



Solutions for
Industrial Agility

OPC Server for DDE

User Manual

Version 1.0

May 2004

OPC Server for DDE User Manual—Version 1.0

This manual is a product of Matrikon Inc

Matrikon Inc.

#1800, 10405 Jasper Avenue

Edmonton, Alberta

T5J 3N4 Canada

Phone: (780) 448-1010

Fax: (780) 448-9191

<http://www.matrikon.com>

Revision History:

<u>Date</u>	<u>Version</u>	<u>Description</u>	<u>Author</u>
2004-05-03	1.0	Initial Document	LAL

© Copyright 2004, Matrikon Inc. All rights reserved.

CONFIDENTIAL

The information contained herein is confidential and proprietary to Matrikon Inc. It may not be disclosed or transferred, directly or indirectly, to any third party without the explicit written permission of Matrikon Inc.

All rights reserved. No part of this document may be reproduced, stored in a retrieval system, translated, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of Matrikon Inc.



Table of Contents

1	Introduction	1
1.1	Who Should Use This Manual	1
1.2	Overview of Manual	1
1.3	References	1
2	Getting Started	2
2.1	System Requirements	2
2.1.1	Software Requirements	2
2.1.2	Hardware Requirements	2
2.2	Installation	2
2.3	Licensing	8
2.3.1	Requesting a Software License	9
2.3.2	The Software License Key	10
2.3.3	The Software Authorization Licensing Program	10
2.3.4	Licensing the OPC Server for DDE	11
2.3.5	Removing the Software License	11
2.3.6	Transferring the Software License	12
2.3.7	Enabling Temporary Authorization of the Software	12
2.4	Contacting Support	13
3	Configuration	14
3.1	Starting the OPC Server for DDE	15
3.2	The Tool Tray Menu	15
3.3	The Control Panel	16
3.4	The Configuration Window	17
3.4.1	The File Menu	19
3.4.2	The Edit Menu	20
3.4.3	The View Menu	20
3.4.4	The Tools Menu	21
3.4.5	The Help Menu	21
3.5	The Options Dialog Box	21
3.5.1	General Options	21



3.5.2	General Logging Options.....	22
3.5.3	Interface Logging Options	24
3.5.4	Advanced Options	25
3.6	Server Configuration	27
3.6.1	Inserting New Objects	27
3.6.2	Removing Objects.....	29
3.7	Alias Configuration	29
3.7.1	Inserting Alias Groups	30
3.7.2	Renaming Alias Groups	30
3.7.3	Inserting New Aliases.....	30
3.7.4	Editing Aliases.....	33
3.7.5	Removing Aliases.....	33
3.7.6	Removing Aliases.....	33
3.7.7	Exporting Aliases	33
3.7.8	Importing Aliases.....	34
3.8	Saving the Configuration	34
3.9	Clearing the Configuration.....	34
3.10	Loading a Saved Configuration	35
3.11	Shutting Down the Server.....	35
4	OPC Data Items	36
4.1	DDE Items	36
5	Diagnostics	38
5.1	Logging.....	38
6	Troubleshooting.....	39
6.1	Problems and Solutions	39
6.2	Questions and Answers.....	43
7	OPC Compliance	44
7.1	Installation.....	44
7.2	Common Interfaces	44
7.3	Data Access.....	45
7.3.1	Groups.....	45
7.3.2	Items	45
7.3.3	Browsing and Item Properties	45



7.3.4 I/O Operations	46
Appendix A - Distributed COM (DCOM)	48
A.1 DCOM Configuration Utility	48
A.2 Default Properties	48
A.3 Security Permissions	49
A.4 Server Identity	52
A.5 Default Protocols	52
A.6 Remote Program ID	53
Appendix B - ALIASES	54
B.1 Scaling Expressions	54
B.2 CSV File Format	55
B.3 Scaling Algorithms	56
Appendix C - Standard Data Types	57
Appendix D - Microsoft Excel as a DDE Client	58
D.1 DDE Read	58
D.2 DDE Write	58
D.3 Net DDE	59



1 Introduction

The Matrikon OPC Server for DDE follows the requirements of the OPC specification to provide data access to any OPC clients. This server implements version 1.0a and 2.0 of the OPC custom interface, which is typically used by C++ and Delphi programs.

The server provides an interface to the local node DDE Server, using Microsoft's Dynamic Data Exchange Management Library (DDEML), which, when used in conjunction with the netDDE services, provides access to any remote DDE server.

Also, the server is optimized for performance and uses multithreaded technology to provide efficient response to client requests. This approach allows multiple clients to connect to and effectively use the resources of a server.

1.1 Who Should Use This Manual

This manual is intended for all users of the OPC Server for DDE . It explains how to install and configure the software as well as how to perform common tasks. In addition, technical information about OPC Data Items is included along with sections on diagnostics and troubleshooting.

1.2 Overview of Manual

This manual consists of several chapters and is structured as follows:

1. **Introduction:** this introductory chapter.
2. **Getting Started:** provides instructions for installing the server and how to contact Matrikon's support group.
3. **Configuration:** shows you how to start and configure the server and describes each component in detail, including the windows, panels, and menu commands.
4. **OPC Data Items:** describes the server's items.
5. **Diagnostics:** explains how to use logging, statistical items, data qualities and timestamps, and result codes to get the most efficiency from your system.
6. **Troubleshooting:** provides solutions for common problems you may encounter and answers frequently asked questions.
7. **OPC Compliance:** details server's OPC compliance with regard to installation common interfaces and data access.

In addition, **Appendix A, B, and C** cover DCOM, aliases, and standard data types.

1.3 References

No external references



2 Getting Started

This chapter contains important information about installing the server and how to contact Matrikon's support group.

The **System Requirements** section shows you how to avoid future problems by ensuring that your system meets the minimum software and hardware requirements. Detailed, step-by-step instructions in the **Installation** section take you through the installation process and lists the files that are installed during this process. When you have installed the server, read the **Licensing** section to learn how to obtain the appropriate license. If you have any problems during the installation or licensing of the server, the **Contacting Support** section tells you how to contact Matrikon's support group for help.

2.1 System Requirements

The server has both **Software** and **Hardware** minimum system requirements. These requirements must be met in order for the server to work properly.

2.1.1 Software Requirements

The server requires, at a minimum, the following software:

- Microsoft Windows NT 4.0 Service Pack 5

2.1.2 Hardware Requirements

The server requires, at a minimum, the following hardware:

- Intel Pentium II 200MHz
- 64MB RAM
- 25 MB Hard Drive

2.2 Installation

Once you are certain that your system meets the system requirements, you are ready to install the server.

To install the server, perform the following steps.

1. Insert the OPC Server for DDE CD into your CD drive.
2. If the Matrikon **Welcome** dialog box does not appear automatically, double-click the Matrikon OPCDDE.exe file.



The Matrikon **Welcome** dialog box (Figure 2-1) appears.

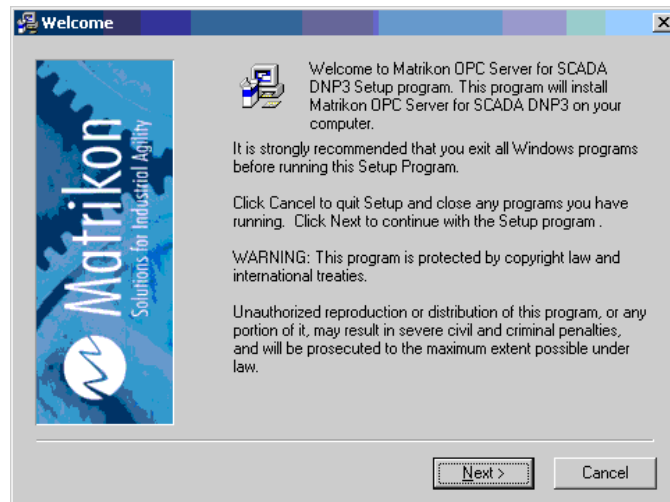


Figure 2-1. The Matrikon Welcome dialog box.

3. Read the information in the dialog box, and then click **Next**.

The **Read Me File** dialog box (Figure 2-2) appears.

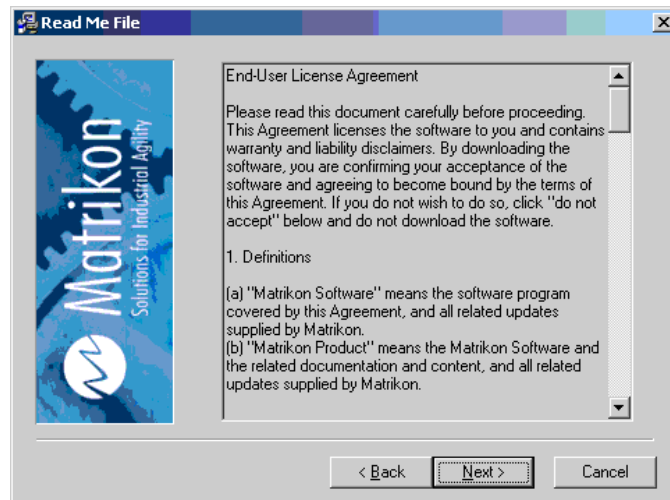


Figure 2-2. The Read Me File dialog box.

4. Read the **Read Me** file, using the scroll bar to view the entire message, and print it out for future reference. Click **Next**.



The **Choose Destination Location** dialog box (Figure 2-3) appears.

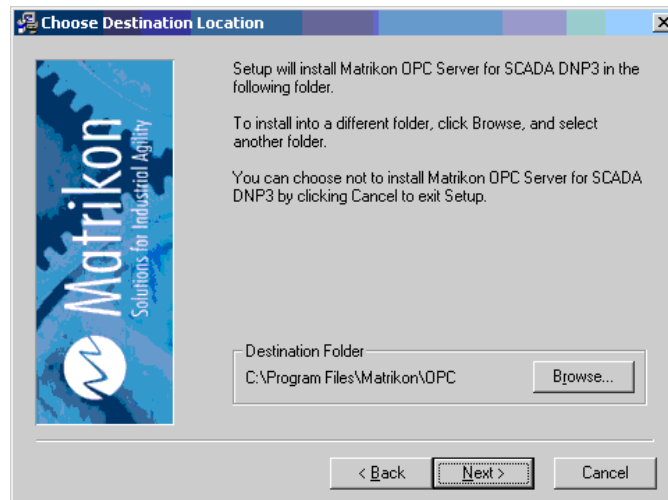


Figure 2-3. The Choose Destination Location dialog box.

5. Click **Next** to install the server files into the default location.
Alternatively, you can click **Browse** to navigate to a different installation folder.

The **Select Components** dialog box (Figure 2-4) appears.

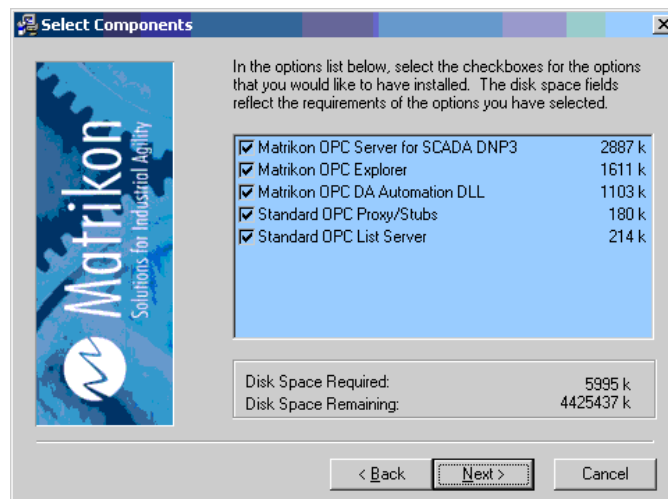


Figure 2-4. The Select Components dialog box.

6. Leave all the checkboxes selected in order to install all the server components (you may deselect the checkbox for components that you do not want to install), and then click **Next**.



The **Select Program Manager Group** dialog box (Figure 2-5) appears.

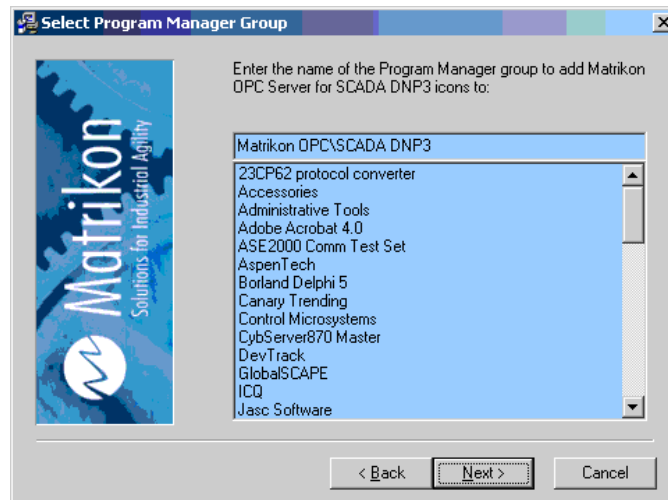


Figure 2-5. The Select Program Manager Group dialog box.

7. Click **Next** to add the server icons to the default program manager group. Alternatively, you may scroll to select another program manager group from the list box.

The **Start Installation** dialog box (Figure 2-6) appears.

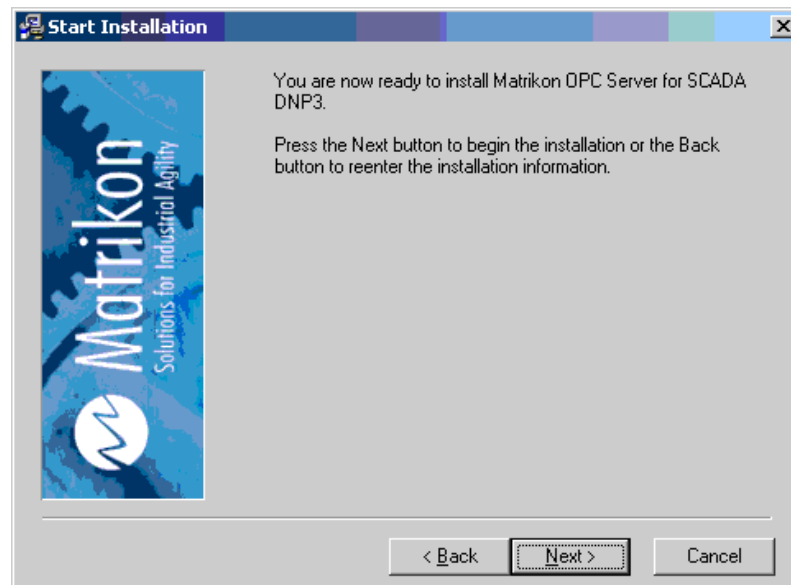


Figure 2-6. The Start Installation dialog box.

8. Click **Next** to begin the installation of the server. Alternatively, you may click the **Back** button to change any of the installation information.

The server files are copied to you machine.



The **Registration Information** dialog box (Figure 2-7) appears.

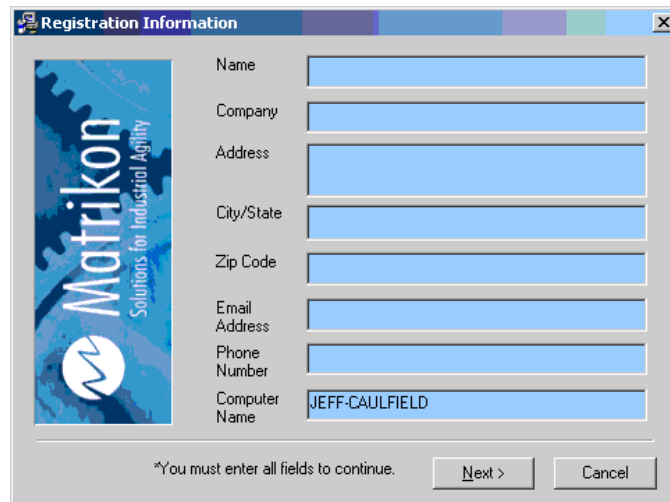
The dialog box is titled "Registration Information" and features the Matrikon logo on the left. It contains several text input fields: Name, Company, Address, City/State, Zip Code, Email Address, Phone Number, and Computer Name. The "Computer Name" field is pre-filled with "JEFF-CAULFIELD". At the bottom, there is a message: "*You must enter all fields to continue." and two buttons: "Next >" and "Cancel".

Figure 2-7. The Registration Information dialog box.

9. Enter your name and email address, as well as the name, address, and telephone number of your company in the appropriate text boxes.
10. Click **Next**.

The **Transaction Number** dialog box (Figure 2-8) appears.

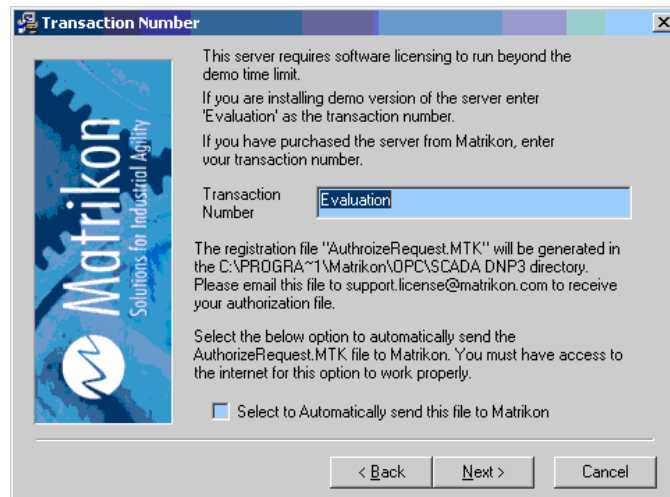
The dialog box is titled "Transaction Number" and features the Matrikon logo on the left. It contains a text input field for the "Transaction Number" which is pre-filled with "Evaluation". Below this field, there is a paragraph of text explaining the purpose of the transaction number and a checkbox labeled "Select to Automatically send this file to Matrikon". At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

Figure 2-8. The Transaction Number dialog box.

11. If you are installing the software as a demo version, type "Evaluation" in the **Transaction Number** text box. If you have purchased the software, enter the transaction number you were given by the Matrikon support representative in the **Transaction Number** text box.

When you have entered your transaction number, a registration file is generated in the server installation directory (AUTHORIZEREQUEST.MTK). To receive your authorization file (which you require in order to use the server) email this file to Matrikon (support.license@matrikon.com).

12. Select the **Select to Automatically send this file to Matrikon** checkbox to have the file emailed to Matrikon automatically, and then click **Next**.



The **Installation Complete** dialog box (Figure 2-9) appears.

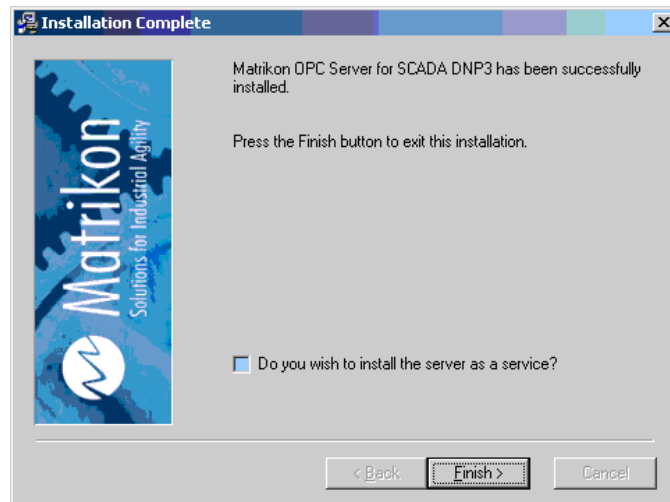


Figure 2-9. The Installation Complete dialog box.

13. Click **Finish** to complete the installation and to exit the installation program.

The necessary files are copied to the target computer, the software components are registered, and short-cut icons are created in the **Start** menu.

The files in Table 2-1 are installed by default in:

C:\PROGRAM FILES\MATRIKON\OPC\DDE

Table 2-1. Installation Files Installed in C:\PROGRAM FILES\MATRIKON\OPC\DDE

File name	Description
OPCDDE.exe	Server executable.
PSTCFGDDLib.ocx	Server ActiveX configuration panels.
AUTHORIZEREQUEST.MTK	Licensing request file (please send to Matrikon).
HTTPCLT.EXE	Generic web client used to email the authorization request.
INSTALL.LOG	Installation log file.
UNWISE.EXE	Uninstall program for the server.
ReleaseNotes	Release Notes for this server.

The files in Table 2-2 are installation by default in:

C:\PROGRAM FILES\MATRIKON\OPC\COMMON

Table 2-2. Installation Files Installed in C:\PROGRAM FILES\MATRIKON\OPC\COMMON

File name	Description
PSTCFG.EXE	Matrikon product configuration utility.
PSTCFGPS.DLL	Matrikon product configuration marshalling library.
OEM_MATRIKON_OPC.DLL	Matrikon OPC OEM badge library.



File name	Description
PSTCFGSCADALIB.OCX	SCADA communication channel ActiveX configuration panels.
HINSTALL.EXE	Hardware key device driver installation utility.
MTKAUTHORIZE.EXE	Matrikon product authorization utility.
MTKSWL32.DLL	Matrikon software licensing library.
OPCEXPLORER.EXE	Matrikon OPC Explorer – a general-purpose OPC client useful for testing the capabilities of this or any other OPC server.
OPCAUTO.DLL	Matrikon OPC Automation Component – enables developers to access OPC data from client applications developed using Automation tools such as <i>Visual Basic</i> , <i>VBA</i> , and <i>VB Script</i> .
OPCDA20_AUTO.DOC	Matrikon OPC Automation Component interface standard.
EXIMG.DLL	Component of OPC Explorer.
LICENSE.TXT	End-User License Agreement.
OPCHDA_PS.DLL	The proxy-stub file to allow OPC clients to make remote connections to an OPC HDA server.
OPCHDA10_AUTO.DOC	Developer documentation for the HDA Automation Component.
OPCHDAAUTO.DLL	Matrikon OPC HDA Automation Component – enables developers to access OPC HDA data from client applications developed using Automation tools such as <i>Visual Basic</i> , <i>VBA</i> , and <i>VB Script</i> .

The files in Table 2-3 are installed by default in the *Windows 2000/NT SYSTEM32* folder.

Table 2-3. Installation Files Installed in the Windows 2000/NT SYSTEM32 Folder

File name	Description
EXPREVAL.DLL	Expression Evaluation library for alias scaling equations.
OPCPROXY.DLL	OPC Data Access 2.0 and 1.0a interfaces and marshalling library.
OPCCOMN_PS.DLL	OPC Common interfaces and marshalling library.
OPC_AEPS.DLL	OPC Alarms and Events 1.0 interfaces marshalling library.
ACTXPRXY.DLL	ActiveX interface marshalling library.
OPCENUM.EXE	OPC server list component.

2.3 Licensing

Most Matrikon OPC products require some form of license criteria to be met in order to function fully. Licensing for a particular server can use either a hardware key or a software key. The OPC Server for DDE supports the following:



Licensing	Supported
Software	YES
Hardware	NO

Hardware keys

For servers that support hardware key licensing, a HASP hardware key coded to that particular program can be purchased. This key must be securely fastened to the parallel port of the computer on which the server is installed. It does not interfere with hardware keys from other vendors, nor does it affect other normal parallel port applications, such as printing.

If a server uses hardware licensing, then the installation program will install a device driver for HASP keys on the target system. When the server starts up, it will display a message box if it does not detect the correct key. It will then function for a demonstration period of two hours before “timing out”. At this point all device communication will cease.

Software keys

For products that support feature- and computer-specific software licensing, a license is issued that is specific to a given set of features in the application, and the computer on which it is installed. The license will not work on another computer, and will only support the features that have been purchased. The balance of this section describes this licensing method in more detail.

The software licensing process works as follows:

To *license* the software:

1. When you have finished installing the software, send `AUTHORIZEREQUEST.MTK` to Matrikon’s support group. They will send you an authorization file.
2. When you receive the authorization file from Matrikon, run the **Software Authorization** licensing program, and select the option to **License** this software.

To *transfer* or *remove* the software license:

1. Send `REMOVEREQUEST.MTK` to Matrikon’s support group. They will issue a removal key file, `REMOVE.MTK`.
2. When you receive the removal file from Matrikon, run the **Software Authorization** licensing program, and select the option to **De-license** this software.
3. When the software has been successfully de-licensed, send `REMOVEVALIDATE.MTK` to Matrikon’s support group.

To *create a new authorization request* on the same computer:

- > Run the **Software Authorization** licensing program, and select the **Create** authorization request option. This option is normally disabled, so you will have to contact Matrikon’s support group for information on how to use this option.

2.3.1 Requesting a Software License

Software licensing is specific to a particular computer, so a license key cannot be created and issued until the software is actually installed on the machine where it will be used.



To accommodate this, an **Authorization Request** file is created, based on information that you provide during the installation process. This text file is named `AUTHORIZEREQUEST.MTK`, and is created in the folder where the software is installed. The file contains all the information needed for Matrikon to issue a software license.

The install program gives you the option of emailing the request file to Matrikon automatically during installation. If you do not select this option, you can manually send the file to Matrikon's support group via email or FTP. Alternatively, you can call our support team and provide them with the information contained in this file. For Licensing contact information, see section 2.3.

Once Matrikon receives the request file, a software license key will be issued to you. The method for authorizing the software with the supplied key is discussed in section 2.3.3.

2.3.2 The Software License Key

If you have purchased the software and sent in the authorization request file, a software license key file will be issued to you. Typically, the key file is sent by email, however there are alternative methods of receiving the software key; these methods are outlined during the installation process.

When you are sent the key via any file-based method (for example, email, ftp, or floppy disk), the key is contained in a file named `AUTHORIZE.MTK`. If you receive the key information by another method, you must enter the information into a file that you create, based on instructions from Matrikon's support group. You can use a text editor such as *Notepad* to create the file.

When you have received or created the file, make a backup copy before you do anything else. You can use the backup file to reauthorize the software should you need to reinstall it at a later date on the same computer. After you have made a backup copy, store the original file in the folder where the server has been installed.

2.3.3 The Software Authorization Licensing Program

Matrikon provides a **Software Authorization** licensing program that is used to license and de-license their driver software, create authorization requests, and enable temporary authorization.

Table 2-4 describes the software licensing options that are available. When you select an option, a default path and file name for the selected option is displayed in the **Authorization** file path field. Normally the default information does not need to be modified, but you can modify this field if required. You can also use the **Browse** button next to the field to locate a specific authorization file.

Table 2-4 Software Authorization Licensing Options

Authorization Option	Description
Create authorization request	Creates a software license request file to be submitted to Matrikon. Normally you do not need to select this option, as a request file is generated automatically during the installation of the product. This option is normally disabled; contact Matrikon if you wish to use this option.
License this software	Reads the specified authorization key file, which contains a license key provided by Matrikon. If the authorization file is valid, the product is licensed for use.
De-license this software	Removes the licensing for the product that was previously licensed. Use this option if you want to transfer the license to a different computer or return the software after an evaluation period. Refer to section 2.3.3 for further details.



Authorization Option	Description
Enable temporary authorization	Allows the product to run in fully functional mode for a specific number of days from the installation date, typically 30 or 90. Use this option if you did not enable temporary licensing during installation.

2.3.4 Licensing the OPC Server for DDE

With the key file residing in the application's installation folder, you can now authorize the software to use the license key by running the **Software Authorization** licensing program provided.

To license the software:

1. Click the Windows **Start** button, point to **Programs**, point to **Matrikon OPC**, point to **OPC Server for DDE**, and click **License Utility**.

The **Matrikon Software Authorization** dialog box (Figure 2-10) appears, displaying a list of licensing options.

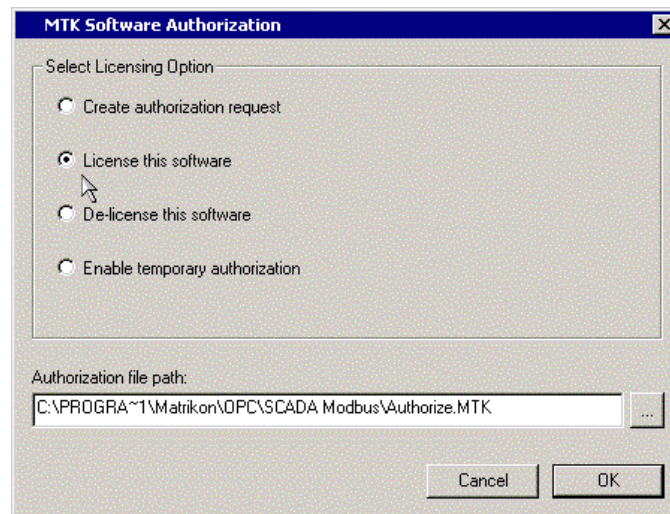


Figure 2-10. Licensing the software.

2. Select the **License this software** checkbox.
3. If the default information is not correct, modify it. Use the **Browse** button to locate the authorization file.
4. Click **OK**.

The application processes the key file and a confirmation message verifies that the software has been successfully licensed. If an error occurs, note the error information carefully, and contact Matrikon's support group.

2.3.5 Removing the Software License

If you want to install the software on a different computer, or return the software, you must de-license the currently installed version first.

To de-license the software:



1. Send the file REMOVEREQUEST.MTK to Matrikon's support group for processing. This file was generated during the authorization process, and is located in the folder where the software was installed.

Upon receipt of this file, Matrikon will send you a de-licensing key file named REMOVE.MTK.

2. Copy REMOVE.MTK into the installation folder.
3. Click the Windows **Start** button, point to **Programs**, point to **Matrikon OPC**, point to **OPC Server for DDE**, and click **License Utility**.

The **Matrikon Software Authorization** dialog box (Figure 2-11) appears, displaying a list of licensing options.

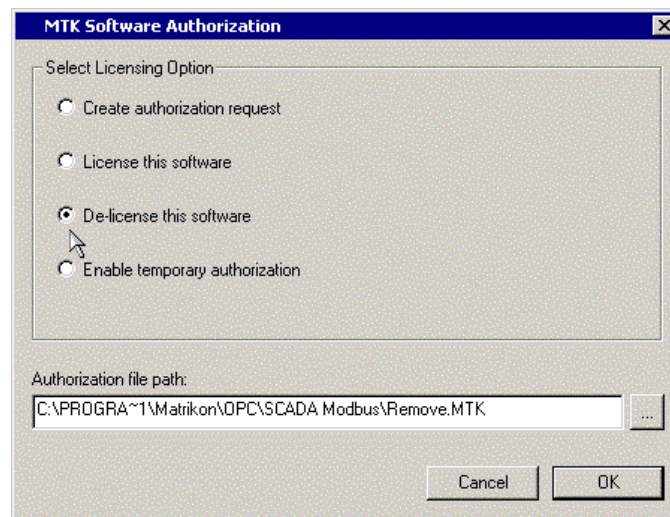


Figure 2-11. De-licensing the software.

4. Select the **De-license this software** checkbox, and then click **OK**.

A validation file named REMOVEVALIDATE.MTK is created to confirm that the software was de-licensed correctly

5. Send REMOVEVALIDATE.MTK to Matrikon's support group.

2.3.6 Transferring the Software License

If you are transferring the software to another computer, you can install it there first, and send your new authorization request file along with the de-license validation file at the same time. Matrikon will then issue you a license authorization file for the new installation.

Before you receive your new license, you can use the temporary authorization feature (see section 2.3.7) to enable the software immediately on the new installation.

2.3.7 Enabling Temporary Authorization of the Software

In addition to creating the authorization request file, the installation program also provides you the option to create a temporary software license key. This allows you to use the software before receiving your permanent software license key or, if you're evaluating the software, to try it before purchasing.



The temporary key allows the product to run in fully functional mode for a specific amount of time from the installation date, typically 30 or 90 days. If you do not select this option during installation, you can perform temporary authorization at a later time.

To enable temporary authorization of the software:

1. Click the Windows **Start** button, point to **Programs**, point to **Matrikon OPC**, point to OPC Server for DDE , and click **License Utility**.

The **Matrikon Software Authorization** dialog box (Figure 2-12) appears, displaying a list of licensing options.

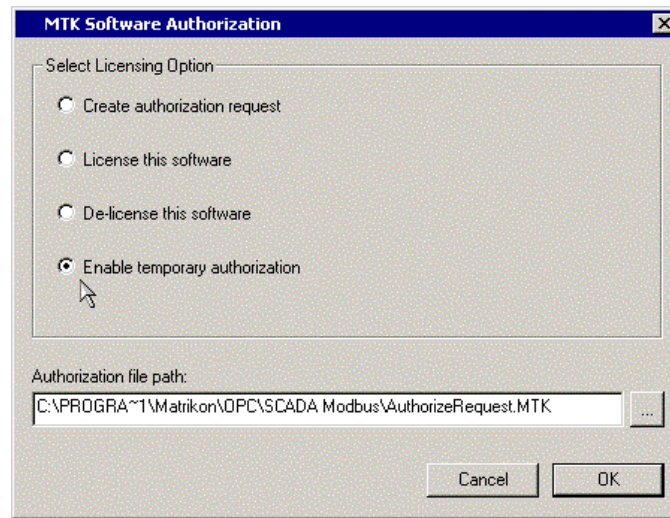


Figure 2-12. Software Authorization licensing options.

2. Select the **Enable temporary authorization** checkbox.
3. If the default information is not correct, modify it. Use the **Browse** button to locate the authorization file.
4. Click **OK**.

The application processes the key file and a confirmation message verifies that the software has been successfully licensed. If an error occurs, note the error information carefully, and contact Matrikon's support group.

2.4 Contacting Support

Matrikon's support is available Monday through Friday, 9AM to 5PM Mountain Time.

Email: support.license@matrikon.com

Phone: 780 448-1010, extension 4011

Fax: 780 448-9191



3 Configuration

The server's graphical user interface allows users to view and alter configuration parameters at run time. When a user views a configuration parameter, the information is retrieved and displayed. Updated parameters are sent as a group to the server when submitted.

Limited configuration of the OPC Server for DDE is required in order for it to run properly, but users can customize the server's behavior as required. This chapter shows you how to start and configure the server and describes each component in detail, including the windows, panels, and menu commands.

The first section, **Starting the OPC Server for DDE**, shows you how to start the software. The next four sections describe **The Tool Tray Menu**, **The Control Panel**, **The Configuration Window**, and **The Options Dialog Box** in detail. Instructions for configuring the OPC Server for DDE appear in the **Dynamic Data Exchange (DDE)**

The Server may act as a DDE Service. In this way, a DDE client can request data from the Server using the following DDE commands:

- XTYP_POKE - Write data to an item in the Server.
- XTYP_REQUEST - Read data from an item in the Server.
- XTYP_ADVREQ - Read latest data from an active advise loop.
- XTYP_ADVSTART - Create and activate an advise loop on a single item in the Server.
- XTYP_ADVSTOP - Stop and destroy an advise loop on a single item in the Server.

DDE Service can be enabled or disabled using the check box. Note, that these options will not be available if the Server does not support DDE.

Items within the Server can be referenced using the following syntax:

SERVICE_NAME | ITEM! SCANDETAILS

SERVICE_NAME represents the name of DDE Service. The first edit box specifies the Service name used by this Server.

ITEM must be the Item ID of some point within the Server.

SCANDETAILS is a combination of the desired scan rate of the Item, and an access path. One or more delimiting characters separate the scan rate and access path. The second edit box can be used to change the delimiters. The Delimiting characters must be provided when referencing an item in the Server, however the scan rate and access path are optional. However, if no scan rate is specified, only data contained in the Server cache will be available through DDE, and an advise loop will not update if no scan rate is specified for the item.

Changes to the DDE options will not take effect until the Server is restarted.



NOTE:

DDE Name Syntax

DDE Names may be described in the following syntax:

SERVICE | TOPIC ! NAME

In this case, consider the TOPIC to be the Item ID, and the NAME to be a combination of the scan rate and access path.

Server Configuration section. The **Alias Configuration** section shows you how to create user-defined aliases in place of regular OPC items.

3.1 Starting the OPC Server for DDE

Start the server using the shortcut under the Matrikon OPC program folder in the Windows Start menu. In addition, the server will automatically start up when a client (such as Matrikon OPC Explorer) first tries to connect to it. If the server is installed as a 2000/NT service, you can also start it using the Service Control Manager applet (under the Windows 2000/NT **Control Panel**).

If the server is not installed as a 2000/NT service, the OPC Server for DDE welcome screen appears briefly when the server starts up.

To start the OPC Server for DDE :

- > Click the Windows **Start** button, point to **Programs**, point to **Matrikon OPC**, point to OPC Server for DDE , and click OPC Server for DDE .

The server starts and the *Matrikon* logo  appears in the **Tool Tray** (Figure 3-1), located by default at the bottom right of the Windows desktop.



Figure 3-1. The Tool Tray.

3.2 The Tool Tray Menu

The **Tool Tray Menu** provides access to the Control Panel, the Configuration Window, Online Help, and the About screen. It also contains the command to shut down the server.

To view the **Tool Tray Menu**:

- > Right-click the *Matrikon* logo .

The **Tool Tray Menu** appears (Figure 3-2).





Figure 3-2. The Tool Tray Menu.

Table 3-1 describes the commands in the **Tool Tray Menu**.

Table 3-1. The Tool Tray Menu

Command	Description
Show Control Panel	Displays the configuration control panel (see section ***).
Configure	Displays the main configuration window (see section ***).
Shutdown	Shuts down the server.
Help	Displays the online help.
About	Displays the server's welcome screen, which includes information about the software.

Note:

*If the server is installed as a 2000/NT service, the **Tool Tray** and the **Tool Tray Menu** are not available.*

3.3 The Control Panel

The **Control Panel** displays the server's status, the time and the number of clients. It also provides access to the **Configuration Window** and the **About** screen and contains the command to shut down the server.

The **Control Panel** stays on top of every other window on the desktop to help monitor the status of the server.

To view the **Control Panel**:

1. Right-click the **Matrikon** logo .
The **Tool Tray Menu** appears.
2. From the **Tool Tray Menu**, select **Show Control Panel**.
The **Control Panel** appears (Figure 3-3).



Figure 3-3. The Control Panel.



3. To “window shade” the **Control Panel** so that it displays only the client count, double-click the title bar

Table 3-2 describes the commands in the **Control Panel**.

Table 3-2. The Control Panel

Command	Description
Status	Displays the current status of the server.
Time	Displays the current time.
Clients	Displays the total number of OPC clients presently connected to the server.
Configure	Display the main configuration window.
Shutdown	Shut down the server.
About	Display the server’s Welcome screen, which includes information about the software.

Note:

*If the server is installed as a 2000/NT service, the **Control Panel** is not available.*

3.4 The Configuration Window

The **Configuration Window** is used to configure the server. It displays the current configuration and allows you to change configuration parameters.

To view the **Configuration Window**:

- > From the **Tool Tray Menu** or the **Control Panel**, select **Configure**.

The **Configuration Window** appears (Figure 3-4).



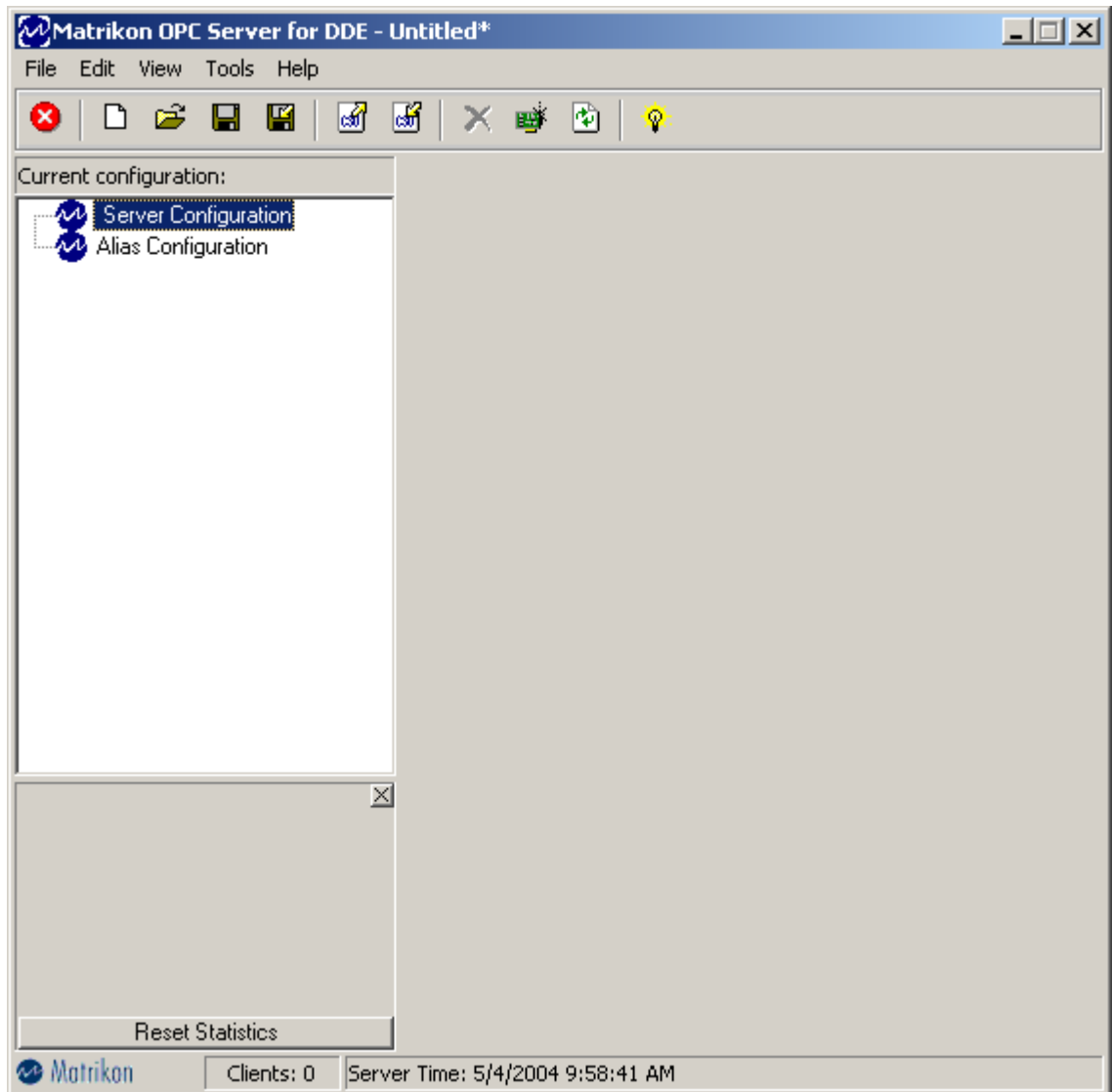


Figure 3-4. The Configuration Window.

Table 3-3 describes the commands in the **Configuration Window**.

Table 3-3. The Configuration Window

Command	Description
Main menu	Provides access to the File, Edit, View, Tools, and Help menus.
Main toolbar	Provides shortcut buttons for commands in the main menu (context-sensitive).
Current configuration	Displays a tree of configuration objects currently defined in the server. Select an object to display its current settings in the right-hand panel.
Server Configuration	Objects under this node affect how the server communicates with the data source.
Alias Configuration	Define aliases and alias groups under this node.
Object settings panel	Displays the current settings of the object presently selected in the tree.



Command	Description
Statistics panel	Displays available statistics for the object presently selected in the tree: Sent, Received, Timed out, Retried, Failed, Overrun. See chapter 5 for more details.
Reset Statistics	Resets statistics on the object presently selected in the current configuration tree.
Matrikon logo	Opens a link to the Matrikon web site.
Clients	Displays the total number of OPC clients presently connected to the server.
Server Time	Displays the current time.

Note:

*If the server is installed as a 2000/NT service, the **Tool Tray Menu** and **Control Panel** are not available. In this case, you must use the Windows **Start** menu to open the **Configuration Window**.*

The following sections describe the menus that are contained in the **Configuration Window** and what they are used for:

3.4.1 The File Menu

Table 3-4 describes the commands in the **File Menu**.

Table 3-4. The File Menu

Command	Description
 New	Clear the current configuration and start a new one. Prompts the user for confirmation before continuing if OPC clients are still connected to the server.
 Open	Clear the current configuration and load a new one from an existing file. Displays the Open Configuration dialog box to prompt for the file name. Prompts the user for confirmation before continuing if OPC clients are still connected to the server.
 Save	Save the current configuration to an XML file. Displays the Save Configuration dialog box to prompt for a new file name if the configuration is new and has no been saved before.
 Save As	Save the current configuration to an XML file. Displays the Save Configuration dialog box to prompt for a new file name.
 Export Aliases	Export all currently configured aliases to a CSV file. Displays the Export Aliases dialog box to prompt for a file name.
 Import Aliases	Clear all aliases and import new ones from a CSV file. Displays the Import Aliases dialog box to prompt for an existing file name.
 Shutdown Server	Close the current configuration and shut down the server after signalling the shutdown event to all connected clients. Prompts the user for confirmation before continuing if OPC clients are still connected to the server.
Close	Hide the main configuration window. The server shuts down after a short delay if no OPC clients are currently connected to the server.



3.4.2 The Edit Menu

Table 3-5 describes the commands that appear in the **Edit Menu** when the currently selected object appears under the **Server Configuration** node.

Table 3-5. The Edit Menu in the Server Configuration Node

Command	Description
Undo/Can't Undo	Not implemented.
 Delete	Remove the currently selected object from the server configuration. Prompts the user for confirmation before continuing if OPC clients have references to items associated with the selected object or one of its children. Does not remove such objects but simply disables them and sets them to "marked for deletion".
 Define New	Display the Insert New Object dialog box used to create a new configuration object under the currently selected configuration object.

Table 3-6 describes the commands that appear in the **Edit Menu** when the currently selected object appears under the **Alias Configuration** node.

Table 3-6. The Edit Menu in the Alias Configuration Node

Command	Description
Undo/Can't Undo	Not implemented.
 Rename	Rename the currently selected alias group.
 Delete Alias Group	Remove the currently selected alias group and all subordinate groups and aliases.
Delete Alias	Remove the currently selected aliases.
 Insert Alias Group	Create a new alias group under the currently selected alias group.
Insert New Alias	Display the Insert New Alias dialog box used to create a new alias under the currently selected alias group.

3.4.3 The View Menu

Table 3-7 describes the commands in the **View Menu**.

Table 3-7. The View Menu

Command	Description
Statistics	Display/hide general communication statistics for the currently selected object.
 Properties	Not implemented.
Reset Statistics	Reset all statistics for the currently selected object to zero.
Defaults	Display the Server Defaults dialog box used to configure the default settings for the various types of communication objects available in the server.
 Refresh	Rebuild the tree display of the server configuration and fully expand all branches.
Options	Display the Options dialog box used to change general server options.



3.4.4 The Tools Menu

Table 3-8 describes the commands in the **Tools Menu**.

Table 3-8. The Tools Menu

Command	Description
 DCOM Configuration	Launch the Microsoft Distributed COM Configuration Properties utility. Use this utility to edit DCOM settings for specific COM servers (such as the 1.0) to allow client applications on remote computers to connect to the server.

3.4.5 The Help Menu

Table 3-9 describes the commands in the **Help Menu**.

Table 3-9. The Help Menu

Command	Description
 Contents	Open the table of contents for online help.
Index	Open the topic index for online help.
Matrikon on the Web	Open a link to the Matrikon web site.
About	Display the 1.0 welcome screen, which includes information about the software.

3.5 The Options Dialog Box

The **Options** dialog box is used to edit the server's options. The **Options** dialog box contains four different tabs that, when clicked on, display a different set of option settings, including **General**, **General Logging**, **Interface Logging**, and **Advanced**.

3.5.1 General Options

The **General** settings allow you to edit general server options.

To view the **General Options**:

1. In the **Configuration Window**, from the **View** menu, choose **Options**.
The **Options** dialog box appears.
2. Click the **General** tab to display the **General Options** settings dialog box.
The **General Options** settings dialog box (Figure 3-5) appears.



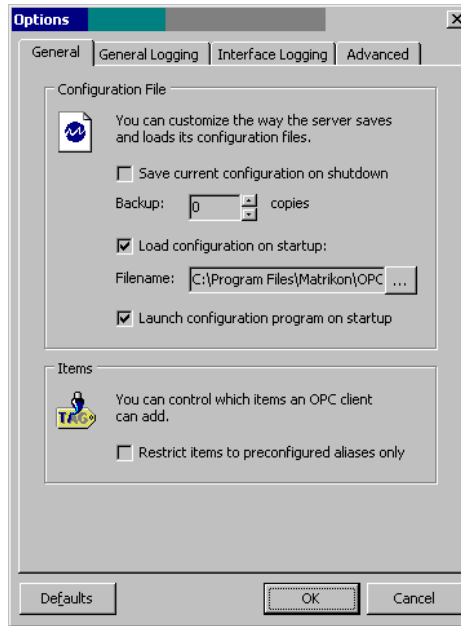


Figure 3-5. The General Options settings dialog box.

Table 3-10 describes the commands in the **General Options** settings dialog box.

Table 3-10. The General Options Settings Dialog Box

Command	Description
Save current configuration on shutdown	Automatically saves the current configuration to the specified file before shutting down if selected.
Backup copies	Automatically keep up to the specified number of backup copies of the configuration file when saving the configuration.
Load configuration on start-up	Automatically load a configuration from the specified file when starting up if selected.
Filename	Full path of an existing file for load and save operations. Click the  ellipsis button to display the Open dialog box used to select an existing file name.
Launch configuration program on start-up	Automatically launch the configuration utility when starting up as a local executable (rather than a 2000/NT service) if selected.
Restrict items to pre-configured aliases only	Prevent OPC clients from adding items other than configured aliases if selected.

Note:

*The server loads these settings from the Windows 2000/NT registry on start-up. To have **General Options Settings** changes take effect, shut down and restart the server.*

3.5.2 General Logging Options

The **General Logging** settings allow you to edit general logging options.

To view the **General Logging Options**:

1. In the **Configuration Window**, from the **View** menu, choose **Options**.



The **Options** dialog box appears.

2. Click the **General Logging** tab to display the **General Logging Options** settings dialog box.

The **General Logging Options** settings dialog box (Figure 3-6) appears.

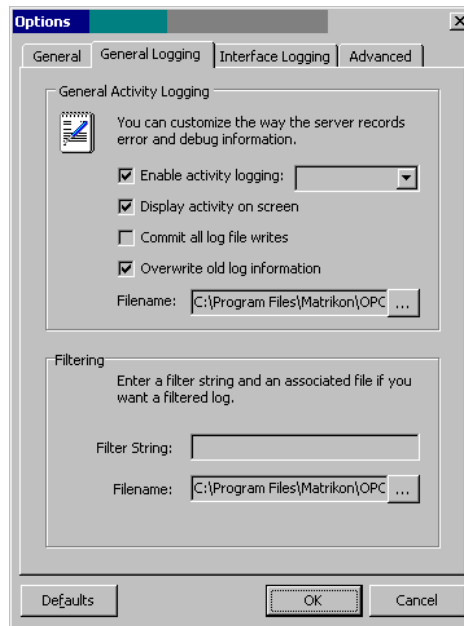


Figure 3-6. The General Logging Options settings dialog box.

Table 3-11 describes the commands in the **General Logging Options** settings dialog box.

Table 3-11. The General Logging Options Settings Dialog Box

Command	Description
Enable activity logging	Enable/disable general activity logging at the specified detail level (High, Medium, Low, or None) if selected. Note that you should not have this option selected unless you are debugging a problem as this will have a negative effect on performance of the OPC server. Always set this back to None when not in use.
Display activity on screen	Display logged messages in a console window as they occur if selected.
Commit all log file writes	Flush the file buffer after each message logged in case the server is crashing.
Overwrite old log information	Overwrite the old log file each time the server starts up if selected. Otherwise, rename the old log file with an underscore (" _ ") prefix.
General Activity Logging Filename	Full path for the general activity log file. Click the ... ellipsis button to display the Open dialog box used to select an existing file name. Default path is C:\PROGRAM FILES\MATRIKON\COMMON\PSTCFGMatrikon.OPC.DDE.1.1.LOG.
Filter String	Match string for filtered log.
Filtering Filename	Full path for the filtered log file. Click the ... ellipsis button to display the Open dialog box used to select an existing file name.



Note:

General Logging Options Settings take effect immediately.

3.5.3 Interface Logging Options

The **Interface Logging** settings allow you to view and edit COM interface logging options.

To view the **Interface Logging Options**:

1. In the **Configuration Window**, from the **View** menu, choose **Options**.

The **Options** dialog box appears.

2. Click the **Interface Logging** tab to display the **Interface Logging Options** settings dialog box.

The **Interface Logging Options** settings dialog box (Figure 3-7) appears.

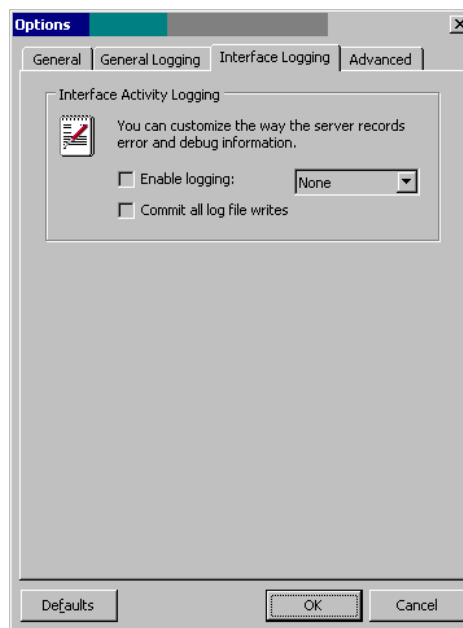


Figure 3-7. The Interface Logging Options settings dialog box.

Table 3-12 describes the commands in the **Interface Logging Options** settings dialog box.

Table 3-12. The Interface Logging Options Settings Dialog Box

Command	Description
Enable logging	Enable/disable interface logging at the specified detail level (High, Medium, Low, or None) if selected. Generates a separate log file for each client named PST###.TMP in the server installation directory. Note that you should not have this option selected unless you are debugging a problem as this will have a negative effect on performance of the OPC server.
Commit all log file writes	Flush the file buffer after each message logged in case the server is crashing.

Note:

Interface Logging Options Settings take effect when the next OPC client connects to the server.



3.5.4 Advanced Options

The **Advanced** settings allow you to view and edit advanced server options.

To view the **Advanced Options**:

1. In the **Configuration Window**, from the **View** menu, choose **Options**.
The **Options** dialog box appears.
2. Click the **Advanced** tab to display the **Advanced Options** settings dialog box.
The **Advanced Options** settings dialog box (Figure 3-8) appears.

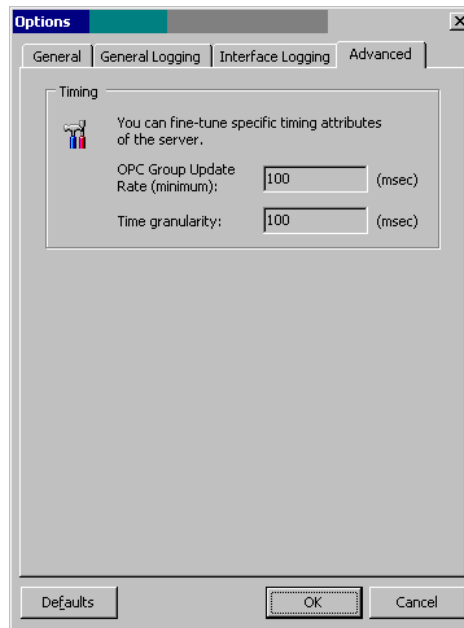


Figure 3-8. The Advanced Options settings dialog box.

Table 3-13 describes the commands in the **Advanced Options** settings dialog box.

Table 3-13. The Advanced Options Settings Dialog Box

Command	Description
OPC Group Update Rate (minimum)	Minimum update rate (milliseconds) allowed for an OPC group. Prevents OPC clients from requesting update rates that are impossible to achieve or that cause heavy CPU loads. The default value is 100ms.
Time granularity	OPC server group scan thread interval (milliseconds). Determines the maximum resolution for data change detection. Time granularity should always be equal to or less than the minimum group update rate.
DDE	Configure the way the server provides data through DDE.



Note:

*The server loads these settings from the Windows 2000/NT registry on start-up. To have **Advanced Logging Options Settings** changes take effect, shut down and restart the server.*

Dynamic Data Exchange (DDE)

The Server may act as a DDE Service. In this way, a DDE client can request data from the Server using the following DDE commands:

- XTYP_POKE - Write data to an item in the Server.
- XTYP_REQUEST - Read data from an item in the Server.
- XTYP_ADVREQ - Read latest data from an active advise loop.
- XTYP_ADVSTART - Create and activate an advise loop on a single item in the Server.
- XTYP_ADVSTOP - Stop and destroy an advise loop on a single item in the Server.

DDE Service can be enabled or disabled using the check box. Note, that these options will not be available if the Server does not support DDE.

Items within the Server can be referenced using the following syntax:

SERVICE_NAME | ITEM! SCANDetails

SERVICE_NAME represents the name of DDE Service. The first edit box specifies the Service name used by this Server.

ITEM must be the Item ID of some point within the Server.

SCANDetails is a combination of the desired scan rate of the Item, and an access path. One or more delimiting characters separate the scan rate and access path. The second edit box can be used to change the delimiters. The Delimiting characters must be provided when referencing an item in the Server, however the scan rate and access path are optional. However, if no scan rate is specified, only data contained in the Server cache will be available through DDE, and an advise loop will not update if no scan rate is specified for the item.

Changes to the DDE options will not take effect until the Server is restarted.

NOTE:

DDE Name Syntax

DDE Names may be described in the following syntax:

SERVICE | TOPIC!NAME



In this case, consider the TOPIC to be the Item ID, and the NAME to be a combination of the scan rate and access path.

3.6 Server Configuration

The server requires some configuration in order for it to run properly, but users can customize the server's behavior as required. This chapter shows you how to create and edit objects, using the **Configuration Window**.

3.6.1 Inserting New Objects

The **Insert New Object** and **Create New** dialog boxes are used to create DDE Configuration objects.

The Insert New Object Dialog Box

The **Insert New Object** dialog box (Figure 3-9) displays a different set of options depending on the type of object selected and the types of objects already configured under it.

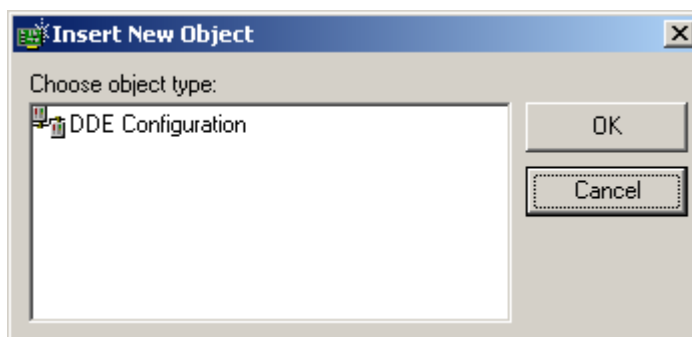


Figure 3-9. The Insert New Object dialog box.

Table 3-14 describes the types of objects that are available for insertion as a child in the **Insert New Object** settings dialog box, depending on which object is currently selected.

Table 3-14. Objects Available Under the Insert New Object Dialog Box

Selected Object	Insert New Object Dialog Box Options
DDE Configuration	DDE Configuration Connection

To insert a new object:

1. In the **Configuration Window**, from the **Edit** menu, click  or, from the **Edit** menu, choose **Define New**.

The **Insert New Object** dialog box (Figure 3-9) appears.

2. Select the type of object you want to create from the list, and then click **OK**.

The **Create New** dialog box appears.

The Create New Dialog Box

The **Create New** dialog box (Figure 3-10) displays the settings available for a connection to a <SystemX Device>.



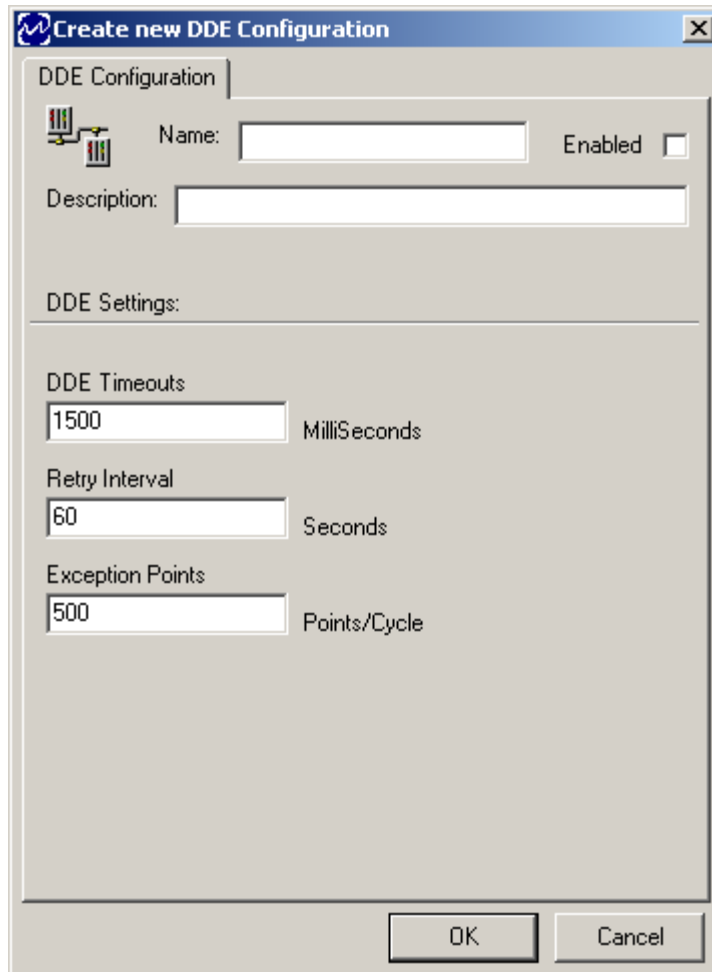


Figure 3-10. The Create New dialog box.

Table 3-15 describes the components of the **Create new DDE Configuration** box.

Table 3-15. The Create New Dialog Box

Component	Description
Name	Name of the object, which becomes an element of the item ID for data items under the object. Automatically converted to title case for display purposes.
Enabled	Enable or disable communication for the object.
Description	Optional, user-defined text (64-character maximum) for documentation purposes.
DDE Timeouts	DDE timeouts in milliseconds
Retry Interval	Retry interval in seconds
Exception Points	Exceptions points in points/cycle

To create a newly inserted object:

3. In the **Create New** dialog box, enter a name for the object. This name is part of the item ID that globally identifies data items under the object. You may also choose to enter a description of the object.



4. Edit the configuration components as desired.
5. Click **OK**.

The object is created.

Note:

In order to use the object for communication, you must enable the object. This can be done at any time.

3.6.2 Removing Objects

You can easily remove any object you have created, but a warning message (Figure 3-11) will appear if you remove an object that has data items to which one or more OPC clients hold reference.

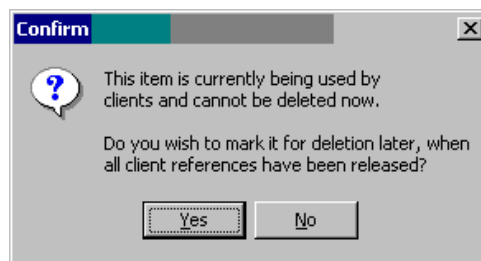


Figure 3-11. A warning message is displayed.

To remove an object:

1. In the **Configuration Window**, select the object you want to remove under **Server Configuration**.
2. From the **Edit** menu, choose **Delete** or click .

If one or more OPC clients hold references to data items somewhere under the selected object, a warning message (Figure 3-11) appears.

3. To mark the object for later deletion, click **Yes**. To leave the object unmodified, click **No**.

Items marked for deletion are disabled and a red **X** appears over the icon on the right side of the window when the object is selected.

3.7 Alias Configuration

MatrikonOPC Servers, including this one, provide the ability to create user-defined *aliases* that can be used in place of regular OPC items. This feature is particularly useful when the item path for a given server is very complex or difficult to remember for example, `Com1.Radio1.Unit1.41.4.123`.

Servers can also be configured so that client applications have access to configured aliases only, rather than every available item.

This chapter shows you how to create and edit aliases, using the **Configuration Window**.

Note:



It is not necessary to define aliases before accessing server data items from an OPC client.

3.7.1 Inserting Alias Groups

Alias Groups are used to contain one or more configured aliases.

To insert an **Alias Group**:

1. In the **Configuration Window**, select **Alias Configuration** or a previously configured **Alias Group**.

2. From the **Edit** menu, choose **Insert Alias Group** or click .

A new **Alias Group** folder appears.

3. Enter a new name for the **Alias Group**, and then press **Enter**.

The **Alias Group** is renamed.

3.7.2 Renaming Alias Groups

Alias Groups can be renamed after they have been created..

To rename an **Alias Group**:

1. In the **Configuration Window**, select an **Alias Group**.

2. From the **Edit** menu, choose **Rename** or click .

The **Alias Group** is renamed.

3.7.3 Inserting New Aliases

Use the **Insert New Alias** dialog box (Figure 3-12) to insert a new **Alias** into an **Alias Group** or on its own, directly under the **Alias Configuration** node.

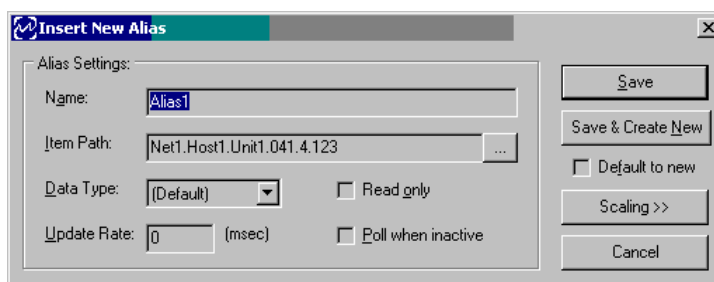


Figure 3-12. The Insert New Alias dialog box.

Table 3-16 describes all the components of the **Insert New Alias** dialog box.

Table 3-16. The Insert New Alias Dialog Box

Component	Description
Name	Name for the alias (unique within the alias group).
Item Path	Fully-qualified item ID for the OPC item to which the alias refers. Click the  ellipsis button to display the Item Path Browser dialog box used to select an existing OPC item



Component	Description
	on the server. Alternatively, leave the item path blank to use the alias as a general in-memory variable. When doing so, either define the data type for the alias point as something other than "Default", or else set the requested data type for reading and explicitly define the data type when writing values to the alias from an OPC client.
Data Type	Coerce the value of the OPC item to the specified type unless 'Default' selected. Also serves as the "canonical" data type for the alias.
Read only	Prevent OPC clients from writing values to the alias if selected.
Update Rate	Update rate (milliseconds) to use with the "Poll when inactive" option.
Poll when inactive	Continue updating the value for the alias at the specified update rate if selected, even if there are no OPC clients currently accessing the alias.
Save	Save changes to the alias and hide the dialog box.
Save & Create New	Save changes to the alias and begin configuring a new one.
Default to new	Pressing Enter activates the "Save & Create New" button rather than the Save button if selected.
Scaling > >	Enable scaling for the alias (displays scaling options).
< < No Scaling	Disable scaling for the alias (hides scaling options).
Cancel	Discard changes to (abandon creation of) the alias and hide the dialog box.

The **Insert New Alias** dialog box can be expanded to display **Scaling Options** (Figure 3-13). Available forms of scaling include: *linear*, *square root*, *gain/offset*, and simple text *expressions*.

Figure 3-13. Scaling Options for the Insert New Alias dialog box.

Table 3-17 describes the **Scaling Options** for the **Insert New Alias** dialog box.

Table 3-17. The Insert New Alias Dialog Box Scaling Options

Tab	Component	Description
Linear & Square Root	Raw High	Maximum expected raw value from the OPC item.
	Raw Low	Minimum expected raw value from the OPC item.
	Scaled High	Maximum desired scaled value for the alias (corresponds to Raw High).
	Scaled Low	Minimum desired scaled value for the alias (corresponds to Raw Low).
	Clamp High	Clamp the scaled value at the high limit to prevent it from going out of range.
	Clamp Low	Clamp the scaled value at the low limit to prevent it from going out of range.



Tab	Component	Description
Gain/Offset	Gain	Scaling factor. (No limits are assumed.)
	Offset	Scaling offset.
Expression	Input	Simple text equation to apply to incoming values (reads). Click the  ellipsis button to display the Expression Wizard dialog box used to help build a formula.
	Output	Simple text equation to apply to outgoing values (writes). Click the  ellipsis button to display the Expression Wizard dialog box used to help build a formula.

Notes:

*The data type for scaled values is double-precision real unless the **Alias** data type is specified.*

*Using illegal settings, such as **zero-zero** for the high-low range in linear scaling, may be fatal to the server, OPC clients, and communications.*

The OPC Item values must be numeric for linear, square root, and gain/offset scaling to work.

The OPC Item values must be non-negative for square root scaling to work. Otherwise, the scaled value will be -1 with a bad quality.

The server may be unable to load configuration files containing illegal scaling expressions, and may fail to start up properly. If this occurs, rename the configuration file so that the server will not load in on start up and create a new configuration file. Alternatively, edit the XML file to correct the bad alias settings.

To insert a new **Alias**:

1. In the **Configuration Window**, select **Alias Configuration** or a previously configured **Alias Group**.

Note:

*It is usually better to create a new alias under an **Alias Group** rather than directly under the **Alias Configuration** node.*

The **Contents** table for that **Alias Group** is displayed on the right side of the **Configuration Window** (Figure 3-14), listing the **Aliases**, if any, it contains.

Contents of alias group 'New Alias 1':				
	Name	Item Path	Data Type	R/W Update Rate
	Alias1	Net1.Host1.Unit1.041.4.123	(Default)	R/W
	Alias2	Net1.Host1.Unit1.041.4.124	(Default)	R/W
	Alias3	Net1.Host1.Unit1.041.4.125	(Default)	R/W

Figure 3-14. The Contents table for the selected Alias Group.

2. From the **Edit** menu, choose **Insert New Alias**.

The **Insert New Alias** dialog box (Figure 3-12) appears.

3. Enter a name for the **Alias** in the **Name** text box.
4. Enter the item **Path** and **ID** for the item to which the **Alias** refers, or click **Browse** to navigate to the item.



5. Click **Scaling** to enable scaling for the **Alias**. Click **No Scaling** to disable scaling and hide the **Scaling Options**.

The **Scaling Options** are displayed at the bottom of the **Insert New Alias** dialog box (Figure 3-13).

6. Configure the **Scaling Options** as required (see Table 3-17 for a description of these options), by clicking the appropriate tab for the form of scaling you require.

Available forms of scaling include: *linear*, *square root*, *gain/offset*, and simple text *expressions*.

7. Configure the remaining fields as required (see Table 3-16 for a description of all the components).
8. Click **Save** to save the **Alias**.

3.7.4 Editing Aliases

Aliases can be edited after they have been created, using the **Edit Alias** dialog box. This is virtually the same as the **Insert New Alias** dialog box (Figure 3-12), with the exception that it appears after the **Alias** has been created.

To edit an **Alias**:

1. In the **Configuration Window**, select an **Alias**, and then double-click or press **Enter**.

The **Edit Alias** dialog box appears.

2. Make the changes you require.

3.7.5 Removing Aliases

You can easily remove any **Alias** you have created.

To remove an **Alias**:

1. In the **Configuration Window**, select one or more **Aliases**.
2. From the **Edit** menu, choose **Delete Alias**.

The **Alias** is removed.

3.7.6 Removing Alias Groups

You can easily remove any **Alias Group** you have created.

To remove an **Alias Group**:

1. In the **Configuration Window**, select an **Alias Group**.
2. From the **Edit** menu, choose **Delete Alias Group** or click .

The **Alias Group** is removed.

3.7.7 Exporting Aliases

Use the **Export Aliases** dialog box to export all currently configured aliases to a CSV file.

To export all currently configured **Aliases**:



1. From the **File** menu, choose **Export Aliases** or click .

The **Export Aliases** dialog box appears.

2. Enter a file name for the CSV export file.
3. Click **Save**.

The **Aliases** are exported.

3.7.8 Importing Aliases

Use the **Import Aliases** dialog box to clear all **Aliases** and import new ones from a CSV file.

To import **Aliases** from a CSV file:

1. From the **File** menu, choose **Import Aliases** or click .

The **Import Aliases** dialog box appears.

2. Browse to the CSV file name.
3. Click **Open**.

The old **Aliases** are cleared and the new ones are imported.

3.8 Saving the Configuration

When you have completed configuration of the server, use the **Save Configuration** dialog box to save the configuration to an XML file.

To save the configuration to an XML file:

1. From the **File** menu, choose **Save As** or click  (alternatively, you can choose **Save** or click ).

The **Save Configuration** dialog box appears.

2. Enter a file name if you are saving the file for the first time.
3. Click **Save**.

The configuration is saved.

3.9 Clearing the Configuration

You can clear the configuration if you want to start a new configuration.

To clear the configuration:

1. From the **File** menu, choose **New** or click .

If OPC clients are still connected to the server, a warning message appears.

2. Click **OK**.

The configuration is cleared.



3.10 Loading a Saved Configuration

If you have saved a configuration, you can clear the current configuration and then load the saved configuration file.

To clear the current configuration and load a saved configuration from an existing file:

1. From the **File** menu, choose **Open** or click .

The **Open Configuration** dialog box appears.

2. Browse for the configuration file you want to load.
3. Click **Open**.

If OPC clients are still connected to the server, a warning message appears.

4. Click **OK**.

The old configuration is cleared and the new configuration is loaded from the file.

3.11 Shutting Down the Server

Ordinarily, the server shuts down automatically shortly after the last OPC client disconnects from it. However, if the **Configuration Window** is displayed, the configuration utility locks the server so that it will not shut down.

To shutdown the server:

1. In the **Control Panel** or the **Tool Tray Menu**, click **Shutdown**. If the server is running as a local executable, from the **File** menu, choose **Shutdown Server** or click .

If OPC clients are still connected to the server, a warning message appears.

2. Click **OK**.

The server is shut down.

Note:

*The shutdown command is not available for the server if it runs as an NT service. Services can only be shut down from the **Service Control Manager** applet (in the Windows 2000/NT Control Panel).*



4 OPC Data Items

This chapter describes the OPC data items used in the OPC Server for DDE .

4.1 DDE Items

The last step before reading and writing data is to add items to your group. This is done by providing an Access Path and Item ID pair. The server uses this information to find the data you are interested in.

If your client supports server browsing, you may not need to provide an Item ID, since you can point and click to specify an Access Path and Item ID from the server browser.

The Matrikon OPC Server for DDE does not use Access Paths. If your client asks you to provide an Access Path, supply a blank.

The Matrikon OPC Server for DDE maintains a consistent look and feel compared to Microsoft's Excel in the way DDE items are accessed. In your client use the specified format to connect to a particular item on the local computer or the second format to connect to data on a remote computer:

```
Application|Topic!Item
Or
Application|Topic!Item{ (delimiter) (field) }
Or
\\NodeName\Application|Topic!Item
Or
\\NodeName\Application|Topic!Item{(delimiter)(field)}
```

Where:

- NodeName is the name of the computer that the DDE application is running from.
- Application is the name of the DDE server.
- Topic is the name within a server to reference specific subset of items.
- Item is the individual items that can be accessed.
- Delimiter, Field (optional) is a single character delimiter and a non-zero positive field. If a value returned by an Item ID is actually several values separated by a delimiter, it is possible to specify which value in the string to return.

Examples

The following is are examples of valid Item IDs:

```
Excel|[Book1]Sheet1!r1c1
Or
\\JEFFGOULD\Excel|[Book1]Sheet1!r1c1
```



The following are examples of valid Item IDs that use the delimiter and field values:

`Excel|[Book1]Sheet1!r1c1{,2}`

Or

`\\JEFFGOULD\Excel|[Book1]Sheet1!r1c1`

The field and delimiter values can be used to return only a portion of a string. For example assume that `Excel|[Book1]Sheet1!r1c1` returns the value “123,456,789”, excluding the quotation marks. If only the “456” portion is needed, then we can specify a delimiter (separator) to be a comma and the field number (portion of the string) to be 2. Thus, `Excel|[Book1]Sheet1!r1c1{,2}` will return “456”.

Refer to your DDE server manual for the exact syntax of the application, topic, and item formats.

Note:

When connecting to points in a DDE server, to verify the format create a corresponding connection in Excel. If you are able to get a connection from Excel, that exact same connection should be available to the Matrikon OPC Server for DDE.



5 Diagnostics

The server supplies diagnostic information to assist operators and support personnel with troubleshooting communication problems and software faults.

5.1 Logging

All Matrikon OPC Servers produce log files that record errors and debugging information. If difficulties occur with a server then the log files can be extremely valuable for troubleshooting. By default, the servers log very little information. The **General Logging** tab of the **Options** dialog in the main configuration window contains settings to control server logging.

General Activity Logging records information about the internal workings of the OPC server. It is useful for troubleshooting problems with configuration and device communication. Interface Activity Logging records information about the client/server OPC communication. It is useful for troubleshooting compliance issues.

For General logging, the higher the log level, the more information is recorded. However, server performance may decrease at higher log levels. The recommended operating level is *Medium*. More log levels are available for both types of logging which record more detailed information, as well as the ability to output log statements to a console window at run time. Contact Matrikon support for further instructions on how to enable the higher log levels and console logging.

For Interface logging, the log level can be considered very high and therefore should never be used during normal operation of the OPC server unless specifically working on problems related to interfacing.

The ***Matrikon OPC Delegator*** is a useful tool for logging OPC client/server communication. It enhances the Interface Activity Logging by loading up in the client application and recording the client-side transactions. It can also be used with other OPC servers. Contact the Matrikon Sales department for further information about this product.

In general, the server logs all errors and other information of immediate importance to the user at the low detail level, all warnings and other information of moderate importance to the user at a medium detail level, and additional information concerning the normal functioning of the software at a high detail level. The server logs also further information of concern to support personnel at debug detail level.



6 Troubleshooting

The following sections address some of the most common problems encountered while using this OPC server. Please check the following list of **Problems and Solutions** before contacting Matrikon support.

[Server stops updating client after two hours](#)

[Server shuts down after 5 minutes when no clients connected](#)

[Cannot configure client access paths, so cannot configure item options](#)

[More than one HASP attached to parallel port, but only the first one is recognized](#)

[Server cannot be configured: no Matrikon Logo in Tool Tray](#)

[OPC client unable to create or read items under configured object \(device\).](#)

[Server does not retain settings](#)

[Server cannot save configuration in XML format](#)

[Server does not show up as local program in OPC client application](#)

[Server does not show up as remote program in OPC client application](#)

[Access Denied or time-out error when connecting to remote server via DCOM](#)

[Server does not start up or client cannot connect](#)

[About screen and Configuration Window do not show up](#)

[DA 2.0 asynchronous I/O doesn't work](#)

[Server cannot find hardware key](#)

In addition, the following questions are answered in the **Question and Answer** section:

[How do I remove the server as a service?](#)

[Does the server need to be started manually when installed as a service?](#)

[How can I get OPC data into other applications?](#)

[How can I access individual bits from an integer item?](#)

[How can I access individual bits from an integer item?](#)

6.1 Problems and Solutions

[Server stops updating client after two hours](#)

Problem: The OPC server stops updating the client with item values after two hours.

Solution: The OPC server is licensed with a hardware key, and the demonstration period for the server has expired.

Check that the correct HASP hardware key is securely fastened to the parallel port. If it is, run the **HINSTALL** program that is located in the MATRIKON\COMMON directory under **Program** files with the /I parameter.



Server shuts down after 5 minutes when no clients connected

Problem: The OPC server shuts down automatically after 5 minutes when no clients are connected.

Solution: This is standard behavior for COM servers. However, you can override this behavior as follows:

1. Create a string value named **LockServer** in:

HKEY_CLASSES_ROOT\CLSID\{024C7FFC-9CC3-476f-867A-BC3CAD79F4FE}\Options

To create a new value, select the **Options** key, and then choose **New String Value** from the **Edit** menu.

2. Set the value of the **LockServer** entry to 1.

To edit the value, select the entry and choose **Modify** from the **Edit** menu (Figure 6-1).

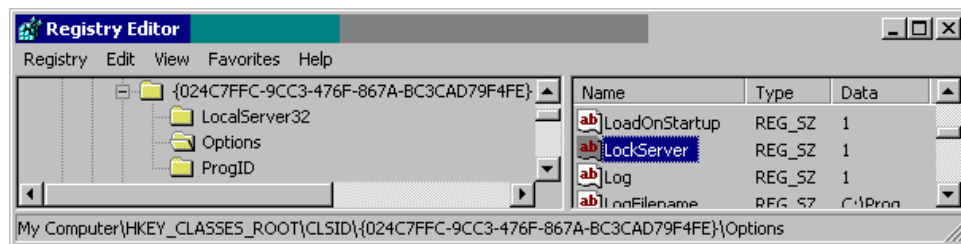


Figure 6-1. Editing the LockServer entry.

3. Shut down the server and restart it to have the change take effect.

Cannot configure client access paths, so cannot configure item options

Problem: The OPC client does not provide a means to configure access paths, making it difficult to correctly specify the data acquisition options for the items.

Solution: The server provides a global parameter for configuring an escape character to allow users to append communication options to the end of an **Item ID** to accommodate clients that do not support access paths.

Perform the following steps.

1. Create a string value named **ItemIDEscapeCharacter** in:

HKEY_CLASSES_ROOT\CLSID\{024C7FFC-9CC3-476f-867A-BC3CAD79F4FE}\Options

To create a new value, select the **Options** key, and then choose **New String Value** from the **Edit** menu.

2. Set the value of **ItemIDEscapeCharacter** to a single character, such as “|” (pipe).

To edit the value, select the entry and choose **Modify** from the **Edit** menu.

3. Shut down the server and restart it to have the change take effect.
4. Configure the **ItemIDEscapeCharacter** **Item ID** in the OPC client with the access path appended to the end with the configured escape character (e.g., ITEMID|ACCESSPATH).



More than one HASP attached to parallel port, but only the first one is recognized

Problem: There is more than one HASP hardware key from Matrikon attached to the parallel port, but the software recognizes only the first one.

Solution: HASP keys from the same vendor cannot be chained together. Send an email to Matrikon support (see section 2.4 Contacting Support on page 13) to obtain a HASP key containing the combined codes of all installed Matrikon OPC servers.

Server cannot be configured: no Matrikon Logo in Tool Tray

Problem: The server cannot be configured because there is no Matrikon Logo  in the **Tool Tray**.

Solution: If the server is running as a service, you will not see the Matrikon Logo  in the **Tool Tray** that indicates the OPC server is running.

To configure the server, start the configuration utility by using the shortcut to the OPC server in the Windows **Start** menu (this shortcut starts the **Configuration** utility as well as the OPC server).

OPC client unable to create or read items under configured object (device).

Problem: The OPC client is unable to create or read items under a configured object (device).

Solution: Check the object configuration. Ensure that the **Enabled** checkbox is selected.

Server does not retain settings

Problem: The OPC server does not retain its previous settings and needs to be reconfigured each time it starts up.

Solution: In the **Configuration Window**, choose **Options** from the **View** menu. Under the **General** tab, ensure that the **Load configuration on start-up** checkbox is selected and that the correct file name appears in the edit box (see section 3.5.1 General Options, on page 21).

Server cannot save configuration in XML format

Problem: The OPC server cannot save the configuration in XML format.

Solution: Microsoft Internet Explorer 4.01 (or later) must be installed to use the .XML format.

Server does not show up as local program in OPC client application

Problem: The OPC server does not show up in a list of locally available program IDs in my OPC client application.

Solution: Make certain that a user with local administrative rights installs the OPC server so that it can create the necessary entries in the registry.

Also, especially for older OPC clients that do not use the OPC Server Browser, make certain that the client is running as a user that has *read* access to the registry.



Server does not show up as remote program in OPC client application

Problem: The OPC server does not show up in a list of remotely available program IDs in my OPC client application.

Solution: Follow the steps found in Appendix A -Distributed COM (DCOM) to copy the program ID from the server machine to the client machine.

Access Denied or time-out error when connecting to remote server via DCOM

Problem: *Access Denied* error or time out trying to connect to a remote OPC server via DCOM.

Solution: Ensure that the access and launch permissions for the OPC server are set correctly on the server machine. For more information, see Appendix A -Distributed COM (DCOM).

Server does not start up or client cannot connect

Problem: A client tries to connect to the server and fails, or the server does not start up.

Solution: Ensure that the access and launch permissions for the OPC server are set correctly. For more information, see Appendix A -Distributed COM (DCOM).

About screen and Configuration Window do not show up

Problem: The **About** screen and **Configuration Window** do not show up when a remotely connecting client or a client that runs as an NT service (such as the Aspen Technologies CIMIO OPC Manager) tries to launch the OPC server.

Solution: Either set the identity for the OPC server to the interactive user, or else consider run the server as an NT service. For more information, see Appendix A -Distributed COM (DCOM).

DA 2.0 asynchronous I/O doesn't work

Problem: After installing an older OPC server, DA 2.0 asynchronous I/O no longer works.

Solution: The old installation program installed and registered its own (older) version of the OPC proxy/stub DLL.

Reinstall the standard OPC proxy/stub DLLs, using an up-to-date installation program or re-register them using the REGSVR32 command-line utility (see section 2.2 Installation, which starts on page 2).

Server cannot find hardware key

Problem: (If using hardware key.) I don't think the server can find my hardware key

Solution: Try running the **hasp.exe** utility under:

C:\Program Files\Matrikon\OPC\Common

When this is run, a small dialog box appears. With the hardware key plugged into the printer port on the back of the computer, select **Check key** from the **utilities** menu. If an error message appears (e.g., "There is a problem with the hardware key set-up"), then there is a problem reading the hardware key. You *should* see **OPC Server for DDE** in the dialog or something similar.



6.2 Questions and Answers

How do I remove the server as a service?

Question: How do I remove the OPC server as a service?

Answer: Reregister the OPC server executable using the /REGSERVER command-line switch.

Does the server need to be started manually when installed as a service?

Question: Does the server need to be started manually when it is installed as a service?

Answer: No, the first OPC client that tries to connect will start the OPC server.

How can I get OPC data into other applications?

Question: How can I get OPC data into Microsoft Excel, Microsoft Word, or another application with support for Visual Basic, VBA, or VB Script?

Answer: Use the Matrikon OPC **Automation Component** to create a Visual Basic script that connects to a server, creates groups and items, and receives data change updates. Contact Driver Support for examples of how to do this in Excel, Visual Basic, or an HTML document.

How can I access individual bits from an integer item?

Question: How can I access individual bits from an integer item?

Answer: Create an alias (see section 3.7 Alias Configuration, which starts on page 29) that references the desired item and configure scaling for the alias to use expression evaluation. Edit the input expression to use binary math to access a particular bit (e.g., `IF ((INPUT AND 4)=4, 1, 0)` to access bit 2). This method allows *read* access only.



7 OPC Compliance

For more information on OPC, view the documents listed below (as well as others) at <http://www.opcfoundation.org>.

- OPC Overview 1.0
- OPC Common Definitions and Interfaces 1.0
- OPC Security Custom Interface 1.0
- OPC Data Access Custom Interface Standard 2.05
- OPC Data Access Custom Interface Standard 3.00 (Pending)

The server passes the automated certification test with the **OPC Foundation Compliance Test** utility.

7.1 Installation

The server installs itself as a local out-of-process COM server and enters its registration information in the Windows registry when instructed to do so with the /REGSERVER command-line option. The server installs itself as an NT/2000 service and enter its registration information in the Windows registry when instructed to do so with the /SERVICE command-line option.

- Version-independent program ID Matrikon.OPC.DDE.1
- Version-specific program ID Matrikon.OPC.DDE.1.1
- OPC sub-key and vendor information string
- Globally unique application ID number **F1F07BB3-D2CB-4e68-A4BF-4888CE1FD9F2**
- Globally unique class ID number **81BD69CB-47A4-49bc-B5BD-2CD55ACC2DDE**
- Full path of 32-bit local server executable
- OPC Data Access Server 1.0 and 2.0 implemented component categories

The server removes its registration information from the Windows registry when commanded to do so with the /UNREGSERVER command-line option.

7.2 Common Interfaces

The server supports the mandatory functionality specified in **OPC Common Definitions and Interfaces**. The server supports the following locales for result code translation: US English (0x0409), system default (0x0800), user default (0x0400), and neutral (0x0000).

The server allows the client to set the client name for each connection. The server supports the shutdown event notification client-side interface.



7.3 Data Access

The server supports the mandatory functionality specified in the **OPC Data Access Custom Interface Standard**.

7.3.1 Groups

The server supports the addition, removal, and cloning of private groups. The server allows the client to manage group state.

- Name
- Active state
- Update rate (100 millisecond resolution)
- Time bias
- Dead-band (percent of analog item high-low range)

7.3.2 Items

The server supports the addition, removal, and validation of items in a group. The server allows the client to manage item configuration.

- Active state
- Requested data type
- Dead-band (percent of analog item high-low range)
- Sampling rate
- Buffer values (used only when sampling rate is enabled and is sampling faster than the group update rate).

7.3.3 Browsing and Item Properties

The server supports address space browsing.

- Hierarchical address space
- Simulate flat address space
- Branch/leaf name filter (pattern matching)
- Item data type filter
- Item access rights filter

The server supports the following mandatory item properties.

- Value, quality, and timestamp
- Canonical data type
- Access rights
- Scan rate



7.3.4 I/O Operations

The server supports synchronous I/O operations.

- Read active item values from cache
- Read item values from device
- Read items value from device based on how old the cache items value is.
- Read items without adding the item to an OPC group.
- Write control values to items (on device)
- Write control value, quality, and/or timestamp to items (if the server supports such features).
- Write control values without adding the item to an OPC group.

The server supports asynchronous I/O operations defined for **DA 3.0**.

- Read items value from device based on how old the cache items value is.
- Write control value, quality, and/or timestamp (if the server supports such feature).

The server supports the data change event notification client-side interface as defined for **DA 3.0**.

- Keep-alive callback indicating server is alive.

The server supports asynchronous I/O operations as defined for **DA 2.0**.

- Read items values from device
- Write control values to items (on device)
- Refresh active items from cache
- Cancel outstanding operations
- Enable/disable event notifications

The server supports the data change event notification client-side interface as defined for **DA 2.0**.

- Data change or dead-band exceeded
- Asynchronous refresh operation complete
- Asynchronous read operation complete
- Asynchronous write operation complete
- Asynchronous operation cancellation complete

The server supports asynchronous I/O operations as defined for **DA 1.0a**.

- Read items values from device
- Read items values from cache
- Write control values to items (on device)
- Refresh active items from cache



- Cancel outstanding operations

The server supports the data change event notification client-side interface as defined for **DA 1.0a**.

- Data change or dead-band exceeded – data with time stamps
- Data change or dead-band exceeded – data without time stamps
- Asynchronous write operation complete



Appendix A - Distributed COM (DCOM)

DCOM is an object protocol that enables COM components (such as OPC clients and servers) to communicate directly with each other across a network. A certain amount of configuration is required on the system where the OPC server is installed to allow remote clients to connect to it over the network.

Note:

The following steps are suggestions only. Ask your Windows NT/2000 System Administrator for more information about the settings that you should use, especially between different domains.

Readers should be familiar with DCOM and with Windows 2000 security features and security administration. Information regarding Distributed COM and various links to related sites, white papers, specs, etc, can be found at <http://www.microsoft.com/com/tech/DCOM.asp>.

Specifications on DCOM/COM and release notes on COM+ can be found in the MSDN Online Library at <http://www.microsoft.com/com/resources/specs.asp>.

A.1 DCOM Configuration Utility

Start the DCOM configuration utility either from the server configuration utility or from the command-line (DCOMCNFG). Answer, **yes** to any message boxes that appear (allowing the utility to assign application ID entries to those servers that don't already have them).

The main window for **DCOMCNFG** allows the user to either configure default settings for all COM servers or else to configure settings for a specific server chosen from the list. The former will affect all servers configured to use the default settings. The latter will affect the selected server only.

Note:

DCOM settings are stored in the registry and loaded by COM (and OPC) servers at start-up. Therefore, server processes must be shut down and restarted in order for these changes to take effect.

A.2 Default Properties

The **Default Properties** tab contains settings that affect all DCOM communication on the machine.

- First of all, ensure that the **Enable Distributed COM on this computer** is selected in so that the machine is available to others via DCOM.
- Select the **Enable COM Internet Services on this computer** to allow DCOM access to the machine from the Internet (check with your administrator).
- In general, the other settings do not need to be changed.

The **Authentication Level** specifies when COM should authenticate the identity of calling clients (each call, each packet, etc).



- Normally, it should be set to **Connect**, indicating that COM should authenticate clients when they first connect to a server. If it is set to **None**, then COM performs no authentication and ignores any access permission settings.

The **Impersonation Level** specifies whether servers can ascertain the identity of calling clients and whether they can then perform operations on the client's behalf (as if the server is the client).

- Normally, it should be set to **Identify**, allowing the server to identify the calling client to see if it is allowed access to a certain resource but not to actually access any of these resources as the client.
- Select the **Provide additional security for reference tracking** to make even the reference counting on COM objects secure. This setting is not generally required.

A.3 Security Permissions

The most important DCOM settings for an OPC server are the security permissions.

There are two ways for you to set these:

1. Change the specific settings for the server (recommended).
2. Change the default settings (not recommended) and make sure that the OPC server will use these.

Either way, be certain that the access and launch permissions are correct for the server.

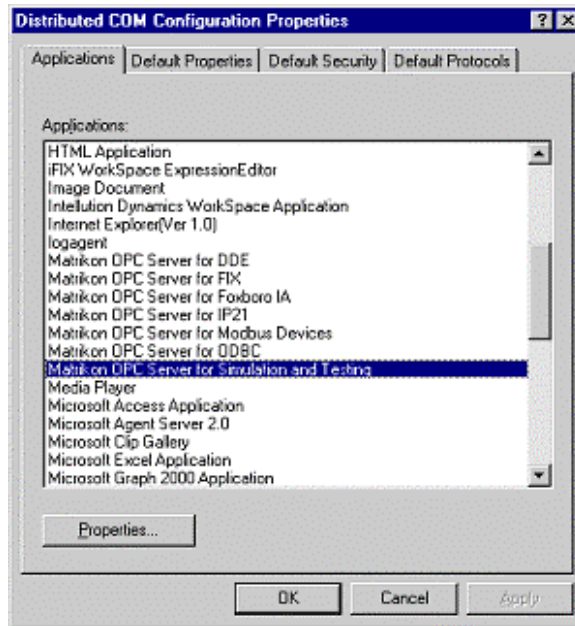
Setting Security Permissions

To set the security permissions for an OPC Server:

1. Open the DCOM configuration utility.
2. Select the OPC server, and then click **Properties**.

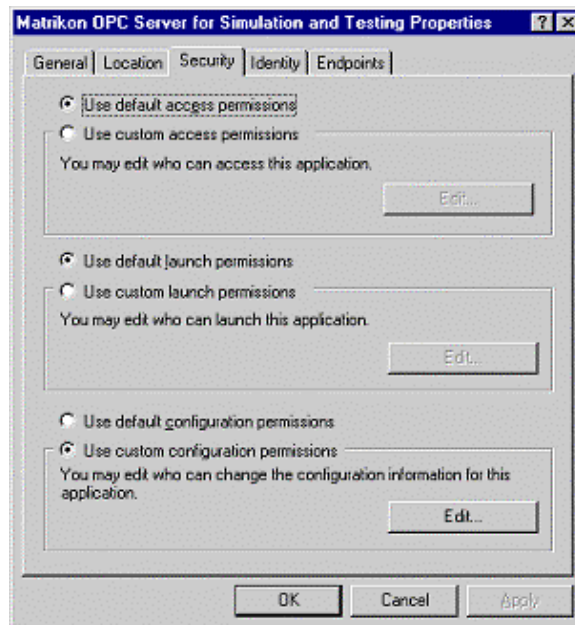
The **Distributed COM Configuration Properties** dialog box appears (see below).





3. Click on the **Security** tab to set the security for the server.

The **Distributed COM Configuration Security** tab appears (see below).



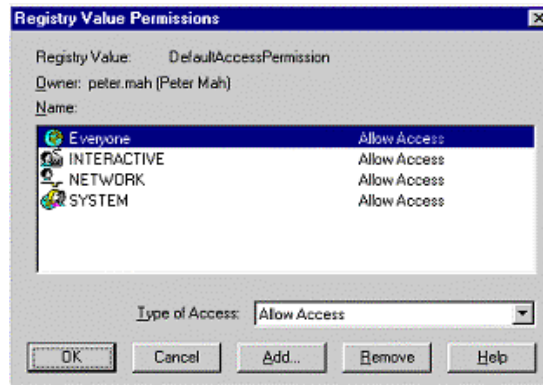
The **Access Permissions** contain an *Access Control List* of principals that are allowed to interact with objects supplied by a server.

The **Launch Permissions** contain an *Access Control List* of principals that are allowed to start up a server process or service.

4. Include the names of users or user groups from trusted domains that you wish to be able to use the OPC server on this machine. Include the **Everyone** group to allow access to all users on a particular domain.
5. To set the *Access* permissions, click **Use custom access permissions** and then click **Edit**.

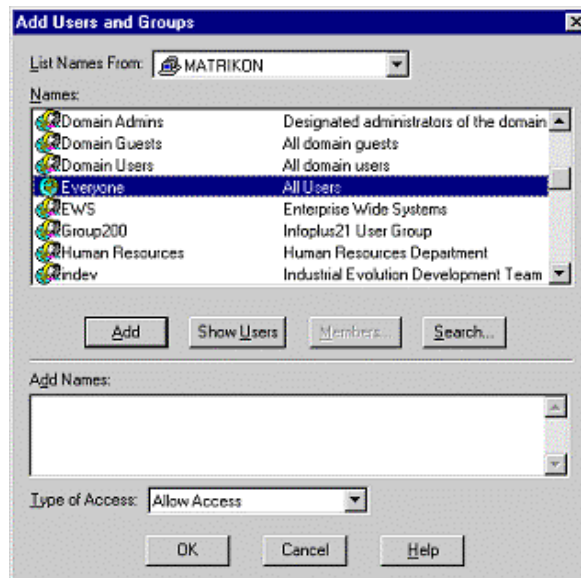


The **Registry Value Permissions** dialog box appears (see below).



6. To add users to the list click **Add**.

The **Add Users and Groups** dialog box appears (see below).



7. To add a user to the list, select the user, and then click **Add**. If the user you wish to add does not appear then click **Show Users**.
8. When you are done adding users, click **OK** to close the **Add Users and Groups** dialog box. You can then choose to **Allow Access** or **Deny Access** for each user.

The procedure to set the launch permissions is similar to the above, but instead of choosing **Allow Access** for a user you would choose **Allow Launch**.

The Configuration Permissions contain an *Access Control List* of principals that are allowed to modify the configuration information for a server. In other words, it indicates who is allowed to alter the registry entries for installed servers as well as who is able to access the registry for the purposes of installing new servers. It is usually simpler to install and configure servers as a user with local administrative rights.

9. To connect to an OPC server from outside of the domain, create a local user account on both the server and the client machine with identical *username* and *password*. Then, add the local user on



the OPC server to the DCOM permissions. Use the local account on the client machine to connect to the OPC server.

A.4 Server Identity

The **Identity** tab for a selected COM (or OPC) server specifies the user account that should be used when COM starts up the process. The available settings are different for servers that run as local executables as opposed to those that run as NT services.

Note:

It is strongly recommended that OPC server should be installed to run as NT services if they are going to be accessed by remote clients via DCOM. This ensures that the server can always be accessed even if no one is presently logged on to the machine, and only one server process ever starts up. It also adds a greater degree of security in terms of who is able to shut down the server process.

Servers that run as local executables have the option of running as the launching user (the calling client—this is the default), the interactive user (the one currently logged onto the machine), or a specified user. It is usually best to use the interactive user or a specified user. Otherwise, remote clients might start up multiple separate server processes that are not accessible to others.

Servers that run as NT services should generally run as the local **System** account. Alternatively, the server can be set to run as a specified user, although this is usually done from the **Service Control Manager** applet rather than DCOMCNFG. *Access* and *Launch* permissions are particularly important when installing a server to run as an NT service.

A.5 Default Protocols

The **Default Protocols** tab specifies the communication protocols available to DCOM. The order that protocols appear in the list indicates the priority in which they will be used (the topmost having the highest priority).

The more protocols that appear in the list, the better the chances of connecting to an OPC server on an unknown remote machine (such as at an OPC Interoperability Workshop). However, it may also take longer for DCOM to time out if a server machine is not present since it has to try each protocol in turn.

For most situations, it is best to remove all unused protocols from the list and only include those that are necessary for your network. For example, on a TCP/IP network, one would include the **Connection-oriented TCP/IP** protocol. Contact your IT personnel for more information about your network.

Note:

Evidence indicates that there are problems with the datagram-oriented protocols (such as UDP/IP) that can cause memory leaks in DCOM. Therefore, it is strongly recommended that these protocols be removed from the list of default protocols. Datagram-oriented protocols are not supported under Windows 2000 at all (although the DCOM configuration utility still allows you to configure them).



A.6 Remote Program ID

Before the **OPC Server Browser** became available, OPC client applications had to search the registry to generate a list of available OPC servers. Therefore, some older OPC clients need to have a program ID in the local registry in order to connect to a particular OPC server.

The simplest solution is to install the OPC server software on the client machine even if it is not used. Alternatively, use the following steps to copy a program ID to the client machine.

Note:

This method may not work for every OPC client. Please check the client documentation for more information.

1. On the server machine, run **REGEDIT** as a user that has access rights to the local registry.
2. Expand the **HKEY_CLASSES_ROOT** key.
3. Find the program ID(s) for the desired OPC server(s).

In the case of Matrikon OPC Servers, the ID has the form *Matrikon.OPC.Device*. If you quickly type the first few letters then **REGEDIT** should jump to the location of that key. Some servers may have both a version-specific as well as a version-independent program ID. In this case both ID's should be copied to the client machine.

4. For each program ID, select the key and choose **Export Registry File** from the **Registry** menu. Enter a file name, and then click **Save**. Be careful not to overwrite other export files that you are creating.
5. Copy the exported **REG** files to the client machine.
6. Merge the **REG** files into the registry of the client machine.

This should simply be a matter of double clicking on the file from the desktop of the client machine. Alternatively, run **REGEDIT** on the client machine and choose **Import Registry File** from the **Registry** menu, selecting each file in turn. This must be done as a user who has write access to the local registry.

7. Use **REGEDIT** to check that the program IDs have in fact been copied.
8. Delete the **REG** files since they are no longer needed.



Appendix B - ALIASES

B.1 Scaling Expressions

Alias scaling expressions may use any of the expression constructs listed in Table 7-1.

Table 7-1. Expressions Constructs for Alias Scaling

Construct	Description	Examples
'text'	Text value (single quotation marks).	'hello' 'Joe''s Alias'
+ - * /	Addition (or Append), Subtraction, Multiplication, and Division	(3 * 7 + 1) / 8 - 2 'hi' + 'there'
= < > <> <= >=	Equal To, Less Than, Greater Than, Unequal To, Less or Equal To, Greater or Equal To	3 < 4
Not And Or	Logical Not, Logical And, Logical Or May also be used for binary math.	(7 >= 3) And (1 <> 0) (12 And 5) = 4
TIME	Current time as text	'The time is' + TIME
DATE	Current date as text	'Today is' + DATE
INT(x)	Returns the integer part of x	INT(3.14) = 3
FRAC(x)	Returns the fractional part of x	FRAC(3.14) = 0.14
SQRT(x)	Returns the square root of x	SQRT(16) = 4
DIV(x, y)	Divides x by y	DIV(42, 7) = 6
IF(expr, x, y)	Returns x if expression evaluates to TRUE, otherwise returns y	IF(6 <= 12, 'OK', 'Bad') = 'OK'
TRUE FALSE	Constant Boolean true and false	(5 > 6) = FALSE
TYPEOF(x)	Returns the data type of x as a text description ('STRING', 'INTEGER', 'FLOAT', 'BOOLEAN', 'ERROR').	TYPEOF('hello') = 'STRING'
STR(x)	Converts the numeric value x to text	STR(3.14) = '3.14'
UPPER(x) LOWER(x) PRETTY(x)	Converts the text value x to all upper case or lower case letters, or the first letter upper case and the rest lower	UPPER('alarm') = 'ALARM' LOWER('ALARM') = 'alarm' PRETTY('ALARM') = 'Alarm'
COPY(x, start, length)	Returns a sub-string of the x, copying length characters starting at start	COPY('FIDDLE', 2, 4) = 'IDDL'
FORMATNUMERIC(mask, x)	Converts the numeric value x to text using the format mask	FORMATNUMERIC('####.#', 123.4567) = '123.5'
INPUT	The incoming value read from OPC	INPUT * 3.1415



Construct	Description	Examples
OUTPUT	The outgoing value written to OPC	OUTPUT / 3.1415
'text'	Text value (single quotation marks).	'hello' 'Joe's Alias'

B.2 CSV File Format

The alias import/export file contains lines of comma-separated values. Values containing commas or spaces are enclosed in double-quotation marks (""). Double-quotation marks occurring inside quoted values are escaped with an extra double-quotation mark. Lines beginning with a hash mark (#) are ignored (used for comments). Each line contains the fields listed in Table 7-2.

Table 7-2. Field Descriptions for File Import/Export

Field	Description
Alias Group	Name of the alias group folder where the alias belongs. Periods in the name indicate subfolders below the root (i.e. "North.FIC101" = alias group "North" under the Alias Configuration root and alias group "FIC101" under that).
Alias Name	Name of the alias. Full alias path name composed of the alias group path, a period, and the alias name (i.e. "North.FIC101.CV" for an alias named "CV").
Item Path	Fully qualified item ID for the OPC item to which the alias refers.
Data Type	Decimal number indicating the data type for the alias.
Read-only	Specifies whether the alias is read-only or read-write. 0 = read-write 1 = read-only
Poll Always	Specifies whether the alias is polled continuously or not. 0 = only poll as requested by an OPC client (normal) 1 = poll continuously at the specified update rate
Update Rate	Update rate (milliseconds) to use with the Poll Always option.
Scaling	Scaling type for the alias. 0 = none 1 = linear 2 = square root 3 = gain/offset 4 = expression

When the scaling field specifies linear (1) or square root (2) scaling, the line contains the additional fields listed in Table 7-3.

Table 7-3. Additional Field Descriptions for File Import/Export: Linear or Square Root Scaling

Field	Description
High Raw	Raw value range (double-precision real).
Low Raw	



Field	Description
High Scaled	Scaled value range (double-precision real).
Low Scaled	
Clamp	Clamp options. 0 = none 1 = clamp low value 2 = clamp high value 3 = clamp both high and low values

When the scaling field specifies gain/offset (3) scaling, the line contains the additional fields listed in Table 7-4.

Table 7-4. Additional Field Descriptions for File Import/Export: Offset Scaling

Field	Description
Gain	Scaling factor (double-precision real).
Offset	Scaling offset (double-precision real).

When the scaling field specifies expression (4) scaling, the line contains the additional fields listed in Table 7-5.

Table 7-5. Additional Field Descriptions for File Import/Export: Linear or Square Root Scaling

Field	Description
Input Expression	Simple formula applied to the value read from the OPC item.
Output Expression	Simple formula applied to values written to the OPC item. The output formula should be the reciprocal of the input formula.

B.3 Scaling Algorithms

For each type of scaling, a different algorithm (Table 7-6) is applied to values read from the OPC item. A reverse algorithm is applied to any values written to the OPC item.

Table 7-6. Scaling Algorithms

Scaling	Algorithm/Example	Reverse Algorithm/Example
Linear	$(x - Raw_{Low}) \left(\frac{Scaled_{High} - Scaled_{Low}}{Raw_{High} - Raw_{Low}} \right) + Scaled_{Low}$	$(x - Scaled_{Low}) \left(\frac{Raw_{High} - Raw_{Low}}{Scaled_{High} - Scaled_{Low}} \right) + Raw_{Low}$
Square Root	$\sqrt{x - Raw_{Low}} \left(\frac{Scaled_{High} - Scaled_{Low}}{\sqrt{Raw_{High} - Raw_{Low}}} \right) + Scaled_{Low}$	$(x - Scaled_{Low})^2 \left(\frac{Raw_{High} - Raw_{Low}}{(Scaled_{High} - Scaled_{Low})^2} \right) + Raw_{Low}$
Gain/Offset	$Gain \cdot x + Offset$	$\frac{x - Offset}{Gain}$
Expression	SQRT (INPUT) + 5	(OUTPUT - 5) * (OUTPUT - 5)



Appendix C - Standard Data Types

Table 7-7. Expressions Constructs for Alias Scaling

Hex	Dec	Data Type	Description
0000	0	VT_EMPTY	Default/Empty (Nothing)
0002	2	VT_I2	2-byte signed integer
0003	3	VT_I4	4-byte signed integer
0004	4	VT_R4	4-byte (single-precision) real
0005	5	VT_R8	8-byte (double-precision) real
0006	6	VT_CY	Currency
0007	7	VT_DATE	Date
0008	8	VT_BSTR	Text (UNICODE)
000A	10	VT_ERROR	Error code
000B	11	VT_BOOL	Boolean (TRUE = -1, FALSE = 0)
0011	16	VT_I1	1-byte signed integer
0012	17	VT_UI1	1-byte unsigned integer
0013	18	VT_UI2	2-byte unsigned integer
0014	19	VT_UI4	4-byte unsigned integer
2002	8194	VT_ARRAY VT_I2	Array of 2-byte signed integers
2003	8195	VT_ARRAY VT_I4	Array of 4-byte signed integer
2004	8196	VT_ARRAY VT_R4	Array of 4-byte (single-precision) real
2005	8197	VT_ARRAY VT_R8	Array of 8-byte (double-precision) real
2006	8198	VT_ARRAY VT_CY	Array of currency values
2007	8199	VT_ARRAY VT_DATE	Array of dates
2008	8200	VT_ARRAY VT_BSTR	Array of text values
200A	8202	VT_ARRAY VT_ERROR	Array of error codes
200B	8203	VT_ARRAY VT_BOOL	Array of Boolean values
2011	8208	VT_ARRAY VT_I1	Array of 1-byte signed integers
2012	8209	VT_ARRAY VT_UI1	Array of 1-byte unsigned integers
2013	8210	VT_ARRAY VT_UI2	Array of 2-byte unsigned integers
2014	8211	VT_ARRAY VT_UI4	Array of 4-byte unsigned integers



Appendix D - Microsoft Excel as a DDE Client

Microsoft Excel can act as both a DDE Client, and a DDE Server. When using Excel as the Client, DDE Items can be bound to specific cells in a spreadsheet, creating a read-only “hot link” to the DDE Items. Using Visual Basic, Excel can also be used to transmit (write) the data contained in a specific cell of a spreadsheet to a DDE Server.

D.1 DDE Read

To perform a DDE Read using Excel, simply enter a DDE Item as a formula in some Spreadsheet cell:

=SERVICE|TOPIC!NAME

Excel will initiate a DDE Advise loop, or “hot link”, to the topic and item within the Service. The DDE Management system (In this case, Windows) will forward any update sent by the DDE Service, to the appropriate DDE Client (in this case, Microsoft Excel). The DDE Service is responsible for update rate / behavior.

To disable a specific hotlink in Excel, use the “Links” option under the “Edit” menu.

Special Characters in Excel

Excel reserves the use of specific characters for use in any cell. If a SERVICE, TOPIC, or NAME contains any special characters, surround the specific field with single quotation characters ('):

=SERVICE|TOPIC!'NAME'

=SERVICE|'TOPIC'!'NAME'

=SERVICE|'TOPIC'!NAME

To include single quotation characters in the name, enter two simultaneous single quotation characters:

=matrikon_opc_simulation_1|'Power.Generator's Value'!'1000\'

D.2 DDE Write

To perform any DDE command other than Requests (read) or advise (hot link), a Visual Basic (VB) function must be used. Most DDE commands are available by using the Application object. For example, the following function will poke (write) the contents of column 1, row 1 to an item in the OPC Simulation Server:



```

Sub WriteToDDE()

' open a DDE channel.  Field 1 = SERVICE, Field 2 = TOPIC
'channel      =      DDEInitiate("matrikon_opc_simulation",      "Bucket
Brigade.Real4")

' poke to the Item 1000\, the value of cell A1
DDEPoke channel, "1000\", Worksheets("Sheet1").Range("A1")

' close the channel
DDETerminate channel

End Sub

```

D.3 Net DDE

Since DDE commands are routed by the Operating System, it is not possible to establish a DDE session between two computers unless some transport mechanism is used. This is usually supplied as a plug-in component of the operating system. In the Windows NT / 2000 Environment, the NetDDE Windows Service allows DDE communication between two computers.



Figure D-1 – DDE Share

NetDDE must first be configured using the DDEShare application (DDEShare.exe). Each SERVICE & TOPIC pair, or “NetDDE Share”, that is to be available through NetDDE must be assigned a unique name.