

OPC Servers

DDE OPC Server



Your comments and suggestions on the operation of this software are welcome. Please address them to:

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Notes:

Getting Started

1

1.1 Introduction

The ICONICS DDE (Dynamic Data Exchange) OPC Server is an OPC compliant server that is able to communicate with real time I/O devices and serve data to OPC clients. This DDE OPC Server was implemented using advanced programming concepts of the most current version of the OPC specification for use in developing the next generation of industrial software applications.

The ICONICS DDE OPC Server communicates with OPC clients and DDE Server Applications. This DDE OPC Server is based on the popular DDE Server/Client and is an ideal way to learn about the emerging OPC standard and can also be used to test other OPC Clients.

1.2 DDE OPC Features

The OPC Server is extremely flexible, and can be utilized and used with DCOM for intranet and internet applications.

Key Features of the DDE OPC Server

- Advanced OPC data Quality and data conversion to client's request
- OPC Client for rapid testing of your OPC data connections.
- GUI interface for viewing tags, groups, and Realtime Signals.
- Full Online Help
- Change Device and Tag properties online.
- Flexible engineering units and signal ranges.
- Import and Export tags to and from CSV files.

1.3 OPC Client Application

The OPC test Client application, provided with the DDE OPC Server, has a rapid method for testing your Server's configuration. The OPC Client is able to browse the registry of PC and display the complete list of installed OPC Servers. Also provide real live data feedback and OPC Server browsing capabilities.

The OPC test Client is also helpful for verifying results and testing other OPC third party applications connected to the same server.

1.4 System Requirements

The following are system requirements for installing the DDE OPC Server and OPC test Client application:

- Software Requirements
- Hardware Requirements
 - * Pentium 166
 - * 32 MB RAM
 - * 50 MB HDD
 - * Installed Internet Explorer 3.02 (or greater)

Note: If you have installed Internet Explorer 4.0 (or wish to install it), it is required that you read the installation notes of IE4.0 since DCOM is part of IE4.0 and you may have an old version of DCOM.

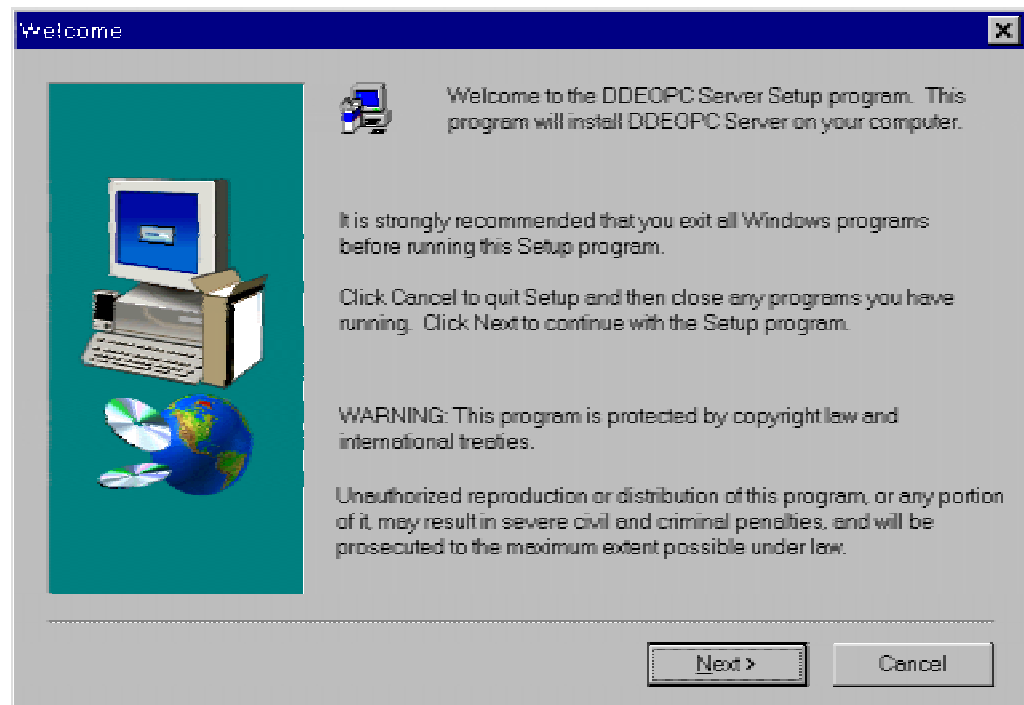
1.5 DDE OPC Server Disk Contents

The ICONICS DDE OPC Server comes with two 3.5- inch disks. Later versions can be obtained by downloading them from the ICONICS OPC Web site. Visit the ICONICS Web site at www.ICONICS.com for up to date information on this as well as other OPC Servers.

1.6 Installing the DDE OPC Server

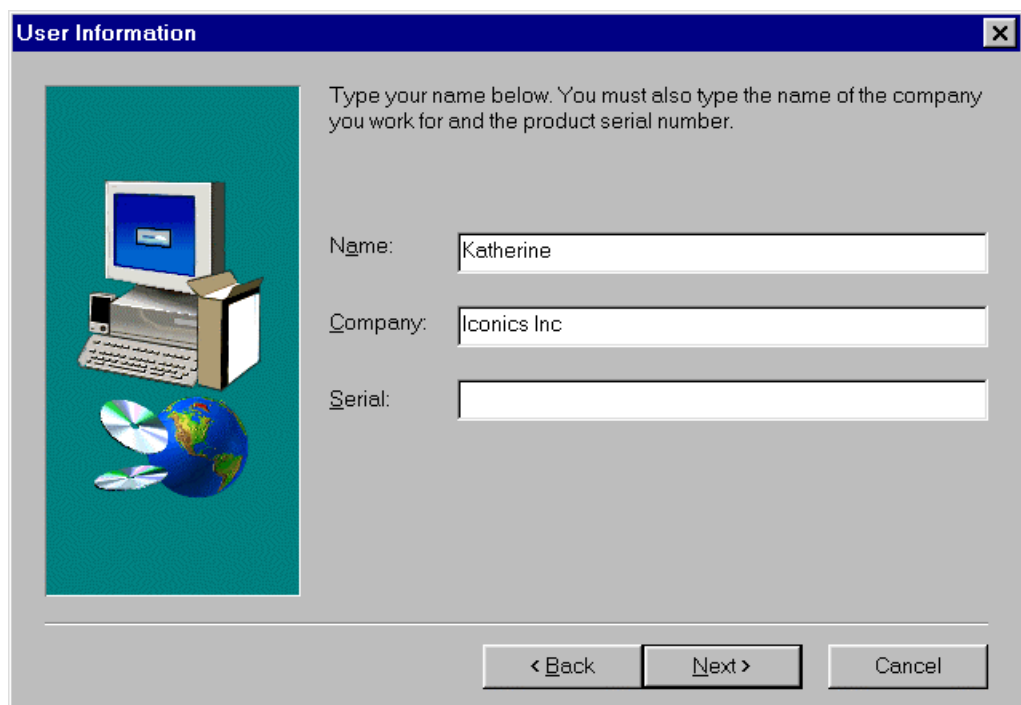
1. Insert the ICONICS DDE OPC Server disk #1 in your 3.5-inch disk drive.
2. Click the Start button from the main menu bar and choose Run.
3. In the Run dialog box, type the following:
A:/Setup (replacing "A" with the actual location of the 3.5-inch disk drive).

4. Read the Welcome message (displayed below) and click OK.



Welcome Message

5. Enter the Serial Number for installation as provided by ICONICS. This number is shipped with your DDE document. Or call ICONICS technical support at: 1-800-946-9679



The image shows a Windows-style dialog box titled "User Information". On the left is a graphic of a computer monitor, keyboard, and CD-ROMs. On the right, there is instructional text and three input fields. The "Name:" field contains "Katherine", the "Company:" field contains "Iconics Inc", and the "Serial:" field is empty. At the bottom are three buttons: "< Back", "Next >", and "Cancel".

User Information

Type your name below. You must also type the name of the company you work for and the product serial number.

Name:

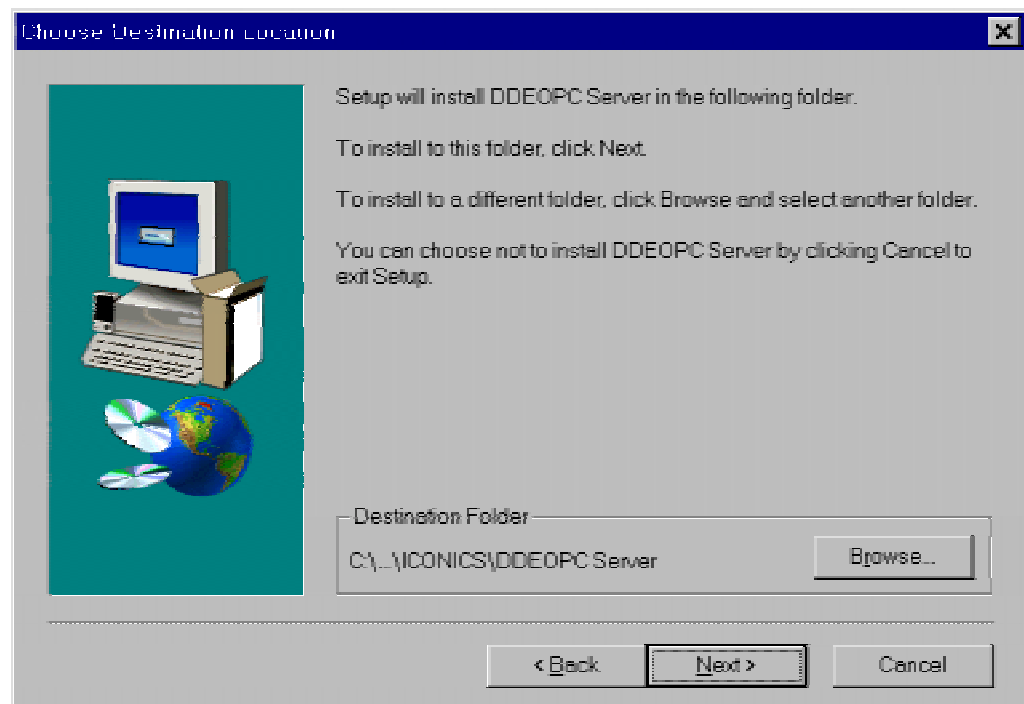
Company:

Serial:

< Back Next > Cancel

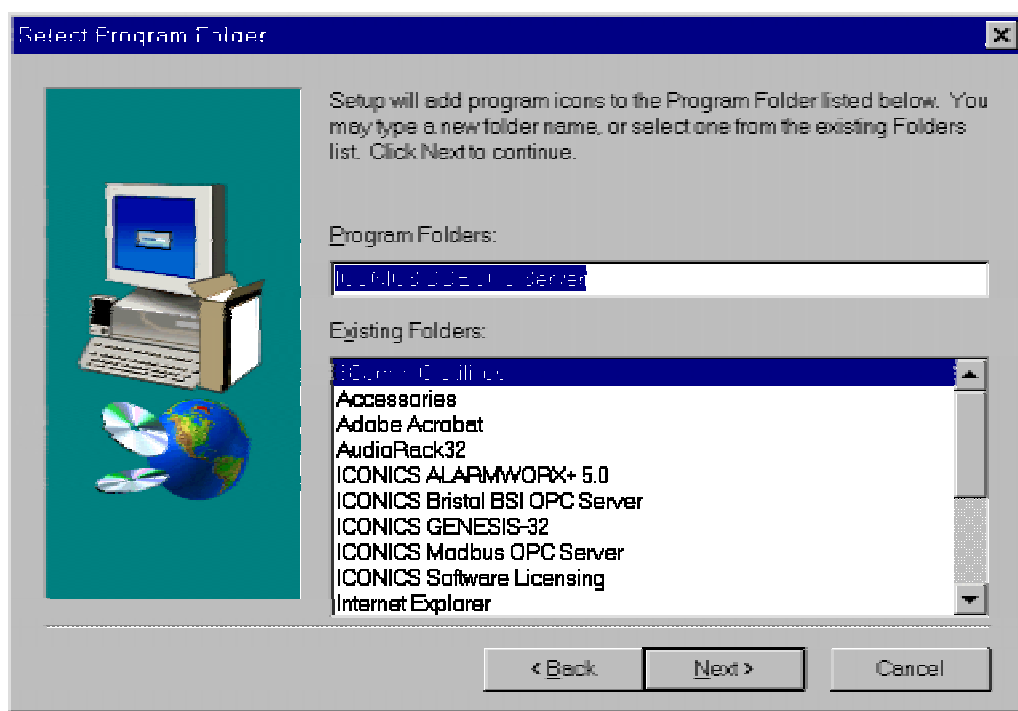
User Information

6. Follow the instructions of the setup program. The setup program will ask you for the folder where most of the files will be located, as shown below.



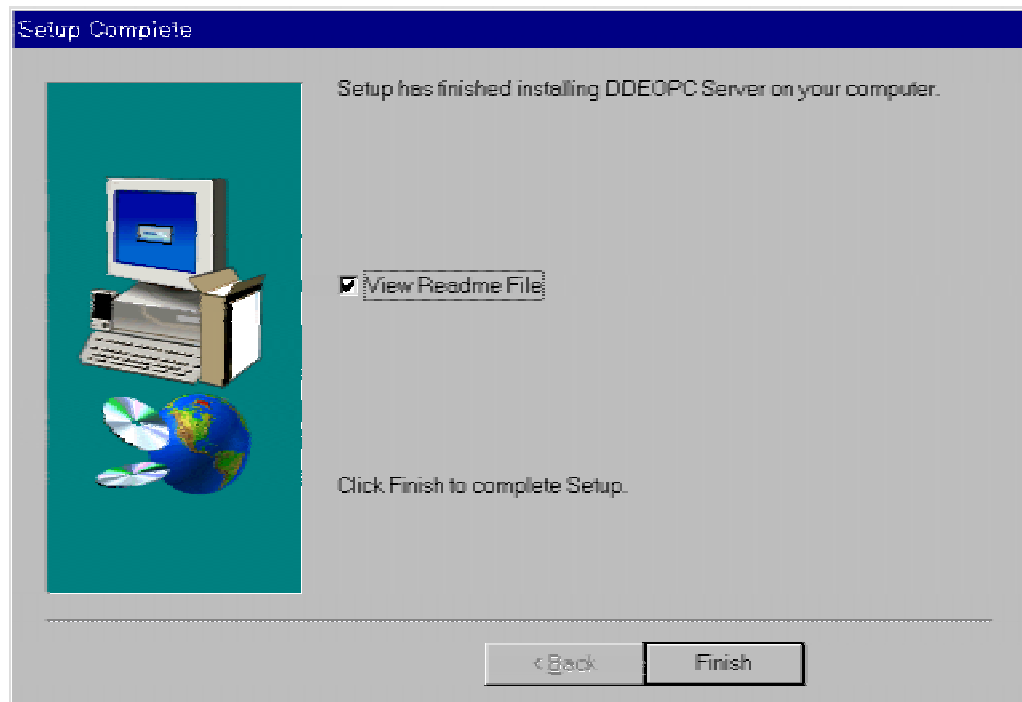
Destination Location

7. The setup will also ask you for the program folder.



Select Program Folder

8. At the end of the installation, click OK to view the Readme file and to launch the OPC client application

**Setup Complete**

Note: As explained in the installation section of this manual, Windows NT 4.0 or Windows 95 with DCOM is required to run the DDE OPC Server.

Note: Internet Explorer 4.0 installs DCOM automatically. However, if you are using Internet Explorer 3.x, DCOM is not provided and can be downloaded from Microsoft.com.

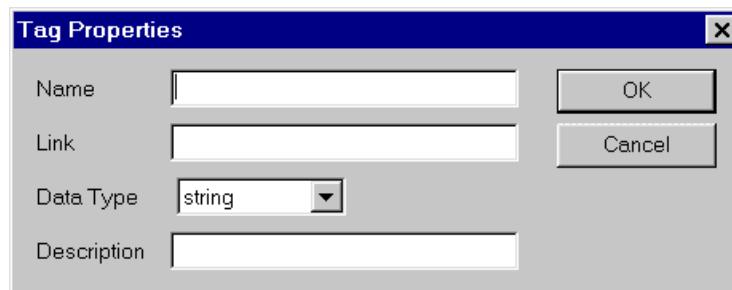
Notes:

DDE OPC Server

2

2.1 Setting up an Example File

- Start the DDE OPC Server from the program group and select File – New from the Menu bar. A blank configuration file will appear.
- Select Edit – New and the following dialog will display:

The image shows a 'Tag Properties' dialog box with a blue title bar and a close button (X). It contains four input fields: 'Name', 'Link', 'Data Type', and 'Description'. The 'Data Type' field has a dropdown menu currently showing 'string'. To the right of the input fields are 'OK' and 'Cancel' buttons.

Tag Properties dialog

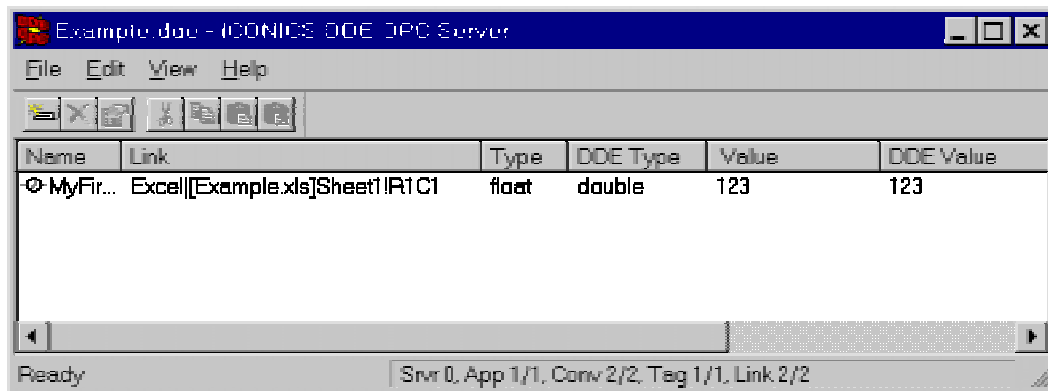
- Enter the following information:

Name:	MyFirstTag
Link:	Excel[[Example.xls]Sheet1!R1C1
Data Type:	Float

Note: The DDE link is comprised of a DDE Server, DDE Topic and DDE Item name. In this example the server name is MS-Excel, the topic is Sheet1, and the item is R1C1 (row 1 column 1).

- Select File – Save from the menu bar and save the file as Example.dde.

- To create the data that will be displayed in your Tag Browser open MS-Excel and type the value 123 in R1C1. Save this file as Example.xls in the same directory as your Example.dde file.
- Switch to the DDE OPC Server and select View – Monitor from the menu bar in order to verify proper configuration. Your Tag Browser should look like the following figure.



Example.dde

- The DDE OPC Server is now ready to be connected to any OPC compliant client program.

Note: As explained in the installation section of this manual, Windows NT or Windows 95 with DCOM is required to run the DDE OPC Server.

The defined tags use a variety of data types and simulation signals such as: int, long, float, double, string, bool, char, currency and date.

The DDE OPC Server lists all tags in the Tag Browser showing their name, link, type and description. In monitor mode the DDE Type, Value and DDE Value are added.

2.2 Menu Items

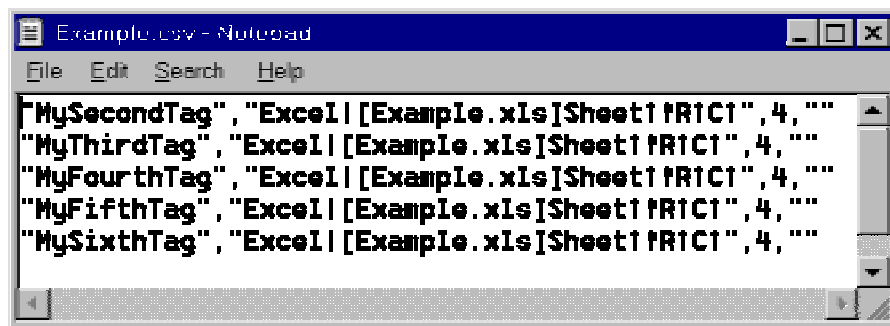
2.2.1 File

The file menu has many options that are common to most file menus such as:

- New (CTRL + N)
- Open (CTRL + O)
- Save (CTRL + S)
- Save As
- Exit

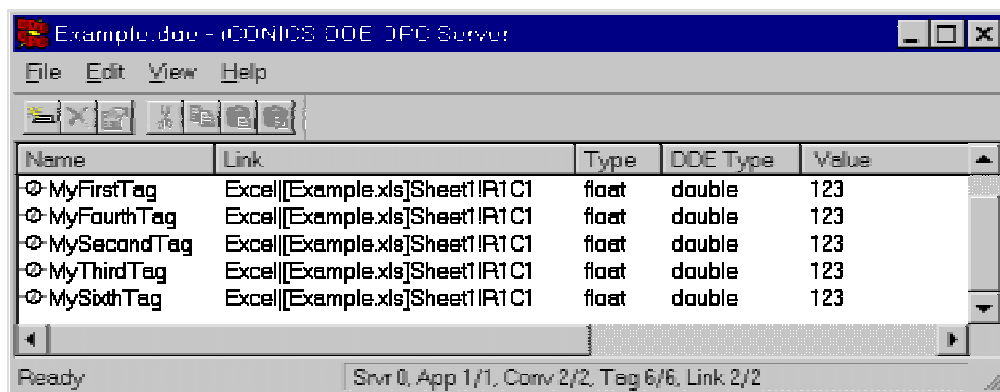
As well as allowing the user to Import data from a CSV file or Export data to a CSV file. The purpose of this function is to ease the configuration of tag names and DDE links using external programs such as Notepad.

- Using your Example.dde file from before, select File – Export CSV.
- Type Example in the File Name field and press Enter or Click on Open.
- Open Notepad and select File – Open and open your Example.csv file.
- Duplicate the tag and change the file name so that your notepad window displays as the following figure.



Duplicated Tags

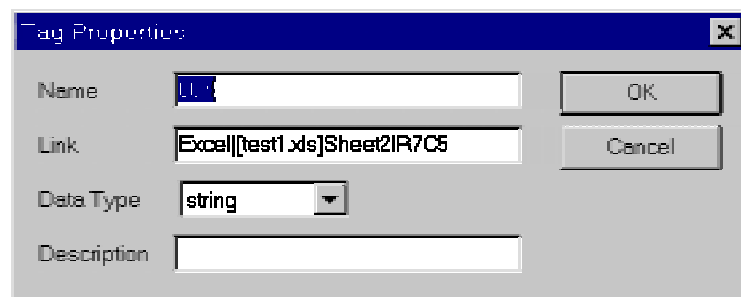
- Save the CSV file.
- In the DDE OPC Server configurator select File – Import CSV and all of the duplicated tags should appear, see figure below.



DDE OPC Server with duplicated tags

2.2.2 Edit

The edit menu also contains several options that are common to most edit menus such as: cut, copy, paste and delete. In addition to these options the user is able to select properties from the menu which brings up the Tag Properties dialog shown below.



Tag Properties



This dialog can also be opened by: right clicking on a tag and selecting properties, double clicking on a tag or clicking the icon shown to the left.

Additionally, users can select New to insert a new tag and the tag properties dialog shown above will appear. Any tag is composed of four elements:

1. **Name** - The tag name that you can see in the tag browser. This name should fit into your naming scheme, and will determine how your tags will be called from the OPC Client.
2. **Link** - The real DDE name you get from the destination application. The link has the Excel form "Application|Topic!Item", for example "Excel[test1.xls]Sheet2!R7C5".
3. **Type** - The type you want to cast the original value to. This is useful when you want to translate the strings (default type of DDE tags) to any other type.
4. **Description** - A string that describes the tag.

The final option available in the Edit menu is the “Paste Link” option. This is the most useful function of the DDEOPC Server. It works like the “special paste” function worked in the 16-bit GFW Point Name Selection dialog. Copying a cell (or group of cells) in Excel, for example, puts the link on the clipboard. Selecting the “Paste Link” option from the Edit menu (or pressing Ctrl + L) will automatically open the tag properties dialog and will enter the copied string in both the name and link fields. It is only necessary to keep this string in the link field. When the string is entered using Paste Link you will notice that the entire path of the link is entered, while this is a way to guarantee your link will be maintained it is not necessary if your server and your destination application file are in the same folder.

2.2.3 View

The view menu allows the user to change the view that they are currently using for configuration. If they check the Monitor option, the value of the tags will be shown and will continually change as the system updates. If the user selects the Status Bar option they will be able to see the bar that appears at the bottom of the screen that explains the functionality of the item which the cursor is over or pointing to. Similarly, the Toolbar option allows the user to view the toolbar that contains several shortcut buttons/icons, which make using the DDE OPC Server much more convenient. Finally, the Reestablish feature reestablishes a connection with the destination application.

2.2.4 Help

The help menu for the DDE OPC Server contains the About DDE OPC Server option which tells the user which version of the DDE OPC Server they are running and copyright information about the product.

DDE OPC Server

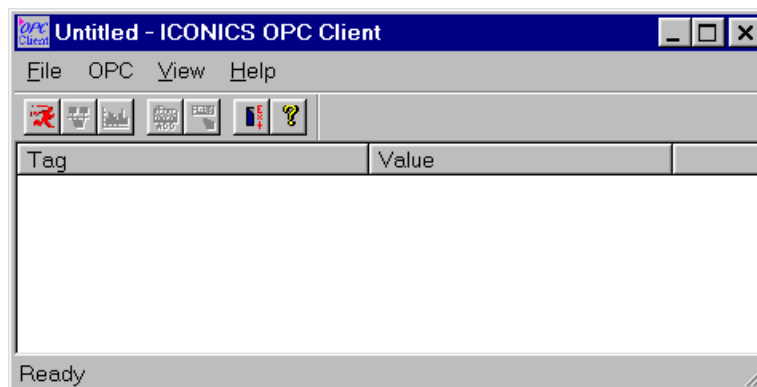
Menu Items

Notes:

DDE OPC Client

3

3.1 Starting the OPC Client



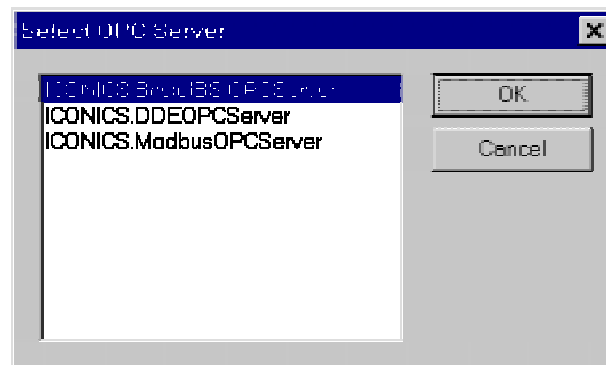
OPC Client Window

The OPC Client is used as a test case to debug an OPC Compliant Server and to access some of the OPC variables and parameter configuration.

- Start the OPC Client. Left click on the Windows Start button, under programs find Iconics DDEOPC Server and click on the OPC Client.

3.1.1 Connect to an OPC Server

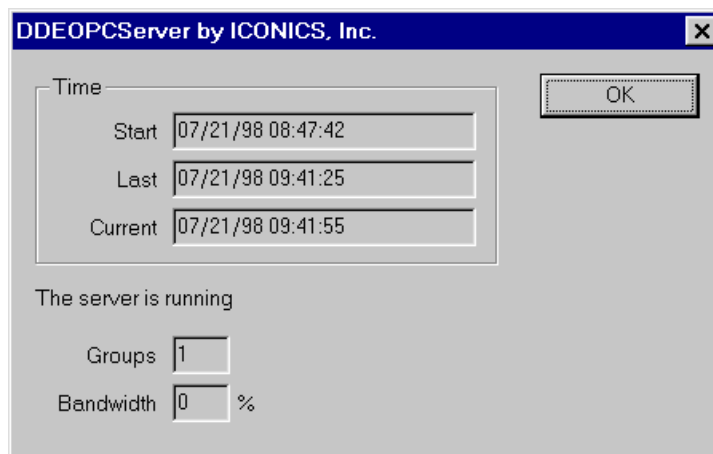
- From the OPC menu, choose Connect. The OPC Server menu appears showing all registered OPC Servers.

**OPC Server Menu**

- Select **ICONICS.DDEOPCServer** and click **OK**. This connects the OPC client to the sample server.

3.1.2 Server Status

- From the OPC menu choose Server Status to view the DDEOPCServer status window, shown below.



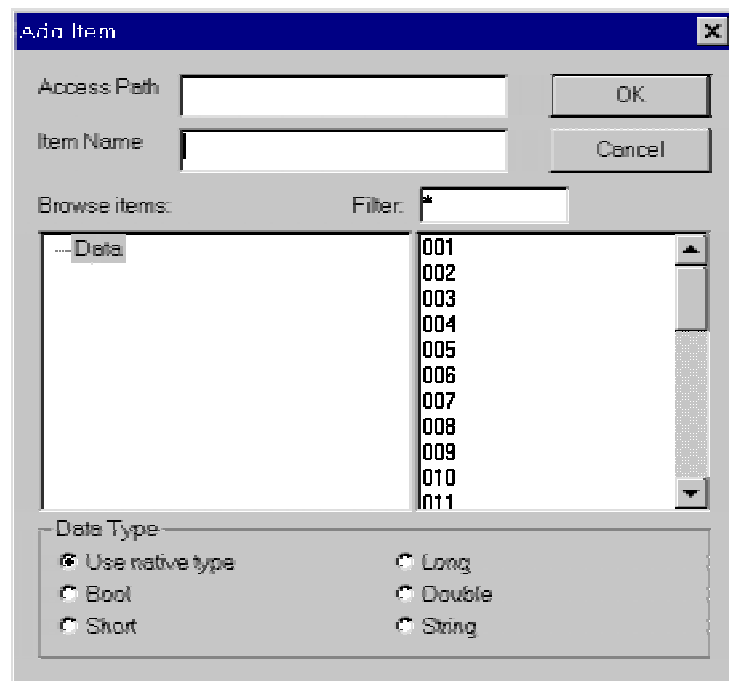
Server Status Window

The Server Status window continuously updates the server start time, time of last update, current time, the number of groups running, and the bandwidth for the selected server. Use this window to verify that the server is running and is connected to the OPC Client. The Server Status dialog periodically queries the Server object for status and displays the results.

- Click OK to close the Server Status window.

3.1.3 Add an Item

- From the OPC menu, choose Add Item. The Add Item dialog box appears as shown below:



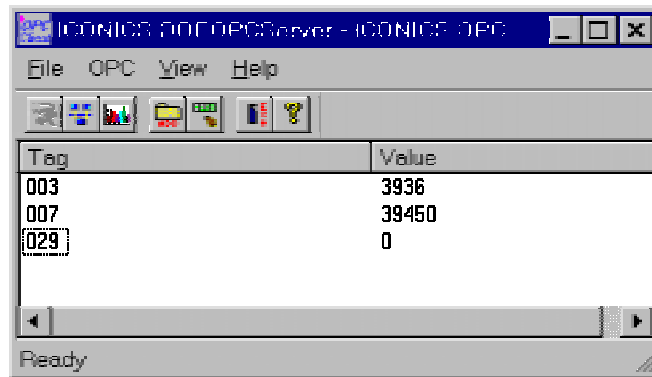
Add Item

The Add Item dialog box displays the tags defined in the current server configuration. These are filtered by expression "*" and by data type. You can enter an access path, type or select an item name and choose the data type in which you want to view the requested tag.

In the Browse Items list, there will only be one option: Data. All of the tags that you specified in the current server configuration are available from the right column. Once the user selects one of these tags the name of the tag will appear in the Item Name field.

- Click OK. The item appears in the OPC Client window with the updating data values.

- Add more tags repeating the previous steps. An example of the OPC Client displaying three sample server items is shown below.



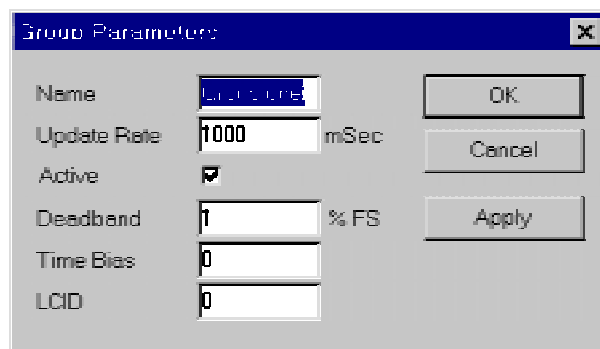
Sample with three tags

When an item is added, the dialog displays either a hierarchy or a flat list of names, depending on the server. The names are queried from the Server object using the filter string and requested data type. When the user either types or selects a name, an item by that name is added to the Group object. This item is also read immediately to get an initial value.

Items in a group are scanned by the server, when their values change, the advise interface in the client is notified. A data structure containing the data for each item whose value or quality has changed (and only those items) is passed to the client's advise interface. The client unpacks and uses the data.

3.1.4 Group Parameters

- From the OPC menu, choose Group Parameters. This command displays the parameters of the group of tags.



Group Parameters dialog

The Update Rate determines how fast data is sent to the client, in milliseconds (mSec). The Active state initiates active communications between the client and the server. You can change any of the items that appear in this dialog, for example the Active state or the Update Rate, and click Apply to send changes to the server.

The Group Parameters dialog queries the group state and displays the results. The OK or Apply buttons in the Group Parameters dialog box write the parameters from the dialog to the Group object and read the parameters back. This primarily controls the scanning and updating of data. When a group is inactive, it does not send data notifications to the client and typically there is no reason to scan the items when the group is inactive. The notifications should be sent to the client, assuming that data has changed. This is also the rate at which items are scanned on behalf of this client.

Note: If the group does not contain active data it is not sent to the client. You can choose Disconnect from the OPC menu to clean up all selections and disconnect from the server.

3.2 Opening a New Client

While a client is connected to a server, you cannot exit the server or open new configurations in the server. You can modify the existing server configuration while client(s) are connected, however, you cannot delete any device or tag in use. For example, you can take a device off-line or change a tag's scaling values without shutting down a client that may be controlling many devices.

Start another instance of the OPC Client and make the same server connection as those defined in the first Client instance.

You can add items, change the group update rate and active states and view the server status in each instance of the OPC Client independently of the other instance. For example, the number of groups is "1" in each client because each one only has one group.

The only way that one client affects the other is through data and data changes. Make sure both clients are showing the same tag.

In one of the clients, select this tag in the window and choose Write Value to Item from the OPC menu.

Type a numeric value and click OK. Both clients display the new value at their own update rates. (Note that a client defined with a very slow update rate does not receive the value immediately.)

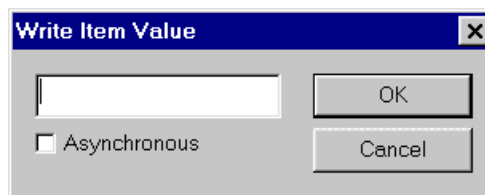
3.2.1 Connecting and Getting Data

When OPC servers are installed on the system, they are registered so that clients can find them and users can view them in a list. To make a client/server connection, the user must first choose a server. The server name is selected (for example, "ICONICS.DDEOPC") and is used to get a class ID, which, in turn is used to create a COM object. If the user selects a server that is not currently running, the system starts the server and then creates the object in the server on behalf of the client.

Once the COM object is created, the client application has an IOPCServer interface, as defined in the OPC specification. This is the main interface to the OPC server and this document refers to this as a server interface. (The other interface is *Group*.) This OPC client always creates a group and registers an advise interface with it to get asynchronous data notification.

3.2.2 Write a Value to an Item

To write a value to an item, select the item in the OPC Client window and choose Write Value to Item from the OPC menu. The client writes the value typed in the Write Item Value dialog box, as seen in the Figure below, to the connected item in the Group object. If the method of writing data is written synchronously, the call to the server blocks until the operation has completed, which may take a long time. When data is written asynchronously, the call to the server returns quickly and the operation is carried out on another thread. When the write has finished, the client's advise interface is notified with the results.



Write Item Value dialog

3.2.3 Disconnect from the Server

The user can disconnect from the selected server by choosing Disconnect from the OPC menu or by left clicking on the above button. The Disconnect command unregisters the advise interface, releases the Group object, and then releases the Server object. *Releasing* an object means that the client is no longer interested in the object, so the system can delete the object in the server.

Notes: