Advant Controller 31

Intelligent Decentralized

Automation System

Example program for 907 AC 1131

OPC server

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ABB STOTZ KONTAKT

1. Which components are required?

Hardware components:

- 1 x basic unit (07 KT 96, **07 KT 97**, 07 KT 98)
  or
  2 x basic unit (07 KT 96, **07 KT 97**, 07 KT 98)
- 1 x power supply unit 24 V DC (e.g. **07 NG 34**)
- 1 x ARCNET cable incl. two terminating resistors (with 2 or 3 connections)

Software:

- 1 x programming software for the basic unit 907 AC 1131
- 1 x CoDeSys OPC server

Caution:
This example requires the OPC server and the gateway which are contained on version 4.3 or higher of the 907 AC 1131 CD.

- 1 x client test software (e.g. Matrikon OPC Explorer)
- 1 x example program(s) for the basic unit (BSP_OPC_N1.PRO or possibly BSP_OPC_N2.PRO)

Miscellaneous equipment for programming:

- 1 x PC (see 907 AC 1131 part 2, OPC server documentation)
- 1 x documentation: - 907 AC 1131 part 1 (hardware and system technology)
  - 907 AC 1131 part 2 (programming and libraries)
  - 907 AC 1131 part 2 (OPC server)

In the following description you will find several references to the documentation.

2. General

The OPC server is used to read process data from the configured basic units and to make them available for a client software (e.g. visualization software). The variables read from the basic units by the OPC server are called items. Refer to 907 AC 1131 documentation, part 2 (OPC server).

To create an OPC configuration the following steps have to be performed:

- Creating the 907 AC 1131 project:
  Generating the symbol file.
  Sending the program to the basic unit and storing it in the flash memory (copying the symbol file to the gateway), see also 907 AC 1131 documentation, part 2 (programming).
- Configuring the OPC server.
- Planning the client.

In our example we used the client test software Matrikon OPC Explorer for testing. This software can be found on our CD (MatrikonOPCsim.EXE) or downloaded via the Internet from the website www.matrikon.com/drivers/opc/explorer.asp. The link refers directly to the download area. Simply click on the button "Free Download", fill in the registration form and start the download.

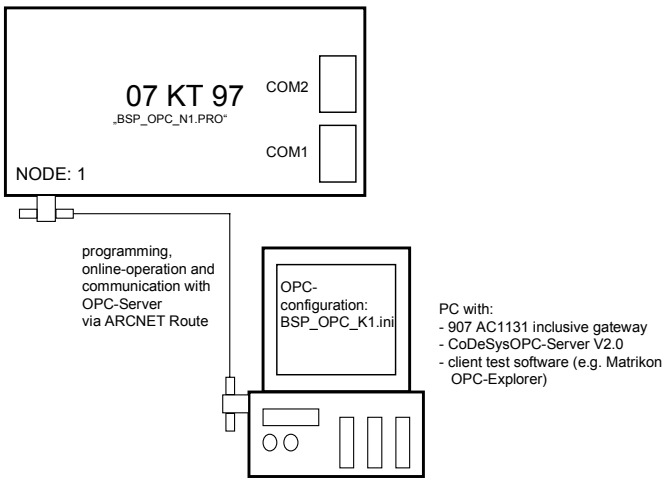
After the download is finished, execute the file "MatrikonOPCsim.EXE" and follow the setup instructions. Refer to section "Planning the client" for further information about this software.

3. Configuration

Our OPC example program can be used for one subscriber as well as for multiple subscribers. We already prepared two configurations for you.

Configuration 1: OPC with one subscriber via ARCNET:

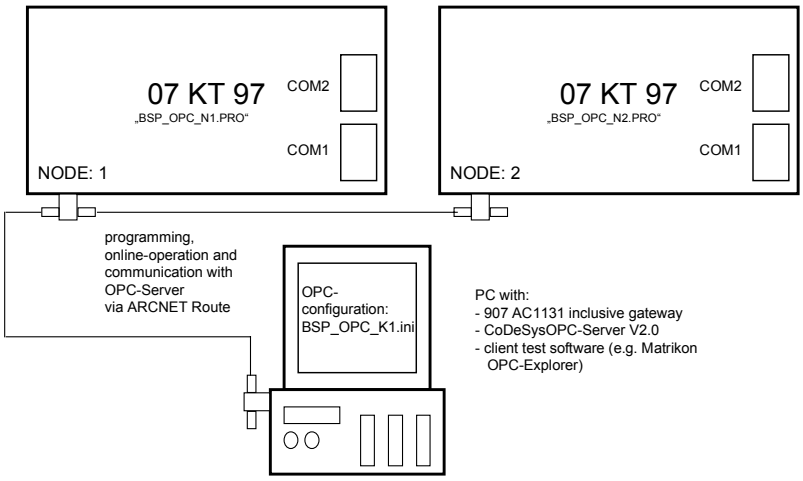
This application uses one PLC which is connected to the PC via an ARCNET network. The PLC is set to node address 1. The example program BSP_OPC_N1 is downloaded from the PC into the basic unit via ARCNET. On the same PC the client software and the OPC server are started.



OPC with one subscriber via ARCNET

Configuration 2: OPC with two subscribers via ARCNET:

This application uses two PLCs which are connected to the PC via an ARCNET network. One PLC is set to node address 1 and the second PLC is set to node number 2. From the PC the example programs BSP_OPC_N1 and BSP_OPC_N2 are downloaded into the corresponding basic units. On the same PC the client software and the OPC server are started.



OPC with two subscriber via ARCNET

Further configurations:

This example program can be used very flexibly. You can download it to several basic units and communicate using different drivers. For this purpose, download the example program to the basic unit (and store it to the flash memory). Then use the menu item "Connection" to set the OPC configuration to the same gateway channel you used when downloading the program.

For example:

Basic unit	**907 AC 1131** **Communication parameters**	**OPC configuration**
PLC 1	BSP_OPC ARCNET Route Node1	PLC1 ARCNET Route Node 1
PLC 2	BSP_OPC ARCNET Route Node2	PLC2 ARCNET Route Node 2
PLC 3	BSP_OPC ABB RS232	PLC3 ABB RS232
PLC 4	BSP_OPC ARCNET Route Node10	PLC4 ARCNET Route Node 10

4. Short description for commissioning

4.1. Commissioning configuration 1

1. Set the ARCNET address (node 1) at the basic unit.
2. Connect the ARCNET cable between basic unit and PC.
3. Supply the basic units with 24 V DC (power supply unit) and switch them on.
4. Copy the example program "BSP_OPC_N1.PRO" to the PLC using the programming software 907 AC 1131, store it in the flash memory and start the program.
5. Load the OPC configuration and save it.
6. Start the client software and configure the items.
7. Test the program.

4.2. Commissioning configuration 2

1. Set the ARCNET addresses (node 1 and node 2) at the basic units.
2. Connect the ARCNET cable between the basic units and the PC.
3. Supply the basic units with 24 V DC (power supply unit) and switch them on.
4. Copy the example programs "BSP_OPC_N1.PRO" and "BSP_OPC_N2.PRO" to the PLCs using the programming software 907 AC 1131, store them in the flash memories and start the programs.
5. Load the OPC configuration and save it.
6. Start the client software and configure the items.
7. Test the program.

5. The following steps have to be carried out

5.1. Setting the ARCNET addresses at the basic units

For configuration 1 only basic unit 1 is required. In configuration 2 both basic units are used. First, the ARCNET addresses (NODE numbers) have to be set at the basic units.

Basic unit 1: Basic unit 1 is identified as NODE number 1. For this, set DIL switch 8 to ON; all other switches remain in the OFF position.

Basic unit 2: Basic unit 2 is identified as NODE number 2. For this, set DIL switch 7 to ON; all other switches remain in the OFF position.

5.2. Establishing the ARCNET cable connection between the basic units

Please use a coaxial cable with a characteristic impedance of 93Ω. At both cable ends a terminating resistor of 93Ω has to be installed (refer to documentation 907 AC 1131 part 1, ARCNET descriptions). Connect this cable to the corresponding connectors at the basic units and the PC.

5.3. Supplying the basic unit with 24 V DC (power supply unit) and switching it on

Now the devices have to be supplied by 24 V DC.

At the basic units 0 V has to be connected to terminal (M) and 24 V DC to terminal (L+). (See documentation 907 AC 1131 part 1, basic units, connection of supply voltage.)

5.4. Copying and starting the example program for the basic units

For copying the example programs make sure that the basic units are supplied with voltage, that the ARCNET cable between the basic unit and the PC is connected, that the ARCNET adapter is installed in the PC and that the PC is running.

For configuration 1: The program "*BSP_OPC_N1*" has to be downloaded to PLC 1 (node 1) and stored in the flash memory.

For configuration 2: The program "*BSP_OPC_N1*" has to be downloaded to PLC 1 (node 1) and stored in the flash memory. Program "*BSP_OPC_N2*" has to be downloaded to PLC 2 (node 2) and stored in the flash memory. The following description starts with PLC 1.

First, start the 907 AC 1131 programming software on the PC. Then, continue as follows:

- Open the example program "*BSP_OPC_N1*" by selecting the menu item *<File>* *<Open>*.

- Prior to sending the example program to the basic unit, it has to be compiled. For that purpose press *<F11>*.

- Now the communication parameters have to be installed. Using the menu item *<Online>* *<Communication parameters>* the corresponding interface parameters can be set. In our example the driver ABB ARCNET Route Node 1 (*Sender node: 254; Target node: 1; Receive Timeout: 2000; Routing levels 0*) was set.

  Note
  If you are using another communication driver, please make sure that the same communication channel is also set in the OPC configuration.

- In the menu *<Online>* *<Login>* you have to activate the sending process. Confirm the information about the existing program stored on the PLC with *OK*.

- Now you are asked "The program was changed! Do you want to load the new program?". Answer this question with *Yes* to load the entire program.

- Store the program in the PLC by selecting the menu item <Online><Create boot project (flash)>.

  Note
  It is important to carry out this step because the OPC server compares the program identifiers in the gateway with those in the PLC. If they do not match, no update of the items (variables) is performed.

- Finally, start the program by pressing *<F5>*.
  The program is running.

- For configuration 2 repeat the described steps using the example program "BSP_OPC_N2".

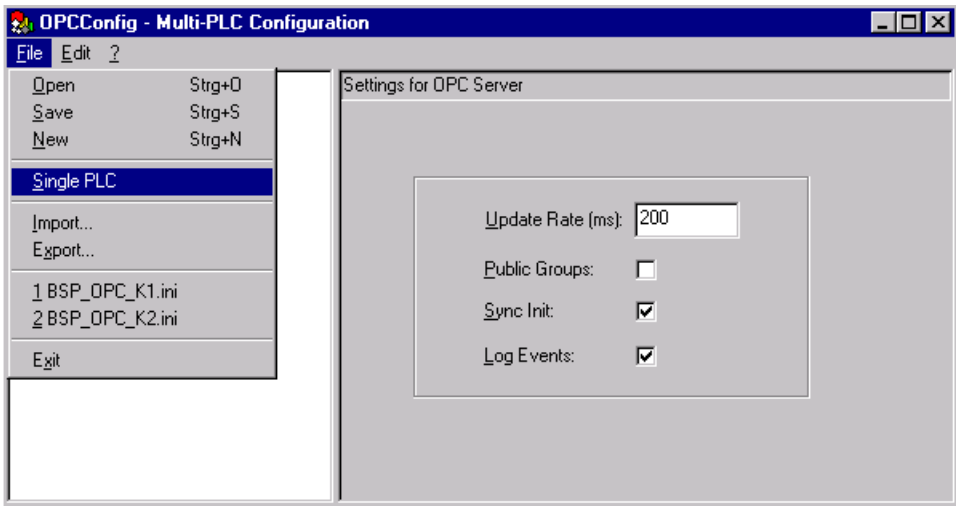
(See documentation 907 AC 1131 part 2, software description, project management and general online functions.)

5.5. Loading and saving the OPC configuration

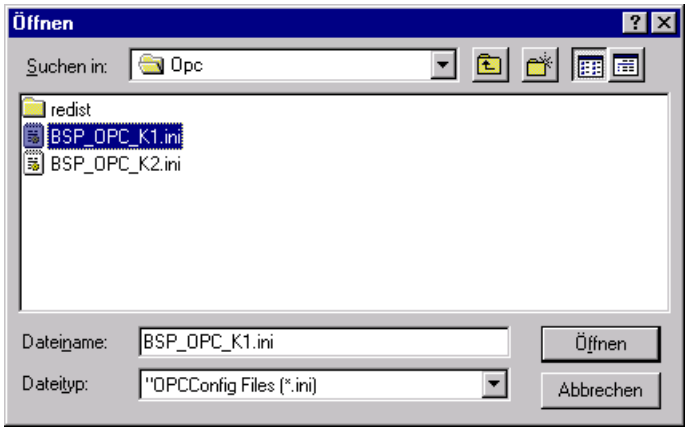
The next step is to configure the OPC server. In the configuration it has to be specified from which basic unit(s) the items (variables) have to be updated and which communication channel has to be used.

Start the configuration menu by executing the file "OPCConfig.exe".

The OPC example was created as a multi-PLC configuration. Open the <File> menu and set the menu item <Single PLC> to multi PLC mode (no checkmark).

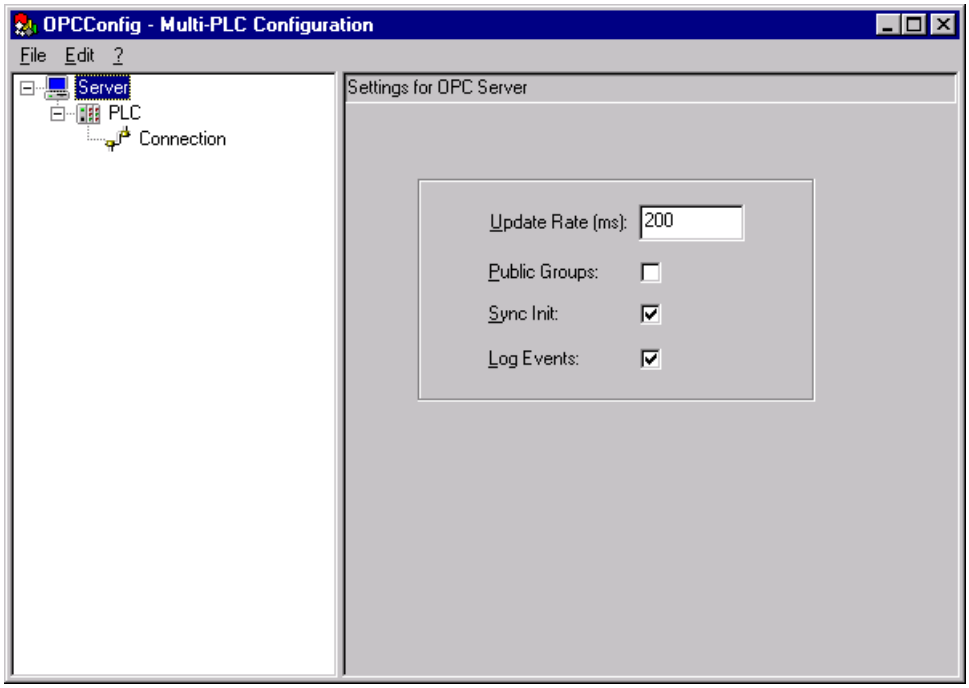


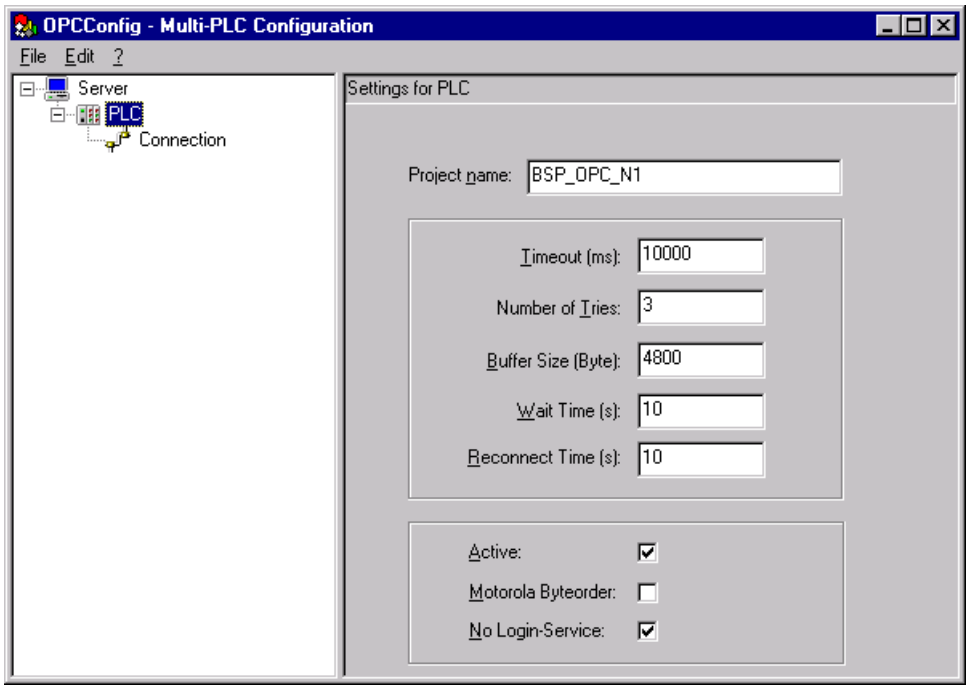
Then select <File><Import...> to start the import of the example configuration. In the <Open file> dialog, select the file "BSP_OPC_K1" for configuration 1 or "BSP_OPC_K2" for configuration 2 and confirm your selection by clicking on the <Open> button.

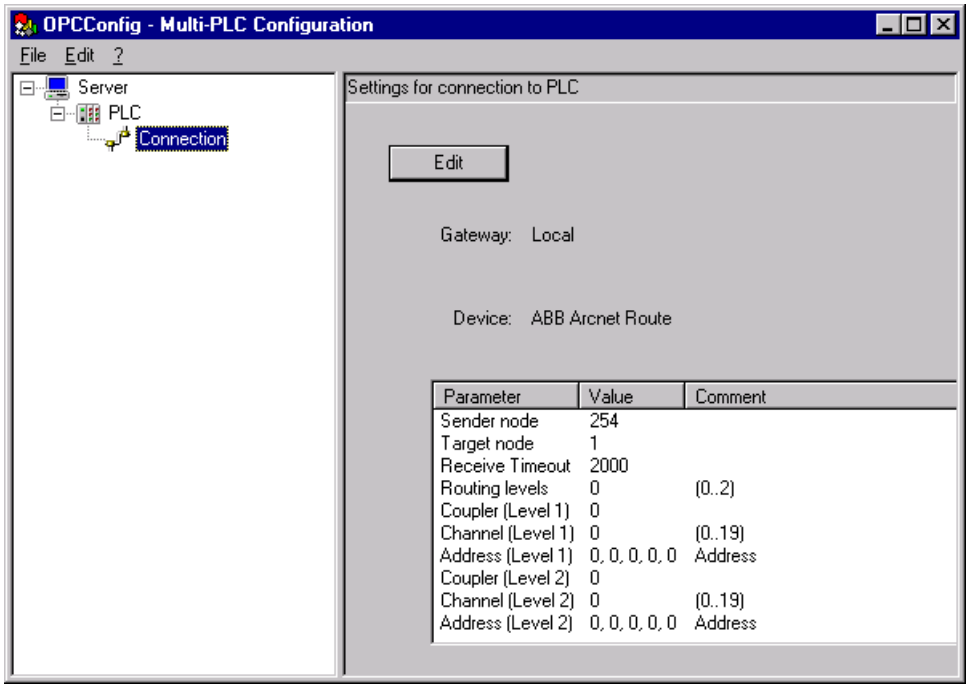


The configuration is now loaded. Verify the parameter settings.

The following example shows the settings of configuration 1.







Finally, save the current settings by selecting the menu item <File><Save> and then leave the OPC configuration with <File><Exit>.

5.6. Planning the client

The planning of the client depends on the used software. In principle, the following procedure is applicable:

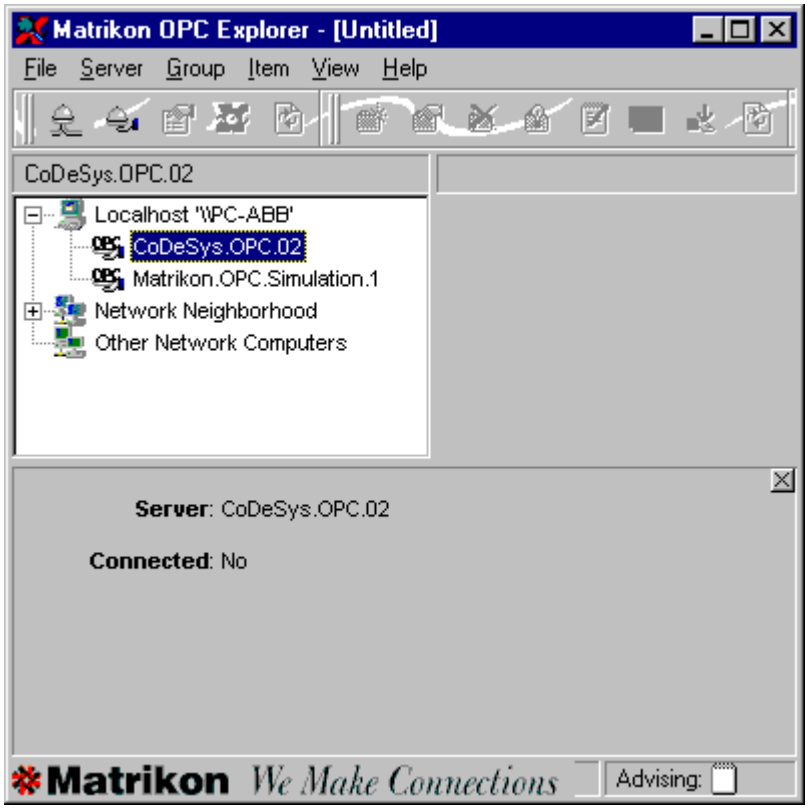
- Connecting the current OPC server:
  First, the connection to the OPC server has to be established. Select "CoDeSys-OPC-Server V2.0" from the available OPC servers and start it with "Connect".

- Creating the groups:
  All items (variables) to be updated at the same time are summarized in one group. For our example the creation of one group is sufficient.

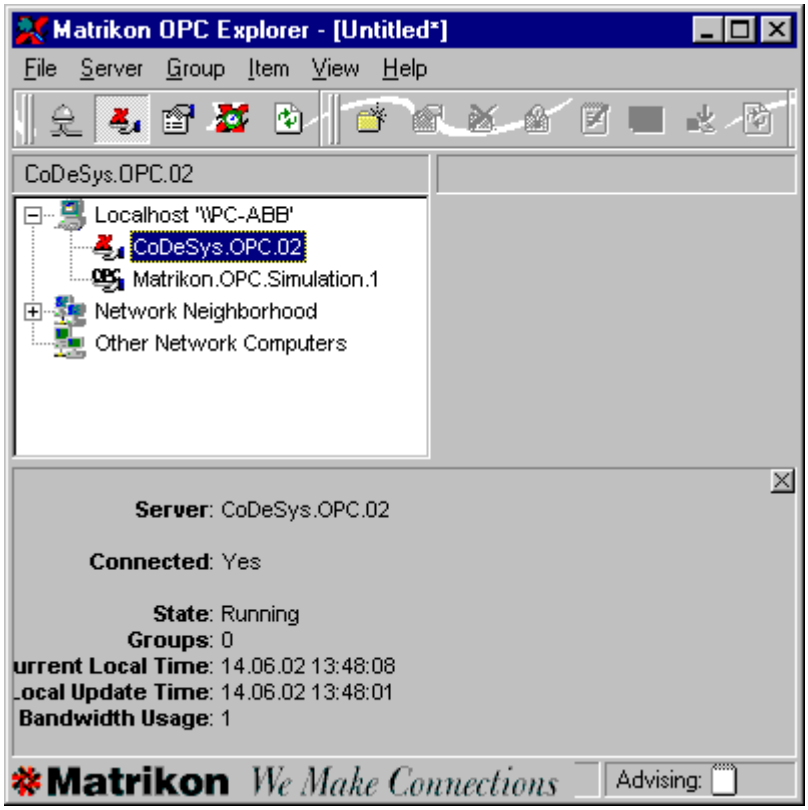
- Selecting the items (variables):
  Finally, the items (variables) for the selected group have to be inserted. For this purpose, select the desired group and insert the items. A list with all available items is opened. This is only possible if the client is in contact with the OPC server and the communication between the OPC server and the configured basic units is established. The items are displayed with their full names in the list (e.g. PLC1.PLC_PRG.MW05_00).

Below, this procedure is described for the recommended client test software "Matrikon OPCExplorer".

- Start the client software by executing "OPCExplorer.exe".



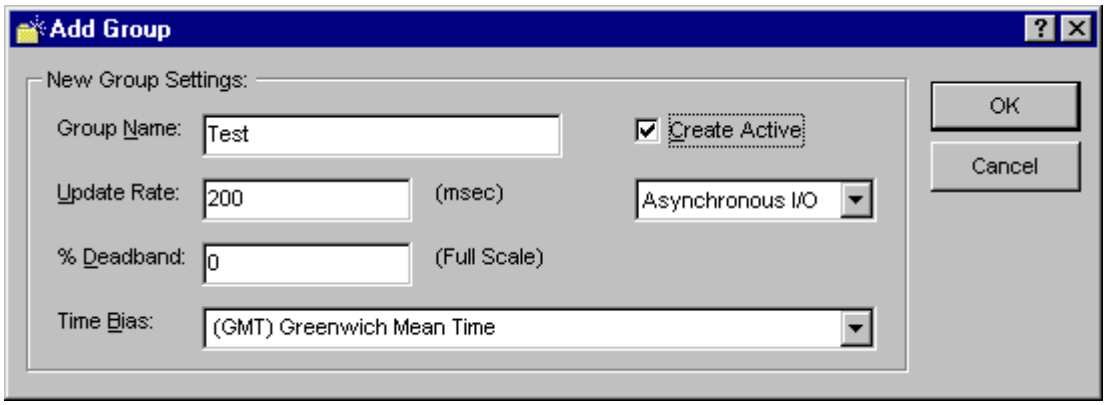
- In the left window area, select "CoDeSys-OPC-Server 2.0" and start it with a double click. The client will then establish the communication with the OPC server. A corresponding status message is displayed in the lower left window area. The status message "State: Running" indicates that the OPC server has been started successfully.



If the status message "State: Not Configured" is displayed, the OPC server is not able to establish communication with the basic unit(s). In this instance the set communication driver and the project name has to be checked. Possibly the program must be transmitted once again to the PLC using 907 AC 1131 and stored in the flash memory.

Note
Close (disconnect) the OPC server before setting the configuration. You can start the OPC server again after you have saved the configuration.

- If the connection to the OPC server has been established successfully, create a group named "Test". For this purpose, select the menu item <Server><Add Group>.



Enter the name "Test" into the <Group Name> field. Then set the <Update Rate> to 200 (200 ms). Confirm your settings with <OK>.

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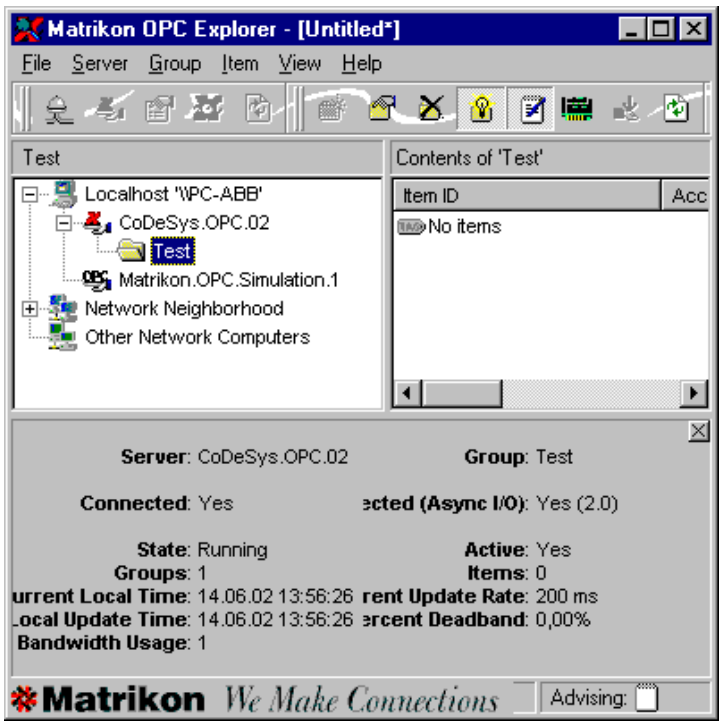
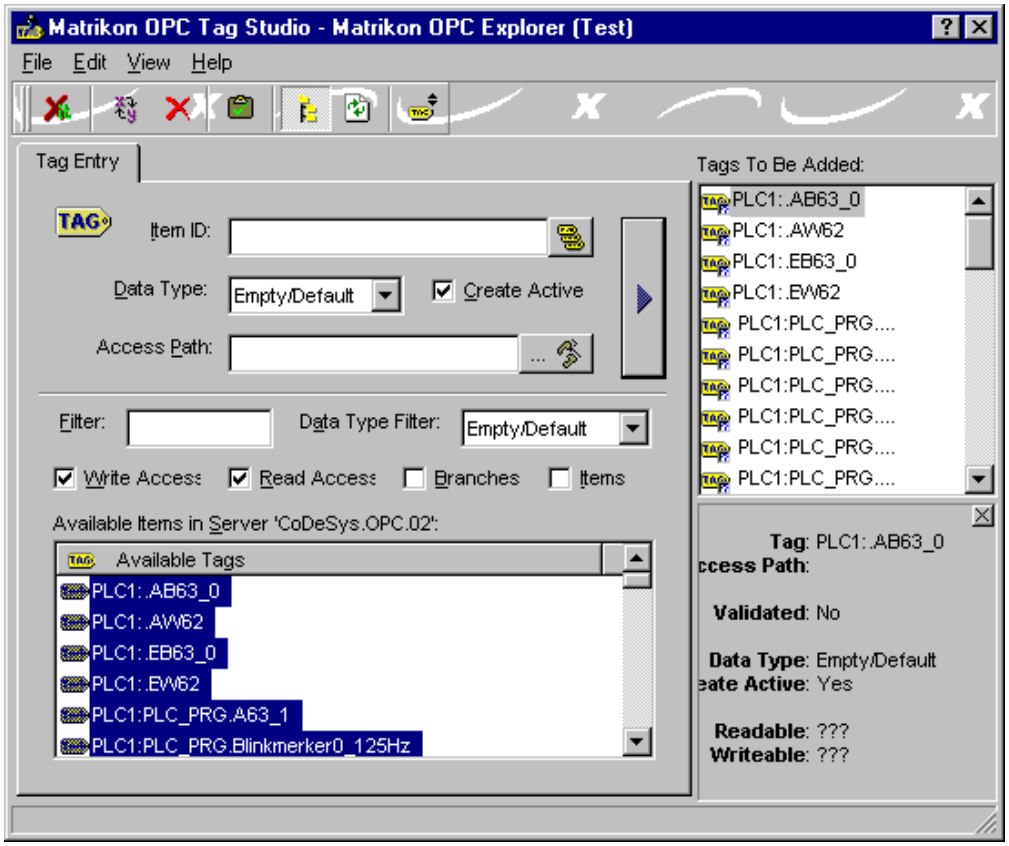
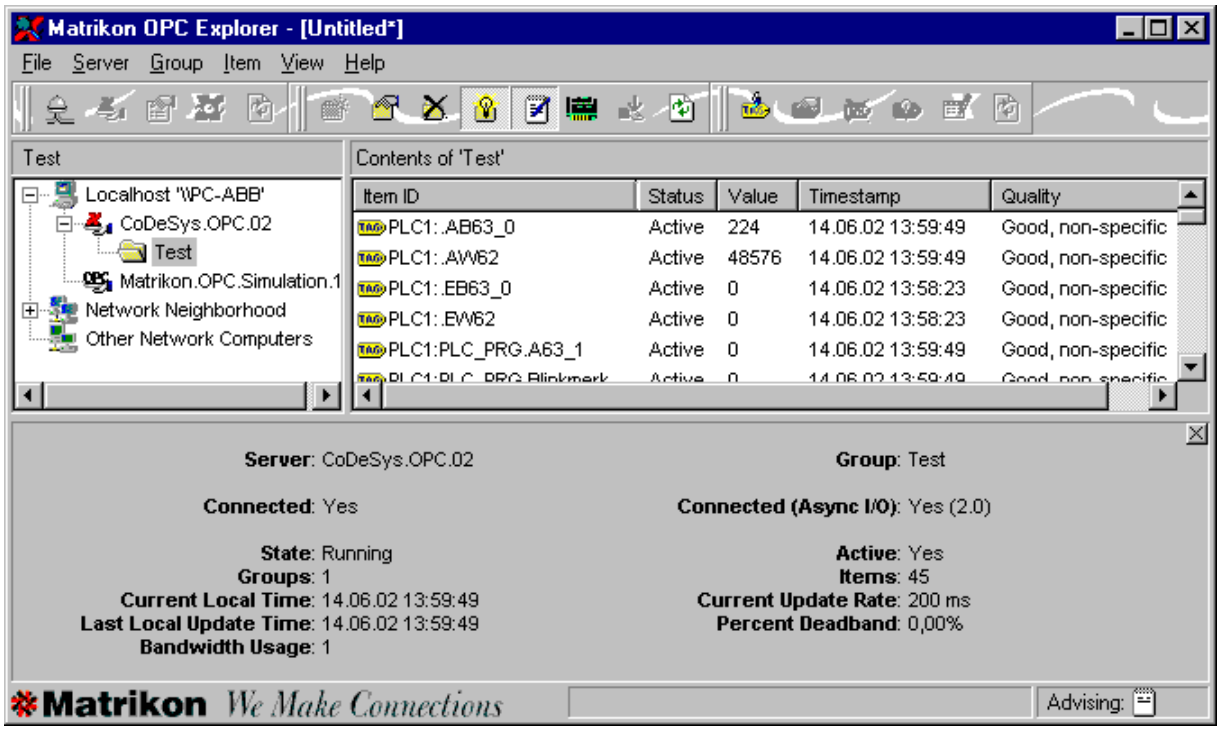


- Now the items (variables) have to be selected. Select the group "Test" and call the menu item <Group><Add Items>. A new window appears listing all available active items.
  Right click into the <Available Items> window. Select <Add All Items to Tag List> from the appearing menu. Then, all items are entered into the right window area <Tags To Be Added>.



Exit the selection with the menu item <File><Close>. Answer the question "Update OPC Group (test) with current item list" with <YES>.

- Now all items are listed in your project window. If the quality status "Good" is displayed for the items, the communication is running. The items are continuously updated (update rate: every 200 ms).



6. Functional description

The example program contains various variables to be read by the OPC server from the basic unit and displayed in the client software. The individual variables are animated to enable the value monitoring.

Program 2 consists of 2 parts. PLC_PRG is the main program which contains counters and flashing lights. The subprogram "Datenspeicher" serves for storing the counting values in an ARRAY.

To enable the display of the individual variables in the client software, these variables must be stored in a symbol file. This symbol file is stored in the gateway when transmitting the program. The symbol file in the gateway is later accessed by the OPC server. The corresponding setting is done using the menu item <Project><Options><Symbol configuration><Configure symbol file>. In our example the variables of the blocks PLC_PRG, Datenspeicher and Globale_Variablen/Globale_Variablen are stored in the symbol file.

For illustration purposes, two visualizations have been created (OPC_Test, OPC_Liste). On the page OPC_Test the individual items are visualized. In the OPC_Liste all items are listed one after the other, in the same order as they are displayed in the client.

Note
The OPC server or client can be operated simultaneously with the 907 AC 1131 software. This allows a concurrent value observation in the visualization of the programming software and the client.