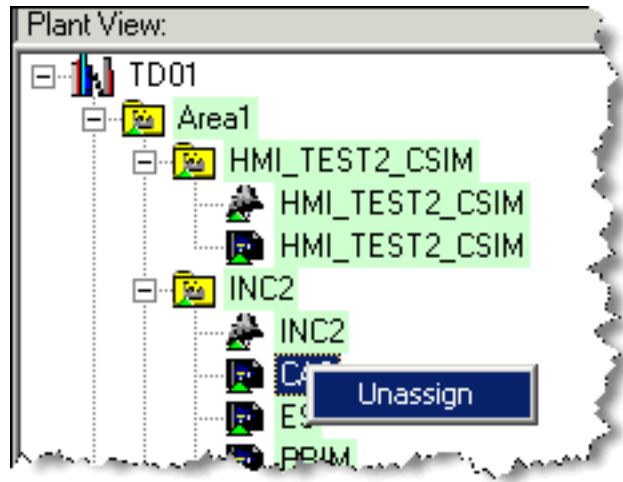
Each folder contains one picture (for example, folder INC1 contains picture INC1).

OS objects marked with green shading indicate that they have never been compiled to the OS or that they have changed since the last OS compile.

7.5 Unassigning (Deleting) Plant View Objects

There are several ways to remove objects from the plant view. (Removing a controller object from the plant view does not remove it from the list of controller objects in the AS view, only from the plant view.)

1. Right-click the object and select **Unassign**.



2. Select the object in the plant view and press the keyboard **Delete** key (one object at a time).
3. Select a folder in the Plant View so that its contained objects appear in the **Objects** tab in the details view to the right. Then make a single or multiple selection in the Objects Tab list and press the keyboard **Delete** key.
4. Drag a symbol from the plant view and drop it on an AS list view (one object at a time).

You may also unassign the object by right-clicking on the object in the list of AS objects in the bottom right DBA quadrant and selecting the "Unassign TH assignment" menu command. You can also select multiple objects in the list by right-clicking and selecting the "Unassign TH assignment" menu command. This unassigns the assignment for all selected objects.

7.6 Picture Lock-Down

7.6.1 Picture Lock-Down

It is possible to "lock down" a picture so that the PDL picture associated with it is not changed, even if changes are made to the contents of the folder. This can be useful in the course of project engineering after you are satisfied that the picture is complete.

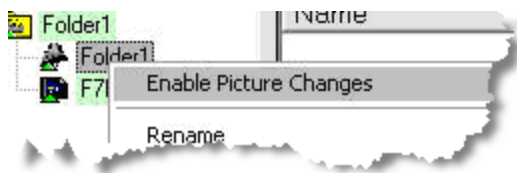
Note

Be cautious when using this feature, since the PCS 7 Alarm aggregation feature is dependent on DBA compilation of objects on pictures. If objects are added, removed or changed manually once the picture has been "locked down", alarm aggregation to the PCS 7 banner may not properly reflect all alarms for all objects.

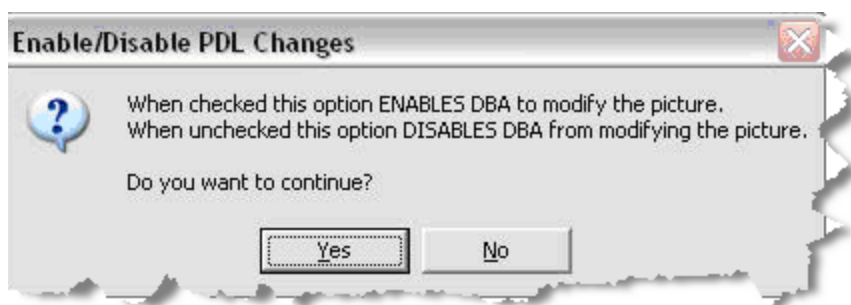
7.6.2 Locking Down a Single Picture

To lock down a picture:

1. Right-click on the picture. A context menu appears. For pictures that are not locked, the **Enable Picture Changes** menu option is checked and appears as below:



2. Select the menu option. A dialog is displayed explaining the consequences.
3. Select **Yes** to proceed or **No** to cancel.



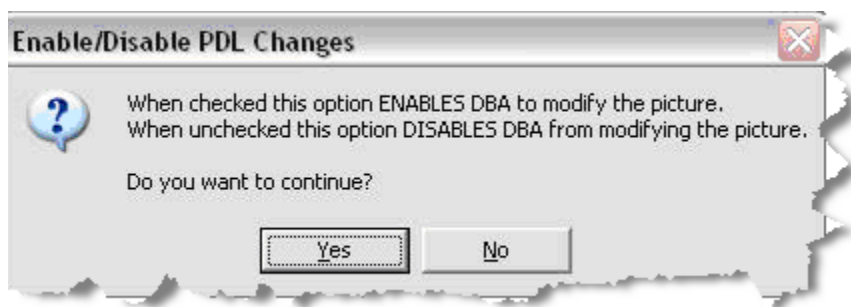
7.6.3 Unlocking a Single Picture

To unlock a picture that has been locked:

1. Right-click on the picture. A context menu appears. If the picture has been locked, the **Enable Picture Changes** menu option is checked and appears as below:



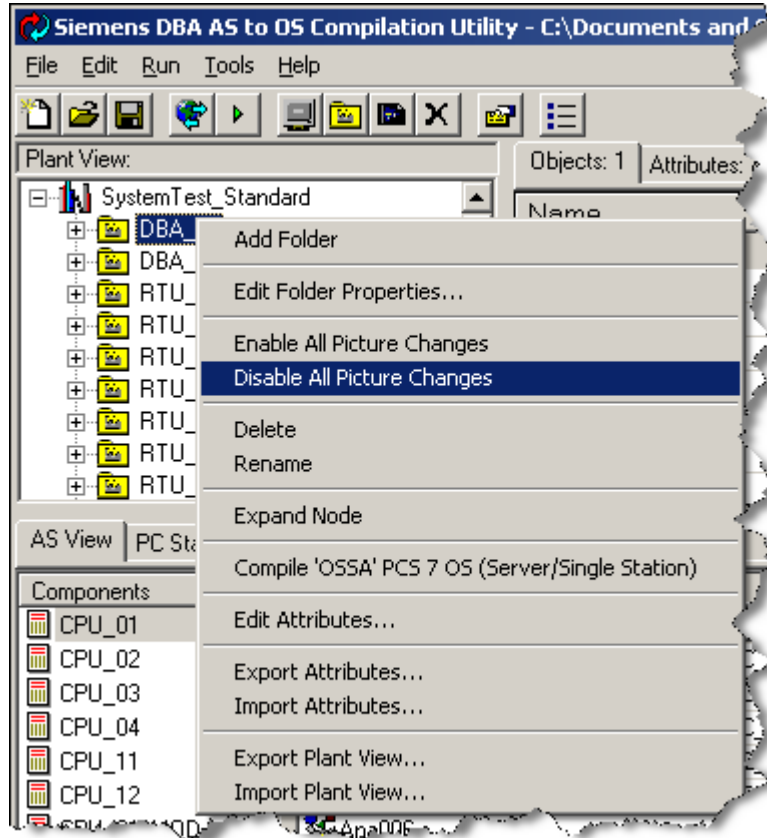
2. Select the menu option. A dialog is displayed explaining the consequences.
3. Select **Yes** to proceed or **No** to cancel.



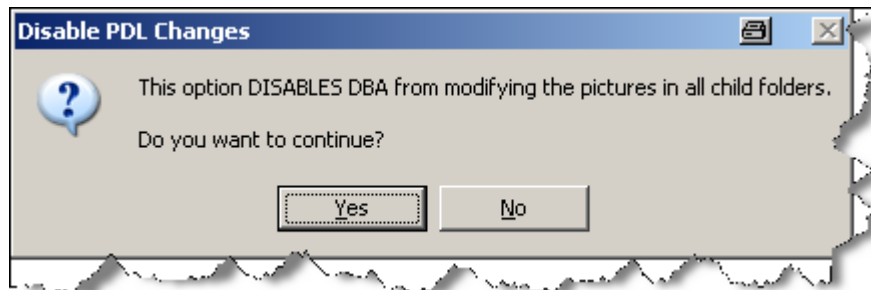
7.6.4 Locking All Pictures Associated with a Folder (and Below)

To lock the picture associated with a folder, and all of the pictures associated with all the folders below it, follow these steps:

1. Right-click on the folder. A context menu appears.



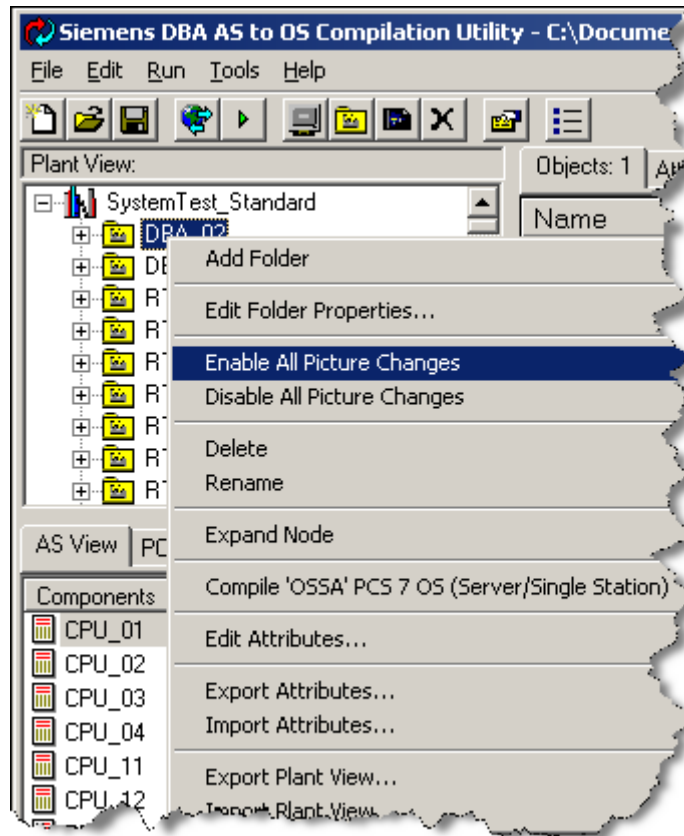
2. Select **Disable All Picture Changes**. A dialog box warns that this operation will lock the selected folder and all child folders.
3. Select **Yes** to continue or **No** to cancel.



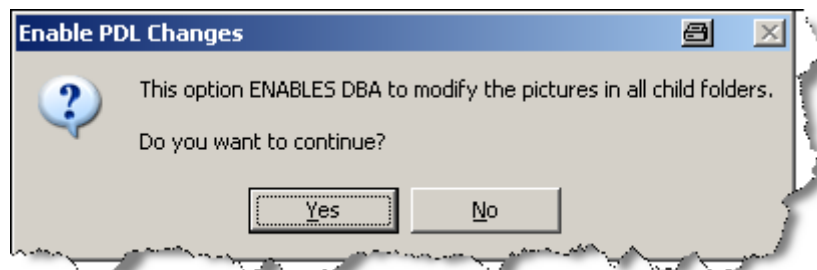
7.6.5 Unlocking All Pictures Associated with a Folder (and Below)

If a folder has been locked down in this way, you can unlock it by following these steps:

1. Right-click on the folder. A context menu appears.

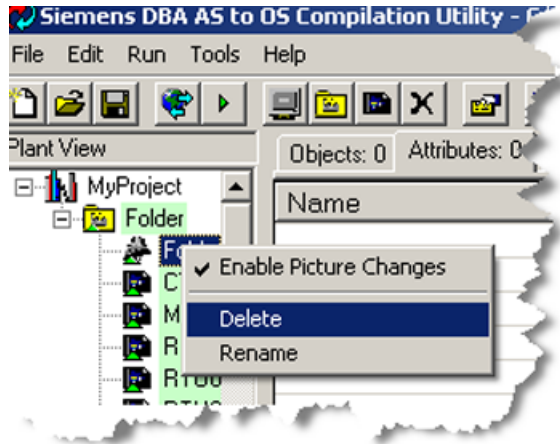


2. Select **Enable All Picture Changes**. A dialog box warns that this operation will unlock the selected folder and all child folders.
3. Select **Yes** to continue or **No** to cancel.



7.7 Deleting Pictures

Picture objects are automatically created for all folders. To delete a picture from a folder, open the folder and right-click the picture object and select **Delete** from the context menu:



Normally, when a project is compiled, each object in a folder is automatically placed on the picture associated with that folder. If you delete a picture from a folder, when the project is compiled, all of the process objects in the folder are placed in the parent folder, provided that folder's picture has not been deleted. If the parent folder's picture has also been deleted, the objects will be placed in the parent's parent's picture, and so forth. If there is no folder in the ancestry of an object with a picture, the object will not be placed on any picture.

Note

Using the "Delete Picture" function of DBA will not actually remove any PDL files that have already been created. They are still available for access via the Graphics Designer.

7.8 Parameter Readback

There are some parameters which can be configured in both DBA, as operational parameters, and from a faceplate in runtime. For such parameters, it is useful to synchronize changes made from the HMI with the DBA Project database. This will ensure that subsequent downloads from DBA contain the most up-to-date parameters.

When an object Type is defined in the DBA Type Editor, attributes that are associated with the Start Value of a variable can be marked as "Readback Enabled". When marked in this way, any

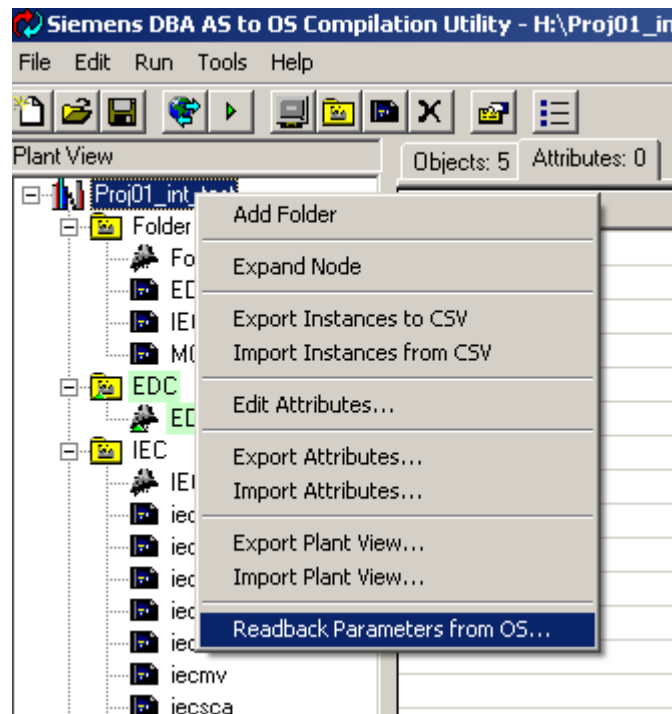
instances of the type can be "read back" from the OS, where the current value of the variable is read back from the OS and stored back into the DBA project as the Start Value of the variable.

Note

The Online MCP File attribute of the WinCC Application (configured as part of PC Station Configuration) is used to determine the location of the WinCC Online project to be used for reading back data.

Reading Back an Entire Project

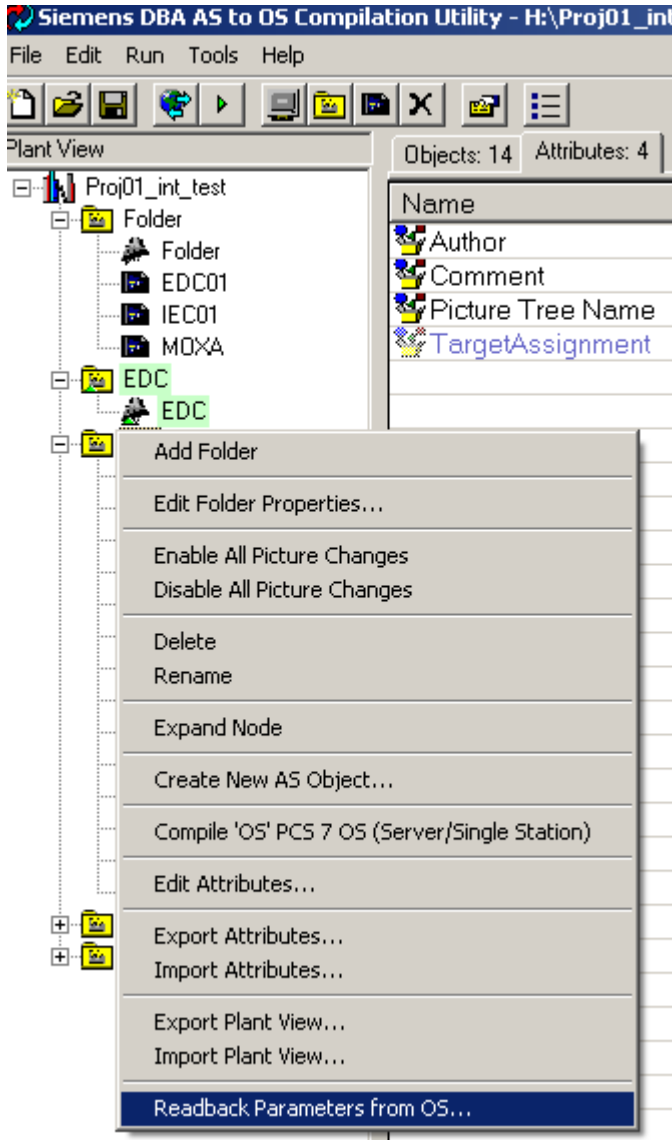
To read back the parameters for the entire DBA project, right-click on the root of the Plant View and select the **Readback Parameters from OS** from the context menu.



The current value of all variables that have been enabled for parameter readback (as configured in the DBA Type Editor) will be read back from the appropriate OS station and, if changed, stored in DBA as a "Start Value" to be used whenever the variable is re-downloaded to the OS.

Reading Back data from a Folder

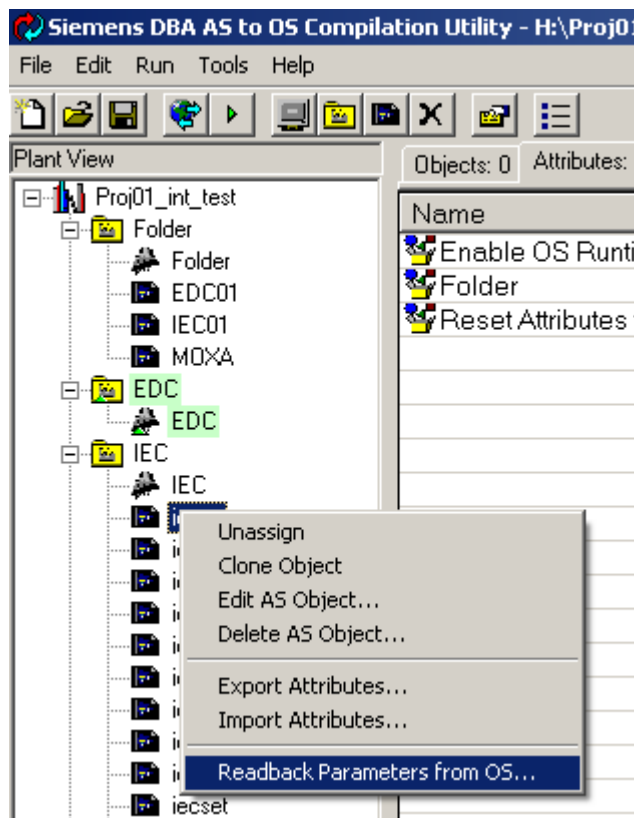
To read back the parameters for all of the objects within a certain folder and below, right-click on the folder in the Plant View and select **Readback Parameters from OS** from the context menu.



The current value of all variables in that folder or any of its' child folders that have been enabled for parameter readback will be read back from the appropriate OS station and, if changed, stored in DBA as a "Start Value" to be used whenever the variable is re-downloaded to the OS.

Reading Back data from an object

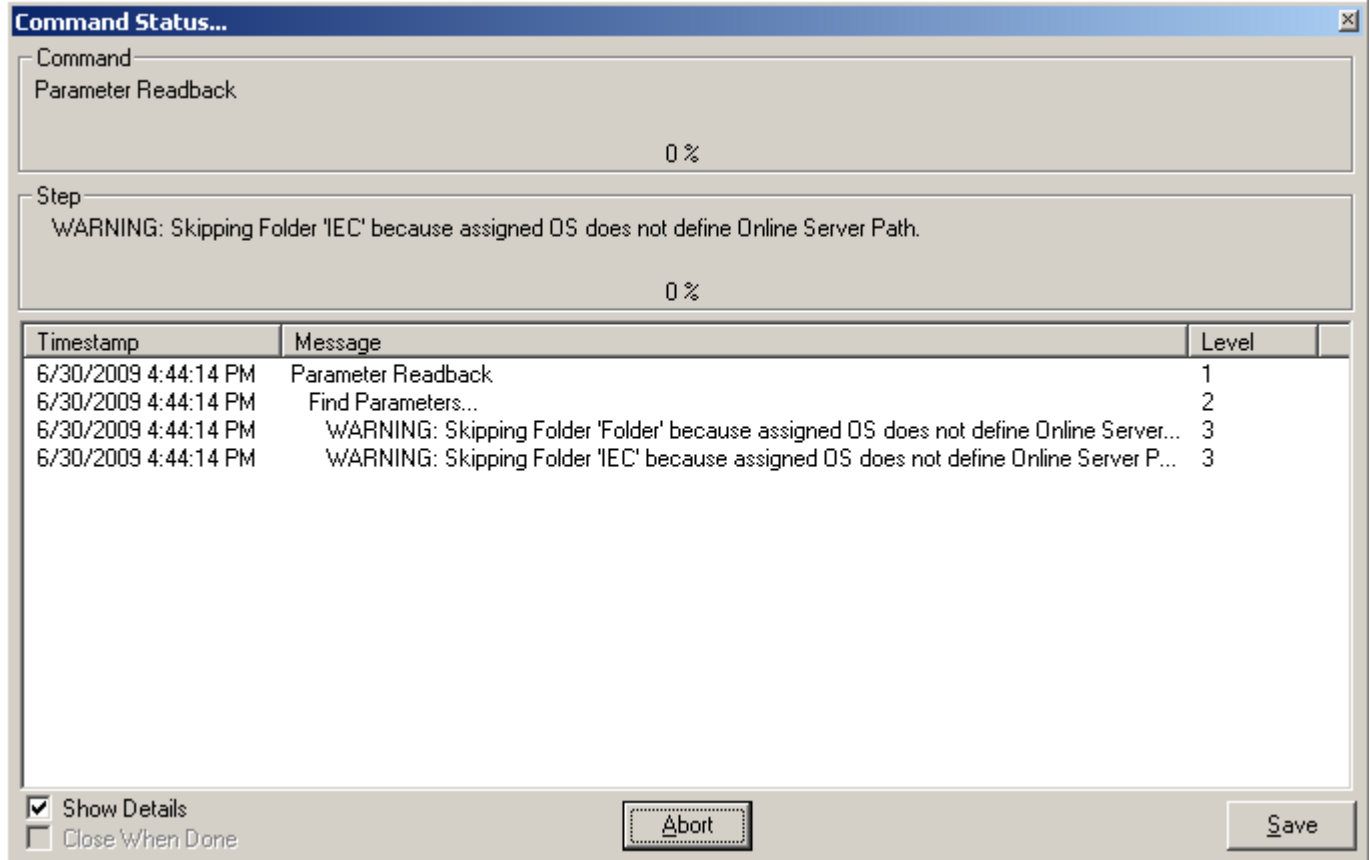
To read back the parameters for all of the variables of a single object instance, right-click on the object instance in the Plant View and select **Readback Parameters from OS** from the context menu.



The current value of all variables for that object that have been enabled for parameter readback will be read back from the appropriate OS station and, if changed, stored in DBA as a "Start Value" to be used whenever the variable is re-downloaded to the OS.

Parameter Readback Status

When reading back parameters for a project, folder or object, a status dialog is displayed that shows the status of the operation.



This status will show any warnings or errors that prohibit a complete parameter readback from being successful, as well as a list of all variables that are being changed in the DBA Project as a result of the Parameter Readback. Note also that the status of all objects that are changed by the readback operation will show as green in the Plant View, indicating that there is a change to the object.

Compiling the Project

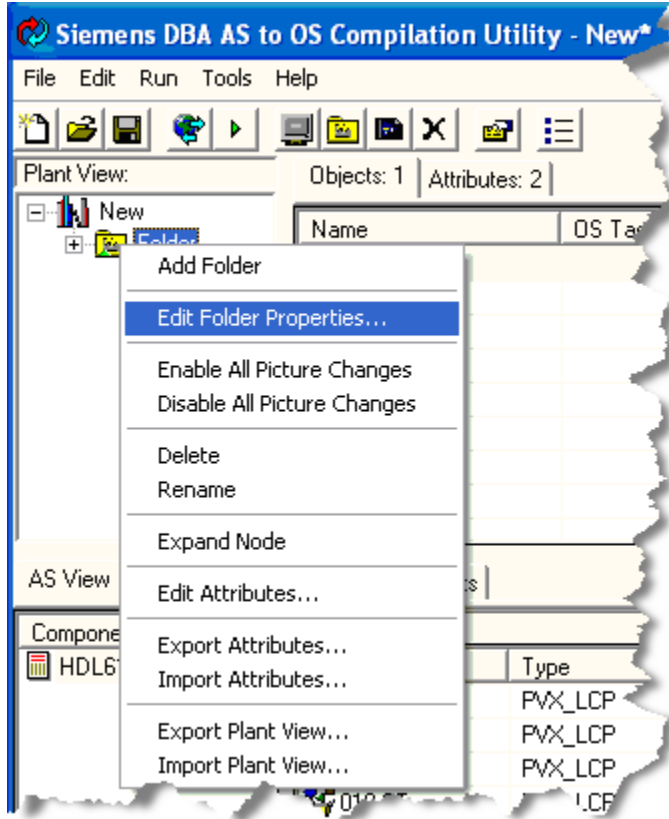
8.1 Assigning an OS to a Plant View Folder

Note

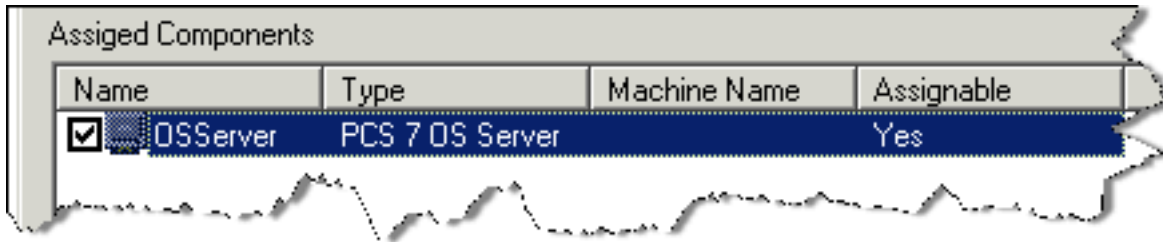
The assignment of OS servers to plant view folders is highly dependent on the hierarchy options that you have configured in DBA. The number of plant view folders that need to be assigned to an OS depends on the number of OS Servers that are configured in your system and how you have partitioned them (as reflected in the hierarchy options in DBA). In the section titled Ensuring Unique Object Names (Page 294) see the subtopic Hierarchy Settings for more details.

The procedure below describes how to make a single assignment of an OS to a plant view folder.

1. Right-click the plant view folder of interest.
2. Select **Edit Folder Properties...** from the context menu.



3. Use a checkbox to select an OS from the Folder Properties window.



8.2 Compiling (Start Compile)

A selected DBA projekt is compiled in a WinCC database during compiling. The DBA concepts aims to make incremental compiling as easy as possible so that minor changes to an AS can be integrated into a WinCC project without any problems.

DBA identifies changed OS folders and other object with a green background to indicate that they must be updated with the help of an OS compilation in the WinCC database. All OS folders and other objects usually have a green background prior to the first compilation.

Before you start the OS compilation, check that the following requirements are met:

- AS nodes whose objects are assigned to the OS must be current. If the comment "(changed)" appears in the AS view next to the AS node, you must execute the "Update controller objects" operation with the AS node. This is usually necessary when you have made changes to the TeleControl object types in the DBA Type editor or after you have added a new AS node.
- The required OS folders must be assigned to a target OS. Folders that are not assigned are ignored during the OS compilation. All folders are usually assigned. However, you have the option of excluding some folders whose objects are not fully configured or are not completely relevant.
- To avoid losing changes to .PDL files that are not saved, save and close all .PDL files assigned to this project in the WinCC Graphics Designer.

A successful compilation process requires the following:

- a WinCC project
- a defined AS source
- an OS and at least one folder that the OS is assigned to in the plant hierarchy
- AS control objects assigned to the OS

Related topics:

Assigning an OS to a Plant View Folder (Page 229)

Adding a PC Station (Page 189)

Assigning Controller Objects to the Plant View (Page 213)


Creating or Opening a DBA Project (Page 17)

Procedures

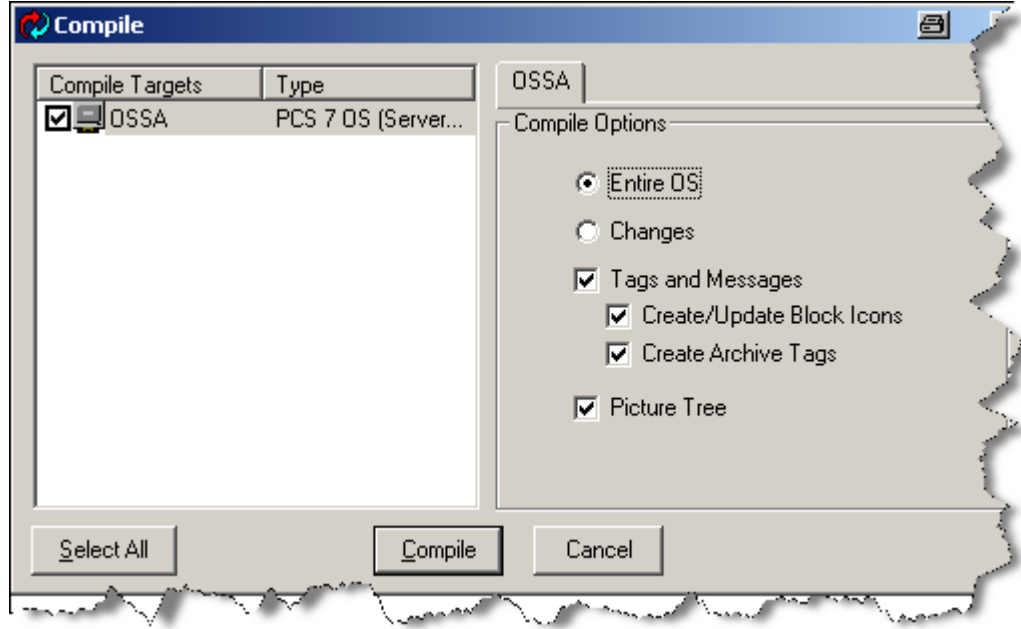
Note

When compiling a DBA project that includes an OS server on a single station, make sure that WinCC Runtime is not active on the engineering station. When you compile a DBA project that includes multiple OS servers, make sure that the WinCC Explorer is either closed or that, if open, it does not include an open WinCC project on the engineering station.

To compile an OS in the DBA project, perform one of the following steps:

1. Choose the menu command **Execute > Start compiling**.
2. Press the **F5** key.
3. Click on the  button for compiling.

4. The "Compile" window opens as shown below. As described below, select the targets that can be compiled in the left pane and the compile options in the right pane.
5. When all targets and options are selected correctly for compiling, click the **Compile** button at the bottom of the window.



Options for compiling of OS

- **Entire OS:** The entire OS project is compiled. This option is the only available option when an OS is compiled for the first time. This option is also the only available option when an OS is compiled for the first time after upgrading the DBA program. When selecting **Entire OS**, all tags, alarm messages, structures and elements created by DBA are deleted and replaced with new objects.
- **Changes:** This is the default option for a project that has been compiled before. Only the changes made since the last compilation are compiled. This is the preferred method because it is a lot faster than a complete compilation process. This option must be specified when you use the "Delta Download" function of SIMATIC Manager.

Note

The setting "Changes" only has an effect on tags and messages. When you select **Create Archive Tags**, all archive tags for tag logging are compiled regardless of whether they were changed and whether the option **Changes** or the option **Entire OS** was selected.

The following options are usually selected:

- **Tags and Messages:** All tags and messages are created when this check box is selected. This check box must be selected in most cases.
- **Create/Update Block Icons:** All picture files (.pdl) are updated as part of the compilation process when this check box is selected. The corresponding block icon is placed in the picture for each block instance in an OS folder, if this picture does not contain an icon for this instance yet.

Note

Make sure that you save and close all open revisions in the WinCC Graphics Designer before you compile with this option. Otherwise all .PDL files included in this compilation are closed by DBA and changes are lost.

- **Create Archive Tags:** All WinCC archive tags are created when this check box is selected. The archive attributes are displayed in the DBA tab "Archived measured values". To speed up the compilation process, it makes sense to select this option only for later compilations so that changes and corrections are completed at that time.
- **Picture Tree:** The picture tree(s) of the OS projects are updated when this check box is selected.

Note

Note the following prior to the first OS compilation with Tag Logging:

During the first compilation of the OS with selected Tag Logging option, DBA initializes the external database for tag logging. For later compilations of OS, DBA ignores most changes to tag logging data with the exception of data of newly added tags. The reason behind it is that you subsequently manage logging tags with external databases such as WinCC Alarm Logging or SIMATIC IT and that DBA is not to overwrite the changes you have made there. Given this background, it may be more efficient to make scheduled changes of tag logging data versus standard values even prior to the first OS compilation. See section Logged Tags Tab (Page 248) for more information.

Note

You can only create or update screen when the "Create/Update Block Icons" check box is selected. No pictures are created when you add a new folder (and a new picture) to the plant hierarchy and then compile it with an unchecked "Create/Update Block Icons" check box. If you have selected "Picture Tree" beforehand, however, the name of the new picture is added to the picture tree even when no picture was created. When adding new folders, make sure that the "Create/Update Block Icons" check box and the "Picture Tree" check box are selected prior to compilation. Otherwise you have the option of creating the respective pictures manually.

Note

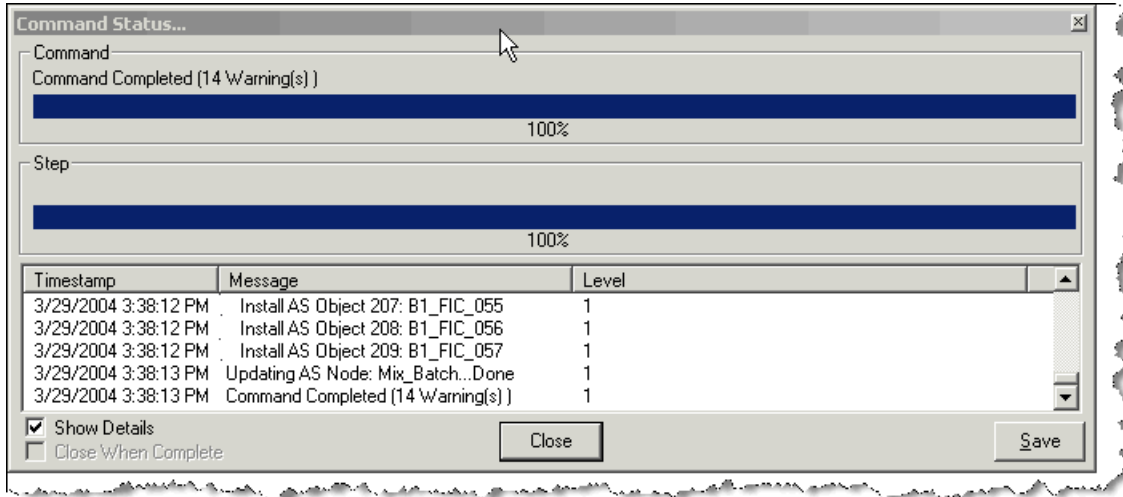
It is not possible to compile only the Picture Tree without Tags and Messages. Checking the Picture Tree checkbox will automatically force the Tags and Messages checkbox to be checked (if it is not already checked). Unchecking the Tags and Messages checkbox will automatically force the Picture Tree checkbox to be unchecked (if it has already been checked).

When no additional changes are to be made to the option selection, click the **Compile** button.

8.2 Compiling (Start Compile)

When an error occurs during compiling due to duplicate or missing icons, a **Command Status...** error message is generated. See section Checking for Duplicate and Missing Symbols (Page 292) for more information.

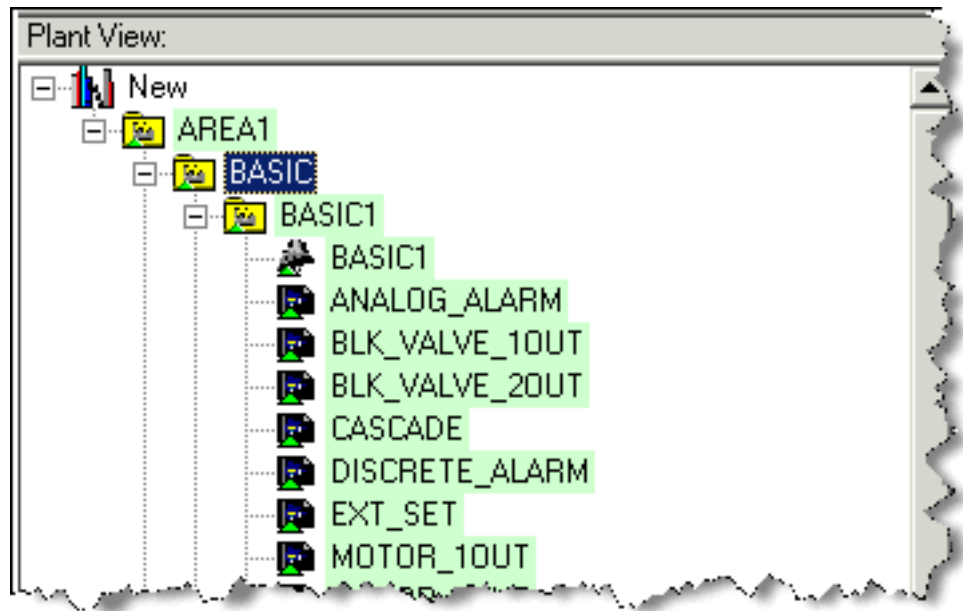
The results of a compilation is written to a log that can be stored as text file on a hard disk drive or in another secondary memory. You can show this log by checking the **Show Details** check box.



If you want to save the log data in a text file, click the **Save** button (is displayed when you check **Show Details**). A **Save as** window is displayed in which you can specify where the data is to be saved as **.LOG** file.

By pressing the **Save** button you are saving the time stamp, the message and the information on the message level that were displayed when you checked the **Show Details** button. A **Saves as** dialog box for saving this data in a **.LOG** file opens.

In the figure below, "AREA1" has changed because new objects were added. Note that only folders with added or deleted elements are identified as changed (with a green background). Folders that contain changed elements are not themselves identified as changed, because only the element was changed and not the higher-level folder. The folder of the top level that is assigned to an OS, too, is identified as changed when subfolders or elements associated with this folder are changed.



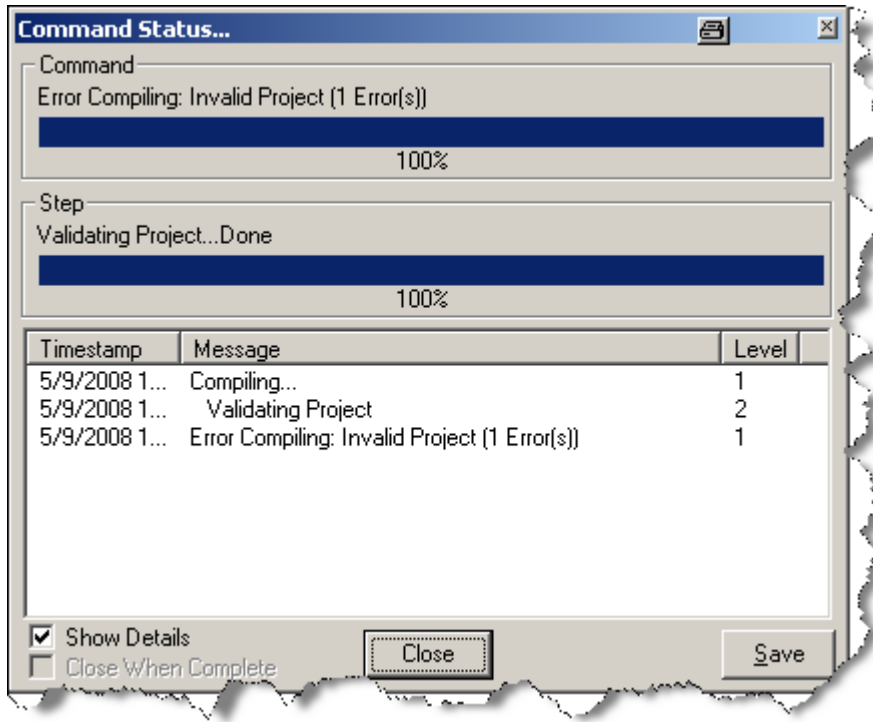
A new compilation with this OS creates a message in the log that is similar to the following excerpt from a log file:

```
4/9/2004 10:54:31 AM    2    Querying Project Database...
4/9/2004 10:54:31 AM    1    Compiling 'OS' PCS 7 OS (Server/Single Station)...
4/9/2004 10:54:31 AM    2    Opening Target...
4/9/2004 10:54:31 AM    3    Compile Scope: Changes
4/9/2004 10:54:31 AM    3    Compile Options:
4/9/2004 10:54:31 AM    3    Tags and Messages - Yes
4/9/2004 10:54:31 AM    3    Picture Tree - Yes
4/9/2004 10:54:31 AM    3    Create/Update Block Icons - Yes
.
.
.
4/9/2004 10:55:58 AM    1    Compiling...Completed
```

The object with a green background is displayed as normal again after compiling.

Plausibility check

If the project includes specific errors, compiling will fail with a plausibility check error. This is a reference to configuration errors or a note with regard to necessary configuration information missing in the project.



In such cases, the display changes automatically to the view with the open "Validation Results" tab which lists all errors that have occurred. Each error is listed with detailed information on the missing object (if applicable) and details on the actual error.



The following configuration errors typically occur:

Object Not Found

This usually means that the object was deleted in the instance editor but not removed from the plant hierarchy.

Duplicate OS Object Name

This error usually occurs when two AS have an object with the same name but the hierarchy settings of the plant view are not set so that unique OS names can be derived. See section Ensuring Unique Object Names (Page 294) for more information.

Network Error (e.g. duplicate station number, slave address, etc.)

The name of the object with the error and the error description usually indicate the specific problem. Troubleshooting usually includes editing the information of an AS node or PC station that was not configured correctly.


Object Errors (e.g. missing telegram numbers, polling groups, etc.)

The name of the object with the error and the error description usually indicate the specific problem. The problem can usually be rectified by editing the object addresses in the instance editor.

Note**Errors with OS path information**

When errors are displayed in this window with an OS path, a double-click on the error automatically highlights the respective object in the plant hierarchy. This means you have easy access to the source of the error and can remedy the error from there.

8.3 Running the OS in Runtime

1. Select **Start > Simatic > WinCC > Windows Control Center**.
The WinCC Explorer opens the most recently opened project. If this is not the project you wish to run, close it and open the project of interest.
2. Click the **Activate** button in the menu bar: 
The project HMI opens.

8.4 Tag Logging

Tag logging is an integrated feature of PCS 7 OS. The DBA Utility allows you to specify the following:

- Which tags will be logged, on a Type or Instance basis
- The logging attributes of each
- The WinCC Tag Archive in which they will be stored

Overview of Procedure

1. In the WinCC Tag Logging Editor of your WinCC project, create one or more named Tag Archives.
2. In the PC Station view of DBA, select the OS Server that is intended for tag logging, and ensure that you have filled in the Tag Logging Archive attribute with the name of one of the archives you created. (See Chapter 5, PC Station View (Page 189).)
3. In the OS View of DBA, ensure that the OS Server that is doing the tag logging is assigned to the relevant OS folders.
4. In the OS Compile dialog, after you are satisfied that tags, messages and pictures compile without errors, select the Create Archive Tags checkbox, and repeat the OS Compile.

The result is that the named Tag Archive will be populated with all of the DBA-specified tags whose Enabled attribute is **Enabled**, as seen in the DBA OS Details view, Logged Tags tab.

The DBA logged tags with Enabled attribute set to **Disabled** are ignored and not entered in the archive. But if this attribute is later changed to **Enabled**, the tag will be entered into the tag archive on the next OS Compile.

Otherwise, changes in other tag logging attributes (frequency, long term) are ignored by subsequent OS compilations.

To Delete Tags from the Tag Archive

DBA will not delete tags from the tag archive. Instead, open the WinCC Tag Logging editor and delete the tags there. To keep the DBA project consistent with the WinCC project, set the Enabled attribute to "Disabled" in the Logged Tags Tab of DBA for each of these deleted tags.

To Modify Tags in the Archive

DBA will not modify tags in the archive. There are two ways to modify attributes of logged tags:

- Use the WinCC Tag Logging Editor to modify any tag entries in the archives. Then if you wish to keep the DBA project consistent in appearance, make the same modifications to the DBA tag logging attributes.
- Delete the tag entry in the WinCC Tag Logging Editor. Then modify the tag logging attributes in DBA and perform the OS compilation, with checked option "Create Archive Tags." This will add the tag to the WinCC tag archive with the new attributes. Note that the WinCC Tag Logging Editor usually must be closed and re-opened to see the re-added tag entry.

Object Attributes

9.1 Attribute Details Overview

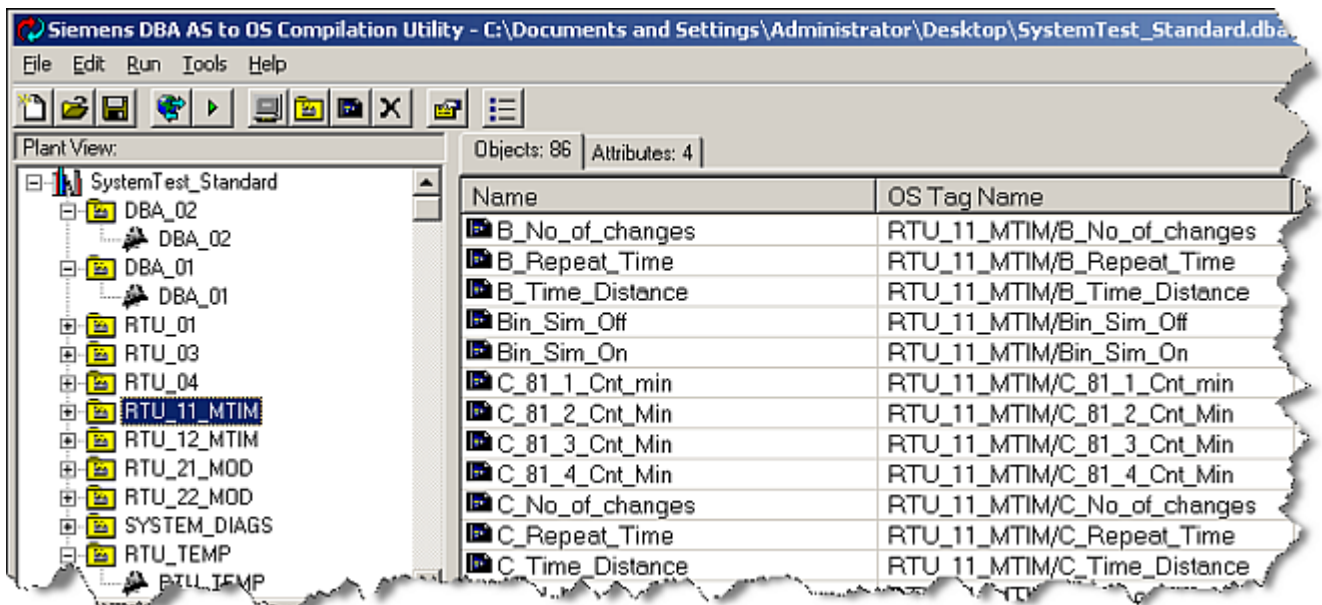
9.1.1 Attribute Details

After you have finished organizing the graphical structure of the picture tree for controller objects, you can assign, examine, and modify some object attributes. The attributes available for this kind of change vary with the object and with the AS system from which they are derived.

The many attributes of an OS object are grouped functionally into tabbed panes in the OS Details view of DBA. For convenience, some tabs show the count of attributes on the tab label.

When you select an OS object from the Plant View pane to the left, all of its visible attributes become accessible in the tabbed detail panes at the right. (Advanced users may use the DBA Type Editor to control an attribute's visibility).

In the illustration below, the selected OS object is a block instance:



Certain fields, like those in the **Value** column, are generally editable by typing in a new value or selecting one from a drop-down list within the cell. Blue text indicates a read-only value which you may not change here. (Advanced users may use the DBA Type Editor to control the read-only property of an attribute).

For editable attributes presented as a list, the attribute is highlighted when the cursor sits in the row containing the attribute. Also, the list can be sorted in ascending or descending alphanumeric order (a toggle) by clicking column headers. For example, to sort by value, click the column header **Value**. To switch between ascending and descending order, click the header cell again.

If you need to modify many objects in the same way, or prefer to use bulk editing techniques, see the following topics:

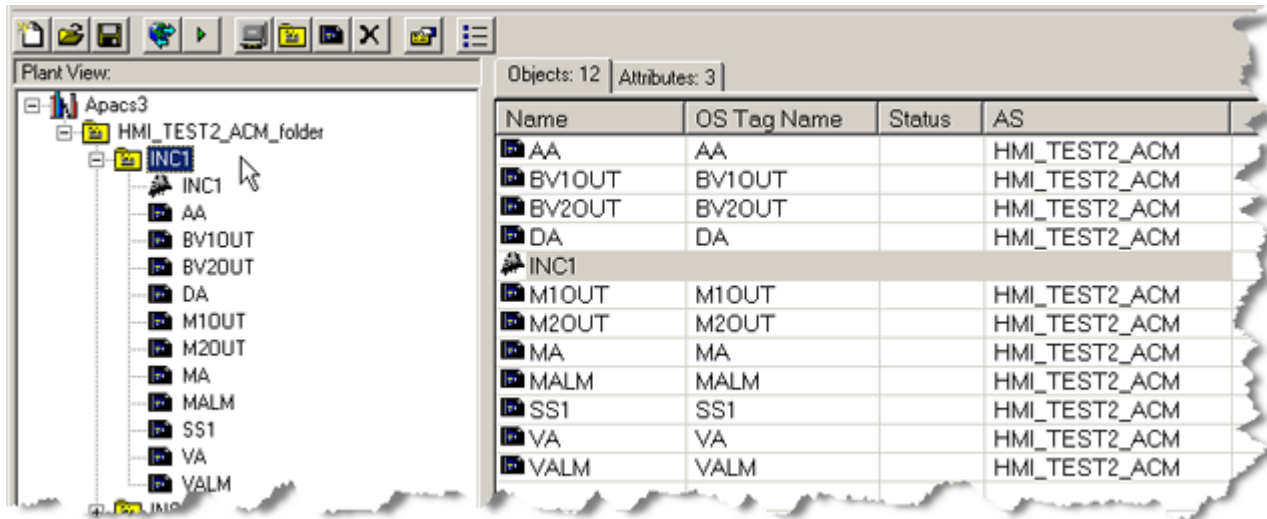
Object Attribute Editor (Page 280)

Importing and Exporting Object Attributes (Page 286)

9.1.2 Objects Tab

When the selected OS object is a folder, this tabbed pane lists all the symbol objects (instances) and the pictures contained by the folder. You can use standard Windows list selection methods (click, Shift-Click, CTRL + A, etc) to make individual or group selections, which makes the following operations convenient:

- Drag-drop an object or group of objects from one folder to another. While dragging, a "No" cursor icon (circle with line through it) is shown until the cursor is over a legal drop point, such as a folder. Then the cursor icon changes to a "+" and you may complete the drop.
- Delete one object or group of objects, equivalent to un-assigning them from the OS Plant Hierarchy. Recall that the corresponding AS objects in the lower right pane will not be removed but will just lose their OS assignment.



Name: the simple tag name of an instance, or picture name.

OS Tag Name: the full tag name of an instance in PCS 7 OS, optionally including leading folder names.

Status: this field will show "changed" if any of the object's attributes changed or if it was moved in the hierarchy since the last OS compilation. Otherwise blank.

AS: this identifies the controller (Automation Station) that contains the instance. Recall that there may be many controllers in the project, each represented by an AS node in the lower left pane.

If the selected OS object in the left pane is not a folder, the Objects tab is blank and not used.

9.1.3 Attributes Tab

General Attributes of the Selected Object

This tabbed pane lists general attributes of the selected object itself. For a folder object, you can edit the following attributes:

Name	Value	Category	Description
Enable OS Runtime Debug	no	Scripting	Enables Instance for OS Runtime script debugging
Folder	AutoAssignWizard		Folder to assign to
Reset Attributes to Default	no	DBA	Marks this object to have its attributes reset to the default

Folder

A folder path can be specified here, which indicates a location where the object should be assigned when the Auto Assign Wizard is run. Refer to section Auto-Assigning AS Objects to the Plant View (Page 216) for more details.

Enable OS Runtime Debugging

If the object instance's type contains runtime scripts, this setting is used to enable debugging of a particular instance within the Microsoft Script Debugger. A special debug thread will be used to execute all scripts of the instance, allowing for more predictable debugging.

Reset Attributes to Default

If the selected object is a block instance (or "symbol"), there may be one attribute relevant to the entire block, such as **Reset Attributes to Default**.

See the section titled Resetting Attribute Values to Controller Defaults (Page 283).

9.1.4 Graphics Tab

Graphic attributes are those that affect the look and behavior of a symbol and faceplate in the graphic runtime environment of the operator.

Name	Value	Category
Comment	Valve_1001	Graphics
SF	@TelecontrolTypicals_APL.pdf	Graphics
SN	@TC_APL_DNPValve_V1/1	Graphics

Every object has a **Symbol File (SF)** attribute and a **Symbol Name (SN)** attribute visible under the Graphics tab. When DBA creates .pdf files during compilation, it creates a picture corresponding to each Picture Tree folder. For each object in the folder, a symbol is inserted into

the folder's picture. The symbol file and symbol name graphics attributes determine which symbols DBA will insert into each **.pdl**.

When objects are inserted by DBA, suitable default values for symbol file and symbol name are set, based on the type of object. However, if you would like to customize particular instances of objects to appear differently within the **.pdl** file, you can change the symbol file and/or symbol name in the graphics tab. These symbol attributes are shown in the illustration at the beginning of this section.

Symbol File (SF)

A symbol file represents a file which contains a set of symbols which are inserted into **.pdl** files automatically from DBA. Using this attribute, it is possible to maintain multiple sets of symbols that are used in different circumstances. For example, one file might contain a set of large symbols. A second file may contain symbols with exactly the same names, but with smaller symbols.

Symbol Name (SN)

A symbol name represents the name of a symbol within the Symbol File which will be inserted by DBA when creating a picture using that object. For example: if the file referenced in Symbol File contains the symbols SingleLoop/1 and SingleLoop/2, you may wish to use Symbol Name of SingleLoop/1 for some objects, and SingleLoop/2 for other objects. During DBA compilation of block icons, DBA will search the block icons in the specified Symbol File for a symbol of the specified symbol name, the Object Name property is checked first. If no block icon matching the Object Name can be found, the Type property is checked. If there is no block icon found that matches either the Object Name property or the Type property, DBA will log a warning that no matching block icon could be found that matches the specified symbol name.

Note

In most case, the **Symbol Name (SN)** attribute starts with the character "@". Whether or not "@" has been specified as the first character, upon compilation, a symbol with the name starting with "@" will always be checked first. If such a symbol is found in the **Symbol File**, it will be used. If no such symbol is found, a symbol without the "@" character will be checked next. If such a symbol is found, that symbol will be used. If there is no symbol found with or without the "@" in the first character, a warning will be logged during compilation.

If no block symbol placing is required use the symbol name *@IGNORE*.

Note

New symbols inserted into a picture by DBA will be placed along in rows starting in the upper left hand corner of the picture. However, if an object already has a symbol existing on a picture, and the SN attribute is changed, the existing symbol will be replaced and a new symbol will be added in the same location as the original symbol.

Comment

Text description of the object. By default, this is the name of the instance as created in the Instance Editor. But this attribute allows more descriptive text to be entered.

9.1.5 Alarm Messages Tab

The attributes of the alarm messages in DBA correspond to the attributes defined in PCS 7 OS. You will receive more detailed and background information after selecting **Start > SIMATIC > WinCC > WinCC Information System** and here the section **Working with WinCC > Setting up the alarm system**.

The message classes and message types available for a DBA project are defined in the WinCC editor "Alarm Logging" where they can also be configured. To display, add or change these WinCC attributes, go to **Start > SIMATIC > WinCC > WinCC Explorer**. Then open the WinCC project as specified in the "PC Station view", OS properties. Next open the "Alarm Logging" editor in the left part of the WinCC project window (use the project name specified under "OS Properties" in the PC Station view. Consult the online help there to add or changes classes and types.

Note

The values that can be selected for the "Class" and "Type" attributes of the message are available in the DBA detail view after initial OS compilation of the DBA project when the corresponding data is retrieved from the WinCC database. This means when you notice that the respective drop-down lists are empty while trying to change the "Class" and "Type" attributes in the "Alarm Messages" tab, follow these steps:

- Make sure that the OS folder that contains the object with these alarm messages is assigned to an OS target that can be compiled.
- Compile the project and select the "Tags and Messages" option.

This fills the drop-down list with selectable values.

Alternatively, you can also use the menu command **Update OS Cache**. See section Updating OS Cache (Page 200) for more information.

Note

The alarm attributes that are available for editing may vary based on the way that the object type was created in the DBA Type Editor. Only message attributes that have been configured in the Type Editor

with the DBA Edit checkbox checked are available for editing within DBA. All of the message attributes described below, with the exception of Batch Name and

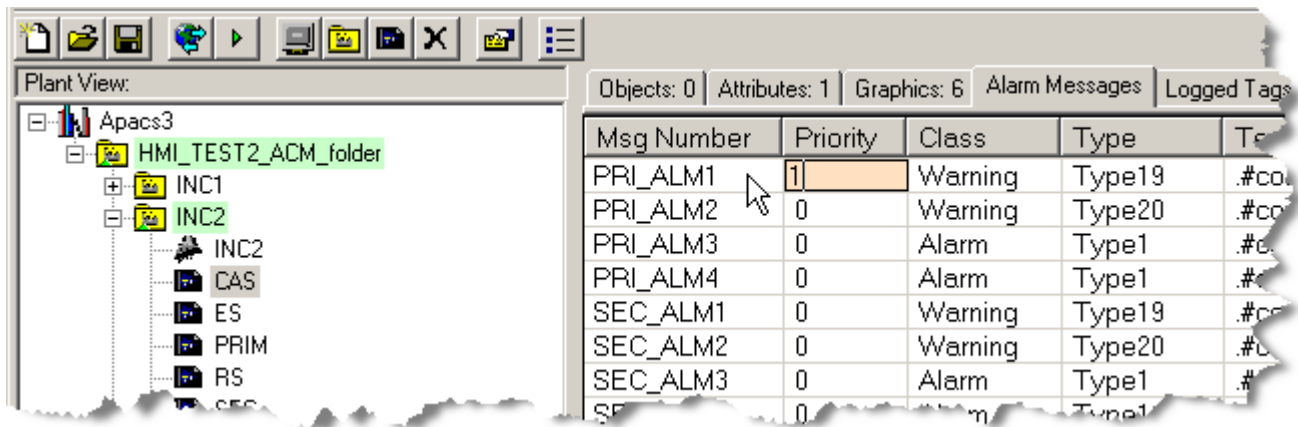
Operation, include the DBA Check box checked by default when a new message is created in the Type Editor.

Alarm priority

The "Alarm priority" attribute is specified for each alarm that can be generated for an object.

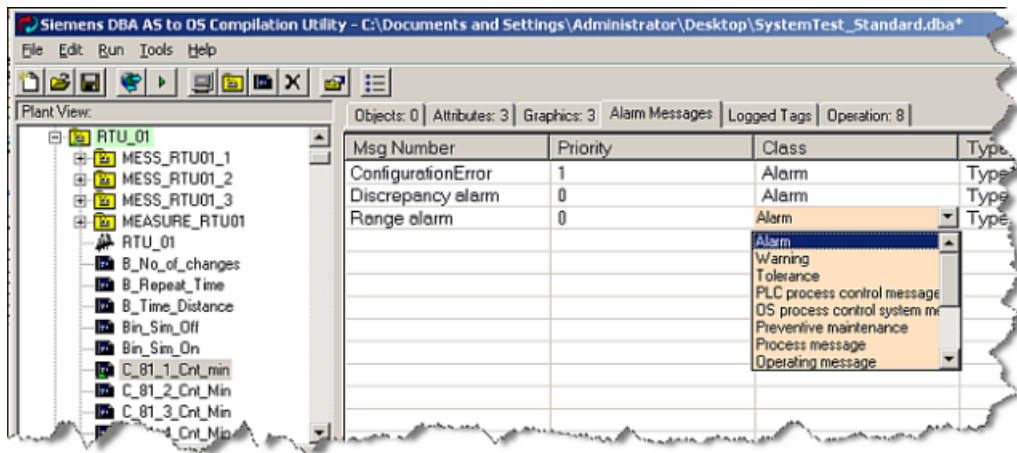
You can assign a unique priority to each alarm that can be generated for an object. The possible values are 0 to 16, whereby "16" is the highest priority and "0" the lowest priority.

To change the alarm priority, click an object in the "Detail" pane of the OS view to which an alarm priority was assigned, and enter a value in the range from 0 to 16.



Message class

The message class is specified for each message that can be generated for an object with the setting of the alarm class. All message classes that are defined in the WinCC alarm logging function are shown in a drop-down list.



Note

If a drop-down list is empty, read the note at the beginning of this section.

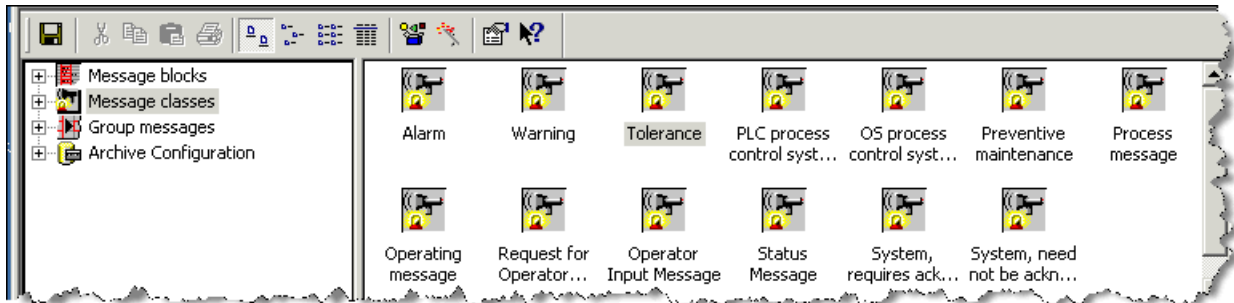
Message type

The message type (in a selected message class) is specified for each message that can be generated for an object with the setting of the message type. A drop-down list includes a numbered list of all message types that are defined in the selected message class. DBA reads the number of the message type. It can, however, not read the message text that is assigned to the

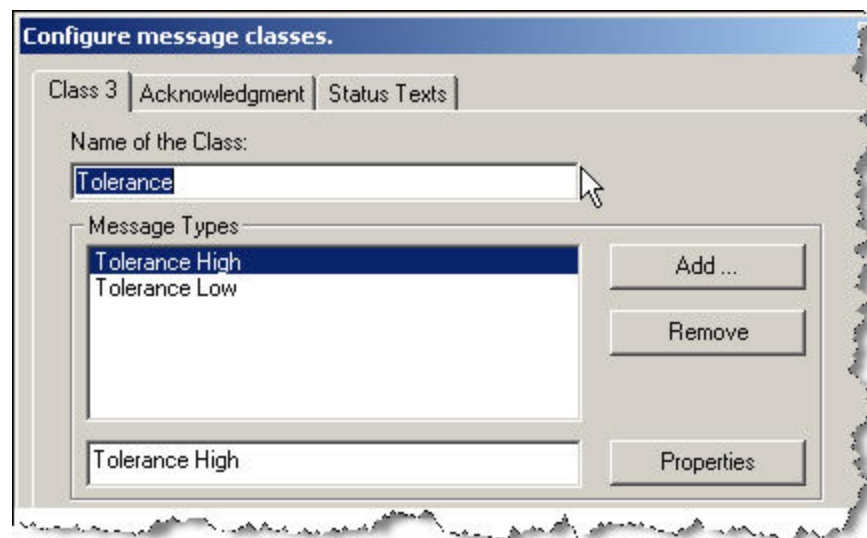
number. To determine which words or word sequences the message text includes, it must be opened in the WinCC Explorer.

1. Select **Start > Simatic > WinCC > Window Control Center 6.0 > Alarm Logging.**

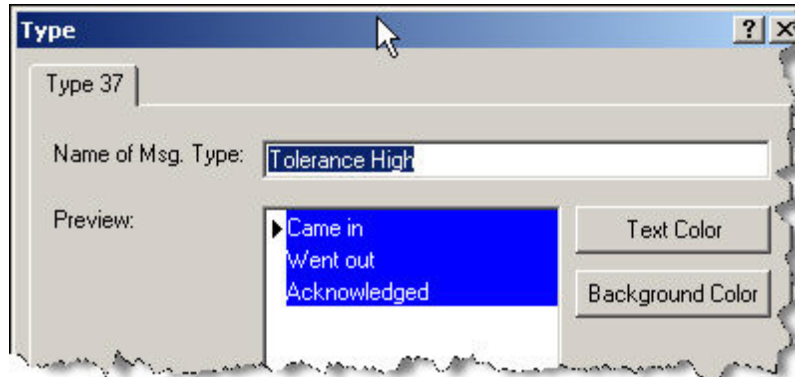
The top right pane of the window includes a list of message classes (**Alarm, Warning, Tolerance, etc.**):



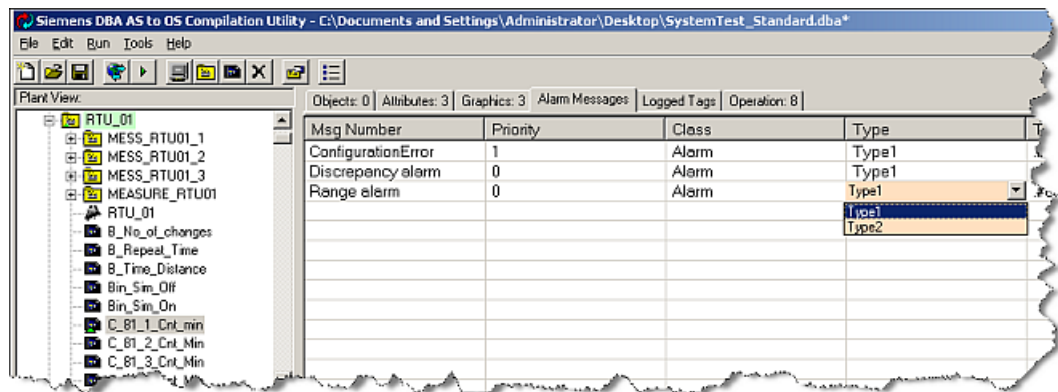
2. Select the required message class (Alarm, Warning, Tolerance, etc.), right-click it, and select "Properties" in the shortcut menu. The window below shows the message types for the "Alarm" class.



3. Select the required message type (e.g. Alarm High), and click the "Properties" button. A "Type" window opens. It shows the number of the message type.



4. After returning to the program, you will find a drop-down menu under the "Type" attribute in which you can select a message type from the message types that are supported by a message class based on the number. The message class in the figure below is "Alarm" and the available message types are Type 1 and Type 2 (message type 1 and message type 2). Proceed as described above to determine the meaning of these message types:



Note

The drop-down menus for "Alarm" and "Message class" are only available for control objects that meet the following criteria:

- The objects were assigned to a folder.
- The folder was assigned to an OS.
- The OS was assigned to an OS server.
- The OS server has been compiled at least once.

OR

The "Update OS Cache" function was executed for the OS server.

Message text

A specific text is displayed for each message, e.g. "@6%s@High Alarm". The text can be changed from its default configuration using the free form **Text** column. Note that specific alarms may include a special embedded syntax that is used as a dynamic substitution during runtime. These

embedded lower-level character strings are specific to the individual message types and usually may not be changed.

	Text
19	@6%s@ High Alarm
20	@6%s@ Low Alarm
37	@6%s@ Absolute Deviation Al
1	@6%s@ Alarm D (user defined)
38	@6%s@ IVP Low Alarm
37	@6%s@ IVP High Alarm
38	@6%s@ SP Low Alarm
37	@6%s@ SP High Alarm

Batch Name

This is a text that is displayed for each message. The text can be changed from its default configuration using the free form "Batch Name" column. Note that alarms may include a special embedded syntax that is used as a dynamic substitution during runtime.

Objects: 0 Attributes: 2 Graphics: 3 Alarm Messages					
Message	Priority	Class	Type	Text	Batch Name
Msg1	0	1 - Alarm	1	Alarm High	
Msg2	0	1 - Alarm	1	Alarm Low	

Operation

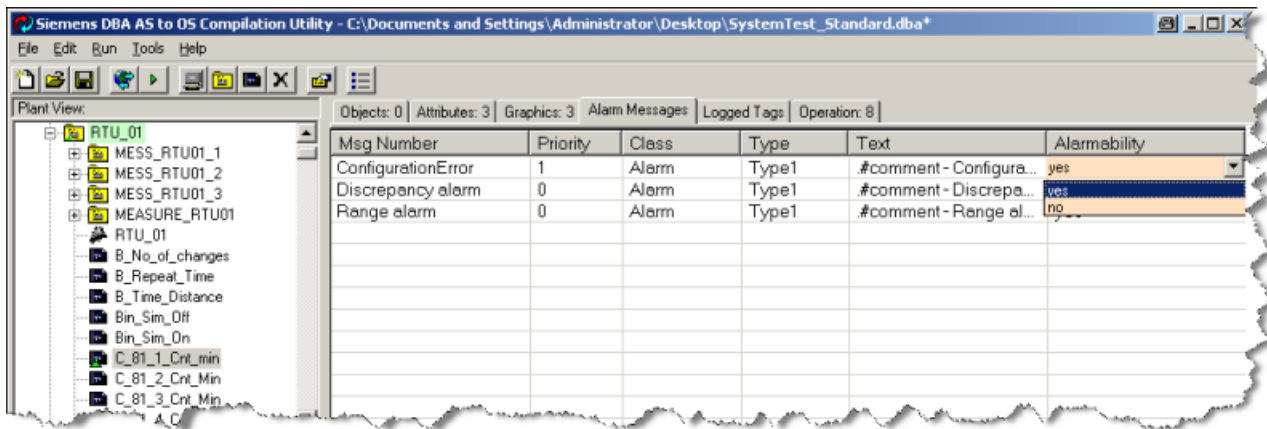
This is a text that is displayed for each message. The text can be changed from its default configuration using the free form "Operation" column. Note that alarms may include a special embedded syntax that is used as a dynamic substitution during runtime.

Objects: 0 Attributes: 2 Graphics: 3 Alarm Messages						
Message	Priority	Class	Type	Text	Batch Name	Operation
Msg1	0	1 - Alarm	1	Alarm High		
Msg2	0	1 - Alarm	1	Alarm Low		

Alarmability

Individual alarms can be configured so that they are never triggered during runtime. You make this configuration by setting the attribute for alarmability (as seen in the drop-down list shown below) to "no":

9.1 Attribute Details Overview

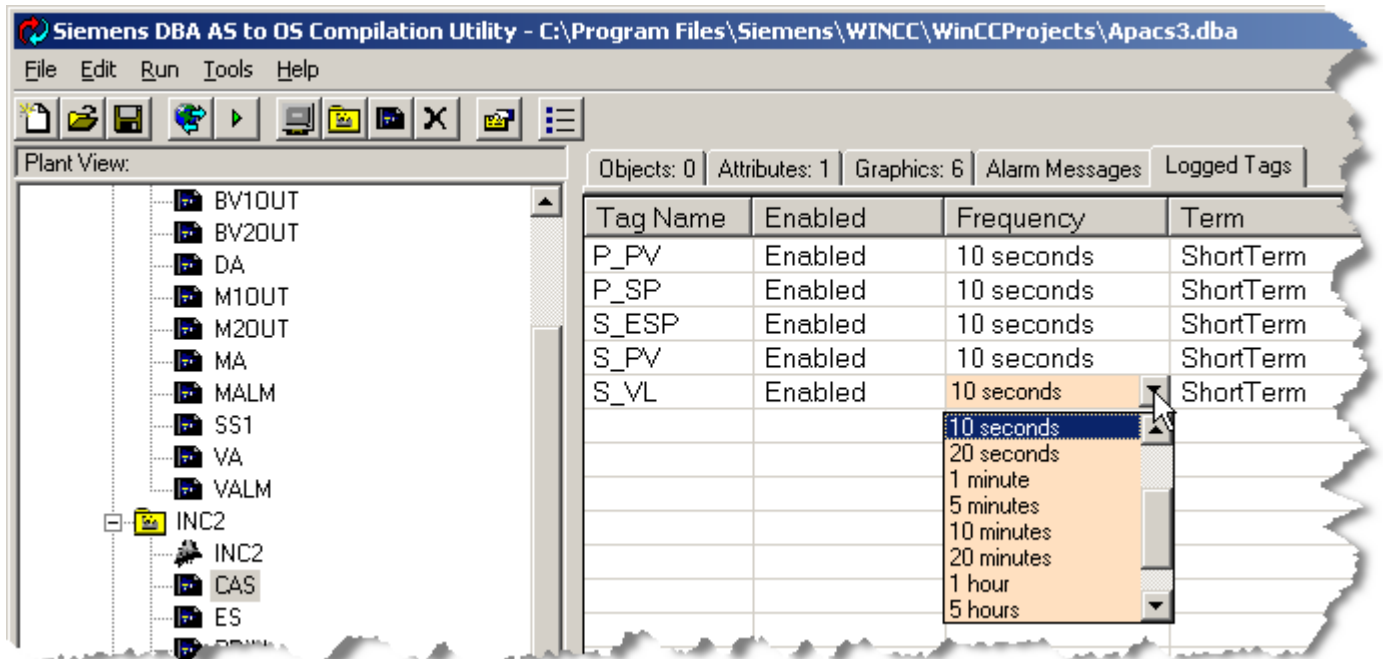


9.1.6 Logged Tags Tab

The Logged Tags View

In the Logged Tags tab view you can modify the Enabled, Frequency and Term attributes of tags that have been designated for saving in a Tag Archive. Please note that most of these modifications are only effective if they are made before the first OS compilation.

In the illustration below all the logged tags for selected OS object "CAS" are shown, with their attributes.



Background

The default values for Enabled, Frequency and Term are controlled by properties of the Type of the Tag, which you can modify in the DBA Type Editor. There you can also select which tags should be included in the Logged Tags list. A small group of important tags has been preselected for tag logging in the DBA software as you receive it but you are free to change the selection. See the documentation for the DBA Type Editor where the Tag Editor is discussed.

The illustration above shows the default values for tag logging in the OS Details. These are available after the first execution of the **Update Controller Objects** function for the AS Node containing these objects.

You can modify any of these default values for any selected OS object, such as **CAS** in the illustration. Subsequent executions of the **Update Controller Objects** function will not affect the editing you have done here (unless you explicitly force this by selecting the attribute **Reset Attributes to Default**).

If you are changing tag logging properties of many different OS objects, it may be more efficient to do this in the DBA Attribute Editor. To do this, in the OS View to the left, select a folder at a level high enough to contain the tags of interest, right click and choose the **Edit Attributes...** command. Then click the **Category** filter button at upper left of the DBA Attribute Editor and clear all but the **Tag logging** filter, in order to display for editing all of the tag logging attributes within this OS folder.

Configuring Tag Logging Attributes of Individual OS objects

Tag Name

This column shows all the tags belonging to the OS object's Type that have been selected for tag logging. The selection may be changed in the DBA Type Editor.

Enabled

Set to Enabled or Disabled.

If Enabled, the tag will be sent to the external tag logging database upon first compilation. Any change to Disabled after this will be ignored by DBA.

If Disabled, the tag will not be sent to the external tag logging database upon first compilation. But changing to Enabled will effectively add the tag to the external database upon the next OS compilation.

Frequency

Frequency is the sampling period for logging. Click the drop-down list to choose one of the available logging frequencies for this tag.

The selected frequency value will be sent to the external tag logging database upon first OS compilation. Subsequent changes to the value will be ignored by DBA since the value is managed by WinCC Tag Logging.

Term

Valid values are Long Term or Short Term. This is relevant only to PCS 7 OS tag logging. If the value is Long Term, the tag will be stored in the Central Archive Server.

Changes to this attribute after first OS compilation will be ignored by DBA.

9.2 Technological Object Operational Attributes

9.2.1 Overview

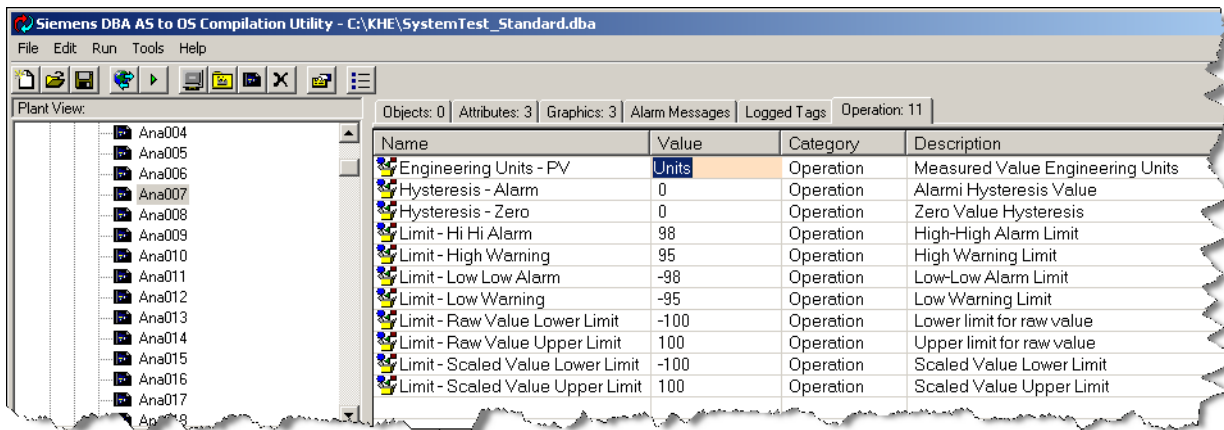
When an instance is created using the DBA instance editor, all operational parameters are preset to default values. An operational parameters tab is provided to allow these to be changed on a per instance basis. The sections below describe which parameters are applicable to each type.

9.2.2 Analog Value Operational Parameters

Configuring operational characteristics

The operational characteristics of an Analog Value object instance can be configured in DBA.

1. Select an Analog Value object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Engineering Units - PV

The text that will be used to identify the PV value of the Analog Value on HMI pictures. Free form text entry is allowed.

Hysteresis - Alarm

A hysteresis value that is used for returning from alarm. For any of the 4 Analog Value limit alarms (High Alarm, High Warning, Low Warning, Low Alarm), the alarm condition is reported as "gone" only when the PV value crosses the alarm limit by a percentage of the complete range that is greater than this hysteresis value. This can be useful for eliminating nuisance alarms when a PV has a tendency to fluctuate by a small amount around an alarm limit. Any floating point value between 0 and 100 can be configured.

Hysteresis - Zero

If, after scaling, the absolute value of PV is smaller than the zero value hysteresis, PV is set to zero. Any floating point value can be configured.

Limit –Hi Hi Alarm

When the PV exceeds this value, a High Alarm will be generated. Any floating point value can be configured.

Limit –Hi Warning

When the PV exceeds this value, a High Warning will be generated. Any floating point value can be configured.

Limit – Lo Lo Alarm

When the PV becomes lower than this value, a Low Alarm will be generated. Any floating point value can be configured.

Limit – Lo Warning

When the PV becomes lower than this value, a Low Warning will be generated. Any floating point value can be configured.

Limit – Raw Value Lower Limit

Represents the lower limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Upper Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes lower than this value, a Low Range Alarm will be generated. Any floating point value can be configured. (If the *Raw Value Lower Limit* is not less than the Raw Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Raw Value Upper Limit

Represents the upper limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Lower Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes higher than this value, a High Range Alarm will be generated. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Scaled Value Lower Limit

Represents the lower limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Upper Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Scaled Value Upper Limit

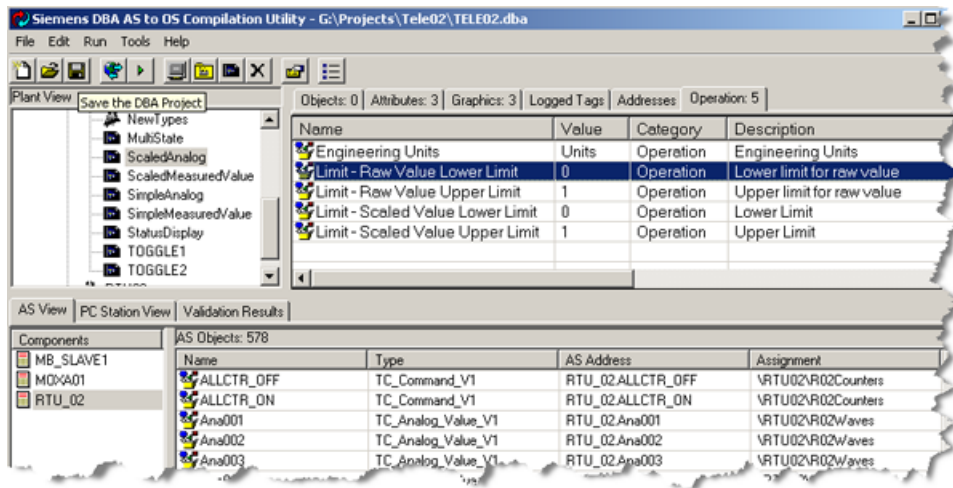
Represents the upper limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Lower Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a Configuration Error alarm will be generated).

9.2.3 Scaled Analog Value Operational Parameters

Configurable operational characteristics

The operational characteristics of a Scaled Analog Value object instance can be configured in DBA.

1. Select a Scaled Analog Value object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Engineering Units - PV

The text used to identify the PV value of the Scaled Analog Value on HMI pictures. Free form text entry is allowed.

Limit – Raw Value Lower Limit

Represents the lower limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Upper Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes lower than this value, a range error indicator is shown on any symbol that is showing the value. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, the range error indicator is also shown.)

Limit – Raw Value Upper Limit

Represents the upper limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Lower Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes greater than this value, a range error indicator will be shown on any symbol that is showing the value. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, the range error indicator will also be shown.)

Limit – Scaled Value Lower Limit

Represents the lower limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Upper Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a range error indicator will be displayed on any symbol showing the value.)

Limit – Scaled Value Upper Limit

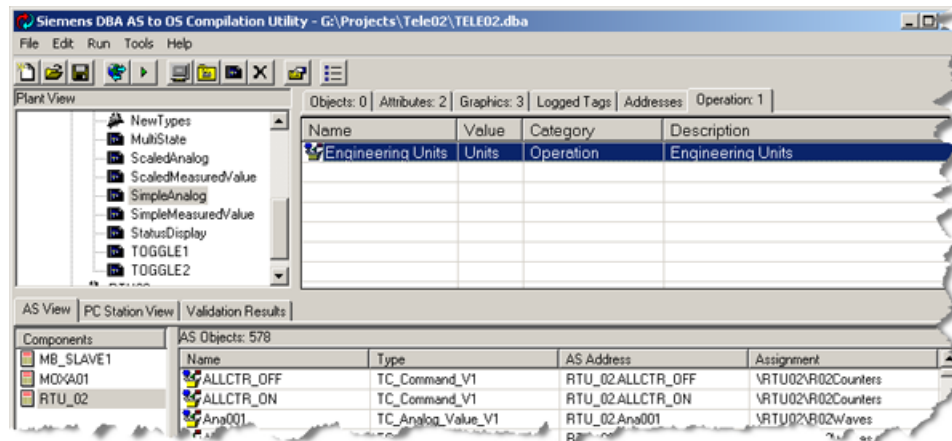
Represents the upper limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Lower Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a range error indicator will be displayed on any symbol showing the value.)

9.2.4 Simple Analog Value Operational Parameters

Configuring operational characteristics

The operational characteristics of a Simple Analog Value object instance can be configured in DBA.

1. Select a Simple Analog Value object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right-hand quadrant of the screen.



Engineering Units - PV

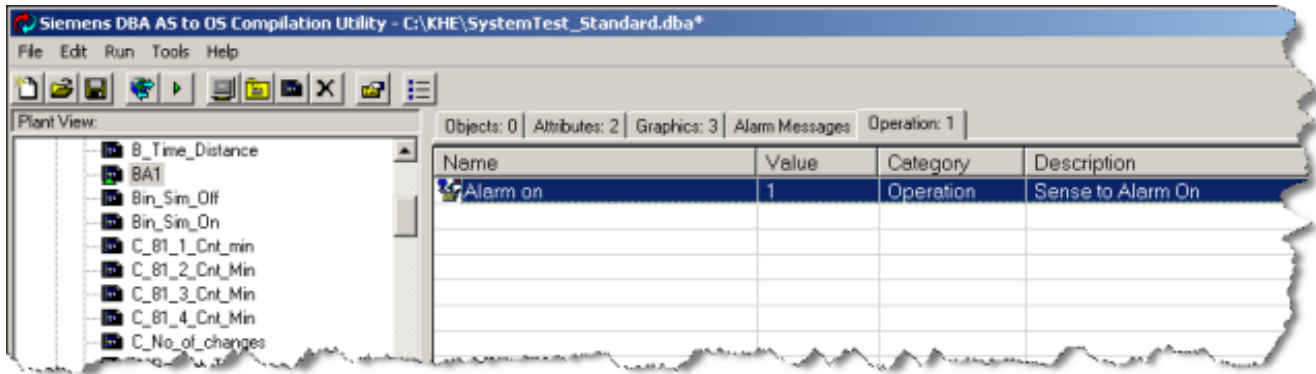
The text used to identify the PV value of the Simple Analog Value on HMI pictures. Free form text entry is allowed.

9.2.5 BitAlarm Operational Parameters

Configuring operational characteristics

The operational characteristics of a BitAlarm object instance can be configured in DBA.

1. Select a BitAlarm object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Alarm On

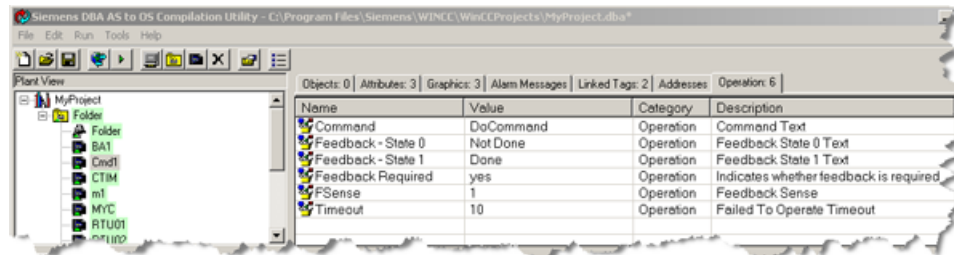
Indicates the value on which the alarm will act. Enter any integer value between 0 and 65535.

9.2.6 Command Operational Parameters

Configuring operational characteristics

The operational characteristics of a Command object instance can be configured in DBA.

1. Select a Command object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Command

The text string that appears on the **Command** button of the faceplate. Free form text entry is allowed.

Feedback – State 0

The text string that appears on the command symbol and faceplate when the Feedback (F) is indicating state "0". Free form text entry is allowed.

Feedback – State 1

The text string that appears on the command symbol and faceplate when the Feedback (F) is indicating state "1". Free form text entry is allowed.

Feedback Required

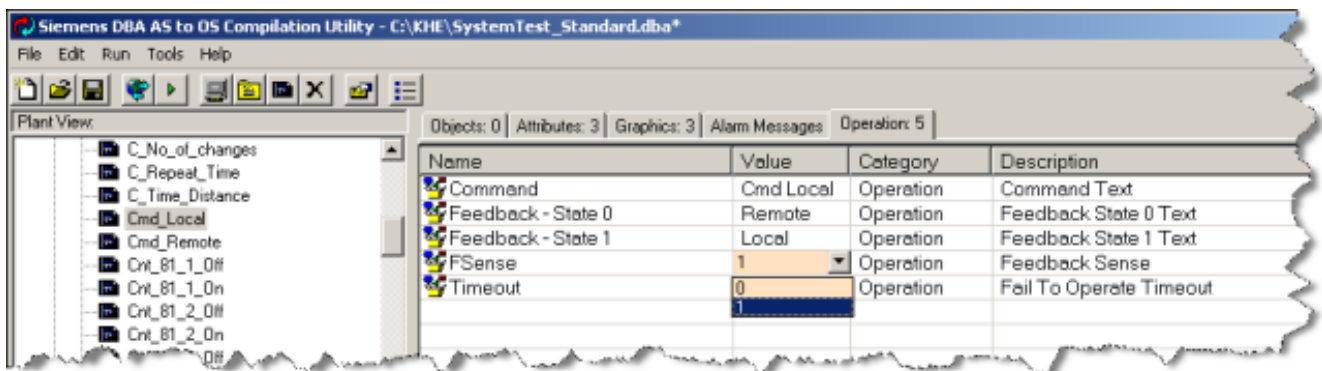
Indicates whether feedback is expected for the command. A drop-down list is provided for selection of "Yes" or "No". If "No" is selected, then the faceplate will not show any feedback indicator.

Note

If the Feedback Required parameter is set to "No" then the Block Icon automatically changes from "\1" to "\2" during the compilation.

FSense

The expected feedback from the Command. If a Timeout has been configured, if the Feedback variable (F) does not correspond to the value of FSense within the timeout period, a Discrepancy Alarm is generated. Clicking on the **Value** column provides a drop-down list from which a value of "1" or "0" can be selected. (The default value is "1").

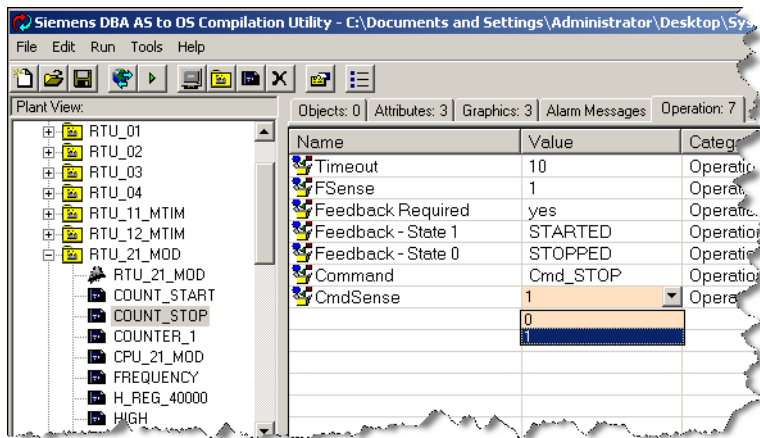


Timeout

Timeout value in units of seconds. If a Timeout has been configured, if the Feedback variable (F) does not correspond to the value of FSense within the timeout period, a Discrepancy Alarm is generated. Any integer value can be specified.

CmdSense (Modbus, IEC and DNP Only)

The sense of the command to be written. (The default value is "1").



9.2.6.1 IEC Command Operational Parameters

The operational parameters for IEC Commands are identical to the Command Operational parameters, with the following additions:

- Automatic Mode**

Indicates whether the IEC protocol feature of select-before-execute is to be used. Use the pulldown list to select **yes** or no. If **yes** is selected, the command is in automatic mode and there is no select required in order to issue the command; the command will be executed directly. If **no** is selected the command must be selected first prior to executing the command.
- Operator Timeout**

In *non-automatic mode*, after a command has been *selected*, it must be *executed* or *deselected*. This time represents the time (in seconds) that an operator is allowed between *selection* and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the command is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used.
- Checkback Timeout**

In *non-automatic mode*, after a command has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the command is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used.

9.2.6.2 DNP Command Operational Parameters

The operational parameters for DNP Commands are identical to the Command Operational parameters, with the following additions:

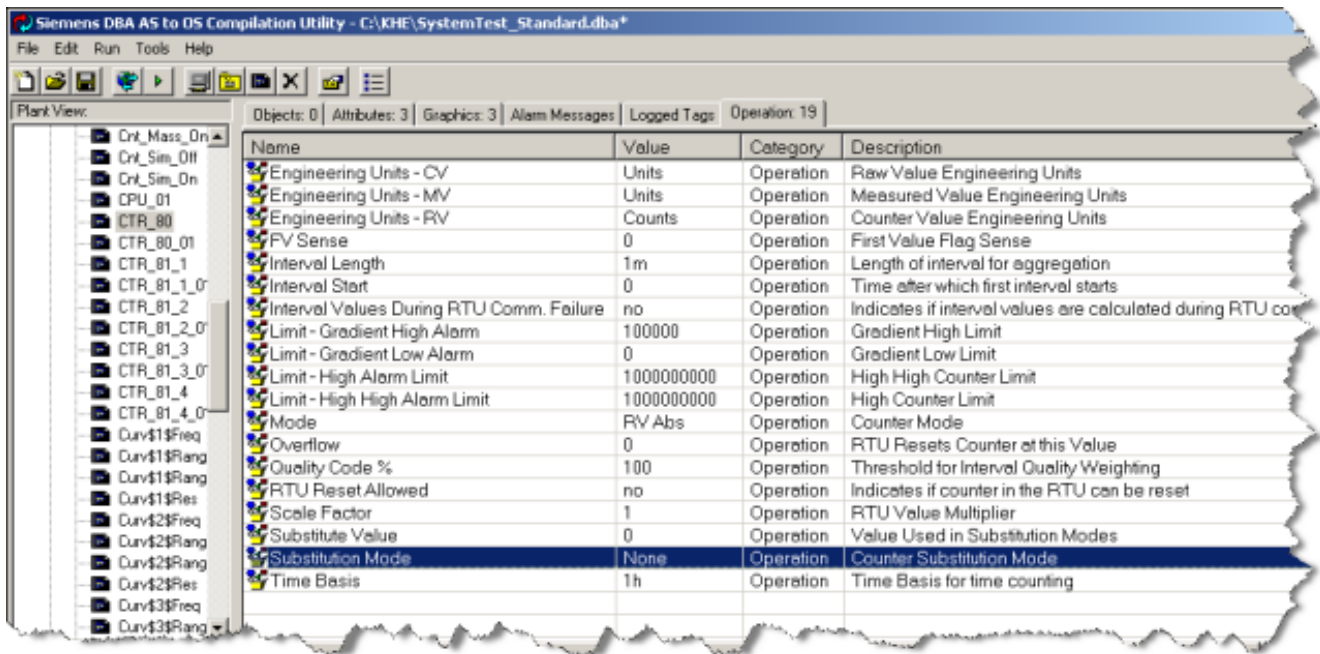
- **Automatic Mode**
Indicates whether the DNP protocol feature of select-before-execute is to be used. Use the pulldown list to select **yes** or **no**. If **yes** is selected, the command is in automatic mode and there is no select required in order to issue the command; the command will be executed directly. If **no** is selected the command must be selected first prior to executing the command.
- **Operator Timeout**
In *non-automatic mode*, after a command has been *selected*, it must be *executed* or *deselected*. This time represents the time (in seconds) that an operator is allowed between *selection* and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the command is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used.
- **Checkback Timeout**
In *non-automatic mode*, after a command has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the command is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used.

9.2.7 Counter Operational Parameters

Configuring operational characteristics

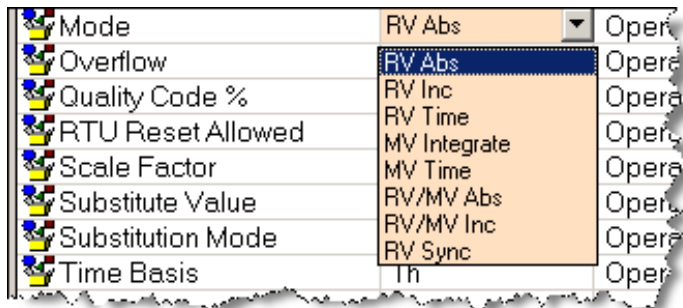
The operational characteristics of a Counter object instance can be configured in DBA.

1. Select a Counter object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Mode

Indicates the calculation mode for the Counter. Clicking on the **Value** column provides a drop list from which a mode can be selected.



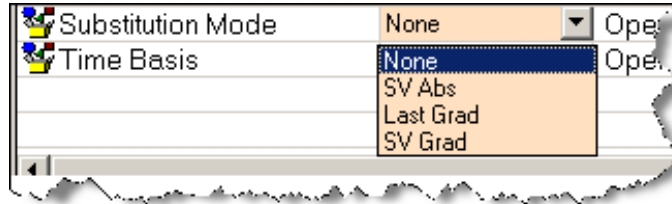
The following modes are available:

- **RV Abs** - RV is absolute counter value
- **RV Inc** - RV is counter increment since last transmission
- **RV Time** - RV is status, count time where status was 1 (e.g. count operating hours)
- **MV Integrate** - Integrate from indirectly addressed measured value
- **MV Time** - MV is status, count time where status was 1 (e.g. count operating hours)
- **RV/MV Abs** - RV is absolute counter value, use measured value for weighing of counter increment before accumulation (e.g. calculate energy equivalents from gas volume and heating value)

- **RV/MV Inc** - RV is increment, use measured value to calculate weighted increment before accumulation
- **RV Sync** - RV is absolute counter value. CV is synchronized with RV and rolls over when RV rolls over.

Substitute Mode

Indicates the substitution mode. The substitution mode is employed when the input value (RV or MV) has bad quality, for example. Clicking on the **Value** column provides a drop list from which a substitution mode can be selected.



The following substitution modes are available:

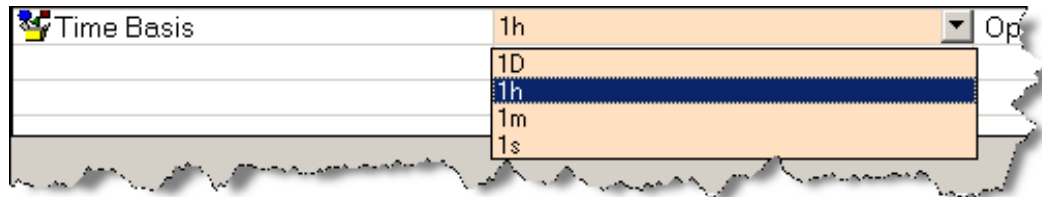
- **None** - No substitution
- **SV Abs** - Substitute value is a manually entered absolute value
- **Last Grad** - Use last gradient to calculate new values in 1 minute intervals
- **SV Grad** - Use substitution value given in SV as gradient to calculate new values in 1 minute intervals

Substitute Value

Indicates the initial substitute value to be used for substitution when Substitute Mode is "SV Abs". Any floating point value can be configured.

Time Basis

The time basis to be used for the gradient calculation and for counting. Clicking on the **Value** column provides a drop list from which a Time Basis can be selected.

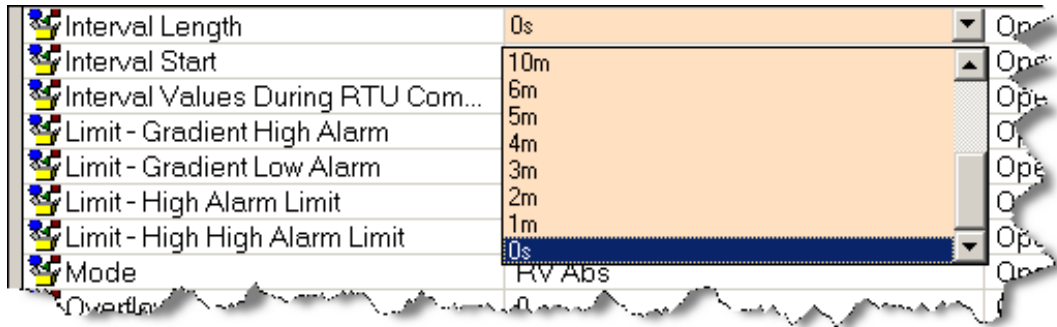


The following gradient Time Basis can be selected

- **1D** - Gradient computed in terms of changes per day
- **1h** - Gradient computed in terms of changes per hour
- **1m** - Gradient computed in terms of changes per minute
- **1s** - Gradient computed in terms of changes per second

Interval Length

Length of interval for interval aggregation. Clicking on the **Value** column provides a drop list from which an Interval Length can be selected.

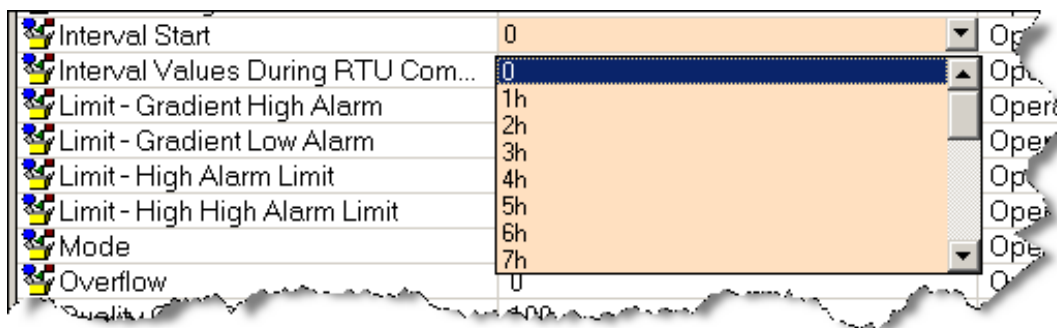


The following interval lengths can be configured:

- 0s - no interval calculation
- 1W - Interval is 1 Week
- 1D - Interval is 1 Day
- 1h - interval is 1 hour
- 30m - interval is ½ hour
- 15m - interval is 1/4 hour
- 12m - interval is 12 minutes
- 10m - interval is 10 minutes
- 6m-1m - interval is 6 , 5, 4, 3, 2 or 1 minutes

Interval Start

Indicates at which point within the interval the calculation is to begin. This provides a kind of offsetting capability for the interval calculation. Clicking on the **Value** column provides a drop list from which an Interval Start can be selected. The exact drop down will be dependent on the interval length.



For weekly intervals, a list of the days of the week is shown.

For daily intervals, a list of the hours of the day is shown.

For hourly intervals, a list of the minutes of the hour is shown.

For any of the minute interval lengths, a list of the seconds of the minutes is shown.

In all cases, 0 can be selected if no starting offset is required.

Quality Code %

Indicates the percentage of time during an interval that must be good and/or substituted quality in order that the interval quality is not reported as "BAD". Any floating point value in the range of 0 to 100 can be specified.

Limit – Gradient High Alarm

When the GRAD exceeds this value, a Gradient Alarm will be generated. Any floating point value can be configured.

Limit – Gradient Low Alarm

When the GRAD is lower than this value, a Gradient Alarm will be generated. Any floating point value can be configured.

Limit – High High Alarm

When the CV exceeds this value, a High Alarm will be generated. Any floating point value can be configured.

Limit – High Alarm

When the CV exceeds this value, a High Warning will be generated. Any floating point value can be configured.

Overflow

Indicates the value at which the RTU will reset the counter. Any floating point value can be configured.

Scale Factor

RTU value will be multiplied by scale factor prior to any further processing. Any floating point value can be configured.

Engineering Units - CV

The text that will be used to identify the CV value of the Counter on HMI pictures. Free form text entry is allowed.

Engineering Units - RV

The text that will be used to identify the RV value of the Counter on HMI pictures. Free form text entry is allowed.

Engineering Units - MV

The text that will be used to identify the MV value of the Counter on HMI pictures. Free form text entry is allowed.

Interval Values During RTU Comm Failure

Indicator of whether or not intervals should be calculated when communication with the RTU is not possible. Clicking on the **Value** column provides a drop list from which a value of "Yes" or "No" can be selected.

RTU Reset Allowed

Indicator of whether or not the RTU supports resetting of the counter. The Counter faceplate will include a "Reset" button if this value is configured as "Yes". Clicking on the **Value** column provides a drop list from which a value of "Yes" or "No" can be selected.

FVSense

The sense of the First Value (FV) indicator for the Counter. Clicking on the **Value** column provides a drop list from which a value of "1" or "0" can be selected.

When this object is used with protocols that defined counters that do not define a First Value concept, this parameter is not shown.

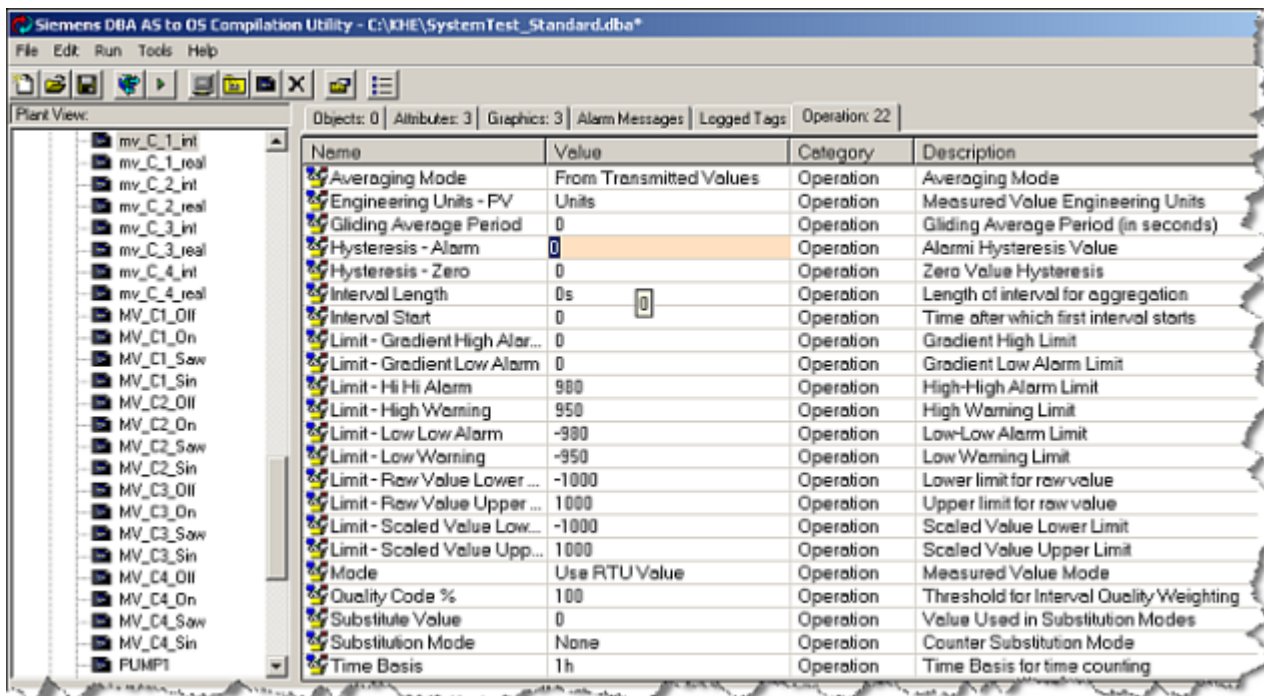
Gradient Alarm Gliding Average (GAVP)

Allows for the specification of a smoothing function for the computation of the gradient. If non-zero, this indicates the time, in seconds, used to compute a "smoothed" gradient. A gliding average of all counter deltas is computed based on the period specified, and this gliding average is the basis for computing the gradient and gradient alarms.

If zero, no smoothing occurs, the gradient is computed based on the instantaneous change between individual counter changes. Note that without smoothing, it is possible that spurious gradient alarms can result if there is a large change between one reading of the counter and the next reading. Use of the gliding average can eliminate such spurious alarms.

9.2.8 Measured Value Operational Parameters

The operational characteristics of a MeasuredValue object instance can be configured in DBA. Select a MeasuredValue object instance from the Plant View and select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Mode

Indicates the calculation mode for the Measured Value. Clicking on the **Value** column provides a drop list from which a mode can be selected.

Mode	Use RTU Value	Oper
Quality Code %	Use RTU Value	Oper
Substitute Value	Use Internal Input Value	Oper
Substitution Mode	None	Oper
Time Basis	1h	Oper

The following modes are available:

- Use RTU Value
- Use Internal Input Value

Averaging Mode

Indicates the averaging mode. Clicking on the **Value** column provides a drop list from which an averaging mode can be selected.

Averaging Mode	From Transmitted Values	Oper
Engineering Units - PV	From Transmitted Values	Oper
Gliding Average Period	From Averages	Oper
Hysteresis - Alarm	From Transmitted Values (No Calc)	Oper
Hysteresis - Zero	From Averages (No Calc)	Oper

The following averaging modes are available:

- **From Transmitted Values** - build average from spontaneously transmitted values
- **From Averages** - build average from averages
- **From Transmitted Values (No Calc)** - build average from spontaneously transmitted values, do not calculate intermediate intervals with no RTU value recorded
- **From Averages (No Calc)** - build average from averages, do not calculate intermediate intervals with no RTU value recorded

Substitution Mode

Indicates the substitution mode. The substitution mode is employed when the input value (RV or IV) has bad quality. Clicking on the **Value** column provides a drop list from which a substitution mode can be selected.

Substitution Mode	None	Op
Time Basis	None	Q
	Use Last Known Good PV	
	Use RAVG	
	Use LAVG	
	Use GAVG	
	Use Substitute Value	

The following substitution modes are available:

- **None** - No substitution
- **Use Last Known Good PV** - Use the last known good PV as the PV
- **Use RAVG** - Use the Running Average as the PV
- **Use LAVG** - Use the Last Interval Average (L1AVG) as the PV
- **Use GAVG** - Use the Gliding Average as the PV
- **Use Substitute Value** - Use the Substitute Value (SUBS) as the PV

Substitute Value

Indicates the initial scaled substitute value to be used for substitution when Substitute Mode is "Use Substitute Value". Any floating point value can be configured.

Gliding Average Period

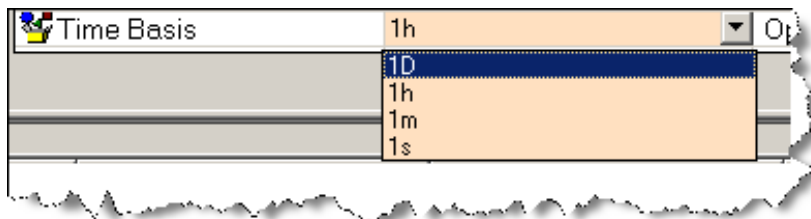
The period for the computation of a gliding average, in units of seconds. Any integer value can be specified.

Note

If gliding average period is non-zero, the computation of the gradient will be based on changes to the gliding average instead of changes between individual readings of the measured value, providing a smoothing of the gradient. Note that without smoothing, it is possible that spurious gradient alarms can result if there is a large change between one reading of the Measured Value and the next reading. Use of the gliding average can eliminate such spurious alarms.

Time Basis

The time basis to be used for the gradient calculation. Clicking on the **Value** column provides a drop list from which a Time Basis can be selected.

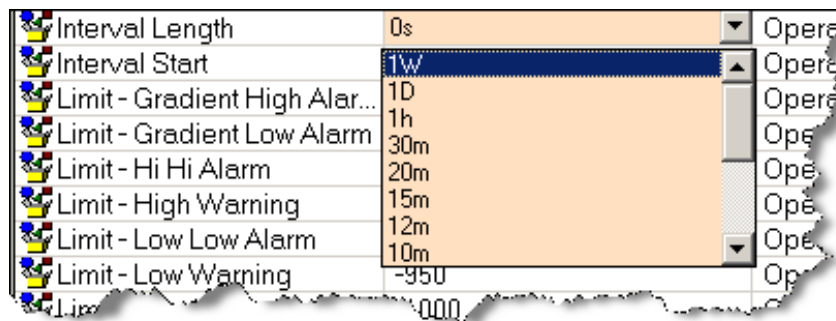


The following gradient Time Basis can be selected:

- 1D - Gradient computed in terms of changes per day
- 1h - Gradient computed in terms of changes per hour
- 1m - Gradient computed in terms of changes per minute
- 1s - Gradient computed in terms of changes per second

Interval Length

Length of interval for interval aggregation. Clicking on the **Value** column provides a drop list from which an Interval Length can be selected.

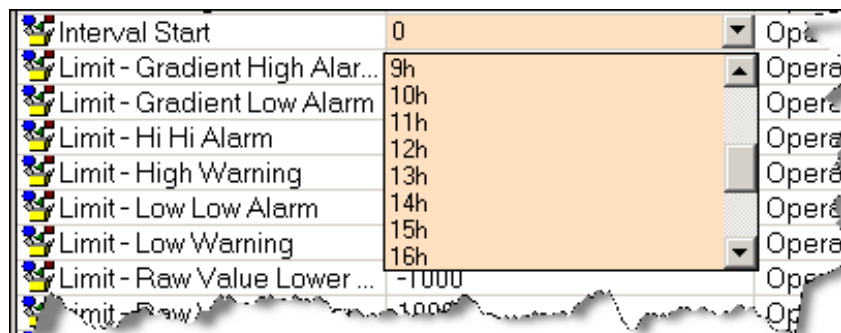


The following interval lengths can be configured:

- 0s - no interval calculation
- 1W - Interval is 1 Week
- 1D - Interval is 1 Day
- 1h - interval is 1 hour
- 30m - interval is ½ hour
- 15m - interval is 1/4 hour
- 12m - interval is 12 minutes
- 10m - interval is 10 minutes
- 6m-1m - interval is 6 , 5, 4, 3, 2 or 1 minutes

Interval Start

Indicates at which point within the interval the calculation is to begin. This provides a kind of offsetting capability for the interval calculation. Clicking on the **Value** column provides a drop list from which an Interval Start can be selected. The exact drop down will be dependent on the interval length.



For weekly intervals, a list of the days of the week is shown.

For daily intervals, a list of the hours of the day is shown.

For hourly intervals, a list of the minutes of the hour is shown.

For any of the minute interval lengths, a list of the seconds of the minutes is shown.

In all cases, 0 can be selected if no starting offset is required.

Quality Code %

Indicates the percentage of time during an interval that must be good and/or substituted quality in order that the interval quality is not reported as "BAD". Any floating point value in the range of 0 to 100 can be specified.

Limit – Gradient High Alarm

When the GRAD exceeds this value, a Gradient High Alarm will be generated. Any positive floating point value can be configured.

Limit –Gradient Low Alarm

When the GRAD is lower than this value, a Gradient Low Alarm will be generated. Any negative floating point value can be configured.

Engineering Units - PV

The text that will be used to identify the PV value of the Analog Value on HMI pictures. Free form text entry is allowed.

Hysteresis - Alarm

A hysteresis value that is used for returning from alarm. For any of the 4 Analog Value limit alarms (High Alarm, High Warning, Low Warning, Low Alarm), the alarm condition is reported as "gone" only when the PV value crosses the alarm limit by a percentage of the complete range that is greater than this hysteresis value. This can be useful for eliminating false alarms when a PV has a tendency to fluctuate by a small amount around an alarm limit. Any floating point value between 0 and 100 can be configured.

Hysteresis - Zero

If, after scaling, the absolute value of PV is smaller than the zero value hysteresis, PV is set to zero. Any floating point value can be configured.

Limit –Hi Hi Alarm

When the PV exceeds this value, a High Alarm will be generated. Any floating point value can be configured.

Limit –Hi Warning

When the PV exceeds this value, a High Warning will be generated. Any floating point value can be configured.

Limit – Lo Lo Alarm

When the PV becomes lower than this value, a Low Alarm will be generated. Any floating point value can be configured.

Limit – Lo Warning

When the PV becomes lower than this value, a Low Warning will be generated. Any floating point value can be configured.

Limit – Raw Value Lower Limit

Represents the lower limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Upper Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes lower than this value, a Low Range Alarm will be generated. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Raw Value Upper Limit

Represents the upper limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Lower Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes higher than this value, a High Range Alarm will be generated. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Scaled Value Lower Limit

Represents the lower limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Upper Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Scaled Value Upper Limit

Represents the upper limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Lower Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a Configuration Error alarm will be generated).

Interval Values During RTU Comm Failure

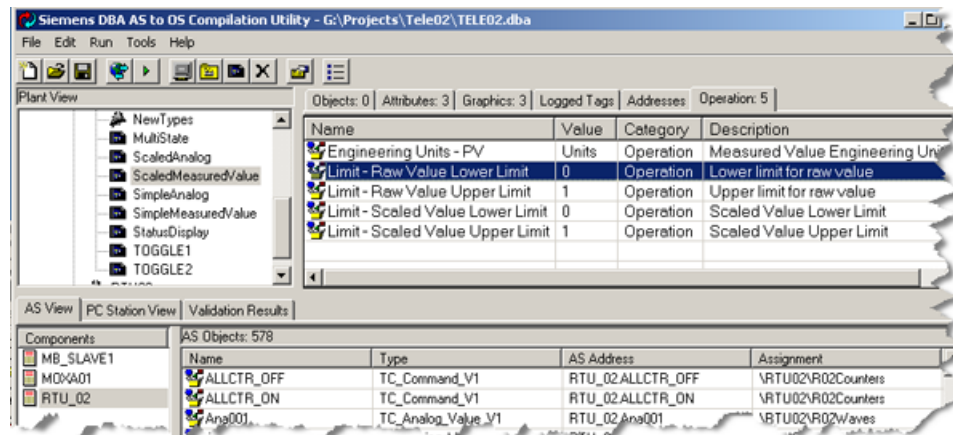
Indicator of whether intervals should be calculated when communication with the RTU is not possible. Clicking the **Value** column provides a drop list from which a value of "Yes" or "No" can be selected.

9.2.9 Scaled Measured Value Operational Parameters

Configuring operational characteristics

The operational characteristics of a Scaled Measured Value object instance can be configured in DBA.

1. Select a Measured Value object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Engineering Units - PV

The text that will be used to identify the PV value of the Measured Value on HMI pictures. Free form text entry is allowed.

Limit – Raw Value Lower Limit

Represents the lower limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Upper Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes lower than this value, a range error indicator will be shown on any symbol that is showing the value. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, the range error indicator will also be shown.)

Limit – Raw Value Upper Limit

Represents the upper limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Lower Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes greater than this value, a range error indicator will be shown on any symbol that is showing the value. Any floating point value can be configured. (If the Raw Value Upper Limit is not less than the Raw Value Upper Limit, the range error indicator will also be shown.)

Limit – Scaled Value Lower Limit

Represents the lower limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Upper Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a range error indicator will be displayed on any symbol showing the value.)

Limit – Scaled Value Upper Limit

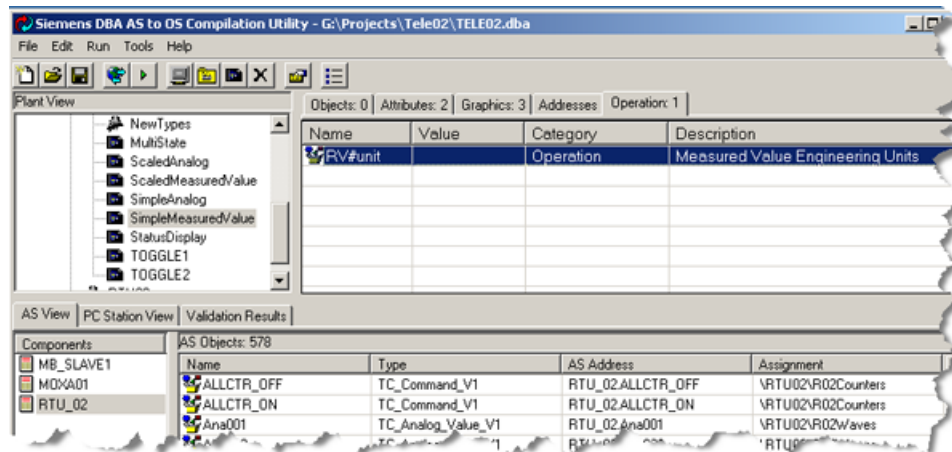
Represents the upper limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Lower Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a range error indicator will be displayed on any symbol showing the value.)

9.2.10 Simple Measured Value Operational Parameters

Configuring operational characteristics

The operational characteristics of a Simple Measured Value object instance can be configured in DBA.

1. Select a Measured Value object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



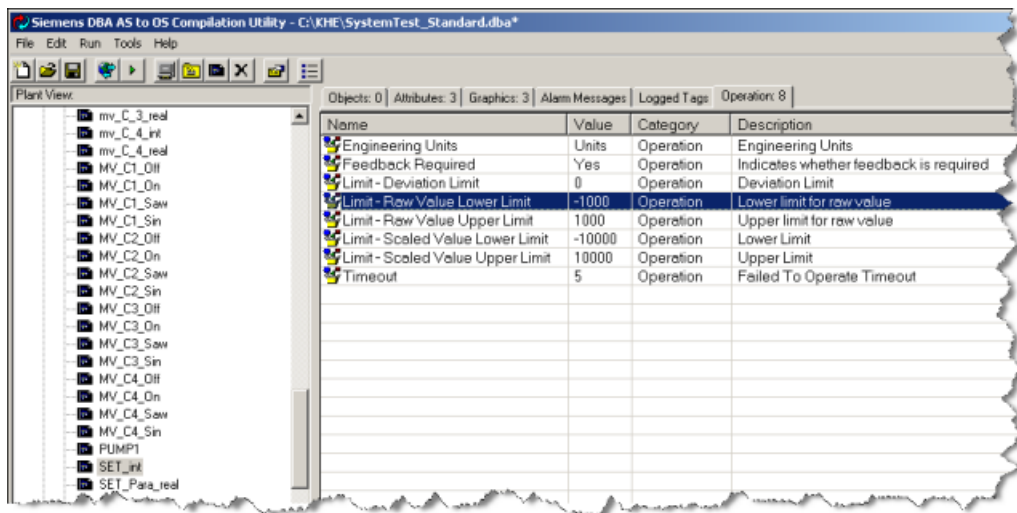
Engineering Units - PV

The text that will be used to identify the PV value of the Measured Value on HMI pictures. Free form text entry is allowed.

9.2.11 Setpoint Operational Parameters

The operational characteristics of a Setpoint object instance can be configured in DBA

1. Select a Command object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Feedback Required

Indicator of whether or not the setpoint is configured to return feedback. If set to "Yes", then a feedback indicator is shown on the Setpoint faceplate. Also, if set to "No", a Discrepancy Alarm will never be generated for the setpoint. Clicking on the **Value** column provides a drop list from which a value of "Yes" or "No" can be selected.

Note

If the Feedback Required parameter is set to "No" then the Block Icon automatically changes from "1" to "2" during the compilation.

Limit – Deviation Limit

Indicates the allowed deviation between the requested Setpoint and the feedback. A Discrepancy Alarm can only be generated if the deviation exceeds this limit. Any floating point value is allowed.

Timeout

Timeout value in units of seconds. If a Timeout has been configured, if the Feedback variable (F) does not correspond to the value of TSP+/- DL within the timeout period, a Discrepancy Alarm is generated. Any integer value can be specified.

Limit – Raw Value Lower Limit

Represents the lower limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Upper Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes lower than this value, a Low Range

Alarm will be generated. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, a Configuration Error alarm will be generated.)

Limit – Raw Value Upper Limit

Represents the upper limit of the range of the RV. The PV value is scaled based on the range that is represented by this value and the Raw Value Lower Limit and on the range represented by the Scaled Value Upper and Lower Limit values. If the RV becomes higher than this value, a High Range Alarm will be generated. Any floating point value can be configured. (If the Raw Value Lower Limit is not less than the Raw Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Scaled Value Lower Limit

Represents the lower limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Upper Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a Configuration Error alarm will be generated).

Limit – Scaled Value Upper Limit

Represents the upper limit of the range of the PV. The PV value is scaled based on the range that is represented by this value and the Scaled Value Lower Limit and on the range represented by the Raw Value Upper and Lower Limit values. Any floating point value can be configured. (If the Scaled Value Lower Limit is not less than the Scaled Value Upper Limit, a Configuration Error alarm will be generated).

9.2.11.1 IEC Setpoint Operational Parameters

The operational parameters for IEC Setpoints are identical to the Setpoint Operational parameters, with the following additions:

- **Automatic Mode**
Indicates whether the IEC protocol feature of select-before-execute is to be used. Use the pulldown list to select **yes** or **no**. If **yes** is selected, the setpoint is in automatic mode and there is no select required in order to change the setpoint; the setpoint change will be executed directly. If **no** is selected the setpoint must be *selected* first prior to *executing* the change of the setpoint
- **Operator Timeout**
In **non-automatic mode**, after a setpoint has been *selected*, it must be *executed* or *deselected*. This time represents the time (in seconds) that an operator is allowed between selection and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the setpoint is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used
- **Checkback Timeout**
In **non-automatic mode**, after a setpoint has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the setpoint is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used

9.2.11.2 DNP Setpoint Operational Parameters

The operational parameters for DNP Setpoints are identical to the Setpoint Operational parameters, with the following additions:

- Automatic Mode
Indicates whether the DNP protocol feature of select-before-execute is to be used. Use the pulldown list to select:
 - **Automatic** (the setpoint is in automatic mode and there is no select required in order to change the setpoint).
 - **Select / Execute** (the setpoint must be selected first prior to executing the change of the setpoint)
 - **Operate without Select before execute (with acknowledge)**
 - **Operate without Select before execute (without acknowledge).**

Note that with/without acknowledge indicates whether the RTU is sending an acknowledgement back to the Server (so you know if it was successful or not).

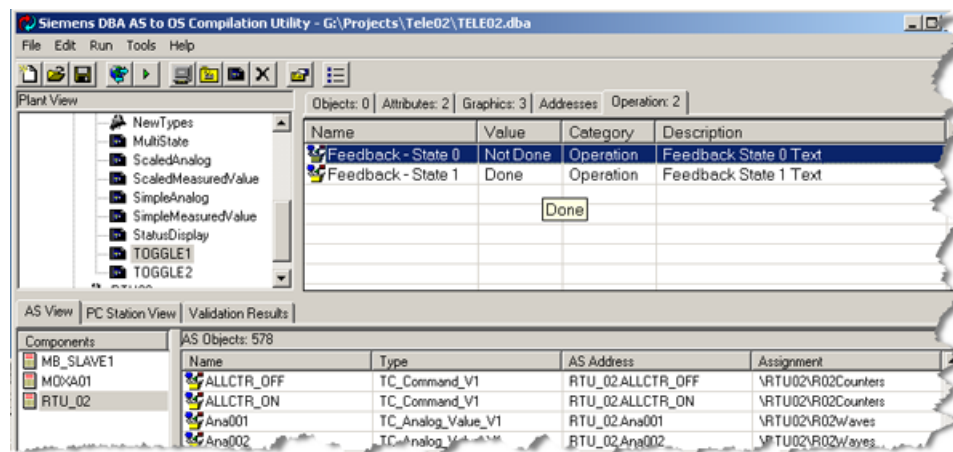
- Operator Timeout
In **non-automatic mode**, after a setpoint has been *selected*, it must be *executed* or *deselected*. This time represents the time (in seconds) that an operator is allowed between selection and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the setpoint is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used
- Checkback Timeout
In **non-automatic mode**, after a setpoint has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the setpoint is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used

9.2.12 Toggle Command Operational Parameters

Operational characteristics

The operational characteristics of a Toggle Command object instance can be configured in DBA.

1. Select a Toggle Command object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Feedback – State 0

The text string that appears on the command symbol and faceplate when the Feedback (F) is indicating state "0". Free form text entry is allowed.

Feedback – State 1

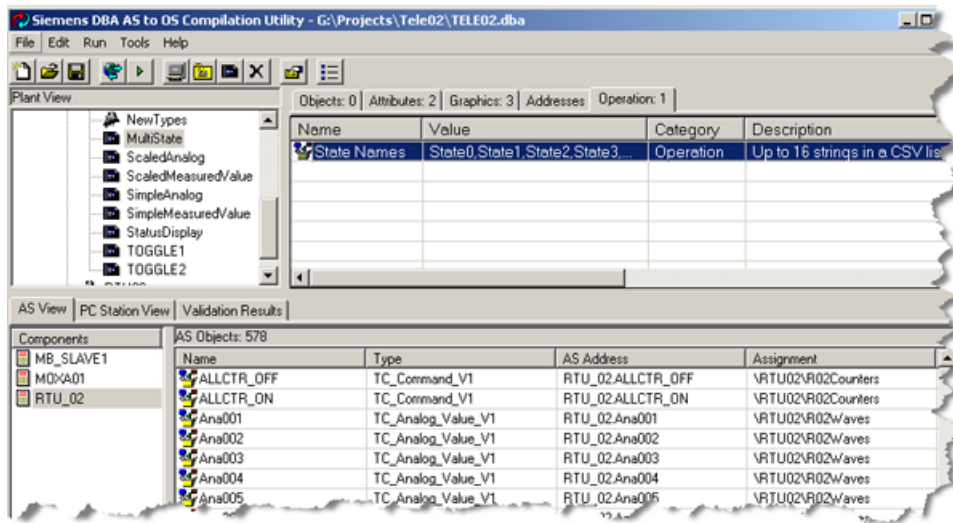
The text string that appears on the command symbol and faceplate when the Feedback (F) is indicating state "1". Free form text entry is allowed.

9.2.13 MultiState Display Operational Parameters

Configuration of operational characteristics

The operational characteristics of a MultiState object instance can be configured in DBA.

1. Select a MultiState object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



State Names

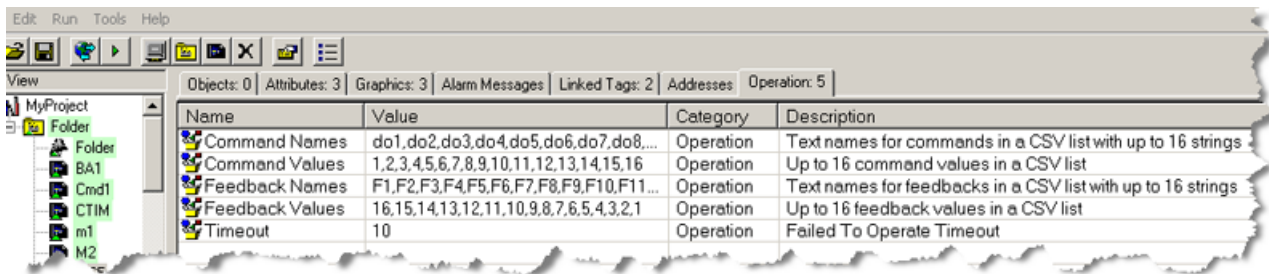
A comma-separated list of up to 16 state texts to be displayed. The MultiState symbol will display the state text corresponding to the value of RV. If a value of RV does not correspond to one of the texts configured here, "?????" will be displayed instead.

9.2.14 MultiCommand Operational Parameters

Configuring operational characteristics

The operational characteristics of a Command object instance can be configured in DBA.

1. Select a Command object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right-hand quadrant of the screen.



Command Values

A comma-separated list of up to 16 integer values that can be sent to the RTU. At least one value must be specified, and up to 16 are allowed, all separated by a comma.

CommandNames

A comma-separated list of up to 16 names that can be associated with command values that can be sent to the RTU. While the number of items varies, it must match the number of CommandValues that have been configured. On the MultiCommand symbols and faceplates, the name is shown, not the number.

FeedbackValues

A comma-separated list of up to 16 expected feedback values, one each corresponding to the list specified as CommandValues. This list is totally optional. If a value is not specified corresponding to a specific CommandValue, it is assumed that there is no feedback required for that command value.

Note

Feedback Required

The Feedback Required parameter is not provided for MultiCommand Type. Remove all the feedback names and feedback values to switch the Block Icon automatically from "I1" to "I2" during the compilation.

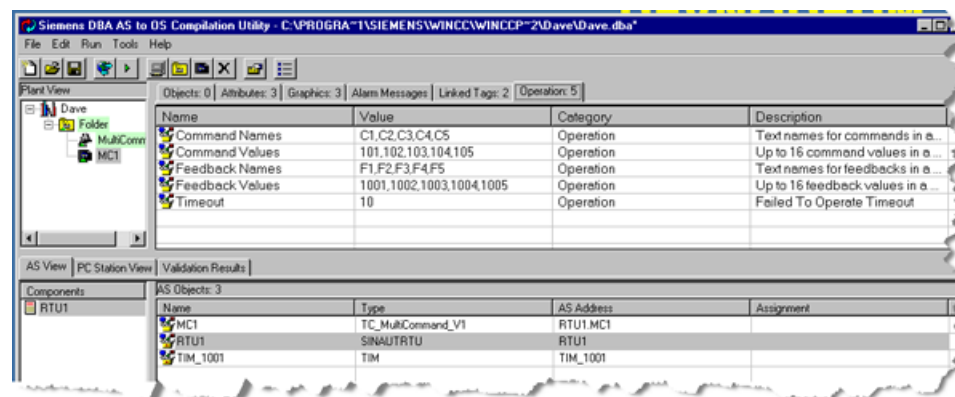
FeedbackNames

A comma-separated list of the name of the up to 16 expected feedback values. If an entry is configured, symbols and faceplates will display the feedback name instead of the feedback value.

Timeout

Timeout values are in units of seconds. Any integer value can be specified. If a Timeout has been configured and if the Feedback variable (F) does not correspond to the value of ExpectedFeedback within the timeout period, a Discrepancy Alarm is generated.

The illustration below shows the fields important to operational parameters.



9.2.14.1 IEC MultiCommand Operational Parameters

The operational parameters for IEC MultiCommands are identical to the MultiCommand Operational parameters, with the following additions:

- **Automatic Mode**
Indicates whether the IEC protocol feature of select-before-execute is to be used. Use the pulldown list to select **yes** or **no**. If **yes** is selected, the MultiCommand is in automatic mode and there is no select required in order to issue the MultiCommand; the MultiCommand change will be executed directly. If **no** is selected the MultiCommand must be selected first prior to **executing** the change of the MultiCommand
- **Operator Timeout**
In **non-automatic** mode, after a MultiCommand has been *selected*, it must be *executed* or *deselected*. This time represents the time (in seconds) that an operator is allowed between *selection* and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the MultiCommand is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used
- **Checkback Timeout**
In **non-automatic** mode, after a MultiCommand has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the MultiCommand is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used

9.2.14.2 DNP MultiCommand Operational Parameters

The operational parameters for DNP MultiCommands are identical to the MultiCommand Operational parameters, with the following additions:

- **Automatic Mode**
Indicates whether the DNP protocol feature of select-before-execute is to be used. Use the pulldown list to select:
Automatic (the MultiCommand is in automatic mode and there is no select required in order to change the MultiCommand).
 - **Select / Execute** (the MultiCommand must be selected first prior to executing the change of the MultiCommand)
 - **Operate without Select before execute (with acknowledge)**
 - **Operate without Select before execute (without acknowledge).**

Note that with/without acknowledge indicates whether the RTU is sending an acknowledgement back to the Server (so you know if it was successful or not).

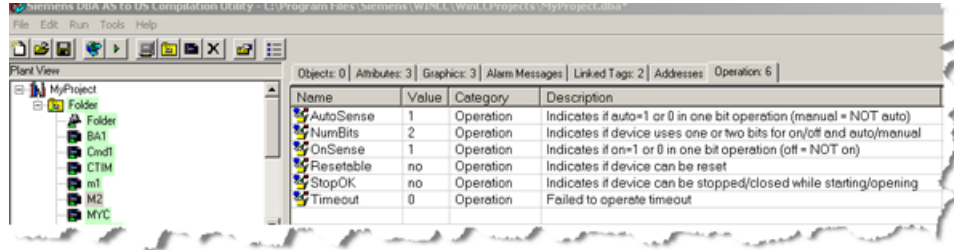
- **Operator Timeout**
In **non-automatic** mode, after a MultiCommand has been *selected*, it must be *executed* or *deselected*. This time represents the time (in seconds) that an operator is allowed between *selection* and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the MultiCommand is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used
- **Checkback Timeout**
In **non-automatic** mode, after a MultiCommand has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the MultiCommand is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used

9.2.15 Device Operational Parameters

Configuring operational characteristics

The operational characteristics of a Device object instance can be configured in DBA.

1. Select a Motor, Pump or Valve object instance from the Plant View.
2. Select the **Operations** tab of the Attribute Edit window in the upper right hand quadrant of the screen.



Timeout

Timeout value in units of seconds. If a Timeout has been configured and the device does not react to a request within the timeout period, a Discrepancy Alarm is generated. Any integer value can be specified.

Resettable

Indicator of whether or not the Device supports reset command. The Device faceplate will include a "Device Reset" button if this value is configured as "Yes". Clicking on the **Value** column provides a drop list from which a value of "Yes" or "No" can be selected.

StopOK

This setting indicates whether the device can be stopped (for a Motor or Pump device) or closed (for a Valve device) while it is starting up (for a Motor or Pump device) or opening (for a Valve device). A drop down list allows the selection of "yes" or "no". If "yes" is selected, the stop/close operation is enabled on the faceplate while the device is in the state of starting/closing. If "no" is selected, the stop/close operation is disabled on the faceplate while the device is in the state of starting/closing.

NumBits

Indicates whether the device is being configured for one bit or two bit operation. In one bit operation, the Device On/Device Off command and status are represented by two external tags (one for the On/Off command and one for the On/Off status). The Auto/Manual command and status are also represented by two external tags. In the case of two-bit operation, DeviceOn/DeviceOff command and status are represented by 4 separate external tags, and the Auto/Manual command and status are represented by 4 separate external tags. For SINAUT devices, the only supported option is 2-Bit, so this parameter is not shown. For MODBUS devices, a pull down list allows the selection of "1" or "2" as the mode of operation.

OnSense

If NumBits is selected as "1", this parameter indicates which sense of the configured tag for DeviceOn/DeviceOff should be considered the "On" state. A pull down list allows the selection of "0" or "1". The opposite sense is considered, then, to be the sense of the Device Off state. Note that since 1-bit operation is only allowed for MODBUS devices, this parameter is not shown for SINAUT devices.

AutoSense

If NumBits is selected as "1", this parameter indicates which sense of the configured tag for Auto/Manual should be considered the "Auto" state. A pull down list allows the selection of "0" or "1". The opposite sense is considered, then, to be the sense of the Manual state. Note that since 1-bit operation is only allowed for MODBUS devices, this parameter is not shown for SINAUT devices.

9.2.15.1 IEC Device Operational Parameters

The operational parameters for IEC devices (IEC Motors, IEC Pumps and IEC Valves) are identical to the Device Operational parameters, with the following additions:

- **Automatic Mode**
Indicates whether the IEC protocol feature of select-before-execute is to be used. Use the pulldown list to select **yes** or **no**. If **yes** is selected, the Device is in automatic mode and there is no select required in order to change the state of the device; the state change (open/close, on/off) will be executed directly. If **no** is selected the Device must be selected first prior to **executing** the change of the state of the device.
- **Operator Timeout**
In **non-automatic** mode, after a Device has been *selected*, it must be *executed* (opened/closed or on/off) or *deselected*. This time represents the time (in seconds) that an operator is allowed between *selection* and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the Device is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used.
- **Checkback Timeout**
In **non-automatic** mode, after a Device has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the Device is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used.

9.2.15.2 DNP Device Operational Parameters

The operational parameters for DNP devices (DNP Motors, DNP Pumps and DNP Valves) are identical to the Device Operational parameters, with the following additions:

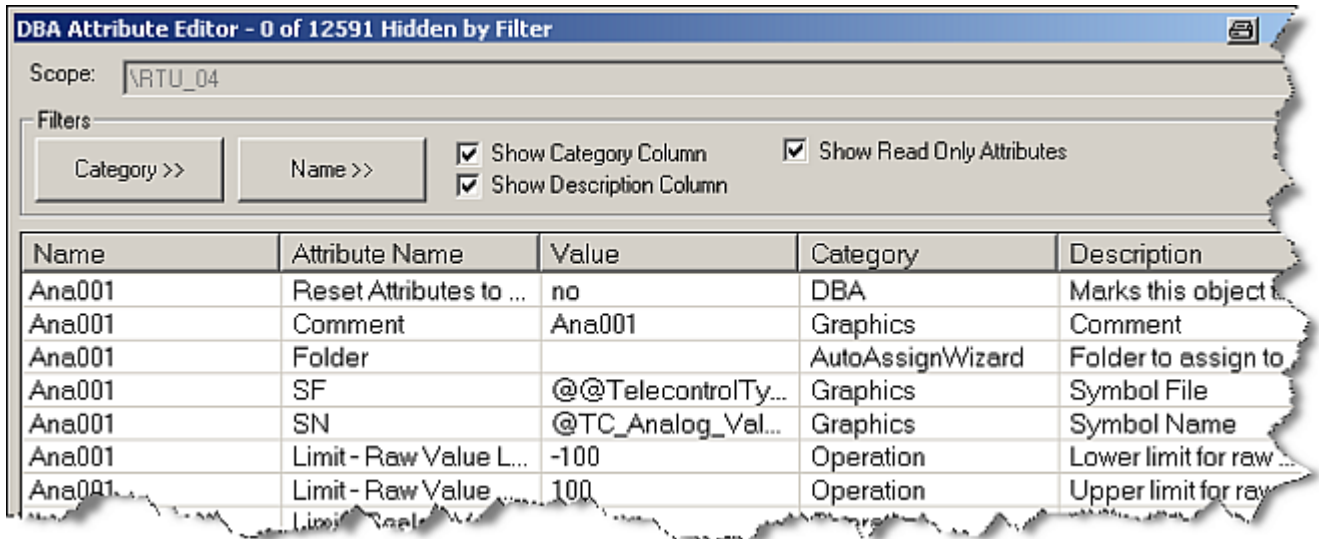
- **Automatic Mode**
Indicates whether the DNP protocol feature of select-before-execute is to be used. Use the pulldown list to select **yes** or **no**. If **yes** is selected, the Device is in automatic mode and there is no select required in order to change the state of the device; the state change (open/close, on/off) will be executed directly. If **no** is selected the Device must be selected first prior to **executing** the change of the state of the device.
- **Operator Timeout**
In **non-automatic** mode, after a Device has been *selected*, it must be *executed* (opened/ closed or on/off) or *deselected*. This time represents the time (in seconds) that an operator is allowed between *selection* and *execution/deselection*. If this time period elapses after a *selection*, with no *execute* or *deselect* action, the Device is automatically *deselected* and a timeout alarm is generated. Specify a value between 2 and 60. Note that in automatic mode, this operational parameter is not used
- **Checkback Timeout**
In **non-automatic** mode, after a Device has been *selected*, *deselected*, or *executed* a checkback feedback is expected from the RTU. If this checkback is not received within this time period, the Device is automatically *deselected* and an alarm is generated. Specify a value between 1 and 60. Note that in automatic mode, this operational parameter is not used

9.3 Object Attribute Editor

The Object Attribute Editor allows bulk editing of object attributes. Its chief use is for editing alarm priorities, but it lends itself to editing other attributes as well. A filtering, or limiting, mechanism helps to isolate the attributes that need editing, such as alarm priority, while hiding others.

It is also possible to export object attributes to a .CSV file and bulk edit them with an external program, such as Microsoft Excel or Microsoft Word, then import them back into the DBA utility. See Importing and Exporting Object Attributes (Page 286) for more information.

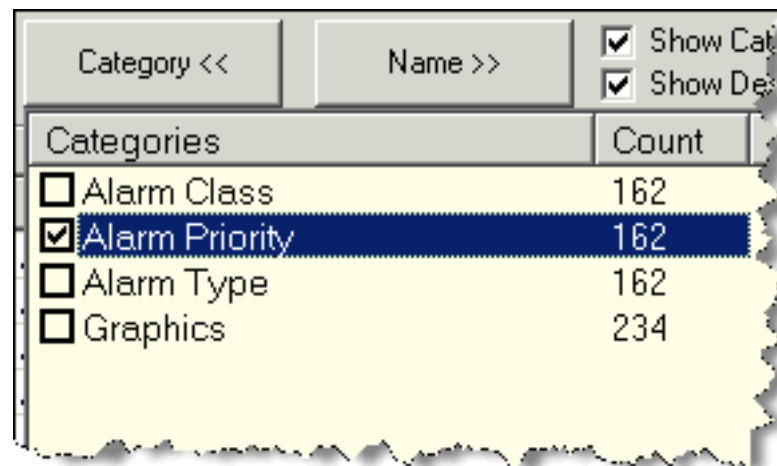
1. Select the folder of interest. Right-click and select **Edit Attributes...** from the context menu. The **DBA Attribute Editor** window opens. The title bar indicates whether any attributes are hidden (filtered). Initially, all attributes are visible.



You can reduce the information displayed by clearing the **Show...** checkbox. You can begin editing immediately by clicking the **Value** cell for the object of interest and replacing the current value with a new value. You may, however, wish to filter and sort the objects first.

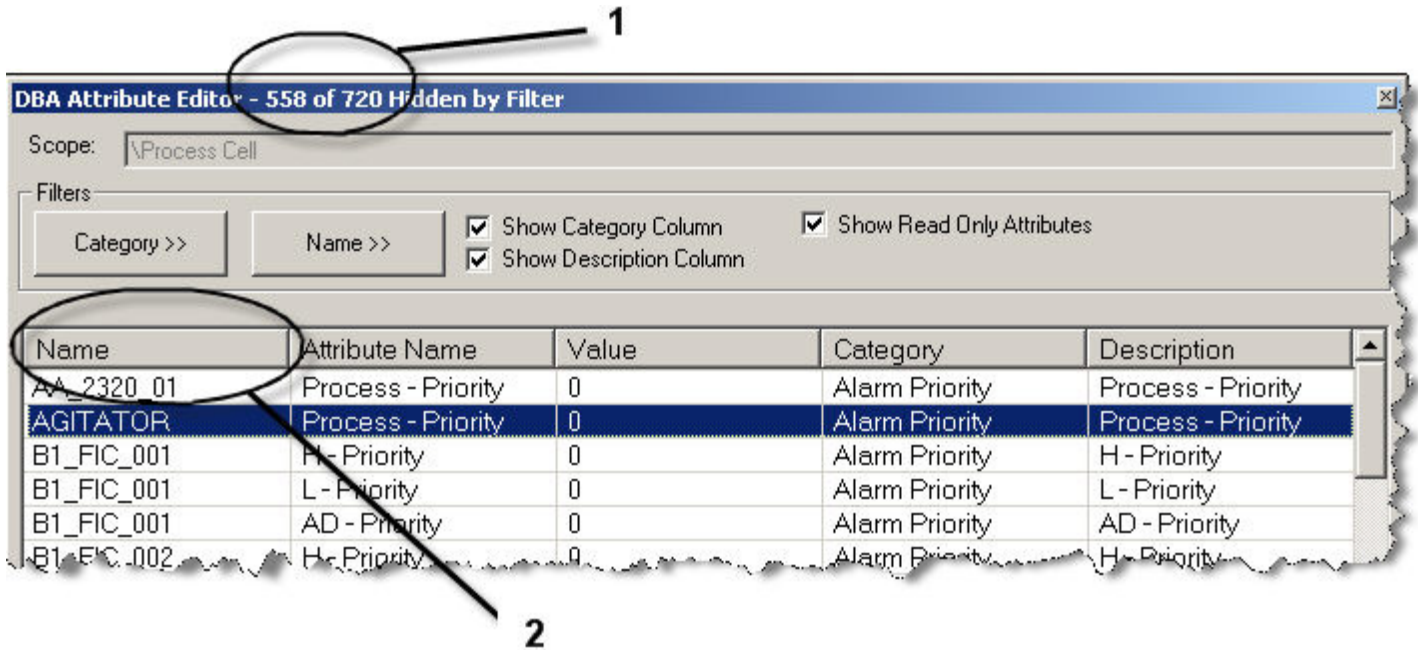
2. The **Category >>** and **Name >>** buttons filter (hide) an object's attributes to make it easier to focus on the attributes of interest.

Click the **Category >>** button to hide attribute categories. If you are interested only in alarm priority, for example, clear the other categories. Click the **Category <<** button again to register your choice.

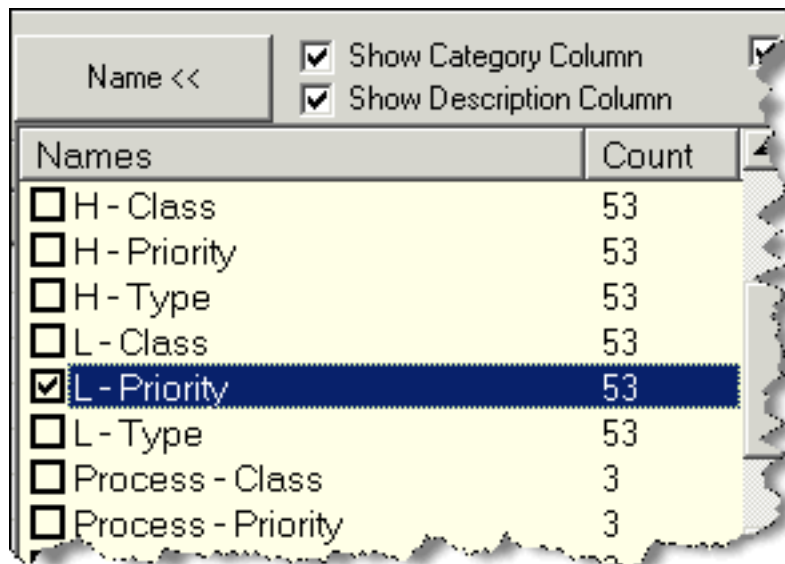


Any action that reduces the number of objects displayed is recorded in the title bar (see 1, below). Note that you can sort the displayed objects by column **Value** by clicking the column

heading. To sort by name for example, click the heading labeled **Name** (see 2, below). Clicking a column once provides an ascending sort; clicking again toggles to a descending sort. This feature is especially useful if you want to see alarms sorted by priority value.



The **Name >>** button provides additional filtering. To display only the **L - Priority**, for example, click the **Name >>** button and clear all but the **L - Priority** box. Then click **Name <<** again to apply the filter.



Tip: The filtering lists support common Windows selection features for convenience:

- Type CTRL + A to select all filter items.
- CTRL + Click any single item to add it to or remove from the current selection.

- Shift + Click to extend the selection.
- Type SPACE to reverse the checkmark of all items in the current selection.

For example, CTRL + A, SPACE reverses all selections.

9.4 Resetting Attribute Values to Controller Defaults

An object's attributes' values are initially defined by the actual controller configuration or a default from the type definition. Once the object exists within the DBA, re-invoking **Update Controller Objects** function will not change the object's attribute values. This allows an override of the controller values without actually changing the controller. For example, an object in the DBA with an alarm priority of 2 based on the initial controller configuration will maintain the alarm priority of 2 for all future calls to **Update Controller Objects** even if the source controller configuration is changed. Similarly, if a type definition initially defined the default Decimal Places attribute value as 2, re-invoking **Update Controller Objects** will not change the value of an existing object's attributes even if the type definition is changed to a different default value.

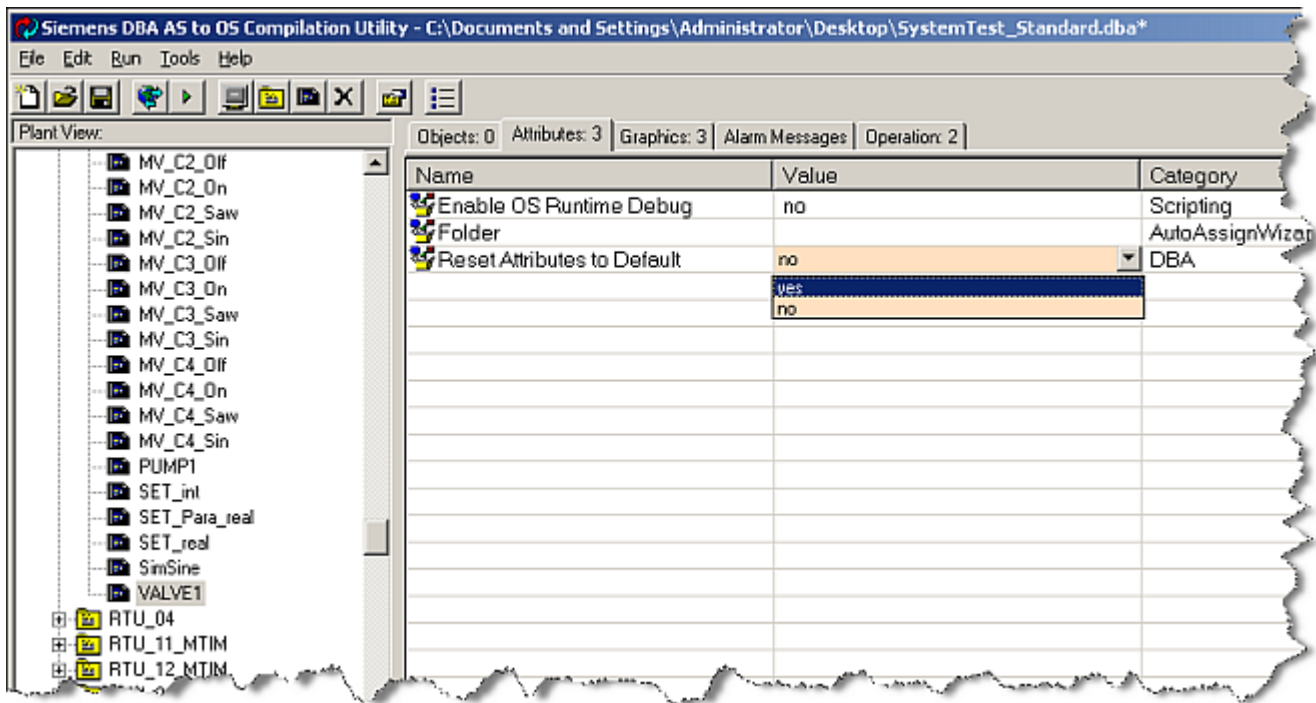
Using the Reset Attributes to Default Attribute

Note

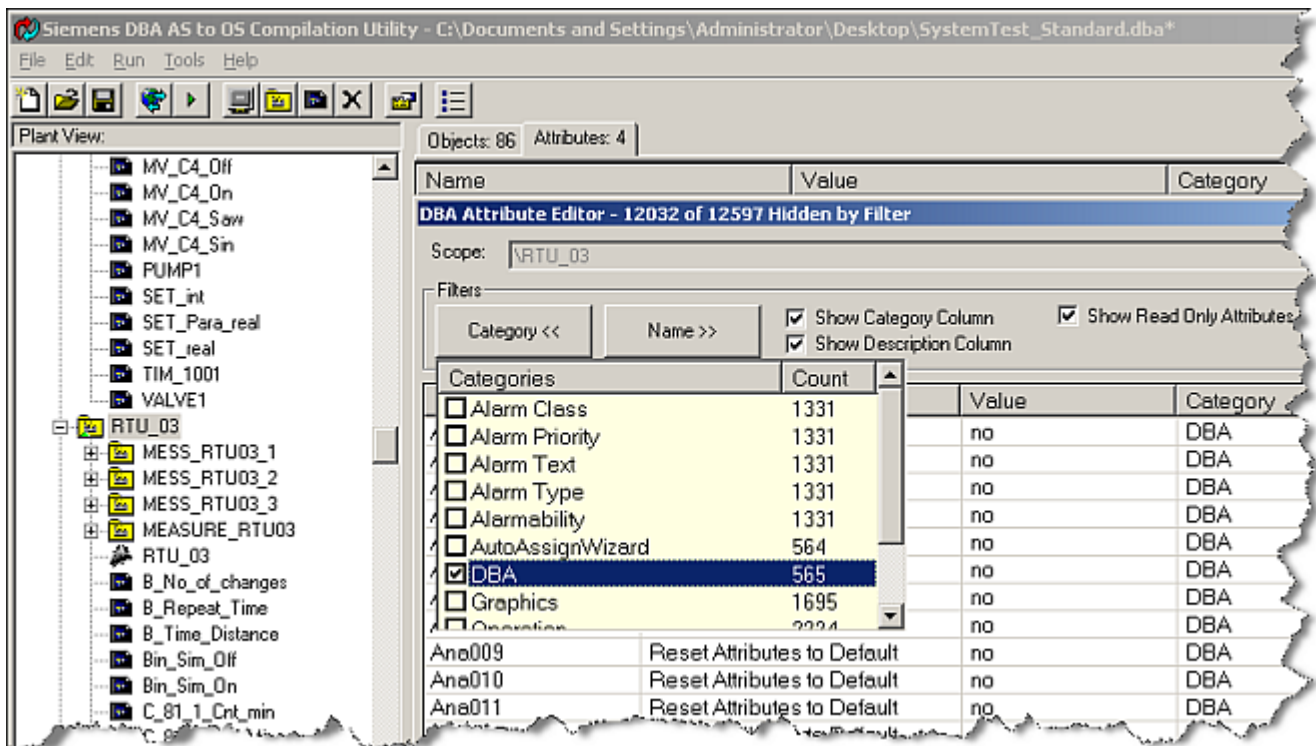
This feature is not available for all objects. For objects that don't support this feature, see the discussion under the heading "Restoring Controller Defaults If Objects Do Not Support Reset Attributes to Default" in this topic.

To reset an existing DBA object's attribute values to the values defined by the controller configuration or type definition, set the Reset Attributes to Default attribute to **yes**. The Reset Attributes to Default attribute may not be available for all objects of a given system type. The next time Update Controller Objects is run, DBA discards the stored values, restores the controller or type-defined values, and resets the Reset Attributes to Default value to **no**. This operation affects all attributes of the given object and cannot be used to restore a subset of the object's attributes:

9.4 Resetting Attribute Values to Controller Defaults

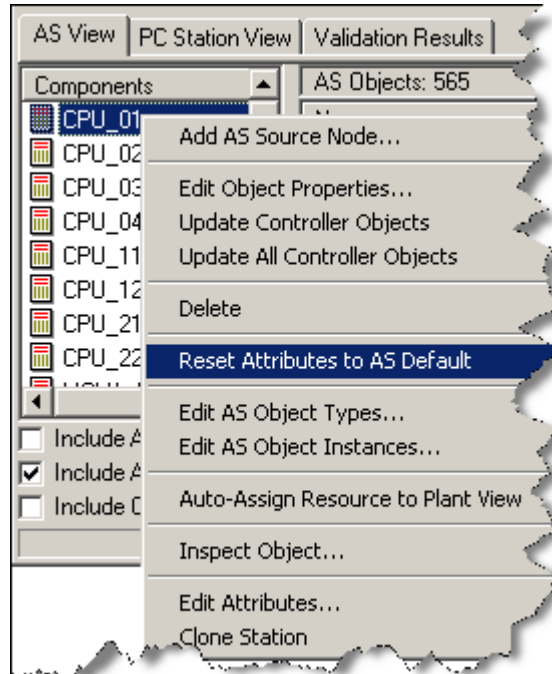


The **Edit Attributes ...** tool can be used to change quickly the attribute values of many objects, especially if the filter is applied to only show the attributes with the **DBA** category. When only the **Reset Attributes to Default** attributes are listed, the values can be set quickly by repeatedly pressing the **y** key followed by the down-arrow key:

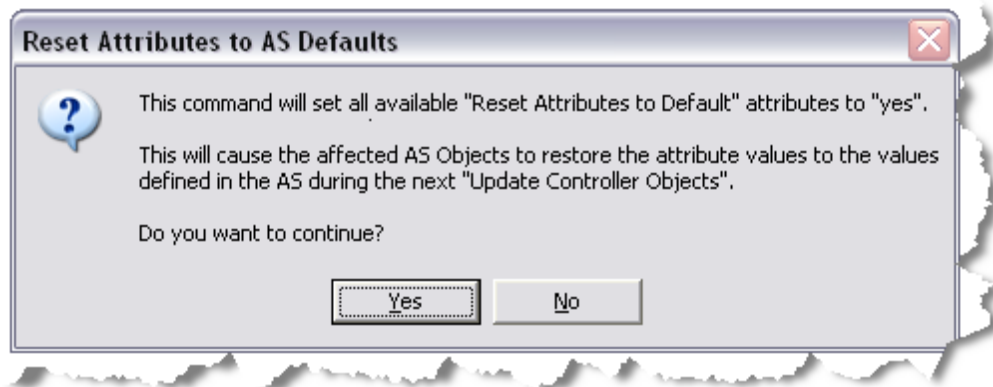


Using the Reset Attributes to AS Defaults Context Menu

The **Reset Attributes to AS Defaults** context menu on an AS Node can be used to set the Reset Attributes to Default attribute of all associated AS objects to **yes** with a single click:



A message appears, describing the implications of your selection and asking for confirmation:



Restoring Controller Defaults If Objects Do Not Support Reset Attributes to Default

If the **Reset Attributes to Default** attribute is not supported for your objects, then reset the attribute values to their defaults as follows:

1. Back up the Plant View (using the **Export Plant View** context menu).
2. Unassign all AS Objects from the Plant View.
3. Delete the AS Node.

4. Add the AS Node again.
5. Execute the **Update Controller Objects** command.
6. Restore the Plant View (using the **Import Plant View** context menu).

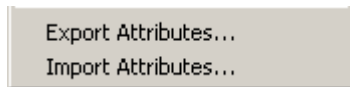
9.5 Importing and Exporting Object Attributes

The AS object attributes available for import and export vary with the AS.

The DBA Utility supports disk-based import and export of controller object attributes.

- The export feature stores attributes from a selected Plant View folder (and all of its subordinate folders), or from an AS Node, to a .CSV file.
- The import feature replaces all attributes in a selected object and all of its subordinate objects with any corresponding attributes in the selected file. The imported .CSV file can be a file produced by exporting or a file edited or even created independently of the DBA Utility program. Alarms are matched by the path of the object, the alarm type, and the alarm description.

Invoke the export or import functions by right-clicking an AS object in the picture tree (limited to root node, OS, and folders). If the object supports attribute import and export, a menu indicates this, as is shown in the following illustration:



You can also invoke the export or import functions by right-clicking on an AS node in the AS View. The right-click menu shows the same menu choices for importing and exporting attributes.

In both cases, clicking **Export** or **Import** opens a dialog box for entering a file name. The default directory for exports and imports is the directory used as a source for the controller objects.

Format of the .CSV File

An exported attribute file takes the form shown below. It can be edited with simple text editing tools or with advanced spreadsheet tools that read from and write to .CSV files. The first line in the listing is the column headers.

Keep in mind that edits made to an imported file can change the object attributes in any object displayed in the picture tree, overwriting the value already there, regardless of the object selected when the import is executed.

```
"ASTagName", "ASTagPath", "OSTagName", "Category", "Name", "Description", "Value  
"  
"RMSC_532", ""RMSC_532"", """, "0", "RMSC_532", "Alarm Priority", "Alarm  
Disabled", "Alarm Disabled", "0"  
"RMSC_532", ""RMSC_532"", """, "0", "RMSC_532", "Alarm Priority", "Bad  
Quality", "Bad Quality", "0"  
"RMSC_532", ""RMSC_532"", """, "0", "RMSC_532", "Graphics", "SF", "Symbol  
File", "@Provox Symbols.pdl"
```

```
"RMSC_532", ""RMSC_532"", """, 0, "RMSC_532", "Graphics", "SN", "Symbol
Name", "@Provox_RMSC/1"
"RMSC_533", ""RMSC_533"", """, 0, "RMSC_533", "Alarm Priority", "Alarm
Disabled", "Alarm Disabled", "0"
```

Required Columns

If a file is created or edited and then used to import object attributes, the required columns are

- **ASTagName:** the name of the AS object whose attribute is being defined (for example, SINGLE_LOOP). This name corresponds to the string found in the Name column of the AS View tab's AS Objects List View (on the right). This is a required field for AS object changes, and should be left blank for non-AS object changes.
- **ASTagPath:** the address of the AS object whose attribute is being defined (for example, LC.LC_PUR.X2320.SINGLE_LOOP). This name corresponds to the string found in the AS Address column of the AS View tab's AS Objects List View (on the right). This is a required field for AS object changes, and should be left blank for non-AS object changes.
- **OSTagName:** the OS tag that is created by the DBA and is used only to reference objects that are non-AS objects such as action requests or batch objects (for example, Process\$Cell/X2320/SINGLE_LOOP). This is a required field for non-AS object changes.
- **Category:** This column is the category of the attribute being defined (for example, Graphics) and is related to the Category column of the attribute editor tab (top right). This is a required field. Case must be correct.
- **Name:** This column is the name of the attribute being defined (for example, DecimalPlacesPV) and is related to the Name column of the attribute editor tab (top right). This is a required field. Case must be correct.
- **Description:** the description of the attribute being defined (for example, PV Decimal Places To Display) and is related to the Description column of the attribute editor tab (top right). This is an optional field, but allows the user to customize the descriptions of attributes which are unchangeable through the DBA interface.
- **Value:** the value of the attribute being defined (for example, 2) and is related to the Value column of the attribute editor tab (top right). This is a required field.

In summary

- **ASTagName**, **ASTagPath**, and **OSTagName** columns locate the object to be changed.
- **Category** and **Name** columns locate the specific attribute on the selected object to be changed.
- **Description** and **Value** columns define the new values to be written into the DBA database.

Other columns are ignored during imports.

Log Files

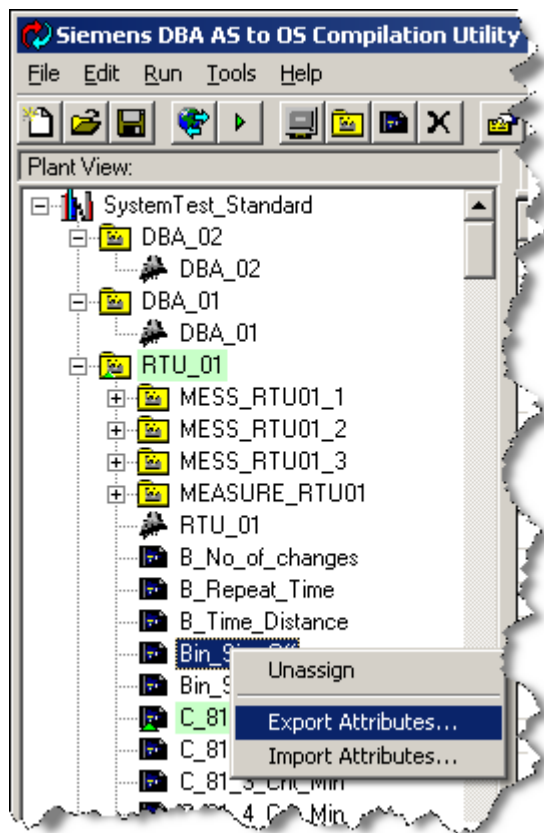
If you want to retain a log file recording the results of an import, select the **Details** button while the import is in progress and the percent-complete window is displayed. Save the results when the import is complete.

9.6 Using Object Import/Export to Create Templates

In bulk engineering, object attributes are frequently imported and exported by means of a CSV file. For importing and exporting attributes at the object level, as opposed to the folder level, attribute templates prove useful, especially when objects have numerous attributes. By creating a template of a set of attributes for a prototypical object, it is easy to configure an object with identical behavior.

To create a template file:

1. Select an object in the Plant View
2. Edit/Configure all of the attributes for the object
3. Right-click the object in the Plant View.
A context menu appears:



4. Select **Export Attributes**
5. Enter a filename for the template, for example, VALVETYPE1.CSV, and click the **Save** button.

To apply these attributes to another object:

1. Select the object in the plant view.
2. Right-click the object and select **Import Attributes**.
3. Browse to the filename of an exported set of attributes, for example, VALVETYPE1.CSV and click the **Save** button.

Note

Typically, it only makes sense to import attributes for an object of the same or similar type. Any attributes specified in an exported CSV file that are not present in the target object are ignored (an error is noted in the progress log). Any attributes in the target object that are not present in the exported CSV file are left untouched by the import operation.

Note

You may need to edit the exported "template" to exclude any instance specific attributes, such as the Comment attribute. A template that is being used for creating instances should always be free of instance attributes.

Advanced Topics

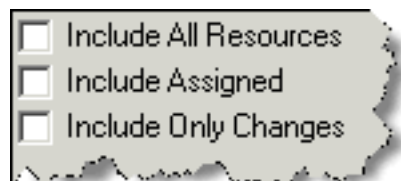
The DBA utility integrates AS configurations and control schemes into the PCS 7 OS. The utility maps tags to a PCS 7 OS environment and creates a hierarchical graphical structure depicting control systems in a PCS 7 OS HMI. The utility offers wide flexibility, and with this comes complexity. While it is possible to devise a step-by-step procedure to provide a quick-start introduction to the utility and its features, no set procedure can accommodate the complexity of customers' applications. The advanced topics provide insight into the features and requirements of the DBA utility.

10.1 Controller Objects

See also Loading (Updating) Controller Objects (Page 115).

Controller Object Filters

The purpose of the **Include All Resources** and **Include Assigned** checkboxes is to provide listings that make it easy to list, sort, and find controller objects and corresponding OS tags. The listings are the listed entries of Controller Objects in the lower-right quadrant of DBA. These listings appear under the headings that vary according to the AS. To sort, click the column heading of the characteristic of interest. Click the heading again to toggle between ascending and descending sorts.



10.2 Checking for Duplicate and Missing Symbols

- **Include All Resources** - list all AS objects loaded. To list objects for a specific controller, ensure that this checkbox is cleared, and select the controller in the AS objects list.
- **Include Assigned** - can be used in conjunction with **Include All Resources**, lists all controller objects for the selected resource, even if they have been assigned to the picture tree (if they have been assigned to the picture tree, they won't normally show up in the list unless this box is checked).
- **Include Only Changes** - list all controller objects that have changed (been added or modified) since the most recent update-controller-objects operation. If you **Update Controller Objects** then select this box and **Update Controller Objects** again, the list of controller objects is empty.

Note

These checkboxes control how the program runs and are independent of individual projects. If you make changes to these checkboxes and exit the project, the changes remain in force when you reopen the project or open a different project. This is true even if you exit a project and elect not to save changes.

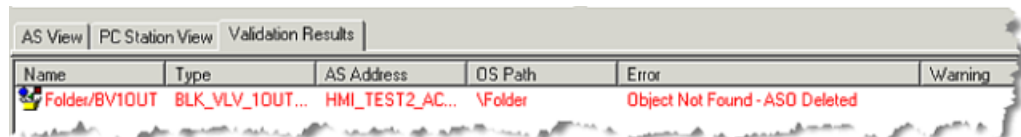
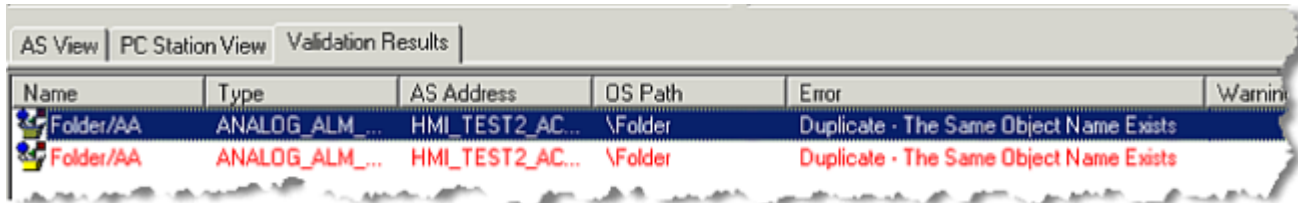
10.2 Checking for Duplicate and Missing Symbols

The AS View **Validation Results** tab leads to a **Validate** function that identifies tags that are duplicate, missing or both (from the perspective of a PCS 7 OS).

The **Compile** function also checks for valid symbols and fails if it identifies symbols that are missing or duplicates. See Invalid Symbols Detected during Compile below.

To validate symbols:

1. Click the **Validation Results** tab.
An empty window opens.
2. Click the **Validate All** button at the bottom of the window.
The validate function runs and, if there are errors, reports them. The following are typical error messages generated when the function detects duplicate objects or missing objects.



Clicking an error in the **Validation Results** window opens the plant view hierarchy as necessary to locate and display the tag that failed validation.

Correcting Duplicate Object Errors

The usual remedy for duplicate objects is to apply the techniques described in Ensuring Unique Object Names (Page 294). Then click the **Validation Results** tab and click the **Validate** button again to ensure that the remedy worked.

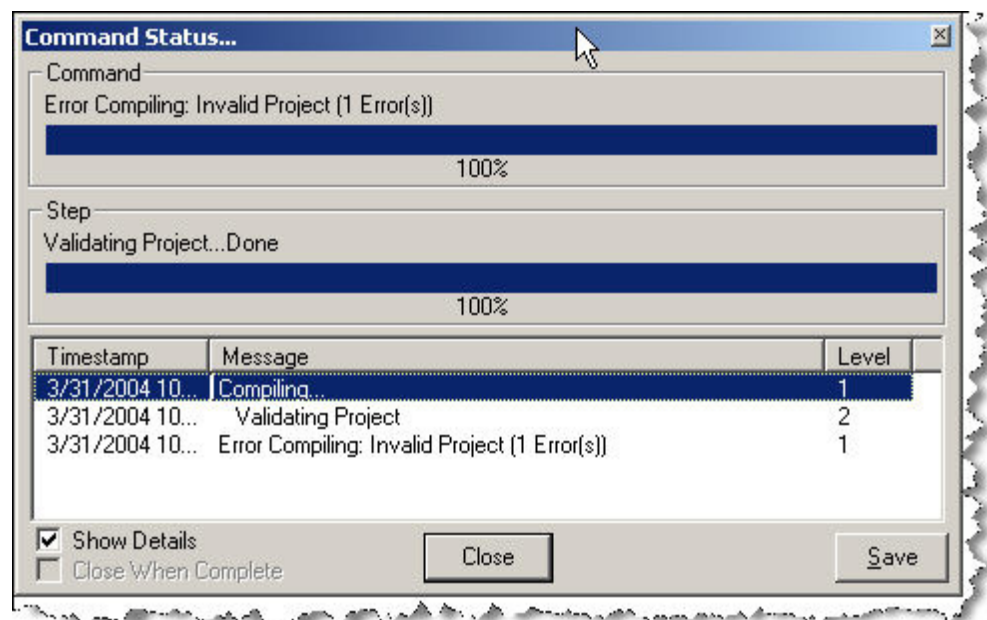
Correcting Missing Tags Errors

The validate function also checks for missing tags, which are marked as objects not found in the controller. This includes changes to tag names, physical paths, or types. A missing-tag error can also be caused by selecting a different source option than the one used to create the current picture tree.

Note that a tag can be both missing and duplicate. This can happen if an object has been removed from a controller and its name conflicts with another object's name. Missing tags are rendered in blue. Duplicated tags are displayed in red and must be resolved or the any compilation fails.

Invalid Symbols Detected during Compile

In the case of a compile error, a **Command Status...** error message appears. When you close **Command Status...** error message, the window associated with **Invalid Symbols** is visible in place of the AS View:



10.3 Ensuring Unique Object Names

PCS 7 OS plant view exists in a flat file system. The hierarchical structure of the plant view is a virtual hierarchy that relies on objects having unique names so they can be distinguished from one another and placed in hierarchical folders. The source AS system may not have this requirement and may be designed with a symmetrical naming convention that, while reasonable in the source OS, can lead to ambiguity in a flat file system. In these cases, uniqueness must be imposed on the AS structures. Sometimes the structures of the AS configurations are named in a way that requires no special efforts to ensure uniqueness.

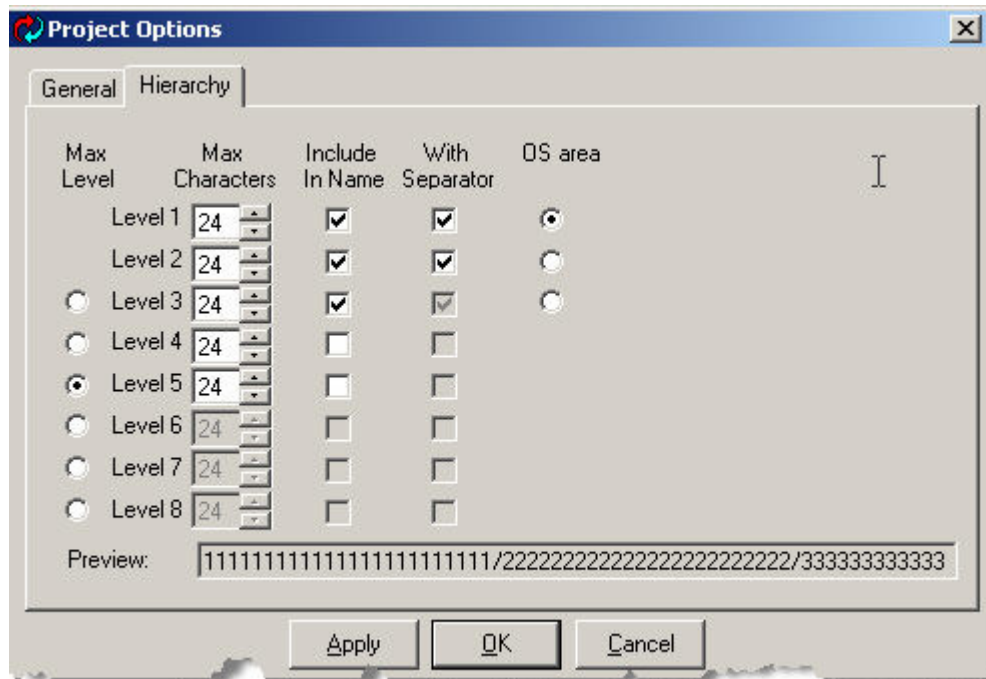
If you know at the outset that because of local naming conventions objects in the source AS environment would appear as duplicates in the PCS 7 OS environment, you can make systematic name changes in advance on a controller object-by-controller-object basis to conform to PCS 7 OS requirements. The Auto-Assigning Resources to the Plant View (Page 216) step includes a function for adding unique characters to AS objects.

If controller objects contain identical structures and function blocks, usually a few characters of uniqueness text make it possible for PCS 7 OS to distinguish among them. When you right-click an AS resource and select the function **Auto Assign Resources to the Plant View**, the DBA Utility provides an opportunity to apply a prefix or suffix to the folder and picture names as they are created in the working template. Applying a prefix or suffix does not by itself create unique OS tag names.

Having created opportunities of uniqueness, it is possible to apply folder names to controller objects using hierarchy settings.

Hierarchy Settings

The functions for controlling hierarchy settings are found by selecting **File > Properties** and the **Hierarchy** tab. The **Hierarchy** window opens. Functions invoked through this window create unique OS tag names.

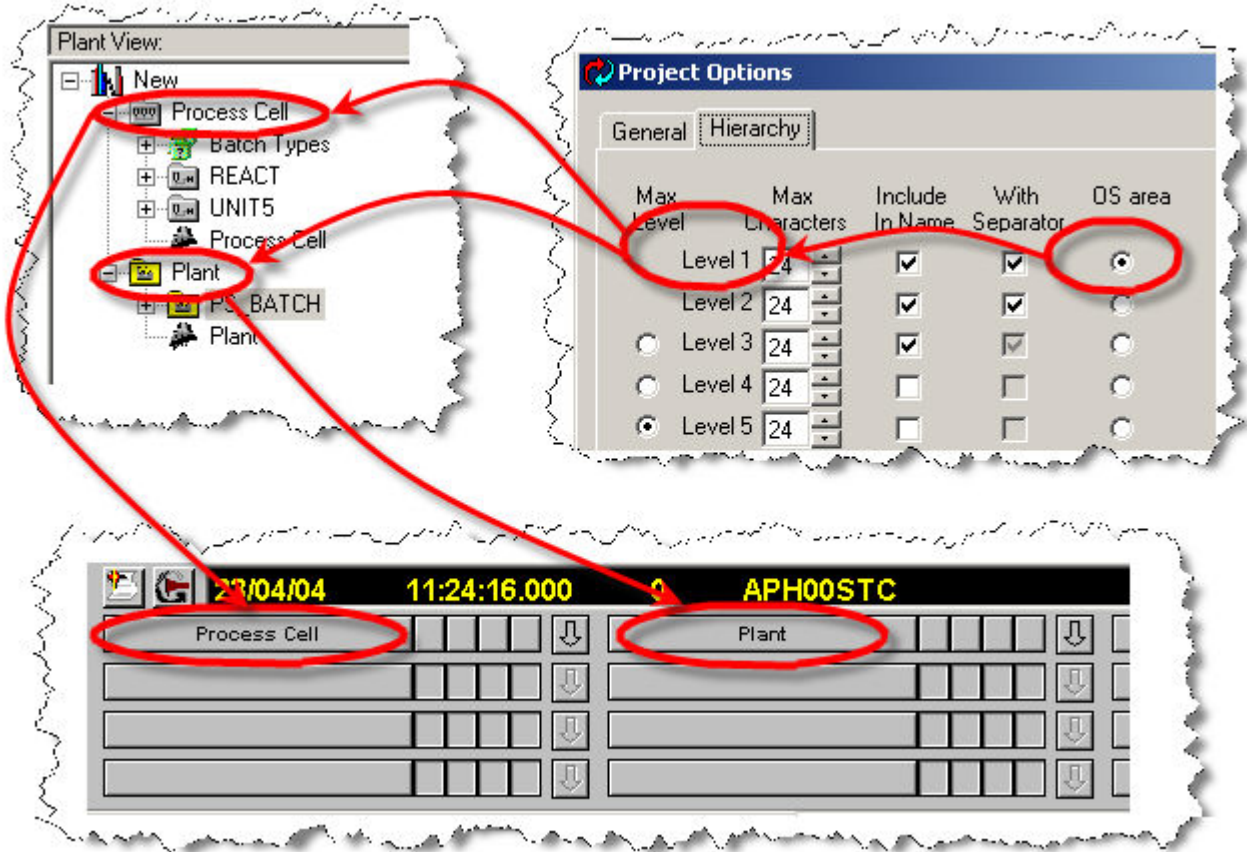


Here are descriptions of significant elements of the function:

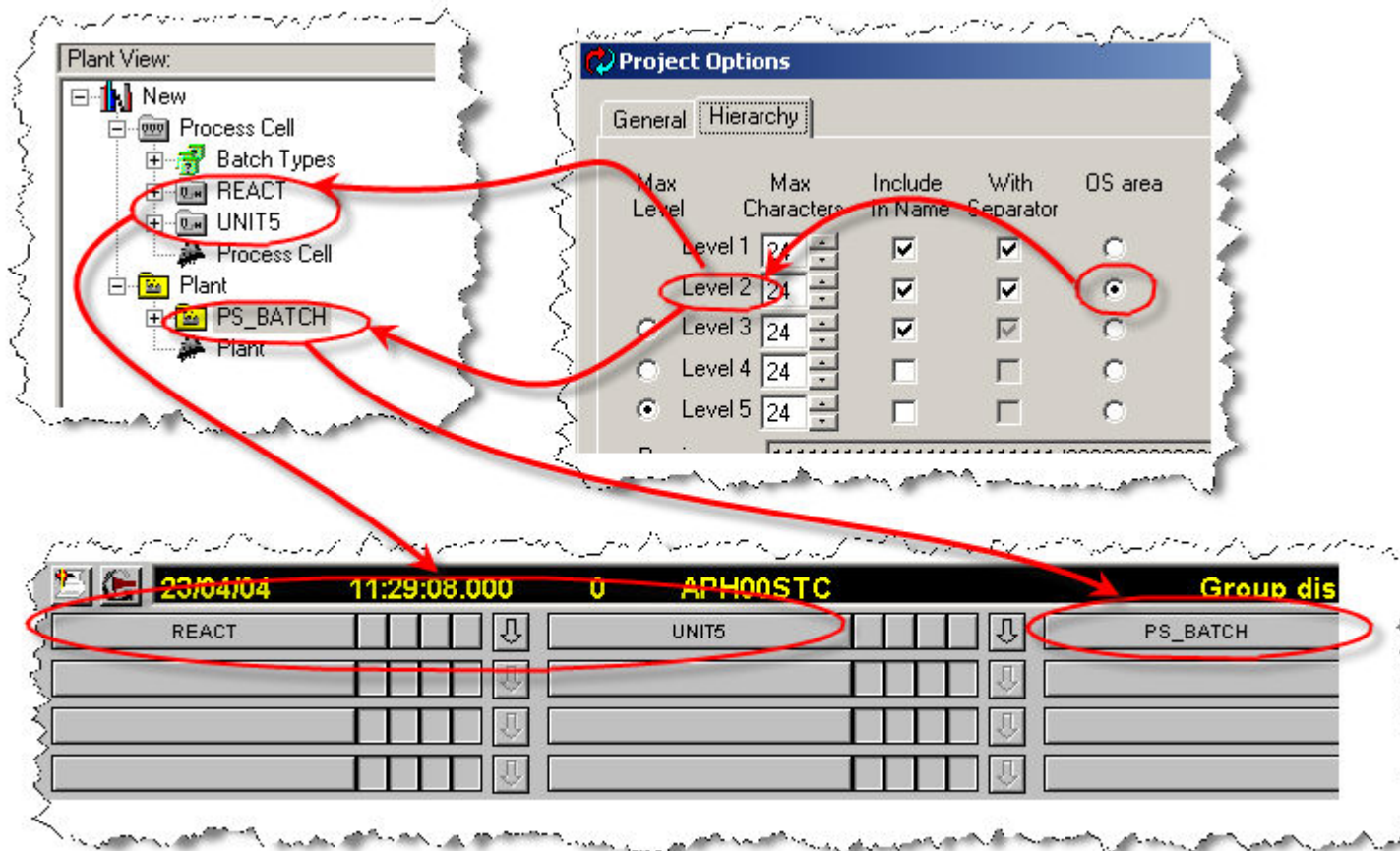
- **Max Level.** Select to determine the depth to which folders can be created.
- **Max Characters.** This field determines the number of characters permitted in folder names for folders created manually or renamed.
But note that existing folder names are not truncated automatically if their name exceeds the **Max Characters** limit. Note also that the **Max Level** and **Max Characters** limitation do not apply to hierarchies created with the **Auto Assign Resources to the Plant View** button.
- **Include in Name.** Select to add the folder name in the plant view to the OS tagname.

10.3 Ensuring Unique Object Names

- **With Separator.** A backslash character is an optional separator. A backslash is always inserted before the original tagname. When **With Separator** is selected, a backslash is inserted between folder names as well.
- **OS Area.** This determines a level in the hierarchy that is the root of the picture trees. This is derived from the plant hierarchy. In the illustration below, the **OS Area** checkbox selects **Level 1**. Level 1 corresponds in the plant view as **Process Cell** and **Plant**. The resulting PCS 7 OS shows **Process Cell** and **Plant** at the top of the hierarchy.



In the illustration below, the **OS Area** checkbox selects **Level 2**. Level 2 corresponds in the plant view as **React**, **Unit5**, and **PS_Batch**, all of which sit at the second level below **Process Cell** and **Plant**. The resulting PCS 7 OS shows **React**, **Unit5**, and **PS_Batch** at the top of the hierarchy.



- Use Short Symbol Names** When selected, all symbols will only show the last level in the hierarchy. If not checked, all selected hierarchy levels are included in the name in the symbol. While this checkbox has no effect if only one level is used to construct object names, it usually should be selected if multiple hierarchy levels are being used to construct symbol names. In this case, if it is not selected, the names of objects will often be truncated on the symbol, making it difficult to distinguish between different objects.

10.4 Dual-Leg Operation via DBA Synchronization

10.4.1 Dual-Leg Operation

Note

This section describes how to synchronize the plant view via DBA in dual-leg systems. This synchronization function is not available in all PCS 7 installations. In this case the dual-leg operation must be configured manually as described in the section Dual-Leg Operation via manual Configuration (Page 303).

A dual-leg system uses AS Nodes engineered with DBA as well as S7 controllers that are engineered with CFC/SFC Editors and the SIMATIC Manager Plant View within the same PCS 7 OS database.

A plant view is created in a DBA project for this purpose. This contains all objects for all AS nodes that are engineered in DBA. A different plant view is created in SIMATIC Manager for this. It contains all objects for all S7 control systems.

Both these plant views can be synchronized automatically by DBA. The reason: All folders created by DBA in the plant view are also created within the SIMATIC Manager plant view, and conversely the following also applies: All folders created by SIMATIC Manager in the plant view are also created in the DBA plant view.

In addition, any pictures that have been associated with a folder in the SIMATIC Manager Plant View are also automatically associated with the same folder in the DBA Plant View.

Note

When using the Plant View Synchronization for dual-leg operation, be sure to pay attention to any warnings that are logged during the synchronization process. It is generally recommended that these warnings should be corrected before proceeding.

When using the Plant View Synchronization feature of DBA, special care should be taken when renaming folders. Renaming folders should be done manually in both SIMATIC Manager and DBA.

Note

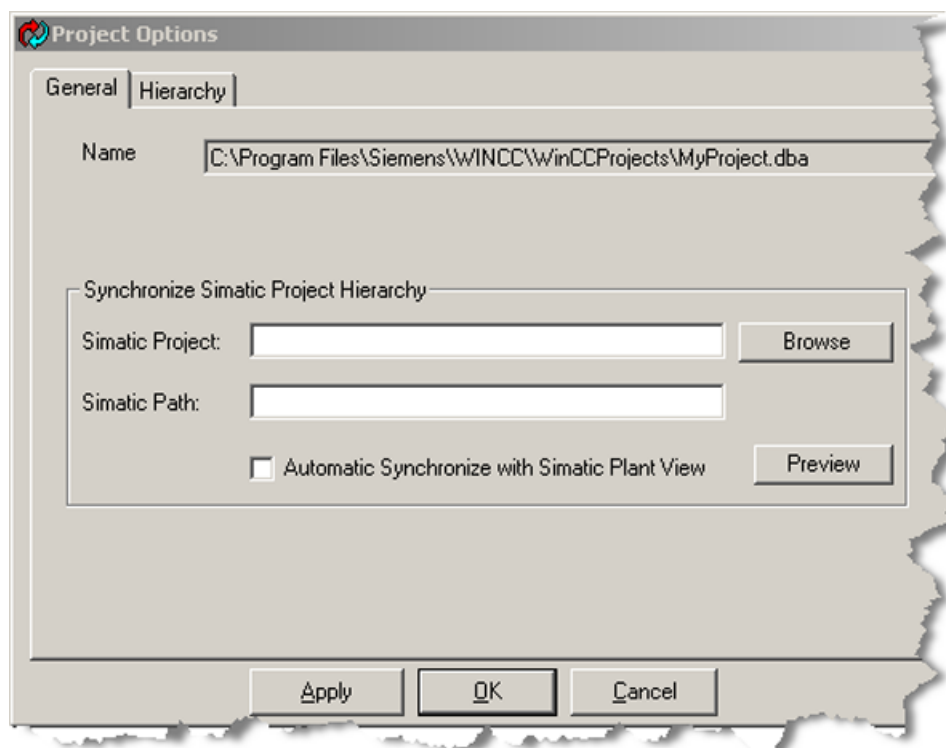
In SIMATIC Manager, in the general Plant View settings you can decide which hierarchy level should represent the OS areas. You can further define an area identifier for each hierarchy folder within this level. The default setting for the area identifier corresponds to the name of the hierarchy folder in the plant view. In DBA, you can also use general Plant View settings to decide which hierarchy level should represent the OS areas. However, in DBA it is not possible to define an area identifier for each hierarchy folder within this level. The area identifier is automatically set to be the name of the hierarchy folder in the plant view.

This should be considered if you plan to synchronize the SIMATIC Manager and DBA plant views. In this case, it is recommended that you use the SIMATIC Manager default behavior whereby the area identifier corresponds to the name of the hierarchy folder in the plant view. This allows the DBA plant view synchronization mechanism to properly synchronize the plant views.

10.4.2 Enabling Plant View Synchronization

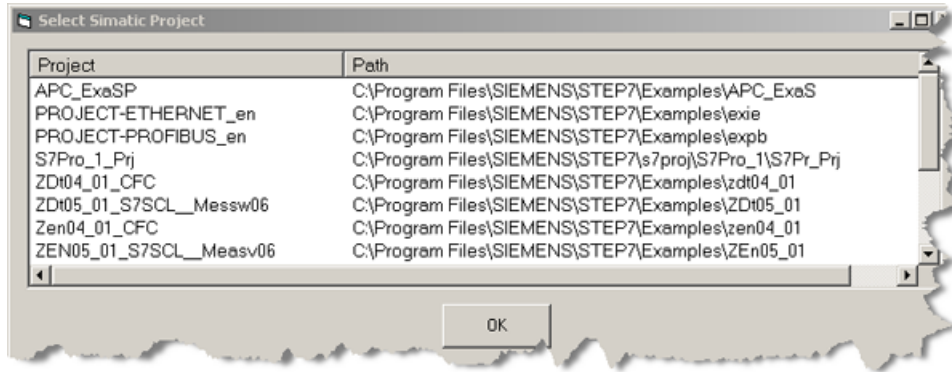
Configuring synchronization

The functions for controlling plant view synchronization are found by selecting "File > Properties" and the "General" tab.



10.4 Dual-Leg Operation via DBA Synchronization

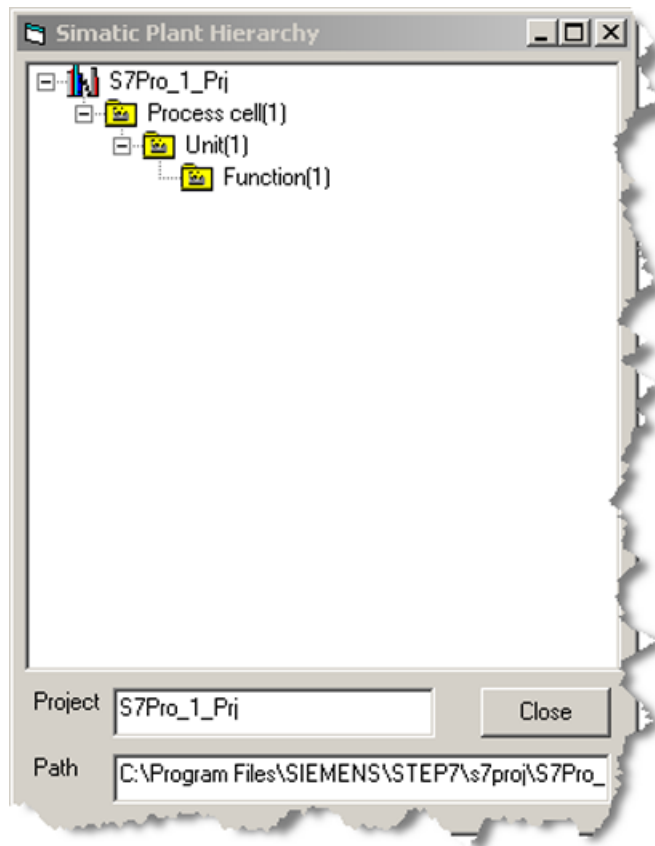
1. Enter the name of a SIMATIC Project and the full path name of the project in the "SIMATIC Project" and "SIMATIC Path" fields. These can be automatically filled in by browsing for a Simatic Project using the "Browse" button. This button invokes a browser that shows all SIMATIC Projects found on your system. Simply select a project from the list and select the "OK" button to fill in both fields automatically.



2. If you want to synchronize the plant view automatically each time your DBA project is compiled, select "Automatic Synchronize with SIMATIC Plant View".

Note

The "Preview" button allows you to see the hierarchy of the selected SIMATIC Project.



10.4.3 Manual plant View Synchronization

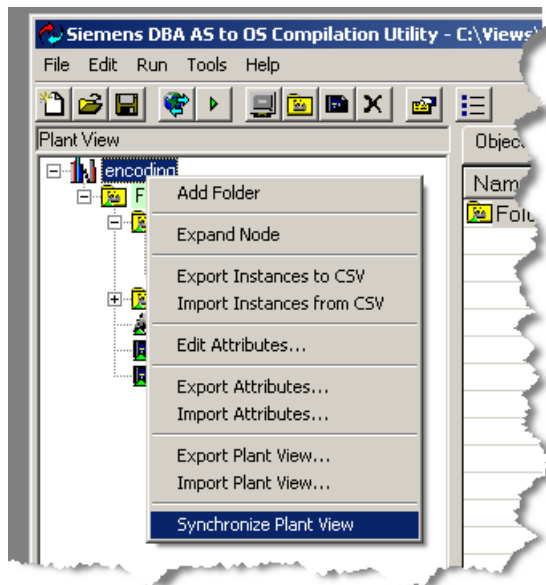
In addition to automatic synchronization, it is possible to manually synchronize the plant view at any time.

Prerequisite

Enable your project for plant view synchronization as described in the section titled "Enabling Plant View Synchronization (Page 299)".

Manual synchronization

1. Right-click on the root of the Plant View.
2. Select the menu option "Synchronize PlantView".



Note

When using the Plant View Synchronization for dual-leg operation, be sure to pay attention to any warnings that are logged during the synchronization process. It is generally recommended that these warnings should be corrected before proceeding.

10.4.4 Results of Synchronization

Result of enabling automatic synchronization

After synchronization, either manual or automatic, expect the following results. (When automatic synchronization is enabled, these results can be expected each time the project is compiled).

- Any folders found in the SIMATIC Project Plant View that do not exist in the DBA Project Plant View are automatically created in the DBA Plant View.
- Any folders found in the DBA Project Plant View that do not exist in the SIMATIC Project Plant View are automatically created in the SIMATIC Plant View.
- Any folders that are assigned to an OS in the SIMATIC Project Plant View will automatically be assigned to the same OS in the DBA Plant View
- Any folders that are assigned to an OS in the DBA Plant View will automatically be assigned to the same OS in the SIMATIC Project Plant View.

Note

The synchronization of OS folder assignments requires that the WinCC application names configured in the SIMATIC Project Component View match the WinCC application names in the DBA PC Station View. "Folder Mismatch" errors will be reported during the synchronization if an OS assignment cannot be synchronized because of a name mismatch.

- Any pictures that are associated with a folder in the SIMATIC Project Plant View that are not associated with the same folder in the DBA Plant View will be re-associated in the DBA Project Plant View.

Note

The re-association step could make it appear that a picture in the DBA Project Plant View appears to be "replaced" by a new picture after the synchronization is complete. However, no pictures are actually deleted. The picture will still exist, but simply is no longer be associated with the Plant View folder.

- Any pictures that are associated with a folder in the DBA Project Plant View that are not associated with the same folder in the SIMATIC Project Plant View will be re-associated in the SIMATIC Project Plant View.

10.5 Dual-Leg Operation via manual Configuration

10.5.1 Guidelines for dual-leg operation

Dual-leg system

Note

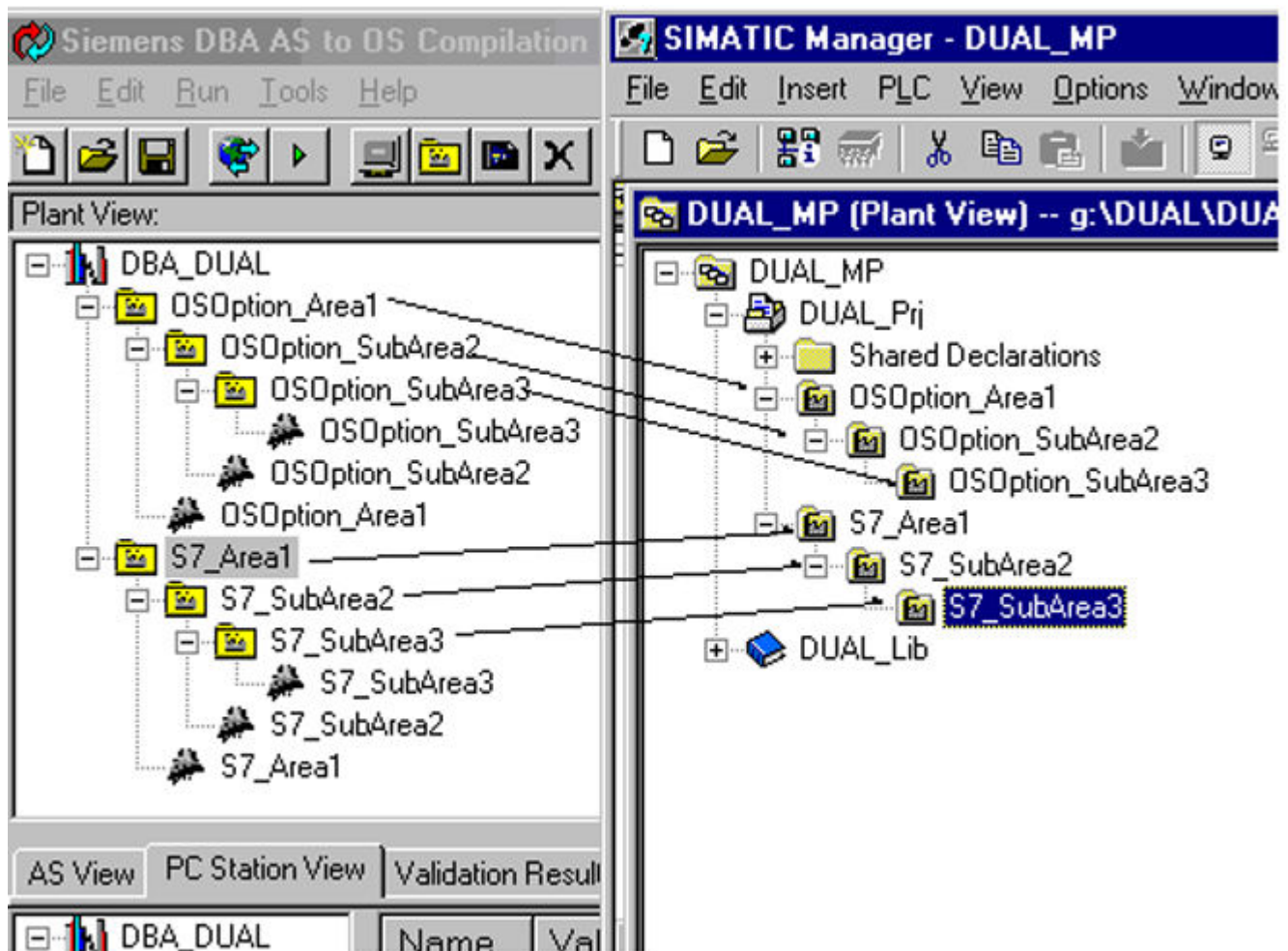
This section describes how to configure the plant view manually in dual-leg systems. Some PCS 7 installations have no automatic synchronization function available. Further information on this can be found under "Dual-Leg Operation via DBA Synchronization" above.

A dual-leg system works with S7 control systems and external control systems which are connected with the same OS server. Tags from both types of control systems are saved on this server in a single database. There are a few special features to be taken into account with dual-leg operation in terms of maintenance for the plant hierarchy and the compilation of projects.

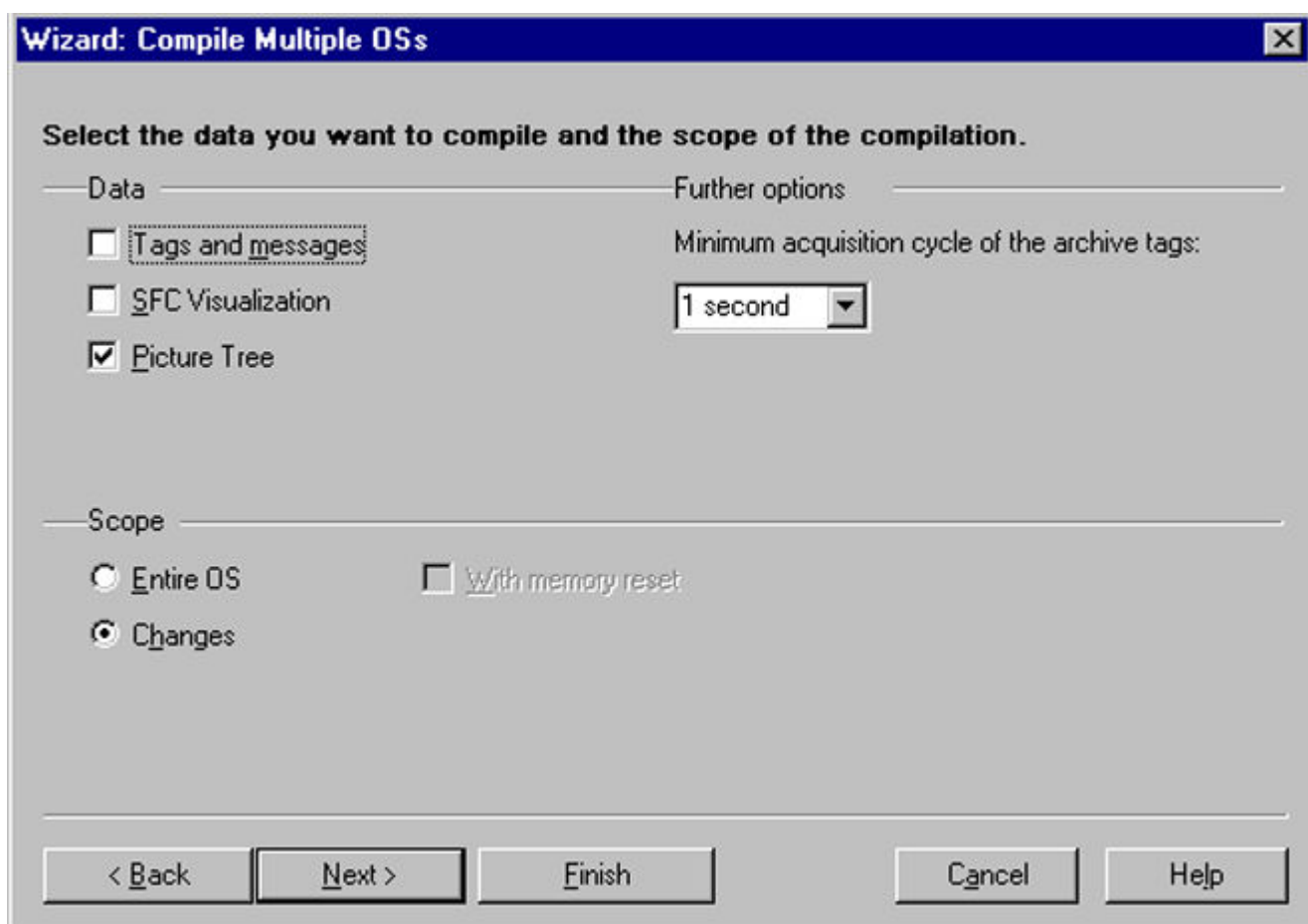
10.5.2 Notes on Maintenance of the Plant View

Create and maintain the plant view

The desired plant view must be set up both in DBA as well as in the SIMATIC Manager. This means that the plant view in DBA must contain all area names and the picture view of the plant view of the SIMATIC Manager, and the plant view of the SIMATIC Manager must contain all area names and the picture view of the DBA plant view. Each plant view must be a mirror image of the relevant other plant view.



- If an area or the picture view in the plant view is altered in SIMATIC Manager, the corresponding alteration must also be made in the DBA plant view.
- If an area or the picture view in the plant view is altered in DBA, the corresponding alteration must also be made in the SIMATIC Manager plant view.
- The individual objects assigned to the relevant pictures differ between the DBA plant view and the SIMATIC Manager plant view as follows:
 - All non-S7 AS objects are assigned to pictures in the DBA plant view.
 - All S7 AS objects are assigned to pictures in the SIMATIC Manager plant view.
 - All pictures assigned to non-S7 folders must be configured in the SIMATIC Manager before compilation in DBA. Otherwise the SIMATIC Manager does not permit use of the same picture name in its plant view.
 - All folders (S7 and non-S7) must be assigned to the correct OS with the SIMATIC Manager. Right-click for this - All S7 AS objects are assigned to pictures in the plant view in SIMATIC Manager.



10.5.3 Special features when compiling projects in dual-leg systems

Important notes:

Note

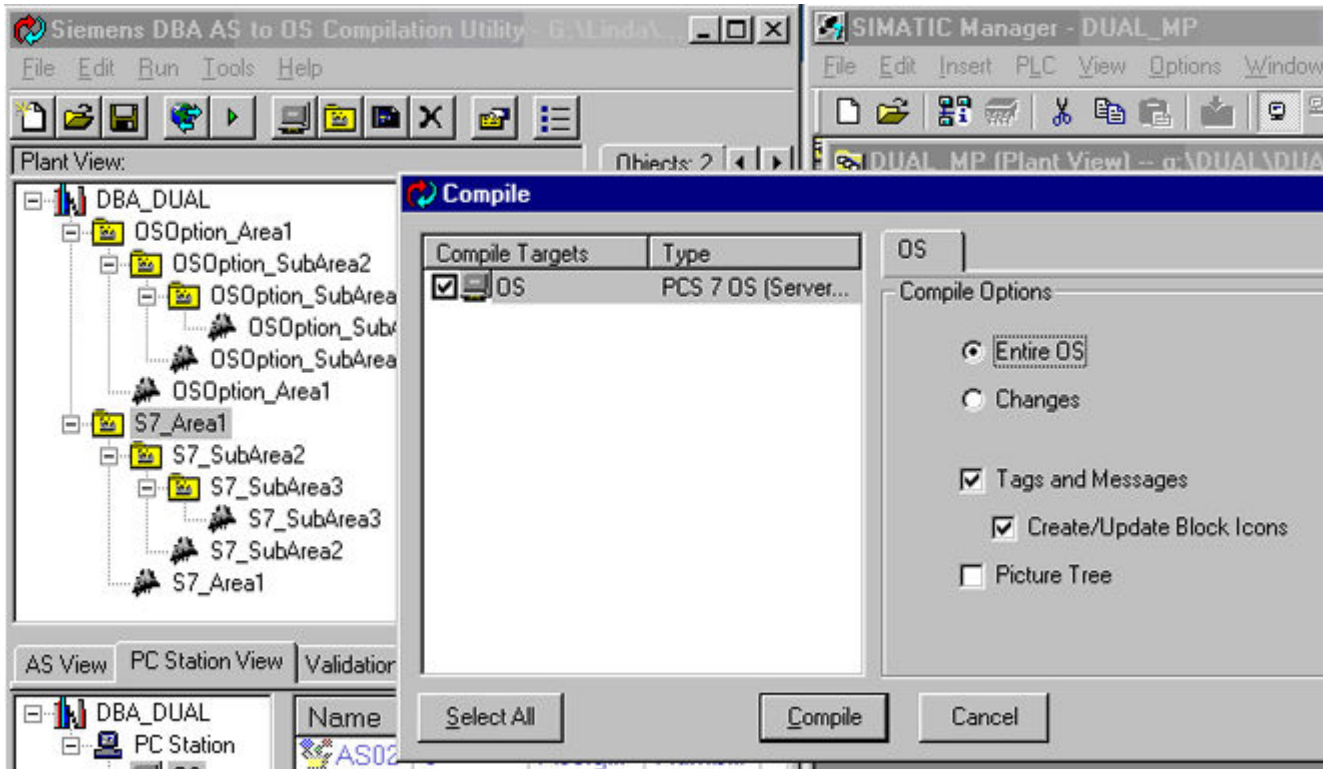
Spaces in area names

If you create a project for a dual-leg system and your area names contain spaces, DBA automatically creates a picture with a space in the name.

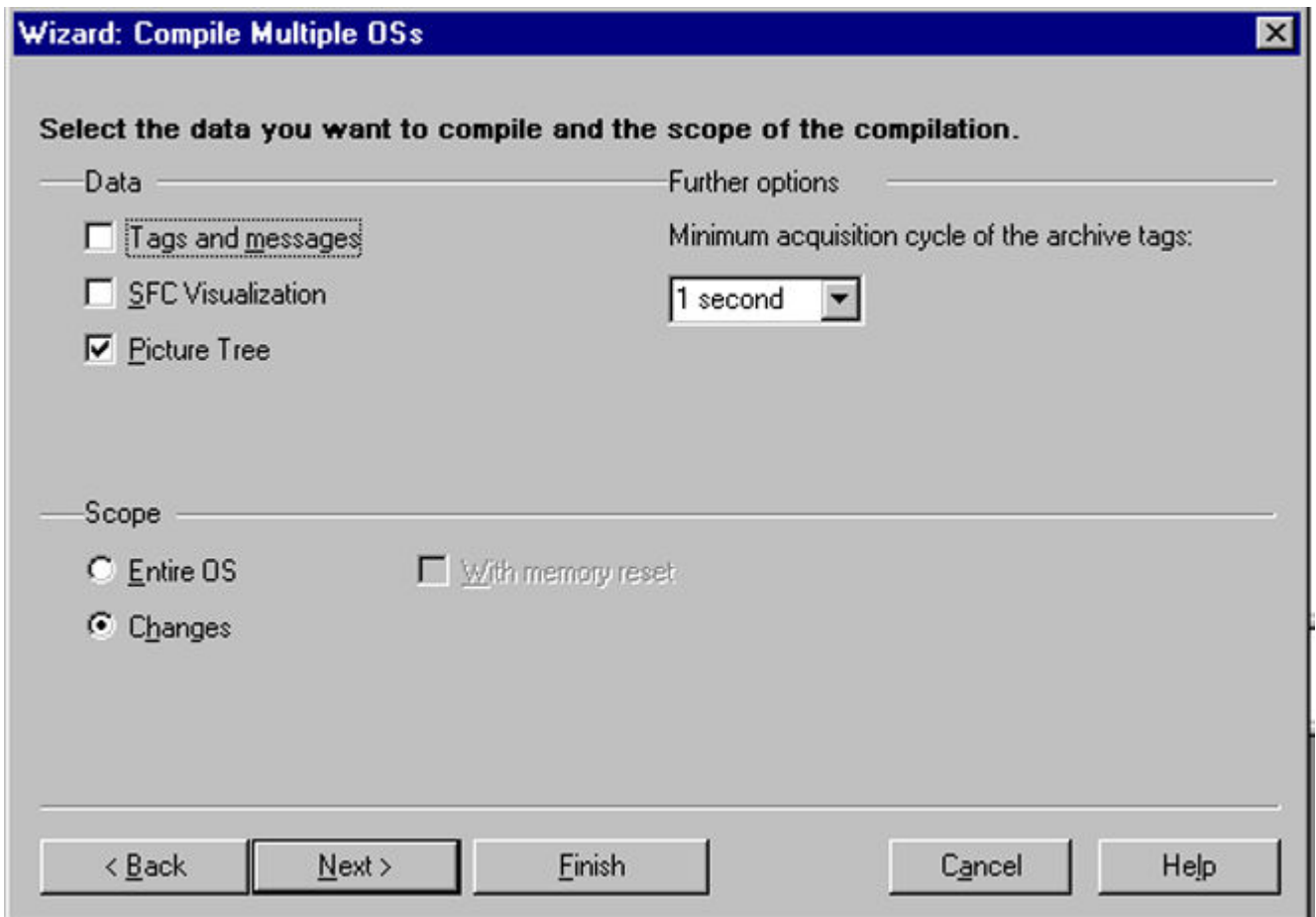
No spaces are permitted in picture names in SIMATIC Manager, which is why the picture is rejected.

As SIMATIC Manager creates the picture tree for the project, you must rename all pictures configured by DBA so that they do not contain spaces.

- The plant view can either be compiled in SIMATIC Manager or in DBA in dual-leg operation. Both applications include an option for activating/deactivating the compilation of the plant view. In order to guarantee proper screen navigation and alarm management function in a dual-leg system, the plant view must be compiled by SIMATIC Manager and not by DBA. Ensure therefore that the **Picture Tree** checkbox is selected in SIMATIC Manager for each project compilation.



- An additional step is required to complete the update in dual-leg systems following EVERY compilation in DBA (**entire OS** or **amendments**). The project must also be compiled with the **Picture Tree** option selected in SIMATIC Manager (including where no changes have been made to the project in SIMATIC Manager). This step is required in order to ensure that all new or amended DBA objects in the system's plant view have been registered correctly.



10.6 Multi-Language String Support

10.6.1 Multi-Language Support

PCS 7 OS supports multiple languages. A text dictionary CSV file is included that has all strings relevant to the Telecontrol library objects translated in both English and German.

The text dictionary CSV file is stored in the directory \Program Files\SIEMENS\DBA on the engineering station (the disk drive will depend on which drive is selected at installation). The file is called TelecontrolTextDictionary.csv.

Below is an except of this file:

	A	B	C
1	:ENGLISH	GERMAN	OPTIONS
2	Run'><"&s	Run'><"&s in German	
3	Not Done	Nicht ausgeführt	
4	Done	ausgeführt	
5	DoCommand	Befehl ausg.	
6	Counts	Zähler	
7	(.*) - General Communication Failure	\$1 - Allgemeiner Kommunikationsfehler	REGEX
8	(.*) - Communication Failure - Master OS	\$1 - Kommunikationsfehler - Master OS	REGEX
9	(.*) - Communication Failure - Standby OS	\$1 - Kommunikationsfehler - Standby OS	REGEX
10	(.*) - Time Sync error	\$1 - Zeit Sync Fehler	REGEX
11	(.*) - Discrepancy Alarm	\$1 - Antwortfehler	REGEX
12	(.*) - Disturbed	\$1 - Störung	REGEX
13	(.*) - Over Temperature	\$1 - Übertemperatur	REGEX
14	(.*) - Protection Fault	\$1 - Schutzfehler	REGEX
15	(.*) - Not Controllable	\$1 - Nicht steuerbar	REGEX

10.6.2 Maintaining Text Entries

Adding a New Text String

New text strings can be added to the text library by adding new entries to the CSV file described above. To add a new text string to the Text Library,

1. Open the language CSV file in Notepad or Excel.
2. Add a new row, filling in all required language columns.
3. Recompile the project. Refer to the Compiling the Project (Page 229) section.

Using Regular Expressions

If the string that you are adding will contain the same text in most parts, but might include a prefix such as a tag name that will be different for each object, you can use a regular-expression feature to handle this.

1. To do this, in column 1, the English column, replace the unique part of the text with the string (.*)
2. In all other columns, replace the unique part of the text with the string \$x, where x is the position in the first column of the (.*) string. Use \$1 to correspond to the first occurrence of (.*), use \$2 to correspond to the second occurrence, and so forth.
3. Finally, in the OPTIONS column, enter the string REGEX.

Adding languages

1. To add an additional language, add an additional column. This column must appear before the OPTIONS column. The first row cell of the new column must contain the name of the language, matching the names of supported languages in the PCS 7 OS Text Library.
2. The second line should contain the string Run'><"&s in LANGUAGE NAME. For example, to add French to the standard library, insert a Column C and populate the first two cells as shown:

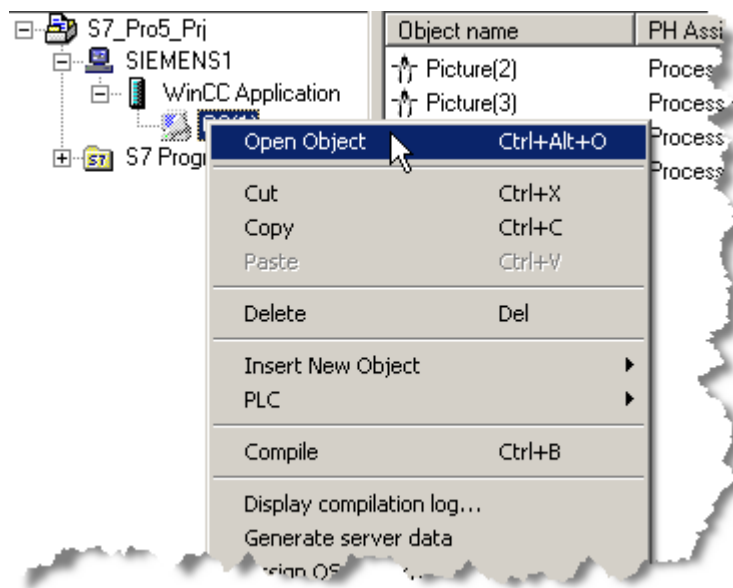
	A	B	C	D
1	:ENGLISH	GERMAN	FRENCH	OPTIONS
2	Run'><"&s	Run'><"&s in German	Run'><"&s in German	
3	Not Done	Nicht zugeführt		

Fill in the remaining text with translated text.

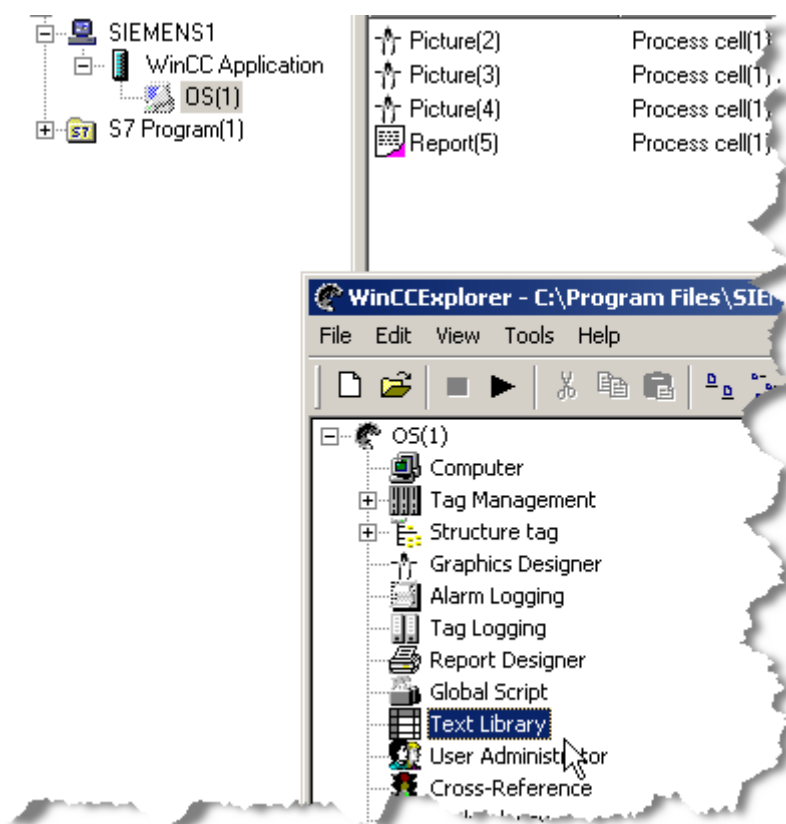
Changing a Text String

If you want to change a text string that has already been compiled in your PCS 7 OS project,

1. From SIMATIC Manager, right-click the OS, and select **Open Object**.



The WinCC Explorer Project Window opens.



2. Double-click the **Text Library** to open it.

Text-ID	English	German	French
1	Error	Störung	Incident
2	+	+	+
3	-	-	-
4	+/-	+/-	+/-
5	*	*	*
6	System, requires acknowle	System, quittierpflichtig	ystème
7	System, without acknowle	System, ohne Quittierung	Système
8	C	K	A
9	G	G	P
10	CG	KG	AP
11	QS	QS	QS
12	Alarm	Alarm	Alarme
13	Warning	Warnung	Avertisse
14	Tolerance	Toleranz	Tolérance
15	PLC process control messa	AS Leittechnik-Meldungen	Message
16	OS process control system	OS Leittechnik-Meldungen	Messages
17	Preventive maintenance	Vorbeugende Wartung	Maintenan
18	Process message	Prozessmeldung	Alarme
19	Operating message	Betriebsmeldung	Alarme
20	...ect for Operator Input	B... Anforderung	Dema

3. Select a cell, and make a change(s).
4. Close the **Text Library** file to save the change(s).
5. Download the project.

Note

To add or update the translated text into the WinCC Text Library, you can use "Export" and "Import" tools in the WinCC Text Library. This can be convenient in some cases, for example, when adding support for a totally new language to an already configured system.

For further information, please refer to the help file **Start > SIMATIC > WinCC > WinCC Information System > Working with WinCC > Setting Up Multilingual Projects > Language Administration with the Text Library > Translating Texts in the Text Library**.

10.6.3 Compile the Project

Compile the project to include the language dictionary. Refer to Chapter, Compiling the Project (Page 229).

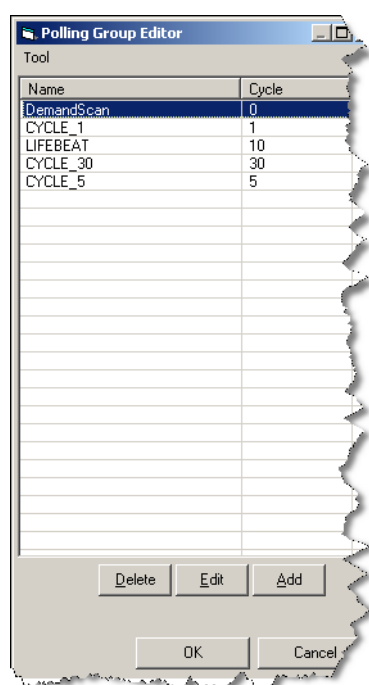
10.7 Implementing Modbus Demand Polling

Normally, Modbus variables are polled. It is possible, however, to set up certain variables to be scanned "on demand".

In order to do this, it is necessary to create one or more Demand Poll Groups and to create a tag that will be used to trigger a demand scan of the tags in the polling group.

10.7.1 Creating a Demand Poll Group

A Demand Scan Poll Group is created using the Poll Group Editor just like any other poll group. What sets a Demand Scan Poll Group apart is a cycle time of 0:



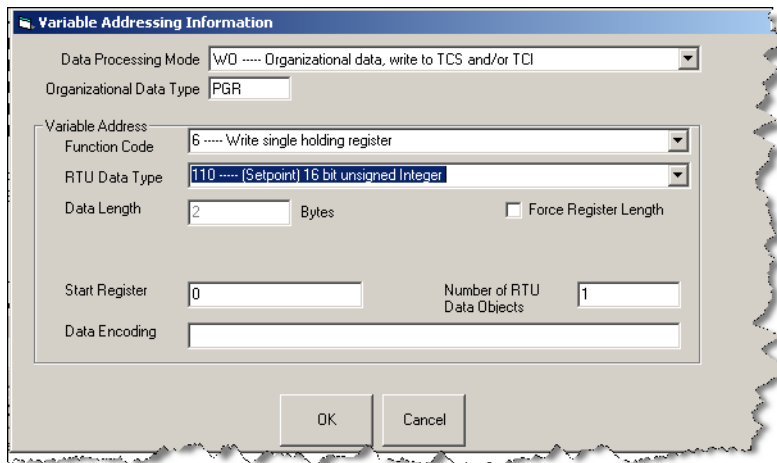
Any tag that is assigned to a polling group with a cycle of 0 will not be polled, but rather will only be scanned when triggered. (See the section titled Creating an RTU Demand Scan Trigger Variable.)

10.7.2 Creating an RTU Demand Scan Trigger Variable

To create an RTU Demand Scan Trigger Variable, use the DBA Type Editor to create a new Modbus type that contains at least one variable that will be the trigger variable.

Refer to the TeleControl DBA Type Editor Manual for details regarding the creation of a type.

The type must contain one variable whose address is defined as shown in the screen below.



Once the new type has been created, create an instance of the new type using the DBA Instance Editor, as described in Chapter, Managing Object Instances (Page 121).

10.7.3 Triggering a Demand Scan

To trigger a demand scan, it is necessary to write the polling group to be scanned to the trigger tag defined in the section titled Creating an RTU Demand Scan Trigger Variable. This can be done via a WinCC script or from an I/O field that has been placed on a picture that is linked to the trigger tag.

Since a demand scan is triggered by writing a polling group, only one instance of the type is required to support as many demand scan poll groups as required. The value written to the tag will determine which group is subject to the demand scan.

10.8 Instance CSV File Format

Each Instance CSV File Format consists of the following format:

```
Header Line 1
Header Line 2
Instance 1 Data
Instance 2 Data
Instance 3 Data
...
...
```

And so forth.

An example of a CSV file showing counters, as viewed from Microsoft Excel, is shown below.

Counter_V1	Operation FV Sense#Start	Operation SV#Start	Operation Mode#Start	Operation SUBS#Start	Operation TB#Start	Operation TL#Start
C1	0	0	1	0	0 1h	0s
C2	0	0	1	0	0 1h	0s
C3	0	0	1	0	0 1h	0s
C4	0	0	1	0	0 1h	0s
C5	0	0	1	0	0 1h	0s
C6	0	0	1	0	0 1h	0s
C7	0	0	1	0	0 1h	0s
C8	0	0	1	0	0 1h	0s
C9	0	0	1	0	0 1h	0s
C10	0	0	1	0	0 1h	0s

Note

The discussion in this section refers to comma-separated values. However, based on locale settings the separating character may be something other than a comma. DBA checks the List Separator configured in the Regional Settings of the Engineering Station to determine the separator character, according to the following rules:

- **Export**
Export CSV files are always created using the List Separator character specified in Regional Settings.
- **Import**
When importing CSV files, if a comma is found to be separator character used in the first header line, a comma will be expected to be used as the separator throughout the file. Otherwise, the List Separator character from Regional Settings will be expected to be the separator character throughout the entire file.

10.8.1 Header Line 1 Format

Comma-separated list of the category and attribute name

The first header line consists of a comma-separated list of the category and attribute name for each attribute. The category name and attribute name are separated by a dot (period). The category and key name are the names that DBA uses to keep track of attributes and their values. They are fixed when the type is created and never change. Note that the category and attribute name are independent of the language that is currently in effect for DBA. In this regard, they may differ from the category and attribute name that are shown in DBA, as these are language dependent.

10.8.2 Header Line 2 Format

Comma-separated list of the language-dependent description of each attribute

The second header line is optional, but DBA automatically creates this line when you export instances, as this line can be very useful for managing the data in the CSV file. This line contains a comma-separated list of the language-dependent description of each attribute.

10.8.3 Instance Data Line Format

Comma-separated list of the value of each attribute

Each object instance is represented by a line in the CSV file below the header line(s). An instance line consists of a comma-separated list of the value of each attribute specified in the corresponding Header Line 1 position.

10.8.4 Special Fields

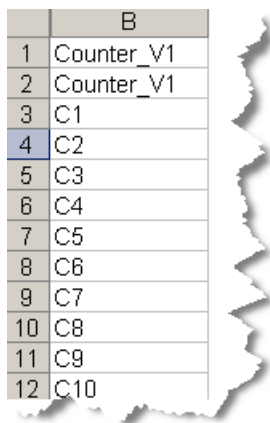
In addition to instance attributes, a maximum of three additional fields may be part of a CSV Import File.

10.8.4.1 Object Type

Including the name of the object type in the file

As each instance CSV file can only represent exactly one object type, the name of the object type must also be included in the file. This is included in Header Line 1, and if present, must be the same in Header Line 2.

For each Instance Line, the name of the instance is shown in this position, as shown in the picture below:



	B
1	Counter_V1
2	Counter_V1
3	C1
4	C2
5	C3
6	C4
7	C5
8	C6
9	C7
10	C8
11	C9
12	C10

10.8.4.2 Path

Path: the location of the object instance in the picture tree

This is an optional field that is used to indicate the location of the object instance in the picture tree. This field can be used to place or move an instance within the Plant View. (Note that even if this field is present, the Instance Import dialogs provide a checkbox that allow it to be ignored, in which case it is not used to place or move instances within the Plant View).

If present, the Header Line 1 name for this field is SPath. The Header Line 2 name of the field is Plant View Assignment.

On each Instance Data Line, the format of the path is one or more hierarchical folder, starting with a backward slash and with folder names separated by backward slashes, as shown in the picture below.

A
SPath
Plant View Assignment
\Folder\Folder1
\Folder\Folder2
\Folder

10.8.4.3 AS Name

AS Name field specifying the owner of each instance object

It is possible to create CSV files that contain all of the instances for an object type for one or more AS Nodes. In this case, it is necessary to include a field that specifies the AS Name that is the owner of each instance object.

If present, the Header Line 1 and Header Line 2 name for this field are both AS.

A
AS
AS
RTU01
RTU02
RTU03
RTU02

10.8.4.4 Edit

This field can be used to delete or rename instances.

To delete an instance, use the following 3-character Edit Descriptor syntax in the edit field.

***-* (star-hyphen-star)**

If the instance specified is found to exist, it will be deleted. If it is not found, a warning is logged and no deletion is required.

To rename an instance, simply specify the new name of the instance as the Edit Descriptor in the Edit field. If the instance specified by the descriptor is found to exist, it will be renamed to the name specified in the edit field. If the instance is NOT found to exist, the name specified by the Edit field will be used to create the instance.

Consider this example :

	A	B	C
1	SPath	Edit	Setpoint_V1
2	Plant View Ass	Edit Descriptor	Setpoint_V1
3		*_*	SP1
4		*_*	SP2
5		XO1	SP3
6			SP4
7			SP5

The following edit actions will take place upon importing this file:

Instance	Action
SP1	Instance Deleted
SP2	Instance Deleted
SP3	Instance Renamed from SP3 to XO1
SP4	no edit action
SP5	no edit action

Note that the edit action is independent of any other changes that are specified on the CSV line. For example, if an edit action is specified to rename the instance, further column entries may cause various attributes of the renamed instance to change as well.

10.8.5 Using Boolean and Enumerated Values

Considerations

Special consideration must be taken when importing data of the following formats:

- **Boolean Values**

For attributes that require a yes/no, true/false, enabled/disabled setting, use the following values in Instance Data lines of the CSV File:

0 False/Off/Disabled

1 True/On/Enabled

- **Enumerated Values**

For enumerated values, there are two cases:

- **Numbered enumerated values**

In some cases, enumerated values are presented within DBA as a list of numbered values, such as the following:

Limit - High High Al...	0	Operat
Mode	1 - RV Abs	Operat
Overflow	1 - RV Abs	Operat
Quality Code %	2 - RV Inc	Operat
RTU Reset Allowed	3 - RV Time	Operat
Scale Factor	4 - MV Integrate	Operat
Substitute Value	5 - MV Time	Operat
Substitution Mode	6 - RV/MV Abs	Operat
Substitution Mode	7 - RV/MV Inc	Operat
Substitution Mode	8 - RV Sync	Operat
Time Basis	1h	Operat

In these cases, within the Instance Data line of a CSV file, use the number only to set or change the value of the attribute. Refer to the attribute entry panel of DBA for an actual instance to see what numbered values are allowed.

- **Non-numbered enumerated values**

In some cases, enumerated values are presented within DBA as a list of non-numbered values, such as the following:

Substitution Mode	0 - None	Operation
Time Basis	1h	Operation
	1D	
	1h	
	1m	
	1s	

In these cases, within the Instance Data line of a CSV file, use the full text for the desired enumeration choice to set or change the value of the attribute. Refer to the attribute entry panel of DBA for an actual instance to see what text values are allowed.

10.8.6 Clearing Text Fields

Normally, when a field is left blank, the corresponding instance attribute is not changed at all during import. If however, for text and enumeration fields, you would like to instance attribute, you can use the following 3-character special syntax:

***-* (star-hyphen-star)**

10.9 Configuring Modbus Polling Schedules

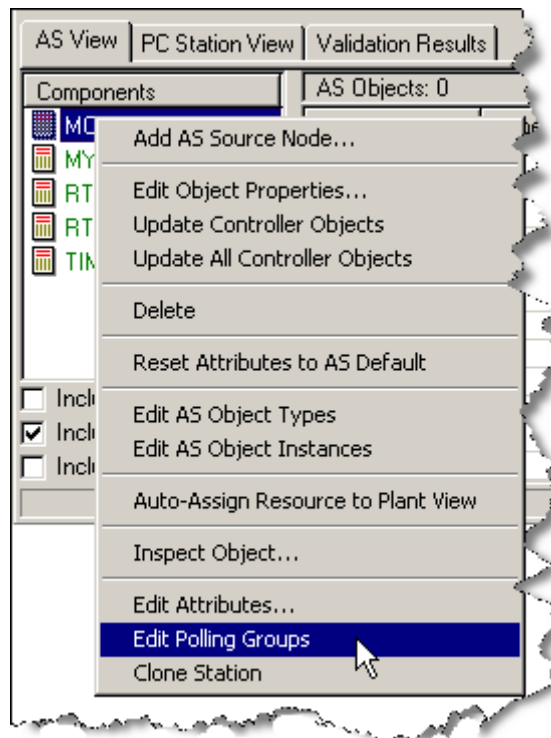
10.9.1 Managing Modbus Polling Groups

Modbus communication is organized around the concept of polling groups.

- Different groups can be defined with different scanning cycles.
- Each tag that is to be read by PCS 7/TeleControl must be associated with a specific polling group.
- A polling group editor is incorporated into DBA.

To add a new Modbus polling group, follow these steps:

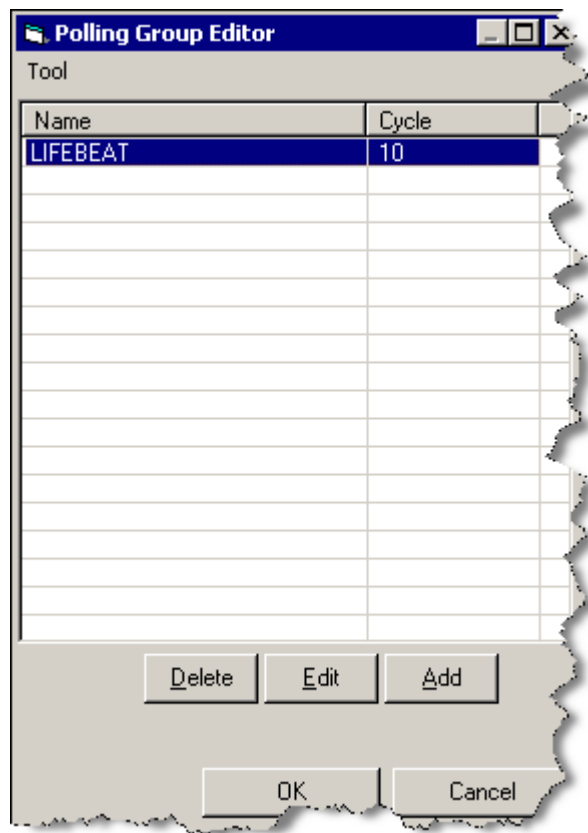
1. In the left pane of the AS View, right-click a Modbus RTU, and select **Edit Polling Groups**.



The **Polling Group Editor** appears.

Note

LIFEBEAT is a system polling group that is created automatically.



2. In the **Polling Group Editor**, click the **Add** button. The **Edit Polling Group** dialog appears.



3. Specify a unique name for the new polling groups in the **Name** field.
4. Specify a polling cycle in seconds in the **Cycle** field, and click **OK**.

To change the name of a polling group, delete the group and then add it again with the new name.

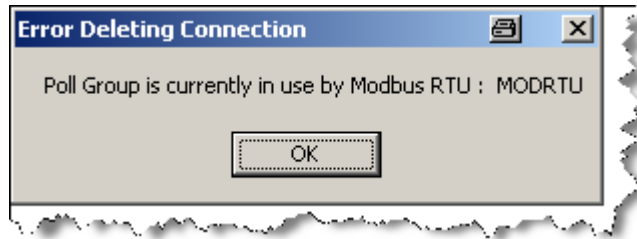
To change the polling group cycle, follow these steps:

1. In the Polling Group Editor, click the **Edit** button.
2. In the Edit Polling Group dialog, specify the new polling cycle in seconds in the **Cycle** field.
3. Click **OK**.

To delete a polling group, select the group name in the Polling Group Editor, and click the **Delete** button.

Note

You cannot delete a polling group that is being used by an RTU. An attempt to do so will result in the following error dialog:



10.10 Configuring DNP Polling Schedules

10.10.1 Time Domain Multiplexing

Time Domain Multiplexing (TDM) Procedure

Communication networks, which are based on wireless radio networks with a multiple-access point-to-multipoint system topology, require efficient data transmission methods to avoid Co-channel interference. Co-channel interference refers to the interference caused by two nearby radios broadcasting simultaneously on the same frequency. This makes it difficult for the receivers to distinguish between the two signals, and results in lost or corrupted data.

In the Time Domain Multiplexing method, each RTU poll can occupy the entire bandwidth, but is given a time slot of limited duration, which is available at regular intervals. This is a common method in WAN network topologies using same network access points (point-to-multipoint). Theoretically there is no maximum number of RTU that can be multiplexed, but there is a limit on the overall transmission rate (i.e. the capacity in bits per second, typically 9600 bits per second).

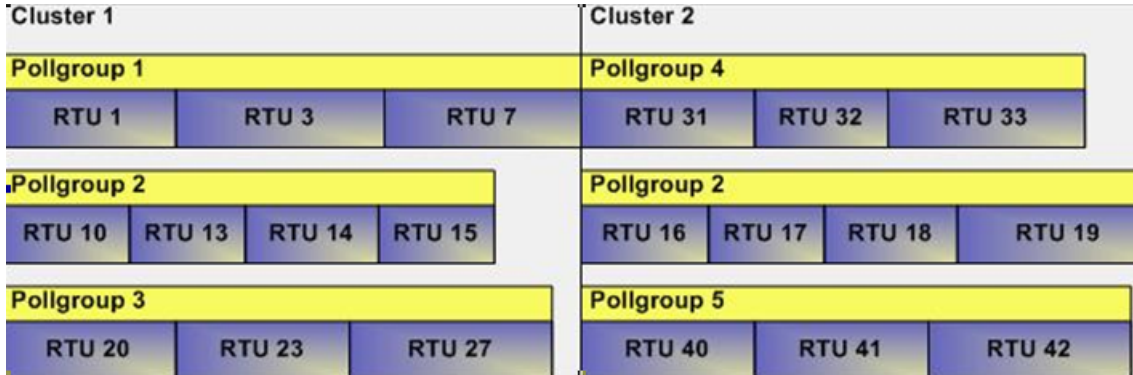
Some systems have predetermined time slots which sets a fixed rate for any RTU. If the capacity is not filled, the other time slots go empty. This is the case for synchronous systems which rely on a fixed timing schedule. Asynchronous systems can dynamically allocate capacity as the demand varies. These systems have a much better performance when demand is low, because the few RTUs, that have a current higher data change rate, have the entire bandwidth available. However at maximum capacity, the synchronous system may be faster because less space is wasted framing the data.

There are 2 methods provided for the TDM procedure for polling RTUs:

1. A **chain of clusters** oriented approach, where a RTU gets assigned to a RTU poll group and additionally to a RTU cluster.
2. A **chain of poll groups** oriented approach, where RTUs get assigned to RTU poll groups.

TDM Procedure of RTU Cluster Chains

The following drawing illustrates the chaining of RTU clusters.



Main principles of the TDM procedure of RTU Cluster:

- Each RTU gets assigned to a poll group
- Each poll group gets assigned to a cluster. A poll groups can only be assigned to a cluster or a chain, but not to both.
- Each RTU gets assigned a max time slot in msec which can be used for polling RTU data. The time slots may be different per RTU depending on the number of I/Os to be processed and the expected data change rate.
- The max time available for polling data of RTUs within a poll group (poll duration of a poll group) is defined by the sum of the individual RTU time slots
- The poll duration of a cluster is defined by the max poll duration of a poll group within the cluster
- The clusters are chained, the polling of RTUs within the following cluster is only started when the polling of all RTUs in the current cluster is finished
- The RTUs in the different poll groups within a cluster are simultaneously polled
- The cycle time and/or synchronisation time of a poll group are irrelevant, if the poll group is assigned to a cluster. If the last RTU of the last cluster was polled, the polling of the RTUs of the first cluster is started automatically.

Building of RTU clusters may lead to a higher overall polling cycle as the polling of all RTUs in a cluster that have to be finished first before the polling of RTUs in the next cluster is started.

The required time to poll data from a RTU may vary and not be limited to the assigned time slot for polling.

Issuing a command to any RTU in the ‘active’ cluster can be executed immediately.

Issuing a command to a RTU not in the ‘active’ cluster is queued until the current polling requests are finished. The command is issued and the polling of RTUs of the previously ‘active’ cluster is continued.

TDM Procedure of RTU Poll Group Chains

The following drawing illustrates the chaining of RTU poll groups:

Pollgroup 1			Pollgroup 4				
RTU 1	RTU 3	RTU 7	RTU 31	RTU 32	RTU 33		
Pollgroup 2				Pollgroup 6			
RTU 10	RTU 13	RTU 14	RTU 15	RTU 16	RTU 17	RTU 18	RTU 19
Pollgroup 3			Pollgroup 5				
RTU 20	RTU 23	RTU 27	RTU 40	RTU 41	RTU 42		

Main principles of the TDM procedure of RTU poll group chains:

- Each RTU gets assigned to a poll group
- Each poll group gets assigned to a chain. A poll groups can only be assigned to a cluster or a chain, but not to both.
- Each RTU gets assigned a max time slot in msec which can be used for polling RTU data. The time slots may be different per RTU depending on the number of I/Os to be processed and the expected data change rate.
- The max time available for polling data of RTUs within a poll group (poll duration of a poll group) is defined by the sum of the individual RTU time slots
- The poll groups are chained, the polling of RTUs within the following poll group of the same poll group chain is only started when the polling of all RTUs in the preceding poll group is finished
- The RTUs in the different poll groups chains are simultaneously polled
- The polling of RTUs within a poll group chain is started according to the polling scheme, i.e. the polling cycle and/or the synchronisation time. If the starting time of a several RTU polls are identical, then the polls are queued. It has to be ensured that only one poll request per RTU is active or queued.

This procedure is only applicable in cases where no interference of frequencies used for polling of RTUs in the different poll group chains is guaranteed.

The required time to poll data from a RTU may vary and not be limited to the assigned time slot for polling. There are requirements for well test procedures that lead to a higher data change rate for single RTUs. In case that well test procedures are running for a RTU (trigger indication), the assigned time gets automatically extended allowing to empty all buffered data in the RTU.

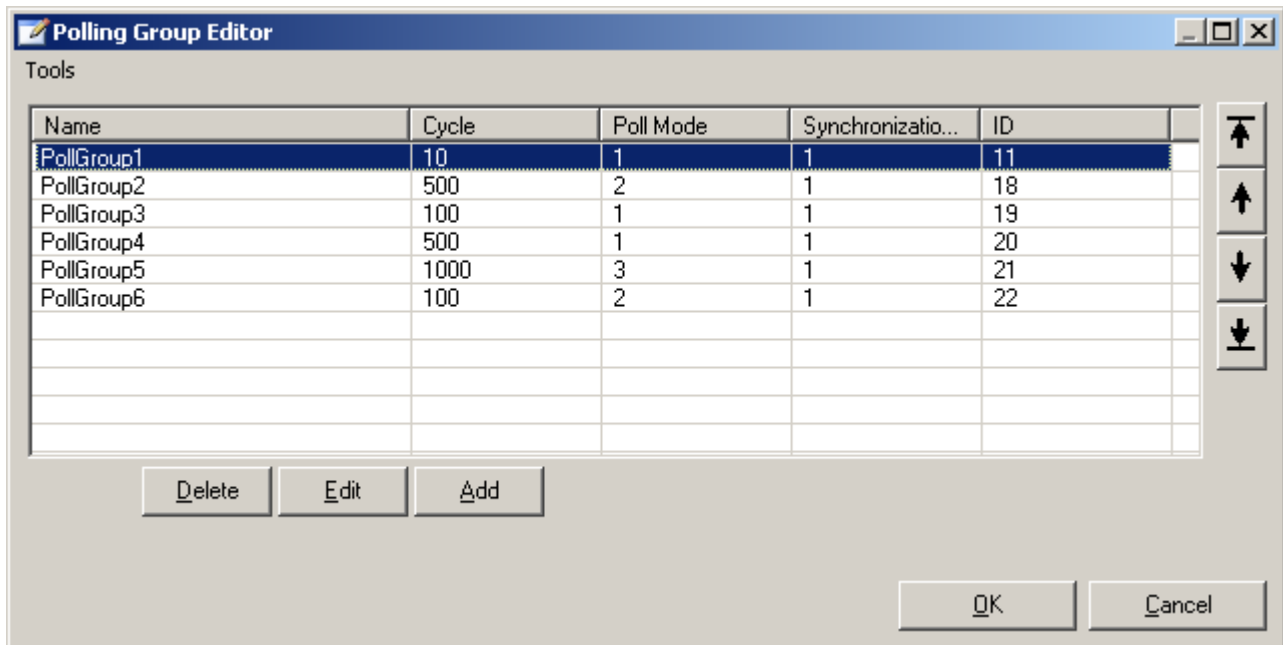
Issuing a command to any RTU can be executed immediately.

10.10.2 Managing DNP Polling Groups

DNP RTUs can be assigned to Poll Groups.

For adding a new DNP Polling Group, follow these steps:

1. Select the **AS View** tab.
2. Right-click on a DNP RTU and select **Edit DNP Polling Groups**.
The **DNP Polling Group Editor** appears.



The error buttons on the right side allow sorting the sequence of the polling groups (moving selected item up and down or begin and end).

- In the DNP Polling Group Editor, click the **Add** button. The **Add DNP Polling Group** dialog appears.

The screenshot shows the 'Add DNP Polling Group' dialog box with the following configuration:

- Identification:**
 - Name: [Empty text box]
 - Cycle: 10 sec
 - Cycle Factor: 0
 - Poll Mode: 1 - Use polling time/cycle
 - Delay Time: 0 sec
- Synchronization:**
 - Synchronization Mode: 1 - Monthly
 - Synch Day: 1
 - Synch Time: 0 HH 0 MM

- Configure Identification:
 - **Name:** Is the name of DNP Polling Group.
 - **Cycle:** Is the poll time in sec, for event class 1 – 3 poll
 - **Cycle Factor:** Is the polling cycle factor of class 0 (static class) polls. The static class (class 0) is only polled every nth cycle of normal event class 1 -3 poll.
 - **Poll Mode:** Defines the polling and synchronization mode.
 - **Delay Time** – Specify a number of seconds in the range of 0 - 60. When non-zero, this is number of seconds to delay between communicating with each RTU configured in the poll group. The default delay time is 0 seconds.
- Configure Synchronization:
 - **Synchronization Mode:** Defines the mode of synchronization
 - **Synch Day:** Define the synchronization day for monthly and weekly synchronization
 - **Synch Time HH:** is the synchronization time in the format HH24 (hours)
 - **Synch Time MM:** is the synchronization time in the format MM (minutes)
- When you have finished configuring the DNP Polling Group, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

In order to change the DNP Polling Group, follow these steps:

1. In the **DNP Polling Group Editor**, click the **Edit** button.
2. In the **Edit DNP Polling Group** dialog, specify the new values. You can only change the name from the Polling Group if the group is not assigned to an RTU.
3. Click **OK**.

In order to delete a DNP Polling Group, select the group name in the **DNP Polling Group Editor**, and click the **Delete** button.

Note

You cannot delete a DNP Polling Group that is being used by an RTU. An attempt to do so will result in an error dialog.

In order to export the DNP Polling Groups in a CSV file use the top left menu **Tools->Export Type(s)** in the **DNP Polling Group Editor**. In the **Save As** dialog specify the filename and the target directory and click **OK**.

In order to import DNP Polling Groups from a CSV file use the top left menu **Tools->Import Type(s)** button in the **DNP Polling Group Editor**. In the Open dialog specify the filename and the source directory and click **OK**.

Note

If you import a list which contains a group with the same name from a group in the current list, this group is skipped.

When you have finished configuring the DNP Polling Groups, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

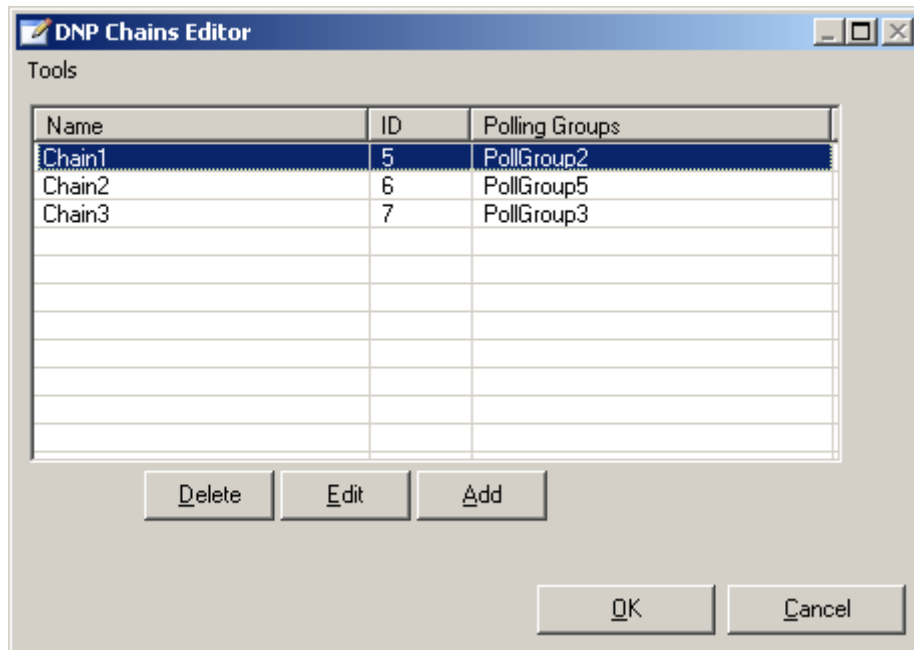
10.10.3 Managing DNP Chains

Note

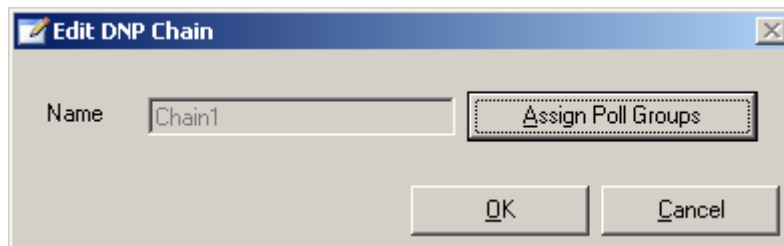
You can only select Edit DNP Chains if you have configured DNP Polling Groups.

In order to add a new DNP Chain, follow these steps:

1. Select the **AS View** tab.
2. Right-click on a DNP RTU and select **Edit DNP Chains**.
The **DNP Chains Editor** appears.

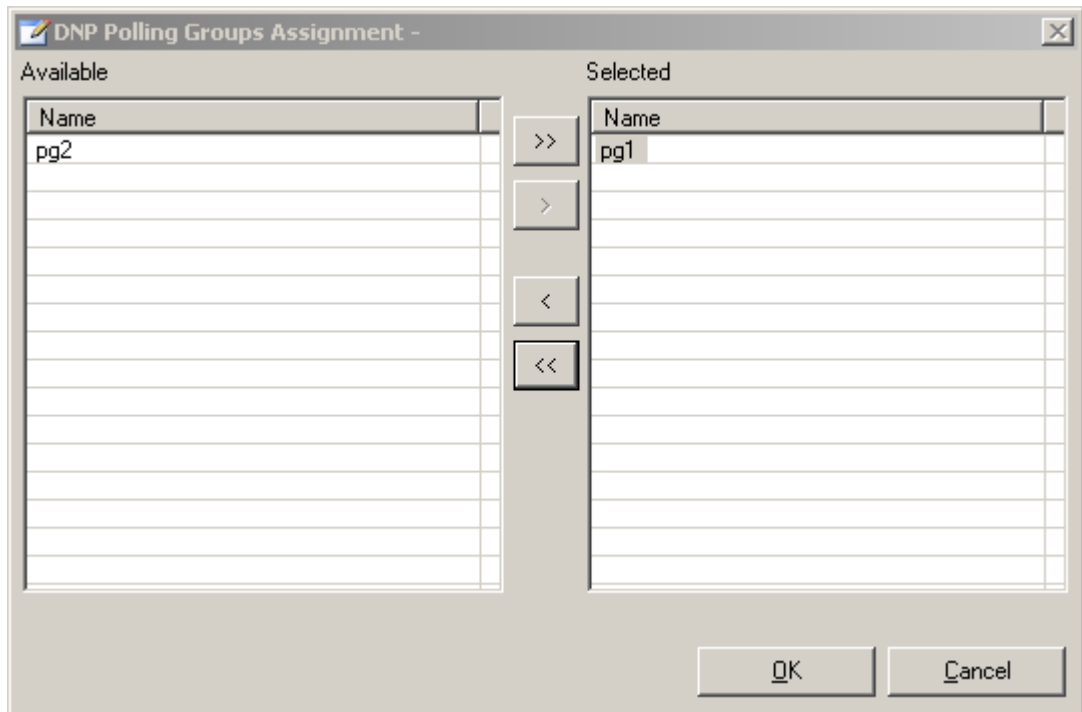


3. In the **DNP Chains Editor**, click the **Add** button.
The **Edit DNP Chain** dialog appears.



4. Specify the name for the DNP Chain.

5. In order to assign DNP Polling Groups to the DNP Chain click **Assign Poll Groups**. The **DNP Polling Groups Assignment** dialog appears.



In the Available list you can see all DNP Polling Groups which are currently not assigned to any DNP Cluster or DNP Chain. In the Selected list you can see the Polling Groups which are currently assigned to the DNP Chain. With the arrows in the middle from the lists you can move the groups from one list to the other.

6. When you have finished assigning the DNP Polling Groups, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button. Also, close the **Add DNP Chain** dialog in the same way.

In order to change a DNP Chain, follow these steps:

- a) In the **DNP Chains Editor** select the Chain and click the **Edit** button.
- b) In the **Edit DNP Chain** dialog, click **Assign Poll Groups**.
- d) Change the Polling Group assignment.
- e) Click **OK**. Also, click **OK** for the **Edit DNP Chain** dialog.

In order to change the name of a DNP Chain, delete the DNP Chain and add it again with the new name.

In order to delete a DNP Chain, select the chain name in the **DNP Chains Editor**, and click the **Delete** button.

When you have finished configuring the DNP Chains, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button.

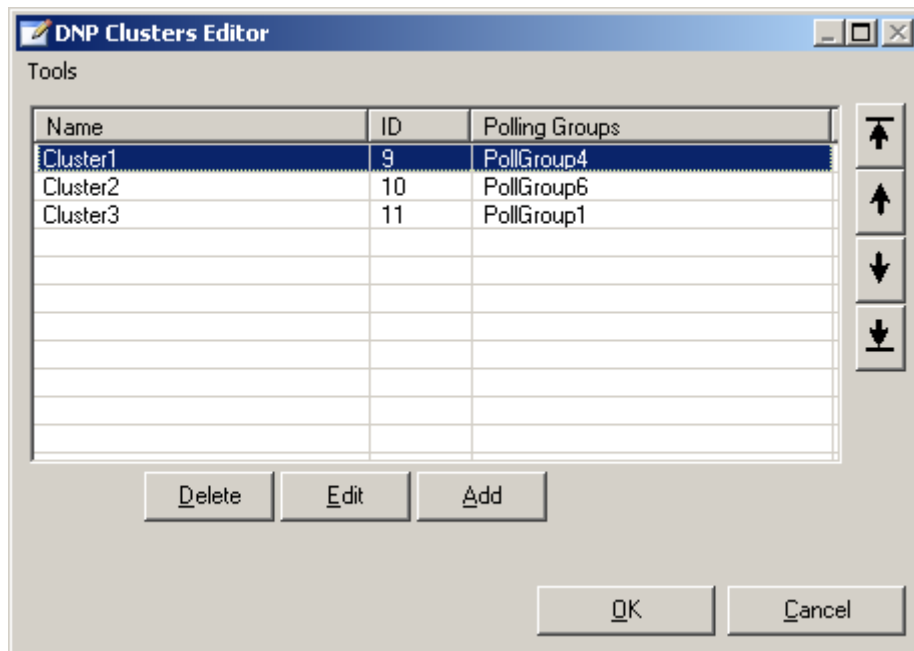
10.10.4 Managing DNP Clusters

Note

You can only select Edit DNP Clusters if you have configured DNP Polling Groups.

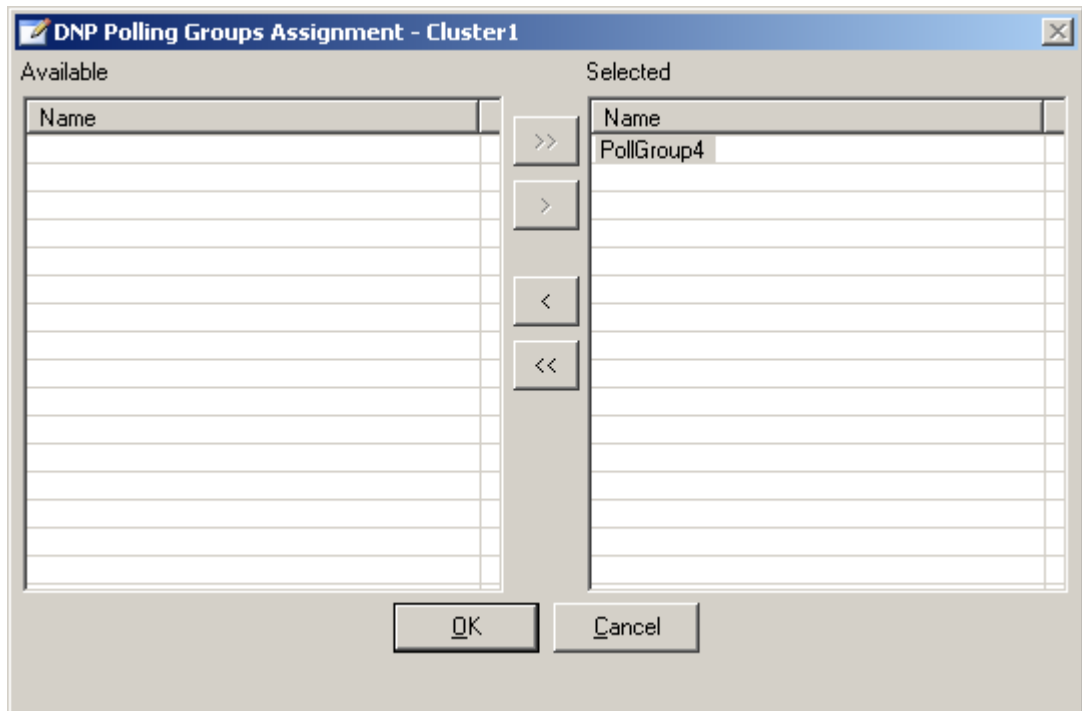
To add a new DNP Cluster, follow these steps:

1. Select the **AS View** tab.
2. Right-click on a DNP RTU and select **Edit DNP Clusters**.
The **DNP Clusters Editor** appears.



3. In the **DNP Clusters Editor**, click the **Add** button.
The **Add DNP Cluster** dialog appears.

4. Specify the name for the DNP Cluster.
Any poll groups that have not been assigned directly to another cluster or to a chain can be assigned to a cluster.
To assign DNP Polling Groups to the DNP Cluster click **Assign Poll Groups**.
The **DNP Polling Groups Assignment** dialog appears.



In the **Available** list you can see all DNP Polling Groups which are currently not assigned to any DNP Cluster or DNP Chain. In the **Selected** list you can see the Polling Groups which are currently assigned to the DNP Cluster. With the arrows in the middle from the lists you can move the groups from one list to the other.

5. When you have finished assigning the DNP Polling Groups, click **OK**. To exit the configuration dialog without saving your changes, select the **Cancel** button. Also, close the **Add DNP Cluster** dialog in the same way.

To change a DNP Cluster, follow these steps:

- a) In the **DNP Clusters Editor** select the Cluster and click the **Edit** button.
- b) In the **Edit DNP Cluster** dialog, click **Assign Poll Groups**.
- c) Change the Polling Group assignment.
- d) Click **OK**. Also, click **OK** for the **Edit DNP Cluster** dialog.

In order to change the name of a Cluster, delete the cluster and add it again with the new name. In order to delete a DNP Cluster, select the cluster name in the **DNP Clusters Editor**, and click the **Delete** button.

When you have finished configuring the DNP Clusters, click **OK**.

To exit the configuration dialog without saving your changes, select the **Cancel** button.

The order of clusters is a factor used in scheduling, as described in section Time Domain Multiplexing (Page 323). To change the order of a cluster, select a cluster and use the arrow keys on the right to move the cluster up or down, or to the top or bottom.

10.11 Multi Project Engineering

Multi-Project engineering allows DBA projects to be organized into a collection of smaller DBA Projects (called SubProjects). This technique allows the following:

- Dividing the effort of engineering large projects between multiple people all working simultaneously on different AS's.
- Dividing very large projects into more manageable subprojects. Since individual DBA projects exceeding 10000 process objects are not supported, using Multi-Project engineering allows the creation of much larger projects than can be created using a single project.

10.11.1 Multi-Project Engineering Modes

There are two modes of engineering DBA Multi-Projects:

- Local Engineering – In this case the Multi-Project and all SubProjects reside on a single PCS 7 ES station. This mode is useful in cases where it is not necessary to allow simultaneous engineering of different parts of the system.
- Remote Engineering – In this case, the DBA Multi-Project resides on a PCS 7 ES Station. All SubProjects are initially created on the ES station, but individual SubProjects may then be copied or referenced by other PCS 7 ES stations, for use by multiple engineers. Once all SubProject engineering is complete, the Multi-Project can be compiled to combine the results of all of the contributing engineers.

10.11.2 Multi-Project Organization

A Multi-Project consists of a set of inter-related DBA Projects. All Multi-Projects contain:

- A single DBA Project (referred to as the Multi-Project) that organizes all of the other DBA projects.
- One or more DBA SubProjects. A SubProject is simply a DBA project that has been created within a Multi-Project.

The Multi-Project contains references to all of the SubProjects.

The Multi-Project and all SubProjects must be stored as individual files in the same directory, with a ".DBA" extension.

Note

For ease and consistency of archiving, it is strongly recommended that a different directory be used for each Multi-Project.

10.11.2.1 AS Node Organization

Before working with Multi-Projects, you should must some decide how data should be divided into SubProjects.

The unit of division for Multi-Project engineering is the AS Node. An AS Node can reside in either in the Multi-Project itself or within one SubProject. Therefore, it is necessary to decide how AS Nodes should be organized into SubProjects.

For example, you might be creating a system that contains AS stations in various geographic regions, and therefore, organize all of the AS Nodes in one region into a single SubProject. As another example, AS stations might be required for different technological functions, each to be engineered by different engineers. In this case, it might make sense to organize all of the AS Nodes related to one function into a single SubProject

It is also not necessary that all AS Nodes be organized into SubProjects. It is also possible to leave one or more AS Nodes configured within the Multi-Project.

10.11.2.2 Plant View Organization

The Plant View can be a organized as a single Plant View that is created in the Multi-Project and is automatically synchronized with all SubProjects.

It is also possible that each SubProject contains only a portion of the Plant View, and that Multi-Project Plant View becomes the union of the Plant Views configured in all SubProjects.

The organization of the Plant View therefore must also be decided. If different engineers will be working on unique parts of the Plant View, it might be useful to configure only a subset of the Plant View in each SubProject.

Also, affecting the Plant View organization are the hierarchy settings described in Section Ensuring Unique Object Name (Page 294). These settings can only be changed in the Multi-Project.

10.11.2.3 Managing DBA Global Data

All engineering data that is considered "global" to the Multi-Project and to all SubProjects must be engineered from Multi-Project.

The following DBA data is considered Global:

- PC Station Configuration (including Sinaut Access Points)
- Project Options (Plant View Hierarchy, Area levels, synchronization)
- Protocol specific global data, such as poll groups, control blocks, etc.

Global data that is engineered in the Multi-Project is automatically synchronized with all SubProjects during the compilation process, and it can also be synchronized manually as described in the sections below.

10.11.2.4 Managing DBA Type Definitions in Multi-Projects

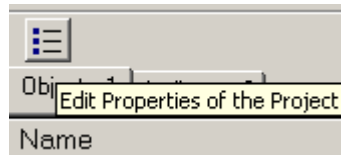
DBA Type Definitions are also a class of "global" data. The DBA Multi-Project and all referenced SubProjects are required to contain the same DBA Object Type definitions. However, it is sometimes necessary to divide the engineering of new types between different people working on different SubProjects. To support this idea, the following strategy is employed to manage object types. The DBA MultiProject concept supports this workflow as described below. When a Multi-Project is compiled, to the extent possible, DBA automatically manages the merging of types that have been modified within the various SubProjects. When there are conflicts detected (such as the same type modified in multiple SubProjects, validation errors are reported; the conflicts must be corrected before compilation can successfully complete. Refer to section, Validation (Page 340).

10.11.3 Creating a DBA Multi-Project

A DBA multiproject is created just like any other DBA project. This is described in chapter Project Setup (Page 17). Some data that are engineered within the multiproject (e.g. PC stations) are also saved in all subprojects. You should follow a specific workflow therefore:

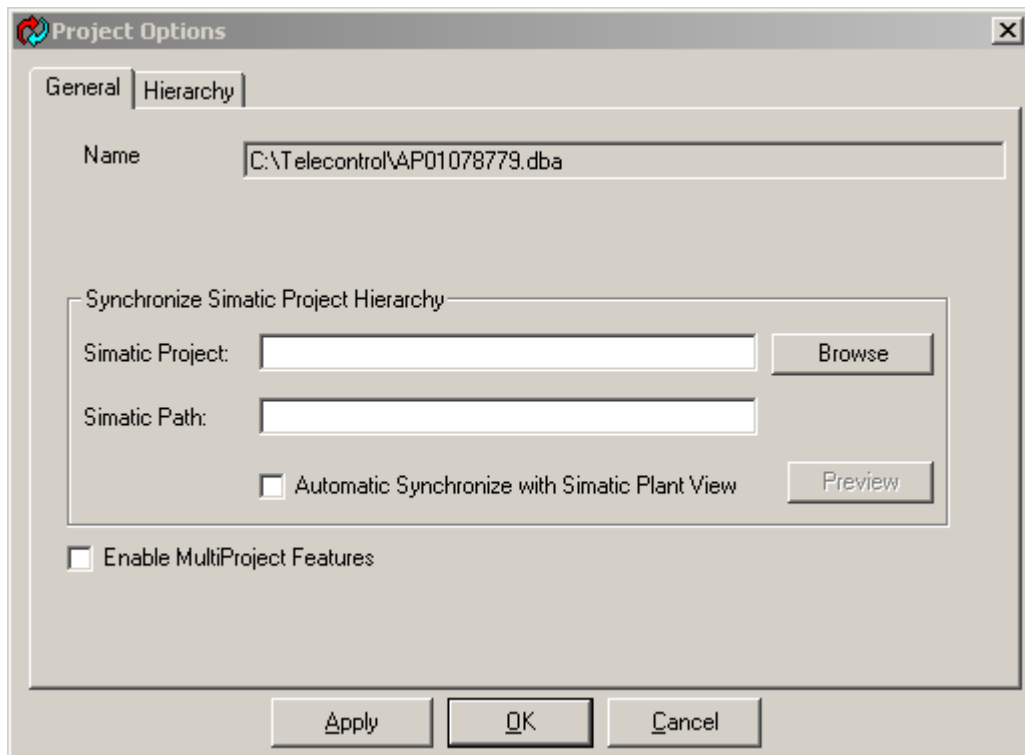
A project becomes a multiproject when you select the "Multiproject" check box, which is made available to you when you

select the "Project Options" button:



Under "Options" select the "Enable MultiProject Features" check box.

The "Project Options" dialog box is displayed when this check box is selected. Select the **Enable MultiProject Features** check box.



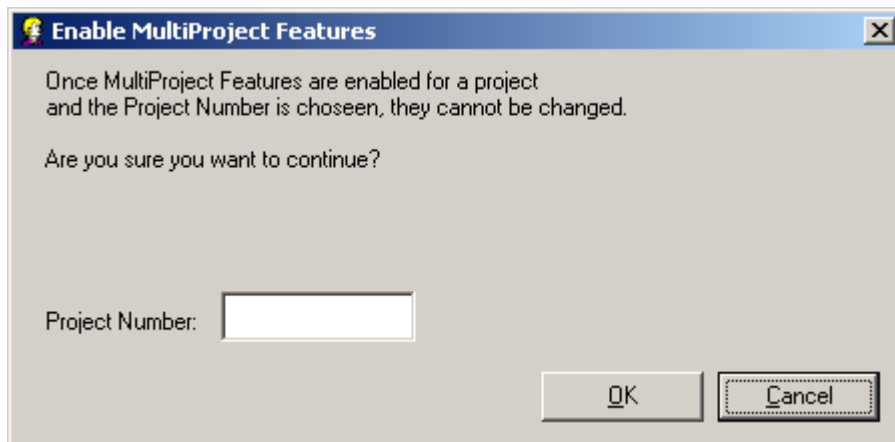
Note

Once multiproject features are enabled for a project, they cannot be disabled. This is why you are prompted to confirm that you actually want to enable this function when you select this check box.

To create a DBA multiproject, follow these steps:

1. Create a DBA project as described in chapter Project Setup (Page 17).
2. Select the project options and select the "Enable MultiProject Features" check box as described above.

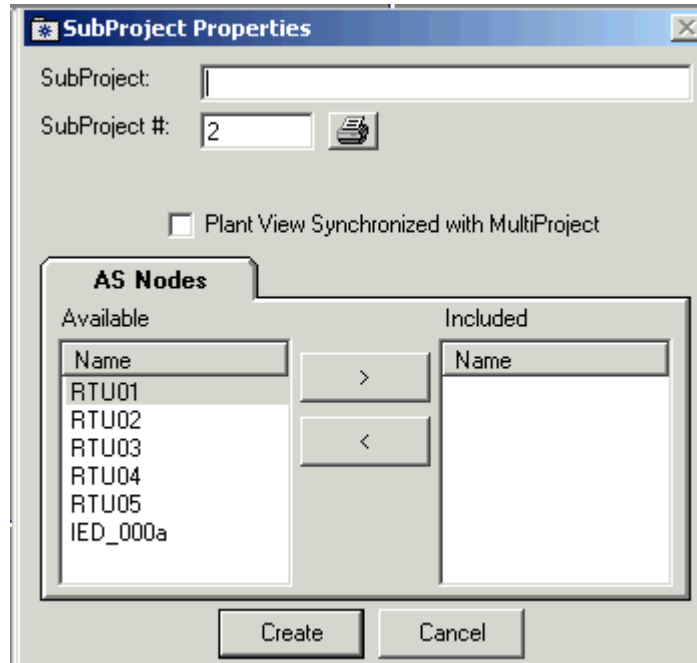
A dialog box opens in which you must enter a project number. Each DBA project (including the multiproject and all subprojects) that is part of a multiproject must have a unique project number in the range from 1 to 32. This is necessary to be able to create unique message numbers for each DBA project.



1. Configure all protocol-specific required global data (such as query groups). You can also configure global data later (or configure them again), but it may be more practical to make this configuration now to simplify engineering of the subprojects.
2. If a single plant hierarchy is synchronized with all subprojects, the complete plant hierarchy can be created at this time. However, this is not required. It is always possible to create nodes as part of individual subprojects in the plant hierarchy. See section Creating subprojects (Page 338).
3. Create all necessary subprojects. The number of required subprojects depends on the how the AS nodes will be divided. You can find out how to create a subprojects in the section Creating subprojects (Page 338).

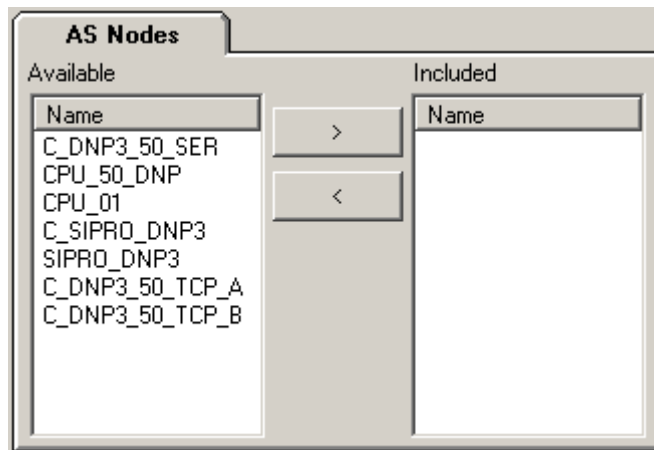
10.11.4 Creating Subprojects

1. To create a SubProject, right click in the AS View area of the Multi-Project and select the option **Add SubProject**:

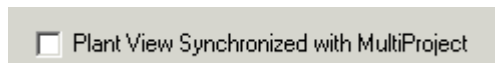


2. Enter a name for the subproject.
3. Enter a unique sub project number. Each DBA project that is part of a Multi-Project must include a unique Project Number in the range of 1 to 32. By default, the next sequential unused number is shown. (To see a report of the currently assigned project numbers, press the printer icon to the right of the sub project number field).

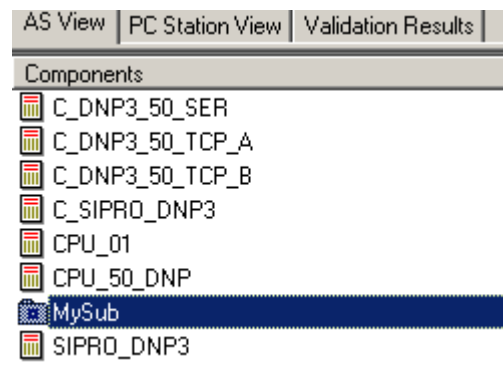
4. Optionally, if there are any AS Nodes that have already been configured in the Multi-Project, these can be moved to the new SubProject when it is being created. Simply use the arrows in the center of the AS Node list to select nodes to be moved to the new Subproject.



5. If you would like to keep the Plant View of the SubProject synchronized with the Plant View of the Multi-Project, select the check box as shown below. This will ensure that any Plant View nodes created directly in SubProject, or in other SubProjects, will be automatically added to the SubProject whenever global data is published (refer to section Managing DNP Clusters (Page 331))



Once your SubProject is created, it appears as a node in the AS View, as shown below:



See also

Creating a DBA Multi-Project (Page 335)

10.11.4.1 Converting an existing DBA project to a DBA Multi-Project

Any existing DBA project can be converted to a Multi-Project simply by adding one or more SubProjects to the project. Refer to section Managing DNP Chains (Page 328) for details concerning the creation of a SubProject.

10.11.4.2 Compiling a DBA Multi-Project

Once all SubProjects have been engineered (refer to Section Engineering Subprojects (Page 343) , Engineering SubProjects), it is necessary to compile the Multi-Project to create the PCS 7 OS Station(s) by combining the object configured in the Multi-Project with all of the objects configured in all of the SubProjects contained in the Multi-Project.

A DBA Multi-Project is compiled in the same manner as single DBA projects, as described in Section Assigning an OS to a Plant View Folder (Page 229).

10.11.4.3 Validation

When a Multi-Project is compiled, a plausibility check is performed to ensure that all AS Node configuration is complete and consistent within each SubProject. Any discrepancy are reported as validation errors, as shown below. Compilation will be stop. In this case, it is necessary to correct all errors in the SubProjects.

Note

Validation errors reported are generally limited to AS Node configuration errors and Plant View assignment errors. Some errors, such as missing AS Object addresses, are detected and reported during individual SubProject compilations and will be reported in the compilation log.

10.11.4.4 Type Definition Validation

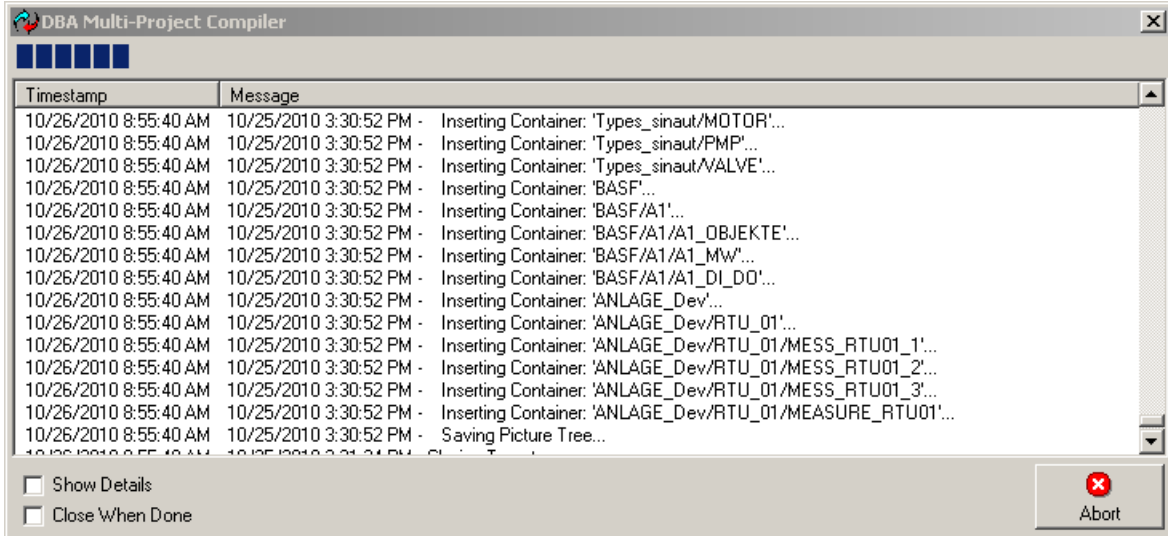
During the validation step, the revision level/timestamp of the DBA object types of all SubProjects and the Multi-Project are checked. The following cases are possible:

- An object type has been updated in exactly one SubProject (or in the MultiProject). In this case, the updated type will be installed into all SubProjects and the master project prior to the compilation proceeding.
- A new object type has been detected in exactly one SubProject (or in the Multi-Project). In this case, the new type will be installed into all SubProjects and the master project prior to the compilation proceeding.
- A type has been update or created in two or more SubProjects, or one or more Subprojects and in the Multi-Project. In this case, a validation error is reported and the compilation will be halted. To successfully complete the compilation, it is necessary that the conflict be manually corrected. This can be done by choosing which one of the multiple versions of the type is the desired version. The DBA Type Editor can be used to export the desired type and to import this type to all other SubProjects.

10.11.4.5 Compilation Process

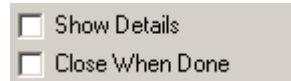
When a MutliProject is compiled and there are no validation errors, the compilation will advance through the following steps:

1. The DBA Multi-Project is closed and the MutliProject Compiler (MPC) Log window is opened, on top of all applications, to record any output messages from the compilation window and to show the compilation progress.



Note

There are two checkboxes that control this log window:



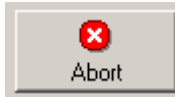
A - Check **Show Details** to see all Log Messages. Uncheck to show only the progress bar.
B- Check **Close When Done** to automatically close the Log Window when compilation is complete (unless there are errors).

2. Publishing of Global Data. This step is required to synchronize the Multi-Project and all SubProjects prior to compilation. Refer to section Publishing Global Data (Page 348) for details regarding the Publishing process.
3. Multi-Project Compile, Phase 1 – During this step, any AS Nodes that have been configured in the Multi-Project itself (i.e., not part of a SubProject) are compiled. All compilation steps, as well as any errors, are output to the MPC Log window.
4. SubProject Compile – each SubProject is compiled in turn. All compilation steps, as well as any errors, are output to the MPC Log window.

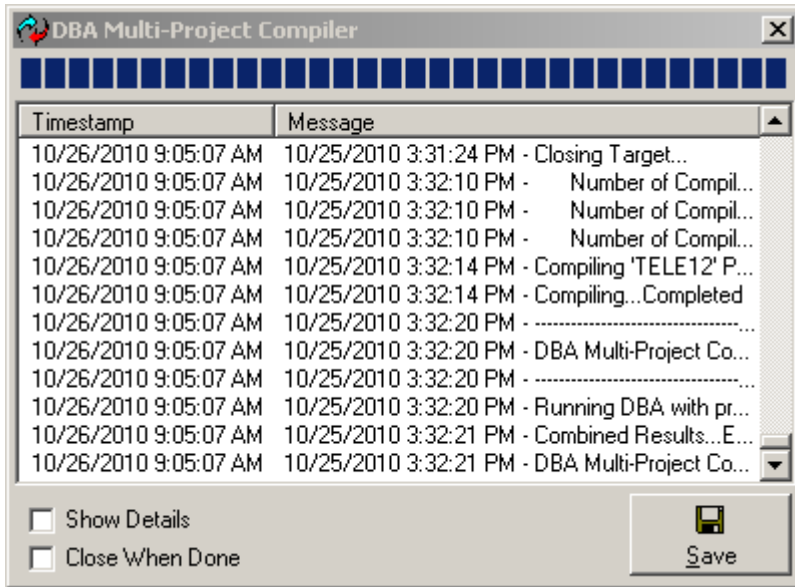
- 5. Multi-Project Compile – Phase II – During this step, the Plant View is created or updated.

Note

At any time during the compilation, press the **Abort** button to stop the Multi-Project compilation.



- 6. The DBA Multi-Project is re-opened. If the **Close When Done** checkbox is unselected, the MPC Log Window remains so that the log can be examined and/or saved. Press the **Save** button to save the log.



Note

When moving AS Nodes between as Subproject and Multi-Project, it is necessary that related AS Nodes are moved together. For example, if a connecting device such as a central TIM is being moved, all connected RTU's must also be moved. The move operation will not be completed (and an error message reported) if an attempt is made to move an AS Node without one or more related AS nodes.

Note

After an AS is moved from a sub-project to the Multi-Project, a full compile of the Multi-Project will be required.

10.11.5 Engineering Subprojects

When SubProjects are created, they automatically include the configuration of all Global Data, which is configuration data that is shared by all SubProjects, such as PC Stations. (Refer to section Configuring Modbus Polling Schedules (Page 320) for details concerning Global Data).

Further engineering steps are required, however :

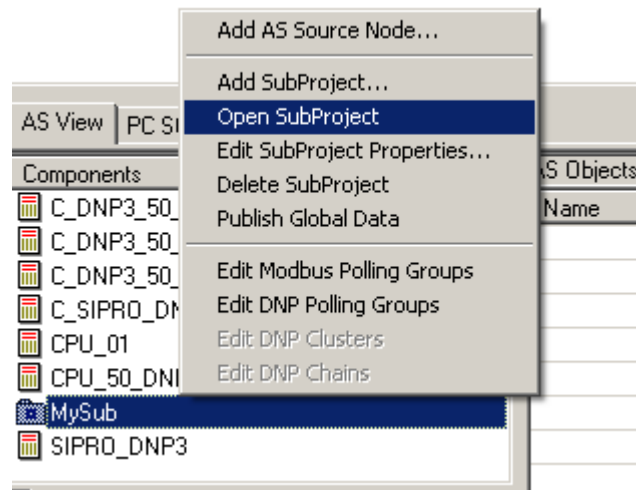
- AS Node Configuration, including AS Object creation
- Assigning AS Objects to the Plant View
- (Optionally) Creating Pictures

The engineering steps required will depend upon whether the engineering mode is local or remote.

10.11.5.1 Engineering Subprojects in Local Engineering Mode

In local engineering mode, the Multi-Project and SubProjects are all engineered from the same ES. From the Multi-Project, it is only necessary to open a SubProject and begin editing.

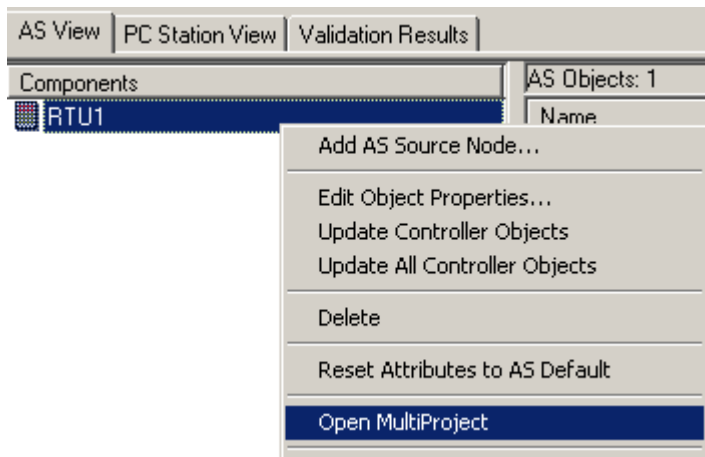
If the Multi-Project is opened, a you can easily switch to a SubProject by right clicking on the SubProject and selecting **Open SubProject**.



Note

An additional shortcut is provided : While holding the shift key down, simply double-click on the SubProject in the AS View list and the Multi-Project is closed and the SubProject is opened.

A shortcut is also provided to close the SubProject and re-open the Multi-Project, by right clicking any AS Node in the SubProject and selecting **Open Multi-Project**

**Note**

An additional shortcut is provided : While holding the shift key down, simply double-click on any AS Node in the AS View list and the SubProject is closed and the Multi-Project is opened.

10.11.5.2 Engineering Subprojects in Remote Engineering Mode

Remote Engineering mode allows simultaneous editing of different SubProjects on different ES Stations. This can be done in two ways:

1. By using network shares to access data across a Local Area Network. This is useful if all of the engineers working on the various SubProjects are co-located. In this mode, to perform engineering steps for a SubProject from another ES, it is only necessary to use DBA to open the SubProject remotely using the configured network share.
2. By temporarily copying SubProject files to other ES stations, such as a stand-alone laptop, for engineering.

In this mode, some care must be taken to prepare for engineering. The following steps should be followed.

- copy the DBA SubProject to another ES, using a network connection or portable media. SubProject files are stored in the same directory as the Multi-Project on the ES station. The name of the SubProject is the same as the file name. For example, if a SubProject is created called "NorthSide", the corresponding DBA file for this SubProject is "NorthSide.DBA" and can be found in the same directory as the MultiProject.
- Perform whatever engineering steps are required on this SubProject remotely.

- Copy the changed SubProject DBA file back to the ES that contains the MultiProject.
- If changes have been made to the Pictures remotely, it will be necessary to also copy any changed PDL files created on the remote ES from the WinCC Project on the remote ES to the WinCC Project on the Multi-Project ES.

Note

When the Plant View is shared by multiple SubProjects, it is possible that picture files might be theoretically edited remotely simultaneously by multiple engineers. Care must be taken to coordinate such activities. Also, additional preparation steps might be required to copy such shared PDL's to the remote ES prior to further SubProject engineering.

10.11.6 Adding AS Nodes

AS Nodes can be added to a SubProject in standard way, as described in chapter AS View (Page 23). In addition, it is possible to move existing AS Nodes that are defined in the Multi-Project into a SubProject.

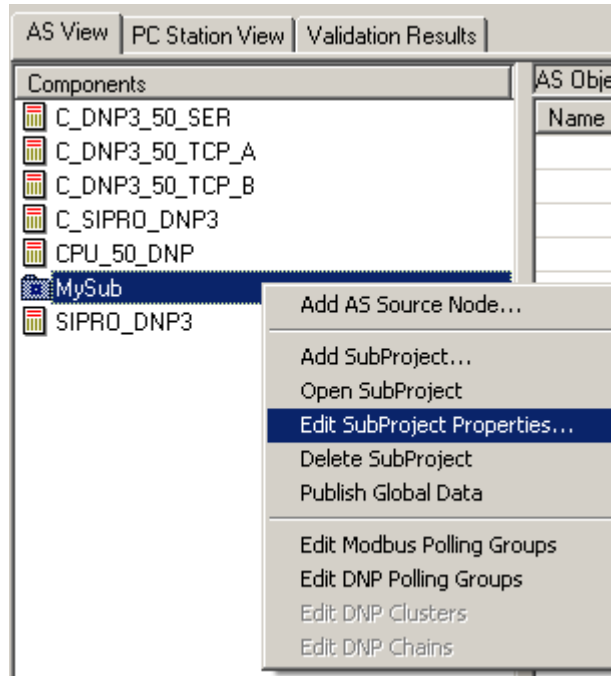
10.11.6.1 Moving AS Nodes Between the Multi-Project and a SubProject

AS Nodes can easily be moved between the Multi-Project and a SubProject.

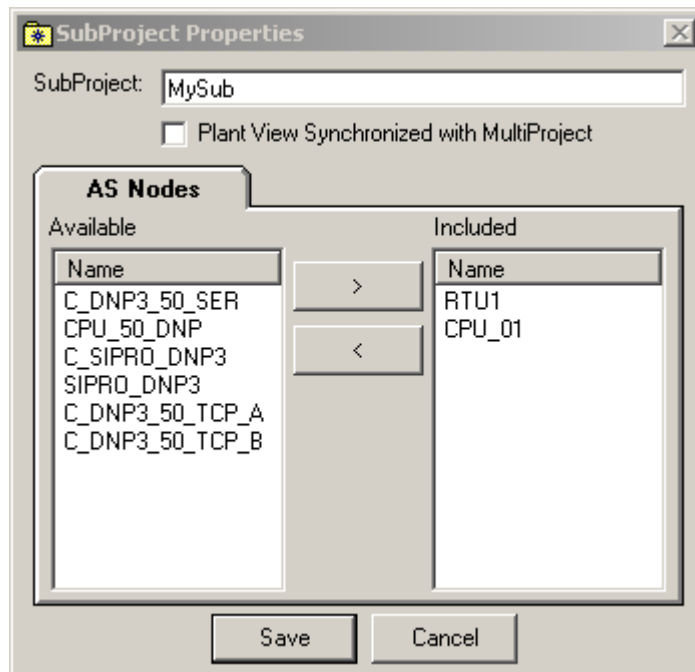
Note

In the following procedure, if you are Engineering Subprojects in Remote Mode and the SubProject has been copied to an ES Station that is different from the Multi-Project, it is first necessary to copy the SubProject back to the Multi-Project's ES station.

1. From the Multi-Project, double-click on a SubProject, or right click on a Subproject and select **Edit SubProject Properties**. This will show the SubProject Properties dialog.



2. AS Nodes that are currently part of the Multi-Project are shown on the left, and AS Nodes that are currently part of the selected SubProject are shown on the right.



3. To move an AS from the Multi-Project to the SubProject, select a node from the AS list on the left and select the right arrow in the center of the two lists.
4. To move an AS from the SubProject to the Multi-Project, select a node from the AS list on the right and select the left arrow in the center of the two lists.

5. Select **Save** to start the move, or **Cancel** to exit the dialog without moving any AS Nodes.
6. A progress dialog logs the status of the move operation.

See also

Engineering Subprojects in Local Engineering Mode (Page 343)

10.11.6.2 Managing the SubProject Plant View

The SubProject Plant View is managed in the normal way, as described in chapter Plant View (Page 203). Any Plant View nodes that are added within the SubProject, will automatically be merged with the Multi-Project the next time the Multi-Project is compiled or Global data is manually published. The reason for this is that the Plant View of the Multi-Project is always maintained as the combination of all Plant Views of all SubProjects.

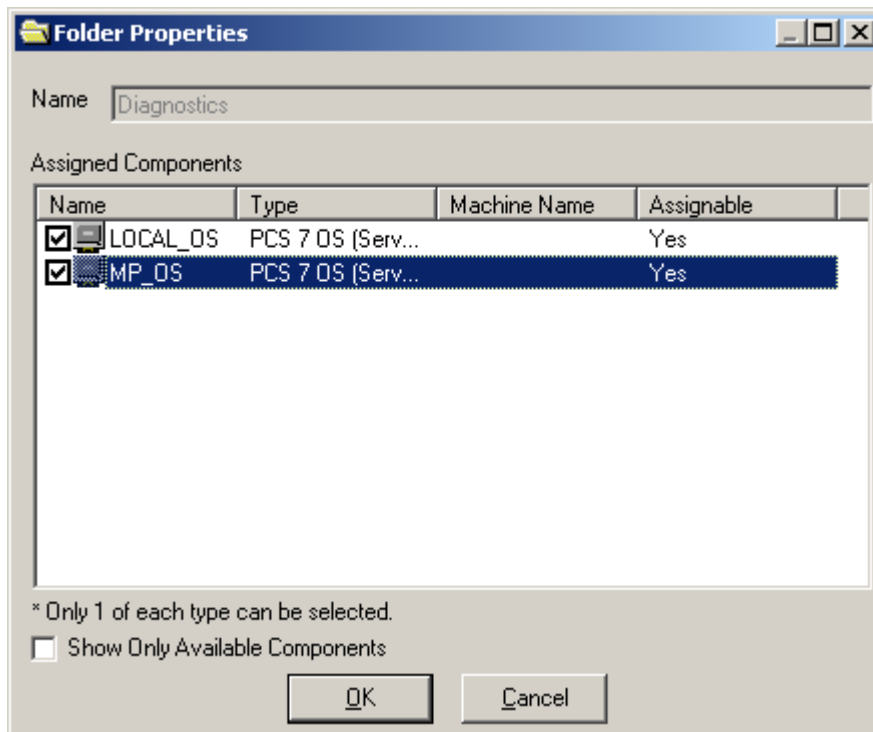
If you change the OS Assignment of a Plant View node in the SubProject, this may also be changed in the Multi-Project, but only if there are no other SubProjects that are using the assignment.

10.11.6.3 Compiling a DBA SubProject locally

It is possible to initiate test compilation of SubProjects in a "stand-alone" way as part of supporting the engineering process. This allows all testing to be conducted before the SubProject is considered "ready" for Multi-Project compilation.

In order to compile a SubProject locally, it is necessary to set create a PC Station and corresponding WinCC Application for the local PC. Normally this will represent a second PC Station, the first being the Multi-Project's PC Station that was published to the SubProject. Refer to chapter PC Station View (Page 189), PC Station View for details regarding the creation of a PC Station and applications.

It is also necessary to assign Plant View folders to the local PC Station's WinCC application. Normally, Plant View folders will be assigned to the Multi-Project's WinCC application. However, for local testing, it is also necessary to assign Plant View folders to the local WinCC application. When you right click a folder and select **Edit Folder Properties**, a list of available WinCC Applications for assignment is shown. In the case of a Subproject, the Multi-Project application is shown in addition to the local application, as shown below. For local testing of a subproject, it is necessary that the Local application be checked for all folders that contain object instances to be tested prior to compiling the project.



10.11.7 Publishing Global Data

It is usually necessary to have access to global data within a SubProject in order to perform other editing functions within the SubProject. All necessary global data is automatically stored with the SubProject when it is created.

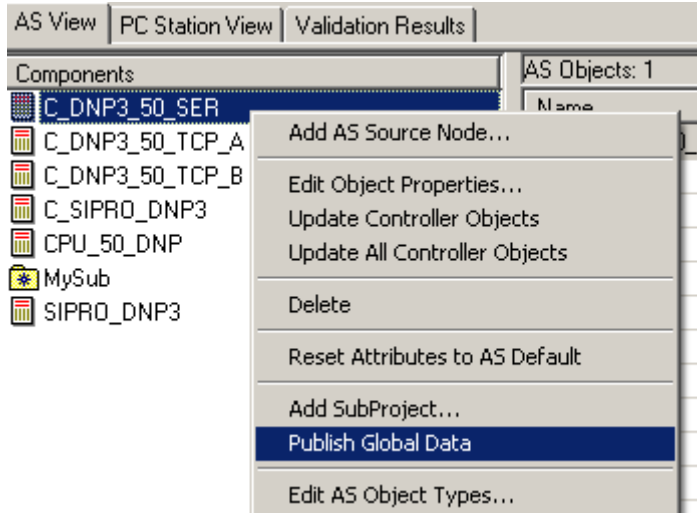
Global Data is also updated (or "Published") each time the Multi-Project is compiled and can be published manually from the Multi-Project.

To publish data manually, follow this procedure:

Note

If you are using Remote SubProject engineering and have copied the SubProjects to other ES stations, be sure that all SubProjects are copied back to the Multi-Project ES station, in the same directory as the Multi-Project, before executing this procedure.

1. Right click on any AS Node in the Multi-Project and select **Publish Global Data**.



2. A progress window is shown, logging all publish steps. This allows you to see what Global Data changes are being propagated to all SubProjects.

