

User's Manual [For ICP DAS XPAC]

(Supports 7000, 8000, 87000 series modules and modbus devices)



OPC®, the OPC-Logo and OPC<sup>™</sup> Foundation are trademarks of the OPC Foundation. (www.opcfoundation.org) Microsoft®, Microsoft .NET<sup>™</sup>, VisualStudio.NET<sup>™</sup> and Microsoft Windows<sup>™</sup> are trademarks of the Microsoft Corporation (www.microsoft.com)

#### **Table of Contents**

| 1 NAPOPC_XPE DA Server                              | 4   |
|---|-----|
| 1.1 Installing NAPOPC_XPE DA Server                 | 5   |
| 1.2 Uninstalling NAPOPC_XPE DA Server               |     |
| 1.3 File  | 7   |
| 1.4 Searching Modules                               | 10  |
| 1.5 Monitoring Devices                              | 14  |
| 1.6 Adding A New Device                             | 15  |
| 1.6.1 Adding A New I-7K/I-8K/I-87K/ZB-2K I/O Module | 15  |
| 1.6.2 Adding A New RPC Controller                   | 18  |
| 1.6.3 Adding A New FRnet I/O                        |     |
| 1.6.4 Adding A New Modbus TCP Controller            | 22  |
| 1.6.5 Adding A New Modbus RTU Controller            | 24  |
| 1.6.6 Adding A New Modbus ASCII Controller          | 27  |
| 1.7 Adding A New Group                              | 30  |
| 1.8 Adding A New Tag                                |     |
| 1.8.1 Adding A New Tag For I/O Module               |     |
| 1.8.2 Adding A New Tag For Controller               |     |
| 1.8.3 Scaling Settings                              |     |
| 1.9 Adding Multi Tags For Modbus Device             |     |
| 1.10 Expand/ Shrink Devices                         |     |
| 1.11 Read/Write Tags                                |     |
| 1.12 Editing A Device/Group/Tag Properties          |     |
| 1.13 Deleting A Device/Group/Tag                    |     |
| 1.14 Generating Tags                                |     |
| 1.15 Configuring Initial Status                     |     |
| 1.16 Help   |     |
| 1.17 About  |     |
| 2 Quick Start                                       |     |
| 3 Connect To OPC Server                             |     |
| 3.1 Optimize Your Communication                     |     |
| 3.2 VB5 Client Demo Program                         |     |
| 3.3 .Net Client Demo Program                        |     |
| 3.4 LabVIEW   |     |
| 3.5 NATIONAL INSTRUMENTS                            |     |
| 3.6 WIZCON  |     |
| 3.7 iFix  |     |
| 3.8 InduSoft  |     |
| 3.9 Citect SCADA                                    |     |
| 4 Remote Accessing                                  |     |
| 4.1 System Requirement                              |     |
| 4.2 Configuring DCOM                                |     |
| 4.2.1 Configuring On the Server Site (XPAC)         |     |
| 4.2.2 Configuring On the Server Site (PC)           |     |
| 4.2.3 Configuring On the Server Site (WinPAC)       |     |
| 4.2.4 Configuring On the Client Site (PC)           |     |
| 4.2.5 Configuring On the Client Site (XPAC)         |     |
| 5 OPC To Modbus Slave                               |     |
| 5.1 OPC To Modbus TCP Slave                         | 141 |

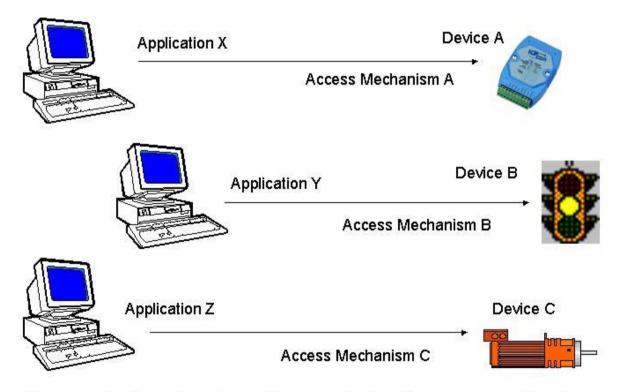
| 5.1.1    | Configuring OPC2MBTCP                          | 141 |
|----------|--|-----|
| 5.1.2    | Startup OPC2MBTCP                              |     |
| 5.2 OF   | PC To Modbus RTU/ASCII Slave                   | 144 |
| 5.2.1    | Configuring OPC2MBRTU                          | 144 |
| 5.2.2    | Startup OPC2MBRTU                              |     |
| 6 Writin | g Client Program with VB                       |     |
| 6.1 Pro  | ogramming with VB5                             | 148 |
| 6.1.1    | Overview of OPC & VB                           | 148 |
| 6.1.2    | Tools You Will Need to Build Your VB Client    | 149 |
| 6.1.3    | Building Your VB Client – Step By Step         | 149 |
| 6.2 Pro  | ogramming with .Net                            | 152 |
| 6.2.1    | Limitations about .Net client programming      | 152 |
| 6.2.2    | Tools – You Need to Build Your .Net Client     | 153 |
| 6.2.3    | Building Your VB.Net Client – Step By Step     | 153 |
| 6.2.4    | Building Your VC#.Net Client – Step By Step    | 156 |
|          | PC_XPE Changes List                            |     |
| 7.1 Fe   | atures of NAPOPC_XPE version 1.01              |     |
| 7.1.1    | Customized Module/Device Polling Time          |     |
| 7.1.2    | Multi-Thread Communication                     |     |
| 7.1.3    | Support Remote Procedure Call with Quicker/UPC |     |
| 7.1.4    | Switch of Single-Thread and Multi-Thread       |     |
|          | atures of NAPOPC_XPE version 1.02              |     |
| 7.2.1    | Bug Fix  |     |
| 7.3 Fe   | atures of NAPOPC_XPE version 1.10              |     |
| 7.3.1    | Support ET-7000 Search                         |     |
| 7.3.2    | Support ZB-2K I/O                              |     |
| 7.3.3    | Support FRnet Module                           |     |
| 7.3.4    | Support Account Selection                      |     |
| 7.3.5    | UI Modification                                |     |
|          | atures of NAPOPC_XPE version 1.12              |     |
| 7.4.1    | Support FRnet module via RPC communication     |     |
| 8 Refere | nce  |     |

# **1 NAPOPC\_XPE DA Server**

The NAPOPC\_XPE DA Server is one set of ICP DAS OPC solution. It works on XPAC(Based on Windows XP Embedded Operation System) and uses an Explorer-style user interface to display a hierarchical tree of modules and groups with their associated tags. A group can be defined as a subdirectory containing one or more tags. A module may have many subgroups of tags and all tags belong to their module. (The "OPC" stands for "OLE for Process Control" and the "DA" stands for "Data Access")

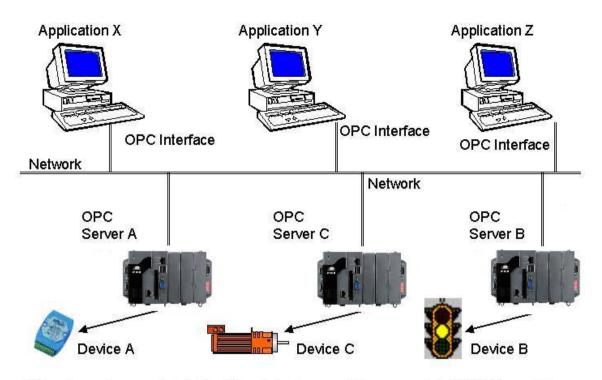
Furthermore, NAPOPC\_XPE DA Server package provides not only traditional "OPC" interface but also two "Modbus Slave" interfaces to communicate with modbus device. The two interfaces play the role of bridge between OPC client and modbus slave to transform the OPC tags to modbus address. Users can accept its result of auto-mapping or adjust the modbus address by themselves.

The following two figures show the difference between traditional system architecture and the OPC architecture.



For accessing the various devices for any application, there are many different mechanisms provided by different vendors.

Figure 1-0-1 Traditional architecture used to access a device.



Different vendors provide both different devices and the appropriate OPC Server. To access each device for any application, there is only one common mechanism through the "OPC Interface".

Figure 1-0-2 Using the OPC architecture to access a device.

The main program of NAPOPC\_XPE DA Server is "NAPOPCSvr\_XPE.exe". It automatically calls the "DCON\_PC.DLL", "IOCtrl.DLL", "XPacSDK.DLL", "pac\_i8017hw.DLL", "pac\_i8024w.DLL", "pac\_i8172W.DLL" and "UART.DLL" functions on demand.

## 1.1 Installing NAPOPC\_XPE DA Server

You can get the software from <u>ftp://ftp.icpdas.com/pub/cd/xp-</u> <u>8000/tools/napopcsvr/</u> or download it from <u>http://opc.icpdas.com/download.htm</u>.

#### Step 1:

Enter the command "ewfmgr c: -commitanddisable –live" at console.

| WINDOWS\system   | 32\cmd.exe  |          |
|--|---|----------|
|  | XP [Version 5.1.2600]<br>5-2001 Microsoft Corp.   | <b>^</b> |
|  | Settings\Administrator>ewfmgr c: -commitanddisab<br>ta and disabling overlay (live)   | le-live  |
| Protected Volume<br>Type<br>State<br>Boot Command<br>Param1<br>Volume ID<br>Device Name<br>Max Levels<br>Clump Size<br>Current Level<br>Memory used for<br>Memory used for | RAM (REG)<br>DISABLED<br>NO_CMD<br>0<br>B8 47 DB 8C 00 7E 00 00 00 00 00 00 00 00 00<br>"\Device\HarddiskVolume1" [C:]<br>1<br>512<br>N/A<br>data 0 bytes |          |

#### Step 2:

Copy NAPOPC\_XPE DA Server.exe to a specific folder in XPAC.

#### Step 3:

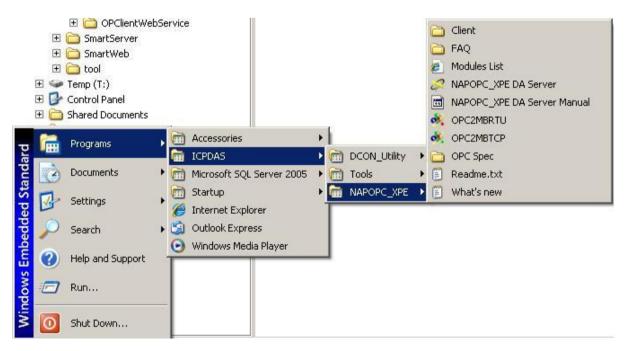
Double click NAPOPC\_XPE DA Server.exe and follow the installing wizard to finish the installation.

#### Step 4:

Restart XPAC.



After you complete the above steps, you can start the NAPOPC\_XPE DA Server by clicking the "NAPOPC\_XPE DA Server" as below.



## 1.2 Uninstalling NAPOPC\_XPE DA Server

| Currently installed programs:                         | Show up <u>d</u> ates      | Sort by: Name | -              |
|---|----------------------------|---------------|----------------|
| DCON Utility Ver 5.1.2                                |                            | Size          | 23.00ME        |
| 👸 Microsoft .NET Framework 2.0 Service Pack 1         |                            | Size          | 186.00ME       |
| 😥 Microsoft .NET Framework 3.0 Service Pack 1         |                            | Size          | 245.00ME       |
| 👸 Microsoft .NET Framework 3.5                        |                            | Size          | 24.93MB        |
| Aicrosoft SQL Server 2005                             |                            | Size          | 193.00ME       |
| Hicrosoft SQL Server Native Client                    |                            | Size          | 4.16ME         |
| Hicrosoft SQL Server Setup Support Files (English)    |                            | Size          | 19.92ME        |
| Microsoft SQL Server VSS Writer                       |                            | Size          | 0.66ME         |
| MSXML 6.0 Parser                                      |                            | Size          | 1.54ME         |
| 뤔 NAPOPC_XPE DA Server                                |                            | Size          | <u>10.23ME</u> |
| Click here for support information.                   |                            | Used          | rarely         |
|   |                            | Last Used On  | 9/16/2009      |
| To change this program or remove it from your compute | r, click Change or Remove. | Change        | Remove         |
| 🚱 OPC Data Access 2.0 Components                      |                            | Size          | 0.05ME         |
|   |                            |               |                |

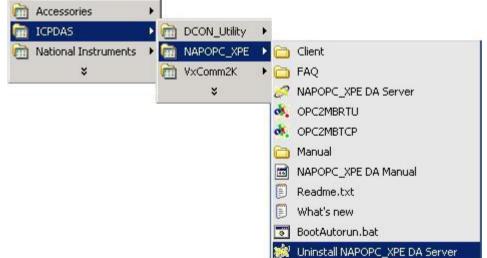
#### Step 1:

Go to "Add or Remove Programs" dialog and select NAPOPC\_XPE DA Server

#### Step 2:

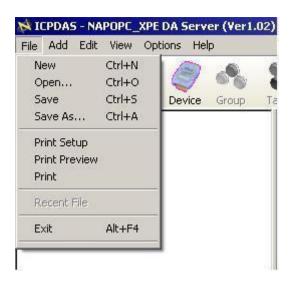
Press "Remove" button to remove NAPOPC\_XPE DA Server

NAPOPC\_XPE DA Server v1.12 or later version provides "Uninstall" function as below. You can use this function to uninstall NAPOPC\_XPE DA Server.



## 1.3 File

All configuration settings can be saved into configuration file by clicking the "File/ Save" and "File/ Save As ..." menu item. The OPC server will automatically load the last configuration file with every launch.



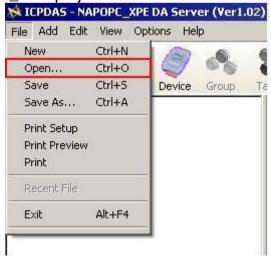
#### New:

#### Clean current project and create a new project

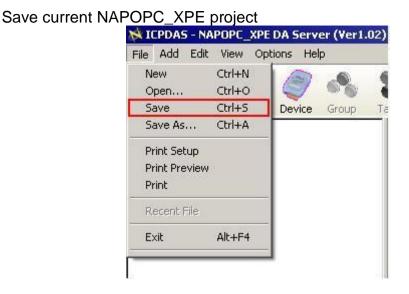


#### Open:

Load old NAPOPC\_XPE project



Save:



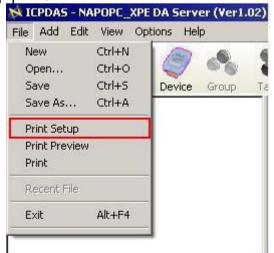
#### Save as...:

Save NAPOPC\_XPE project as a new one



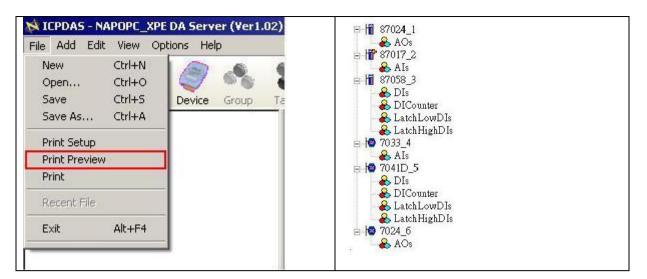
#### Print Setup:

Choose and setup printer



#### **Print Preview:**

Preview current modules list



#### Print

Print current modules list

| File | Add Edi      | t View O | ptions He | lp    |    |
|------|--------------|----------|-----------|-------|----|
| N    | ew           | Ctrl+N   |           | -0    | -  |
| 0    | pen          | Ctrl+O   |           | 00    |    |
| Se   | ave          | Ctrl+S   | Device    | Group | Ta |
| Sa   | ave As       | Ctrl+A   |           |       |    |
| Pr   | rint Setup   |          |           |       |    |
| Pi   | rint Previev | v        |           |       |    |
| Pi   | rint         |          |           |       |    |
| R    | ecent File   |          |           |       |    |
|      | xit          | Alt+F4   |           |       |    |

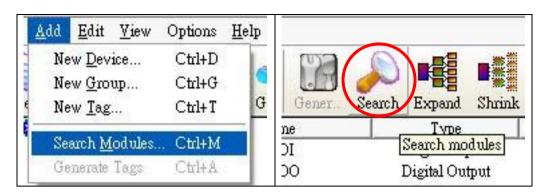
## 1.4 Searching Modules

The "Search Modules..." function lets you configure the OPC server automatically. It searches the RS-232 and RS-485 network to find modules and then generates tags automatically. This function generates AI/AO, DI/DO, Latched DI and Counter tags.

#### NOTE:

For complete module support, please update "\module.ini", "module\_ET.ini", "module\_FRnet.ini" ,and "module\_WISE.ini" frequently from the Web Page of https://www.icpdas.com/en/product/guide+Software+Applications+NAPOPC\_DA\_Server > [Download Center] > [Utility & Tools].

**Step 1:** Click on the "Add/ Search Modules..." menu item or the  $\checkmark$  icon to search for modules.



**Step 2:** The "Search Modules" dialog box pops up.

| Baud Rate Searc)   | 460800 🗖 230400 | ☑ 115200    |
|--|-----------------|-------------|
| and the second | 38400 🔲 19200   | 9600        |
| 4800   | 2400 🗖 1200     |             |
| Select All   | l Clea          | u All       |
|  | _               |             |
| Address (1 to 25   | 5) Checksum     | Timeout (mS |
| Start 0  | 🗹 Disabled      | 200         |
| End 255  | 🗹 Enabled       |             |
| tatus: Static  |                 |             |

#### COM Port:

Specifies which "COM Port" number is search. The default value is 1 and the valid range is from 1 to 255. Please verify the "COM Port" number that the RS-232 or RS-485 network is connected.

#### ET-7000:

If this field is checked, NAPOPC can search not only the modules communicating via COM port but also ET-7000 modules via Ethernet automatically.

#### **Clear Modules:**

Modules can be added many times. If this field is checked, it removes all modules from the list window before searching. Checking this box prevents adding a duplicate module. The default setting is "not checked".

#### Baud Rate Searching:

Specifies which "Baud Rate" will be look for. The default setting is "9600".

Naturally, if multiple baud rates are checked, the search will be longer. The computer system must close and then reopen the COM ports to communicate with modules when searching for multiple baud rates. This also reduces communication performance. Thus, using the same baud rate and COM port number for every module is highly recommended.

#### Select All:

Sets all of the "Baud Rate" be checked. Please refer to the above "Baud Rate Searching" section.

#### **Clear All:**

Sets all of the "Baud Rate" be unchecked (nothing to search). Please refer to the above "Baud Rate Searching" section.

#### Address/Start:

Specifies the starting address. The default value is 1 and the valid range is from 1 to 255. It won't search for an address below these settings.

#### Address/End:

Specifies the ending address. The default value is 255 and the valid range is from 1 to 255. It won't search for an address greater than these settings.

#### Checksum/Disabled:

If this field is checked, modules are searched with no checksum. If both the "Disabled" and "Enabled" fields were unchecked, the search would be undefined.

#### Checksum/Enabled:

If this field is checked, it searches modules with checksum. If both the "Disabled" and "Enabled" fields were unchecked, again, the search would be undefined.

#### Timeout:

Specifies the communicate timeout value for each module. The default value is 500 (equal to 0.5 Seconds), measured in millisecond(s) [0.001 Second(s)]. After a module has been found, this timeout value will also be recorded for further use.

Users can reduce this value to shorten the search time. Be careful. A shorter search time may cause communication failure.

#### Status:

It shows the searching status (includes: progress in %, Address in "A:??", Baud-Rate in "B:???", Checksum in "S:?" and Error-Code in "EC:??"). The timeout error code is 15. In most cases, it indicates no module has responded to the current command.

#### Search:

After setting the above options, click this button to search. The window will be closed automatically when completed.

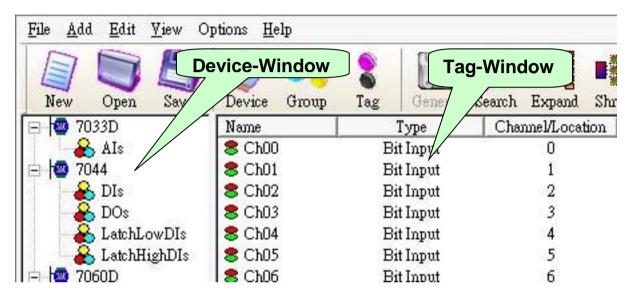
#### Stop:

During the search, users can click the button to stop. The window will stay on the screen after the search is cancelled.

#### Exit:

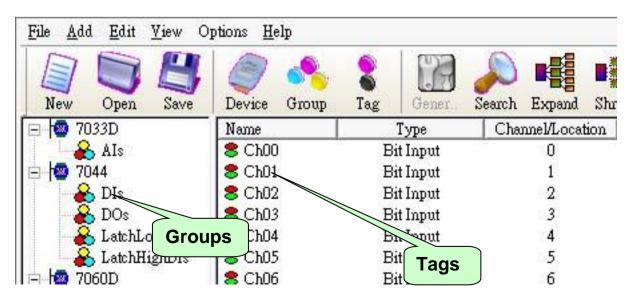
Users can click the button to close the window.

Step 3: After the search, the discovered modules will be listed on the Device-Window (left side). Users can also see the tags on the Tag-Window (right side) generated by the "Search Modules..." function automatically.



The "Search Modules..." function generates "Digital Input", "Digital Output" "Bit Input" or "Bit Output" tags.

The "Digital Input" and "Digital Output" tags use one communication to read the status of all channels, while the "Bit Input" and "Bit Output" tags use one communication to read only one-channel status. The "Digital Input" and "Digital Output" tags have better performance than the "Bit Input" and "Bit Output" tags. Using the "Digital Input" and "Digital Output" tags to access modules is highly recommended.



## **1.5 Monitoring Devices**

Use the "Monitor" function to see values of tags by checking the "View/ Monitor" menu item. Uncheck the item to stop monitoring.

| <u>File A</u> dd <u>E</u> dit <u>View</u> C | ptions <u>H</u> elp |       |          |         |        |            |      |
|---|---------------------|-------|----------|---------|--------|------------|------|
| Monit                                       | or Ctrl+U           |       |          | EC.     | 0      |            |      |
| New Open -                                  | Bar Ctrl+B          | ıp    | •<br>Tag | Gener.  | Search | Expand     | Shri |
| □ 🚳 7033D 🗸 ToolE                           | lar                 |       |          | Гуре    | Cha    | nnel/Locat | tion |
| AIs   | 8 Ch00              | 20110 | Bi       | t Input |        | 0          |      |
| 044   | 8 Ch01              |       | Bi       | t Input |        | 1          |      |
| 🔒 DIs                                       | 8 Ch02              |       | Bi       | t Input |        | 2          |      |
| 🔒 🥉 DOs                                     | 8 Ch03              |       | Bi       | t Input |        | 3          |      |
| 🔒 🔏 LatchLowDIs                             | 8 Ch04              |       | Bi       | t Input |        | 4          |      |
| 🔒 🦓 LatchHighDIs                            | 8 Ch05              |       | Bi       | t Input |        | 5          |      |
| 😑 🚾 7060D                                   | 8 Ch06              |       | Bi       | t Input |        | 6          |      |
| BIS DIS                                     | 1.000               |       |          |         |        |            |      |
| 🔒 🦀 DOs                                     |                     |       |          |         |        |            |      |
| Counter                                     |                     |       |          |         |        |            |      |
| LatchLowDIs                                 |                     |       |          |         |        |            |      |
| 🔓 LatchHighDIs                              |                     |       |          |         |        |            |      |

Step 1: Click the "View/ Monitor" menu item or the Sicon to enable monitor.

Step 2: Select the "DIs" group in the Device-Window (left side) to monitor its own Bit -Input tags.

| 庄 📲 🔁 7011      | Name   | Туре      | Channel/Location | Value |
|-----------------|--------|-----------|------------------|-------|
| 🗄 🖓 7012D       | 8 Ch00 | Bit Input | 0                |       |
| 🗄 🖓 7033D       | 8 Ch01 | Bit Input | 1                |       |
| 🗄 🖓 7044        | 8 Ch02 | Bit Input | 2                |       |
| 🗄 🖓 7060D       | 8 Ch03 | Bit Input | 3                |       |
| 🖻 🖓 7050D       | 8 Ch04 | Bit Input | 4                |       |
|                 | 8 Ch05 | Bit Input | 5                |       |
|                 | 8 Ch06 | Bit Input | 6                |       |
| 🖌 🔒 Counter     |        |           |                  |       |
| 🕺 🏯 LatchLowDIs |        |           |                  |       |

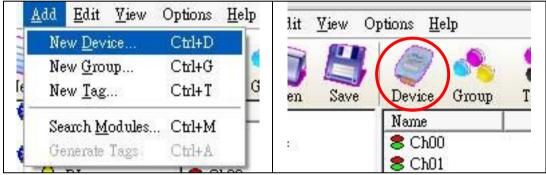
**Step 3:** Select the "7050D" module on the Device-Window to monitor its own Digital-Input and Digital-Output tags.

| 🕀 🔷 7033D      | Name   | Туре    | Channel/Location | Value |
|----------------|--------|---------|------------------|-------|
| 🗄 🚾 7044       | 🛢 СЪОО | Counter | 0                |       |
| 🗄 🚾 7060D      | 🛢 СЪО1 | Counter | 1                |       |
| 🖻 🖓 7050D      | 8 Ch02 | Counter | 2                |       |
| 🚽 🍰 DIs        | 8 Ch03 | Counter | 3                |       |
| 🚽 🍰 DOs        | 8 Ch04 | Counter | 4                |       |
| Counter        | 8 Ch05 | Counter | 5                |       |
| 🔒 LatchLowDIs  | 8 Ch06 | Counter | 6                |       |
| 🔒 LatchHighDIs |        |         |                  |       |

## **1.6 Adding A New Device**

### 1.6.1 Adding A New I-7K/I-8K/I-87K/ZB-2K I/O Module

**Step 1:** Click on the "Add/ New Device..." menu item or the *signal icon* to add a new module.



**Step 2:** The "Select Device" dialog box pops up.

Step 3: Click on the "DCON" radio button.

- Step 4: Click on the "I-7K/I-8K/I-87K/ZB-2K I/O Modules" radio button.
- Step 5: Click on the "On Board", "Remote" or "With Controller" radio button.

| Device Name Devic    |             | e               |                       |          |
|----------------------|-------------|-----------------|-----------------------|----------|
| Module Setting —     |             |                 |                       |          |
| 🔿 On Board           | 7K          | <u> </u>        | B-2K                  | Ψ.       |
| O Remote             | Controller  | <b>v</b>        | 87K                   | <u>_</u> |
| With Controller      | - 8K        | Ŧ               |                       |          |
| Address 1            | (0~255)     | Timeout (n      | 1Sec) 200             | _        |
| Slot 0               | _           | viodules) Checl |                       |          |
| COM Port Setting     |             | ,               | 1                     |          |
| COM 1                | •           | Parity          | None                  | -        |
| Baud Rate 11520      |             | Data Bi         | and the second second |          |
| 1                    |             | Stop Bi         | ts 1                  | -        |
| ) RPC                |             |                 |                       |          |
| Controller Setting - |             |                 |                       |          |
| Address 192.16       | 8.255.1 Por | t 505 T         | imeout 200            | )        |
| 1                    |             | 1               | 1                     | i.       |

#### **Device Name:**

Names with spaces or punctuation such as "|!.," cannot be used within a module name. The clients use the "Device Name" and "Tags" to access its value. The "Device Name" can not be the same as any other module.

#### 7K/ 87K/ 8K/ZB-2K Controller Module ID:

User can click on the Combo Box to select a Module ID.

#### Address:

Specifies a Module Address for this module. The default value is 1 and the valid range is between 1 to 255.

This field is disabled for the 8000 sub-devices. It will use the 8000 main-device's address.

#### Timeout:

Specifies timeout (Response time) value for this module. The default value is 200 ms. A smaller timeout value may cause communication failure and a greater timeout value may reduce the performance of the client program.

This field is disabled for the 8000 sub-devices and it will use the 8000 main-device's timeout value.

#### Slot:

The 8000 main-device ("With Controller") has 4 or 8 slots for the 8000 sub-device to plug in. This "slot" field indicates the slot number that the 8000 sub-device is using. The valid range is from 0 to 7.

The XPAC ("On Board") has 3 or 7 slots for the 8000 sub-device to plug in. This "slot" field indicates the slot number that the 8000 sub-device is using. The valid range is from 1 to 7.

This field is disabled for 8000 main-device and 7000 series modules.

#### Checksum:

This checksum field must match the hardware setting. A mismatch will always cause a communication failure with this module.

This field is disabled for the 8000 sub-devices and it will use the 8000 main-device's checksum.

#### COM Port:

Specifies the COM port to be used. Please verfiy which COM port number that the RS-232 / RS-485 network is using. Wrong settings will always cause communication failure.

This field is disabled for the 8000 sub-devices. It will use the 8000 main controller unit COM port setting.

#### Baud Rate:

Specifies the baud rate to be used. Verify the module's current baud rate. A wrong setting will always cause communication failure for this module.

This field is disabled for the 8000 sub-devices. It will use the 8000 main-controller unit baud rate.

#### Simulate I/O:

The "Simulate I/O" checkbox switches to a simulator of reading I/O. Since the simulator does not open the TCP/IP port, it is an easy way to work with the server, to configure tags or to connect clients without requiring any hardware.

#### Pending Time:

Minimum interval time between two access. To activate this function, NAPOPC\_XPE can work under optimized communication performance. If this module only needs to be accessed 1 time per 5 seconds. You can set pending time as 5000 ms. NAPOPC\_XPE will automatically spread time resource to other modules which are connected with each other.

#### OK:

Click on the "OK" button to add the new module setting.

#### Cancel:

Click on the "Cancel" button to avoid any changes.

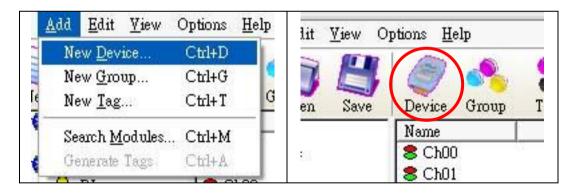
**Step 6:** Click on the "OK" button to add this new module.

### 1.6.2 Adding A New RPC Controller

Before adding a new "RPC" controller, please check "RPC Server" and "Active ScanKernel" at "Services Setup" dialog of "NAPOPC\_CE5/CE6" in WinCon/WinPAC/ ViewPAC.

| E 8057_1   |             | Name      | Type   | l.             | Channe  | l/Locatio |
|--|-------------|-----------|--------|----------------|---------|-----------|
| <ul> <li>⊕ 1 8041_2</li> <li>⊕ 1 8053_3</li> </ul>   |             | 8 DO      | Digita | al Output      | *       | 1.2.5.5   |
| ⊕ 87057_4  | Services S  | etup      |        |                |         | ×         |
| <ul> <li>⊕ 1 87041_5</li> <li>⊕ 1 87052_6</li> </ul> |             | ver 505   |        | Modbus 1       | СР      |           |
| 1 87018R_7   | Active S    | canKernel |        | Port number    | 502     | -         |
| ⊡ 1 87054_8  | Slave numbe | er 1      | ~      | , ore ridineoi | 1       |           |
|  | Modbus      | RTU 1     |        | Modbus F       | RTU 2   |           |
|  | COM port    | COM2      | -      | COM port       | СОМЗ    |           |
|  | Baudrate    | 9600      | -      | Baudrate       | 9600    | ~         |
|  | Parity      | None      | -      | Parity         | None    | -         |
|  | Data Bits   | 8 (RTU)   | ~      | Data Bits      | 8 (RTU) | -         |
|  | Stop Bits   | 1         | ~      | Stop Bits      | 1       | ~         |

**Step 1:** Click on the "Add/ New Device..." menu item or the sicon to add a new module.



**Step 2:** The "Select Device" dialog box pops up.

- Step 3: Click on the "DCON" radio button.
- **Step 4:** Click on the "RPC" radio button.

| evice Name Device:             |                 |                 |            |          |
|--------------------------------|-----------------|-----------------|------------|----------|
| ) I-7K/I-8K/I-87K/Z            | B-2K I/O Module |                 |            |          |
| Module Setting —<br>🔿 On Board | 7к [            |                 | -2K        | T.       |
| <b>)</b> Remote                | Controller      |                 | 37K        |          |
| With Controller                | 8K [            |                 | ,          |          |
|                                | _               |                 | 1 1000     | _        |
| Address 1                      | (0~255)         | Timeout (mS     |            |          |
| Slot 0                         | (0~7 for 8K №   | iodules) Checks | um Disable | <b>*</b> |
| COM Port Setting -             |                 |                 | - 11       |          |
| COM 1                          | <u></u>         | Parity          | None       | <b>_</b> |
| Baud Rate  115200              | <u>*</u>        | Data Bits       | 8          | <u> </u> |
| 144                            |                 | Stop Bits       | ]1         | <b>*</b> |
| RPC                            |                 |                 |            |          |
| Controller Setting —           |                 |                 |            |          |
| Address 192.168                | .255.1 Port     | 505 Tin         | neout 200  |          |
|                                | 4.0             | · ·             |            | 6.1      |

#### **Device Name:**

Names with spaces or punctuation such as "|!.," cannot be used within a module name. The clients use the "Device Name" and "Tags" to access its value. The "Device Name" can not be the same as any other module.

#### Timeout:

Specifies timeout (Response time) value for this controller. The default value is 200 ms. A smaller timeout value may cause communication failure and a larger timeout value may reduce the performance of the client program.

#### Port:

You have to set up the value with "505" for communicating with NAPOPC\_CE5 or NAPOPC\_CE6.

#### IP Address:

The uniqe IP address of your NAPOPC\_CE5 or NAPOPC\_CE6.

#### OK:

Click on the "OK" button to add the new controller setting.

#### Cancel:

Click on the "Cancel" button to avoid any changes.

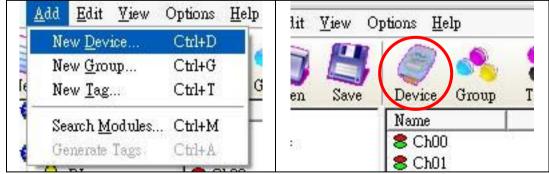
Step 5: Click on the "OK" button to add this new device.

**Step 6:** After clicking on the "OK" button, NAPOPC\_XPE will automatically synchronize and generate the modules of "NAPOPC\_CE5/CE6".

| New Open Save Device Group | Tag Multi Ge | ner. Search Expand | Shrink Monitor   |
|----------------------------|--------------|--------------------|------------------|
| ⊡ Device5                  | Name         | Туре               | Channel/Location |
| 8057_1                     | 8 Ch00       | Bit Output         | 0                |
| DOs 💦                      | 8 Ch01       | Bit Output         | 1                |
| E 8041_2                   | 8 Ch02       | Bit Output         | 2                |
| DOs                        | 8 Ch03       | Bit Output         | 2<br>3<br>4<br>5 |
| ⊟ 1 8053_3                 | 8 Ch04       | Bit Output         | 4                |
| 🔒 🔒 DIs                    | 8 Ch05       | Bit Output         |                  |
| E 87057_4                  | 8 Ch06       | Bit Output         | 6                |
| 🔒 🔒 DOs                    | 8 Ch07       | Bit Output         | 6<br>7<br>8      |
| in 10 87041_5              | 8 Ch08       | Bit Output         |                  |
| 🔒 🔒 DOs                    | 8 Ch09       | Bit Output         | 9                |
| ⊟ 1 87052_6                | 8 Ch10       | Bit Output         | 10               |
| 🚽 🔒 DIs                    | 8 Ch11       | Bit Output         | 11               |
| - 🔒 DICounter              | 8 Ch12       | Bit Output         | 12               |
| - 💫 LatchLowDIs            | 8 Ch13       | Bit Output         | 13               |
| 🚽 🚣 LatchHighDIs           | 8 Ch14       | Bit Output         | 14               |
| 🖻 📊 87018R_7               | 8 Ch15       | Bit Output         | 15               |
| AIs                        |              |                    |                  |
| 🖻 📊 87054_8                |              |                    |                  |
| 🔒 DIs                      |              |                    |                  |
| 🔏 DOs                      |              |                    |                  |
| - 🙈 DICounter              |              |                    |                  |
| - 🔒 LatchLowDIs            |              |                    |                  |
| 🚽 🔬 LatchHighDIs           |              |                    |                  |

## 1.6.3 Adding A New FRnet I/O

**Step 1:** Click on the "Add/ New Device..." menu item or the sicon to add a new module.



Step 2: The "Select Device" dialog box pops up.Step 3: Click on the "FRnet" radio button.

| DCON                             | • FRnet           | O Modbus |  |
|----------------------------------|-------------------|----------|--|
| Device Name [<br>- Board Setting |                   |          |  |
| Slot 0                           | Port 0            |          |  |
| -FRnet module                    | Setting           |          |  |
| FR-                              | Receiver Address: | 8        |  |
|                                  | Sender Address:   | 0        |  |
|                                  |                   |          |  |
|                                  |                   |          |  |
|                                  |                   |          |  |

#### **Device Name:**

Names with spaces or punctuation such as "|!.," cannot be used within a module name. The clients use the "Device Name" and "Tags" to access its value. The "Device Name" can not be the same as any other module.

#### Slot:

The XPAC has 3 or 7 slots for the 8000 sub-device to plug in. This "slot" field indicates the slot number that the 8000 sub-device is using. The valid range is from 1 to 7.

#### Port:

The "Port" indicates the port number(0 or 1) of I-8172. Every FRnet I/O modules have to use I-8172 as FRnet communication module. Please refer to the I-8172 manual for more information.

#### **FRnet Module ID:**

User can click on the Combo Box to select a FRnet module ID.

#### **Receiver Address:**

FRnet communication needs correct hardware configurations for the sender address (SA) and receiver address (RA) on the host controller and the remote module in the network. Please refer to the FRnet manual for more

#### information.

#### Sender Address:

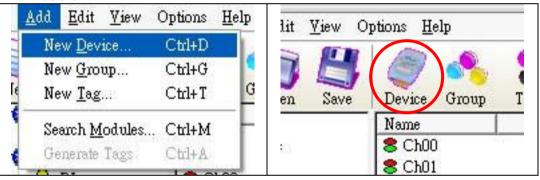
FRnet communication needs correct hardware configurations for the sender address (SA) and receiver address (RA) on the host controller and the remote module in the network. Please refer to the FRnet manual for more information.

#### Simulate I/O:

The "Simulate I/O" checkbox switches from reading I/O from the module to running a simulator. Since the simulator does not open the COM port, it is an easy way to work with the server, to configure tags or to connect clients without requiring any hardware.

## 1.6.4 Adding A New Modbus TCP Controller

Step 1: Click on the "Add/ New Device..." menu item or the vice icon to add a new module.



**Step 2:** The "Select Device" dialog box pops up.

Step 3: Click on the "Modbus" radio button.

**Step 4:** Click on the "Modbus TCP" radio button.

| evice Name Device4<br>Controller Setting —     |   | 029                              |  |
|--|---|----------------------------------|--|
| O Modbus RTU<br>O Modbus ASCII<br>⊙ Modbus TCP | <ul> <li>O ISaGRAF</li> <li>O General Modbus I</li> <li>IP Address 192.168</li> <li>Port 502</li> </ul> | Device                           | Address 1<br>Fimeout 200<br>Msg Delay 0<br>Word Swap |
| COM Port Setting -<br>COM 1<br>3aud Rate 11520 |   | Parity<br>Data Bits<br>Stop Bits |  |
| Request Tag Numbe                              | r <sub>Coil</sub> 122   | Reg                              | rister 122   |
| -  | not access the RS-485   | /Modbus dev                      | ice)   |

#### **Device Name:**

Names with spaces or punctuation such as "|!.," cannot be used within a module name. The clients use the "Device Name" and "Tags" to access its value. The "Device Name" can not be the same as any other module.

#### **ISaGRAF**:

Connect ISaGRAF controller

#### General Modbus Device:

Connect general modbus device

#### **IP Address:**

The uniqe IP address of your Modbus TCP controller.

#### Port:

You have to set up the value with "502" for communicating with ICP DAS Modbus TCP controller.

#### Address:

Specifies a Address for this controller. The default value is 1 and the valid range is between 1 to 247.

#### Timeout:

Specifies timeout (Response time) value for this controller. The default value is 200 ms. A smaller timeout value may cause communication failure.

#### Msg Delay:

Specifies message delay value for this controller. The default value is 0 ms. A smaller msg delay value may have a higher system loading, but it will have a faster data exchange speed.

#### Word Swap:

The "Word Swap" checkbox switches the interpretation of 4 Byte values. Sometimes we need to make the checkbox "TRUE" in order to achieve the purpose of Lo-Hi/Hi-Lo communication.

#### Request Tag Number:

The "Request Tag Number" sets tag value numbers that each command will get from device. For ISaGRAF, it should less than 124 for coil and register. For 7188MTCP, it should less than 498 for coil and 127 for register. The default numbers are both 122. (For Modbus standard, it can't greater than 2000 for coil and 127 for register.

#### Simulate I/O:

The "Simulate I/O" checkbox switches to a simulator of reading I/O. Since the simulator does not open the TCP/IP port, it is an easy way to work with the server, to configure tags or to connect clients without requiring any hardware.

#### Pending Time:

Minimum interval time between two access. To activate this function, NAPOPC\_XPE can work under optimized communication performance. If this module only needs to be accessed 1 time per 5 seconds. You can set pending time as 5000 ms. NAPOPC\_XPE will automatically spread time resource to other modules which are connected with each other.

#### OK:

Click on the "OK" button to add the new controller setting.

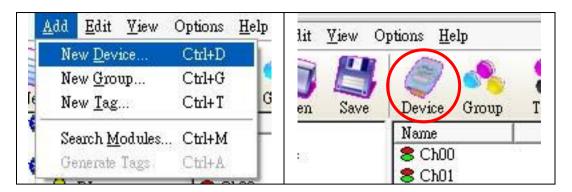
#### Cancel:

Click on the "Cancel" button to avoid any changes.

**Step 5:** Click on the "OK" button to add this new device.

## 1.6.5 Adding A New Modbus RTU Controller

**Step 1:** Click on the "Add/ New Device..." menu item or the silon to add a new module.



Step 2: The "Select Device" dialog box pops up.

Step 3: Click on the "Modbus" radio button.

Step 4: Click on the "Modbus RTU" radio button.

| <ul> <li>Modbus R TU</li> <li>Modbus ASCII</li> <li>Modbus TCP</li> </ul> | <ul> <li>O ISaGRAF</li> <li>O General Modbus Device</li> <li>IP Address 192.168.255.1</li> <li>Port 502</li> </ul> | Address 1<br>Timeout 200<br>Msg Delay 0<br>Word Swap |
|---|--|--|
| COM Port Setting -<br>COM 1<br>Baud Rate 11520                            | Parity<br>D T<br>Stop  | Bits 8 💌   |
| Request Tag Numbe   | r Coil 122   | Register 122   |

#### Device Name:

Names with spaces or punctuation such as "|!.," cannot be used within a module name. The clients use the "Device Name" and "Tags" to access its value. The "Device Name" can not be the same as any other module.

#### ISaGRAF:

Connect ISaGRAF controller

#### General Modbus Device:

Connect general modbus device

#### Address:

Specifies a Address for this controller. The default value is 1 and the valid range is between 1 to 247.

#### Timeout:

Specifies timeout (Response time) value for this controller. The default value is 200 ms. A smaller timeout value may cause communication failure and a larger timeout value may reduce the performance of the client program.

#### Msg Delay:

Specifies message delay value for this controller. The default value is 0 ms. A smaller msg delay value may have a higher system loading, but it will have a faster data exchange speed.

#### Word Swap:

The "Word Swap" checkbox switches the interpretation of 4 Byte values. Sometimes we need to make the checkbox "TRUE" in order to achieve the purpose of Lo-Hi/Hi-Lo communication.

#### COM Port:

Specifies the COM port to be used. Please verfiy which COM port number that the RS-232 / RS-485 network is using. Wrong settings will always cause communication failure.

#### Baud Rate:

Specifies the baud rate to be used. Verify the module's current baud rate. A wrong setting will always cause communication error for this controller.

#### Parity:

Specifies the parity scheme to be used. It is one of the following values.

| Value | Description |
|-------|-------------|
| None  | No parity   |
| Even  | Even        |
| Odd   | Odd         |

#### Data Bits:

Specifies the number of bits in the bytes transmitted and received.

#### Stop Bits:

Specifies the number of stop bits to be used. It is one of the following values.

| Value | Description   |
|-------|---------------|
| 1     | 1 stop bit    |
| 2     | 2 stop bits   |
| 1.5   | 1.5 stop bits |

#### **Request Tag Number:**

The "Request Tag Number" sets tag value numbers that each command will get from device. For ISaGRAF, it should less than 124 for coil and register. For 7188MTCP, it should less than 498 for coil and 127 for register. The default numbers are both 122. (For Modbus standard, it can't greater than 2000 for coil and 127 for register.

#### Simulate I/O:

The "Simulate I/O" checkbox switches to a simulator of reading I/O. Since the simulator does not open the TCP/IP port, it is an easy way to work with the server, to configure tags or to connect clients without requiring any hardware.

#### Pending Time:

Minimum interval time between two access. To activate this function, NAPOPC\_XPE can work under optimized communication performance. If this module only needs to be accessed 1 time per 5 seconds. You can set pending time as 5000 ms. NAPOPC\_XPE will automatically spread time resource to other modules which are connected with each other.

#### OK:

Click on the "OK" button to add the new controller setting.

Cancel:

Click on the "Cancel" button to avoid any changes.

**Step 5:** Click on the "OK" button to add this new device.

## **1.6.6 Adding A New Modbus ASCII Controller**

**Step 1:** Click on the "Add/ New Device..." menu item or the vice icon to add a new module.

|    | <u>Add Edit V</u> iew | Options <u>H</u> e | lp   | t View | Options Help     |   |
|----|-----------------------|--------------------|------|--------|------------------|---|
|    | New <u>D</u> evice    | Ctrl+D             |      |        |                  |   |
|    | New Group             | Ctrl+G             |      |        |                  |   |
| ſe | New <u>T</u> ag       | Ctrl+T             | G et | n Save | Device Group     | Т |
| •  | Search Modules        | Ctrl+M             | H -  |        | Name             |   |
| •  | Generate Tags         | Ctrl+A             | 1 8  |        | 8 Ch00<br>8 Ch01 |   |

**Step 2:** The "Select Device" dialog box pops up.

Step 3: Click on the "Modbus" radio button.

Step 4: Click on the "Modbus ASCII" radio button.

| evice Name Device4<br>Controller Setting —      |  |  |
|---|--|--|
| O Modbus R TU<br>⊙ Modbus ASCII<br>O Modbus TCP | O ISaGRAF<br>O General Modbus Device<br>IP Address 192.168.255.1<br>Port 502 | Address 1<br>Timeout 200<br>Msg Delay 0<br>Word Swap |
| COM Port Setting -<br>COM 1<br>Gaud Rate 11520  | ) 🚽 Da   | rity Nome 💌<br>ta Bits 8 💌<br>op Bits 1 💌            |
| Request Tag Numbe                               | r Coil 122   | Register 122   |
|   | not access the RS-485/Mod b<br>000 ms  | us device)   |

#### **Device Name:**

Names with spaces or punctuation such as "|!.," cannot be used within a module name. The clients use the "Device Name" and "Tags" to access its value. The "Device Name" can not be the same as any other module.

#### ISaGRAF:

Connect ISaGRAF controller

#### General Modbus Device:

Connect general modbus device

#### Address:

Specifies a Address for this controller. The default value is 1 and the valid range is between 1 to 247.

#### Timeout:

Specifies timeout (Response time) value for this controller. The default value is 200 ms. A smaller timeout value may cause communication failure and a larger timeout value may reduce the performance of the client program.

#### Msg Delay:

Specifies message delay value for this controller. The default value is 0 ms. A smaller msg delay value may have a higher system loading, but it will have a faster data exchange speed.

#### Word Swap:

The "Word Swap" checkbox switches the interpretation of 4 Byte values. Sometimes we need to make the checkbox "TRUE" in order to achieve the purpose of Lo-Hi/Hi-Lo communication.

#### COM Port:

Specifies the COM port to be used. Please verfiy which COM port number that the RS-232 / RS-485 network is using. Wrong settings will always cause communication failure.

#### **Baud Rate:**

Specifies the baud rate to be used. Verify the module's current baud rate. A wrong setting will always cause communication error for this controller.

#### Parity:

Specifies the parity scheme to be used. It is one of the following values.

| Value | Description |
|-------|-------------|
| None  | No parity   |
| Even  | Even        |
| Odd   | Odd         |

#### Data Bits:

Specifies the number of bits in the bytes transmitted and received.

#### Stop Bits:

Specifies the number of stop bits to be used. It is one of the following values.

| Value | Description   |
|-------|---------------|
| 1     | 1 stop bit    |
| 2     | 2 stop bits   |
| 1.5   | 1.5 stop bits |

#### Request Tag Number:

The "Request Tag Number" sets tag value numbers that each command will get from device. For ISaGRAF, it should less than 124 for coil and register. For 7188MTCP, it should less than 498 for coil and 127 for register. The default numbers are both 122. (For Modbus standard, it can't greater than 2000 for coil and 127 for register.

#### Simulate I/O:

The "Simulate I/O" checkbox switches to a simulator of reading I/O. Since the simulator does not open the TCP/IP port, it is an easy way to work with the server, to configure tags or to connect clients without requiring any hardware.

#### Pending Time:

Minimum interval time between two access. To activate this function, NAPOPC\_XPE can work under optimized communication performance. If this module only needs to be accessed 1 time per 5 seconds. You can set pending time as 5000 ms. NAPOPC\_XPE will automatically spread time resource to other modules which are connected with each other.

OK:

Click on the "OK" button to add the new controller setting.

#### Cancel:

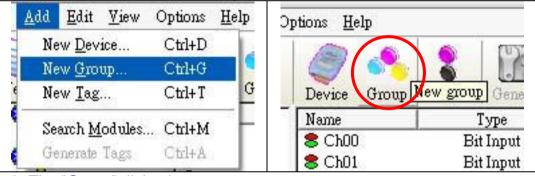
Click on the "Cancel" button to avoid any changes.

**Step 5:** Click on the "OK" button to add this new device.

## 1.7 Adding A New Group

If the device you add is "RPC", you do not need to add groups manually. NAPOPC\_XPE will automatically synchronize and generate the modules of "RPC".

Step 1: Click on the "Add/ New Group" menu item or the sicon to add a new group.



**Step 2:** The "Group" dialog box pops up.

| Group         |        |
|---------------|--------|
| Name Group    | ОК     |
| Mante Storing | Cancel |

Name:

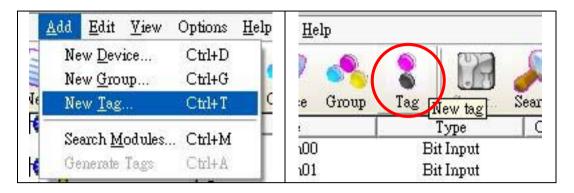
A "Group Name" may have any name, but avoid names with spaces or punctuation such as "|!.,". The "Group Name" must not be used twice. A group can be defined as a subdirectory containing one or more tags. A device may have many subgroups of tags. All tags belong to their module when they are scanned to perform I/O.

## 1.8 Adding A New Tag

If the device you add is "RPC", you do not need to add tags manually. NAPOPC\_XPE will automatically synchronize and generate the modules of "RPC".

## 1.8.1 Adding A New Tag For I/O Module

Step 1: Click on the "Add/ New Tag" menu item or the 🚺 icon to add a new tag.



**Step 2:** The "Tag Properties" dialog box pops up.

**Step 3:** Choose the "Settings" page. Because the tag belongs to the module-type device, the "I/O Modules" radio button is active.

| escription<br>Device Type<br>Di/O Module | Туре     | Bit Ing | out            | • |
|--|----------|---------|----------------|---|
|  | Channel  |         |                |   |
| <b>)</b> Controller                      | Location | 1       | Input Register | Ŧ |
|  | Data     | Bit     |                | - |
| Scaling<br>Enable<br>Settings            |          |         |                |   |

Name:

Any "Tag Name" may be used, but avoid names with spaces or punctuation such as "|!.,". The clients will use the "Device Name" and "Tags" to access its value. Hence the "Tag Name" cannot be a duplicate of another tag in the same group.

#### Description:

Specifies the description text for this tag. This can be blank.

#### Type:

Specifies the command to be used for this tag. Different modules support different commands. For commands, please refer to a "MODULES.HTM" file in \\ICPDAS\NAPOPC\_XPE folder

#### Channel:

Specifies the channel number to be used for this tag. The "Digital Input" and "Digital Output" tags do not use this channel setting, because all channels are read with one communication.

#### Simulation signal:

The valid signal is SINE, RAMP and RANDOM. This field is validated when the module uses simulation I/O. Please refer to the "Adding A New Device" section.

OK:

Click on the "OK" button to add the new tag setting.

#### Cancel:

Click on the "Cancel" button to avoid any changes.

#### Scaling:

Enable:

Check this check-box to enable the "Settings..." button.

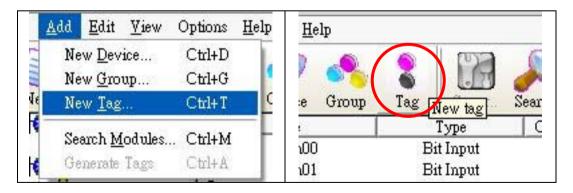
#### Settings:

Click on this button to set the scaling feature.

For more information, please refer to the section "1.8.3 Scaling Settings".

### **1.8.2** Adding A New Tag For Controller

Step 1: Click on the "Add/ New Tag" menu item or the 💈 icon to add a new tag.



**Step 2:** The "Tag Properties" dialog box pops up.

**Step 3:** Choose the "Settings" page. Because the tag belongs to the controller-type device, the "Controller" radio button is active.

| Description  |            |                  |
|--------------|------------|------------------|
| Device Type  |            |                  |
| O I/O Module | Туре       | *                |
|              | Channel 🛛  |                  |
| ⊙ Controller | Location 2 | Input Register 💌 |
|              | Data Float |                  |
| Scaling      |            |                  |
| Enable       |            |                  |
| Settings     |            |                  |
|              |            |                  |
|              |            |                  |

#### Name:

Any "Tag Name" may be used, but avoid names with spaces or punctuation such as "|!.,". The clients will use the "Device Name" and "Tags" to access its value. Hence the "Tag Name" cannot be a duplicate of another tag in the same group.

#### **Description**:

Specifies the description text for this tag. This can be blank.

#### Data:

Specifies the data type of this tag which's location type is "Input Register" or "Output Register". NAPOPC\_XPE Server support five kinds of data type which are "Short", "Long", "Float", "Word", and "DWord".

| Data Type | Definition              | Range                  |
|-----------|-------------------------|------------------------|
| Short     | 16-bit signed integer   | -32768~32767           |
| Long      | 32-bit signed integer   | -2147483648~2147483647 |
| Float     | Floating-point variable | -1.7E-308~1.7E+308     |
| Word      | 16-bit unsigned integer | 0~65535                |
| DWord     | 32-bit unsigned integer | 0~4294967295           |

The data type of "Input Coil" or "Output Coil" is "Bool".

#### Location:

Specifies the tag address. It must be the same with the the variable address in the controller. Besides, you have to choose the location type. After you choose the location number, there are four location types you can choose.They are "Input Coil", "Output Coil", "Input Register", and "Output

Register". When you monitor controller device(see 1.5 Monitoring Device), the "Channel/Location" field will show a value according to the location and location type as below.

| Location Type   | Range           |
|-----------------|-----------------|
| Output Coil     | 000001 - 065536 |
| Input Coil      | 100001 - 165536 |
| Input Register  | 300001 - 365536 |
| Output Register | 400001 - 465536 |

#### Simulation signal:

The valid signal is SINE, RAMP and RANDOM. This field is validated when the module uses simulation I/O. Please refer to the "Adding A New Device" section.

#### OK:

Click on the "OK" button to add the new tag setting.

#### Cancel:

Click on the "Cancel" button to avoid any changes.

#### Scaling:

Enable:

Check this check-box to enable the "Settings..." button.

Settings:

Click on this button to set the scaling feature.

For more information, please refer to the section "1.8.3 Scaling Settings".

### **1.8.3 Scaling Settings**

In general, the "Scaling" feature is only useful for the "floating-point" data type.

| Min 10<br>Max 1000 Scales to > Min 10<br>Max 10<br>Conversion<br>O Linear O Square Root<br>Deadband: 0 % |  |
|--|--|
| ⊙ Linear ○ Square Root   |  |
|  |  |
| Deadband: 0 %  |  |
|  |  |
|  |  |
|  |  |
|  |  |

#### Raw Data:

Min: The original Minimum value. ([MinRaw]) Max: The original Maximum value. ([MaxRaw])

#### Scales to:

Units: The unit of the scaled value. (Just for reference only.) Min: The scaled Minimum value. ([MinScale]) Max: The scaled Maximum value. ([MaxScale])

#### Conversion:

Linear:

Scaled Value = ((Original Value – [MinRaw]) / ([MaxRaw] – [MinRaw])) \* ([MaxScale] – [MinScale]) + [MinScale]

#### Square Root:

Scaled Value = ((sqrt (Original Value) – [MinRaw]) \* ([MaxScale] – [MinScale])) / sqrt ([MaxRaw] – [MinRaw]) + [MinScale]

#### Deadband (%):

In general, keep "0" in this field.

For more information, please refer to the "4.5.1.6 Percent Deadband" section in the "OPCDA20\_Cust.PDF" manual, page 68.

#### OK:

Click the "OK" button to save these settings.

#### Cancel:

Click the "Cancel" button to avoid any changes.

## **1.9 Adding Multi Tags For Modbus Device**

This function only works when the device's protocol is Modbus. **Step 1:** Click on the "Add/ Multi Tags" menu item or the **1** icon to add a new tag.

| New <u>D</u> evice<br>New <u>G</u> roup<br>New <u>T</u> ag | Ctrl+D<br>Ctrl+G<br>Ctrl+T | G   | Sroup | Tag Multi Multi Tags |
|--|----------------------------|-----|-------|----------------------|
| <u>S</u> earch Modules                                     | Ctrl+M                     | 200 | )01   | Reg Output[Float]    |
| Generate Tags  | Ctrl+A                     | þor | )02   | Reg Output[Short]    |
| Multi Tags   |                            | 000 | )03   | Reg Output[Float]    |
| · · · · ·  |                            |     | 104   | Reg Output[Short]    |

Step 2: The "Add Multi Tags Dialog" dialog box pops up.

Step 3: Choose correct "Prototype", "Data Type" and key in Modbus address.

|                  |            |            | C Register Output |
|------------------|------------|------------|-------------------|
| Data Type ———    |            |            |                   |
| C Bool C Sho     | ort C Long | C Float C  | Word C DWord      |
| Modbus Address — |            | Separation | _                 |

#### Prototype:

There are four kinds of prototype for modbus tag. "Coil Input", "Coil Output", "Register Input" and "Register Output".

#### Data Type:

"Bool": 8 bits, True or False
"Short": 16 bits, -32768 ~ 32767
"Long": 32 bits, -2147483648. ~ 2147483647
"Float": 32 bits, float numbers
"Word": 16 bits, 0 ~ 65535
"DWORD": 32 bits, 0 ~ 4294967295

#### Modbus Address:

"From" : modbus address number of start tag, 1 ~ 65535

"To" : modbus address number of end tag. 1 ~ 65535

#### Separation:

Separation numbers between each tag. 1 ~ 100

#### OK:

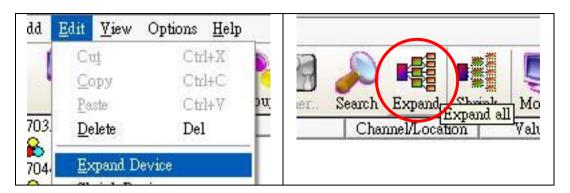
Click on the "OK" button to add the new tag setting.

#### Cancel:

Click on the "Cancel" button to avoid any changes.

## **1.10 Expand/ Shrink Devices**

Click on the "Edit/ Expand device (Shrink device)" menu item or the  $\blacksquare(\blacksquare)$  icon to expand(shrink) all devices.



# 1.11 Read/Write Tags

First, you have to use the "Monitor" function to see values of tags by checking the "View/ Monitor" menu item. Select a tag and right click the mouse button. Then select the "Properties..." option. Choose the "Read & Write" page to read/write the tag.

**Step 1:** Click the "View/ Monitor" menu item to enable monitor.

- Step 2: Select a tag and right click the mouse button. Then select the "Properties.." option.
- Step 3: Select the "Read & Write" page. You can see the "Tag name" and "Access right" at the first. If the access right is "Read only!", the write function is disable.

| Read Value                  |       |     |       |
|-----------------------------|-------|-----|-------|
| Value: OFF                  |       | C.R | ead!  |
| Quality: Uncertain          |       |     |       |
| Timestamp: 08/30/04 10:0    | 1:51  |     |       |
| Iagname: Ch00               |       |     |       |
| Access right: Read & Write! |       |     |       |
| Write Value                 |       |     |       |
| Timestamp: 08/30/04 10:0    | 01:49 |     |       |
| Quality: Uncertain          |       |     |       |
| Value:                      |       |     |       |
| 0                           |       | W   | nite! |
|                             |       |     |       |
|                             |       |     |       |

## Read Value/Value:

You can press the "Read!" button to read the tag value as you saw on the "Tag-Window".

## Read Value/Quality:

Three kinds of qualities, "Good", "Bad", and "Uncertain", would be shown. If the communication status is good, the quality shows "Good". If the communication status has something wrong, the quality shows "Bad". And the other situation is "Uncertain". Maybe you do not click the "View/ Monitor" menu item to enable monitor etc.

### Read Value/Timestamp:

It shows the time, when you read the tag.

## Tag name:

It is the same with the "Name" at the "Settings" page. You can modify it at the "Settings" page.

### Access right:

Two kinds of access right, "Read Only!" and "Read&Write!", would be shown. The access right depends on what kind of tag property it is. Please refer to the "1.7 Adding A New Tag"

### Write Value/Timestamp:

It shows the time, when you write the tag.

## Write Value/Quality:

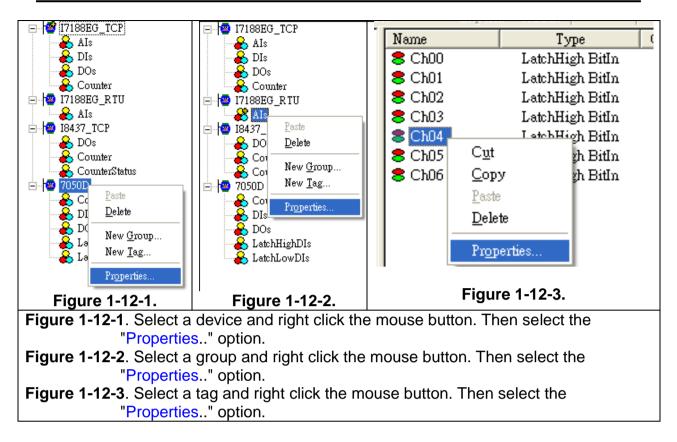
Three kinds of qualities, "Good", "Bad", and "Uncertain", would be shown. If the communication status is good, the quality shows "Good". If the communication status has something wrong, the shows "Bad". And the other situation is "Uncertain". Maybe you do not click the "View/ Monitor" menu item to enable monitor etc.

### Write Value/Value:

You can press the "Write!" button to write the value you key-in to the tag. If the tag data type is "Boolean" the write value "0" means "OFF" and the write value "not 0" means "ON".

# **1.12 Editing A Device/Group/Tag Properties**

To edit a existing Device(/Group/Tag), just select the Device(/Group/Tag) and right click the mouse button. Then select the "Properties..." option.



# 1.13 Deleting A Device/Group/Tag

To delete a existing Device/Group/Tag, just select the Device(/Group/Tag) and right click the mouse button. Then select the "Delete..." option or the <sup>1</sup>/<sub>2</sub> icon.

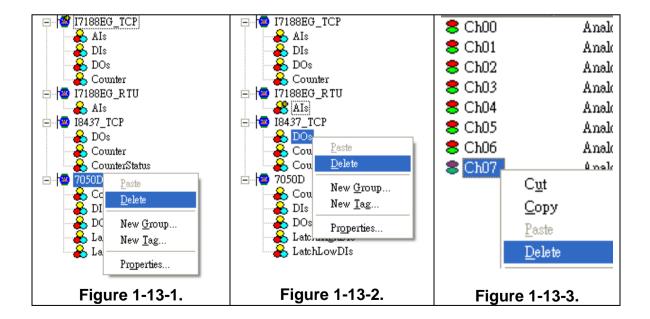


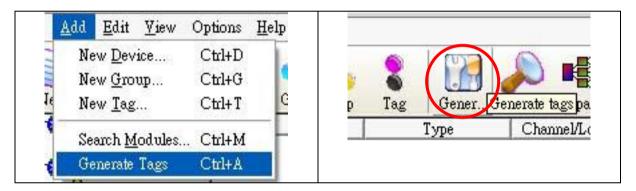
Figure 1-13-1. Select a device and right click the mouse button. Then select the "Delete" option.
Figure 1-13-2. Select a group and right click the mouse button. Then select the "Delete" option.
Figure 1-13-3. Select a tag and right click the mouse button. Then select the "Delete" option.

## 1.14 Generating Tags

This function lets you easily create tags of specific module and test it in the OPC server under simulation mode. It is only valid when the selected device has no "Group" or "Tag" such as a new device.

**Step 1:** Select a device you want to generate tags.

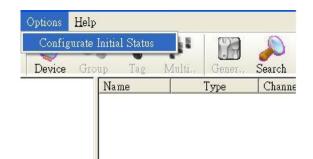




# 1.15 Configuring Initial Status

This function lets you configurate initial status of NAPOPC\_XPE server when client softwares connect to it. The ""Recent File Source" options lets user save related information in registry under "Administrator account" or "Current user account". Some DCOM application needs to adjust this option for specific scenario. The "File Open Dialog" option lets user load a file automatically or manually. The "System Tray" option can hide or minimize program of NAPOPC\_XPE server. And "Communication Mechanism" option lets user define the communication behavior of NAPOPC\_XPE. Generally, "Multi-Thread" is the best choice for high performace. However, for some particular OPC clients which can not work smoothly under "Multi-Thread" communication, user can choose "Single-Thread" instead. This function, Configurate Initial Status, can be selected only when "Monitor" function isn't running.

**Step 1:** Click on the "Options/ Configurate Initial Status" menu item to open "Initial Setting Dialog".



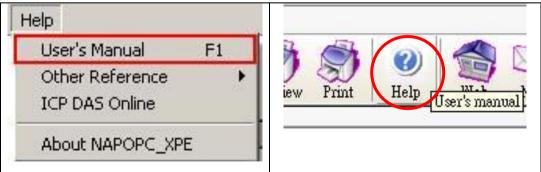
Step 2: Select initial status of NAPOPC\_XPE at this dialog

| <ul> <li>Last One (Auto-load, No Ask)</li> <li>User Select (Manually)</li> <li>Recent File Source</li> </ul> | Cancel |
|--|--------|
| Recent File Source   |        |
|  | 21     |
| Administrator Account  |        |
| C Current User Account   |        |
| System Tray  |        |
| 🔿 Hide (Hide in Background)  |        |
| • Minimize (Show Icon on System Tray   | n)     |
| Communication Mechanism  |        |
| Single-Thread  |        |

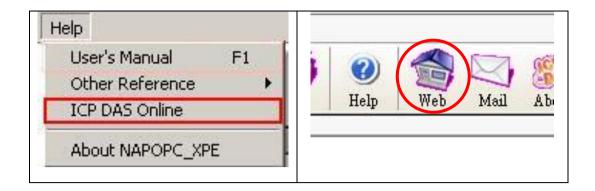
## 1.16 Help

Refer to the user's manual by Checking the "Help/ User's Manual" menu item. All PDF formatted files are best view using Acrobat Reader 5 or newer. You can install it from our CD or download a free copy from <u>Adobe's Web Site</u>.

Clicking on the "Help/ User's Manual" menu item or the <sup>10</sup> icon refer to the user's manual.



Welcome to visit our web site by checking the "Help/ ICP DAS Online" menu item or pressing the icon.



## 1.17 About

Click on the "Help/ About NAPOPC\_XPE" menu item or the icon to see the "About NAPOPC\_XPE DA Server" dialog box. It shows the version number of NAPOPC\_XPE DA Server.

**Step 1:** Click on the "Help/ About NAPOPC\_XPE" menu item.

**Step 2:** The "About NAPOPC\_XPE DA Server" window pops up.

| bout NAPOPC_XPE DA Server   | ×  |
|---|----|
| NAPOPC_XPE DA Server<br>Version 1.10<br>Copyright @ 2009. All Rights Reserved | OK |
| TEL: 886-3-5973366<br>FAX: 886-3-5973733                                      |    |
| E mail: convice@iendae.com  |    |

# 2 Quick Start

Please follow these steps:

## [Configure NAPOPC\_XPE Server]

- Wire Modules or Controllers. Wire modules in the RS-232 / RS-485 network. (Refer to "\CD \Napdos\7000\manual \GetStart.PDF" manual.) Wire controllers to your PC.
- Configure Modules or Controllers. Use DCON Utility to set modules. (Refer to "\CD \Napdos\7000\manual \GetStart.PDF" manual.) Use ISaGRAF to configure the I-7188EG/XG or I-8xx7.
- 3. Install the OPC server. Install the NAPOPC\_XPE on XPAC.
- Run the OPC Server. Launch the OPC server by executing " C:\ICPDAS\NAPOPC\_XPE\NAPOPCSvr\_XPE.exe"
- Search Modules. Refer to the "1.4 Search Modules..." section to search modules in the RS-485 network.
- Add a new controller Refer to the "1.6 Adding A New Device" section to add a I/O or add a new modbus RTU, modbus ASCII or modbus TCP controller.
- 7. Save Configuration. Save the configuration by clicking "File/Save" menu item.
- Close OPC server. Close OPC Server by clicking "File/Exit" menu item.

## [Connect to NAPOPC\_ST Server]

 Connect to OPC server. Run your client program and connect to our OPC server by linking "NAPOPC.Svr" or " NAPOPC.Svr.1". (Please refer to user's manual of your client software provided by your vendor.) This forces the system to run the OPC server automatically in background.

# **3 Connect To OPC Server**

The OPC is defined by the OPC Foundation, and any client program supporting OPC can connect to OPC server (for example: Lab VIEW v5.0 and WIZCON 7.51). Any computer language supporting the COM mechanism can also connect to the OPC server directly through the COM interface.

The first section shows you how to optimize your communication. And the following sections show you how to connect to OPC server by using client program provided by Factory Soft, Inc, Lab VIEW, Server Explorer provided by National Instruments, WIZCON, iFix, InduSoft and CitectSCADA. To connect to OPC server by other OPC client, please refer to your OPC client user's manual.

# 3.1 Optimize Your Communication

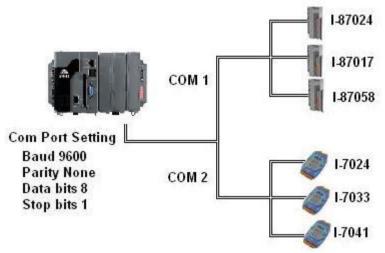
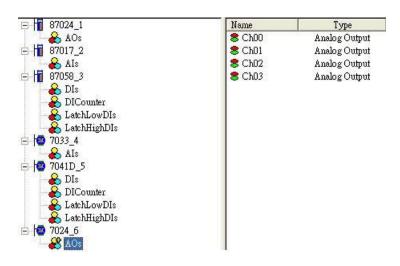


Figure 3.1.1 Communication architecture of I/O modules

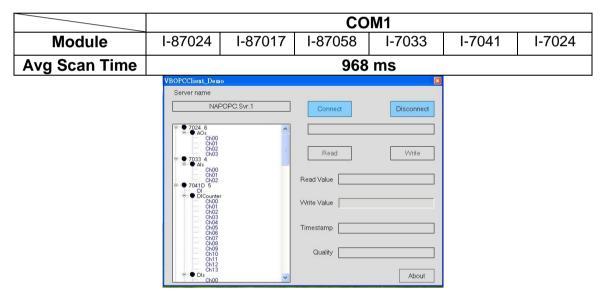
Figure 3.1.1 shows the communication architecture of I/O modules. NAPOPC\_XPE server accesses to I-87024/I-87017/I-87058/I-7024/I-7033/I-7041 via serial COM port. Suppose we need the interval time of accessing I-87024 and I-7024 is 1 sec and the interval time of I-7041 and I-87058 is 3 sec. But, we want to update I-7033 and I-87017 every 100 ms. For this purpose, we can achieve it by seven steps as below.

**Step 1:** First of all, we try to connect all modules on COM1 and to auto search these modules.

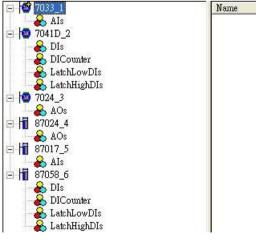


**Step 2:** Connect OPC client to NAPOPC\_XPE Server. At the status bar of NAPOPC\_XPE window, it shows average scan time AvgScentime:968 ms when clicking any module.

We will find the average scan time is 968 ms.



**Step 3:** We divide these modules into two groups. I-87024/I-87017/I-87058 connects to COM1. I-7033/I-7041/I-7024 connects to COM2. And we search again.



**Step 4:** Connect OPC client to NAPOPC\_XPE server again. We can discover the average scan time separately when clicking each module. We will find the average scan time of COM1 is 391 ms, and of COM2 is 516 ms.

|               |         | COM 1   |         |        | COM2   |        |
|---------------|---------|---------|---------|--------|--------|--------|
| Module        | I-87024 | I-87017 | I-87058 | I-7033 | I-7041 | I-7024 |
| Avg Scan Time |         | 391 ms  |         |        | 516 ms |        |

#### **Step 5:** Now we can set pending time to each module as below.

|              | I-7033 | I-7041 | I-7024 |
|--------------|--------|--------|--------|
| Pending Time |        | 2000   | 800    |

|              | I-87024 | I-87017 | I-87058 |
|--------------|---------|---------|---------|
| Pending Time | 800     | —       | 2000    |

| Controller Setting<br>Port Type              |   |
|--|---|
| O Modbus TCP Port Address 502                | Address 1                                       |
| TCP/IP Address 192.168.255.1                 | Timeout 200                                     |
| O Modbus RTU O ISaGRAF                       | Msg Delay                                       |
| <b>O</b> M-7K                                | 🔲 Word Swap                                     |
| COM Port Setting<br>COM 1<br>Baud Rate 9600  | Parity None<br>Data Bits 8 (RTU)<br>Stop Bits 1 |
| O Request Tag Number Coil : 122              | Register 122                                    |
| Simulate I/O (does not access the RS-485/Mod | nus device)                                     |
| Pending Time 800 mSec                        | OK Cancel                                       |

**Step 7:** Discover the average scan time of COM1 and COM2. We can find it is at our target. The average scan time of COM1 is 62 ms. The average scan time of COM2 is 31 ms.

|               |         | COM 1   |         |        | COM2   |        |
|---------------|---------|---------|---------|--------|--------|--------|
| Module        | I-87024 | I-87017 | I-87058 | I-7033 | I-7041 | I-7024 |
| Avg Scan Time |         | 62 ms   |         |        | 31 ms  |        |

# 3.2 VB5 Client Demo Program

We provide three OPC client demo programs for Visual Basic 5.0, Visual Basic .Net and Visual C# .Net. It is placed under the "\\ICPDAS \NAPOPC\_XPE \Client\" folder after installation of our NAPOPC\_XPE server.

- Note: The .Net demo programs could compatibility for Visual Studio .Net 2003 or later.
- Step 1: Launch the client demo program.

(The client program will search the system registry to find OPC servers. The new servers will be added to the list.)

**Step 2:** Select the "NAPOPC.Svr.1" OPC Server.

**Step 3:** Click on the "Connect" button.

| •                      | NAPOPC Te   | 000       |            |
|------------------------|---|-----------|------------|
| OPC Server             | 8   |           |            |
| NAPOPC.S               | vr.1  | Connect   | Disconnect |
| FactorySoft            | Rapid Service.1<br>ModbusShell.1<br>Shell.1<br>Solutions ASMBTCPO |           |            |
| NAPOPC S               | vr.1  | >         |            |
| OCSTK.DA<br>Matrikon.O |   | Ų         |            |
| 1.000.040.0.200.000    |   |           |            |
|                        |   |           |            |
| Tag Value              | Read  | Loop Read |            |
| Text1                  |   |           |            |
| Counte 0               | Write   | Stop Loop | Exit       |

**Step 4:** Select a file which you want to use and click on the "OK" button.

| Open a NAPOPC Doc   | cument  |
|---|---------|
| Click here to browse more files<br>01. ISaGRAF_TEST.tdb<br>02. ISaGRAF_TEST1.tdb<br>03. WINCON_8837.tdb<br>04. NAPOPC1.tdb<br>05. NAPOPC2.tdb | ►<br>OK |

The following steps 5 ~ 6 are read operation of Modbus TCP controllers.

Step 5: Select a tag matching on your configuration. (For example: Select the "i-8437" controller, "DO" group and "DO1" tag in the tree-view window.)

**Step 6:** Click on the "Read" button to read the ""MTCP\_8054.DO.DO1" value.

|                            | NAPOPC Test (    | 000           |            |
|----------------------------|------------------|---------------|------------|
| OPC Server<br>NAPOPC.Svr.1 | <u> </u>         | Connect       | Disconnect |
| Tag Selected : 🤇           | MTCP_8054.DO.DO1 | $\overline{}$ |            |
|                            | DI               |               | Û          |
| Tag Value<br>False         | Read             | Loop Read     |            |
| Counte 0                   | Write            | Stop Loop     | Exit       |

The following steps 7 ~ 9 are write operation of Modbus TCP controllers.

- Step 7: Select a tag matching on your configuration. (For example: Select the "i-8437" controller, "DO" group and "DO1" tag in the tree-view window.)
- **Step 8:** Fill in the "Tag-Value" field with 1.

**Step 9:** Click the "Write" button to write the "MTCP\_8054.DO.DO1" value.

|               | NAPOPC Test C    | 000          |            |
|---------------|------------------|--------------|------------|
| OPC Server    |                  |              |            |
| NAPOPC.Svr.   | 1                | Connect      | Disconnect |
| Tag Selected: | MTCP_8054.DO.DO1 | $\mathbf{>}$ |            |
| - MTCH        |                  |              |            |
| <b>±</b>      | DI               |              |            |
|               | DOI              |              |            |
|               | DO2              |              |            |
|               | D03              |              | -          |
|               | DO5              |              |            |
| 1             | JDO6             | i.           | 11         |
| Tag Value     | Read I           | Loop Read    |            |
| μ             | Write            | Stop Loop    | Exit       |
| Counte 0      | wille _          | sub roob     | IXII       |

The following steps 10 ~ 12 are read operation, which loops unless you stop it.

- **Step 10:** Click on the "Loop Read" to continuously read data.
- Step 11: After about 5 seconds (or more), click on the "Stop Loop" button to stop reading.
- **Step 12:** A window pops up to show the performance. Close it by clicking the "OK" button.

|                            | NAPOPC Test Client                    | 000        |
|----------------------------|---------------------------------------|------------|
| OPC Server<br>NAPOPC Svr.1 | Connect                               | Disconnect |
| Tag Selected:              | MTCP_8054.DO.DO1                      |            |
|                            | Project1 Performance = 1435 Reads/Sec |            |
| Tag Value                  | Read Loop Read                        |            |
| False<br>Counte 4711       | Write Stop Loop                       | Exit       |

Step 13: Click on the "Disconnect" button to disconnect from the OPC server.

**Step 14:** Click on the "Exit" button to end the client demo program.

| <b>.</b>           | NAPOPC 1      | est Clien | ıt      | $\mathbf{O}$ $\mathbf{O}$ $\mathbf{O}$ |
|--------------------|---------------|-----------|---------|--|
| OPC Server         |               |           |         | $\frown$                               |
| NAPOPC.Svr.        | 1             |           | Connect | Disconnect                             |
| Tag Selected :     | MTCP_8054.DO  | D.DO1     |         | $\smile$                               |
|                    |               |           |         |  |
|                    |               |           |         |  |
|                    |               |           |         |  |
|                    |               |           |         |  |
|                    |               |           |         |  |
| 1                  |               |           |         |  |
| )<br>Tag Value     | Read          | Loop      | Read    |  |
| Tag Value<br>False | Read<br>Write | Loop      | Read    | Exit                                   |

# 3.3 .Net Client Demo Program

We provide another two OPC client demo programs for Visual Basic .Net 2003 and Visual C# .Net 2003. It's placed under the following folder "\\ICPDAS\NAPOPC\_XPE\Client\OPC\_NetClientDemo\VBOPCClient\_Demo" and "\\ICPDAS\NAPOPC\_XPE \Client\OPC\_NetClientDemo\VCSOPCClient\_Demo"after installation of our NAPOPC\_XPE server.

Step 1: Launch the client demo program "VBOPCClient\_Demo.exe" or "VCSOPCClient\_Demo.exe". (The client program set "NAPOPC.Svr.1" as default OPC Server)

Step 2: Click on the "Connect" button.

| VBOPCClient_Demo |             |             |               |                   |                            |
|------------------|-------------|-------------|---------------|-------------------|----------------------------|
| Berver name      | e           |             |               |                   |                            |
|                  | Server Name |             |               |                   |                            |
| <del></del>      | Server Name | !: (``)     | Connect       |                   | Disconneo                  |
|                  |             |             |               |                   | <mark></mark>              |
|                  |             | <del></del> |               |                   | • • • • • • • • • • • •    |
|                  |             |             |               |                   |                            |
|                  |             |             |               |                   |                            |
|                  |             |             |               | <u></u>           | <u></u>                    |
|                  |             |             | Read          |                   | : Write                    |
|                  |             |             |               |                   | · · [                      |
|                  |             |             |               |                   |                            |
|                  |             |             | <u></u>       | <u></u>           | <u></u>                    |
|                  |             | Rea         | ad Value 🗌    |                   |                            |
|                  |             |             | . L.          | • • • • • • • • • | • • • • • • • • • • • •    |
|                  |             |             |               |                   |                            |
|                  |             | · Salai     | te Value 🗌    |                   |                            |
|                  |             | · · · · ·   | le value · ]  |                   |                            |
|                  |             |             |               |                   |                            |
|                  |             |             | <u></u>       |                   |                            |
|                  |             | Tin         | nestamp       |                   |                            |
|                  |             |             | <b>!</b> : Ļ. |                   |                            |
|                  |             |             |               |                   | • • • • • • • • • • •      |
|                  |             |             | A 10 1        |                   |                            |
|                  |             | • •         | Quality       |                   |                            |
|                  |             |             |               |                   |                            |
|                  |             |             |               |                   | · · · · <u>- · · · · ·</u> |
|                  |             |             |               |                   | About                      |
|                  |             |             |               |                   |                            |

**Step 3:** Select a file which you want to use and click on the "OK" button.

| Open a NAPOPC Doc   | ament        |
|---|--------------|
| Click here to browse more files<br>01. ISaGRAF_TEST.tdb<br>02. ISaGRAF_TEST1.tdb<br>03. WINCON_8837.tdb<br>04. NAPOPC1.tdb<br>05. NAPOPC2.tdb | ▲<br>▼<br>OK |

The following steps 4 ~ 5 are read operation of Modbus TCP controllers.

**Step 4:** Select a tag matching on your configuration.

(For example: Select the "i-8437" controller, "DO" group and "DO1" tag in the tree-view window.)

Step 5: Click on the "Read" button to read the "MTCP\_8054.DO.DO1" value.

| ٩                     | 7BOPCClient_Demo 🧧             |
|-----------------------|--------------------------------|
| Server name           |                                |
| NAPOPC.Svr.1          | Connect Disconnect             |
| B● MTCP_8054<br>B● DI | MTCP_8054.D0.D01               |
| DI                    |                                |
| DI2                   |                                |
| D13                   | Read Write                     |
| DI4                   |                                |
| DI5                   |                                |
| D16                   | Read Value False               |
| D17                   | Read value Faise               |
| D18                   |                                |
| ⊟•● D0                |                                |
| _ D01                 | Write Value                    |
| D02                   |                                |
| D03                   |                                |
| D04                   | Timestamp 2004/7/8 下午 02:15:41 |
| D06                   | 2004/10/11/02/10/41            |
| D07                   |                                |
| D 08                  | Quality GOOD                   |
|                       | Quality GOOD                   |
|                       |                                |
|                       | About                          |
|                       | About                          |

The following steps 6 ~ 8 are write operation of Modbus TCP controllers.

- Step 6: Select a tag matching on your configuration. (For example: Select the "i-8437" controller, "DO" group and "DO1" tag in the tree-view window.)
- Step 7: Fill in the "Write Value" field with 1.

**Step 8:** Click the "Write" button to write the "MTCP\_8054.DO.DO1" value.

| <b>V</b>  | CSOPCClient_Demo  |
|---|---|
| Viewer name           NAPOPC.Svr.1           ■         MTCP_8054           ■         D1           □         D1           □         D1           □         D1           □         D1           □         D12           □         D13           □         D14           □         D15           □         D16           □         D10           □         D01           □         D03           □         D04 | CSOPCCliext_Demo Connect Disconnect MTCP_8054.DO.D01 Read Write Read Value Write Value 1 Timestamp 2004/7/8 下午 02:31:17 |
| D06<br>D07<br>D08   | Quality GOOD  |
|   | About   |

**Step 13:** Click on the "Disconnect" button to disconnect from the OPC server.

# 3.4 LabVIEW

Note: The following steps are on PC not on XPAC. If you have LabVIEW SCADA based on Windows XP Embedded, you can refer to the following steps to try it.

| Eile Edit Iools Help           Open an existing virtual instrument.         New           Open         Ei |
|---|
| Open an existing virtual instrument.  |
| New   |
| Open  |
|   |
| Configure   |
| LabVIEW 7 Express Help  |

Step 1: Run the LabVIEW program and select "Open..." -> Example

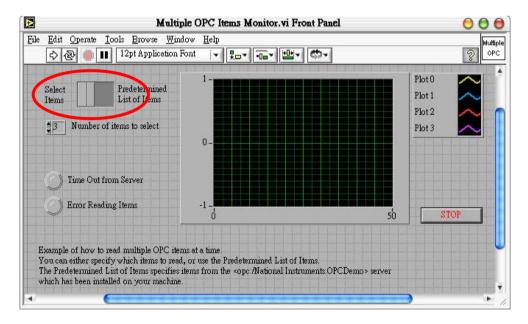
Step 2: Click on the "Search Examples" button to get information on using OPC.

|                             | NI Example Finder                      | 00   |
|-----------------------------|--|--|
| Browse Search Submit        | Double-click an example to open it.    | Description  |
| Enter keyword (s)<br>opc    | No examples match your search criteria | No available description information.  |
| Search                      |  |  |
| Double-click keyword (s)    |  |  |
| opc                         |  |  |
|                             |  | All hardware compatible with selected<br>example. Double-click a device to view<br>Web information |
| Search for:                 |  |  |
| any of the words            |  |  |
| 🗆 Include ni.com examples 🍈 |  |  |
| dware                       |  |  |
| No hardware found           |  |  |

**Step 3:** Double-click on the "Multiple OPC Items Monitor.vi" item in the middle window of NI Example Finder dialog.

|   | NI Example Finder  | 00   |
|---|--|--|
| Browse Search Submit  | Double-click an example to open it.  | Description  |
| Enter keyword (s)<br>opc<br>Search<br>Double-click keyword (s)<br>opc | 6 Examples match your search criteria<br>Browse To OPC Item vi<br>Multiple OPC Item Montoc vi<br>NI DAQ OPC Client vi<br>NI Demo OPC Client vi<br>NI FieldPoint OPC Client vi<br>OPC Quality and Timestamp Attributes.vi | This example uses the DataSocket VIs<br>that shipped with versions of<br>LabVIE W prior to version 6i. These<br>VIs are provided with LabVIEW 6i<br>for compatibility. The DataSocket<br>primitives shipping with LabVIEW 6i<br>are not currently fully compatible with<br>OPC. When using DataSocket to<br>connect to OPC Servers, use the older<br>compatibility DataSocket VIs. |
| Search for:   |  | All hardware compatible with selected<br>example. Double-click a device to view<br>Web information   |
| any of the words 🔹  |  |  |
|   | 271  |  |
| ardware   |  |  |

Step 4: Click on the "Select Items" item in the "Multiple OPC Items Monitor.vi" demo.



Step 5: Run this demo.

**Step 6:** Click on a machine name in the "Network" tree-view.

Step 7: Select the "NAPOPC.Svr" OPC server.

Step 8: Click on the "OK" button to close it.

**Step 9:** Select a file which you want to use and click on the "OK" button.

**Step 10:** Select an item (tag) in the tree-view.

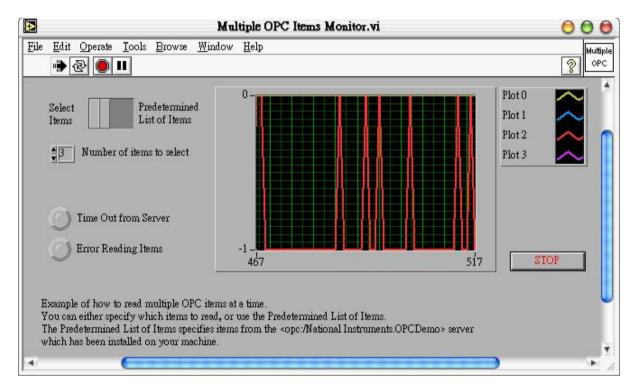
| DO                            | <u>о</u> к     |
|-------------------------------|----------------|
| DO1<br>DO2<br>DO3             | <u>C</u> ancel |
|                               |                |
| <b>DO4</b>                    |                |
| 2005<br>2006                  |                |
| D06                           | -              |
|                               |                |
| National Instruments OPC Demo | *              |
| •                             |                |
| rowse host:                   | Refresh        |

Step 11: Click on the "OK" button to add this one

**Step 12:** Repeat the steps 6 ~ 11 to add more items(tags).

**Step 13:** Click on the "Cancel" button to finish adding items(tags).

Step 14: The grid window graphs a line(s) to show changes of each item (tag).



# 3.5 NATIONAL INSTRUMENTS

National Instruments is a comprehensive industrial automation company by providing the software, hardware, and technologies necessary to transform personal computers into powerful computer-based and networked measurement and automation systems. The ServerExplorer is one of their products for connecting to OPC Server. For more information, please visit <u>http://www.ni.com</u>

Step 1: Start ServerExplorer. Right-click on "NAPOPC.Svr", then select "Wizard".

| 🚀 New Project -   | Server Explorer 2.                      | .4.1                   |                    |          |   |
|---|---|------------------------|--------------------|----------|---|
| File Servers Edit   | View Options Help                       |                        |                    |          |   |
|   |   |                        |                    |          |   |
| My Computer     FactorySc     FactorySc     FactorySc     FactorySc     FactorySc     MAPOPC     My Network | ft.Sample<br>ft.Shell                   | Name (Device\Item)     | Item ID            | Value    |   |
|   | Properties<br>Add/Edit Groups<br>Delete |                        |                    |          |   |
|   | Map Network Server                      | r -                    |                    |          |   |
|   |   | <                      |                    |          | > |
| Automagically configur  | e and test a server                     | C:\Program Files\Natio | nal Instruments\na | ati.ccdb |   |

Step 2: The OPC Wizard - Connection dialog box appears. Then click on "Next>"

|         |          | Press the 'Next' button to connect to the OPC Server. |
|---------|----------|---|
|         | Server:  | NAPOPC.Svr  |
| P AL-TO | Machine: | VRABBIT   |
|         | Run As:  | Local Server (EXE)                                    |
| ***     | \$       |   |
|         |          | < Back Next > Cancel Help                             |

**Step 3:** Select a file which you want to use and click on the "OK" button.

**Step 4:** Enter the **Group Name** and **Update Rate**. The name can be any name you want. Click "Next>" to continue.

| OPC Wizard - Group Creatio | Press the 'Next' button to create the OPC Group     | X |
|----------------------------|---|---|
|                            | Group Name: Wizard Group<br>Update Rate (msec): 100 |   |
|                            | < Back Next > Cancel Help                           |   |

**Step 5:** Select all the items that you want to view from the **Available OPC Items** list. Then click "Finish".

|           | Available OPC Items  |      | Selected OPC Items   |   |
|-----------|----------------------|------|----------------------|---|
| 3 4 4     | Items (Device\Item)  | ~    | Items (Device\Item)  | ^ |
| I MASING  | 👉 7016_17.Als.Ch00   |      | 6 17188EG_TCP.IO.BI1 |   |
|           | 👉 7016_17.D0         | _    | 6 17188EG_TCP.10.BI2 |   |
| PADAD     | 👉 7016_17.D0s.Ch00   |      | 👉 17188EG_TCP.10.813 |   |
| 1 SKE     | 👉 7016_17.D0s.Ch01   |      | 6 17188EG_TCP.10.BI4 |   |
| 1718      | 🔗 7016_17.D0s.Ch02   | >>   | 👉 I7188EG_TCP.IO.BO1 |   |
| Alexer    | 👉 7016_17.D0s.Ch03   | _    | 👉 17188EG_TCP.10.802 |   |
| 2         | 👉 7050D.Counter.Ch00 | 1831 | 17188EG_TCP.10.803   |   |
|           | 🔗 7050D.Counter.Ch01 | Ve.s | 17188EG_TCP.IO.BO4   |   |
| * *       | 👉 7050D.Counter.Ch02 |      | 👉 17188EG_TCP.IO.T1  |   |
|           | 7050D.Counter.Ch03   |      | 6 I7188EG_TCP.IO.V1  |   |
| Fig. Same | 👉 7050D.Counter.Ch04 |      | 6 17188EG_TCP.10.V2  |   |
|           | 👉 7050D.Counter.Ch05 | ~    | 👉 17188EG TCP.10.V3  | ~ |
|           | <                    |      | <                    | > |

Step 6: Now you should be able to view the OPC connection that you just created.

| Name (Device\Item) Item ID   | Value  | Timestamp  |
|------------------------------|--|--|
| I7188EG_TC I7188EG_TCP.IO    | 0  | 15:50:16:  |
|                              |  | 15:50:16:  |
| 17188EG_TC 17188EG_TCP.IO    | 0  | 15:50:16:  |
| ▲ I7188EG_TC I7188EG_TCP.IO  |  | 15:50:16:  |
|                              | 0  | 15:50:16:  |
| 17188EG_TC 17188EG_TCP.IO    | 0  | 15:50:16:  |
| 17188EG_TC 17188EG_TCP.IO    | 0  | 15:50:16:  |
| Ø 17188EG_TC 17188EG_TCP.IO  | 0  | 15:50:16:  |
| 17188EG_TC 17188EG_TCP.IO.T1 | 100  | 15:50:16:  |
|                              | -199.4   | 15:50:16:  |
| 17188EG_TC 17188EG_TCP.IO.V2 | -33.4  | 15:50:16:  |
| 17188EG_TC 17188EG_TCP.IO.V3 | 523  | 15:50:16:  |
| I7188EG_TC I7188EG_TCP.IO.V4 | 23   | 15:50:16:  |
|                              |  |  |
|                              |  |  |
|                              |  |  |
|                              |  |  |
|                              |  | 10000  |
| J≤ I                         |  | >  |
|                              | Name (Device\Item)         Item ID           I7188EG_TC         I7188EG_TCP.IO           I7188EG_TC         I7188EG_TCP.IO.V1           I7188EG_TC         I7188EG_TCP.IO.V2           I7188EG_TC         I7188EG_TCP.IO.V3           I7188EG_TC         I7188EG_TCP.IO.V4 | Name (Device\Item)         Item ID         Value           I7188EG_TC         I7188EG_TCP.IO         0           I7188EG_TC         I7188EG_TCP.IO.V1         -199.4           I7188EG_TC         I7188EG_TCP.IO.V2         -33.4           I7188EG_TC         I7188EG_TCP.IO.V3         523           I7188EG_TC         I7188EG_TCP.IO.V4         23 |

Step 7: To add new items, right-click on the group name then select "Add/Edit Items".

| File Servers Edit View Options Help  |   |        |           |
|--|---|--------|-----------|
|  |   |        |           |
| 🖃 🔡 My Computer  | Name (Device\Item) Item ID                    | Value  | Timestamp |
| FactorySoft.InProc   | 👉 I7188EG_TC I7188EG_TCP.IO                   | 0      | 15:50:16: |
| FactorySoft.Sample   | I7188EG_TC I7188EG_TCP.IO                     | 0      | 15:50:16: |
| FactorySoft.Shell  | I7188EG_TC I7188EG_TCP.IO                     | 0      | 15:50:16: |
| E VAPOPC.Svr   | I7188EG_TC I7188EG_TCP.IO                     | 0      | 15:50:16: |
| Wizard Group<br>T7100 Properties   | 7188EG_TC I7188EG_TCP.IO                      | 0      | 15:50:16: |
| 7 17188 Properties<br>7 17188 Add/Edit Items   | 7188EG_TC I7188EG_TCP.IO                      | 0      | 15:50:16: |
| 717188 Delete  | 7188EG_TC I7188EG_TCP.IO                      | 0      | 15:50:16: |
| 17188 Duplicate  | 7188EG_TC I7188EG_TCP.IO                      | 0      | 15:50:16: |
| A 17188  | 7188EG_TC I7188EG_TCP.IO.T1                   | 100    | 15:50:16: |
| 17188 Deactivate Gro   | up 7188EG_TC I7188EG_TCP.IO.V1                | -199.4 | 15:50:16: |
| 6 I7188EG_TCP.IO.BO3   | I7188EG_TC I7188EG_TCP.IO.V2                  | -33.4  | 15:50:16: |
| 🛷 17188EG_TCP.IO.BO4   | I7188EG_TC I7188EG_TCP.IO.V3                  | 523    | 15:50:16: |
| 🚽 👉 17188EG_TCP.IO.T1  | I7188EG_TC I7188EG_TCP.IO.V4                  | 23     | 15:50:16: |
| 🛷 I7188EG_TCP.IO.V1  |   |        |           |
| - 🔗 I7188EG_TCP.IO.V2  |   |        |           |
| // I7188EG_TCP.IO.V3   |   |        |           |
| I7188EG_TCP.IO.V4  |   |        |           |
| 🗄 🍓 My Network Places  |   |        |           |
| - Andread - Andr | <   |        | >         |
| udds a new element   | C:\Program Files\National Instruments\nati.cc | db     |           |

**Step 8:** Make sure the **Item ID** textbox at the bottom has the correct object and item name. Then click "Add>>" to add the item to the list on the right. In this example, we add the "I7188EG\_TCP.IO.V5". Click "OK" when you are done.

| Item Definition   |  | Names (Device\Item)  |
|---|--|--|
| <ul> <li>☐ 17188EG_TCP</li> <li>☐ 10</li> <li>☐ 17188EG_RTU</li> <li>☑ 7050D</li> <li>☑ 7188×8</li> <li>☑ 18437_TCP</li> <li>☑ 7050D_16</li> <li>☑ 7016_17</li> </ul> | BI1<br>BI2<br>BI3<br>BI4<br>BO1<br>BO2<br>BO3<br>BO4<br>T1<br>V1<br>V2<br>V3<br>V3<br>V4<br>V5 | <ul> <li>I7188EG_TCP.IO.BI1</li> <li>I7188EG_TCP.IO.BI2</li> <li>I7188EG_TCP.IO.BI3</li> <li>I7188EG_TCP.IO.BI3</li> <li>I7188EG_TCP.IO.B01</li> <li>I7188EG_TCP.IO.B02</li> <li>I7188EG_TCP.IO.B03</li> <li>I7188EG_TCP.IO.B04</li> <li>I7188EG_TCP.IO.V1</li> <li>I7188EG_TCP.IO.V1</li> <li>I7188EG_TCP.IO.V3</li> <li>I7188EG_TCP.IO.V4</li> </ul> |
| Name (Device\Item):   | Data Type:   |  |
| 17188EG_TCP.IO.V5   | Default  |  |
| Item ID:  | Access Paths:  |  |
| 17188EG_TCP.IO.V5   | Default  |  |
| Advanced  | Active Add >>  | Validatel  |

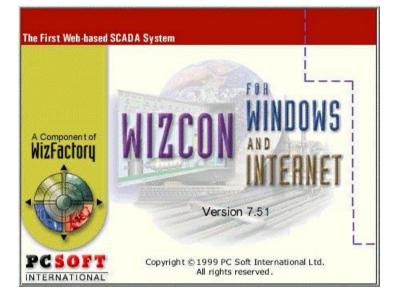
Step 9: Now you should be able to read all the items that you added in the main window.

| 🖃 😼 My Computer 🛛 🧖                 | Name (Device\Item)   | Item ID           | Value  | Timestamp    |
|-------------------------------------|----------------------|-------------------|--------|--------------|
| 🛛 🐺 FactorySoft.InProc              | I7188EG_TCP.IO.BI1   | I7188EG_TCP.IO    | 0      | 15:52:49:823 |
| FactorySoft.Sample                  | 17188EG_TCP.IO.BI2   | I7188EG_TCP.IO    | 0      | 15:52:49:823 |
| FactorySoft.Shell                   | 👉 17188EG_TCP.IO.BI3 | I7188EG_TCP.IO    | 0      | 15:52:49:823 |
| E T NAPOPC.Svr                      | 17188EG_TCP.IO.BI4   | I7188EG_TCP.IO    | 0      | 15:52:49:823 |
| E Wizard Group                      | I7188EG_TCP.IO.BO1   | 17188EG_TCP.IO    | 0      | 15:52:49:843 |
| 7188EG_TCP.IO.BI                    | 17188EG_TCP.IO.BO2   | I7188EG_TCP.IO    | 0      | 15:52:49:843 |
| I7188EG_TCP.IO.BI I7188EG_TCP.IO.BI | 17188EG_TCP.IO.BO3   | I7188EG_TCP.IO    | 0      | 15:52:49:843 |
| 7/188EG_TCP.IO.B                    | I7188EG_TCP.IO.BO4   | I7188EG_TCP.IO    | 0      | 15:52:49:843 |
| I7100EG_TCP.IO.B                    | 17188EG_TCP.IO.T1    | I7188EG_TCP.IO.T1 | 100    | 15:52:49:883 |
| // I7188EG_TCP.IO.B                 | I7188EG_TCP.IO.V1    | I7188EG_TCP.IO.V1 | -199.4 | 15:52:49:863 |
| / I7188EG_TCP.IO.B                  | 17188EG_TCP.IO.V2    | I7188EG_TCP.IO.V2 | -33.4  | 15:52:49:863 |
| / I7188EG_TCP.IO.B                  | 17188EG_TCP.IO.V3    | I7188EG_TCP.IO.V3 | 523    | 15:52:49:863 |
| // I7188EG_TCP.IO.T                 | 17188EG_TCP.IO.V4    | 17100EG_TCP.IO.V4 | 23     | 15:52:49:863 |
| 🚽 👉 I7188EG_TCP.IO.V:               | 17188EG_TCP.IO.V5    | I7188EG_TCP.IO.V5 | 50     | 5:52:49:863  |
| 🚽 👉 17188EG_TCP.IO.V                |                      |                   |        | -            |
| 🚽 👉 I7188EG_TCP.IO.V.               |                      |                   |        |              |
| 🚽 👉 I7188EG_TCP.IO.V                |                      |                   |        |              |
| 🚽 🤣 I7188EG_TCP.IO.V                |                      |                   |        |              |

# 3.6 WIZCON

Wizcon for Windows and Internet is a powerful HMI/SCADA software package that delivers real-time and historical information from the plant floor to the boardroom and beyond. For more information, please visit <u>http://www.emation.com</u>

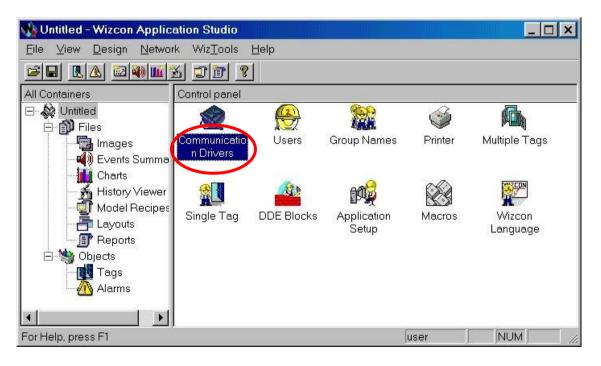
Note: The following steps are on PC not on XPAC. If you have WIZCON SCADA based on Windows XP Embedded, you can refer to the following steps to try it.



Step 1: Run WIZCON (Version 7.51 or newer) program.

Step 2: Create a new project.

Step 3: Click on the "Communication Drivers" icon in the right hand window.



Step 4: Click on the "Add" button to add new drivers.

| Co    | ommunication | n Drivers     |            |                |                |               | ?    | × |
|-------|--------------|---------------|------------|----------------|----------------|---------------|------|---|
| Î     | 🖉 Th         | e following c | ommunicati | on drivers are | defined in the | application   |      |   |
| [     | Logical Na   | Device        | Name       |                | Parameters     |               |      |   |
|       |              |               |            |                |                |               |      |   |
|       |              |               |            |                |                |               |      |   |
|       |              |               |            |                |                |               |      |   |
|       |              |               |            |                |                |               |      |   |
|       | Add          | Rei           | move       | Properties     | 1              |               | -    |   |
| 10000 |              |               | <u></u>    |                |                |               |      |   |
|       |              |               |            |                |                | <u>C</u> lose | Help |   |

**Step 5:** Select the "OPC Client" item.

**Step 6:** Click on the "Next >" button.

| the list.<br>OPC Client                                    |
|--|
| Omron AnyNet TCP/IP<br>Omron E5/E5K<br>Omron SVSMAC family |
| OPC Client<br>Opto 22, TCP/IP<br>Perax P200                |
| PHILIPS 💌  |
| Description:<br>OLE for Process Control Client             |
|  |

**Step 7:** Enter the driver name (for example: "NAPOPC\_XPE").

Step 8: Select the OPC Server Name as "NAPOPC.Svr.1".

Step 9: Click on the "Test Access" button to see if the OPC server can be accessed.

**Step 10:** Click on the "Finish" button.

| Specify a unique logical name for the d<br>NAPOPC<br>OPC Senser Name | .1461 |
|--|-------|
| NAPOPC.Svr.1   | E     |
| Note: Name (Service, of www.server.co                                |       |
| Test Access The server was launched successfully.                    |       |
|  |       |

Step 11: Click on the "Close" button.

| Logical Name | Device | Name       | Parameters              |
|--------------|--------|------------|-------------------------|
| IAPOPC       | OPC    | OPC Client | Read/Write,Out of Block |
|              |        |            |                         |
| ۱ <u> </u>   |        |            |                         |

**Step 12:** Click on the "OK" button to close the window.

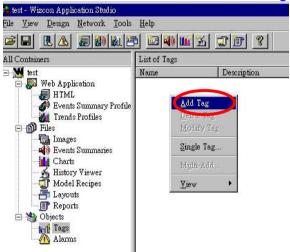


Step 13: Click on the far-right icon (the arrow) to close the WIZCON.



**Step 15:** Select the "Tags" item from the left-hand window.

Step 16: Right click the mouse button and select the "Add Tag" option to add tag(s).



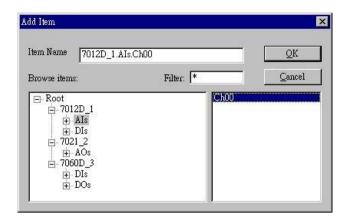
- Step 17: Enter a tag name in the "Tag Name" field.
- Step 18: Select "PLC" in the "Tag Source" field.
- Step 19: Select "NAPOPC\_XPE " in the "Driver" field.
- Step 20: Select "Always" in the "Sample" field.

Step 21: Click on the "..." button to set the "Address" field.

|             | 👢 Tag Defini | tion: NEW Tag             | ?)  |
|-------------|--------------|---------------------------|---|
|             | General R    | ecord   DDE Link          |   |
|             |              | Tag Name:<br>Description: | AIO <u>G</u> roups  |
|             | Tag Source:  | PLC                       |   |
|             | Driver:      | NAPOPC                    | Sample C Never  |
|             | Address:     |                           | In Monitor     In Monitor |
| Set Address |              |                           | • Always  |
|             | Tag Type:    | Analog                    |   |
|             | Format:      | Unsigned-16               | Conversion<br>Measured Engineering  |
|             | Tolerance:   | 0                         | Value 1 0 0   |
|             | Low Limit:   | 1                         | Value 2 1 1   |
|             | High         | 0                         |   |
|             | 8            | 4 <u>0</u>                | K <u>C</u> ancel Apply <u>H</u> elp   |

Close

Step 22: Select a tag and click on the "OK" button.



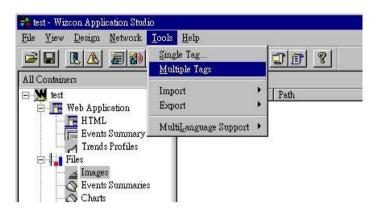
**Step 23:** Click on the "OK" button to close it.

|                          | Tag Name:<br>Description: | AIO                                      |          | Groups                  |
|--------------------------|---------------------------|--|----------|-------------------------|
| ag Source:               | PLC                       | Ð  |          |                         |
|                          | NAPOPC                    | Sample<br>Never<br>I O In Moni<br>Always | tor      | e Rate:<br>sec. 0 📰 ms. |
| 'ag Type:                | Analog                    | -  |          |                         |
| Format:                  | Unsigned-16               | -<br>Conversion                          | Measured | Engineering             |
|                          | 0                         | Value 1                                  | 0        | 0                       |
| Tolerance:               | 1                         | Value 2                                  | 1        | 1                       |
| Tolerance:<br>Low Limit: | 1                         | Value Z                                  | 10       |                         |

Step 24: The right hand window shows the tag(s) that were previously added.

| 🛟 test - Wizcon Application Studio             |              |               |        |             |            | - 🗆 ×  |
|--|--------------|---------------|--------|-------------|------------|--------|
| <u>File View Design N</u> etwork <u>T</u> ools | <u>H</u> elp |               |        |             |            |        |
|  | ð 🖾 🚳 🛍      | <u>% TT ?</u> |        |             |            |        |
| All Containers                                 | List of Tags |               |        |             | <i>a</i> . |        |
| 🖃 💹 test                                       | Name         | Description   | Source | Format      | Driver     | Addres |
| 🖻 🔚 Web Application                            | ∕VAO0        |               | PLC    | Unsigned-16 | NAPOPC     | 7021_: |
| HTML   | ∧ AIO        |               | PLC    | Unsigned-16 | NAPOPC     | 7012D  |
| Events Summary Profile                         |              |               |        | 20-10-20-   |            |        |
| Trends Profiles                                |              |               |        |             |            |        |
| 🗇 📊 Files                                      |              |               |        |             |            |        |
| Images   |              |               |        |             |            |        |
| 🚽 🛶 🚫 Events Summaries                         |              |               |        |             |            |        |
| Charts   |              |               |        |             |            |        |
| History Viewer                                 |              |               |        |             |            |        |
| - 3 Model Recipes                              |              |               |        |             |            |        |
| Layouts  |              |               |        |             |            |        |
| Reports  |              |               |        |             |            |        |
| 🖻 <u></u> Objects                              |              |               |        |             |            |        |
| Tags   |              |               |        |             |            |        |
| 🔤 📶 Alarms                                     |              |               |        |             |            |        |

Step 25: Click on the "Tools/ Multiple Tags" menu item.



Step 26: Click on the "OK" button to close the "Tag Filter" window.

| ie]  |                        | [Dr:                                  | iver][Addr                 | ess] [Value]   |
|--|------------------------|---------------------------------------|----------------------------|--|
| Tag Filter<br>- Tag Filter<br>Name:<br>Driver No.:<br>Address: | From                   |                                       | To                         | Source File<br><u>Wi</u> zpro<br><u>16</u><br><u>File (.GLS)</u> |
| Source 🔽<br>Type 🔽   | P <u>L</u> C<br>Analog | ☑ Du <u>m</u> my<br>☑ <u>D</u> igital | ☑ Com <u>p</u><br>☑ String |  |

Step 27: The "Tags Exerciser Program" window shows tag(s) and value(s).

| File Option Help |                   |         |          |        |        |
|------------------|-------------------|---------|----------|--------|--------|
| [Name]           | [Driver][Address] | [Value] | [Rate][S | ample] | [TYPE] |
|                  | 02 7012D 1.AIs.C  | h00 3   | 1.00     | Ŷ      | A      |
| A I 0<br>A O 0   | 02 7021_2.AOs.Ch  | 00 3    | 1.00     | Y      | A      |

Ш

# 3.7 iFix

iFIX is a powerful HMI/SCADA system that features full process visualization, data collection and management, and supervisory control. iFIX, the HMI/SCADA component of the Installation Dynamics family of automation software, is a Windows NT-based industrial automation solution for monitoring and controlling manufacturing operations. For more information, please visit <u>http://www.intellution.com</u>.

Note:The following steps are on PC not on XPAC. If you have iFix based on Windows XP Embedded, you can refer to the following steps to try it.

**Step 1:** Run iFix 2.1 and start system configuration.

Step 2: Click on the "Add" button to add I/O drivers.

| SCADA Configuration                          |
|--|
| SCADA Support Database Definition            |
| © Enable O Disable Database Name: DATABASE ? |
| I/O Driver Definition                        |
| I/O Driver Name: SIM - Simulation Driver     |
| Configured I/O Drivers                       |
| SIM - Simulation Driver                      |
| Configure                                    |
| Setup  |
| Delete                                       |
| Backup SCADA<br>SCADA Name:                  |
| OK Cancel Help                               |

Step 3: Select the "OPC - OLE for Process Control Client 7.12" driver.

**Step 4:** Click on the "OK" button.

| Driv           | vers available  |                     |
|----------------|---|---------------------|
| <b>0</b><br>P3 | )F - 32-bit DDE Drive<br>PC - OLE for Process<br>81 - Paradym-31 Drive<br>M - Simulation Driver | Control Client 7.12 |
|                | ОК  | Cancel              |

**Step 5:** Select the "OPC - OLE for Process Control Client 7.12" driver.

**Step 6:** Click on the "Configure..." button to configure the I/O driver.

| SCADA Configuration  |               |  |  |  |
|--|---------------|--|--|--|
| SCADA Support Database Definition                                    |               |  |  |  |
| ⊙ Enable ○ Disable Database Name: DATA                               | BASE ?        |  |  |  |
| I/O Driver Definition  |               |  |  |  |
| I/O Driver Name: OPC - OLE for Process Control C                     | Client 7.12 ? |  |  |  |
| Configured I/O Drivers   |               |  |  |  |
| SIM - Simulation Driver<br>OPC - OLE for Process Control Client 7.12 | Add           |  |  |  |
| OPC - OLE for Process Control Cheme 7.12                             | Configure     |  |  |  |
|  | Setup         |  |  |  |
|  | Delete        |  |  |  |
| Backup SCADA<br>SCADA Name:  |               |  |  |  |
| OK   | Help          |  |  |  |

**Step 7:** Click on the "Connect..." button.

| I/O Driver Server Connection  | ×                             |
|---|-------------------------------|
| <ul> <li>Use Local Serve</li> <li>Use Remote Server</li> <li>To run the User Interface, you must<br/>first connect to an I/O Driver OLE<br/>Automation Server.</li> <li>If you want to connect to the server<br/>on this machine, select "Use Local<br/>C"</li> <li>If you want to connect to a server<br/>on another machine, select "Use<br/>Remote Server" and enter the machine<br/>name, or a TCP/IP address of the</li> </ul> | Remote machine name or TCP/IP |
| machine that has the server that you<br>You can use the tree browser to help<br>select a remote machine name.<br>Show this dialog on st:  |                               |
| Connect.  | Cancel                        |

Step 8: To configure the OPC server.

| C:\DYNAMICS\Untitled.opc = F                                | PowerTool  |  |
|---|--|--|
| <u>F</u> ile <u>E</u> dit <u>V</u> iew <u>D</u> isplay Mode | e <u>O</u> ptions <u>H</u> elp   |  |
|   |  |  |
|   | Name: OFCDrv OLE for Process Control Client, Version 7.12<br>Number of 0<br>Number of 0<br>Number of 0 |  |
|   |  |  |
| + <u></u> + <u></u> ,                                       |  |  |
| For Help, press F1  |  |  |

**Step 9:** Select the "NAPOPC.Svr" and click on the "OK" button.

| Latte. | lution OPCEDA<br>LUTION OPCEDA<br>C. Svr | 1 |  |
|--------|--|---|--|
|        |  |   |  |
|        |  |   |  |
| Ŀ      |  |   |  |
|        |  |   |  |
|        |  |   |  |

Step 10: Add server, group and items. Fill properties by clicking on the "Browse Server..." button.

| D: C:\DYNAMICS\Untitled.opc = PowerTool   |
|---|
| <u>File Edit Yiew Display Mode Options Help</u>   |
|   |
| Item       Item2       Enable         Groupi       Descriptic         OPC Item Settings:       Item         Item       Access       No Access Path         Requested       Server       Browse Server         Client Settings:       Disable Output         Disable Output       Latch Date |
|   |
| For Help, press F1  |

**Step 11:** Select the item which you need. Click on the "OK" button.

| Item IDs:   | Access Paths:        |
|---|----------------------|
| □ NAPOPC. Svr<br>□ 7018P_1<br>□ AIs<br>□ Ch00<br>Ch01<br>□ Ch03<br>□ Ch04<br>□ Ch05<br>□ Ch06<br>□ Ch07 | ● 7018P_1. AIs. Ch02 |
| ItemID<br>7018P_1.AIs.Ch02  | Access               |

Step 12: Enter database manager of iFix 2.1.

#### Step 13: Add relative data units.

For example: AI. Driver: "OPC OLE for Process Control Client 7.12". I/O Address: "Server1;Group1:Item1".

| nalog Input - [AI1]*                |                                     | ? ×                |
|-------------------------------------|-------------------------------------|--------------------|
| Basic Alarms Advanced               |                                     |                    |
| Tag Name : AI1<br>Description       |                                     |                    |
| Previous :                          | Next                                | ▲                  |
| Addressing<br>Driver : OPC OLL      | for Process Control Client 7.12     | ▼ /0 Configuration |
| I/O Address : Server1;G             | roup1;Item1                         |                    |
| Conditioning None                   | Hardware<br>Options :               | •                  |
| Scan Settings<br>Process by Excepti | Engineering Units<br>Low Limit 0.00 |                    |
| Scan Time  1<br>Phase At :          | High Limit 100.00<br>Units :        |                    |
|                                     | Save Cancel                         | Help               |
|                                     | Dave Cancer                         |                    |

Step 14: The window displays the current value of the AI unit.

|                   | Manager - [FIX : 1 row<br>it View Blocks Drive |               | Heln                          |                |         | _ 8 ×    |
|-------------------|--|---------------|-------------------------------|----------------|---------|----------|
|                   | a x 🖻 🖻 🛤                                      | -<br>64 120 1 | 51 •4 •% •6 🔎 😵 🕺             |                |         |          |
| Open conne        | ction to node an Time                          | 1/0 Dev       | I/O Addr                      | Curr Value     |         | <u> </u> |
| 1 Al1             | 1  | OPC           | Server1;Group1;7018P_1.Als.Ch | 26.24          | 1       |          |
| 2                 |  |               |                               |                | 1       |          |
| 3                 |  |               |                               |                | ]       | -        |
| 4                 |  |               |                               |                | ]       |          |
| 5                 |  |               |                               |                |         |          |
| •                 |  | ·             |                               |                | •       | •        |
| Open connection ( | to a node and view the                         | database      | OF                            | F EDIT default | default | default  |

# 3.8 InduSoft

InduSoft Web Studio is a powerful, integrated collection of automation tools that includes all the building blocks needed to develop human machine interfaces (HMIs), supervisory control and data acquisition (SCADA) systems, and embedded instrumentation and control applications. Web Studio runs in native Windows NT, 2000, XP and CE 3.0 environments and conforms to industry standards such as Microsoft DNA, OPC, DDE, ODBC, XML, SOAP and ActiveX. For more information please visit: <u>http://www.indusoft.com/</u>

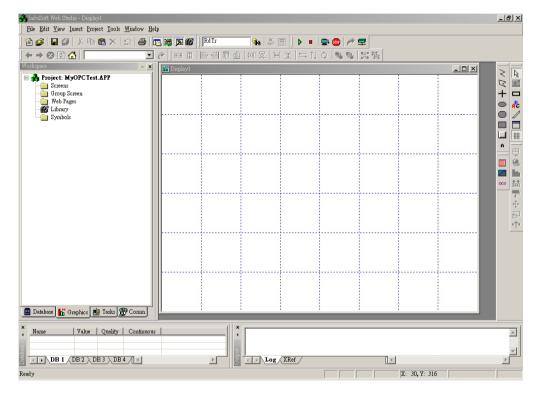
**Step 1:** Before using the InduSoft OPC Client module, you need to install and configure the OPC server in the machines you will run it.

| 7 📷 💾 🥔 🔧                 |                  |                          |                  |                 |        | 1.00        |       | 1              |       |
|---------------------------|------------------|--------------------------|------------------|-----------------|--------|-------------|-------|----------------|-------|
|                           | 8 12             | 📓 🔊 🖷                    | <b>I</b>         | 8 9 0           | 7      | 1 2         | 9     | 3              |       |
|                           |                  |                          |                  |                 | Delete |             |       |                | - Mad |
| ew Open Save Device Group | Tag Multi,       | Gener Search Expan       |                  | Cut Copy Past   |        | 1           | Print | Help Web       | Mail  |
| 8041_1                    | Name             | Туре                     | Channel/Location | Value Scalin    | g      | Description |       |                |       |
|                           | 8 Ch00           | Bit Output               | 0                |                 |        |             |       |                |       |
| 8017H_2                   | 8 Ch01           | Bit Output               | 1                |                 |        |             |       |                |       |
| Als                       | 8 Ch02           | Bit Output               | 2                |                 |        |             |       |                |       |
| 8024_3                    | 8 Ch03           | Bit Output               | 3                |                 |        |             |       |                |       |
| AUS                       | 8 Ch04           | Bit Output               | 4                |                 |        |             |       |                |       |
|                           | 8 Ch05           | Bit Output               | 5                |                 |        |             |       |                |       |
|                           | 8 Ch06           | Bit Output               | 6                |                 |        |             |       |                |       |
|                           | 8 Ch07           | Bit Output               | 7                |                 |        |             |       |                |       |
|                           | 8 Ch08           | Bit Output               | 8                |                 |        |             |       |                |       |
|                           | 8 Ch09           | Bit Output               | 9                |                 |        |             |       |                |       |
|                           | 8 Ch10           | Bit Output               | 10               |                 |        |             |       |                |       |
|                           | 8 Ch11           | Bit Output               | 11               |                 |        |             |       |                |       |
|                           | 8 Ch12           | Bit Output               | 12               |                 |        |             |       |                |       |
|                           | 8 Ch13           | Bit Output               | 13               |                 |        |             |       |                |       |
|                           | 8 Ch14           | Bit Output               | 14               |                 |        |             |       |                |       |
|                           | 8 Ch15<br>8 Ch16 | Bit Output               | 15<br>16         |                 |        |             |       |                |       |
|                           | 8 Ch16           | Bit Output               | 15               |                 |        |             |       |                |       |
|                           |                  | Bit Output               |                  |                 |        |             |       |                |       |
|                           | 8 Ch18           | Bit Output               | 18<br>19         |                 |        |             |       |                |       |
|                           | 8 Ch19<br>8 Ch20 | Bit Output               |                  |                 |        |             |       |                |       |
|                           | 8 Ch20           | Bit Output               | 20               |                 |        |             |       |                |       |
|                           | 8 Ch21           | Bit Output               | 21               |                 |        |             |       |                |       |
|                           |                  | Bit Output               | 22               |                 |        |             |       |                |       |
|                           | 8 Ch23<br>8 Ch24 | Bit Output               | 23               |                 |        |             |       |                |       |
|                           | 8 Ch24           | Bit Output               | 24               |                 |        |             |       |                |       |
|                           | 8 Ch25           | Bit Output               | 25               |                 |        |             |       |                |       |
|                           | 8 Ch26           | Bit Output               | 26               |                 |        |             |       |                |       |
|                           | 8 Ch27           | Bit Output               | 27<br>28         |                 |        |             |       |                |       |
|                           | 8 Ch28           | Bit Output               | 28               |                 |        |             |       |                |       |
|                           | Ch29             | Bit Output<br>Bit Output | 30               |                 |        |             |       |                |       |
|                           | 8 Ch31           |                          | 31               |                 |        |             |       |                |       |
|                           | CII31            | Bit Output               | 51               |                 |        |             |       |                |       |
|                           |                  |                          |                  |                 |        |             |       |                |       |
|                           |                  |                          |                  |                 |        |             |       |                |       |
| У                         |                  |                          |                  | DOs has 32 Tags |        |             | F     | Avg Scan Time: | 0 ms  |

Step 2: Run the InduSoft (Version 4.1 or newer)



Step 3: Create the new project.



**Step 4:** In the Studio Workspace window, click the OPC tab, right-click the OPC folder, and click "Insert":

| 💑 InduSoft Web Studio - Display1  |               |             |          |              | _ 8 ×    |
|---|---------------|-------------|----------|--------------|----------|
| j <u>F</u> ile <u>E</u> dit <u>V</u> iew Insert <u>P</u> roject <u>T</u> ools <u>W</u> indow <u>H</u> elp |               |             |          |              |          |
| ) 🏠 🥔 日 🖉   X 🖻 🛍 X   그   🖨   💽   | 🛱 🔊 🍪 🔤 Rd Tr | 🎭 🕌 🕨 🔹     | 🖳 🖳 🍘 🚍  |              |          |
| $  \leftrightarrow \Rightarrow \otimes \textcircled{0} \bigtriangleup   \fbox{0} \Leftrightarrow ()$      |               | 山 ബ昇  ⊌王 ⇒↑ | ↓◇ 특별 발텔 |              |          |
|   | Display1      |             |          | _ 🗆 🗵        |          |
| Project: MyOPCTest.APP  |               |             |          |              |          |
|   |               |             |          |              |          |
|   |               | 1 1         |          | : :          |          |
| 📓 Database 👫 Graphics 📑 Tasks 🕵 Comm  |               |             |          |              |          |
| × Name   Value   Quality   Continuous   | 1             | *           |          |              | <u>^</u> |
|   |               |             |          |              |          |
| DB1 DB2 DB3 DB4   |               | Log XRef    |          | 1            |          |
|   |               |             | CAP      | X: 1, Y: 233 |          |
|   |               |             | CAP      | A: 1, Y: 233 |          |

Step 5: OPC Attributes window pops up.

| Description: Server Identifier: Disable:   Update Rate (ms): Percent Deadband: Status:   Remote Server Name: | OPC OPCC | L001.OPC         |                   |      |
|--|----------|------------------|-------------------|------|
| 1         2           3         4  | Update   | Rate (ms): Perce | ▼<br>nt Deadband: |      |
| 2<br>3<br>4  |          | Tag Name         |                   | ltem |
| 3<br>4   | 1        |                  |                   |      |
| 4  | 2        |                  |                   |      |
|  | 3        |                  |                   |      |
| 5  | 4        |                  |                   |      |
|  | 5        |                  |                   |      |
|  |          |                  |                   |      |

**Step 6:** Click on the Server Identifier: drop-down menu and select the "NAPOPC.Svr".

| escription:           | Server Identifier:              | Disable: |  |
|-----------------------|---------------------------------|----------|--|
| CP                    | NAPOPC.Svr                      |          |  |
| ead Update Rate (ms): | N.SPOPC.Svr<br>Studio.Scada.UPC | Status:  |  |
| emote Server Name;    |                                 |          |  |

The configuration table for OPC has the following entries:

- Description: this field is used for documentation only. The OPC Client module ignores it.
- Server Identifier: this field should contain the name of the server you want to connect. If the server is installed in the computer, its name can be selected through the list box.
- Disable: this field should contain a tag or a constant. If its value is different of zero, the communication with the OPC server is disabled.
- Update Rate: this field indicates how often the server will update this group in milliseconds. If it is zero indicates the server should use the fastest practical rate.
- Percent Deadband: this field indicates the percent change in an item value that will cause a notification by the server. It's only valid for analog items.
- Tag Name: these fields should contain the tags linked to the server items.
- Item: these fields should contain the name of the server's items

**Step 7:** In the first cell of the Tag Name column type the tag name created in database.

Step 8: In the first cell of the item you can right-click it to get a menu.

| escrip      | tion:             | 0.000005306 | dentifier:                | Disable:                              |   |
|-------------|-------------------|-------------|---------------------------|---------------------------------------|---|
| ICP         |                   | NAPOF       | PC.Svr 👱                  |                                       |   |
| lead U      | lpdate Rate (ms): | Percent     | Deadband:                 | Status:                               |   |
|             |                   |             |                           |                                       |   |
| emote       | Server Name:      |             |                           |                                       |   |
| remote      | sector reality.   | - 12        | -6                        |                                       |   |
|             |                   | Browse.     |                           |                                       |   |
|             |                   |             |                           |                                       |   |
|             |                   |             |                           |                                       |   |
|             | Tag Nag           | 0           | Itom                      | Coon                                  | 1 |
|             | Tag Nan           |             | ltern                     | Scan                                  |   |
| 1           | Tag Nan<br>do1    |             |                           |                                       |   |
| 1           |                   |             |                           |                                       |   |
|             |                   |             |                           | PC Browser                            |   |
| 2           |                   |             | <b>ر م</b><br>لا م        | PC Browser                            |   |
| 2<br>3      |                   |             | ر<br>پ ها<br>ه و          | PC Browser<br>ut Ctrl+X<br>opy Ctrl+C |   |
| 2<br>3<br>4 |                   |             | ر<br>پر م<br>اک م<br>اک م | PC Browser<br>ut Ctrl+X<br>opy Ctrl+C |   |

Step 9: Click the OPC Browser to appear the OPC Browser window.

| OPCCL    | 801.OPC          |                    |                                |           |   |
|----------|------------------|--------------------|--------------------------------|-----------|---|
| Descript | ion:             | Server Identifier: | Disable:                       |           |   |
| ICP      |                  | NAPOPC.Svr         |                                |           |   |
| Read Uj  | pdate Rate (ms); | Percent Deadban    | t <u>Status</u>                |           |   |
|          |                  |                    |                                |           |   |
| Remote   | Server Name:     |                    |                                |           |   |
|          |                  | Browse             |                                |           |   |
|          |                  |                    |                                |           |   |
|          | Tag Nam          | e 🖸                | PC Browser: 'NAPOPC.Svr' [LOCA | AL]       | 1 |
| 1        | do1              |                    |                                |           |   |
| 2        |                  |                    | Conc List of Items<br>□        |           |   |
| 3        |                  |                    | E 🔁 Als                        | Cancel    |   |
| 4        |                  |                    | 🖻 🧰 Dis                        |           |   |
| 5        |                  |                    | 🖻 🛅 DOs                        |           |   |
| 6        |                  |                    | V Ch01                         |           |   |
| 7        |                  |                    | 🕀 🧰 Counter                    | Filter;   |   |
| 8        |                  |                    |                                | C Read    |   |
|          |                  |                    |                                | C Write   |   |
|          |                  |                    | ⊞ 7060D_4                      | →1 • Both |   |
|          |                  |                    |                                |           |   |
|          |                  |                    | 1 1 1 1 10000 4                | Both      |   |
|          |                  |                    | a 🦰 7080 5                     |           |   |

Step 10: Select an item(tag) in the tree-view.

Step 11: Click the "OK" button to add this one.

| • • • OPCCL | 001.0PC                                  |   |             |                     | <u>-0×</u> |
|-------------|--|---|-------------|---------------------|------------|
| ſ           | ion:<br>odate Rate (ms):<br>Server Name; | Server Identi<br>NAPOPC.Sv<br>Percent Dea | и 🗾         | Disable:<br>Status: |            |
|             | Tag Nami                                 | 9   | lterr       | <u> </u>            |            |
| 1           | do1                                      |   | D_2.DOs.Ch0 |                     | Always     |
| 2           |  |   |             |                     |            |
| 3           |  |   |             |                     |            |
| 4           |  |   |             |                     |            |
| 5           |  |   |             |                     |            |
| 6           |  |   |             |                     |            |
| 7           |  |   |             |                     |            |
| 8           |  |   |             |                     |            |
| <b>*</b> [  |  |   |             |                     | M          |

Step 12: Repeat the step between 7 to 11 to add more tags.

**Step 13:** Creating a Text String for the Input/Output Dynamic. Click the Text icon on the Object Editing toolbar. Position the crosshairs in the Display2.scr. Press the"#" key three times to display "###" in the gray square.

**Step 14:** Click the Text Input/Output property icon on the Object Editing toolbar. *Text I/O* appears in the drop-down menu of the Object Properties window. In the Tag/Expression field type the tag name you want to link.

| 🙀 Display2  |               |         |          |               |   | -OX   |
|-------------|---------------|---------|----------|---------------|---|-------|
|             |               |         |          |               |   | -     |
|             | do1           | ###     |          |               |   |       |
|             |               |         |          |               |   |       |
| Objec       | t Properties  |         | i<br>I   | i i           | × |       |
| -im         | Replace       | Hint:   | Text     |               | • |       |
| <u>C</u> aj | otion: 🗱      |         |          |               |   |       |
| Ali         | gn Left       | - Borde | er Color | Transparent   |   |       |
|             | <u>F</u> onts | Bac     | kColor:  | Extern transl |   |       |
|             |               |         |          |               |   |       |
|             |               |         |          |               |   |       |
|             |               |         |          |               |   | -     |
| •           |               |         |          |               |   | • //. |

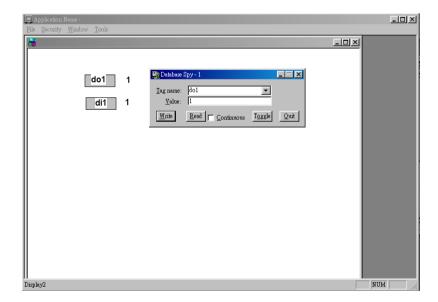
**Step 15:** From the Project select status. Then select the OPC Client Runtime in "Execution Tasks" tab. Click on the Startup button to setup the Startup as Automatic.

| Task                    | Status | Startup   |               |
|-------------------------|--------|-----------|---------------|
| 🦉 Background Task       |        | Automatic | <u>S</u> tart |
| 📑 Database Spy          |        | Manual    |               |
| DDE Client Runtime      |        | Manual    | Stop          |
| 🚰 DDE Server            |        | Manual    |               |
| 📷 Driver Runtime        |        | Manual    |               |
| 🔜 LogWin                |        | Manual    | Startup       |
| ODBC Runtime            |        | Manual    |               |
| OPC Client Runtime      |        | Automatic |               |
| 💓 TCP/IP Client Runtime |        | Manual    |               |
| 💖 TCP/IP Server         |        | Manual    |               |
| Viewer                  |        | Automatic |               |

**Step 16:** Run the program InduSoft OPC Client Runtime module automatically or by the menu "Project->Status". After running this program, a small icon will appear in your system tray. To close the InduSoft OPC Client module, right-click its icon in the system tray, and select "Exit".



**Step 17:** Database Spy allows you to monitor and forces application tags, reading and writing to the database. You can find it in Tools menu.

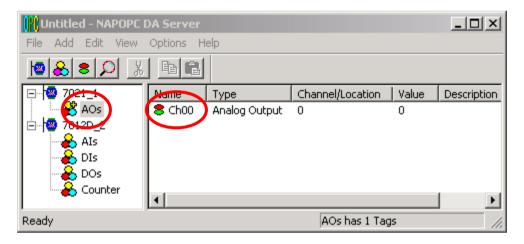


# 3.9 Citect SCADA

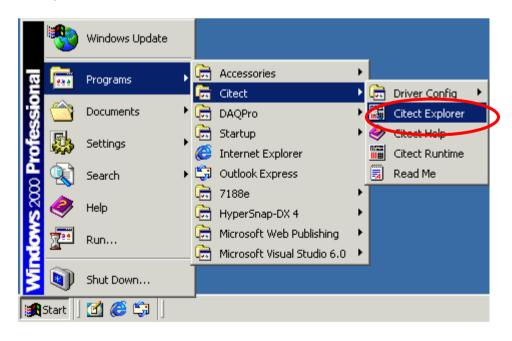
CitectSCADA is a reliable, scaleable and high performance SCADA system that includes over 100 drivers and free development software. Used in a wide range of industries, CitectSCADA enables users to reduce costs by optimizing process operations. Furthermore, it not only reduce risk with built-in redundancy for servers, networks and communications, but open data connectivity via OPC client & server, OLE DB, ODBC, DDE and API as well as over a hundred native drivers. CitectSCADA can implement in Windows 98, NT and 2000. Visit http://www.citect.com for more information about CitectSCADA

# Note: The following steps are on PC not on XPAC. If you have Citect SCADA based on Windows XP Embedded, you can refer to the following steps to try it.

**Step 1:** Before using the CitectSCADA, you need to install and configure the OPC server in the machines you will run it (see Chapter 1).



Step2: Start up the CitectSCADA with version 5.40.



**Step3:** Left click the "page-marked button" or select "File / New Project…" from the CitectSCADA window menu to build a new project in the CitectSCADA.

| QuickStart - Citect Explo  | rer               |            | [       | IX |
|--|-------------------|------------|---------|----|
| File View Tools Help QuickStart Project List My Projects Example | Contents of M     |            |         |    |
| ⊕ 🔁 QuickStart   | Computer<br>Setup | QuickStart | Example |    |
| Ready  |                   |            |         |    |

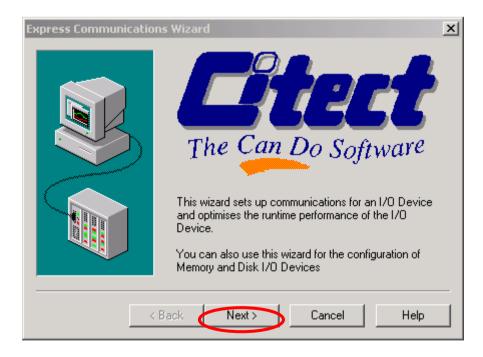
**Step4:** Fill a name of new project in the blank and then click "OK button" to finish this process.

| New Project                              |
|--|
| Name: OPC_test                           |
| Description:                             |
| Location: C:\Citect\User\OPC_test Browse |
| Page defaults                            |
| Template style: Standard                 |
| Template resolution: Default             |
| Show template title bar                  |
| Background colour:                       |
| OK Cancel Help                           |

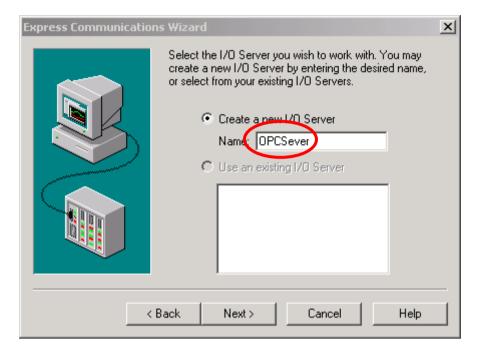
**Step5:** Click the "Express I/O Device Setup" icon to set all communication parameters.

| <b>GPC_test - Citect Explor</b><br>File View Tools Help   | er _OX   |
|---|--|
| OPC_test  | 🔽 🗎 🛋 🖉 🛤 📥 🔚 🖬 🖻 🕞 🚈 🤌  |
| Project List  | Contents of Communications   |
| My Projects  Example  OPC_test  Graphics  Gra | Image: Construction of the second |
| Ready   | ]  |

#### Step6: Start up the "Express Communications Wizard Dialog".



**Step7:** Create a new I/O Server and define a name called "OPCServer" for that one.



**Step8:** Create a new I/O Device under the I/O Server that created previously and define a name called OPCDev for that one.

| Express Communication | s Wizard  | × |
|-----------------------|---|---|
|                       | Select the I/O Device you wish to work with. You may<br>create a new I/O Device by entering the desired name,<br>or select from your existing I/O Device<br>Name: OPCDev<br>C Edit an existing I/O Device |   |
| < E                   | Back Next > Cancel Help   |   |

### Step9: Select "External I/O Device" to be the type of OPCDev I/O Device.

| Express Communication     | ns Wizard                          | × |  |  |  |  |
|---------------------------|------------------------------------|---|--|--|--|--|
|                           | Select the type of the I/O Device. |   |  |  |  |  |
|                           | External I/O Device                |   |  |  |  |  |
|                           | C Memory I/O Device                |   |  |  |  |  |
|                           | Disk I/O Device                    |   |  |  |  |  |
|                           | 1/0 Device name: I0Dev             |   |  |  |  |  |
| < Back Next > Cancel Help |                                    |   |  |  |  |  |

Step10: Set OPC to be the method of communication for OPCDev I/O Device.

| Express Communicati   | ions Wizard  | x |
|---|--|---|
| Select the<br>manufacturer, model<br>and method of<br>communication for<br>the I/O Device | Mitsubishi     Modicon     Moore Industries     National     Mematron     OPC Foundation     OPC Servers     Mematron     OPC Servers     Mematron     OPC Servers | 1 |
| Selected driver<br>Manufacturer:  | OPC Foundation   | ] |
| Model:  | OPC Servers  |   |
| Communications:   | OPC  |   |
|   | < Back Next > Cancel Help  |   |

| Express Communica | tions Wizard  | × |
|-------------------|---|---|
|                   | You need to provide an address for your I/O Device. Press<br>the Driver Address Help button for help on the address of the<br>driver you have selected. |   |
|                   | Driver Address Help   |   |
|                   | Enter an address below or accept the default.   |   |
| Address:          | NAPOPC.Svr.1  |   |
| Selected driver-  |   |   |
| Manufacturer:     | OPC Foundation  |   |
| Model:            | OPC Servers   |   |
| Communications:   | OPC   |   |
|                   |   | _ |
|                   | < Back Next > Cancel Help   |   |

**Step11:** Set Address to be "NAPOPC.Svr.1" for OPCDev I/O Device.

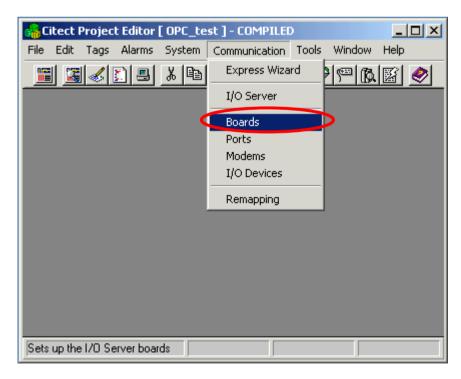
Step12: Do not set any parameter in this step.

| Express Communication | ns Wizard 🔀   |
|-----------------------|---|
|                       | Select this option if you want this I/O Device to link to an external tag database. |
|                       | 🔲 Link I/O Device to an external tag database                                       |
|                       | External tag database:  |
|                       | Browse  |
|                       | Database type:  |
|                       | Concept Ver 2.1 ASCII file  |
|                       | Connection string:  |
|                       | Add prefix to externally linked tags  |
|                       | T ag prefix:  |
|                       | Automatic refresh of tags   |
|                       |   |
| <                     | Back Next> Cancel Help  |

**Step13:** Click the "OK button" to finish the setting of communication parameters.

| Express Commu                    | nications Wizard   | × |  |  |  |  |  |  |
|----------------------------------|--|---|--|--|--|--|--|--|
|                                  | The Communications Wizard will make the following changes to the project 'OPC_test'.   |   |  |  |  |  |  |  |
| Using new I/O Server 'OPCSever'. |  |   |  |  |  |  |  |  |
|                                  | Creating I/O Device 'OPCDev'.<br>+ Type: Disk I/O Device<br>+ Manufacturer: OPC Foundation<br>+ Model: OPC Servers<br>+ Communications: OPC<br>+ Address: [RUN]:OPCDev.CDK |   |  |  |  |  |  |  |
|                                  |  |   |  |  |  |  |  |  |
|                                  | Press Finish to save this setup.   |   |  |  |  |  |  |  |
|                                  | < Back Finish Cancel Help  |   |  |  |  |  |  |  |

Step14: Open the "Citect Project Editor window" to edit Boards parameters.



**Step15:** Edit Boards parameters. The Address (scanning period) is set to be "250ms", and the Special Opt is set to be blank.

| 🛄 Boards [ C      | DPC_test2]               |
|-------------------|--------------------------|
| Server Name       | OPCServer A              |
| Board Name        | BOARD1                   |
| Board Type        | OPC                      |
| Address           | 250 I/O Port Interrupt 💌 |
| Special Opt       |                          |
| Comment           |                          |
| Add<br>Record : 1 | Replace Delete Help      |

Step16: Define two Variable Tags.

| 🔀 OPC_test - Citect Explore  | er   |    |
|--|--|----|
| File View Tools Help   |  |    |
| OPC_test   | I 🎦 🖼 🛋 🖉 🖪 🛯 🔚 🔚 🖬 🐨 🕞 🖂                                  |    |
| Project List  My Projects  Content of the second se | Contents of Tags<br>Ariable Tage<br>Trend Tags<br>SPC Tags |    |
| Ready  |  | // |

**Step17:** Define a variable tag for analog output of the modules 7021. The Variable Tag Name is "A\_out1", the Data type is "REAL", the I/O Device Name is selected to be "OPCDev", and the Address is "7021\_1.AOs.Ch00".(see Step 6)

| 🔜 Variable Tags [ OPC_test ]                    |                         |
|---|-------------------------|
| Variable Tag Name A_out1                        | Data Type REAL 🗨        |
| I/O Device Name OPCDev 💽                        | Address 7021_1.A0s.Ch00 |
| Raw Zero Scale                                  | Raw Full Scale          |
| Eng Zero Scale                                  | Eng Full Scale          |
| Eng Units                                       | Format                  |
| Comment   |                         |
| Add <u>R</u> eplace <u>D</u> elete <u>H</u> elp |                         |
| Record: 1                                       | Linked: No              |

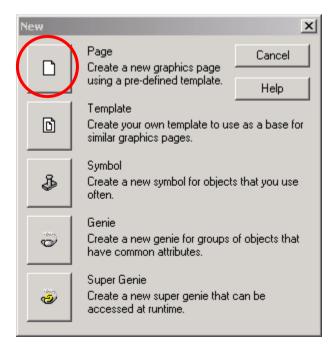
**Step18:** Define another variable tag for analog input of the modules 7012D. The Variable Tag Name is "A\_in1", the Data type is "REAL", the I/O Device Name is selected to be "OPCDev", and the Address is "7012D\_2.Als.Ch00". (See Step 6)

| 🔛 Variable Tags [ OPC_test ]                    |                          |
|---|--------------------------|
| Variable Tag Name A_in1                         | Data Type REAL 🔽         |
| I/O Device Name OPCDev                          | Address Z012D_2.Als.Ch00 |
| Raw Zero Scale                                  | Raw Full Scale           |
| Eng Zero Scale                                  | Eng Full Scale           |
| Eng Units                                       | Format                   |
| Comment   |                          |
| Add <u>R</u> eplace <u>D</u> elete <u>H</u> elp | Linked: No               |
| necolu. Z                                       | LINKEU. NO               |

| Step19: Create a new page | in the "Citect G | raphics Builder window". |
|---------------------------|------------------|--------------------------|
|---------------------------|------------------|--------------------------|

| oitect Grap     | hics Builde | r           |           |          |        |      |      |    |      |     | _     |      |
|-----------------|-------------|-------------|-----------|----------|--------|------|------|----|------|-----|-------|------|
| File Edit View  | • Objects   | Text        | Arrange   | Tools    | Window | Help |      |    |      |     |       |      |
| New             | Ctrl+N      | <b> </b>  @ |           | 3 🖻      | ß۵     |      | 8    | 6  | 51 🥏 | 1   |       | -    |
| Open            | Chrl+O      |             |           |          |        |      |      |    |      |     |       |      |
| Close<br>Find   |             |             |           |          |        |      |      |    |      |     |       |      |
|                 |             | - 11        |           |          |        |      |      |    |      |     |       |      |
| Save<br>Save As | Ctrl+S      |             |           |          |        |      |      |    |      |     |       |      |
| Save As         |             |             |           |          |        |      |      |    |      |     |       |      |
| Import          |             |             |           |          |        |      |      |    |      |     |       |      |
| Properties      |             |             |           |          |        |      |      |    |      |     |       |      |
| Defaults        |             |             |           |          |        |      |      |    |      |     |       |      |
| Compile         | Alt+F10     | -           |           |          |        |      |      |    |      |     |       |      |
| Run             | F5          |             |           |          |        |      |      |    |      |     |       |      |
| Print           | Ctrl+P      |             |           |          |        |      |      |    |      |     |       |      |
| Print Setup,,   |             |             |           |          |        |      |      |    |      |     |       |      |
| Exit            | Alt+F4      |             |           |          |        |      |      |    |      |     |       |      |
|                 |             |             |           |          |        |      |      |    |      |     |       |      |
|                 |             |             |           |          |        |      |      |    |      |     |       |      |
|                 |             |             |           |          |        |      |      |    |      |     |       |      |
|                 |             |             |           |          |        |      |      |    |      |     |       |      |
| Creates a new p | age, templa | te, symb    | ol, genie | or super | genie  | I    | 1 0: | ×0 | -    | 0,0 | GUIDE | GRID |

#### **Step20:** Click the "page-marked button" to create a new page.



| - 1 | lse Template    |          |           |             |   | <b>0</b> .1                  |   | ×      |
|-----|-----------------|----------|-----------|-------------|---|------------------------------|---|--------|
|     | Template: norma |          |           |             |   | Style:<br>bottom<br>standard |   | ОК     |
| (   |                 |          |           |             |   | top<br>version2              |   | Cancel |
|     | normal          | pagemenu | poptrend  | rangechart  |   |                              | - | Edit   |
|     |                 |          |           |             |   | 4 <u>F</u>                   |   |        |
|     | singletrend     | speepk   | spcpareto | spcxrschart |   | ✓ Linked Title bar           |   |        |
|     |                 |          |           |             |   | Resolution:                  |   |        |
|     | standardchart   | summary  | tab1menu  | tab2menu    | • | ,                            |   | Help   |

**Step21:** Select normal template to be the background and function of this page.

**Step22:** Select "Objects /Text " from "Citect Graphics Builder window menu" to insert a "Text Object" on the page.

| or the citect Graphics B | uilder - [OPC_test -       | Intitled1]           | _ 🗆 🗵             |
|--------------------------|----------------------------|----------------------|-------------------|
| 🛅 File Edit View         | Objects Text Arran         | ge Tools Window Help | _ 8 ×             |
| III III III III III      | Free Hand Line             |                      | 1월 🔗 🛛 - 🗌        |
| ?                        | Straight Line<br>Rectangle | 4                    |                   |
|                          | Ellipse                    | \$#                  |                   |
| <u>f(x)</u>              | Polygon                    | + <sup>3</sup>       |                   |
|                          | Pipe                       |                      |                   |
| ð (                      | Text                       |                      |                   |
| 40                       | Button                     |                      |                   |
| <a></a>                  | Symbol Set                 |                      |                   |
|                          | Trend                      |                      |                   |
| 1 (V                     | Cicode Object              |                      |                   |
|                          |                            |                      |                   |
| 45                       |                            |                      |                   |
| <u></u>                  |                            |                      |                   |
| $\square$                |                            |                      |                   |
| ♦ ♦ ♦ ♦                  |                            |                      |                   |
|                          |                            |                      |                   |
|                          |                            |                      |                   |
| \$                       |                            |                      |                   |
|                          |                            |                      |                   |
| Adds text                |                            | [ <sup>i=</sup> 0×0  | 136,15 GUIDE GRID |

**Step23:** Key-in the words "AO:" in the Text object. Then, left click to put the Text object on the page and set "Appearance parameters" of Text object.

| Text Properties  |                      |  |   |     | x             |
|--|----------------------|--|---|-----|---------------|
| Appearance   | Movement 🕅 🖉 Scaling | g∫ ≪ Fill ∫ ≪ Inj                        | put 🛛 🗹 Slider 🗍 🖉 Acce   | ess | 1             |
| Font:<br>Arial   |                      | Style:<br>Bold                           | Size:   |     | General       |
| Arial<br>Arial Black<br>Comic Sans MS<br>Courier<br>Courier New<br>Fixedsys<br>Georgia |                      | Regular<br>Bold<br>Bold Italic<br>Italic | 12       14       16       18       20       22       24       24 |     | 3D Effects    |
| Alignment<br>C Left<br>C Right<br>C Centre   |                      | ext                                      | ×   |     | Display Value |

**Step24:** Select "Objects/Number" from "Citect Graphics Builder window menu" to insert a "Number Object" on the page. Left Click to put Number object on the page. Then, set "Appearance attributes" and "Input attributes" for this Number object.

| Text Properties   | ×                        |
|---|--------------------------|
| 🖌 Appearance 🥪 Movement 🤟 Scaling 🖉 Fill 🗇 Input 🖉 Slider 🖉 Access  |                          |
| Type       Numeric expression         On / off       A_out1         Multi-state       Arroy         Numeric       String         Format:       #####.#### | General 3D Effects 🗸 Dis |
| Text Properties   | x                        |
| 🗸 Appearance 🗹 Movement 🗹 Scaling 🗹 Fill 🗹 Input 🗹 Slider 🗹 Access  |                          |
| Key sequence command  |                          |
| Key sequence  | Touch                    |
|   | Keyboard Commands        |
| Same area as object Same privilege as object  | Com                      |
| Command area: <all areas="">  Privilege level: <none></none></all>  | mands                    |

**Step25:** Set another Text object and Number object by the same way, and the "Appearance attributes" of Text and Number object are showed below.

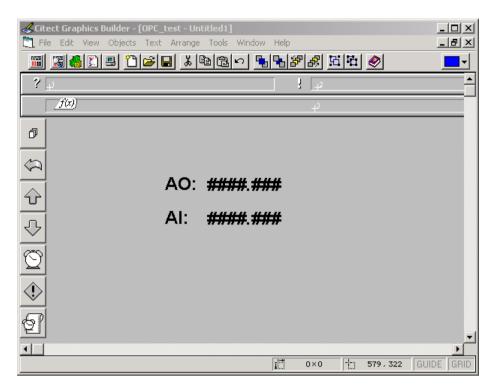
| Text | object: |
|------|---------|
|      |         |

| Appearance Movement C<br>Font:<br>Arial<br>Arial<br>Arial Black<br>Comic Sans MS<br>Courier<br>Courier New<br>Fixedsys<br>Georgia<br>Alignment Effects<br>Cheft<br>Cheft<br>Cheft<br>Centre<br>Foreground: | Scaling Fill Inp<br>Style:<br>Bold<br>Bold Bold Italic<br>Italic | Size:<br>18<br>18<br>18<br>20<br>22<br>24<br>26<br>28<br>36<br>V | General 3D Effects 🖉 Display Value 🖉 Visibility |
|--|--|--|---|
| <b>—</b>   |  |  |   |

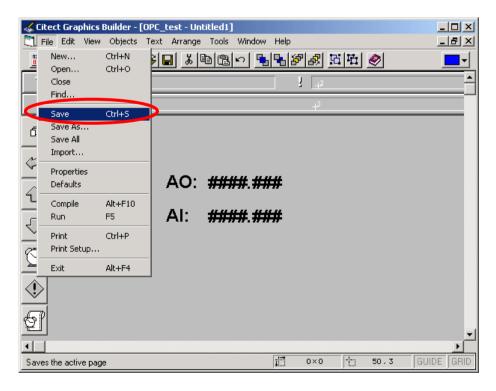
## Number object:

| Text Properties   |                        |               |                 |            | ×   |
|---|------------------------|---------------|-----------------|------------|---|
| Appearance Movi   | ement 🖂 Scaling 🖂 Fill | ∝ Input   ∝ 3 | Slider 🧹 Access |            |   |
| Type<br>O On / off<br>Multi-state<br>Array<br>Nuperic<br>String | Format:                |               |                 | Clear Prop | General 3D Effects ✓ Display Value ✓ Visibility |
|   |                        | <u> </u>      | Cancel          | Apply      | Help  |

**Step26:** When finish the all object and attribute setting, the page is looked like as one, which shows below.



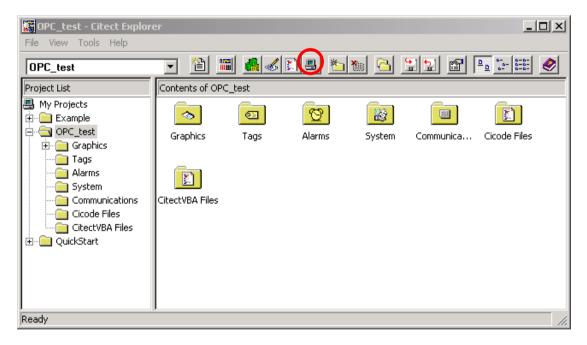
**Step27:** Select "File/Save " from "Citect Graphics Builder window menu" to save this page.

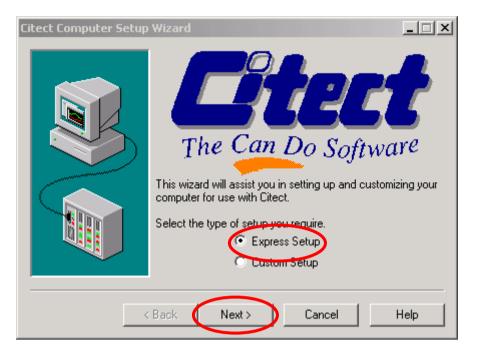


| Save As |          |                     |          | ×           |
|---------|----------|---------------------|----------|-------------|
| Page    | Template | Symbol              | Genie    | Super Genie |
| Page:   |          | ect:                | Preview  |             |
| (page1) |          | C_test              | Ena      | ble Cancel  |
|         | inc      | ample<br>Iude<br>v2 |          |             |
|         | ( op     | c_test<br>ckstart   |          | New         |
|         | <b>T</b> |                     | <b>_</b> | Delete      |
| र       |          |                     |          |             |
|         |          |                     |          | Help        |
|         |          |                     |          |             |

Step28: Fill the name of this page and save it under OPC\_test project.

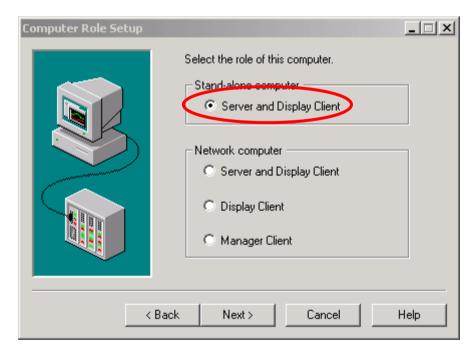
Step29: Left click the "computer-marked button" to define the role of this computer.

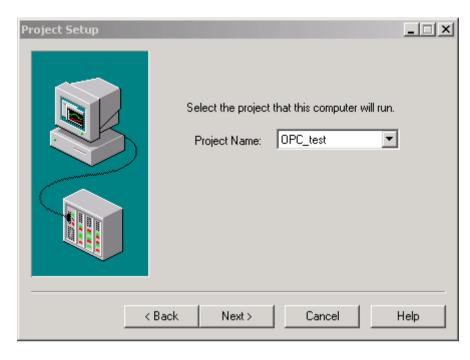




### Step30: Start up the Citect Computer Setup Wizard.

Step31: Select the "Stand-alone computer" item to be the role of this computer.





**Step32:** Select the project "OPC\_test" to be the project that this computer will run.

## Step33: Click the "Next button" to next step.

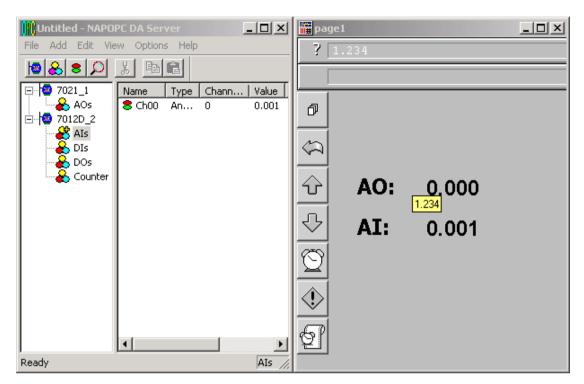
| I/O Server Setup |   |
|------------------|---|
|                  | The I/O Server is the part of Citect that requests data<br>from, and writes data to I/O Devices.<br>A physical connection is required between the computer<br>acting as an I/O Server and the I/O Device it is<br>communicating with. |
|                  | This computer is an I/O Server  |
|                  | Select the I/O Server that this computer will be.   |
|                  | I/O Server Name: <none configured=""></none>  |
|                  | You have no I/O Servers configured in your project.<br>The I/O Server will be disabled.   |
|                  |   |
|                  | Back Next > Cancel Help   |



**Step34:** Left click the "Finish button" to finish the computer setup.

**Step35:** Select OPC\_test project and press "F5" to run this project. Compare the NAPOPC\_XPE Server monitor and CitectSCADA runtime window.

| 🚻 Untitled - NAPOPC DA Serve |           | . D × D | 🛗 page 1 | 1   |       | - 🗆 🗵 |
|------------------------------|-----------|---------|----------|-----|-------|-------|
| File Add Edit View Options   |           |         | ?        |     |       |       |
|                              |           |         |          |     |       |       |
| - 7021_1 Name T              | ype Chann | Value   | <u> </u> |     |       |       |
| AOs SChoo A                  | m O       | 0.001   | ð        |     |       |       |
| AIs                          |           |         |          |     |       |       |
| DIs                          |           |         | \$       |     |       |       |
| Counter                      |           |         | Ŷ        |     | 0.000 |       |
|                              |           |         | <u> </u> | AO: | 0.000 |       |
|                              |           |         | 오        | АТ. | 0.004 |       |
|                              |           |         |          | AI: | 0.001 |       |
|                              |           |         | Õ        |     |       |       |
|                              |           |         |          |     |       |       |
|                              |           |         |          |     |       |       |
|                              |           |         |          |     |       |       |
| •                            |           |         | Q        |     |       |       |
| Ready                        |           | AIs //  |          |     |       |       |



**Step36:** Key-in the value "1.234" to output a voltage via the module 7021.

**Step37:** Both NAPOPC\_XPE Server monitor and CitectSCADA runtime window show the analog input of the modules 7012D is 1.231V.

|                                 | -D×    | 🛗 page1               |     |       |  |
|---------------------------------|--------|-----------------------|-----|-------|--|
| File Add Edit View Options Help |        | ?                     |     |       |  |
|                                 |        |                       |     |       |  |
| Type Chann                      |        | <u> </u>              |     |       |  |
| AOs Schoo An 0                  | 1.231  | đ                     |     |       |  |
| AIs                             |        |                       |     |       |  |
| DIS                             |        | < <u></u>             |     |       |  |
| Counter                         |        | Ŷ                     |     | 4 022 |  |
|                                 |        |                       | AO: | 1.233 |  |
|                                 |        | ۍ                     | AI: | 4 024 |  |
|                                 |        | <u> </u>              | AI: | 1.231 |  |
|                                 |        | Õ                     |     |       |  |
|                                 |        |                       |     |       |  |
|                                 |        | $  \langle \rangle  $ |     |       |  |
|                                 |        |                       |     |       |  |
|                                 | Þ      | Q                     |     |       |  |
| Ready                           | AIs // |                       |     |       |  |

**Step38:** Check if the analog output value of the modules 7021 that showed in the NAPOPC\_XPE Server monitor is 1.234V.

| Untitled - NAPOPC D                 | A Server     |               |                  |          | - 🗆 🗵 | 🔡 page1  |     |       |  |
|-------------------------------------|--------------|---------------|------------------|----------|-------|----------|-----|-------|--|
| File Add Edit View C                | Options Help |               |                  |          |       | ?        |     |       |  |
|                                     |              |               |                  |          |       |          |     |       |  |
| 🖓 7021_1 Nar                        |              | Туре          | Channel/Location | Scaling  | Value |          |     |       |  |
| 0 12D 2                             | Ch00         | Analog Output | 0                |          | 1.233 | ð        |     |       |  |
| 🔒 AIs                               |              |               |                  |          |       |          |     |       |  |
| AIS<br>AIS<br>DIS<br>DOS<br>Counter |              |               |                  |          |       | \$       |     |       |  |
|                                     |              |               |                  |          |       |          |     | 4 000 |  |
|                                     |              |               |                  |          |       | Ŷ        | AO: | 1.233 |  |
|                                     |              |               |                  |          |       | ۍ        | Αι. | 4 000 |  |
|                                     |              |               |                  |          |       |          | AI: | 1.232 |  |
|                                     |              |               |                  |          |       | Q        |     |       |  |
|                                     |              |               |                  |          |       | M        |     |       |  |
|                                     |              |               |                  |          |       |          |     |       |  |
|                                     |              |               |                  |          |       | <u> </u> |     |       |  |
|                                     |              |               |                  |          |       | ଟ୍ର      |     |       |  |
|                                     |              |               |                  |          |       | <u> </u> |     |       |  |
|                                     |              |               |                  |          | ►     |          |     |       |  |
| Ready                               |              |               | AOs ha           | s 1 Tags | 11.   |          |     |       |  |

# 4 Remote Accessing

OPC Client has two ways to access the OPC Server. One is called "Local Accessing", and the other is called "Remote Accessing". If the OPC Client and the OPC Server are at the same computer, we said this kind of architecture is "Local Accessing". In other words, if the OPC Client should access OPC Server through a network, we said this kind of architecture is "Remote Accessing".

The following figure shows the integrated architecture including "Local Accessing" and "Remote Accessing". At the real Process Industry, the two ways are often used at the same time. At the Process Management Layer, we often use "Local Accessing" architecture to monitor and control manufacturing processes. At the Business Management Layer, we just set up the OPC Client to collect the process information from the Process Management Layer. If you just want to construct the "Local Accessing" architecture, you do not need to read this chapter. If you want to construct the "Remote Accessing" architecture, you have to know how to set up the DCOM between OPC Client and OPC Server.

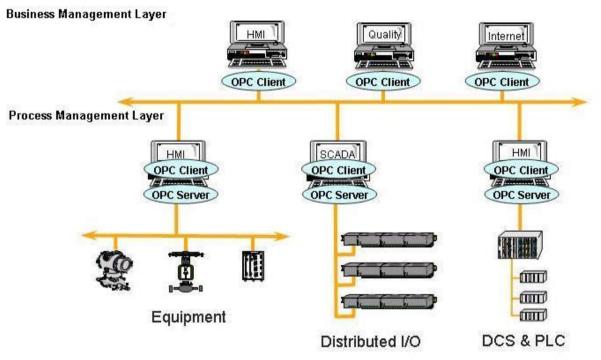


Figure 4-0-1 Local access and Remote access architecture.

# 4.1 System Requirement

To access a remote OPC server over a network, it is required to enable the DCOM mechanism on both stations, where the client and server are resided.

It is not possible to launch a secure process on a Windows 95 computer from a client computer. All processes in Windows 95 run in the security context of the currently logged-on user; therefore, DCOM on Windows 95 does not support remote activation. A server application on a Windows 95 computer will have to be launched manually or by some other mechanism to be accessed by a client application on another computer. Consequently, the "DefaultLaunchPermissions" and "LaunchPermissions" registry values have no affect on Windows 95.

| Platform       | Does the platform support the DCOM?  |
|----------------|--|
| Windows 95     | No.<br>Users need to download and install the DCOM95.EXE and<br>DCM95CFG.EXE from Microsoft's web site to enable the remote<br>access.   |
| Windows 98     | Yes.<br>Windows 98 supports the DCOM mechanism. It is<br>recommended to upgrade to the newest version of DCOM98. The<br>newest DCOM98 is also available at Microsoft's web site. |
| Windows NT 4.0 | Yes.<br>Windows NT 4.0 supports the DCOM mechanism. It is<br>recommended to upgrade to the newest Service Pack for Windows<br>NT 4.0 (Service Pack 3 or newer one).              |
| Windows 2000   | Yes.<br>Windows 2000 supports the DCOM mechanism.  |
| Windows XP     | Yes.<br>Windows XP supports the DCOM mechanism.  |

# 4.2 Configuring DCOM

Before making changes, register the server application in the registry of both the client and server computers. This may involve either running the server applications setup program or running the server application, then shutting it down on both computers. The server application does not need to reside on the client computer.

If the server uses custom interfaces, the marshaling code must be installed on the client and server computers. Automation servers that support "vtbl-binding" must install their type libraries on the client and server computers. Automation servers that do not support "vtbl-binding" do not need to install their type libraries on the client computer.

After changing the registry, run the client application on the client computer. The DCOM looks at the server application registry entries on the client computer and determines the name of the server computer. It will then connect to the server computer, use the server computer registry to determine the location of the server application, and start the server application on that computer.

You can change the registry with the DCOMCnfg.exe tool, the OLE Viewer tool, or manually. For more information on using OLE Viewer or manual changes, please refer to the "Q158582, HOWTO: Configure a Non-DCOM Server and Client to Use DCOM" article on Microsoft's web site. For more information on using DCOMCnfg.exe to configure the DCOM, please refer to "Inside Distributed COM", written by Guy Eddon and Henry Eddon in 1998 for Microsoft Press.

This section shows you how to configure the DCOM status with DCOMCnfg.exe graphic-driven utility (can be found in the Windows NT system32 folder or in the Windows95/98 system folder) on the client and server computer.

The following table shows four combinations of DCOM settings related to XPAC. You can see XPAC and PC can be client site and server site with each other, but WinPAC only can be server site against XPAC. The limitation is due to DCOM security. We only choose Windows XP for example to set up DCOM because there are too many kinds of OS on PC. You can use other Microsoft desktop operation system on our PC.

| Client Site             | Server Site               |
|-------------------------|---------------------------|
| PC(NAPOPC_ST Server)    | XPAC(NAPOPC_XPE Server)   |
| XPAC(NAPOPC_XPE Server) | XPAC(NAPOPC_XPE Server)   |
| XPAC(NAPOPC_XPE Server) | PC(NAPOPC_ST Server)      |
| XPAC(NAPOPC_XPE Server) | WinPAC(NAPOPC_CE5 Server) |

## 4.2.1 Configuring On the Server Site (XPAC) Configuring the Firewall

**Step1:** By default the windows firewall is set to "On". This setting is recommended by Microsoft and by OPC to give your machine the highest possible protection. For trouble shooting, you may wish to temporarily turn off the firewall to prove or disprove that the firewall configuration is the source of any communication failure.

**Note:** It may be appropriate to permanently turn off the firewall if the machine is sufficiently protected behind a corporate firewall. When turned off, the individual firewall settings outlined here need not be performed to allow OPC communication.

| 🖗 Windows Firewall 🛛 🔀   |
|--|
| General Exceptions Advanced  |
| Windows Firewall is helping to protect your PC   |
| Windows Firewall helps protect your computer by preventing unauthorized users<br>from gaining access to your computer through the Internet or a network.   |
| On (recommended)   |
| This setting blocks all outside sources from connecting to this<br>computer, with the exception of those selected on the Exceptions tab.   |
| Dan't allow exceptions   |
| Select this when you connect to public networks in less secure<br>locations, such as airports. You will not be notified when Windows<br>Firewall blocks programs. Selections on the Exceptions tab will be<br>ignored. |
| 🔯 🔿 Off (not recommended)  |
| Avoid using this setting. Turning off Windows Firewall may make this<br>computer more vulnerable to viruses and intruders.   |
| What else should know about Windows Firewall?  |
| OK Cancel  |

**Step 2:** Select the .Exceptions tab and add all OPC Clients and Servers to the exception list. Also add Microsoft Management Console (used by the DCOM configuration utility in the next section) and the OPC utility OPCEnum.exe found in the Windows\System32 directory.

| Windo  | ws Firewa  | U   |        |
|--|--|---|--------|
| General  | Exceptions   | Advanced  |        |
| program<br>to work   | ns and service   | ocking incoming network connections, ex<br>selected below. Adding exceptions allow<br>ht increase your security risk. |        |
| Name   |  |   | ~      |
| Contraction Contra | e and Printer S<br>en Agent. exe<br>en RegistrarSe<br>aphWorX32<br>.SEngine. exe<br>ecense Monitor<br>crosoft Manag<br>PC DataSpy<br>PC Simulator<br>emote Desktor | ver.exe<br>ement Console<br>ce  |        |
| 🗹 Disp   |  | Add Port Edit (<br>on when Windows Firewall blocks a progr<br>allowing exceptions?                                    | Delete |

In the Add a Program dialog, there is a listing of most applications on the machine, but note that not all of them show up on this list. Use the "Browse" button to find other executables installed on the computer.

**Note:** Only EXE files are added to the exceptions list. For in-process OPC Servers and Clients (DLLs and OCXs) you will need to add the EXE applications that call them to the list instead.

| Add a Program                |  |
|------------------------------|--|
| To allow communications with | a program by adding it to the Exceptions list, |
|                              | owse to search for one that is not listed.     |
| Programs:                    |  |
| Alarm Logger Configurate     | ır 💦   |
| Alarm Server Corfigurato     |  |
| AlarmWorX32                  |  |
| Carousel                     |  |
| 🔐 DataWorX32                 |  |
| BOPCServerConfiguration      | or   |
| 🚰 DrDCOM                     |  |
| 🧾 FreeCell                   |  |
| 🚰 GenDOS3 to GFW16           |  |
| 🔤 GenDOS4 to GFW16           |  |
| 🖾 GenStatistics Viewer       |  |
| Path: C:\Program Files'      | VICONICS\GENESIS-32\Bin\ Browse                |
| Patri, C. a logiant nos      |  |
|                              |  |
|                              |  |
|                              |  |
| Change scope                 | OK Cancel                                      |

**Step 3:** Add TCP port 135 as it is needed to initiate DCOM communications, and allow for incoming echo requests. In the Exceptions tab of the Windows Firewall, click on Add Port.

| 😻 Windows Firev  | vall                               |             |               |           |        |
|--|------------------------------------|-------------|---------------|-----------|--------|
| General Exception  | © Advanced                         |             |               |           |        |
| Windows Firewall is<br>programs and servi<br>to work better but r<br>Programs and Serv | ces selected b<br>night increase y | elow. Addin | g exception   |           |        |
| Name   | 22557362                           |             |               |           | ~      |
| File and Printe  | r Sharing                          |             |               |           |        |
| GenAgent.exe   | 9                                  |             |               |           |        |
| GenRegistrar   | Server.exe                         |             |               |           |        |
| GraphWorX32  | 2                                  |             |               |           |        |
| LASEngine.ex   | e                                  |             |               |           |        |
| 🗹 License Monit  | or .                               |             |               |           |        |
| Microsoft Mar  | agemert Cons                       | ole         |               |           | -      |
| 🗹 OPC DataSpy  | l.                                 |             |               |           |        |
| OPC Simulato   | r                                  |             |               |           |        |
| Remote Assis   | tance                              |             |               |           |        |
|  | ton                                |             |               |           |        |
| Add Program  | Add Por                            | L)          | <u>E</u> dit  | De        | lete   |
| Display a notific  | ation when Wi                      | ndows Firev | vall blocks a | a program |        |
| What are the risks   | of allowing exc                    | eptions?    |               |           |        |
|  |                                    |             |               | ок        | Cancel |

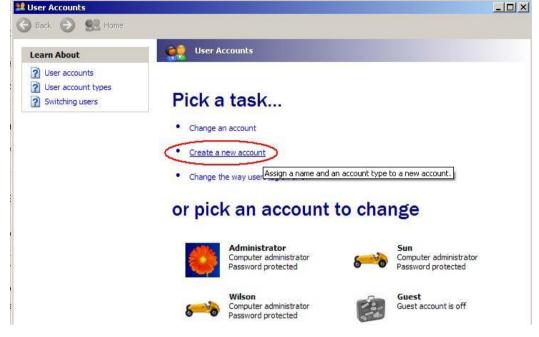
In the Add a Port dialog, fill out the fields as follows: Name: DCOM Port number: 135

Choose the TCP radio button

| Add a Port           |   |
|----------------------|---|
|                      | to open a port through Windows Firewall. To find the port<br>ol, consult the documentation for the program or service you |
| <u>N</u> ame:        | ОСОМ  |
| <u>P</u> ort number: | 135   |
|                      |   |
| What are the risks   | of cpening a port?  |
| Change scope         | OK Cancel   |

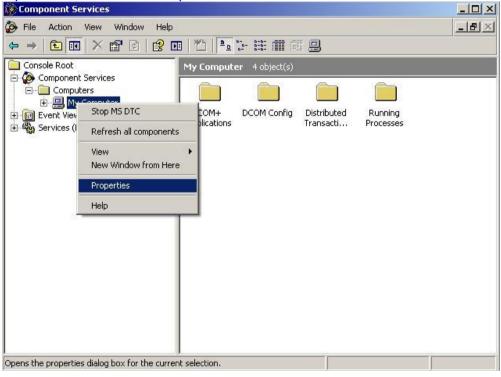
## **Creating the Account**

Step 1: Create a account which must be the same with the account of client site.



## **Configuring DCOM**

**Step 1:** Run the dcomcnfg.exe program to launch component services. Right clieck "My Computer" and choose "Properties".



**Step 2:** Select the "Default Properties" tab page.

Step 3: Use the following settings:

| Field Name                              | Set to   |
|---|----------|
| Enable Distributed COM on this computer | Checked  |
| Default Authentication Level:           | Default  |
| Default Impersonation Level:            | Identify |

| My Computer Properties  |
|---|
| Default Protocols MSDTC COM Security  |
| General Options Default Properties  |
| Enable Distributed COM on this computer   |
| Enable COM Internet Services on this computer   |
| Default Distributed COM Communication Properties  |
| The Authentication Level specifies security at the packet level.  |
| Default Authentication Level:   |
| Default   |
| The impersonation level specifies whether applications can determine<br>who is calling them, and whether the application can do operations<br>using the client's identity.                    |
| Default Impersonation Level:  |
| Identify  |
| Security for reference tracking can be provided if authentication is used<br>and that the default impersonation level is not anonymous.<br>Provide additional security for reference tracking |
| OK Cancel Apply   |

## Step 4: Select the "COM Security" tab page.

| General           | Options  | Default Properties                                     |
|-------------------|--|--|
| Default Protocols | MSDTC  | COM Security   |
| ccess Permissions |  |  |
|                   | o is allowed default acces<br>applications that determin | s to applications. You may<br>e their own permissions. |
|                   | Edit Limits  | Edit Default   |
|                   | Edit Limits  | Edit Default   |
|                   |  |  |
|                   |  |  |
|                   |  |  |
|                   |  |  |
|                   |  |  |

Step 5: Click on the "Edit Limits..." of "Access Permissions" button to set.

| aroup or user names:<br>Management of user names:<br>Management of the second of the secon |              |                |
|--|--------------|----------------|
| Permissions for ANONYMOUS<br>OGON<br>Local Access<br>Remote Access   | Add<br>Allow | Remove<br>Deny |
|  |              |                |

| cess Permission          |       | ?      |
|--------------------------|-------|--------|
| ecurity Limits           |       |        |
| Group or user names:     |       |        |
| ANONYMOUS LOGON          |       |        |
| 🕵 Everyone               |       | 1      |
|                          |       |        |
| -                        |       |        |
|                          | Add   | Remove |
| Permissions for Everyone | Allow | Deny   |
| Local Access             |       |        |
| Remote Access            |       |        |
|                          |       |        |
|                          |       |        |
|                          |       |        |
|                          |       |        |
|                          |       |        |

Step 6: Click on the "Edit Default..." of "Access Permissions" button to set.

| Everyone<br>SELF<br>SYSTEM    |       |        |
|-------------------------------|-------|--------|
|                               | Add   | Remove |
| missions for Everyone         | Allow | Deny   |
| Local Access<br>Remote Access |       |        |
|                               |       |        |

**Step 7:** Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

| Administrators (ZIBET \Ac<br>Everyone | lministrators) |                |
|---------------------------------------|----------------|----------------|
| ermissions fer Everyone               | Add            | Remove<br>Deny |
| Local Launch                          |                |                |
| Remote Launch                         |                |                |
| Local Activation                      |                |                |
| Remote Activation                     |                |                |
|                                       |                |                |

Step 8: Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

| Administrators (ZIBET\Adi     Everyone     INTERACTIVE     SYSTEM      |                  |                |
|--|------------------|----------------|
| ermissions for Everyone  | Add              | Remove<br>Deny |
| Local Launch<br>Remote Launch<br>Local Activation<br>Remote Activation | V<br>V<br>V<br>V |                |

**Step 9:** Right click on the "NAPOPC\_XPE DA Server" of "DCOM Config" button and select "Properties".

| · → 🗈 📧 🗙 📽 🖻 😫 🖬  |                         |                    |             |                       |                      |
|--|-------------------------|--------------------|-------------|-----------------------|----------------------|
| Console Root\Component Services\   | Computers\My            | Computer           | DCOM Config |                       | _0                   |
| 🖻 🧰 Computers 📃  | DCOM Config             |                    |             |                       |                      |
| My Computer     GOM+ Applications  | and Suppor              | Uploa              | WBEM        | Provider Su           | Aspnet. Sn           |
| DCOM Config  |                         |                    |             |                       |                      |
| 🕀 🚸 AcroPDF<br>🕀 🚸 Adobe Acrobat D   | MMC<br>Applicati        | MobSync            | MPriborDB   | MSDAINITI             | NAP Agent<br>Service |
| ArchiverService     Blocked Drivers  |                         |                    |             |                       |                      |
| COM+ Event Sys      Omevents.Com      Omevents.Com      Omevents.Com      Omevents.Com | NAPOPC_XPE<br>DA Server | netman             | NetMeeting  | Network<br>Provisioni | OpcEnum              |
| 🕀 🧑 CustReg Class<br>🕀 🥎 Defrag FAT engir  |                         | View<br>Properties |             | -                     |                      |

**Step 10:** Select the "Security" tab page and click "Edit..." of "Configuration Permissions". To make sure there is "Everyone" in "Group or user names" and allow "Full Control" and "Read"

| Use Default               |      |   |         |
|---------------------------|------|---|---------|
| C Customize               | Edit | Change Configuration Permission   |         |
| Access Permissions        |      | Security Group or user names:   |         |
| Use Default     Customize | Edit | Administrator (DEM-03WQK3Cl4HB\Adminis     Administrators (DEM-03WQK3Cl4HB\Admini     Administrators (DEM-03WQK3Cl4HB\Admini     CREATOR OWNER     Everyone | 36      |
| Configuration Permissions |      | Add   | Remov   |
| © Customize               | Edit | Permissions for Everyone     Allow       Full Control     Image: Control       Read     Image: Control       Special Permissions     Image: Control         | Deny    |
|                           |      | For special permissions or for advanced settings, click Advanced.   | Advance |

Step 11: Select the "Identity" tab page and check "The launching user"

| NAPOPC_ST DA Server                       | Properties        |                  | 2 🔀    |
|---|-------------------|------------------|--------|
| General Location Secur                    | ity Endpoints     | Identity         |        |
| Which user account do yo                  | ou want to use to | run this applica | tion?  |
| C The interactive user.                   |                   |                  |        |
| <ul> <li>The interactive user.</li> </ul> |                   |                  |        |
| The launching user.                       |                   |                  |        |
| C This user.                              |                   |                  |        |
| User:                                     |                   |                  | Browse |
| Password:                                 |                   |                  |        |
| Confirm password:                         |                   |                  |        |
| C The system account (s                   | services only).   |                  |        |
|   |                   |                  |        |
|   |                   |                  |        |
|   |                   |                  |        |
|   |                   |                  |        |
|   | OK                | Cancel           | Apply  |

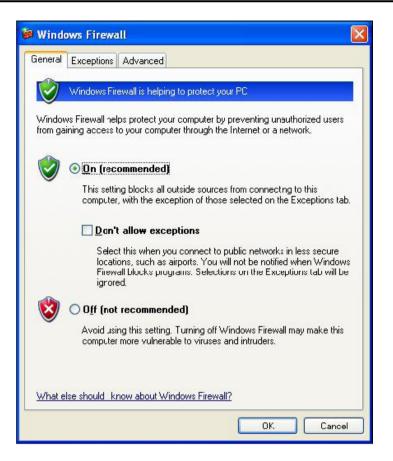
#### Step 12: Restart XPAC

| Shut Down<br>Copyright © :<br>Microsoft Cor |                           | Window<br>Standard     | s Embed | ⊻<br>Ided<br>Microsoft |
|---|---------------------------|------------------------|---------|------------------------|
|   | What do you               | want the computer to ( | do?     |                        |
| 9   | Log off Admi              | nistrator              | -       |                        |
|   | Log off Admi<br>Shut down | nistrator              | 6       |                        |
|   | Restart                   |                        |         |                        |
|   | Stand by                  |                        |         |                        |
|   |                           | ОК                     | Cancel  | Help                   |
|   |                           |                        |         |                        |

## 4.2.2 Configuring On the Server Site (PC) Configuring the Firewall

**Step1:** By default the windows firewall is set to "On". This setting is recommended by Microsoft and by OPC to give your machine the highest possible protection. For trouble shooting, you may wish to temporarily turn off the firewall to prove or disprove that the firewall configuration is the source of any communication failure.

**Note:** It may be appropriate to permanently turn off the firewall if the machine is sufficiently protected behind a corporate firewall. When turned off, the individual firewall settings outlined here need not be performed to allow OPC communication.



**Step 2:** Select the .Exceptions tab and add all OPC Clients and Servers to the exception list. Also add Microsoft Management Console (used by the DCOM configuration utility in the next section) and the OPC utility OPCEnum.exe found in the Windows\System32 directory.

| Windows Firewa                | Advanced   |
|-------------------------------|--|
| programs and service          | plocking incoming network connections, except for the<br>as selected below. Adding exceptions allows some programs<br>ght increase your security risk. |
| Name                          | ~~   |
| File and Printer              | Sharing  |
| GenAgent.exe                  |  |
| GenRegistrarSe<br>GraphWorX32 |  |
| License Monitor               |  |
| Microsoft Mana                | gement Console   |
| 🗹 OPC DataSpy                 |  |
| OPC Simulator                 |  |
| Remote Assista                |  |
| Bemote Deskto                 | n 🔛  |
| Add Program                   | Add Port   |
| -                             |  |
| V Display a notifical         | ion when Windows Firewall blocks a program   |
|                               | 30 T.  |
| What are the risks of         | allowing exceptions?   |
|                               |  |
|                               |  |

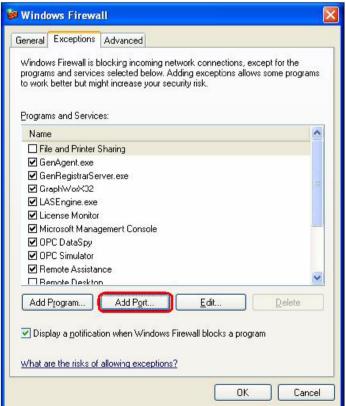
In the Add a Program dialog, there is a listing of most applications on the machine,

but note that not all of them show up on this list. Use the "Browse" button to find other executables installed on the computer.

**Note:** Only EXE files are added to the exceptions list. For in-process OPC Servers and Clients (DLLs and OCXs) you will need to add the EXE applications that call them to the list instead.

| Add a Pro | gram   |        |
|-----------|--|--------|
|           | ommunications with a program by adding it to the Except<br>program, or click Browse to search for one that is not list |        |
| Programs: |  |        |
| Alarm     | Logger Configurator  | ~      |
| 🙎 Alarm   | Server Corfigurator  |        |
| Alarm\    | WorX32   |        |
| Carou:    |  |        |
| 🛛 🎇 DataW |  |        |
|           | PCServerConfigurator   |        |
| S DrDC0   |  |        |
| FreeCo    |  |        |
|           | OS3 to GFW16   |        |
|           | OS4 to GFW16   |        |
| Genst     | tatistics Viewer   | ~      |
| Path:     | C:\Program Files\ICONICS\GENESIS-32\Bin\   | rowse  |
|           |  |        |
|           |  |        |
| (         |  |        |
| Change sc | cope   | Cancel |

**Step 3:** Add TCP port 135 as it is needed to initiate DCOM communications, and allow for incoming echo requests. In the Exceptions tab of the Windows Firewall, click on Add Port.

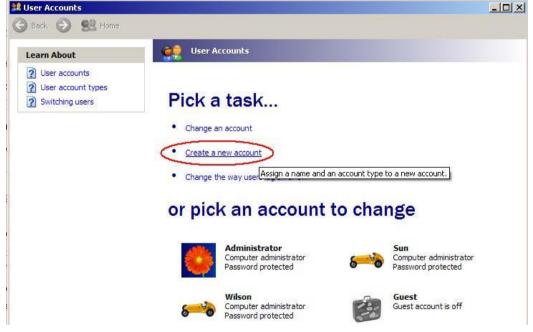


In the Add a Port dialog, fill out the fields as follows: Name: DCOM Port number: 135 Choose the TCP radio button Add a Port Use these settings to open a port through Windows Firewall. To find the port number and protocol, consult the documentation for the program or service yo want to use.

| <u>N</u> ame:        | DCOM |  |  |
|----------------------|------|--|--|
| <u>P</u> ort number: | 135  |  |  |
|                      | ⊙ICP |  |  |

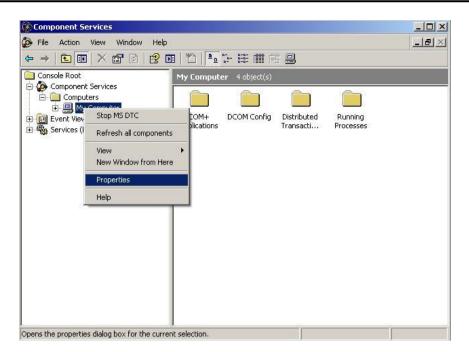
## **Creating the Account**

Step 1: Create a account which must be the same with the account of client site.



#### **Configuring DCOM**

**Step 1:** Run the dcomcnfg.exe program to launch component services. Right clieck "My Computer" and choose "Properties".



**Step 2:** Select the "Default Properties" tab page.

Step 3: Use the following settings:

| Field Name                              | Set to   |
|---|----------|
| Enable Distributed COM on this computer | Checked  |
| Default Authentication Level:           | Default  |
| Default Impersonation Level:            | Identify |

| My Computer Properties  |  |
|---|--|
| Default Protocols MSDTC COM Security<br>General Options Default Properties  |  |
| Enable Distributed COM on this computer   |  |
| Enable COM Internet Services on this computer   |  |
| Default Distributed COM Communication Properties  |  |
| The Authentication Level specifies security at the packet level.  |  |
| Default Authentication Level:   |  |
| Default   |  |
| The impersonation level specifies whether applications can determine<br>who is calling them, and whether the application can do operations<br>using the client's identity.                    |  |
| Default Impersonation Level:  |  |
| Identify 🗨  |  |
| Security for reference tracking can be provided if authentication is used<br>and that the default impersonation level is not anonymous.<br>Provide additional security for reference tracking |  |
| OK Cancel Apply   |  |

| General                                     | Options   | Default Properties                                 |
|---|---|--|
| Default Protocols                           | MSDTC   | COM Security                                       |
| ccess Permissions -                         |   |  |
|   | s allowed default access<br>plications that determine | to applications. You may<br>their own permissions. |
|   | Edit Limits   | Edit Default                                       |
| activate objects. Yo<br>determine their own | permissions.  |  |
|   | permissions.  | Edit Default                                       |
|   |   | Edit Default                                       |

#### Step 4: Select the "COM Security" tab page.

Step 5: Click on the "Edit Limits..." of "Access Permissions" button to set.

|     | ?              |
|-----|----------------|
|     |                |
| Add | Remove<br>Deny |
|     |                |
|     |                |
|     | Allow          |

| cess Permission          |       | ?      |
|--------------------------|-------|--------|
| ecurity Limits           |       |        |
| Group or user names:     |       |        |
| 🕵 ANONYMOUS LOGON        |       |        |
| 🙀 Everyone               |       |        |
|                          |       |        |
|                          |       |        |
|                          | Add   | Remove |
| Permissions for Everyone | Allow | Deny   |
| Local Access             |       |        |
| Remote Access            |       |        |
|                          |       |        |
|                          |       |        |
|                          |       |        |
|                          |       |        |
|                          |       |        |

Step 6: Click on the "Edit Default..." of "Access Permissions" button to set.

| Everyone<br>SELF<br>SYSTEM    |     |                |
|-------------------------------|-----|----------------|
| ermissions for Everyone       | Add | Remove<br>Deny |
| Local Access<br>Remote Access |     |                |
|                               |     |                |

**Step 7:** Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

| Administrators (ZIBET \Ac<br>Everyone | lministrators) |                |
|---------------------------------------|----------------|----------------|
| ermissions fer Everyone               | Add            | Remove<br>Deny |
| Local Launch                          |                |                |
| Remote Launch                         |                |                |
| Local Activation                      |                |                |
| Remote Activation                     |                |                |
|                                       |                |                |

Step 8: Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

| Administrators (ZIBET\Adi     Everyone     INTERACTIVE     SYSTEM      |                  |                |
|--|------------------|----------------|
| ermissions for Everyone  | Add              | Remove<br>Deny |
| Local Launch<br>Remote Launch<br>Local Activation<br>Remote Activation | V<br>V<br>V<br>V |                |

**Step 9:** Right click on the "NAPOPC DA Server" of "DCOM Config" button and select "Properties".

| Component Services  |                         |            |             |                       |                      |
|---|-------------------------|------------|-------------|-----------------------|----------------------|
| File Action View Window Help  |                         |            |             |                       |                      |
|   |                         |            |             |                       |                      |
| Console Root\Component Services\                                    | Eomputers\My            | Computer   | DCOM Config |                       |                      |
| Computers   | DCOM Config             |            |             |                       |                      |
| Hy Computer     GOM+ Applications                                   | and Suppor              | Uploa      | WBEM        | Provider Su           | Aspnet. Sn 🔺         |
| DCOM Config   |                         |            |             |                       |                      |
| AcroPDF     Adobe Acrobat D     Adobe Acrobat D     ArchiverService | MMC<br>Applicati        | MobSync    | MPriborDB   | MSDAINITI             | NAP Agent<br>Service |
| Blocked Drivers     GOM+ Event Sys                                  |                         | -          | <b>(</b>    |                       |                      |
| ComEvents.Com     GomEvents.Com                                     | NAPOPC_XPE<br>DA Server | netman     | NetMeeting  | Network<br>Provisioni | OpcEnum              |
| 🕀 🧑 CustReg Class   |                         | View       |             |                       |                      |
| ⊕ Oefrag FAT engir     ⊕ Oefrag NTFS eng                            | - 🧡 📘                   | Properties |             |                       |                      |
|   | •                       |            |             |                       |                      |
|   |                         |            |             |                       | 1                    |

**Step 10:** Select the "Security" tab page and click "Edit..." of "Configuration Permissions". To make sure there is "Everyone" in "Group or user names" and allow "Full Control" and "Read"

| Use Default               |           |   |                |
|---------------------------|-----------|---|----------------|
| C Customize               | Edit      | Change Configuration Permission                     |                |
| Access Permissions        |           | Security Group or user names:                       |                |
| Use Default               |           | Administrator (OEM-03WQK3Cl4HB\Adm                  | ministrator)   |
| C Customize               | Edit      | Administrators (DEM-03WQK3CI4HB\Ad<br>CREATOR OWNER | dministrators) |
| Configuration Permissions |           |   | Remov          |
| Customize                 | Edit      | Permissions for Everyone Alle                       |                |
|                           |           | Read  |                |
| <u> </u>                  | Cancel Ap | Special Permissions                                 |                |
|                           |           |   |                |

Step 11: Select the "Identity" tab page and check "The launching user"

| NAPOPC_ST DA Server      | Properties                     | 2 🛛        |
|--------------------------|--------------------------------|------------|
| General Location Secur   | ity Endpoints Identity         |            |
| Which user account do yo | ou want to use to run this app | plication? |
| C The interactive user.  |                                |            |
| The launching user.      |                                |            |
| C This user.             |                                |            |
| User:                    |                                | Browse     |
| Password:                |                                | _          |
| Confirm password:        |                                |            |
| C The system account (s  | ervices only).                 |            |
|                          |                                |            |
|                          |                                |            |
|                          |                                |            |
|                          | OK Can                         | cel Apply  |

Step 12: Restart PC

## 4.2.3 Configuring On the Server Site (WinPAC) System Requirement

OS version: WinPAC OS 1.3.04 or later Program: NAPOPC\_CE5 DCOMCnfg.exe WinPAC Utility 2.0.2.1 or later

## **Configuring DCOM**

**Step 1:** Run the \\NAPOPC\_CE5\napopc\_ce5boot.exe program to register.

Step 2: Run the dcomcnfg.exe program and choose "Default".



| Default Securit | , 🛛 🛛             |
|-----------------|-------------------|
| Authentication: |                   |
| Impersonation:  |                   |
| Enable DCOM     | Secure references |
| Access          | ОК                |
| Launch          | Cancel            |

**Step 3:** Select the "Access" button to add an account which is current connection account from client site.

|                                   | ОК     |
|-----------------------------------|--------|
|                                   | Cancel |
|                                   | Add    |
|                                   | -      |
|                                   | Delete |
| dd Permissions                    | Delete |
| dd Permissions<br>Principal: Test | Delete |

**Step 4:** Select the "Launch" button to add an account which is current connection account from client site as above.

Step 5: Execute "WinPAC Utility->Network Setting->Users and Password"

| WinPAC Utility [2.0.2.1]        |  |
|---------------------------------|--|
| File Help Configuration         |  |
| System Setting Ethernet Setting | Network Setting System Information A   |
| FTP Setting Users and Passwo    | ord  |
| User name Password              |  |
| Test ****                       | Add Delete   |
| User name Password              | Note:<br>The accounts is used to login<br>the servers search as Telnet,<br>FTP, WebServer etc on WinPAC. |
|                                 | Setting  |

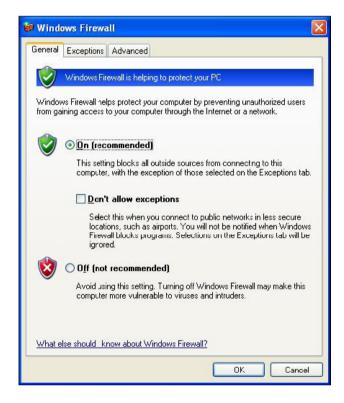
**Step 6:** Fill out "User name", "Password", and press "Add". The "User name" and "Password" must be the account we set at **Step 3.** After pressing "Add", press "Setting" to finish all settings.

**Step 7:** Run WinPAC Utility to save and reboot.

## 4.2.4 Configuring On the Client Site (PC) Configuring the Firewall

**Step1:** By default the windows firewall is set to "On". This setting is recommended by Microsoft and by OPC to give your machine the highest possible protection. For trouble shooting, you may wish to temporarily turn off the firewall to prove or disprove that the firewall configuration is the source of any communication failure.

**Note:** It may be appropriate to permanently turn off the firewall if the machine is sufficiently protected behind a corporate firewall. When turned off, the individual firewall settings outlined here need not be performed to allow OPC communication.



**Step 2:** Select the .Exceptions tab and add all OPC Clients and Servers to the exception list. Also add Microsoft Management Console (used by the DCOM configuration utility in the next section) and the OPC utility OPCEnum.exe found in the Windows\System32 directory.

| eneral Exceptions   | Advanced                                     |             |                |                |
|---|--|-------------|----------------|----------------|
| Windows Firewall is b<br>programs and service<br>to work better but mig | es selected below. /<br>ght increase your se | Adding exc  |                |                |
| Programs and Servic<br>Name   | es.  |             |                | ~              |
| File and Printer  | Sharing                                      |             |                |                |
| GenAgent.exe  | -  |             |                |                |
| GenRegistrarSe  | rver.exe                                     |             |                |                |
| 🗹 GraphWorX32   |  |             |                |                |
| 🗹 LASEngine.exe   |  |             |                |                |
| License Monitor   |  |             |                |                |
| 🗹 Microsoft Manaj   | gement Console                               |             |                |                |
| 🗹 OPC DataSpy   |  |             |                |                |
| OPC Simulator   |  |             |                |                |
| Remote Assista  |  |             |                | ~              |
|   | n  |             |                |                |
| Add Program   | Add Port                                     | <u>E</u>    | dit            | <u>D</u> elete |
|   |  |             |                |                |
| Display a notificat   | ion when Windows                             | Firewall bl | ocks a progran | n              |
|   |  |             |                |                |
|   | allowing exception                           | ~2          |                |                |
| I that are the risks of   |  |             |                |                |

In the Add a Program dialog, there is a listing of most applications on the machine, but note that not all of them show up on this list. Use the "Browse" button to find other executables installed on the computer.

**Note:** Only EXE files are added to the exceptions list. For in-process OPC Servers and Clients (DLLs and OCXs) you will need to add the EXE applications that call them to the list instead.

| Add a Pro | gram   | × |
|-----------|--|---|
|           | mmunications with a program by adding it to the Exceptions list<br>rogram, or click Browse to search for one that is not listed. |   |
| Programs: | rogram, or click browse to search for one that is not listed.  |   |
|           | Logger Configurator  | ~ |
|           | Server Corfigurator  |   |
| Alarm     |  |   |
| 🔤 Carou:  | sel  |   |
| 💦 🔀 DataW | /oiX32   |   |
|           | CServerConfigurator  |   |
| DrDC0     |  |   |
| StreeCo   |  |   |
|           | DS3 to GFW16   |   |
|           | DS4 to GFW16<br>atistics Viewer  | _ |
| uerist    | ausuus viewei  | ~ |
| Path:     | C:\Program Files\ICONICS\GENESIS-32\Bin\ Browse  |   |
|           |  |   |
|           |  |   |
|           |  |   |
| Change sc | ope OK Cancel  |   |

**Step 3:** Add TCP port 135 as it is needed to initiate DCOM communications, and allow for incoming echo requests. In the Exceptions tab of the Windows Firewall, click on Add Port.

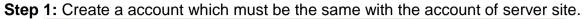
| General            | Exceptions               | Advanced   |           |
|--------------------|--------------------------|--|-----------|
| program<br>to work | ns and service           | locking incoming network connecti<br>s selected below. Adding exception<br>ht increase your security risk. |           |
| Name               |                          |  | ^         |
| 🗆 File             | e and Printer S          | iharing  |           |
| 57.87 BOX          | enAgent.exe              |  |           |
| 10 AND \$1000      | enRegistrarSe            | ver.exe  | =         |
| 1000               | aphWorX32                |  |           |
|                    | SEngine.exe              |  |           |
| 0.000              | ense Monitor             |  |           |
| 2222.212           | 성 사람이 있는 것을 같았다.         | jemert Console   |           |
| 0.00000000         | PC DataSpy               |  |           |
|                    | PC Simulator             |  |           |
|                    | emote Assistar           |  |           |
|                    | emote Deskto             |  |           |
| Add                | Program                  | Add Port   | Delete    |
|                    |                          |  |           |
|                    | Jau a natifiaat          | on when Windows Firewall Marker  |           |
|                    | iay a <u>riotifica</u> t | on when Windows Firewall blocks a  | a program |
|                    |                          |  |           |
| What a             | re the risks of          | allowing exceptions?   |           |
|                    |                          | -  |           |
|                    |                          |  | OK Cancel |

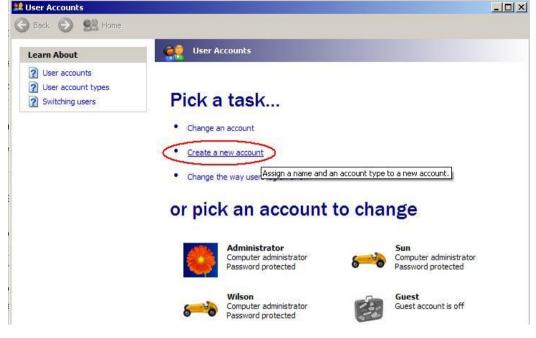
In the Add a Port dialog, fill out the fields as follows: Name: DCOM Port number: 135

Choose the TCP radio button

| Add a Port         |   | ×    |
|--------------------|---|------|
|                    | to open a port through Windows Firewall. To find the<br>ol, consult the documentation for the program or serv |      |
| <u>N</u> ame:      | рсом  |      |
| Port number:       | 135   |      |
|                    |   |      |
| What are the risks | of cpening a port?  |      |
| Change scope       | ОК Са   | ncel |

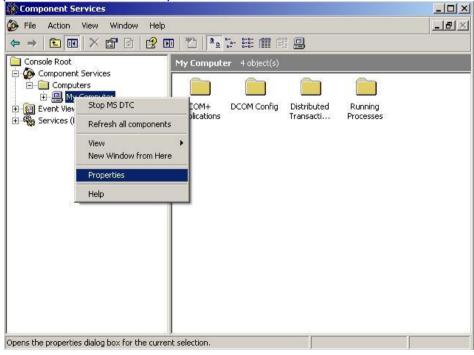
## **Creating the Account**





## **Configuring DCOM**

**Step 1:** Run the dcomcnfg.exe program to launch component services. Right clieck "My Computer" and choose "Properties".



**Step 2:** Select the "Default Properties" tab page.

Step 3: Use the following settings:

| Field Name                              | Set to   |
|---|----------|
| Enable Distributed COM on this computer | Checked  |
| Default Authentication Level:           | Default  |
| Default Impersonation Level:            | Identify |

| My Computer Properties  |
|---|
| Default Protocols MSDTC COM Security<br>General Options Default Properties  |
| Enable Distributed COM on this computer   |
| Enable COM Internet Services on this computer   |
| Default Distributed COM Communication Properties  |
| The Authentication Level specifies security at the packet level.  |
| Default Authentication Level:   |
| Default   |
| The impersonation level specifies whether applications can determine<br>who is calling them, and whether the application can do operations<br>using the client's identity.                    |
| Default Impersonation Level:  |
| Identify  |
| Security for reference tracking can be provided if authentication is used<br>and that the default impersonation level is not anonymous.<br>Provide additional security for reference tracking |
| OK Cancel Apply   |

#### Step 4: Select the "COM Security" tab page.

| General                                  | Options   | Default Properties                                |
|--|---|---|
| Default Protocols                        | MSDTC   | COM Security                                      |
| ccess Permissions -                      |   |   |
|  | s allowed default access<br>plications that determine                     | to applications. You ma<br>their own permissions. |
|  | Edit Limits   | Edit Default                                      |
| You may edit who is                      | s allowed by default to la<br>ou may also set limits on                   |   |
| activate objects. Yo                     | s allowed by default to la<br>ou may also set limits on                   |   |
| You may edit who is activate objects. Yo | s allowed by default to la<br>ou may also set limits on<br>o permissions. | applications that                                 |
| You may edit who is activate objects. Yo | s allowed by default to la<br>ou may also set limits on<br>o permissions. | applications that                                 |
| You may edit who is activate objects. Yo | s allowed by default to la<br>ou may also set limits on<br>o permissions. | applications that                                 |

Step 5: Click on the "Edit Limits..." of "Access Permissions" button to set.

| ccess Permission                   |       | ? 🛛    |
|------------------------------------|-------|--------|
| Security Limits                    |       |        |
| Group or user names:               |       |        |
| ANONYMOUS LOGON                    |       |        |
| 👧 Everyone                         |       |        |
|                                    |       |        |
|                                    |       |        |
|                                    | Add   | Remove |
| Permissions for ANONYMOUS<br>LOGON | Allow | Deny   |
| Local Access                       |       |        |
| Remote Access                      |       |        |
|                                    |       |        |
|                                    |       |        |
| 1                                  |       |        |
|                                    |       |        |
|                                    | ОК    | Cancel |

| access Permission        |        | ?      |
|--------------------------|--------|--------|
| Security Limits          |        |        |
| Group or user names:     |        |        |
| ANONYMOUS LOGON          |        |        |
| Everyone                 |        |        |
|                          |        |        |
|                          |        |        |
|                          | Add    | Remove |
| Permissions for Everyone | Allow  | Deny   |
| Local Access             |        |        |
| Remote Access            |        |        |
|                          | $\sim$ |        |
|                          |        |        |
|                          |        |        |
|                          |        |        |
|                          | ОК     | Cancel |

#### Step 6: Click on the "Edit Default..." of "Access Permissions" button to set.

| ess Permission                |     | ك              |
|-------------------------------|-----|----------------|
| roup or user names:           |     |                |
| Everyone<br>SELF<br>SYSTEM    |     |                |
| ermissions for Everyone       | Add | Remove<br>Deny |
| Local Access<br>Remote Access |     |                |
|                               |     |                |
|                               |     | 20             |

Step 7: Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

| Launch Permission           |                | ? 🛛    |
|-----------------------------|----------------|--------|
| Security Limits             |                |        |
| Group or user names:        |                |        |
| 🛃 Administrators (ZIBET \Ad | dministrators) |        |
| Everyone                    |                |        |
|                             |                |        |
|                             |                |        |
|                             | Add            | Remove |
| Permissions for Everyone    | Allow          | Deny   |
| Local Launch                |                |        |
| Remote Launch               |                |        |
| Local Activation            |                |        |
| Remote Activation           |                |        |
|                             |                |        |
|                             |                |        |
|                             |                |        |
|                             |                |        |
|                             | OK             | Cancel |

**Step 8:** Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

|               | ? 🛿                    |
|---------------|------------------------|
|               |                        |
|               |                        |
| ninistrators) |                        |
|               |                        |
|               |                        |
|               |                        |
|               |                        |
| Add           | Remove                 |
| Allow         | Deny                   |
|               |                        |
| <b>~</b>      |                        |
|               |                        |
| ~             |                        |
|               |                        |
|               |                        |
|               |                        |
|               |                        |
| ОК            | Cancel                 |
|               | Add<br>Allow<br>V<br>V |

**Step 9:** Right click on the "NAPOPC\_ST DA Server" of "DCOM Config" button and select "Properties".



**Step 10:** Select the "Location" tab page and check "Run application on the following computer". And enter the Server IP here.

| POPC_>   | PE DA Se       | rver Prope                     | rties      |                |   | ? > |
|----------|----------------|--------------------------------|------------|----------------|---|-----|
| General  | Location       | Security                       | Endpoints  | Identity       |   |     |
| applicat | tion. Îf you r | nake more ti                   | han one se |                | ct computer fo<br>DCOM uses t<br>elections. |     |
|          |                | n on the corr<br>n on this con |            | re the data is | located.                                    |     |
| -        |                | n on the follo                 |            | outer:         |   | 7   |
| 192      | 2.168.1.91     |                                |            |                | Browse                                      |     |
|          |                |                                |            |                |   |     |
|          |                |                                |            |                |   |     |
|          |                |                                |            |                |   |     |
|          |                |                                |            |                |   |     |
|          |                |                                |            |                |   |     |
|          |                |                                |            |                |   |     |

Step 11: Select the "Identity" tab page and check "The launching user"

| NAPOPC_ST DA Server Properties                                 | 21 |
|--|----|
| General Location Security Endpoints Identity                   |    |
| Which user account do you want to use to run this application? |    |
| <ul> <li>The launching user.</li> </ul>                        |    |
| C This user.   |    |
| User: Browse   |    |
| Password:  |    |
| Confirm password:  |    |
| C The system account (services only).                          |    |
|  |    |
|  |    |
|  |    |
| OK Cancel Apply  |    |

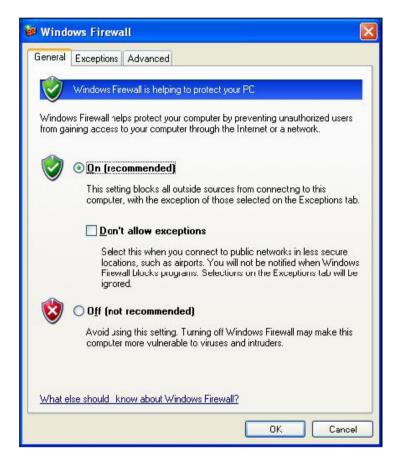
Step 12: Restart PC

## 4.2.5 Configuring On the Client Site (XPAC)

#### **Configuring the Firewall**

**Step1:** By default the windows firewall is set to "On". This setting is recommended by Microsoft and by OPC to give your machine the highest possible protection. For trouble shooting, you may wish to temporarily turn off the firewall to prove or disprove that the firewall configuration is the source of any communication failure.

**Note:** It may be appropriate to permanently turn off the firewall if the machine is sufficiently protected behind a corporate firewall. When turned off, the individual firewall settings outlined here need not be performed to allow OPC communication.



**Step 2:** Select the .Exceptions tab and add all OPC Clients and Servers to the exception list. Also add Microsoft Management Console (used by the DCOM configuration utility in the next section) and the OPC utility OPCEnum.exe found in the Windows\System32 directory.

| General   | Exceptions   | Advanced   |   |       |
|---|--|--|---|-------|
| progran<br>to work                                    | ns and service   | s selected below. Addin<br>ht increase your security | k connections, except fo<br>g exceptions allows some<br>risk. |       |
| Name  | 9  | 1974<br>   |   | ~     |
| V Ge<br>V Gr<br>V LA<br>V Lid<br>V Mi<br>V OF<br>V OF | e and Printer S<br>enAgent.exe<br>aphWorX32<br>SEngine.exe<br>cense Monitor<br>crosoft Manag<br>PC DataSpy<br>PC Simulator<br>emote Assistar | rver.exe<br>gement Console                           |   |       |
| 🗹 Disp  | -  | Add Port   |   | elete |

In the Add a Program dialog, there is a listing of most applications on the machine, but note that not all of them show up on this list. Use the "Browse" button to find other executables installed on the computer.

**Note:** Only EXE files are added to the exceptions list. For in-process OPC Servers and Clients (DLLs and OCXs) you will need to add the EXE applications that call them to the list instead.

| Alarm    | Logger Configurator |  |   |
|----------|---------------------|--|---|
| 🧟 Alarm  | Server Corfigurator |  |   |
| 🚉 Alarm\ | VorX32              |  |   |
| 🖾 Carou: | el                  |  |   |
| 💦 DataV  | /orX32              |  |   |
| 🛗 DBOP   | CServerConfigurator |  |   |
| S DIDCO  | IM                  |  |   |
| 🌉 FreeC  | ell                 |  |   |
| 🛅 GenDi  | DS3 to GFW16        |  |   |
| 🔤 GenDi  | DS4 to GFW16        |  |   |
| 🔤 GenSt  | atistics Viewer     |  | 1 |
|          |                     |  |   |

**Step 3:** Add TCP port 135 as it is needed to initiate DCOM communications, and allow for incoming echo requests. In the Exceptions tab of the Windows Firewall,

click on Add Port.

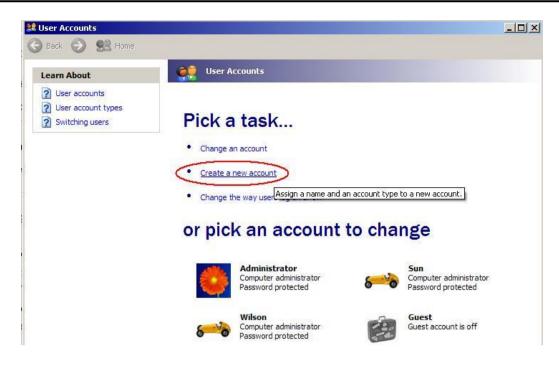
| Windows Firewall   |        |
|--|--------|
| General Exceptions Advanced  |        |
| Windows Firewall is blocking incoming network connections, e<br>programs and services selected below. Adding exceptions allow<br>to work better but might increase your security risk.<br>Programs and Services: |        |
| Name   | ~      |
| File and Printer Sharing   |        |
| GenAgent.exe   |        |
| GenRegistrarServer.exe   |        |
| ☑ GraphWorX32  |        |
| 🗹 LASEngine.exe  |        |
| ✓ License Monitor  |        |
| Microsoft Managemert Console   |        |
| ☑ OPC DataSpy  |        |
| ☑ OPC Simulator  |        |
| Remote Assistance  |        |
| Bemote Deskton   |        |
| Add Program Add Port   | Delete |
|  |        |
| Display a notification when Windows Firewall blocks a progr  | ram    |
|  | ium -  |
| What are the risks of allowing exceptions?   |        |
| ОК   | Cancel |

In the Add a Port dialog, fill out the fields as follows: **Name: DCOM Port number: 135** Choose the TCP radio button

| DCOM               |        |
|--------------------|--------|
| 135                |        |
|                    |        |
| of cpening a port? | Cancel |
|                    | 125    |

## **Creating the Account**

Step 1: Create a account which must be the same with the account of server site.



## **Configuring DCOM**

**Step 1:** Run the dcomcnfg.exe program to launch component services. Right clieck "My Computer" and choose "Properties".

| 🛞 Component Sei      | rvices                        |            |             |                          |                      |     |
|----------------------|-------------------------------|------------|-------------|--------------------------|----------------------|-----|
| Dile Action          | View Window Help              |            |             |                          |                      | _8× |
| ⇔ → 🗈 🖪              | X 🗗 🖻 😫 💷                     | * <u>`</u> |             | 9                        |                      |     |
| Console Root         | Services<br>ers               |            | DCOM Config | Distributed<br>Transacti | Running<br>Processes |     |
| Opens the properties | dialog box for the current se | lection.   |             |                          |                      | _   |

Step 2: Select the "Default Properties" tab page.

Step 3: Use the following settings:

| Field Name                              | Set to   |
|---|----------|
| Enable Distributed COM on this computer | Checked  |
| Default Authentication Level:           | Default  |
| Default Impersonation Level:            | Identify |

| My Computer Properties 🛛 🔋 🛽  |
|---|
| Default Protocols         MSDTC         COM Security           General         Options         Default Properties   |
| <ul> <li>Enable Distributed COM on this computer</li> <li>Enable COM Internet Services on this computer</li> <li>Default Distributed COM Communication Properties</li> <li>The Authentication Level specifies security at the packet level.</li> <li>Default Authentication Level:</li> </ul> |
| Default The impersonation level specifies whether applications can determine who is calling them, and whether the application can do operations using the client's identity. Default Impersonation Level: Identify  |
| Security for reference tracking can be provided if authentication is used<br>and that the default impersonation level is not anonymous.<br>Provide additional security for reference tracking   |
| OK Cancel Apply   |

#### Step 4: Select the "COM Security" tab page.

| General                               | Options  | Default Properties |
|---------------------------------------|--|--------------------|
| Default Protocols                     | MSDTC  | COM Security       |
| Access Permissions                    | -  |                    |
|                                       | o is allowed default access<br>applications that determine                     |                    |
|                                       | Edit Limits  | Edit Default       |
| You may edit who                      | o is allowed by default to la<br>You may also set limits on<br>wn permissions. | applications that  |
| activate objects.                     | o is allowed by default to la<br>You may also set limits on                    |                    |
| You may edit who<br>activate objects. | o is allowed by default to la<br>You may also set limits on<br>wn permissions. | applications that  |
| You may edit who<br>activate objects. | o is allowed by default to la<br>You may also set limits on<br>wn permissions. | applications that  |
| You may edit who<br>activate objects. | o is allowed by default to la<br>You may also set limits on<br>wn permissions. | applications that  |
| You may edit who<br>activate objects. | o is allowed by default to la<br>You may also set limits on<br>wn permissions. | applications that  |

Step 5: Click on the "Edit Limits..." of "Access Permissions" button to set.

| ccess Permission                   |       | ?      |
|------------------------------------|-------|--------|
| Security Limits                    |       |        |
| Group or user names:               |       |        |
| ANONYMOUS LOGON                    |       |        |
| S Everyone                         |       |        |
|                                    |       |        |
|                                    |       |        |
|                                    | Add   | Remove |
| Permissions for ANONYMOUS<br>LOGON | Allow | Deny   |
| Local Access                       |       | 2      |
| Remote Access                      |       |        |
|                                    |       |        |
|                                    |       |        |
| 1                                  |       |        |
|                                    |       |        |
|                                    | ОК    | Cancel |

| Access Permission        |       | ? 🛛    |
|--------------------------|-------|--------|
| Security Limits          |       |        |
| Group or user names:     |       |        |
| ANONYMOUS LOGON          |       |        |
| 🙀 Everyone               |       |        |
|                          |       |        |
|                          |       |        |
|                          | Add   | Remove |
| Permissions for Everyone | Allow | Deny   |
| Local Access             |       |        |
| Remote Access            |       |        |
|                          |       |        |
|                          |       |        |
| 1                        |       |        |
|                          |       |        |
|                          | ОК    | Cancel |

Step 6: Click on the "Edit Default..." of "Access Permissions" button to set.

|              | ?      |
|--------------|--------|
|              |        |
|              |        |
|              |        |
| Add<br>Allow | Remove |
| V            |        |
|              | Cancel |
|              |        |

Step 7: Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

| iroup or user names:<br>Administrators (ZIBETVAd<br>Everyone           | ministrators)    |                |
|--|------------------|----------------|
| ermissions for Everyone  | Add              | Remove<br>Deny |
| Local Launch<br>Remote Launch<br>Local Activation<br>Remote Activation | 9<br>9<br>9<br>9 |                |

**Step 8:** Click on the "Edit Limits..." of "Launch and Activation Permissions" button to set.

| efault Security<br>Group or user names: | the function of the function o |        |
|---|--|--------|
| Administrators (ZIBET \Adm<br>Everyone  | ninistratorsj  |        |
|   |  |        |
|   | Add  | Remove |
| Permissions for Everyone                | Allow  | Deny   |
| LocalLaunch                             |  | -      |
| Remote Launch                           | ~  |        |
| Local Activation                        |  |        |
| Remote Activation                       | <u> </u>   |        |
|   |  |        |
|   |  |        |

**Step 9:** Right click on the "NAPOPC\_XPE DA Server" of "DCOM Config" button and select "Properties".



**Step 10:** Select the "Location" tab page and check "Run application on the following computer". And enter the Server IP here.

|     | PC_XPE DA Se  | rver Properti                     | es              |             |               | ? 2 |
|-----|---|-----------------------------------|-----------------|-------------|---------------|-----|
| Gen | eral Location   | Security End                      | dpoints   Iden  | itity       |               |     |
| ар  | e following setti<br>plication. If you<br>plicable one. Cli | make more thar                    | n one selection | h, then DC  | DM uses the I |     |
|     | Run applicatio  | n on the compu<br>n on this compu |                 | data is loc | ated.         |     |
| 7   | Run applicatio  | n on the followir                 | ng computer:    |             |               | ٦   |
|     | 192.168.1.91  |                                   |                 |             | Browse        |     |
| -   |   |                                   |                 |             |               | -   |
|     |   |                                   |                 |             |               |     |
|     |   |                                   |                 |             |               |     |
|     |   |                                   |                 |             |               |     |
|     |   |                                   |                 |             |               |     |
|     |   |                                   |                 |             |               |     |

Step 11: Select the <u>"Identity"</u> tab page and check "The launching user"

| NAPOPC_ST DA Server Properties 🔹 😢                             |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
| General Location Security Endpoints Identity                   |  |  |  |  |  |  |
| Which user account do you want to use to run this application? |  |  |  |  |  |  |
| C The international  |  |  |  |  |  |  |
| C The interactive user.  |  |  |  |  |  |  |
| The launching user.  |  |  |  |  |  |  |
| C This user.   |  |  |  |  |  |  |
| User: Browse   |  |  |  |  |  |  |
| Password:  |  |  |  |  |  |  |
| Confirm password:  |  |  |  |  |  |  |
| C The system account (services only).                          |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| OK Cancel Apply  |  |  |  |  |  |  |



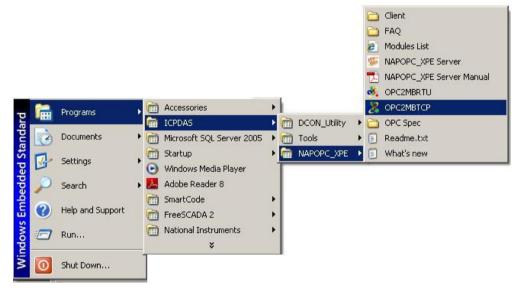


# 5 OPC To Modbus Slave5.1 OPC To Modbus TCP Slave

Except NAPOPC\_XPE DA Server, the OPC solution of XPAC provides the interface of "**OPC**" to "**Modbus TCP Slave**" to transform OPC data to Modbus TCP format. This interface allows you define OPC tag by modbus address to communicate with Modbus TCP master application. Furthermore, this interface can add in "Startup" area to execute while XPAC starting up.

## 5.1.1 Configuring OPC2MBTCP

OPC2MBTCP provides a clear and easy-to-use user interface to transform the OPC to Modbus TCP. You just need to press "Connect" button to connect to NAPOPC\_XPE Server and generate the modbus mapping address automatically. You can use your modbus master application to read and write OPC tags via these modbus address. Or you can modify these modbus addresses by double clicking the field of "MB Address". If you want to modify modbus address, you **have to** disconnect to NAPOPC\_XPE Server first by pressing "Disconnect" button. If you want OPC2MBTCP to connect to NAPOPC\_XPE Server automatically while starting up, please check "Auto Connect" before closing OPC2MBTCP.



| Server Name     |         |  |
|-----------------|---------|--|
| NAPOPC.Svr.1    |         | Auto Connect Disconnect  |
| Tag Path        | Туре    | MB Address   |
| 8041_1.DO       | Long    | 400001   |
| 8041_1.DOs.Ch00 | Boolean | 000001   |
| 8041_1.DOs.Ch01 | Boolean | 000002   |
| 8041_1.DOs.Ch02 | Boolean | 000003   |
| 8041_1.DOs.Ch03 | Boolean | 000004   |
| 8041_1.DOs.Ch04 | Boolean | 000005   |
| 8041_1.DOs.Ch05 | Boolean | 000006   |
| 8041_1.DOs.Ch06 | Boolean | 000007   |
| 8041_1.DOs.Ch07 | Boolean | 000008   |
| 8041_1.DOs.Ch08 | Boolean | 000009   |
| 8041_1.DOs.Ch09 | Boolean | 000010   |
| 8041_1.DOs.Ch10 | Boolean | 000011   |
| 8041_1.DOs.Ch11 | Boolean | 000012   |
| 8041_1.DOs.Ch12 | Boolean | 000013   |
| 8041_1.DOs.Ch13 | Boolean | 000014   |
| 0044 4 DO- CH44 | nl      | lana di la d |

#### Server Name:

This name is "NAPOPC.Svr.1" and can not be modified in this program.

#### Auto Connect:

You can check it if you want OPC2MBTCP to connect to NAPOPC\_XPE Server automatically while starting up.

#### Connect:

Connect to NAPOPC\_XPE Server and generate the modbus address mapping of OPC tag.

#### **Disconnect:**

Disconnect to NAPOPC\_XPE Server. If you want to modify modbus address, you **have to** disconnect to NAPOPC\_XPE Server first.

#### MB Address:

Specifies the tag address. It must be the same with the the variable address of modbus master application

| Modbus Type     | Range           |
|-----------------|-----------------|
| Output Coil     | 000001 - 065536 |
| Input Coil      | 100001 - 165536 |
| Input Register  | 300001 - 365536 |
| Output Register | 400001 - 465536 |

×.

#### Close OPC2MBTCP.

## 5.1.2 Startup OPC2MBTCP

If you want to launch OPC2MBTCP, please follow these steps as below.

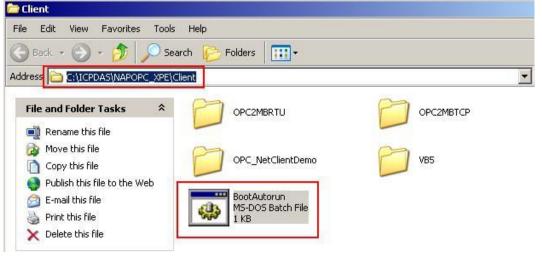
| Step 1: Edit "BootAutorun.bat | " in | \\Root\NAPOPC_ | _XPE\Client |
|-------------------------------|------|----------------|-------------|
|-------------------------------|------|----------------|-------------|

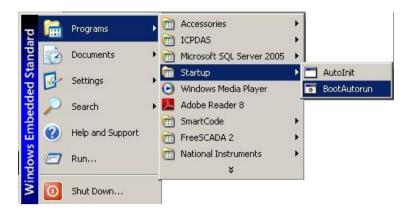
| 📕 BootAutorun - Notepad    |              |
|----------------------------|--------------|
| File Edit Format View Help |              |
| Øecho off                  | A            |
| OPC2MBRTU_Boot.exe -T 30   |              |
| OPC2MBTCP_Boot.exe         |              |
|                            |              |
|                            |              |
|                            |              |
|                            |              |
|                            | ▶ <i>I</i> . |

If you want to execute "OPC2MBTCP" while XPAC starting up, please write "OPC2MBTCP\_Boot.exe" in this file. The option "-T" means delay time(sec.) while XPAC starting up. Because XPAC needs some time to initial some devices, OPC2MBTCP has to add delay time to delay the execution of OPC2MBTCP. Usually you have to add "-T 30" which means 30 sec. delay for the first program. For this example, the first program is "OPCMBRTU\_Boot.exe". If you only want to launch "OPC2MBTCP\_Boot.exe", you have to add the option behind it as below.

| 📕 BootAutorun - Notepad |              |        |      |           |   |
|-------------------------|--------------|--------|------|-----------|---|
| File                    | Edit         | Format | View | Help      |   |
| @ec                     | ho           | off    |      |           | A |
| орс                     | 2 <b>M</b> B | ТСР_В  | oot. | ехе -т 30 |   |
|                         |              |        |      |           |   |
|                         |              |        |      |           |   |
|                         |              |        |      |           |   |
|                         |              |        |      |           | - |
|                         |              |        |      |           |   |

Step 2: Copy "BootAutorun.bat" in <u>\\Root\NAPOPC\_XPE\Client</u> to "Startup" area.





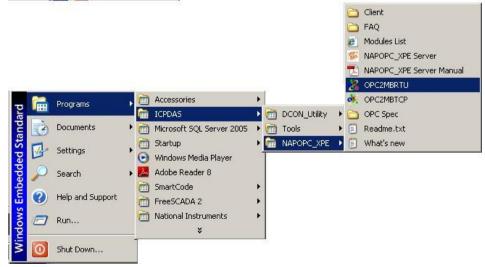
Step 3: That is all. You can test by restarting XPAC.

## 5.2 OPC To Modbus RTU/ASCII Slave

Except NAPOPC\_XPE DA Server, the OPC solution of XPAC provides the interface of "**OPC**" to "**Modbus RTU/ASCII Slave**" to transform OPC data to Modbus RTU/ASCII format. This interface allows you define OPC tag by modbus address to communicate with Modbus RTU/ASCII master application. Furthermore, this interface can add in "Startup" area to execute while XPAC starting up.

#### 5.2.1 Configuring OPC2MBRTU

OPC2MBRTU provides a clear and easy-to-use user interface to transform the OPC to Modbus RTU/ASCII. You just need to press "Connect" button to connect to NAPOPC\_XPE Server and generate the modbus mapping address automatically. Naturally, you have to decide the slave ID, which COM port you want to use and which parameters of this COM port. OPC2MBRTU allows you to use four COM ports at a time. After setting up these parameters, you can use your modbus master application to read and write OPC tags via these modbus address. Or you can modify these modbus addresses by double clicking the field of "MB Address". If you want to modify modbus address, you have to disconnect to NAPOPC\_XPE Server first by pressing "Disconnect" button. If you want OPC2MBRTU to connect to NAPOPC\_XPE Server automatically while starting up, please check "Auto Connect" before closing OPC2MBRTU.



| Server | Name NA   | POPC.Svr.    | 1 Slave ID | 1 🗖 Aut   | o Conne | ct Conne  | ct         | Disconnec |
|--------|-----------|--------------|------------|-----------|---------|-----------|------------|-----------|
| Active | Com Port  | Туре         | Baud Ra    | te Parity |         | Data Bits | St         | top Bits  |
|        | 2         | RTU          | 9600       | 🚬 None    |         | 8         | <b>-</b> 1 |           |
|        | 3         | RTU<br>ASCII | 9600       | None      |         | 8         | • 1        | -         |
|        | 4         | RTU          | 9600       |           | -       | 8         | - 1        |           |
|        | 5         | RTU          | 9600       | None      |         | 8         | <b>-</b> 1 |           |
| Tag Pa | ath       |              | Туре       |           | МВ      | Address   |            | 4         |
| 8041_1 | .DO       |              | Long       |           | 4000    | 01        |            |           |
| 8041_1 | .DOs.Ch00 |              | Boolean    |           | 0000    | 01        |            |           |
| 8041_1 | .DOs.Ch01 |              | Boolean    |           | 000002  |           |            |           |
| 8041_1 | .DOs.Ch02 |              | Boolean    |           | 0000    | 03        |            |           |
| 8041 1 | .DOs.Ch03 |              | Boolean    |           | 0000    | 04        |            | -         |

#### Server Name:

This name is "NAPOPC.Svr.1" and can not be modified in this program.

#### Auto Connect:

You can check it if you want OPC2MBRTU to connect to NAPOPC\_XPE Server automatically while starting up.

#### Connect:

Connect to NAPOPC\_XPE Server and generate the modbus address mapping of OPC tag.

#### Disconnect:

Disconnect to NAPOPC\_XPE Server. If you want to modify modbus address, you **have to** disconnect to NAPOPC\_XPE Server first.

#### MB Address:

Specifies the tag address. It must be the same with the the variable address of modbus master application

| Modbus Type     | Range           |
|-----------------|-----------------|
| Output Coil     | 000001 – 065536 |
| Input Coil      | 100001 – 165536 |
| Input Register  | 300001 – 365536 |
| Output Register | 400001 – 465536 |

#### Active:

To activate this COM port.

#### COM port:

Specifies the COM port to be used. Please verfiy which COM port number that the RS-232 / RS-485 network is using.

#### Type:

Specifies the service of Modbus RTU protocol or Modbus ASCII protocol.

#### Baud rate:

Specifies the baud rate to be used. Verify the module's current baud rate. A wrong setting will always cause communication error for this controller.

#### Parity:

Specifies the parity scheme to be used. It is one of the following values.

| Value | Description |
|-------|-------------|
| None  | No parity   |
| Even  | Even        |
| Odd   | Odd         |

#### Data Bits:

Specifies the number of bits in the bytes transmitted and received.

### Stop Bits:

Specifies the number of stop bits to be used. It is one of the following values.

| Value | Description   |
|-------|---------------|
| 1     | 1 stop bit    |
| 2     | 2 stop bits   |
| 1.5   | 1.5 stop bits |

### ×

Close OPC2MBRTU.

### 5.2.2 Startup OPC2MBRTU

If you want to launch OPC2MBRTU, please follow these steps as below.

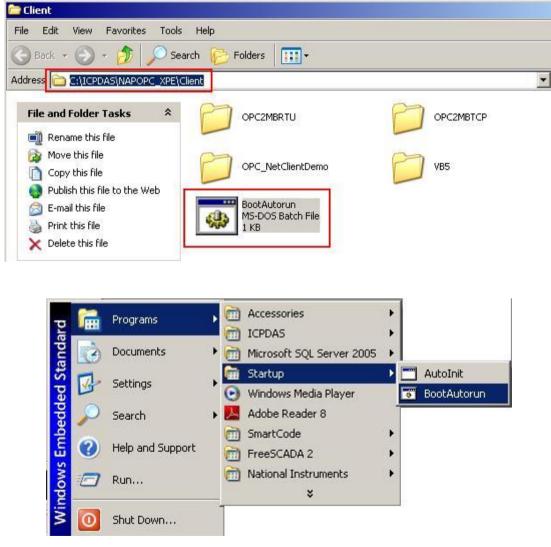
**Step 1:** Edit "BootAutorun.bat" in \\Root\NAPOPC\_XPE\Client

| 📕 BootAutorun - Notepad                        |        |
|--|--------|
| File Edit Format View Help                     |        |
| Øecho off                                      | *      |
| OPC2MBRTU_Boot.exe -T 30<br>OPC2MBTCP_Boot.exe |        |
|  | _      |
|  | ×<br>Þ |

If you want to execute "OPC2MBRTU" while XPAC starting up, please write "OPC2MBRTU\_Boot.exe" in this file. The option "-T" means delay time(sec.) while XPAC starting up. Because XPAC needs some time to initial some devices, OPC2MBRTU has to add delay time to delay the execution of OPC2MBRTU. Usually you have to add "-T 30" which means 30 sec. delay for the first program. For this example, the first program is "OPCMBRTU\_Boot.exe". If you only want to launch "OPC2MBRTU\_Boot.exe", you have to add the option behind it as below.

| 🚺 BootAutorun - Notepad    |          |
|----------------------------|----------|
| File Edit Format View Help |          |
| Øecho off                  | *        |
| OPC2MBRTU_Boot.exe -T 30   |          |
|                            |          |
|                            |          |
|                            |          |
|                            |          |
|                            | <b>v</b> |
|                            | ▶ /h     |

Step 2: Copy "BootAutorun.bat" in <u>\\Root\NAPOPC\_XPE\Client</u> to "Startup" area.



**Step 3:** That is all. You can test by restarting XPAC.

# **6 Writing Client Program with VB**

# 6.1 **Programming with VB5**

### 6.1.1 Overview of OPC & VB

Visual Basic language supports COM(**C**omponent **O**bject **M**odel). COM implementation from Visual Basic use what is called an "Automation" interface. The OPC Foundation supplies the source code of "Automation Wrapper" DLL which lets VB access OPC Servers and their underlying Groups and items. That's why we have to install the OPC DAC (Data Access Component.) software(see 2 Quick Start). After we install the OPC DAC software, we can use Automation Wrapper connects VB to OPC.

The following figure shows the architecture of object model for the automation wrapper. Because the OPC Server Object contains Group Objects and Items Objects by using Collection, OPC Browse Object can access the item data through the pointer of OPC Server Object.

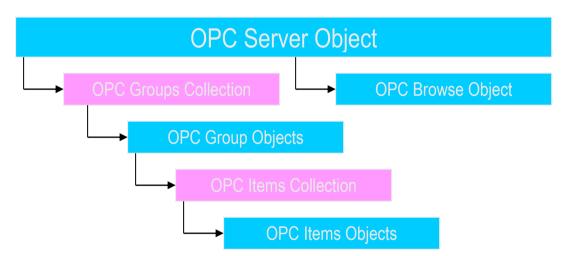


Figure 6-1-1. Object model for the Automation Wrapper

The following figure shows the architecture of OPC Server Object through the Automation Wrapper under COM/DCOM mechanism. The VB program wakes up the remote OPC Server Object through the automation wrapper object by DCOM mechanism.

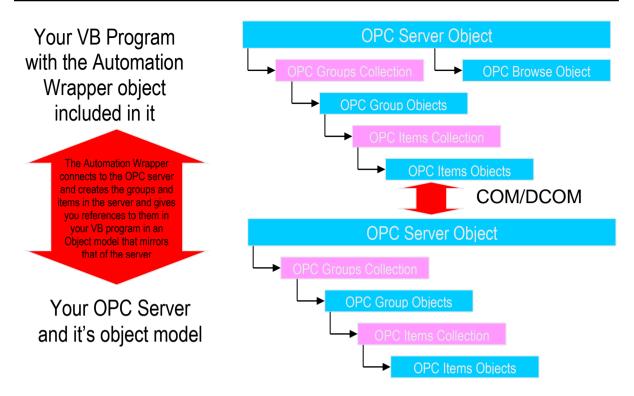


Figure 6-1-2. Architecture of OPC Server Object under COM/DCOM mechanism

## 6.1.2 Tools You Will Need to Build Your VB Client

If you want to build an OPC client in VB and test it, you will need the following tools.

- Visual Basic 5 or 6 running on Windows 95/98/2000/ME/NT/XP
- An OPC Server At this manual, we use ICP DAS NAPOPC\_XPE Server as the demo. You can find it at your CD:\\xp-8000\tools\ NAPOPC\_XPE or you can download it from the <u>http://opc.icpdas.com/download.htm</u>
- The OPC Automation Wrapper You can find it from <u>http://opc.icpdas.com/download.htm</u>

### 6.1.3 Building Your VB Client – Step By Step

At this section, we just focus on the key steps of building the VB client. If you want to know more information about OPC Automation 2.0 and the VB demo, please refer to the opcda20\_auto.pdf in the C:\ICPDAS\NAPOPC\_XPE\Manual and the VB demo source code in the C:\ICPDAS\NAPOPC\_XPE\Client\VB5.

#### Step 1:

- Install OPCDAC on your PC
- Start a new VB project
- In VB, click on Project -> References on the VB menu bar

The OPC Automation Wrapper appears on the dialog as "OPC Automation 2.0" – select it as shown here

| vailable Re                                     | erences:                          |          | ОК     |  |
|---|-----------------------------------|----------|--------|--|
|   | sic For Applications              | <b>^</b> | Cancel |  |
|   | sic runtime objects and procedure | es 🗖     |        |  |
| <ul> <li>Visual Ba</li> <li>OLE Auto</li> </ul> | sic objects and procedures        |          | Browse |  |
|   | omation 2.0                       |          |        |  |
| IAS Helr  | er COM Component 1.0 Type Lib     | irary 🔶  |        |  |
|   | IUS Protocol 1.0 Type Library     |          |        |  |
|   | jer 1.0 Type Library              | Priority | Help   |  |
| aboutlook 1.0 Type Library                      |                                   |          |        |  |
| _ aboutioo<br>Acrobat                           | kex 1.0 Type Library              | +        |        |  |
| Acrobat   | Nistiller                         |          |        |  |
|   | 5 Type Library                    | -        |        |  |
|   | tun Control Library               | ×        |        |  |
| Active Se                                       |                                   | 5        |        |  |

#### Step 2:

First, you have to design your UI(User Interface). You can refer to the UI demo of VB program shown as below. Next, you need to declare some variables at the General Declarations area of VB code window. The most important types of variables are OPCServer, OPCGroup, and OPCBrowser. As the declaration, we can use several functions to read/write item values through Server and Group variables.

| OPC Server        |                        |          |            |
|-------------------|------------------------|----------|------------|
| Combo1            | •                      | Connect  | Disconnect |
| Tag Selected: Tag | g                      |          |            |
| Sa Sa             | mple Node<br>mple Node |          |            |
| Sample No         | de                     |          |            |
| Tag Value         | • • • • • • • • • •    | oop Read |            |

'Declare a new OPC Server object Public Server As OPCServer 'Declare a new OPC Group object Public Group As OPCGroup *Declare a new Browser object* Public browser As OPCBrowser

#### Step 3:

You can call GetOPCServers() to scan the OPC Servers at your PC as the following codes.

'Declare a Variant Variable
Dim Servers As Variant
'Create a new OPC Server object
Set Server = New OPCServer
'Call GetOPCServers to scan the OPC Servers on your PC
Servers = Server.GetOPCServers("")
'Show the servers on the Combo box
Dim lastIndex As Integer
lastIndex = 0
For I = LBound(Servers) To UBound(Servers)
 cbServerList.AddItem Servers(I)
 If Servers(I) = lastServer Then lastIndex = I - 1
Next I
cbServerList.ListIndex = lastIndex
MousePointer = vbDefault

### Step 4:

Next, you'll go ahead and add the code rights after you get your connection to the NAPOPC\_XPE Server. Please refer to the FillItems and Branch subroutine of VB demo program.

'Generate the tree of tags Private Sub FillItems() 'Populate the sub branches in the browser tree Public Sub Branch(Count As Integer, node1 As node)

### Step 5:

Now, you can add the code for the "Read" button and "Write" button. Please refer to the btnRead\_Click and btnWrite\_Click subroutine of VB demo program. In these two functions, the *anItem.Read* and the *anItem.Write* are two key methods.

'Read the OPCItem value after the read button press Private Sub btnRead\_Click() 'Write the value in the text box after the write button press Private Sub btnWrite\_Click()

### Step 6:

You can build the project and you will see the UI as below.

| DPC Server<br>NAPOPC.Svr |      | Connect   | Disconnect |
|--------------------------|------|-----------|------------|
| ag Selected: Ta          | g    |           |            |
|                          |      |           |            |
|                          |      |           |            |
| ag Value                 | Read | Loop Read |            |

#### Step 7:

After you click on the "Connect" button, you will see the OPC Server tree list. You can choose one of them and click on the "Read" button. You will see the item value at the "Tag Value" field as below. You can also type the value you want to write in the text box and click on the "Write" button. (Refer to 4.1 Client Demo Program)

| 🖏 NAPOPC T          | est Client                                      |           |            |
|---------------------|---|-----------|------------|
| OPC Server          |   |           |            |
| NAPOPC.Svr          | •   | Connect   | Disconnect |
| Tag Selected:       | 17188EG_TCP.IO.V                                | 1         |            |
|                     | B02<br>B03<br>B04<br>T1<br>T2<br>V1<br>V2<br>V3 |           |            |
| Tag Value<br>-199.3 | Read  | Loop Read |            |
| Counter: 0          | Write   | Stop Loop | Exit       |

# 6.2 **Programming with .Net**

### 6.2.1 Limitations about .Net client programming

1. OPC DA component 2.0 must be installed. (In this case, OPC DA Component 1.0 can't be used)

- Development was done on a Windows XP SP1 system using Microsoft Development Environment 2003 version 7.1.3091 with .Net Framework 1.1 version 1.1.4322 and any new release version of .Net will need to modify these codes.
- 3. Testing was done on following operation system, any others might not work
  - Windows 98 second edition 4.10.2222A
  - Windows 2000 professional 5.00.2195 service pack 4
  - Windows XP professional version 2002 service pack 1

### 6.2.2 Tools – You Need to Build Your .Net Client

If you want to build an OPC VB .Net or VC# client and test it, you will need following tools.

- Visual Basic .Net 2003 or newer version running on Windows 98/2000/XP
- OPC Automation 2.0

You can install NAPOPC\_XPE DA Server(From CD:\\xp-8000\tools\ NAPOPC\_XPE or download it from <u>http://opc.icpdas.com/download.htm</u>). The NAPOPC\_XPE DA Server installation will install OPC Automation 2.0 automatically.

#### An OPC Server

At this manual, we use ICPDAS NAPOPC\_XPE Server as the demo. You can find it at your CD:\\xp-8000\tools\NAPOPC\_XPE or download it from the <u>http://opc.icpdas.com/download.htm</u>

## OPC .Net wrapper named "OPCNetWrapper.dll".

After you install NAPOPC\_ST DA Server (From <u>http://opc.icpdas.com/</u> <u>download.htm</u>), you can find it in Root\\ ICPDAS\ NAPOPC\_XPE\Client\ OPC\_NetClientDemo\VBOPCClient\_Demo

 OPCNETWrapper.pdf
 After you install NAPOPC\_XPE DA Server (From <a href="http://opc.icpdas.com/download.htm">http://opc.icpdas.com/ download.htm</a>), you can find it in Root\\ICPDAS\NAPOPC\_XPE\Manual

### 6.2.3 Building Your VB.Net Client – Step By Step

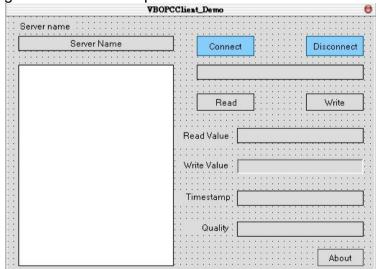
#### Step 1:

- Install OPC DA Component 2.0 on your PC
- Start a new VB.Net project with "Windows Application Program"
- In VB.Net, click Project -> Add References on the VB.Net menu bar
- Click Browse... to select "OPCNetWrapper.dll" as shown below

| 000.0<br>300.0<br>000.0<br>000.0<br>000.0<br>000.0 | C:(WINDOWS)Microsoft.NET/F<br>C:(Program Files)Microsoft.NE<br>C:(Program Files)Common File<br>C:(Program Files)Common File<br>C:(Program Files)Common File<br>C:(Program Files)Common File | Sglect  |
|--|---|---|
| 000.0<br>000.0<br>000.0                            | C1Program Files/Microsoft.NE<br>C1Program Files/Common File<br>C1Program Files/Common File<br>C1Program Files/Common File   |   |
| 000.0  | C1Program Files/Common File<br>C1Program Files/Common File<br>C1Program Files/Common File   |   |
| 000.0  | C:\Program Files\Common File  |   |
|  | C:\Program Files\Common File  |   |
| 0.000  |   |   |
|  | C.y regram racsycemmen rac  |   |
| 000.0  | C:Program Files\Common File   |   |
| 000.0  | C:\Program Files\Common File  |   |
| 000.0  | C:\Program Files\Common File  |   |
| 000.0  | C:\Program Files\Common File  |   |
| 0.000  | C:(Program Files)Common File  |   |
| 000.0  | C:(Program Files)/Common File   |   |
|  |   |   |
| 2  | Source  | Remoy   |
|  | C1Documents and Settings(step   | -   |
|  | 000.0<br>000.0<br>000.0   | 000.0 C3Program Files\Common File<br>000.0 C3Program Files\Common File<br>000.0 C3Program Files\Common File<br>000.0 C3Program Files\Common File •<br>000.0 C3Program Files\Common File • |

#### Step 2:

First, you must Import following declarations "ICPDAS.OPC", "ICPDAS.OPCDA" and "ICPDAS.OPC.NET". Second, you could design your UI (User Interface). You can refer to the UI of VB.Net program shown as below. Third, you need to declare some variables at the General Declarations area of VB.Net code window. The most important types of variables are ICPDAS\_OPCServer, ICPDAS\_SynclOGroup, and ServerTreeBrowser. As the declaration, we can use several functions to read/write tag values through Server and Group variables.



'Declare a new ICPDAS\_OPCServer object Dim Svr As ICPDAS\_OPCServer 'Declare two new ICPDAS\_SynclOGroup objects Dim ReadWriteGroup, Grp As ICPDAS\_SyncIOGroup 'Declare a new ServerTreeBrowser object Dim TagTree As ServerTreeBrowser 'Declare two new RefreshGroup objects Dim AsyncRefrGroup, rGrp As RefreshGroup 'Declare a new TagDef object Dim TagData As TagDef 'Declare a new String variable for OPC Server ProgID Dim ServerName As String

#### Step 3:

You can set ServerName as "NAPOPC.Svr.1" and pass it to ICPDAS\_OPCServer for connecting.

'Set a ProgID to ServerName ServerName = "NAPOPC.Svr.1" 'Create a new OPC Server object Svr = New ICPDAS\_OPCServerr 'Connect to NAPOPC DA Server Svr.Connect (ServerName)

### Step 4:

Now, you'll go ahead and add the code rights after you get your connection to the NAPOPC Server. Please refer to following TagReadWrite and DataChangeHandler subroutine of VB demo program.

'Handles of data change callbacks Public Sub DataChangeHandler (ByVal sender As Object, ByVal e As DataChangeEventArgs)

Private Sub TagReadWrite (ByVal lgrp As ICPDAS\_SyncIOGroup, ByVal lrgrp As RefreshGroup, ByVal iTree As ServerTreeBrowser, ByVal tagId As String)

#### Step 5:

Now, you can add codes for the "Read" button, "Write" button and "TreeView" AfterSelect function. Please refer to the btnRead\_Click, btnWrite\_Click and tvTags\_AfterSelect subroutine of VB.Net demo program. In these three functions, the *Grp.Read*, the *Grp.Write and the* TagTree.TagName are three key methods.

'Read the OPCTag value after the read button press Private Sub btnRead\_Click () 'Write the value in the text box after the write button press Private Sub btnWrite\_Click () 'The action after selecting the tag Private Sub tvTags\_AfterSelect ()

#### Step 6:

You can build the project and you will see the UI as below.

| ۲۷.          | BOPCClient_Demo    |
|--------------|--------------------|
| Server name  |                    |
| NAPOPC.Svr.1 | Connect Disconnect |
|              |                    |
|              |                    |
|              |                    |
|              | Read Write         |
|              |                    |
|              | Read Value         |
|              | Write Value        |
|              | white value        |
|              | Timestamp          |
|              |                    |
|              | Quality            |
|              | the <b>L</b>       |
|              | About              |

#### Step 7:

After you click on the "Connect" button, you will see the OPC Server tree list. You can choose one of them and click on the "Read" button. You will see the tag value at the "Read Value" field as below. You can also type the value you want to write in the "Write Value" and click on the "Write" button. (Refer to 4.2 .Net Client Demo Program)

| ۲ <b>۷</b>                        | BOPCClieat_Demo           |
|-----------------------------------|---------------------------|
| Server name                       |                           |
| NAPOPC.Svr.1                      | Connect Disconnect        |
| Ch14<br>Ch15                      | * 8411_1.8054_S0.D0s.Ch00 |
| B● 8054_S0<br>DI<br>B● DIS<br>DIS | Read                      |
| Ch01<br>Ch02<br>Ch03<br>Ch04      | Read Value False          |
| Ch05<br>Ch06<br>Ch07              | Write Value               |
| DO<br>DOs<br>Ch00<br>Ch01         | Timestamp                 |
| Ch02<br>Ch03<br>Ch04<br>Ch05      | Quality BAD               |
| Ch06<br>Ch07                      | About                     |

### 6.2.4 Building Your VC#.Net Client – Step By Step

#### Step 1:

- Install OPC DA Component 2.0 on your PC
- Start a new VC#.Net project with "Windows Application Program"
- In VC#.Net, click Project -> Add References on the VC#.Net menu bar
- Click Browse... to select "OPCNetWrapper.dll" as shown below

| Component Name                | Version    | Path                           |        |
|-------------------------------|------------|--------------------------------|--------|
| ccessibility.dll              | 1.0.5000.0 | C:(WINDOWS)Microsoft.NET/F     | Select |
| dodb                          | 7.0.3300.0 | C1Program Files/Microsoft.NE   |        |
| RVsPackageLib                 | 9.1.5000.0 | C:\Program Files\Common File   |        |
| CrystalDecisions.CrystalRepor | 9.1.5000.0 | C1Program Files/Common File    |        |
| CrystalDecisions.ReportSource | 9.1.5000.0 | C1Program Files\Common File    |        |
| CrystalDecisions.Shared       | 9.1.5000.0 | C:\Program Files\Common File   |        |
| CrystalDecisions.Web          | 9.1.5000.0 | C:\Program Files\Common File   |        |
| rystalDecisions.Windows.For   | 9.1.5000.0 | C:\Program Files\Common File   |        |
| CrystalEnterpriseLib          | 9.1.5000.0 | C:\Program Files\Common File   |        |
| CrystalInfoStoreLib           | 9.1.5000.0 | C:\Program Files\Common File   |        |
| CrystalKeyCodeLib             | 9.1.5000.0 | C:\Program Files\Common File   |        |
| CrystalPluginMorl ib          | 9.1.5000.0 | C:\Program Files\Common File * |        |
|                               |            |                                |        |
| cted Componente:              |            |                                |        |
| nponent Name                  | Туре       | Source                         | Remoye |
| NetWrapper.dll                | File       | C1/Documents and Settings/step |        |
|                               |            |                                | _      |

#### Step 2:

First, you must using directive as following declarations:

"ICPDAS.OPC","ICPDAS.OPCDA" and "ICPDAS.OPC.NET". Second, you could design your UI (User Interface). You can refer to the UI of VC#.Net program shown as below. Third, you need to declare some variables at the General Declarations area of VC#.Net code window. The most important types of variables are ICPDAS\_OPCServer, ICPDAS\_SynclOGroup, and ServerTreeBrowser. As the declaration, we can use several functions to read/write tag values through Server and Group variables.

|                | VCSOF                   | CClient_Demo 😝       |
|----------------|-------------------------|----------------------|
|                | Server name             |                      |
|                | NAPOPC.Svr.1            | Connect Disconnect   |
|                | -                       |                      |
|                |                         |                      |
|                |                         | Read Write           |
|                |                         | Read Value           |
|                |                         | Write Value          |
|                |                         | Timestamp            |
|                |                         | Quality              |
|                |                         | About                |
| 'Declare a new | ICPDAS_OPCServer of     | bject                |
| ICPDAS_OPC     | Server                  | Svr = null;          |
| 'Declare two n | ew ICPDAS_SynclOGro     | up objects           |
| ICPDAS_Sync    | lOGroup                 | ReadWriteGroup, Grp; |
| 'Declare a new | / ServerTreeBrowser obj | ect                  |
| ServerTreeBro  | wser                    | TagTree;             |
|                |                         |                      |

'Declare two new RefreshGroup objectsRefreshGroupAsyncRefrGroup, rGrp;'Declare a new TagDef objectTagDefTagData;'Declare a new String variable for OPC ServerProgIDstringServerName;

### Step 3:

You can set ServerName as "NAPOPC.Svr.1" and pass it to ICPDAS\_OPCServer for connecting.

'Set a ProgID to ServerName ServerName = "NAPOPC.Svr.1;" 'Create a new OPC Server object Svr = new ICPDAS\_OPCServer (); 'Connect to NAPOPC DA Server Svr.Connect (ServerName);

### Step 4:

Now, you'll go ahead and add the code rights after you get your connection to the NAPOPC Server. Please refer to following TagReadWrite and DataChangeHandler subroutine of VC# demo program.

'Handles of data change callbacks public void DataChangeHandler ( object sender, DataChangeEventArgs e )

public void TagReadWrite ( ICPDAS\_SyncIOGroup grp, RefreshGroup rgrp, ServerTreeBrowser iTree, string tagId)

### Step 5:

Now, you can add codes for the "Read" button, "Write" button and "TreeView" AfterSelect function. Please refer to the btnRead\_Click, btnWrite\_Click and tvTags\_AfterSelect subroutine of VC#.Net demo program. In these three functions, the *Grp.Read*, the *Grp.Write and the* TagTree.TagName are three key methods.

### Step 6:

You can build the project and you will see the UI as below.

| ¥C:          | SOPCClient_Demo | 0          |
|--------------|-----------------|------------|
| Server name  |                 |            |
| NAPOPC.Svr.1 | Connect         | Disconnect |
|              |                 |            |
|              |                 |            |
|              |                 |            |
|              | Read            | Write      |
|              |                 | 8          |
|              | Read Value      |            |
|              | Write Value     |            |
|              | inite relies j  |            |
|              | Timestamp       |            |
|              |                 |            |
|              | Quality         |            |
|              |                 |            |
|              |                 | About      |

#### Step 7:

After you click on the "Connect" button, you will see the OPC Server tree list. You can choose one of them and click on the "Read" button. You will see the tag value at the "Read Value" field as below. You can also type the value you want to write in the "Write Value" field and click on the "Write" button. (Refer to 4.2 .Net Client Demo Program)

| VC  | SOPCClient_Demo                        |
|---|--|
| Server name<br>NAPOPC.Svr.1   | Connect Disconnect                     |
| B● MTCP_8054  | MTCP_8054.D0.D01                       |
| DI<br>DI<br>DI2<br>DI3<br>DI4<br>DI5<br>DI6<br>DI7<br>DI8<br>DO1<br>DO2<br>DO3<br>DO3 | Read Write Read Value True Write Value |
| D04<br>D05<br>D06   | Timestamp2004/7/8 下午 04:50:47          |
| D08   | Quality GOOD                           |
|   | About                                  |

# 7 NAPOPC\_XPE Changes List

# 7.1 Features of NAPOPC\_XPE version 1.01

The new features of NAPOPC\_XPE version 1.01 are briefly described in this section.

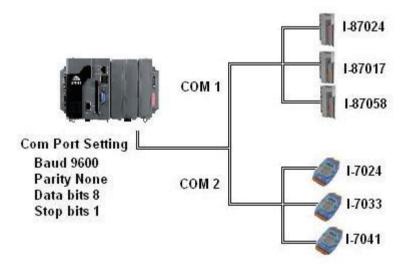
### 7.1.1 Customized Module/Device Polling Time

NAPOPC\_XPE version 1.01 allows customers to optimize their communication by setting "Pending Time" in "Device Dialog ". Customers have chance to spread more time resource to other modules which are connected with each other. Please refer to "3.1 Optimize Your Communication" in detail.

### 7.1.2 Multi-Thread Communication

NAPOPC\_XPE version 1.01 uses multi-thread architecture to organize module and device communication. Before NAPOPC\_XPE version 1.01, NAPOPC\_XPE uses single-thread to deal with module and device communication. Therefore, if NAPOPC\_XPE connects many modules and devices, accessing time will increase observably. By NAPOPC\_XPE version 1.01, customers have chances to group modules and devices into several parts, and connect via different COM port. One COM port works in one thread. All TCP communications belong to one thread.

Here is an example to show the difference of average scan time between NAPOPC\_XPE version 1.01 and before NAPOPC\_XPE version 1.01.



Under the same architecture, the average scan time in NAPOPC\_XPE version 1.01 is 375 ms and 539 ms separately. Before NAPOPC\_XPE version 1.01, the average scan time is 1109 ms.

### 7.1.3 Support <u>Remote Procedure Call with Quicker/UPC</u>

NAPOPC\_XPE version 1.01 supports RPC(<u>Remote Procedure Call</u>) communication with Quicker and UPC(ICP DAS <u>Universal Protocol Converter</u>). Based on RPC service, NAPOPC\_XPE can synchronize OLE data with Quicker and

UPC automatically. The behavior of changing data between "NAPOPC\_CE5/CE6" and NAPOPC\_XPE is not polling from NAPOPC\_XPE but sending from "NAPOPC\_CE5/CE6". This mechanism can transfer data effectively and shorten response time.

### 7.1.4 Switch of Single-Thread and Multi-Thread

NAPOPC\_XPE version 1.01 supports "Communication Mechanism" option at "Options/ Configurate Initial Status". This option lets user define the communication behavior of NAPOPC\_XPE. Generally, "Multi-Thread" is the best choice for high performace. However, for some particular OPC clients which can not work smoothly under "Multi-Thread" communication, user can choose "Single-Thread" instead.

# 7.2 Features of NAPOPC\_XPE version 1.02

### 7.2.1 Bug Fix

- Fix "Unsupported\_Device" bug when searching RU87PN
- Fix modbus tags showing error when tag property length is 4 bytes
- Fix coil type error in "OPC to Modbus client" program

# 7.3 Features of NAPOPC\_XPE version 1.10

The new features of NAPOPC\_XPE version 1.10 are briefly described in this section.

### 7.3.1 Support ET-7000 Search

NAPOPC\_XPE version 1.10 supports "ET-7000 Search" option at "Add/Search Modules". This option lets NAPOPC\_XPE can search not only the modules communicating via COM port but also ET-7000 modules via Ethernet automatically.

### 7.3.2 Support ZB-2K I/O

NAPOPC\_XPE version 1.10 supports "ZB-2K" I/O modules at "Select Device" dialog. User can easily choose ZB-2K module ID to add ZB-2K module. And then use "Generate Tags" function to generate ZB-2K properties automatically.

### 7.3.3 Support FRnet Module

NAPOPC\_XPE version 1.10 supports "FRnet" I/O modules at "Select Device" dialog. User can easily choose FRnet module ID to add FRnet module. And then use "Generate Tags" function to generate FRnet properties automatically.

### 7.3.4 Support Account Selection

NAPOPC\_XPE version 1.10 supports "Recent File Source" selection at "Options/Configurate Initial Status" dialog. User can choose "Administrator Account" or "Current User Account" to decide registry location for some DCOM application scenario.

### 7.3.5 UI Modification

For more protocol support, NAPOPC\_XPE version 1.10 modifies "Select Device" user interface. NAPOPC\_XPE version 1.10 separates three groups of "DCON", "FRnet", and "Modbus" from one property sheet to clarify the user interface of device settings. Also, it limits the dialog size to an allowable boundary.

# 7.4 Features of NAPOPC\_XPE version 1.12

The new features of NAPOPC\_XPE version 1.12 are briefly described in this section.

### 7.4.1 Support FRnet module via RPC communication

NAPOPC\_XPE version 1.12 supports "FRnet" I/O modules via RPC communication. User can easily create RPC device to synchonize "FRnet" I/O modules plugged in WinPAC(See 1.6.2 Adding A New RPC Controller).

# 8 Reference

## FAQ.txt

The frequently asked questions and answers. <u>http://opc.icpdas.com/faq\_xpe.htm</u>

### GetStart.PDF

This manual can be downloaded from below link. http://www.icpdas.com/download/7000/manual.htm

### **OPCNetWrapper.PDF**

This document describes how to use OPC .NET wrapper for .NET programming.

### **OPCOvw.PDF**

The OPC overview - written by the OPC Foundation.

### **OPCCommn.PDF**

The OPC common interface - specifications by the OPC Foundation.

### OPCDA20\_Cust.PDF

The OPC DA v2.0 custom interface - specifications by the OPC Foundation.

### OPCDA20\_Auto.PDF

The OPC DA v2.0 automation interface - specifications by the OPC Foundation.

### **OPC Foundation Web Site**

http://www.opcfoundation.org/