

SIEMENS

Process Analytics

Maxum OPC Server User Manual

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

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

CAUTION

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

NOTICE

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

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens Process Analytics products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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

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Preface

If you are unfamiliar with any of the terms or concepts used in this document please refer to the Glossary section located at the end of this document. If you wish to obtain more information on any of the terms or concepts presented here please refer to the section titled: Additional Information Resources.

Trademarks

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1. Introduction

Maxum OPC Server is a software application that provides a standard interface to Siemens Process Gas Chromatographs. The server acquires real-time analysis results and presents the data through an OPC DA interface. Any OPC compliant client may access the data remotely using standard OPC protocols. A single OPC Server can provide data from multiple Siemens GCs to multiple client applications or a single client may access data from multiple OPC Servers. Maxum OPC Server is the ideal solution for sharing process analytical information with Distributed Control Systems, Statistical Quality Control programs, Data Historians or any custom application supporting an OPC interface

Maxum OPC Server provides the following features:

- OPC DA 2.04 compliant
- Runs as a Windows® Service
- Tag browsing using OPC Foundation List Server (OPCEnum.exe)
- Supports server self-registration
- Support for both the OPC Custom and Automation Interface (Visual Basic®, VBA)
- Supports both local and network data access
- Uses free threading model for efficient COM/DCOM communications
- Supports asynchronous and synchronous communications
- Supports network communication over Ethernet, Advance Datanet, and Advance DataHiway^{*}.

1.1. System Requirements

Platform requirements :

Component	Minimum	Recommended
CPU	1.4 GHz or faster 32-bit (x86) or 64-bit (x64) processor for <u>single core</u> 1.3 GHz or faster 32-bit (x86) or 64-bit (x64) processor for <u>multi-core</u>	3.1 GHz (64-bit processor) or faster multi-core
Memory (RAM)	4 GB	16 GB
Hard Drive	50 GB	100 GB
Display	Super VGA (800 x 600) or higher-resolution monitor	Microsoft® DirectX® 9 graphics device with WDDM driver

1.1.1. Supported OS

Microsoft Windows 7	SP1
Microsoft Windows 8	SP3.1
Microsoft Windows 8.1	SP1
Microsoft Server 2008	SP1
Microsoft Server 2008 R2	SP1
Microsoft Server 2012	
Microsoft Server 2012 R2	

While Maxum OPC Server may work on platforms not meeting the minimum specifications, operational reliability and efficiency will be diminished.

1.1.2. Product Interface Requirements

Product	Description
Maxum Maxum Edition II	Can connect to the Maxum OPC Server directly through an Ethernet or DataNet network
Advance Optichrom	Requires an (ODS) Optichrom Data Server. The ODS consists of a NAU (Network Access Unit) and either an Advance Ethernet Gateway or an Advance DataNet Gateway. The Optichrom analyzers communicate to the ODS and the ODS communicates with OPC Server.
MicroSam	Can connect to the Maxum OPC Server directly through an Ethernet or DataNet network

2. Overview

2.1. OPC

OPC, now known as **O**pen **P**latform **C**ommunications, is a series of standards designed to bridge Windows based applications and process control hardware and software applications. It is an open standard that permits a consistent method of accessing field data from industrial devices. OPC DA, or OPC Data Access was the first standard created by the OPC Foundation.

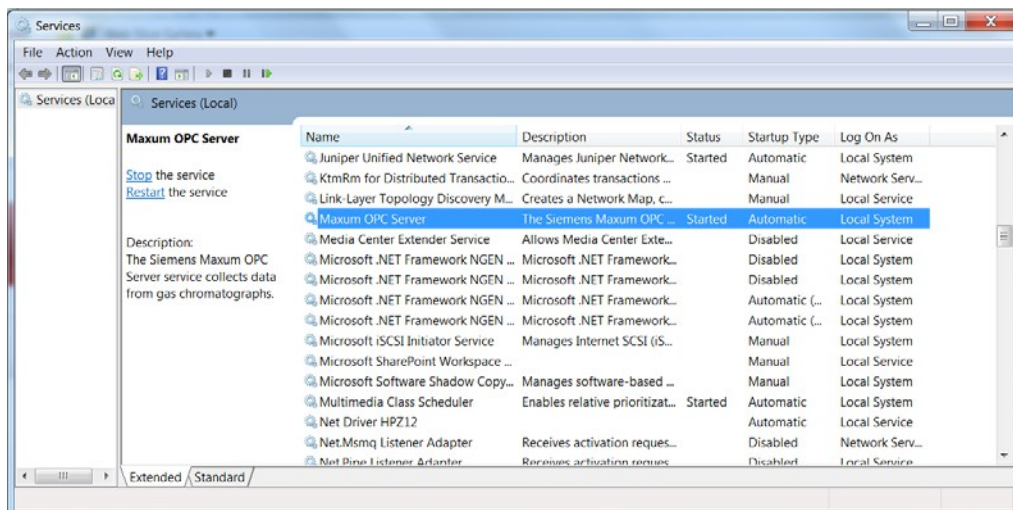
OPC DA is based on Windows COM (Common Object Model). COM is a binary standard that specifies how objects interact with each other. A COM object is accessed exclusively through one or more sets of interfaces. An interface is a set of functions or methods. The COM standard not only specifies the binary object standard, it also defines a series of standard interfaces that provide common functionality. The OPC-DA specification defines several COM objects and their associated interfaces. These objects and interfaces provide a standard for real-time information exchange between software applications and process hardware.

DCOM or Distributed Common Object Model extends COM communication to remote COM objects running on networked machines.

2.2. OPC Server Service

Maxum OPC Server is a COM object server that runs as a Windows 32-bit service (MaxumOPCServer). Windows services are controlled by the Service Control Manager (SCM). The SCM is the central utility provided by Windows to administer services. SCM is used to start, stop, pause, resume, and configure a service. A Windows service exporting a COM component must be recognized by the operating system as a COM server and as a running service. Therefore, it must be registered directly in the registry as a COM server and in the services database as a service. **LocalService** is a registry key that merges two fundamental constructs of the Microsoft Win32® environment. It binds a Component Object Model (COM) component to a service combining the benefits of both technologies. The resulting object is available to COM clients and service controllers. Services registered with **LocalService** are not automatically stopped between logon sessions. Like other services, **LocalService** continues to execute when a user session concludes

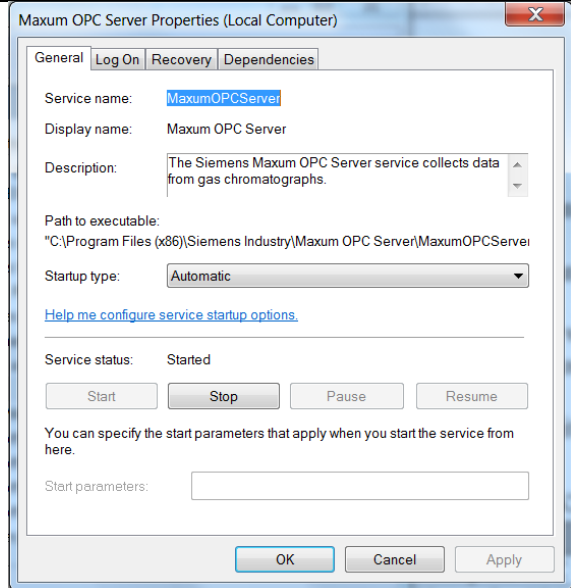
MOS is automatically registered and added to the services database during installation under the name MaxumOPCServer. To view the MOS service properties select **Start**, then type "**service.msc**" in the **Search programs and files** box. Once the Services console is displayed, scroll down to **MaxumOPCServer**.



Right click on **MaxumOPCServer** and select **Properties** from the pop-up menu to display or change OPC Server properties. Under the General tab there are buttons to **Start**, **Stop**, **Pause**, or **Resume** the service. The

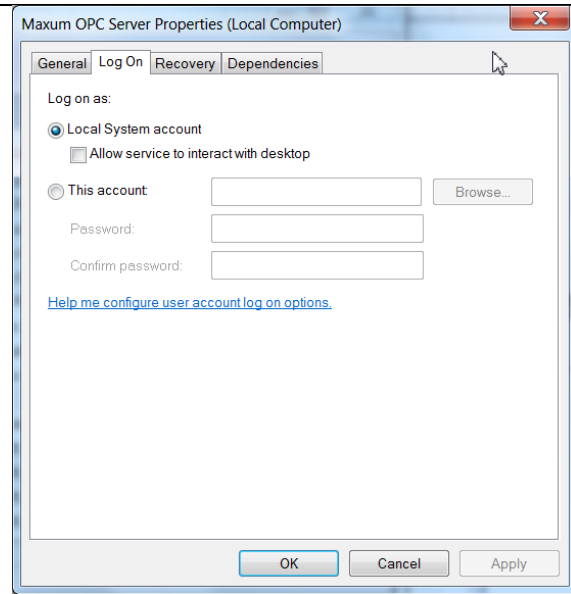
service start mode can be set in the **Startup type**: drop down box. Select **Automatic (Delayed Start)**, **Automatic**, **Manual**, or **Disabled**.

Automatic – starts the service immediately on system start-up (Power-up). This is the recommended setting for MOS.
Automatic (Delayed Start) – starts the service shortly after all other services designated as **Automatic** have been started. Use this setting for the less critical services. This setting ensures that the critical services get their resources early, become available sooner. The default delay is 120 seconds.
Manual – The service can only be started by the currently logged-on user clicking the **Start** button.
Disabled – disables the service from running.



Within a service, you assign a COM component a user or system security context. MaxumOPCServer service is typically configured to run in the security context of the **LocalSystem** account. Select the Log On Tab.

The **Local System account** is a predefined local account used by the Service Control Manager. This account has extensive privileges on the local computer, and acts as the computer on the network. A service that runs in the context of the **LocalSystem** account inherits the security context of the SCM. (Service Control Manager).



IMPORTANT: A user must have Administrator privileges to fully access a service running under the **LocalSystem** account. However, it is possible for a standard User account to run MaxumOPCServer with only Start/Stop user permissions. See the section titled “Starting the MOS service without administrator permissions.”

2.3. OPC Server User Interface

Windows Services are designed to run unattended without a user interface or a logged on user. MaxumOPCServer service runs unattended without a user interface or a logged-on user once the Tag database is created. A separate Windows application, **Maxum OPC Client** (MOC), is used to create, delete, modify, monitor, and save the Tag database. MOC provides a user-friendly, graphical user interface (GUI) that allows the Interactive user (the logged on user) to communicate directly with the MOS service. When the logged-on user starts the MOC application, it tests if the MOS service is already running, then attaches to the OPC server. If the MOS service is not running, the Client application uses the SCM to start the MOC service and then attach to the server. The OPC Client application can be stopped at any time without affecting the operation of the MOS service. The MOS service will continue to run even if the user logs off the system.

2.4. Starting MOS without Administrator Privileges

To overcome the limitation of requiring every user who needs access to MOS to have Administrator privileges, a third application, **Launch.exe** is provided. Launch uses the Service Control Manager (services.msc) to signal the MOS service to start MaxumOPCClient from the security context of the MOS service. This means that the interactive user does not need to be a member of the Administrators account to use MaxumOPCClient. The interactive user needs only start/stop access permissions to edit and monitor the MOS service with MaxumOPCClient.

One method to assign a standard User account the ability to Start/Stop MaxumOPCServer is to use a Security Template. Security Templates can be used to modify the MOS service's ACL (Access Control List) to allow start/stop permissions only. You must have Administrator privileges to perform the following steps:

1. Create a new custom security template using Microsoft Management Console (mmc) with **Security Templates** and **Security Configuration and Analysis** snap-ins.
 - a. Go to **Start > Run**, type: **mmc**, press enter
Add the two snap-ins from the main menu:
 - b. Select **File > Add/Remove Snap-ins ...**
From the Available Snap-ins drop down box:
 - c. Select **Security templates** then click on **Add**.
 - d. Select **Security Configuration** then **Add**.
 - e. Click on **OK**.
2. From the Console Tree (left window panel) expand the Security Templates and right click on [DriveLetter]:\Windows\security\templates.
 - a. Select **New Template**
 - b. Enter a name for the new template in **Template Name**
 - c. Click on **OK**
3. From the Console list (middle window panel):
 - a. Double click on the newly created template name. Or, from the Console Tree (left window panel) expand the Security Templates then expand the [DriveLetter]:\Windows\security\templates.
 - b. Select the newly created template.
 - c. Select **System Services**.
 - d. From the Console list scroll down to **MaxumOPCServer**.
 - e. Double click on **MaxumOPCServer** to bring up the **Service Properties** dialog box.
 - f. Check the **Define this policy** setting in the template checkbox.
 - g. Click on the **Edit Security** button.
 - h. Add the account to delegate permission for. Using the **INTERACTIVE** account is suggested.
 - i. Check the **start**, **stop** and **pause** checkbox under permissions.
 - j. Click on **OK** to exit **Security for MaxumOPCServer** dialog.
 - k. Click on **OK** to exit **MaxumOPCServer Properties** dialog.

-
4. Save the new template.
 - a. Right click on the new template name in the Console Tree (left pane).
 - b. Select **Save** from the pop-up menu.

 5. From the Console Tree (left window panel):
 - a. Right click on Security Configuration and Analysis.
 - b. From the pop-up menu select **Open Database**.
 - c. Under File Name enter a unique name for the security database and select **Open**.
 - d. Select the Security template name entered in step 2 above.
 - e. Click on **Open** to import the new template.

 6. From the Console Tree (left window panel):
 - a. Right click on Security Configuration and Analysis.
 - b. From the pop-up menu select **ConFigure Computer Now**.

 7. If no errors are displayed this procedure is complete. To verify:
 - a. Log Off the machine, then Log On using a non-administrator account. Go to **Start > Run**, type **service.msc**, press enter.
 - b. Scroll down to the **MaxumOPCServer** service.
 - c. Double click **MaxumOPCServer** to bring up the Properties dialog.
 - d. Verify that the Start button is not grayed out and the **MaxumOPCServer** service can now be Started and Stopped.
 - e. Verify that the Launch.exe program works correctly.
 - f. Go to **Start > Run**, browse to: C:\Program Files(x86)\Siemens Industry\Maxum OPC Server.
 - g. Select **Launch.exe**.

Maxum OPC Client (MOC) should now be running.

MOC uses a secure shared memory region to communicate directly with MOS. Connecting and dis-connecting from the MOS service will not affect the service's operation.

IMPORTANT: When using the MOC to add, delete, or edit the OPC configuration file (*.cfg) you must save the configuration file prior to closing MOC or all changes will be lost once the MOS service is Stopped.

3. Getting Started

This section describes the necessary steps to install, configure, and run OPC Server.

IMPORTANT: Maxum OPC Server is compatible with Maxum database version 4.0 (or greater).

Please upgrade any analyzer running an earlier version before starting the server configuration procedure. Optichrom analyzers communicate through an intermediary device called an Optichrom Data Server. The Optichrom Data Server provides the necessary database conversions between the two systems. One of the many enhancements provided in version 4.0 is the OPC table. The OPC Table was added to facilitate data exchange between Maxum analytical devices and OPC Server. The OPC Table must be initialized and populated before a device or analyzer is added to OPC Server.

Complete the following steps in order:

Step 1 – Install OPC Server software. (3.1)

Step 2 – Configure analyzer to communicate with OPC Server. (3.2)

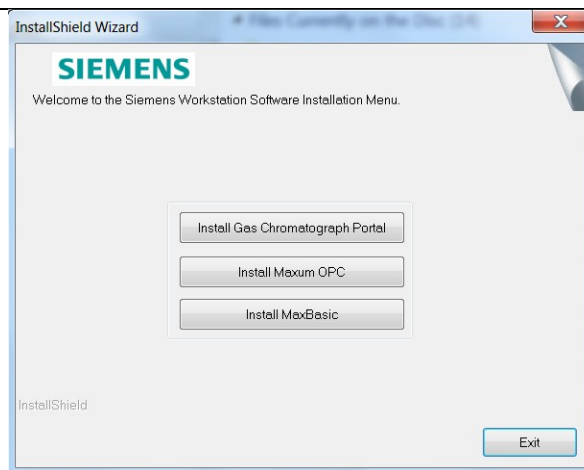
Step 3 - Create the OPC Tag database. (3.3 *Using Maxum OPC Client And Server*)

3.1. Step 1 - Install Maxum OPC Server software

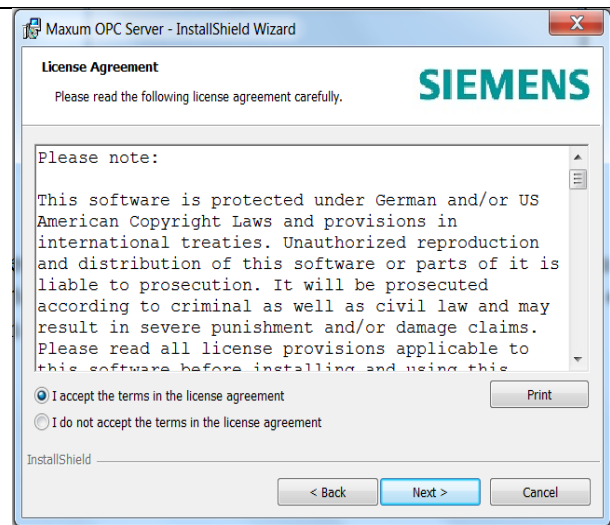
IMPORTANT: The installer software requires that the logged On user have administrator permissions.

To install the Maxum OPC Server software follow these steps:

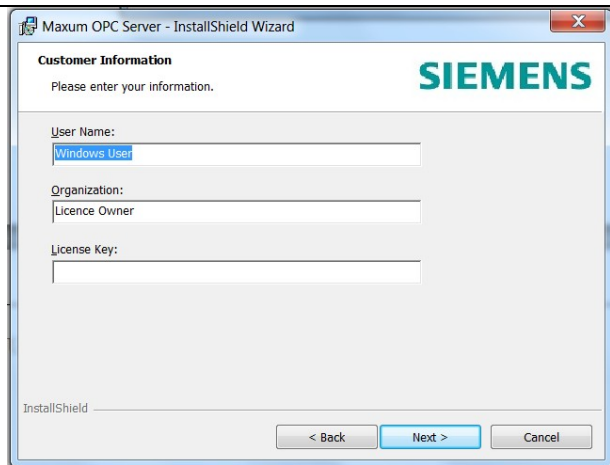
a. Insert the Maxum Workstation DVD into the DVD player. If the AutoPlay option is enabled Windows will automatically start the installation program. If the AutoPlay option is disabled use Windows Explorer to browse to the DVD and double-click on the "setup.exe" file. Click on the Install Maxum OPC button.



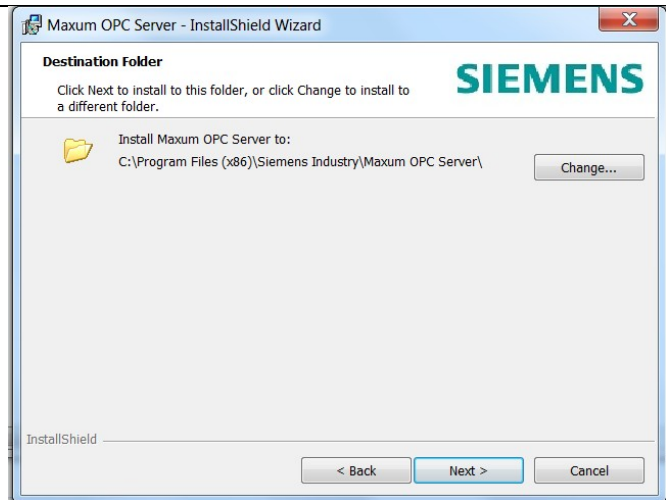
b. The next screen is the License Agreement screen. Please read the License Agreement carefully. If you agree to all the terms and conditions select: **"I accept the terms of the agreement"** radio button. Then click on the Next button.



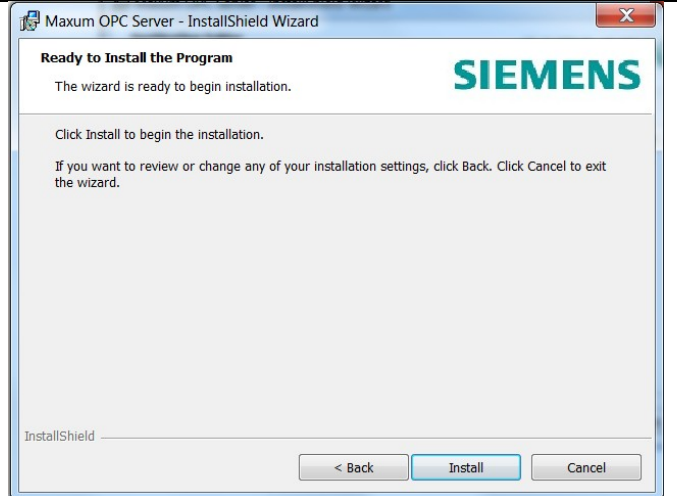
c. Enter your User Name, Organization, and License key on the Customer Information screen. Then click on the Next button.



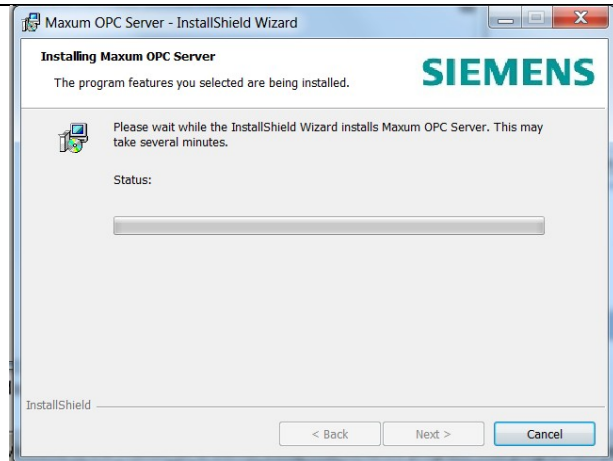
d. Click on the **Next** button on the Destination Folder screen to accept the default installation path or click the **Change...** button to change the destination path to an alternate location and then click the **Next** button.



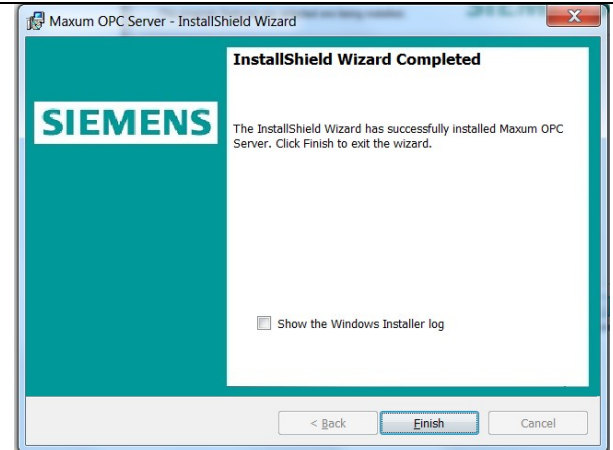
e. Click on the Install button to begin the installation process.



f. The installation program will install the OPC Server software.



g. Once the OPC Server software is successfully installed select the Finish button to complete the installation process.



This completes the installation procedure. The OPC Server has been installed and registered as both a COM server and a Windows service: MaxumOPCServer. The required OPC Foundation support programs are automatically registered and no additional installation steps are required.

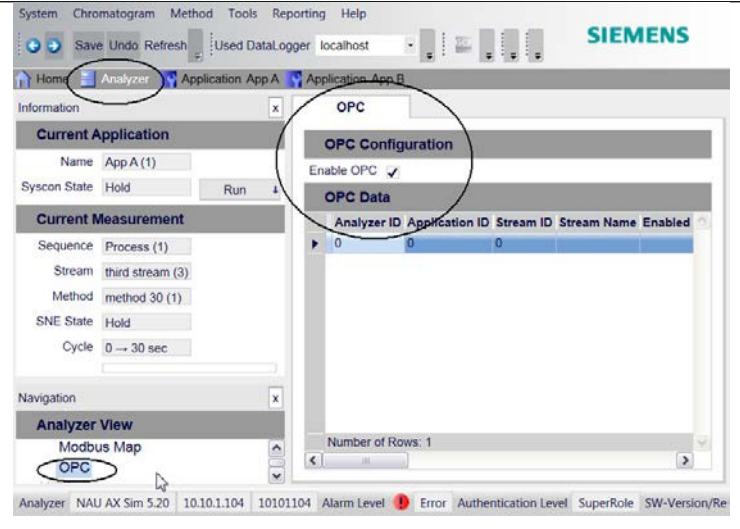
3.2. Step 2 - Configure analyzer to use OPC

3.2.1. How to configure a Maxum analyzer to communicate with OPC Server

a. Enable OPC functionality by checking the Enable OPC check box.

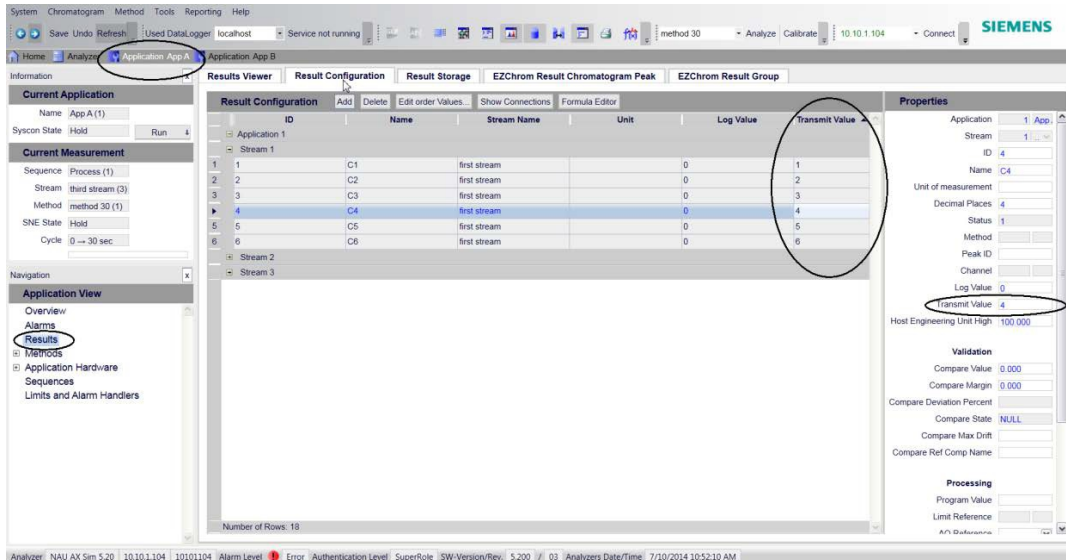
Using Siemens Gas Chromatograph Portal Network View (GCP-NV) select the analyzer to be configured then double-click to connect and display the GCP Analyzer View (GCP-AV).

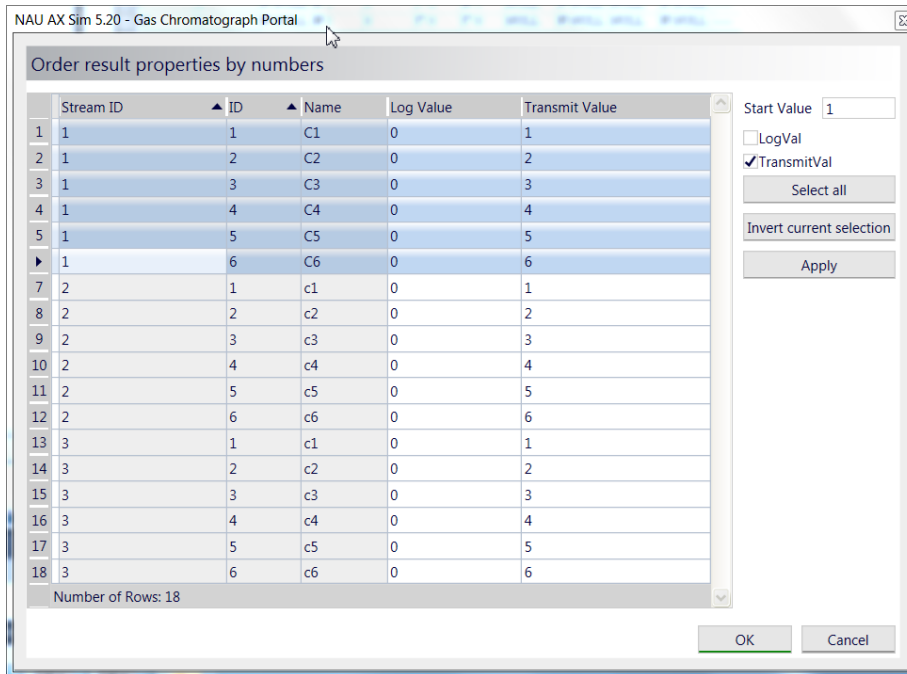
From Analyzer View select Analyzer on the View Selector bar. On the Navigation panel under Analyzer View select **Network -> OPC**. On the OPC Configuration tab check the Enable OPC check box. This checks the OPCflag attribute in the system_control table.



b. Set the Application\Stream\Result transmit order.

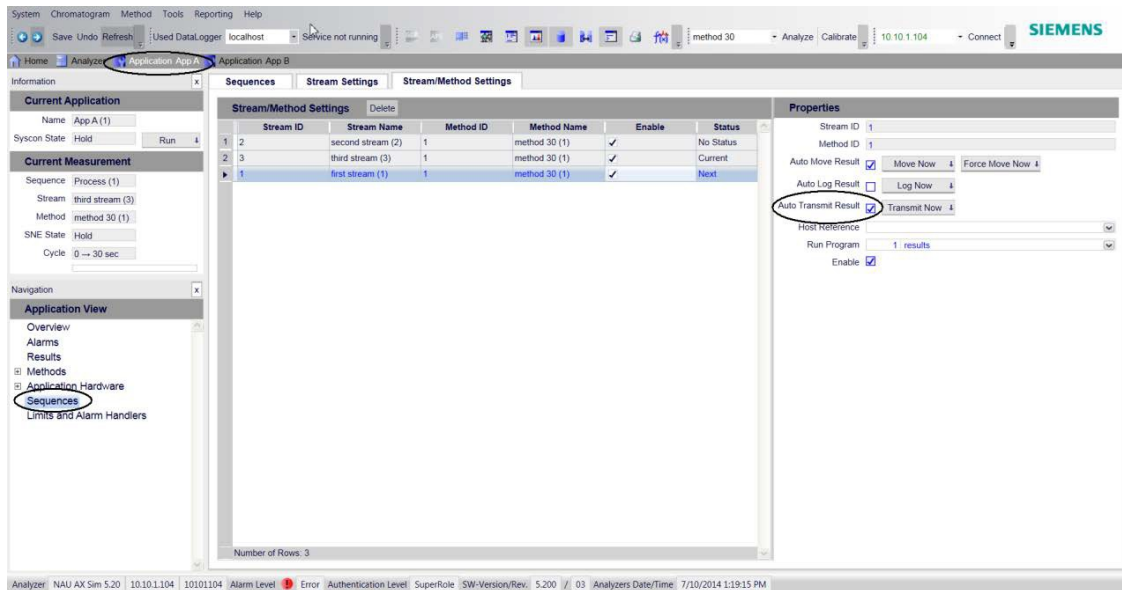
From the GCP Analyzer View select Application View on the View Selector bar. From the Application View select Results then select the **Result Configuration** tab. Set the order results will be transmitted to OPC Server for each Application and stream. Results may be sent in any order. The **Transmit Value** column displays the Stream sequence order. The individual Result sequence order can be set on the Properties panel next to Transmit Value. To set the entire sequence for all streams select the **Edit Order Values...** button. Select the Stream(s) and Results to order then check the **TransmitVal** checkbox, select **Apply** then **OK** buttons. This sets the **trtval** attribute in the result table for each selected result. **Trtval** values must be sequential starting with '1'. Out of sequence values or results with a **trtval** equal to '0' will not be transmitted. Repeat this step for each application/stream.





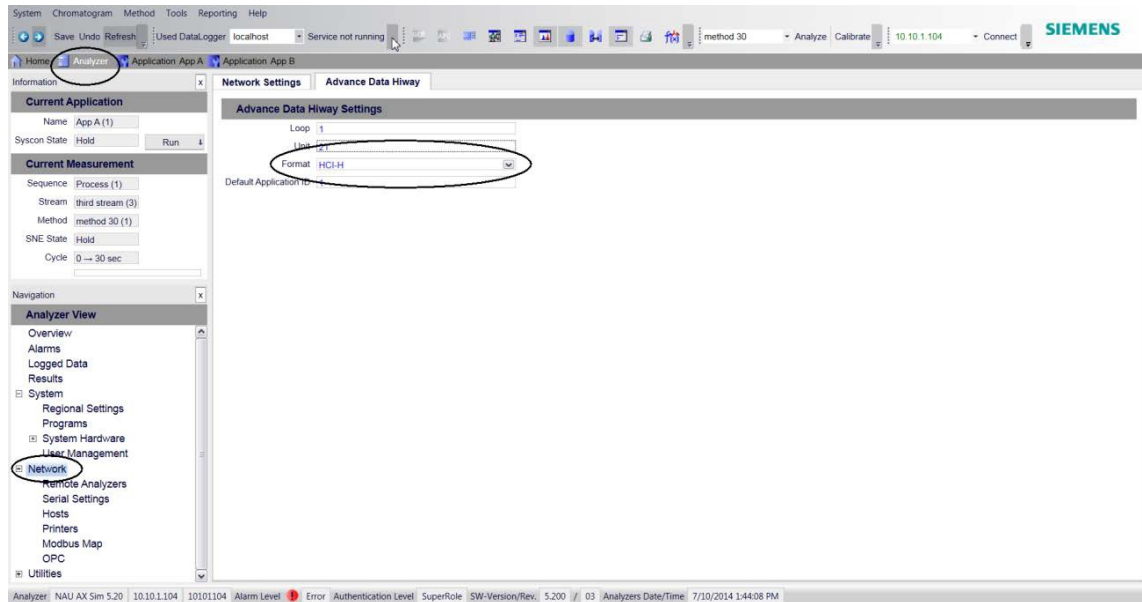
c. Set the stream(s) Auto Transmit Result check box to insure the results are sent at the end of cycle.

From the Application View on the Navigation panel select Sequences. Select the Stream/Method Settings tab. From the Properties panel set the **Auto Transmit Result** check box for each stream. Repeat this step for each application that will be sending Results to OPC Server. This procedure sets the **autotrt** attribute in the **stream_method** table.



When using Optichrom analyzers with OPC Server define the preferred Optichrom communication protocol.

d. Optichrom analyzers support several different communication protocols. HCI-H (Modbus), HCI-CO1, HCI-CO4, and HCI-A (ASCII). OPC Server requires that the data be sent in Maxum Analyzer format. The Maxum analyzer database provides routines to convert Optichrom protocols to Maxum format. Use GCP Analyzer View to specify the Optichrom protocol to be converted. From Analyzer View select **Analyzer** on the View Selector bar. On the Navigation panel under Analyzer View select **Network**. On the Advance Data Hiway tab select the **Format** drop down list box and select the desired Advance Data Hiway protocol. This sets the adh_trformat attribute equal to the desired host computer format: 0=HCI-H, 1 = HCI-CO1, 2 = HCI-CO4, 3 = HCI-A in the System_control table.



Optichrom analyzers use Advance Data Hiway as the physical medium for all communication. Maxum analyzers use Ethernet. This requires the use of a media convertor to convert ADH to Ethernet. The Advance Network Gateway card (ANG) provides this conversion. Typically a Network Access Unit (NAU) is used as an Optichrom Data Server (ODS) to collect, convert, and transmit the Optichrom data to OPC Server. The Optichrom Data Server consists of and NAU (Network Access Unit) with an ANG (Advance Network Gateway) card. The NAU must be configured to use an OPC Server.

The OPC table must be initialized with each streams results before you configure OPC Server. OPC table entries are automatically created at the end of each analysis cycle. Run at least one analysis cycle on each stream prior to configuring OPC Server.

3.2.2. COM Server Registration

Maxum OPC Server is automatically installed and registered during the installation process. You can use the windows program *regedit* to check the registry entries. OPC Server puts two entries under the HKEY_CLASSES_ROOT key. One is **Siemens.MaxumOPCServer** which contains the version-independent program ID (CLSID) and, one titled **Siemens.MaxumOPCServer.1** that contains the version-specific program ID(CLSID). COM/DCOM use the CLSID to determine the path to the Maxum OPC Server executable for remote launch capability.

3.2.3. Standard OPC Proxy/Stubs

In compliance with OPC standards, the Maxum OPC Server installs and registers the following files in the WINDOWS/ SYSTEM32 directory on 32-bit Windows or in WINDOWS/sysWOW64 on 64-bit Windows.

- The official OPC proxy/stub DLL's, "OPCCOMN_PS.DLL and "OPCPROXY.DLL".
- The official OPC List Server (Browser) "OPCENUM.EXE".
- The Automation Component "OPCDAAUTO.DLL" wrapper which enables developers to access OPC data from client applications developed using Automation tools such as Visual Basic, VBA, and VB Script.

The version information contain in these files is used to avoid overwriting newer files with outdated ones.

3.2.4. OPC Foundation Supplied Programs:

Filename	Description
OPCCOMN_PS.DLL	Proxy library for OPC Common interface
OPCPROXY.DLL	Proxy library for OPC Custom interface
OPCENUM.EXE	OPC List server
OPCDAAUTO.DLL	OPC-DA automation library

3.2.5. Maxum OPC Server Files

The following files are installed during the installation procedure:

Filename	Description
MAXUMOPCSERVER.EXE	OPC Server service executable
MAXUMOPCCCLIENT.EXE	OPC Server user interface application executable
POLYHEDRA.DLL	Maxum database communication dll
OPCCCLIENT.EXE	OPC test client

3.2.6. Default Directory Structure

The MOS installation program creates the following default directory structure:

\Program Files (x86)
\Siemens Industry
\System
\Client
\Documents

The following files are loaded under the specified directory.

\Program Files
\Siemens Applied Automation
MaxumOPCServer.exe - main program executable
DbPolyhedra.dll - support dll
SwKey.dll - support dll
MaxumOPCServer.hlp - Windows Help file
MaxumOPCServer.cnt - Windows Help support
\System
OPCerror.log - The OPC Server log file is created the first time program is run.

\Client

- AutomationClientEx.xls - Example Excel-VBA automation client program
- OPC Client.exe - FactorySoft OPC Client test program

\Documents

- MaxumOPCServerManual.Doc - This manual
- OPCda20_auto.doc - Data Access Automation Interface Standard provided by the OPC Foundation

3.2.7. Software Licensing

The Maxum OPC Server utilizes a software license key to enable/disable functionality and provide warranty tracking information. The Installation key is a 26-digit alphanumeric number supplied with the product. The Installation key must be entered in the Software Registration screen during installation. Product licensing information is displayed in the About box. This includes the Serial Number and License type.

NOTE: The Gas Chromatograph Portal (GCP) provides an Update license utility that can be used to update a license key without having to re-run the install program.

There are two types of license keys supported:

- A **Trial version** that allows the product to run in a fully functional mode for a specific period of time, typically 30 days. After the time period has expired the product reverts to the Demo version.
- The **Full version** that provides complete and full access on a permanent basis.

There are two types of licenses available.

- A **Single user** type that allows a single machine to run OPC Server on the same network.
- A **Site user** type that enables multiple machines to run OPC Server on the same network.

3.3. Using Maxum OPC Client And Server

3.3.1. User Interface

Maxum OPC Client (MOC) is the Windows application used to configure Maxum OPC Server. MOC provides the graphical user interface (GUI) that enables the Interactive user (the logged on user) to communicate directly with the MOS service.

The MOC window consists of two panels:

- The Device Group pane: used to display the top-level device (analyzer) and associated groups.
- The Tag View pane: used to display the tag name, value, and description.

The Title bar located at the top of the screen displays the open MOS tag configuration file name. or untitled if no configuration file exists or is open.

The Status bar located at the bottom of the screen displays the selected device logical ID, IP address, and device name.

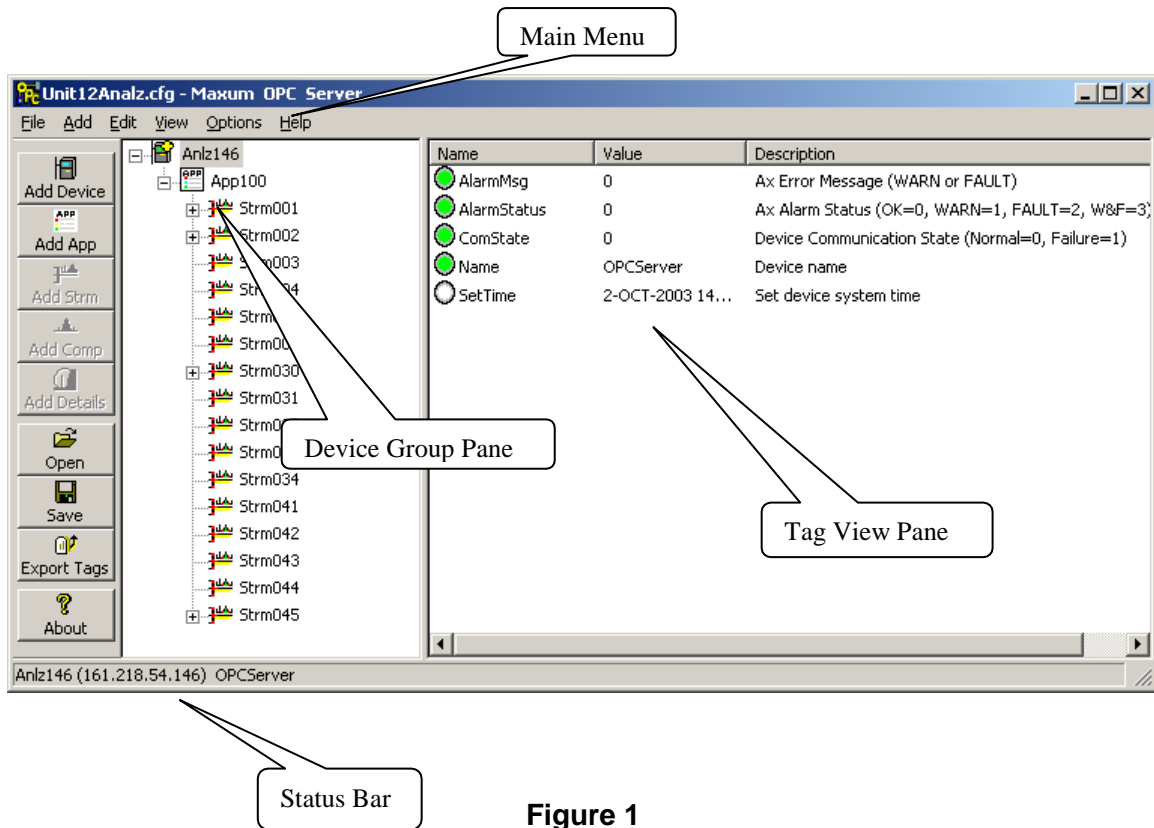


Figure 1

3.3.2. Main Menu

The Main menu located towards the top of the MOS screen consists of six items:

File, Add, Edit, View, Options, Help.

File Menu

The *File* menu offers the following choices:

- *New*: Creates a new tag configuration *.cfg file
- *Open*: Loads a configuration from a *.cfg file. See section 3.5 for a description of the configuration file format. The current MOS configuration is erased.
- *Save*: Saves the MOS configuration to a *.cfg file.

IMPORTANT: Save also sets the default startup file.

- *Save As*: Saves the MOS configuration to a *.cfg file after prompting for a file name.
- *Export Tags*: Saves the MOS device, group and tag names to a CSV file after prompting for a file name.
- *Exit*: Closes the Maxum OPC Server application.

Add Menu

The *Add* menu offers the following choices:

- *New Device*: Creates a new device group(Anlzxxx, Nauxxx).
- *New Application*: Creates a new application group(Appxxx) under the selected Device group.
- *New Stream*: Creates a new stream group(Strmxxx) under the selected Application group.
- *New Component*: Creates a new component group(Compxxx) under the selected Stream group.
- *Component Details*: Adds peak and group component details under the selected component.

Edit Menu

The *Edit* menu offers the following choices:

- *Delete*: Deletes the selected group.

IMPORTANT: The Delete menu item is grayed out when in the monitor mode. To delete a Device, Application, Stream, Component, or OPC Item de-select the Monitor command located under the View menu. This will enable the Delete command.

- *Properties*: Displays the Device, group, and tag properties.

View Menu

- *Debug*: Displays the OPCError.log file in a Notepad window.
- *Status Bar*: Shows or hides the Status bar. The Status bar displays the active device logical ID, IP address, and device name.

Options Menu

- *Short Tag Names*: The Short Tag Names command is used to limit the Tag name length. This feature is useful for legacy OPC clients that require short tag names typically 35 characters or less. When the Short Tag Names feature is enabled all new tags are created with abbreviated tag name fields. Any existing tags are not affected by this command. If you wish to change an existing tag to a short tag name you must delete the old tag and re-create the tag with the Short Tag Name feature enabled.

IMPORTANT – Do not mix Short Tag Names with Standard Tag Names. Use all Short Tag names or all Standard Tag names. If you are not sure, export the tag names to a file using the Export command and view the tag list to be certain.

Help Menu

- *Help Topics...*: Displays the MOS help file. Very useful information!
- *About*: Displays the MOS Version number, Serial number, License type, and Support contact information.

Editing

There are two selections under the “*Edit*” item on the Main Menu. “*Delete*” and “*Properties*”.

Deleting

Devices, Applications, Streams, Components, and individual data points or Tags can be deleted from the MOS configuration. To delete an item or folder, select the item by right clicking the mouse on the item, in either the Device pane or the Tag View pane, then select “*Delete*” from the “*Edit*” menu or push the “*Del*” key or right click the mouse to display the pop-up menu and select the “*Delete*” item from the menu. When you delete a folder (Device, Application, Stream, Component) from the Device pane you automatically delete all the folders and items that are directly underneath the item. For example if you delete a device you delete all the Application, Streams, Components, and all the associated tags. If you delete a tag from the Tag View pane only the single item is deleted from the configuration.

IMPORTANT –After deleting any item remember to save the Configuration file or the item will return the next time the MOS is re-started.

Properties

Device and Tag properties can be displayed with the “*Properties*” command. See Figure 2, 3 and 4 for an example of the Device and Tag properties dialog box.

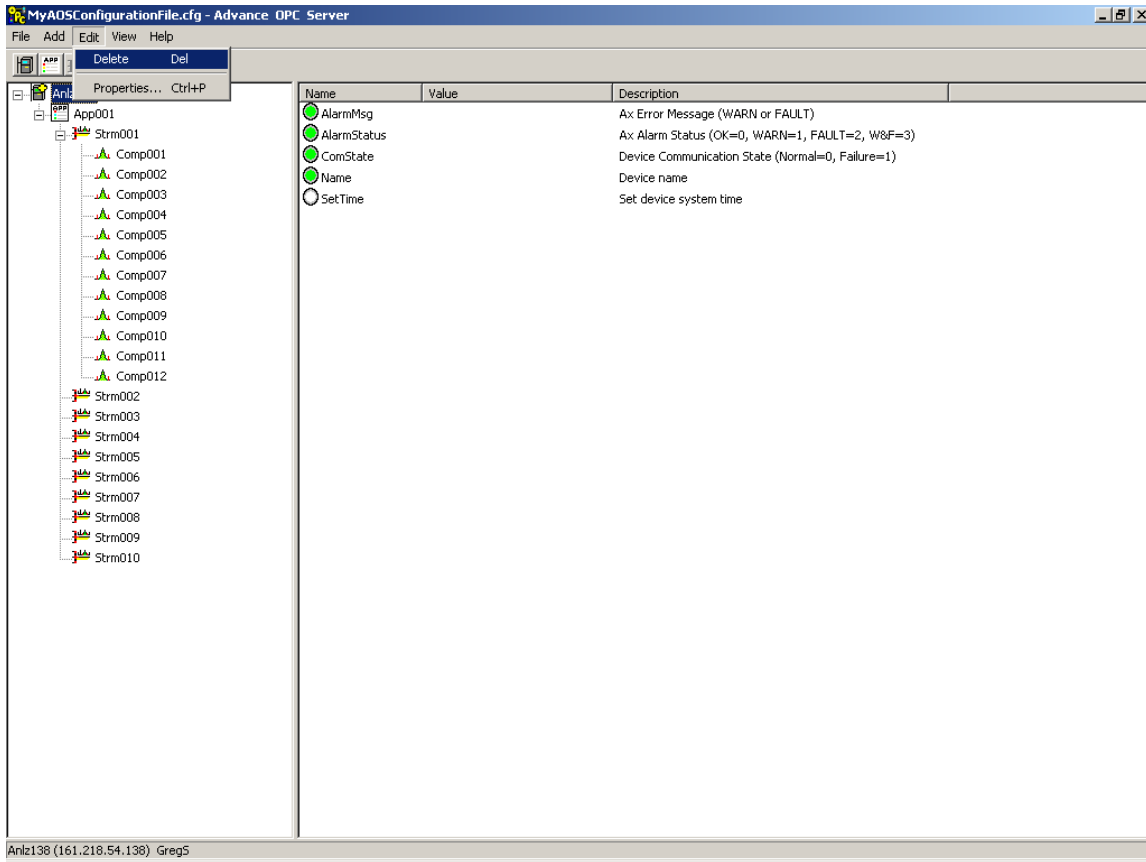


Figure 2

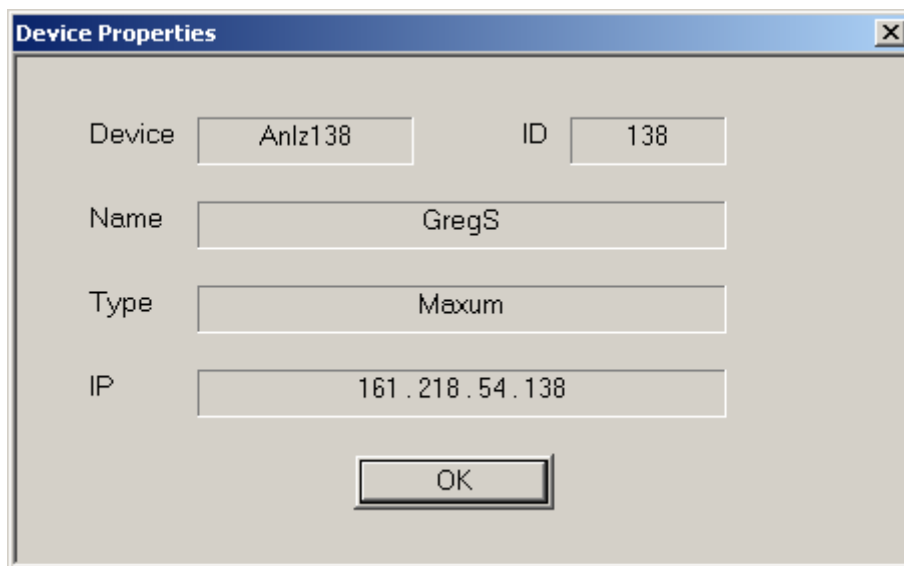


Figure 3

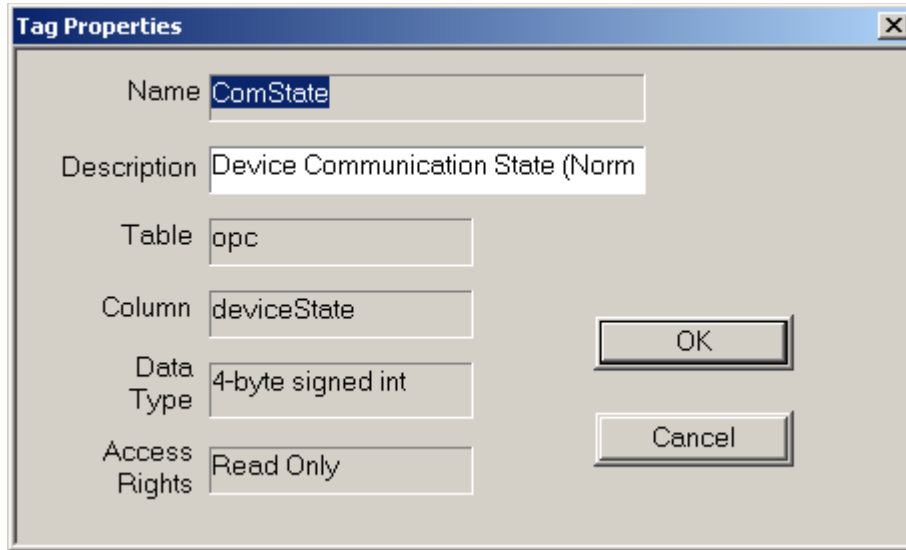


Figure 4

Export tags

MOS tags can be Exported to a *.CSV (Comma Separated Value) file for input to Microsoft Excel or other similar programs. To Export the OPC Server tags select "Export Tags..." from the Main Menu.

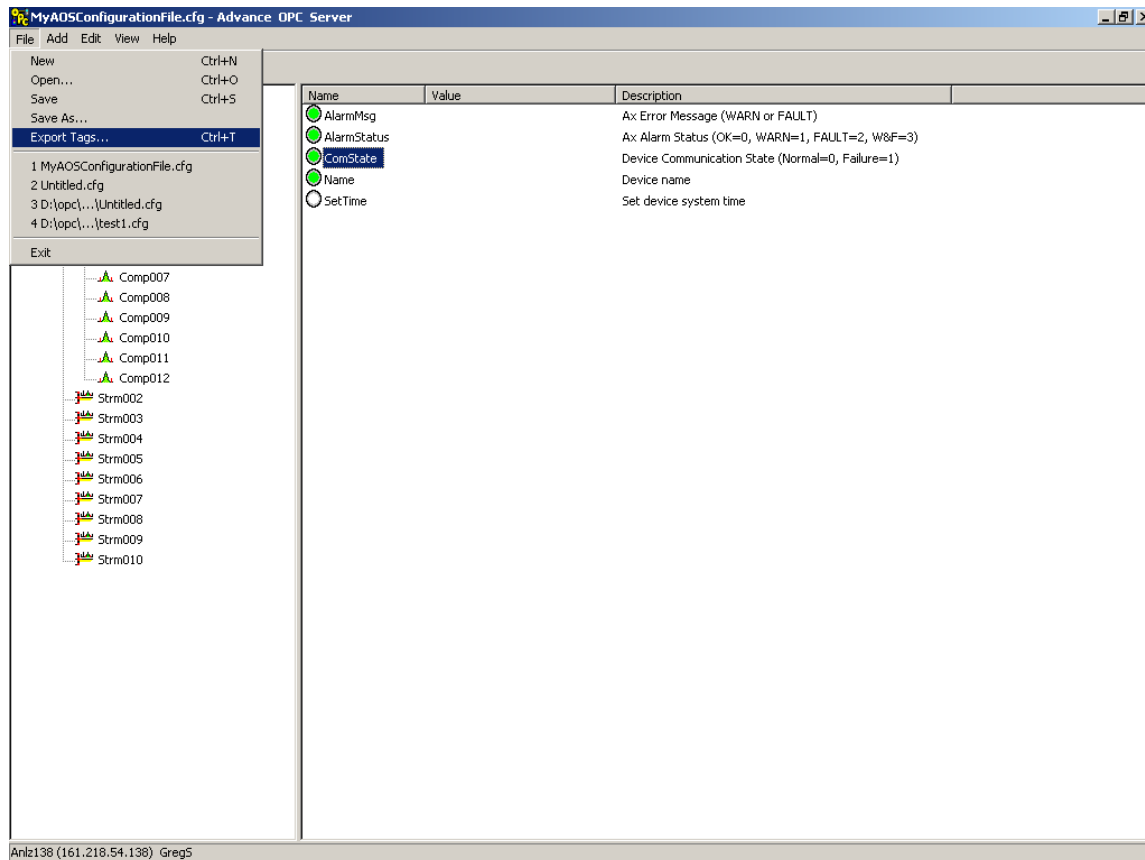


Figure 5

This results in the Export Tags dialog box being displayed.

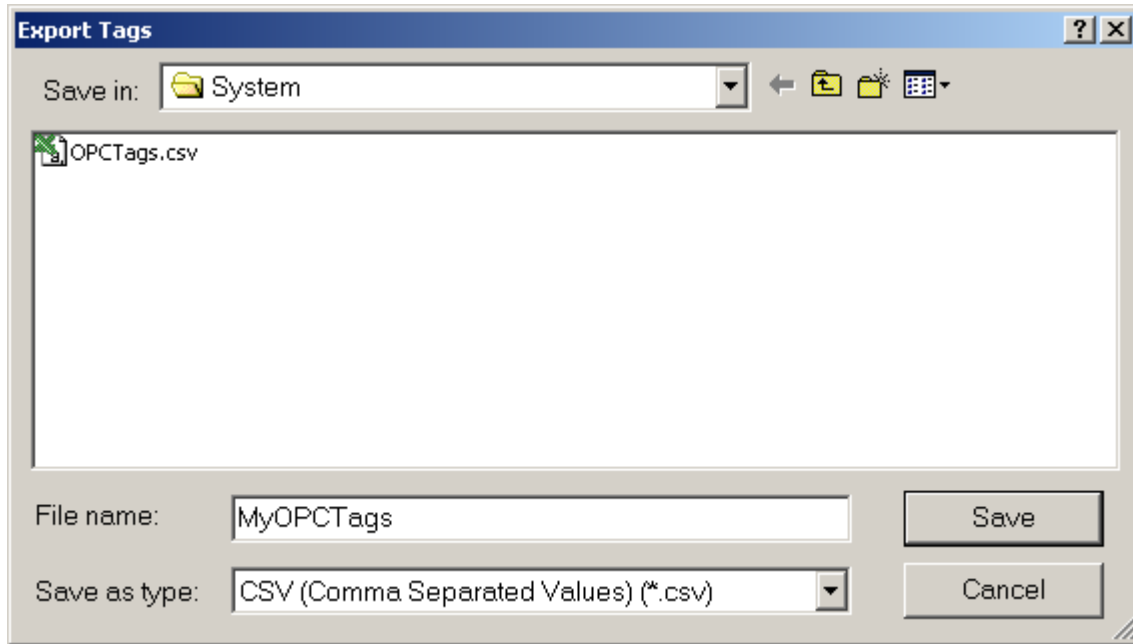


Figure 6

Specify a File name and a directory if you want the file to be saved in a directory other than the default directory. Then select “Save” and the file will be saved as a *.csv file. The Tag export file has the following format:

TagName	Data Type	Access Rights
Anlz138.ComState	3	1
Anlz138.Name	8	1
Anlz138.SetTime	7	3
Anlz138.App001.CurrStrm	3	1
Anlz138.App001.Name	8	1
Anlz138.App001.RunState	3	1
Anlz138.App001.Strm001.AlarmMsg	8	1
Anlz138.App001.Strm001.AlarmStatus	3	1

3.4. OPC Server Configuration

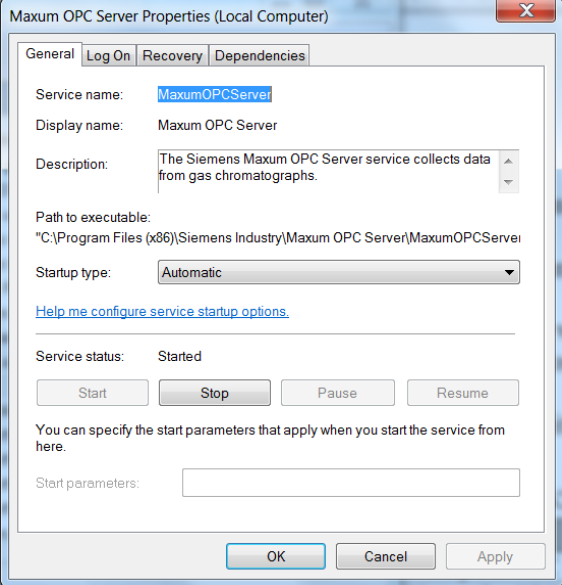
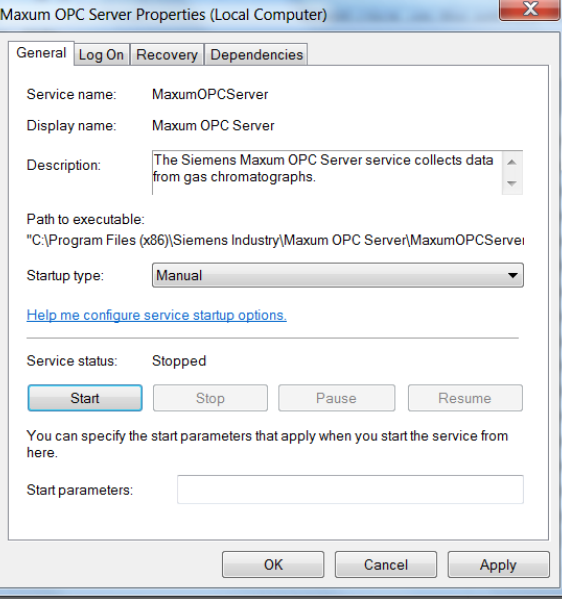
OPC Server configuration is a relatively fast and easy process of defining the analyzers (devices) and Tags (OPC Items) that will be available for OPC Clients to access.

Configuration consists of the following steps:

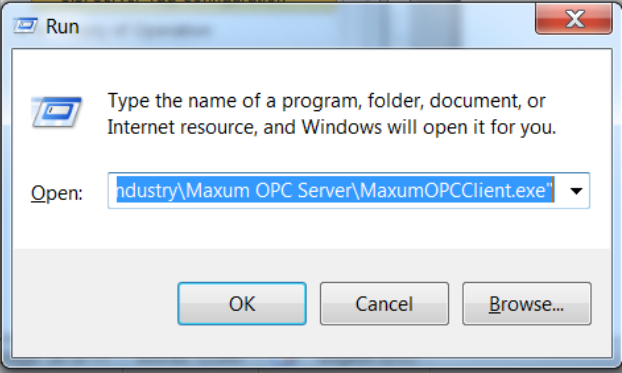
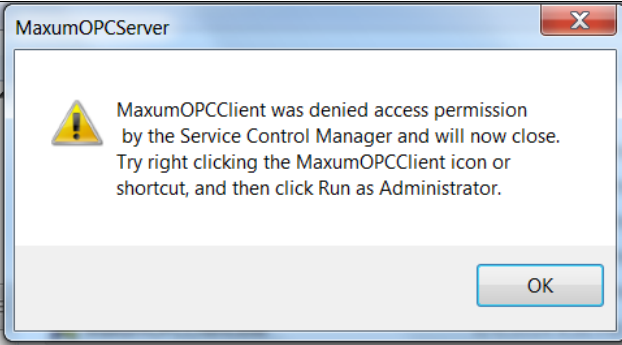
1. **Start MaxumOPCServer service.**
There are three ways to start the MOS service.
 - h. Automatically at power-up.
 - i. Manually using Windows Service Control Console (SCM).
 - j. Automatically using Maxum OPC Client.
2. Start the user interface application MaxumOPCClient.
3. Add a new device or analyzer to OPC Server.
4. Add one or more applications to the device folder.
5. Add one or more streams to the application folder.
6. Add one or more components to the stream folder.
7. Add one or more component details to the component folder.

3.4.1. Configuration Description

Step 1: Start MaxumOPCServer service

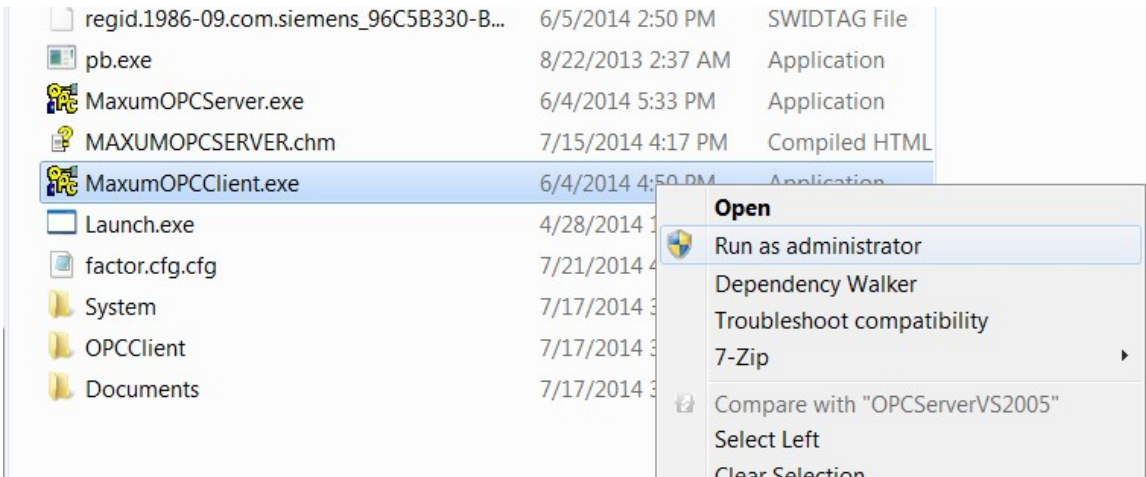
<p>a. How to start MOS service automatically at power-up. Start the windows Service Control Manager (SCM) utility. Scroll down to MaxumOPCServer service. Right click on the service and select Properties from the pop-up menu. Change the Startup type to Automatic. This is the recommended setting for MOS service.</p>	 <p>The screenshot shows the 'Maxum OPC Server Properties (Local Computer)' dialog box. The 'General' tab is selected. The 'Service name' is 'MaxumOPCServer', 'Display name' is 'Maxum OPC Server', and 'Description' is 'The Siemens Maxum OPC Server service collects data from gas chromatographs.' The 'Path to executable' is 'C:\Program Files (x86)\Siemens Industry\Maxum OPC Server\MaxumOPCServer'. The 'Startup type' is set to 'Automatic'. The 'Service status' is 'Started'. There are buttons for 'Start', 'Stop', 'Pause', and 'Resume'. A 'Start parameters' field is empty. The 'OK', 'Cancel', and 'Apply' buttons are at the bottom.</p>
<p>b. How to start MOS service manually. Start the windows Service Control Manager (SCM) utility. Scroll down to MaxumOPCServer service. Right click on the service and select Properties from the pop-up menu. Click the Start button to manually start the MOS service.</p>	 <p>The screenshot shows the 'Maxum OPC Server Properties (Local Computer)' dialog box. The 'General' tab is selected. The 'Service name' is 'MaxumOPCServer', 'Display name' is 'Maxum OPC Server', and 'Description' is 'The Siemens Maxum OPC Server service collects data from gas chromatographs.' The 'Path to executable' is 'C:\Program Files (x86)\Siemens Industry\Maxum OPC Server\MaxumOPCServer'. The 'Startup type' is set to 'Manual'. The 'Service status' is 'Stopped'. There are buttons for 'Start', 'Stop', 'Pause', and 'Resume'. A 'Start parameters' field is empty. The 'OK', 'Cancel', and 'Apply' buttons are at the bottom.</p>
<p>c. How to start MOS service automatically using Maxum OPC Client.</p>	<p>On startup Maxum OPC Client queries the service database to determine if the MOS service is running. If the MOS service is not running the OPC Client will start the MOS service and connect to it. If the MOS service is already running the Client connects to the running service. The OPC Client will not stop the MOS service on exit. Once the service is running the only way to stop it is with the SCM.</p>

Step 2: Start the user interface application, MaxumOPCClient

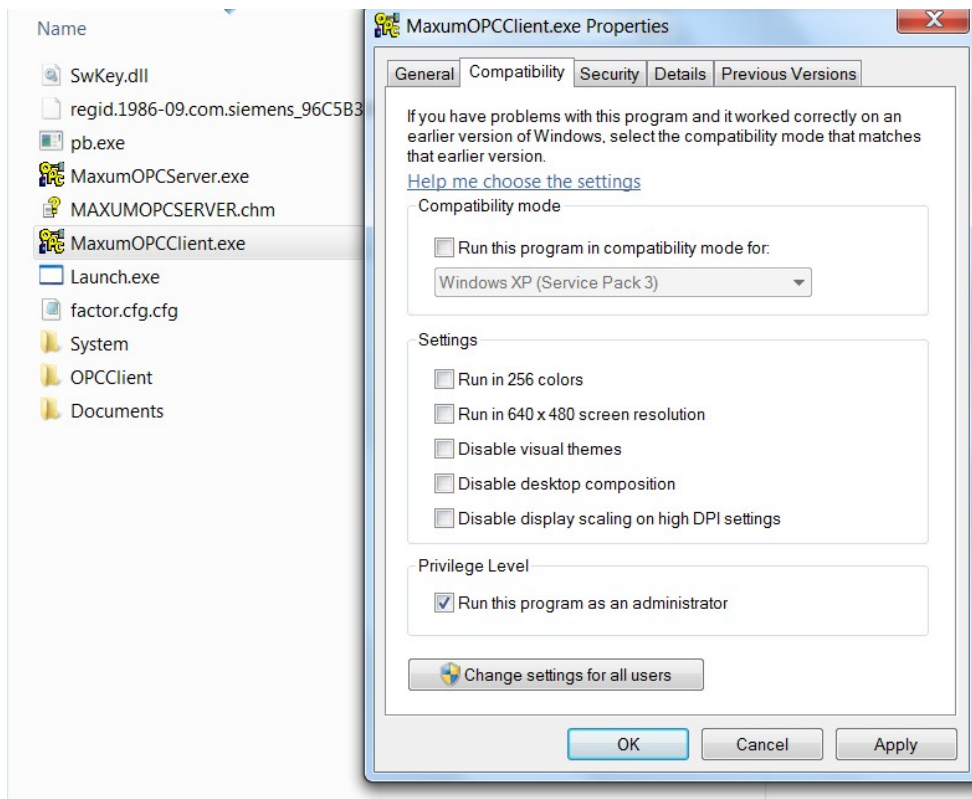
<p>Double click the desktop icon or Select Start->Run then Browse to the MaxumOPCClient.exe program. Click OK.</p>	
<p>If the following error is displayed use the Run as Administrator option to start MOC.</p>	
<p>... or see the section titled "Starting MOS Without Administrator Privileges"</p>	

To use the Run as Administrator option follow these steps:

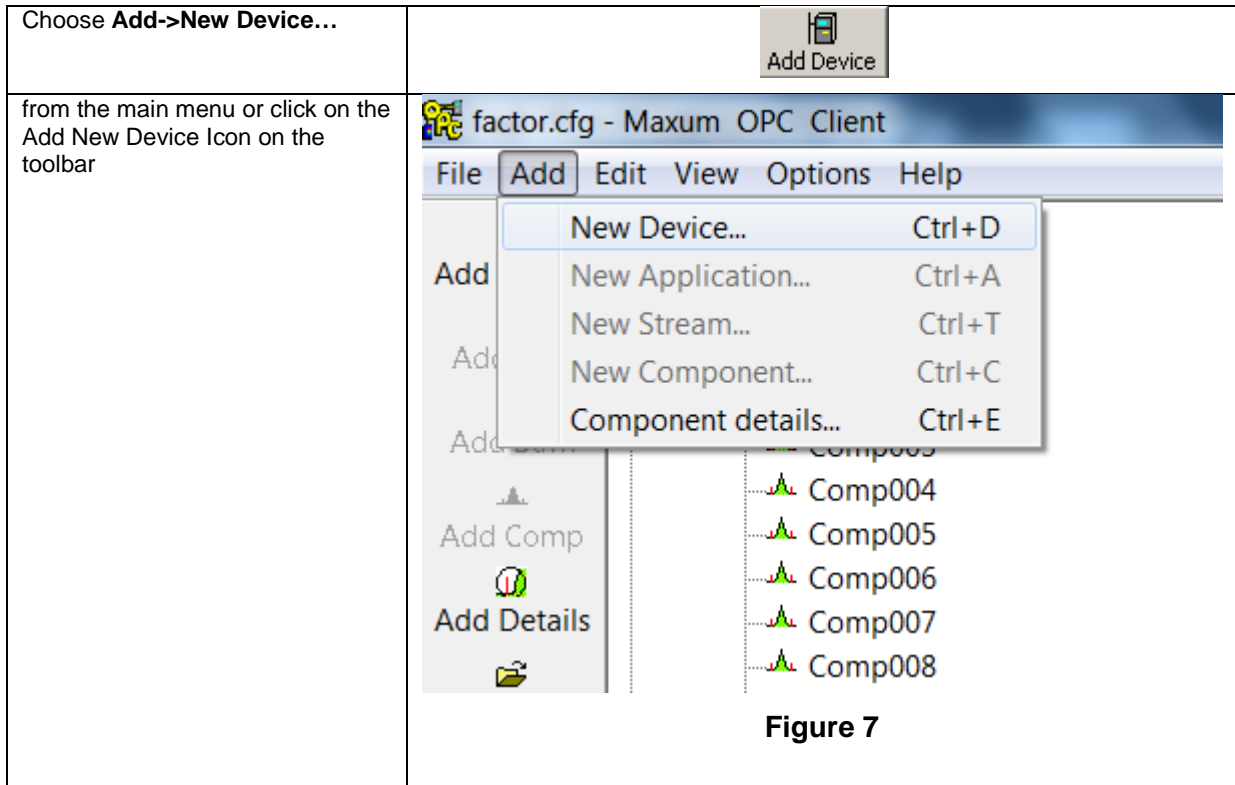
- a. Using Windows explorer browse to the directory where the MaxumOPCClient.exe file is located.
- b. Right click on the file name, select Run as Administrator from the pop-up menu.



Or, select Properties from the pop-up menu and check the **Run this program as an administrator** check box.



Step 3: Add a new device or analyzer to OPC Server.



Step 4: Specify the device's network address

(See Figure 8). Then click on **OK**.

Maxum, Maxum Edition II, MicroSam analyzers: Maxum analyzers use TCP/IP (Internet Protocol) addressing. IPv4 uses a 32-bit address to identify a machine on a network and the network to which it is attached. The IP addresses are usually written out in their decimal equivalents in **dotted quad notation**, four decimal integers, ranging from 0 to 255 each. (xxx.xxx.xxx.xxx (ex. 196.198.52.2)). Each Maxum analyzer must be assigned a unique address.

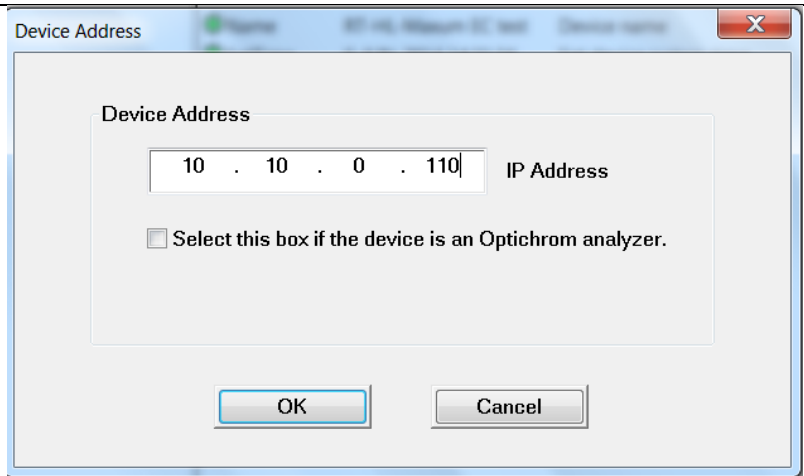


Figure 8a. Maxum analyzer 10.10.0.110

Advance Optichrom (legacy) analyzer addressing: For Optichrom analyzers the IP address plus the logical ID (Analyzer number) determine the device address. Optichrom analyzers use Advance Data Hiway (ADH) addressing consisting of a Loop (1-8) and a Unit (1-31) and require the use of an Advance Network Gateway board to convert the electrical signals from ADH to Ethernet TCP/IP. Typically an NAU is configured as an Optichrom Data Server (ODS). The ODS converts the Optichrom messages to Maxum format. For example if the ODS IP address is 10.10.0.110 and the Optichrom analyzer Logical ID is 115 then the address would be specified as shown in figure 8b. First enter the ODS IP address in the IP address box, then check the "Select this box if the device is an Optichrom analyzer" checkbox. Finally specify the Logical ID of the Optichrom analyzer in the "Enter the device (Anlz) Number" box.

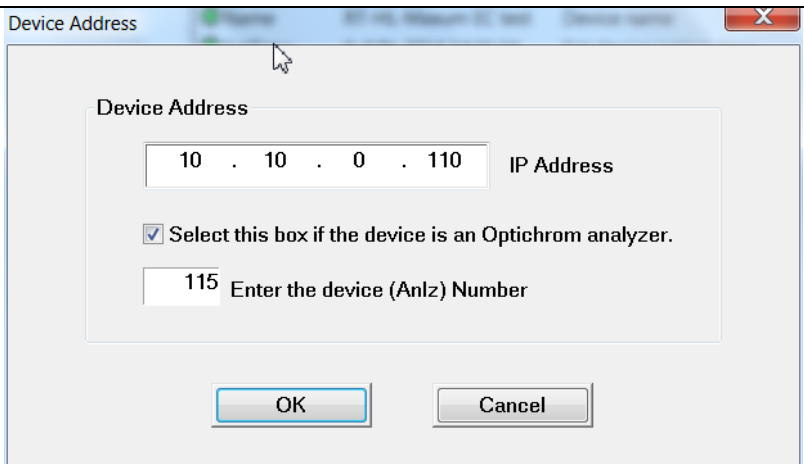


Figure 8b. Optichrom analyzer 115 reporting to NAU 10.10.0.110 configured as Optichrom Data Server (ODS)

NOTE: This is the only exception to the rule that the IP address must be unique for each analyzer. Up to 50 Optichroms can use the same ODS with OPC Server. This means that all 50 Optichroms would specify the same IP address, yet each Optichrom has a unique system address consisting of the IP + Logical ID.

Step 5: Specify the Applications and Streams to create OPC Tags for.

The MOS connects with the device and sends a query to determine the available Applications and Streams. The **Device Setup** dialog box is automatically displayed. Select the specific Application(s) and Stream(s) by clicking on the appropriate checkbox under the **Enable** column or select all of the Applications and associated Streams by clicking the left mouse button on the **Select All** checkbox. (See Figure 9). Click on OK to create the Device, Application, and Stream folders with their associated Tags.

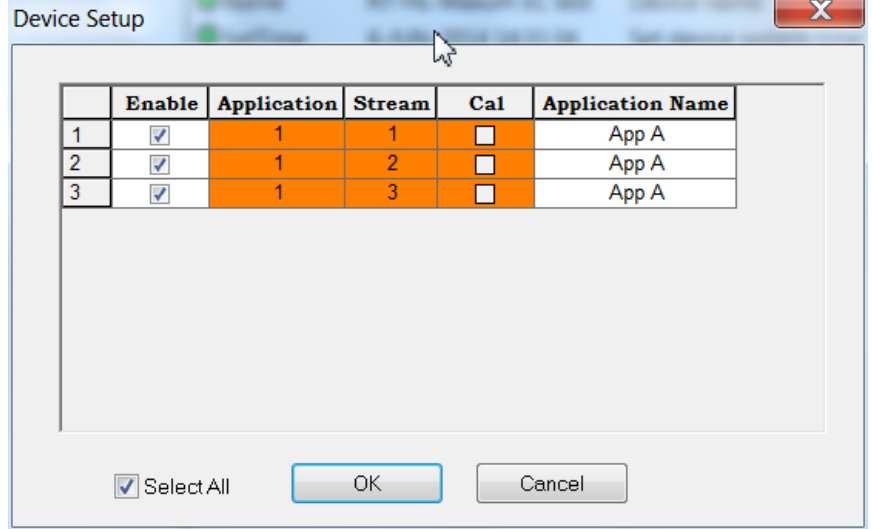


Figure 9

Notice that the Device Setup dialog box displays the available Applications ID's, Stream ID's, and for Maxum only whether the stream is a normal process stream or a Calibration stream and the Application name. Figure 10 shows the newly created OPC Tags.

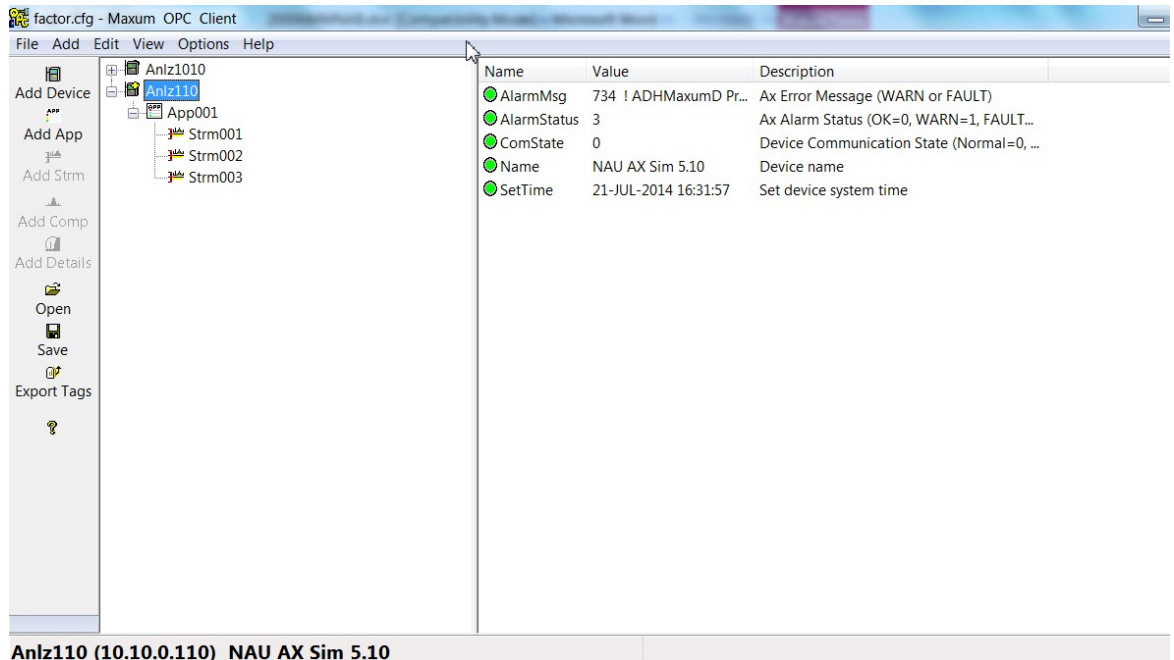


Figure 10

The configuration program automatically adds the Device Folder in the Device pane and labels the device with either "Anlzxxx" or "NAUxxx". Where "xxx" is replaced with the device's logical ID. See Figure 10 (Anlz110). The following device level tags are automatically added to the Tag View pane under the device: AlarmMsg, AlarmStatus, ComState, Name, and SetTime.

Located directly under the device folder in the Device pane is the Application folder(s). (See Figure 11)

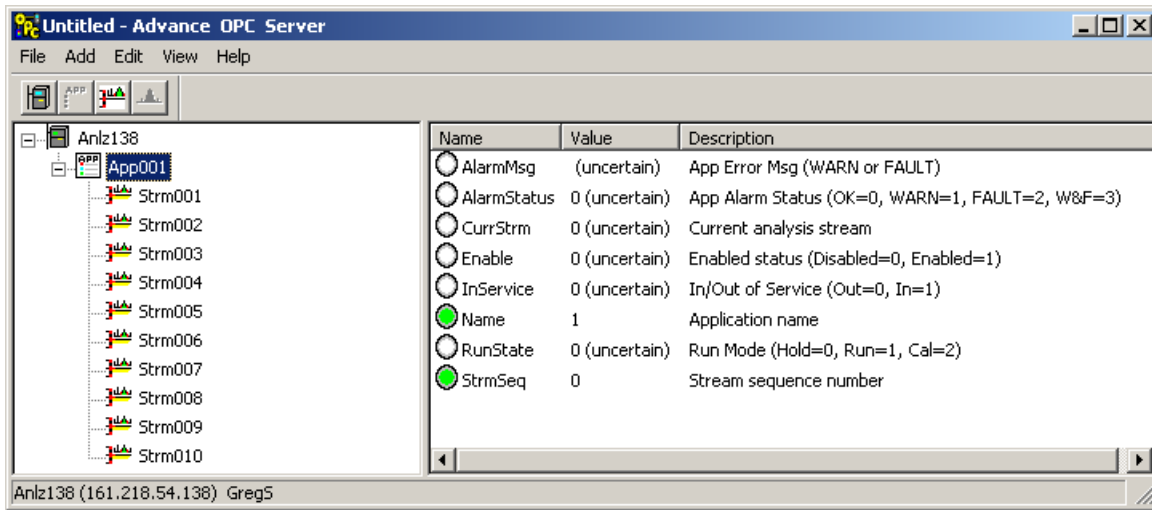


Figure 11

Each application folder is given the name “Appxxx”. Where “xxx” is replaced with the Application number. In the example in Figure 11 its App001. The following Application level tags were automatically added to the Tag View pane: AlarmMsg, AlarmStatus, CurrStrm, Enable, InService, Name, RunState, and StrmSeq. Located directly under the Application folder in the Device pane is the Stream folder(s). Each Stream folder is given the name “Strmxxx”. Where “xxx” is replaced with the Stream number. In the example in Figure 12 its Strm001.

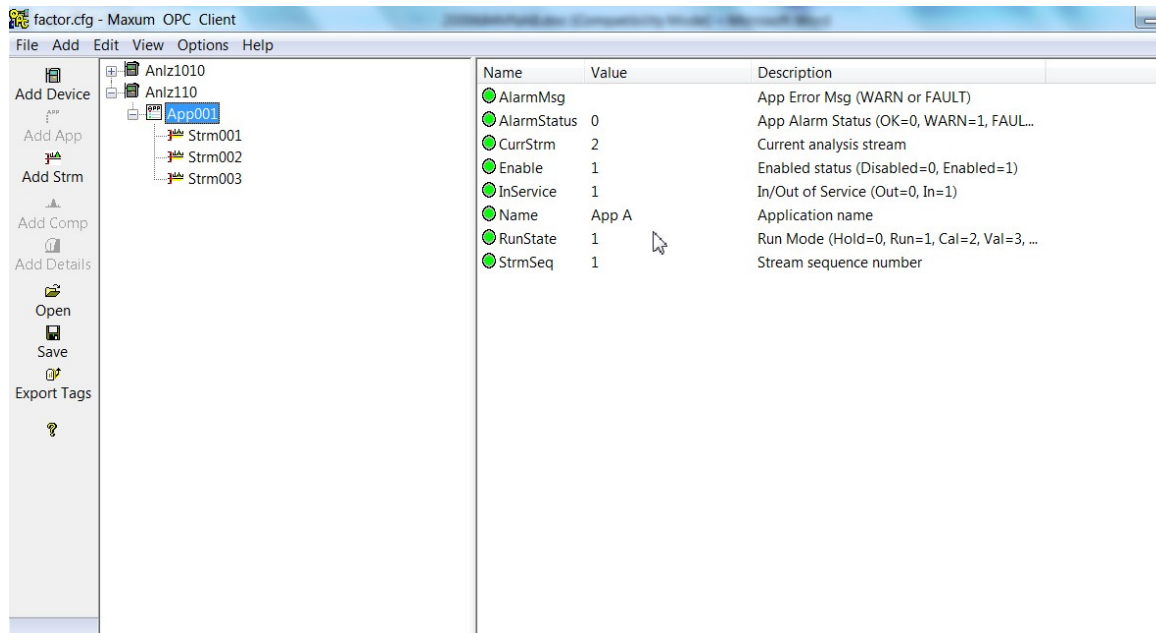


Figure 12

Step 6: Specify each Stream's component tags.

Notice that there are no stream components or results tags shown under the Stream folders in figure 12. To specify the stream dependent Components select "Add" from the main menu then "New Component" or click the left mouse button over the desired stream in the Device pane then right click to display the pop-up menu and select "New Component(s)", or select the Add "New Component(s)" button from the tool bar. The MOS sends a query to the device to determine the available components for the specified stream.

IMPORTANT – For Maxum and Maxum Edition II devices the components are only displayed in the Component Selection dialog box that have a sequence number defined in the Trtval attribute of the Result table.

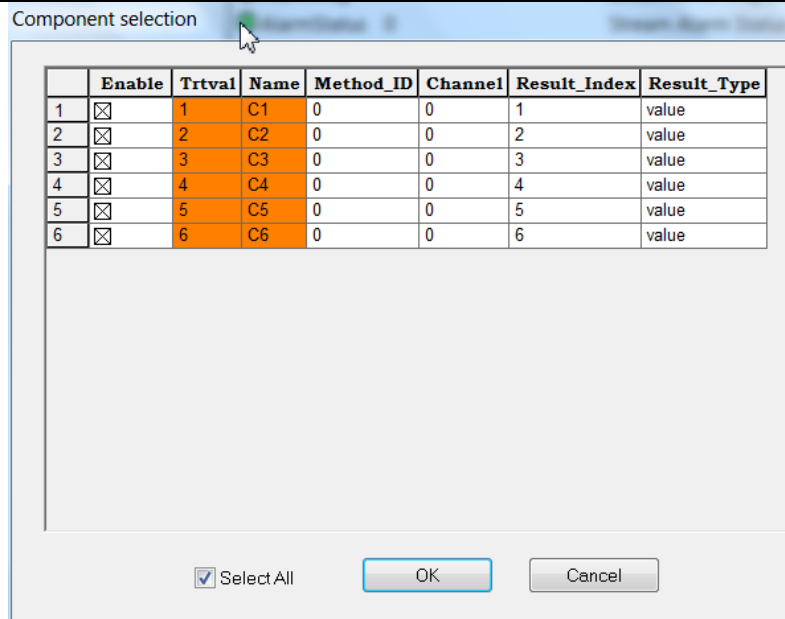


Figure 13

Select the specific Components by clicking on the appropriate checkbox under the **Enable** column or select all of the stream components by clicking the left mouse button on the **Select All** checkbox. Then select **OK** to create the Component folder(s) and associated Tags. (See Figure 13)

Each Component is given its own folder under its associated stream. Each component folder is given the name "Compxxx", where "xxx" is replaced with the Component number (as defined in TrtVal). The following Component level tags were automatically added to the Tab View pane: **Name**, **ValCompare**, **ValMargin**, **ValState**, and **Value**. (see Figure 14)

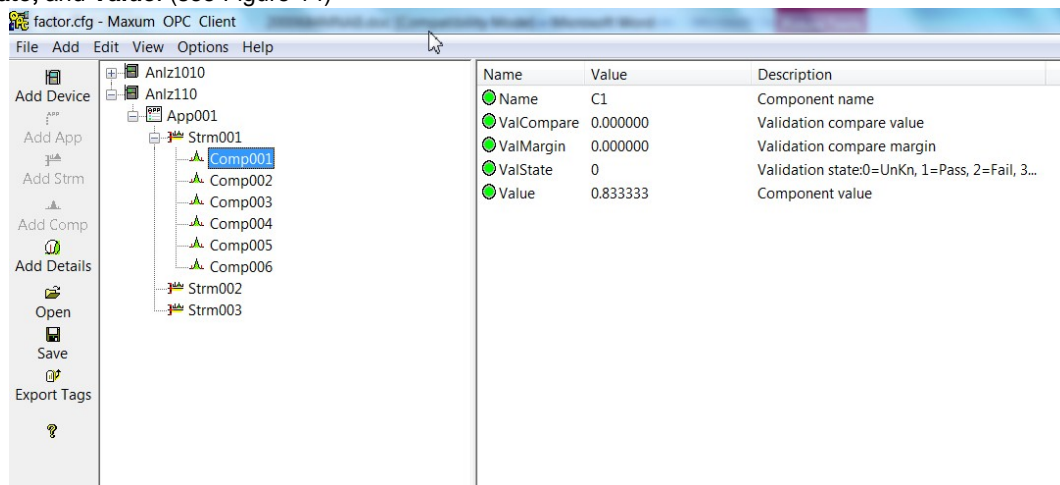


Figure 14

Step 7: Adding Component detail tags

Note: Detail tags are only supported in Maxum analyzers.

Once the Component tags have been added to a stream additional Component Detail tags may be added to each component depending on the Component's type. Maxum supports three types: Values, Peaks or Groups. Groups support two types: Peak groups and Calibrated groups.

To add one or more Detail tags to a component first select the component in the Device pane. Then select "Add" from the main menu then "Component details..." or right click the mouse on the component and select "Component details" from the pop-up menu, or select the "Add Details" button from the tool bar. The Component Detail dialog box will be displayed for Peaks, Peak groups or Calibrated groups. The Component Detail dialog will not be displayed for component types of Values.

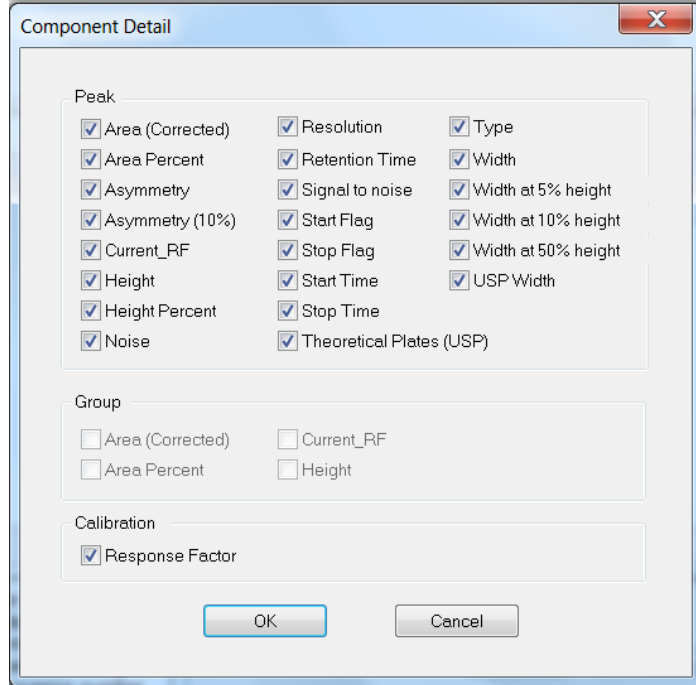


Figure 15

Select the specific Component details by clicking on the appropriate checkbox(s) on the Component Detail dialog box. Depending on the Component type either the Peak or Group section will be enabled. The Peak section tags are enabled for Peak or Peak groups types while the Group section tags are enabled for Calibrated group types. Select **OK** to create the Component detail tag(s) (See Figure 16)

Name	Value	Description
Current_RF	2345678.000000	Current Response Factor
Name	Ethane	Component name
PkArea	83500.000000	Peak Area Corrected
PkArea%	55.181438	Peak Area Percent
PkAsym	0.000000	Peak Asymmetry
PkAsym10	0.000000	Peak Asymmetry at 10%
PkHeight	49100.000000	Peak Height
PkHeight%	56.901806	Peak Height Percent
PkNoise	0.000000	Peak Noise
PkResolution	0.000000	Peak Resolution
PkRetTime	47.799999	Peak Retention_time
PkSignalto...	0.000000	Peak Signal to Noise
PkStartFlg	66	Peak Start Flag
PkStartTime	41.900002	Peak Start Time
PkStopFlg	66	Peak Stop Flag
PkStopTime	53.100002	Peak Stop Time
PkType	32	Peak Type
PkUSPWidth	0.000000	Peak USP Width
PkWidth	11.200001	Peak Width
PkWidth10	0.000000	Peak Width at 10% Height
PkWidth5%	0.000000	Peak Width at 5% Height
PkWidth50	0.000000	Peak Width at 50% Height
RespFactL0	8185.100098	Calibration Response Factor
TheorPlates	0.000000	Peak Theoretical Plates (USP)
Value	0.035597	Component value

Figure 16

Step 8: Saving Tag Configuration File Changes

Save the changes to the Tag configuration file by selecting “File”, “Save As” from the Main Menu.

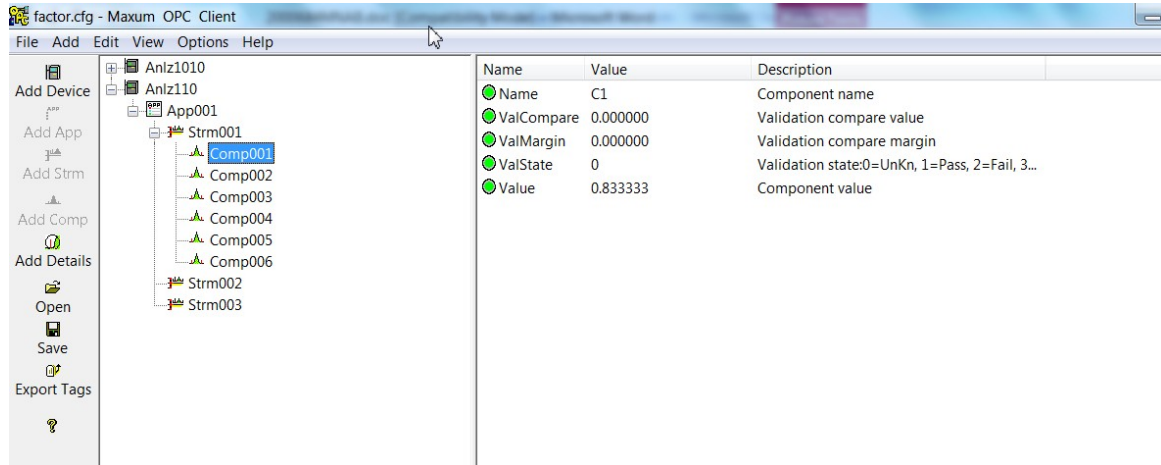


Figure 17

This results in the MOS displaying the “Save As” dialog box. Specify the desired configuration file name under the “File name:” edit box and select “Save”. This will save the Configuration file under the specified directory. This file will automatically load and run the next time the MOS program is started. (see Figures 17 & 18)

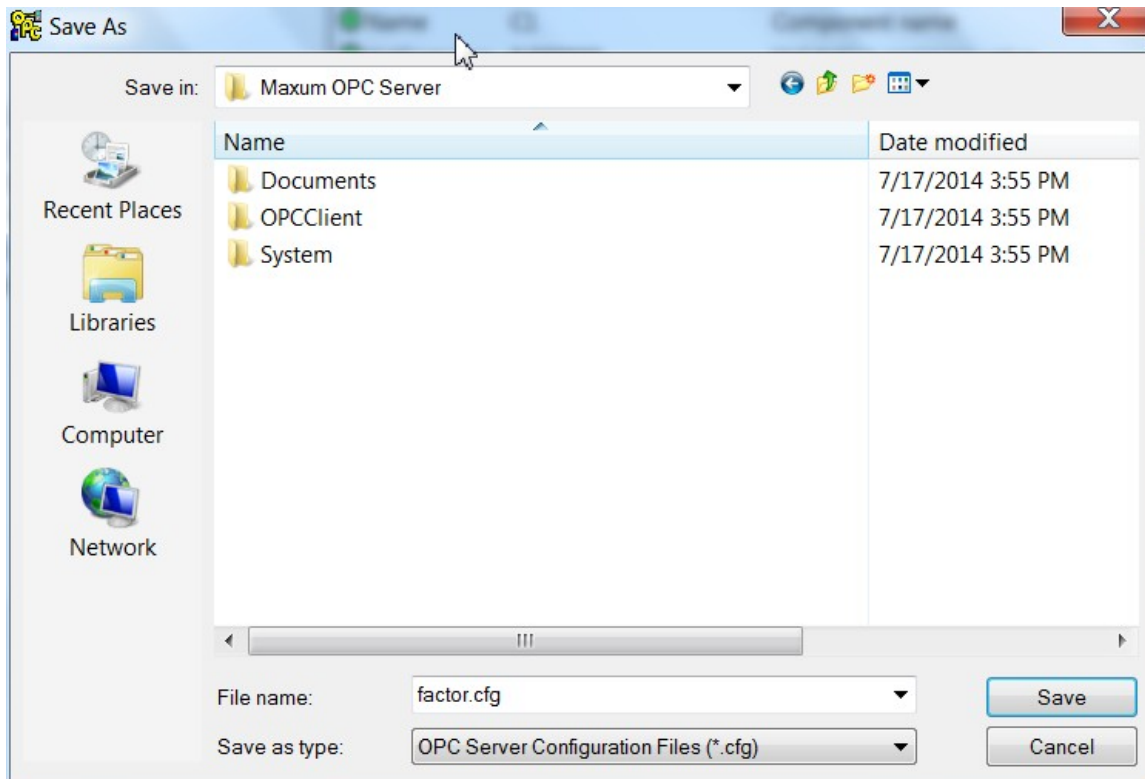


Figure 18

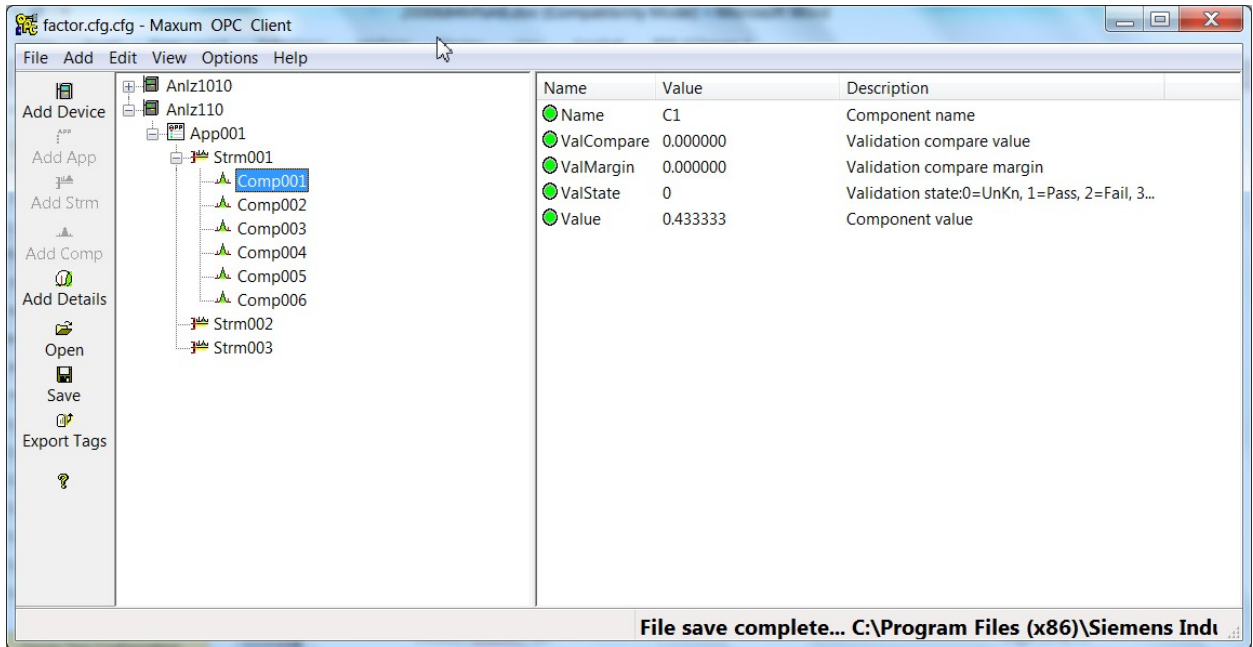


Figure 19

4. DCOM Configuration

The OPC DA specification is based on Microsoft's COM technology. COM (Component Object Model) is a binary-interface standard for software components that enables inter-process communication and dynamic object creation. [DCOM](#) (Distributed Component Object Model) is a protocol that enables COM objects to communicate over a reliable, secure, and efficient network link.

Maxum OPC Server (MOS) is an OPC DA server that uses COM/DCOM to communicate with remote OPC Clients. COM/DCOM access and security permissions must be configured on both the OPC Server and Client machines to allow communication between DCOM (OPC) objects.

Windows provides a COM/DCOM configuration utility called DCOMCNFG. This section describes how to use the utility to allow communication between Maxum OPC Server and a remote OPC Client.

IMPORTANT: Inadvertently changing DCOM settings can potentially make your PC inoperable.

Document any changes you make to your DCOM settings. If you have problems restore the original settings. Read through this document before you make any changes to your DCOM Configuration Properties. This document is intended to provide guidance for proper DCOM setup. The settings suggested here may need to be varied for your situation depending on your OPC Client application and network security requirements. It is suggested that you review your DCOM settings with your network Administrator prior to making any changes.

IMPORTANT : Make sure you are logged in as the Administrator or on an account with Administrator rights before attempting to modify the DCOM settings. The instructions here are for Windows 7. There may be slight differences in the setup steps for Windows XP, Server 2003, Windows 8.1, Windows 9, and Server 2012.

Step 1: Start the DCOM configuration utility by selecting **Start->Run** or use the **Windows Key + R** shortcut to launch the Run window.

Step 2: Type in **DCOMCNFG** and click **OK**.

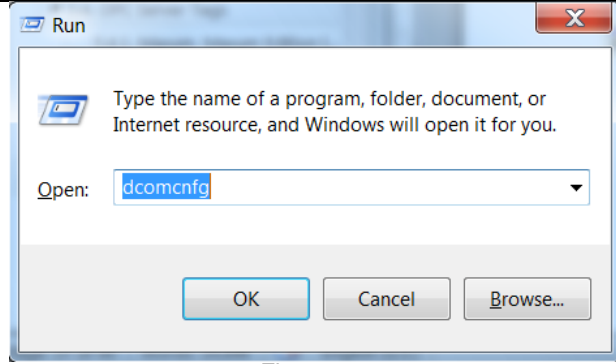


Figure 4.1

Step 3: In the **Component Services** windows, navigate to **Console Root->ComponentServices->Computers** then right-click on **My Computer** and select **Properties** from the pop-up menu.

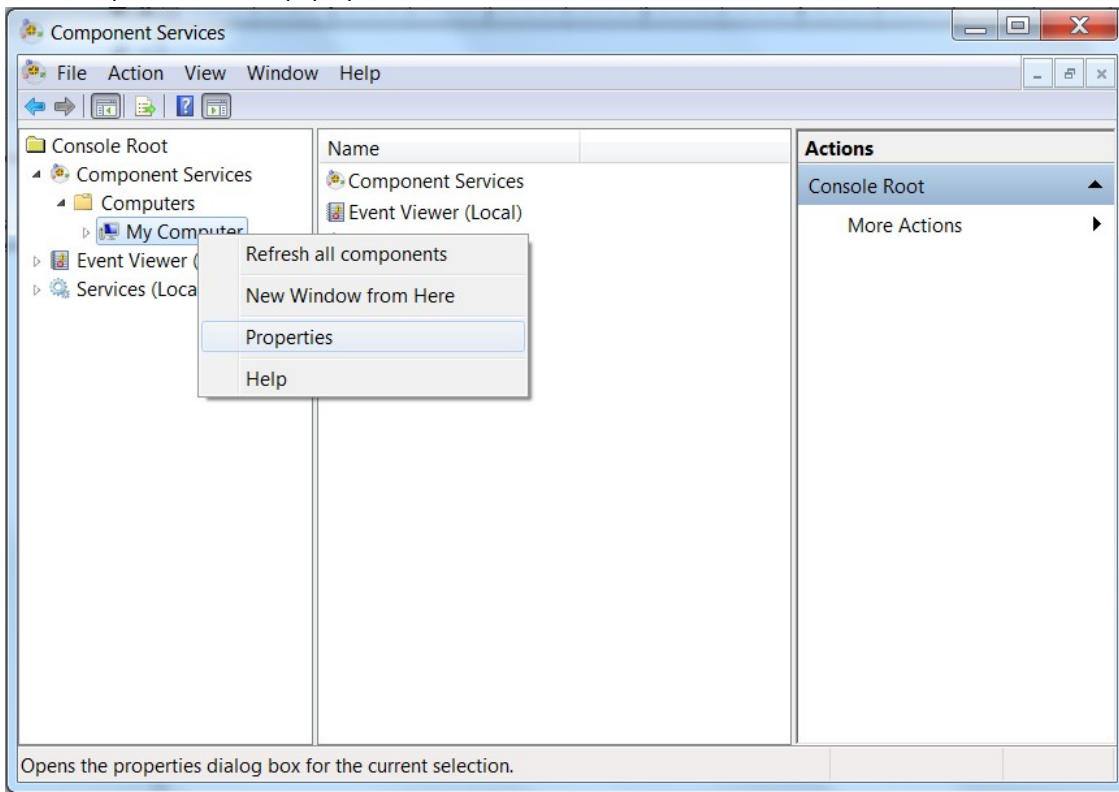


Figure 4.2

Step 4: On the **My Computer Properties** window, select the **Default Properties** tab. (see Figure 4.3)

Verify that the following settings are properly configured:

- a: **Enable Distributed COM on the computer option** is checked. **IMPORTANT** : Any time this option is changed you must reboot the PC for the change to take effect.
- b: **Default Authentication Level** is set to **None**.
- c: **Default Impersonation Level** is set to **Identify**.

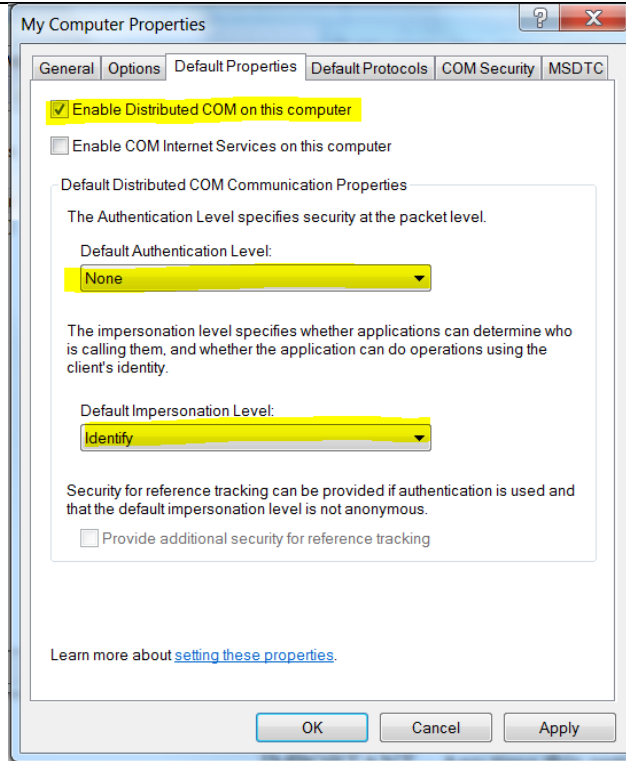


Figure 4.3

Step 5: Select the **COM Security** tab.

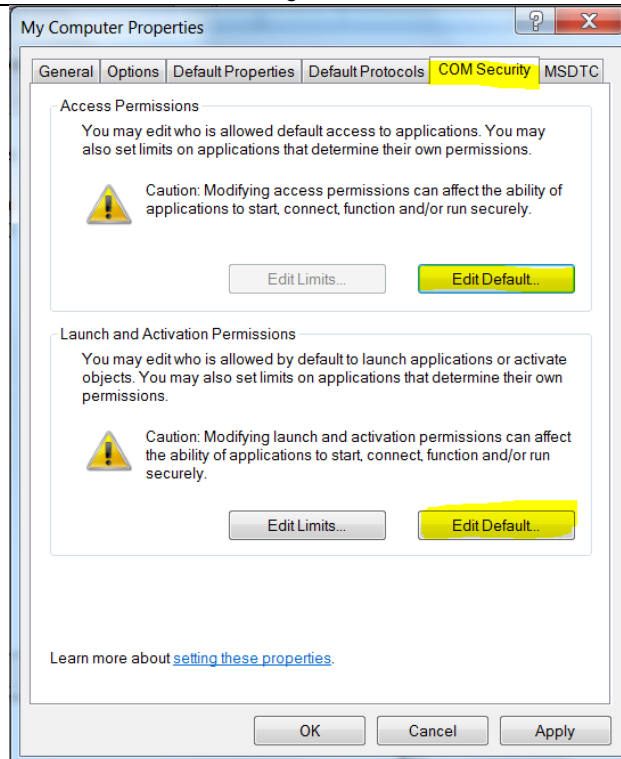


Figure 4.4

Step 6: Under Access

Permissions, select the **Edit Default** button. (Figure 4.4)

Add the following groups to the **Group or user names** list. Do not remove any others that may already be listed. (Figure 4.5)

- a: **Anonymous Logon** – this must be added to the defaults in order for OPC Enumerator to function correctly.
- b: **Everyone**
- c: **Interactive**
- d: **Network**
- e: **System**

Make sure that both the **Local** and **Remote Access** permissions are set to **Allow**. (see Figure 4.5)

Click on **OK**.

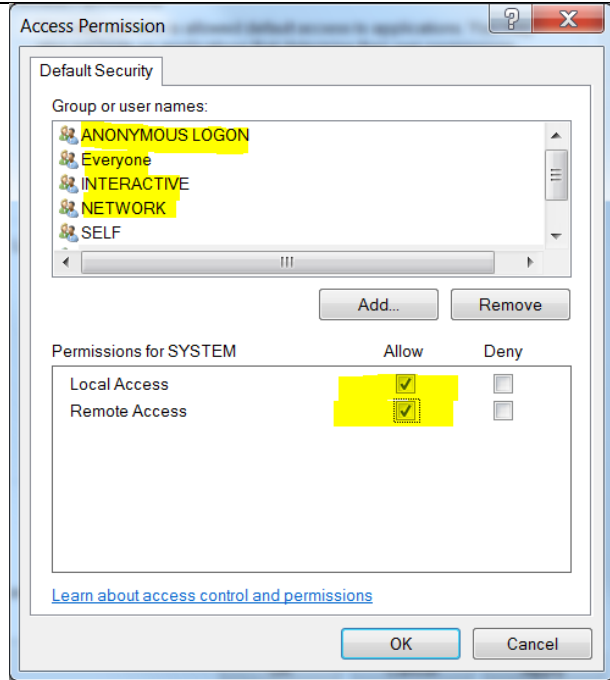


Figure 4.5

Step 7: Under Launch and

Activation Permissions select the **Edit Default** button. (Figure 4.4)

Add the following groups to the **Group or user names** list. Do not remove any others that may already be listed. (Figure 4.6)

- f: **Anonymous Logon** – this must be added to the defaults in order for OPC Enumerator to function correctly.
- g: **Everyone**
- h: **Interactive**
- i: **Network**
- j: **System**

Make sure that both the **Local** and **Remote Access** permissions are set to **Allow**. (see Figure 4.6)

Click on **OK**.

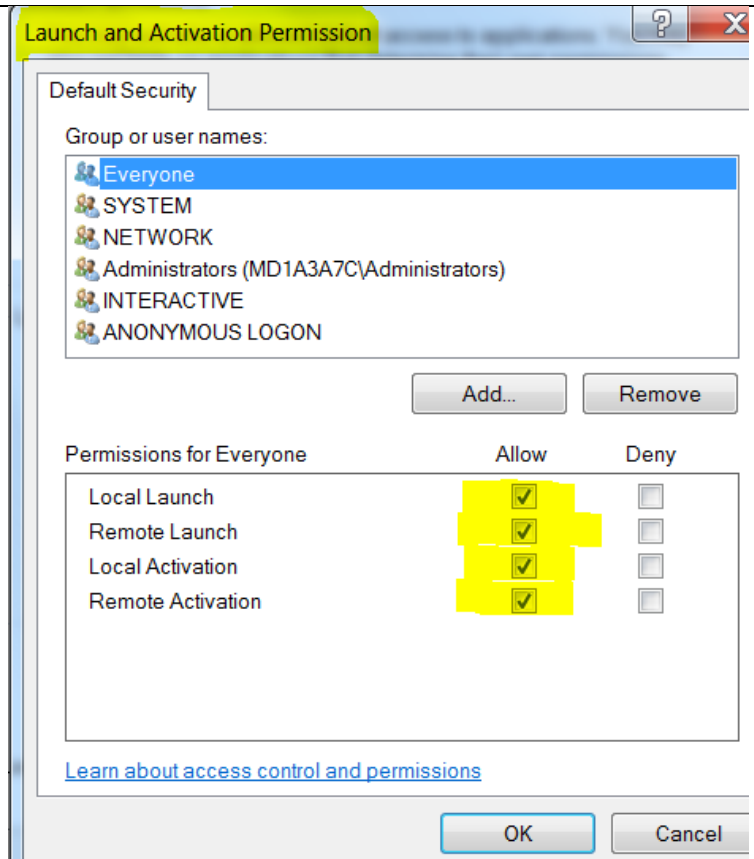


Figure 4.6

Step 8: Under My Computer, open the folder labeled DCOM Config. (see Figure 4.7)

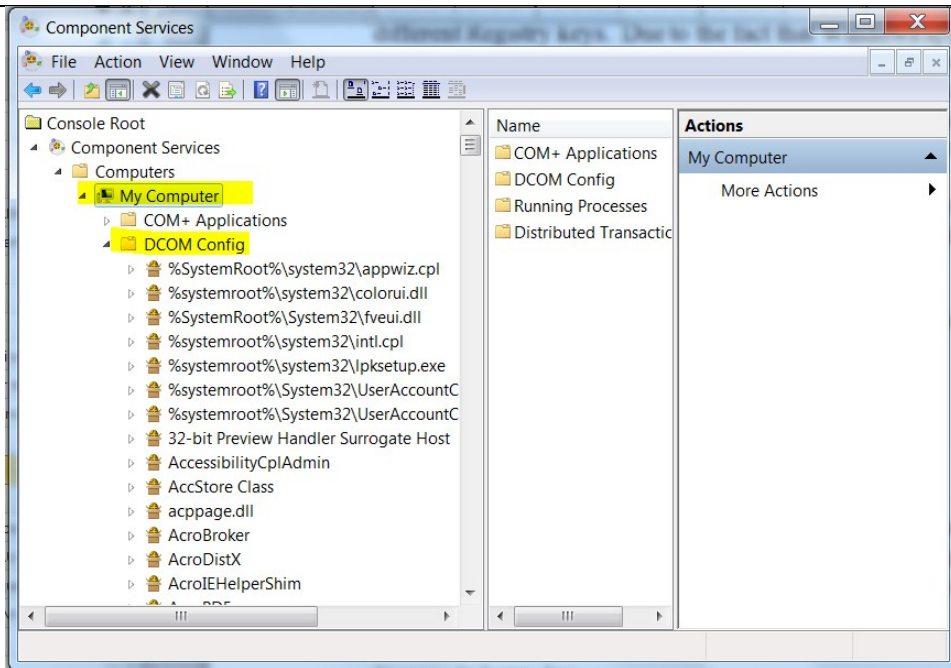


Figure 4.7

Step 9: Browse to the Siemens MaxumOPCServer COM object. Right-click, and select **Properties** from the pop-up menu. On the **General** tab, set the **Authentication Level** to **None**. (see Figure 4.8)

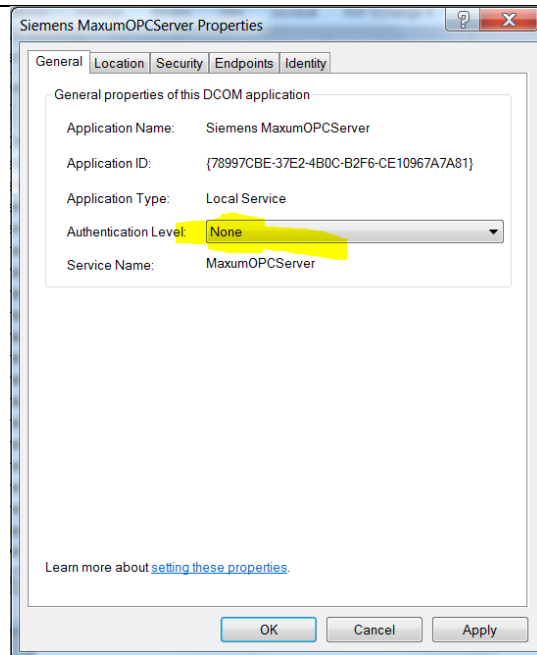


Figure 4.8

Step 10:

Select the **Security** tab.
Under the **Launch and Activation Permissions**, select **Customize**.
Then click **Edit**. (see Figure 4.9)

Step 11:

Select the Security tab.
Under the Launch and Activation Permissions,
select Customize.
Then click Edit. (see Figure 4.9)

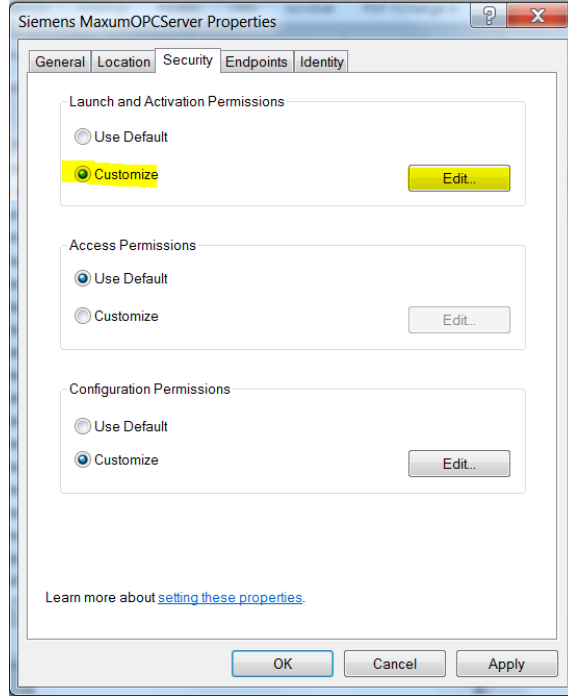


Figure 4.9

Step 12:

Add the following groups to the Group or user names list. Do not remove any others that may already be listed. (Figure 4.10)

- a: **Everyone**
- b: **Interactive**
- c: **Network**
- d: **System**

Make sure that both the **Local** and **Remote Launch and Activation** permissions are set to **Allow**. (see Figure 4.10)

Click on **OK**

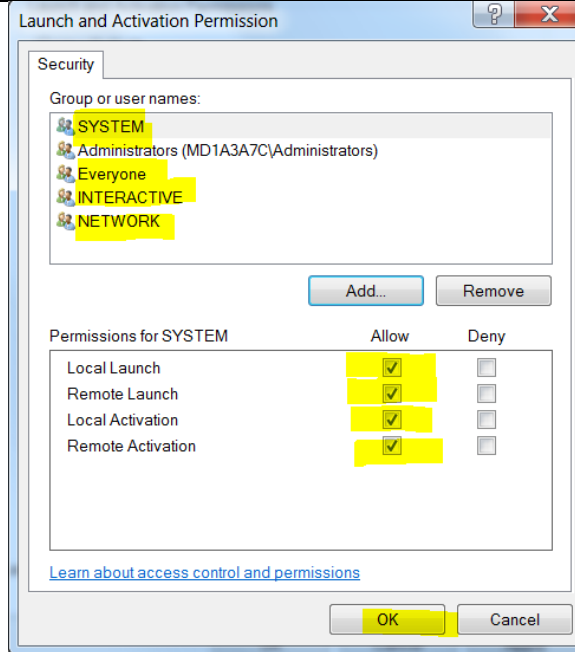


Figure 4.10

Step 13:

Under Access Permissions (see Figure 4.9) , select **Customize**. Then click **Edit**. (see Figure 4.9) Add the following users to the **Group or user names** list. Do not remove any others that may already be listed.

- a: **Everyone**
- b: **Interactive**
- c: **Network**
- d: **System**

Make sure that both the **Local** and **Remote Access** permissions are set to **Allow**. (see Figure 4.11)

Click on **OK**.

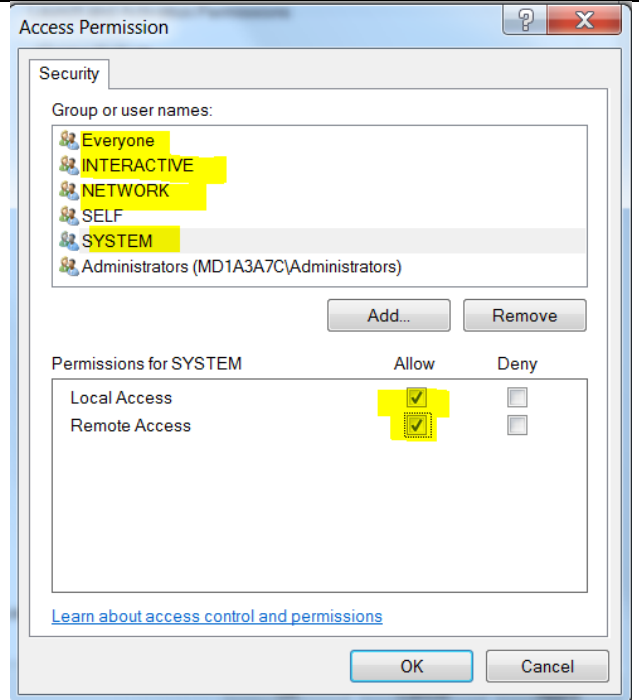


Figure 4.11

Step 14:

Select the **Endpoints** tab. (see Figure 4.9) Make sure the **Connection-oriented TCP/IP** is entered in the list. Click the **Add** button, select **Connection-oriented TCP/IP** in the dropdown list and the **Use default endpoints** radio button. (see Figure 4.12) Click **OK**.

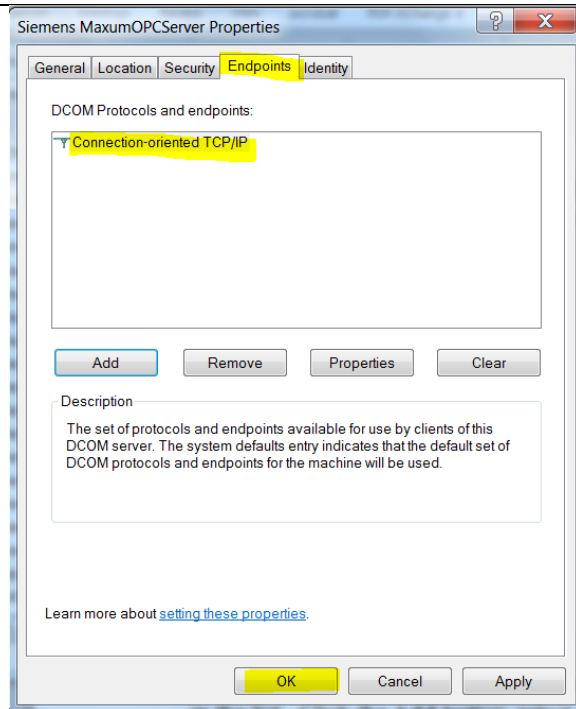


Figure 4.12

Step 15:

Select the **Identity** tab.
Make sure **The system account (service only)** radio button is selected.
Click **Ok**. (This is the recommended option for COM objects running as a service.)

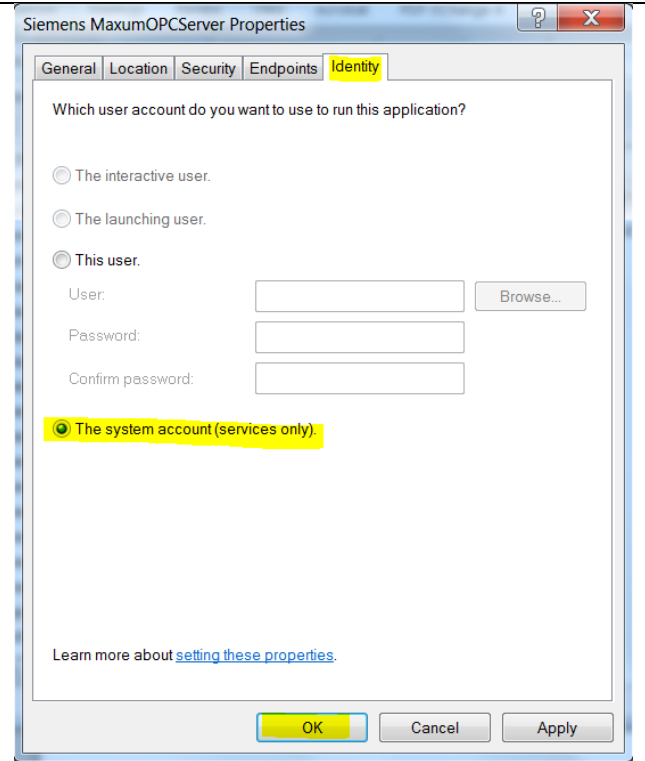


Figure 4.13

5. Theory of Operation

5.1. Device Connection

OPC Server uses TCP/IP over Ethernet to communicate with Maxum, Maxum Edition II, NAU, MicroSam, and Advance Optichrom analyzers. When a new device is added to OPC Server a connect message is sent to the remote device. If the connection is successful, the server sends a query to determine the device firmware version number. The firmware version must be equal to or greater than 4.0 for the connection process to continue. Once the server has verified the device version number the server sets up (registers) three Active queries (subscribes) for a Maxum device or two Active queries for an Optichrom device.(See tables below) This completes the connection process.

5.1.1. Maxum/NAU ACTIVE QUERIES:

When OPC Server connects to an analyzer it sets up three Active queries in the analyzer's database. When any of the attributes associated with an active query have a change in value the OPC Server is automatically notified and updated. The three active queries are:

Active queries

	Maxum Database Table	Table Attributes
1	OPC	lastreceived
2	OPC	force enable runstatus
3	Application	enable inservice mode

Active query #1 is configured on the OPC table - *lastreceived* attribute. *Lastreceived* is updated at the end of each analysis cycle and contains the date and time the analysis cycle completed. This query is used to update all of the OPC tags at the end of the analysis cycle.

Active query #2 is configured on the OPC table - force, enable, and runstatus. This query automatically updates the OPC tags – Force, Stream Enable, and RunState tags whenever there is a change in value on any of these database attributes.

Active query #3 is configured on the Application table – enable, inservice, and mode attributes. This query automatically updates the Application mode attributes whenever there is a change in value.

5.1.2. OPTICHROM ACTIVE QUERIES:

Table Name	Table Attributes(s)
OPC	lastreceived
OPC	enable, force, runstatus

5.2. Device Updates

At the end of each analytical cycle the analysis results are updated in the device (analyzer) database. The *lastreceived* attribute is updated to reflect the time the analysis cycle completed. Any change to the *lastreceived* attribute activates an Active query forcing the event notification to be sent to OPC Server. OPC Server responds

with a query for the analysis results. The Server overwrites the previous analysis cycle results and updates any interested OPC Clients with the new data.

5.3. OPC Client

A client is defined as a requester of services and a server is defined as the provider of services. A single machine can be both a client and a server depending on the software configuration.

An OPC client is any OPC compatible application that wants to use the information stored in Maxum OPC Server. A typical client is a DCS (Distributed Control System) or SQC program that supports an OPC interface.

OPC clients connect to OPC Server by creating an OPC Group object and specifying the OPC Items (tags) to be included in the group. The client registers and subscribes to server data by creating an advise sink which receives data change notifications from the server. OPC is change-driven. Data is only sent when there is a change in value.

OPC Groups have several properties that must be specified when the group is created in the OPC Server. One property of an OPC Group is the update rate. The update rate is the rate at which data changes should be evaluated and sent to the client.

5.3.1. The Registry

OPC clients locate OPC Servers on the local or remote machine through a set of entries in the Windows Registry. Chapter 6 of the OPC Specification discusses the registry entries necessary for an OPC server. A COM class is identified through a CLSID (ClassID). The operating system maintains a database of all registered CLSIDs in the Registry. The registry entries for a server's CLSID specify the location of the server, its type (local, remote, in-process), threading model, etc. Maxum OPC Server is self-registering. The first time OPC Server is executed, a set of entries is installed in the Registry. Registration entries are made under HKEY_LOCAL_MACHINE\CLASSES\Siemens.MaxumOPCServer.1, referred to as the ProgID. A subkey located under this key contains the CLSID for Maxum OPC Server. Clients use the registration information to find the server path.

5.5. OPC Server Tags

5.5.1. Maxum, Maxum Edition II, NAU, MicroSam Tags

Access Types: R = Read Only, RW = Read/Write, W = Write Only. "xxx" = analyzer logical ID

Tag Name	Access Type	Database Location (Source)	Description
Device.Tag – Example: Anlzxxx.AlarmMsg			
AlarmMsg	R	OPC table "sysmsg" attribute.	String value (VT_BSTR) that displays the highest priority device level Alarm message
AlarmStatus	R	OPC table "sysalmstatus" attribute.	4-byte integer value (VT_I4) that displays the device alarm status 0 = OK, Normal 1 = WARNING ALARM 2 = FAULT ALARM 3 = WARNING & FAULT ALARM
ComState	R	Set by the MOS based on the connection state between the MOS and the device (anz, NAU).	4-byte integer value (VT_I4) that displays the current status of the communication link between the MOS and the device 0 = OK, Normal 2 = COMMUNICATION FAILURE between device and server 4 = Optichrom analyzer timeout
Name	R	System_Control table "name" attribute.	String (VT_BSTR) that contains the device name
SetTime	W	OPC table "settime" attribute.	OLE Date tag (VT_DATE); sets the device and/or system time. A Maxum analyzer or NAU can be configured as a Time server. SetTime updates the time/date in the designated Time server. The other devices in the system must be configured with the IP address of the designated Time Server. Maxum devices automatically synchronize their time base once a day at 12:20am. Write format: Time may be entered in 12 or 24-hour format 06/11/2003 01:28 pm or 6-11-2003 13:28

Tag Name	Access Type	Database Location (Source)	Description
Application.Tag – Example: Appxxx.AlarmMsg			
AlarmMsg	R	AlarmMsg - Application table "app_status_msg" attribute.	String tag (VT_BSTR) that contains the current application error message. AlarmMsg always contains the highest priority FAULT or WARNING alarm message. Displays a NULL string for no alarm.
AlarmStatus	R	AlarmStatus - Application table "app_status" attribute.	4-byte integer (VT_I4) that contains the current application alarm status. 0 = OK, Normal 1 = WARNING ALARM 2 = FAULT ALARM 3 = WARNING & FAULT ALARM
CurrStrm	R	CurrStrm - OPC table "nextstream" attribute.	4-byte integer (VT_I4) that contains the number of the stream currently being analyzed by the application
Enable	RW	Enable - Application table "app_status" attribute.	Boolean (VT_BOOL) that enables or disables this application 0 = This application DISABLED 1 = This application ENABLED Write format: 0 or 1
InService	R	InService - Application table "inservice" attribute.	Boolean (VT_I4) that contains the current service state for this application 0 = This application is OUT OF SERVICE 1 = This application is IN SERVICE Write format: 0 or 1
Name	R	Name - Application table "application_name" attribute.	String (VT_BSTR) that contains the name of this application
RunState	RW	RunState - OPC table "runstatus" attribute.	4-byte integer (VT_I4) that sets the state of this application. 0 = This application is in HOLD 1 = This application is in the RUN state 2 = This application is in the CALibration state 3 = This application is in the Validation state 4 = Analyzer timeout valid for Optichrom analyzers only Other values are not allowed. Write format: range 0 - 2
StrmSeq	RW	StrmSeq - Application table "active_sequence" attribute.	4-byte integer (VT_I4) that sets/displays the active application stream sequence. Write format: positive integer greater than zero

Tag Name	Access Type	Database Location (Source)	Description
Stream.Tag – Example: Strmxxx.AlarmMsg			
AlarmMsg	R	AlarmMsg - OPC table "alarmmsg" attribute.	String tag (VT_BSTR) that contains the highest priority WARNING or FAULT error message for this stream
AlarmStatus	R	AlarmStatus - OPC table "alarmstatus" attribute.	4-byte integer (VT_I4) tag that contains the current stream alarm status. 0 = OK, Normal 1 = WARNING ALARM this stream 2 = FAULT ALARM this stream 3 = WARNING & FAULT ALARM this stream
CycleLength	R	OPC table "cyclelength" attribute.	4-byte integer (VT_I4): Stream cycle length in seconds
DataReady	R	MOS internally generated when the SampleTime tag is updated	Boolean (VT_BOOL): Set to a '1' at the end of the analysis cycle. It is reset after a user defined period between 5 - 25 seconds. The default is 10 seconds.
Enable	RW	Enable - OPC table "enable" attribute.	Boolean tag (VT_BOOL): Sets this stream ENABLE/DISABLE state 0 = This stream DISABLED 1 = This steam ENABLED Write format: 0 or 1
Force	RW	Force - OPC table "force" attribute.	Boolean tag (VT_BOOL): Forces this stream to run repeatedly 0 = Normal Stream Sequencing 1= Force this stream to run next Write format: 0 or 1
MethodID	R	MethodID – result table "method_id" attribute	4-byte integer (VT_I4): Method ID used on this stream
Name	R	Name - OPC table "streamname" attribute.	String (VT_BSTR): Stream name
RunEvent	RW	RunEvent - OPC table "runevent" attribute.	4-byte integer (VT_I4) Runs a stream-dependent event. Example: To run EVT32 in the analyzer, write 32 to this tag. Write format: Positive integer in the range 1- 32535
SampleTime	R	SampleTime - OPC table "lastreceived" attribute	Date tag (VT_DATE) Contains the time the sample was injected for the associated components (results) on this stream. Updated at the end of the analysis cycle with the date/time the stream analysis was started.
SetAlarm	RW	SetAlarm - OPC table "setalarm" attribute.	4-byte integer (VT_I4) Sets an alarm in the device. Write format: Positive integer in the range 1- 32,535 Example: To force an Alarm 54 in the device, write 54 to this tag.

Tag Name	Access Type	Database Location (Source)	Description
Component.Tags The Name and Value tags are automatically created for each component on Process, Validation, or Calibration streams			
Name	R	Name - Result table "result_name" attribute.	String tag (VT_BSTR): Contains the name of this component
Value	R	Value - OPC table "results" attribute.	4-byte real tag (VT_R4): Contains the value of the component
Component ValidationTags The ValCompare, ValMargin, and ValState tags are automatically created for each component on a Validation stream only Works with Peaks, Peakgroups, and Calibratedgroups			
ValCompare	R	ValCompare - Result table "compare_value" attribute. Used for validation.	8-byte real tag (VT_R8): Used in validation to compute a difference between the buffered result value
ValMargin	R	ValMargin - Result table "compare_margin" attribute. This is a percentage of full scale.	8-byte real tag (VT_R8): Used to specify the valid range for comparison between the buffered result value and the ValCompare value.
ValState	R	ValState - Result table "compare_state" attribute. Used for validation.	8-byte real tag (VT_R8): Provides Validation state information. (Pass = 1/Fail = 2/Validation Inprogress = 8)
Component Detail PeakTags The following Component detail tags are valid on Process, Validation, and Calibrations streams. These tags are valid for Peaks and Peak groups only.			
Current_RF	R	Current_RF - ezchrom_result_chrompeak table "current_rf" attribute.	8-byte real tag (VT_R8): Contains the value of the Response Factor used on the current analysis. Maybe calculated or manually entered response factor.
PkArea	R	PkArea - ezchrom_result_chrompeak table "corrected_area" attribute.	8-byte real tag (VT_R8): Contains the corrected peak area for this component
PkArea%	R	PkArea% - ezchrom_result_chrompeak table "area_percent" attribute.	8-byte real tag (VT_R8): Contains the percent area for this component
PkAsym	R	PkAsym - ezchrom_result_chrompeak table "asymmetry" attribute.	8-byte real tag (VT_R8): Contains the peak asymmetry for this component
PkAsym10	R	PkAsym10 - ezchrom_result_chrompeak table "asym10" attribute.	8-byte real tag (VT_R8): Contains the Asymmetry at 10% peak height for this component
PkHeight	R	PkHeight - ezchrom_result_chrompeak table "peak_height" attribute.	8-byte real tag (VT_R8): Contains the maximum peak height for this component
PkHeight%	R	PkHeight% - ezchrom_result_chrompeak table "height_percent" attribute.	8-byte real tag (VT_R8): Contains the percent height for this component

Tag Name	Access Type	Database Location (Source)	Description
PkNoise	R	PkNoise - ezchrom_result_chrompeak table "peak_noise" attribute.	8-byte real tag (VT_R8): Contains the peak noise for this component
PkResolution	R	PkResolution - ezchrom_result_chrompeak table "resolution" attribute.	8-byte real tag (VT_R8): Contains the peak resolution relative to previous peak for this component
PkRetTime	R	PkRetTime - ezchrom_result_chrompeak table "retention_time" attribute.	8-byte real tag (VT_R8): Contains the retention time at peak apex for this component
PkSignaltoNoise	R	PkSignaltoNoise - ezchrom_result_chrompeak table "peak_signal_to_noise" attribute.	8-byte real tag (VT_R8): Contains the peak signal to noise for this component. (Peak height / rms noise)
PkStartFlg	R	PkStartFlg - ezchrom_result_chrompeak table "start_flag" attribute.	String tag (VT_BSTR): Contains the peak start flag for this component
PkStartTime	R	PkStartTime - ezchrom_result_chrompeak table "front_time" attribute.	8-byte real tag (VT_R8): Contains the retention time at start of peak for this component
PkStopFlg	R	PkStopFlg - ezchrom_result_chrompeak table "stop_flag" attribute.	String tag (VT_R8): Contains the peak stop flag for this component
PkStopTime	R	PkStopTime - ezchrom_result_chrompeak table "back_time" attribute.	8-byte real tag (VT_R8): Contains the retention time at end of peak for this component
PkType	R	PkType - ezchrom_result_chrompeak table "peak_type" attribute.	8-byte real tag (VT_R8): Contains the peak type this component
PkUSPWidth	R	PkUSPWidth - ezchrom_result_chrompeak table "usp_peak_width" attribute.	8-byte real tag (VT_R8): Contains the peak USP width (U.S. Pharmacopeia) for this component
PkWidth	R	PkWidth - ezchrom_result_chrompeak table "peak_base_width" attribute.	8-byte real tag (VT_R8): Contains the peak width at base for this component
PkWidth10	R	PkWidth10 - ezchrom_result_chrompeak table "peak_width10" attribute.	8-byte real tag (VT_R8): Contains the peak width at 10% height for this component
PkWidth5%	R	PkWidth5% - ezchrom_result_chrompeak table "peak_width5" attribute.	8-byte real tag (VT_R8): Contains the peak width at 5% height for this component
PkWidth50	R	PkWidth50 - ezchrom_result_chrompeak table "peak_width50" attribute.	8-byte real tag (VT_R8): Contains the peak width at 50% height for this component
TheorPlates	R	PkTheorPlates - ezchrom_result_chrompeak table "theor_plates" attribute.	8-byte real tag (VT_R8): Contains the Theoretical plates for this component

Tag Name	Access Type	Database Location (Source)	Description
Component Detail GroupTags The following Component detail tags are valid on Process, Validation, and Calibrations streams. These tags are valid for Calibrated groups only.			
GrpArea	R	GrpArea - ezchrom_result_group table "corrected_area" attribute.	8-byte real tag (VT_R8): Contains the corrected peak area (for the group) for this component
GrpArea%	R	GrpArea - ezchrom_result_group table "area_percent" attribute.	8-byte real tag (VT_R8): Contains the peak area percent (for the group) for this component
GrpHeight	R	GrpHeight - ezchrom_result_group table "group_height" attribute.	8-byte real tag (VT_R8): Contains the maximum peak height (for the group) for this component
Component Detail Calibration Tag The following Component detail tag is valid on Process, Validation, and Calibrations streams. This tag is valid on Process, Validation, and Calibration streams on Peaks, Peak groups, and Calibrated groups.			
RespFactL(0-9)	R	RespFactL(0-9) - ezchrom_result_group table "response_factor" attribute. RespFactL0 – RF level 1 or single point cal . . RespFactL9 – RF level 10 for multipoint cal	8-byte real tag (VT_R8): Contains the calibration response factor. Supports up to 10 levels of response factors for multipoint calibrations.

5.5.2. Advance Optichrom Tags

Access Types: R = Read Only, RW = Read/Write, W = Write Only.

Tag Name	Access Type	Database Location (Source)	Description
Device.Tag – Example: Anlzxxx.AlarmMsg (xxx = Analyzer logical ID)			
ComState	R	Set by the MOS based on the connection state between the MOS and the device.	4-byte integer value (VT_I4) that displays the current status of the communication link between the AOS and the device 0 = OK, Normal 1 = COMMUNICATION FAILURE between device and server
Name	R	System_Control table “name” attribute.	String (VT_BSTR) that contains the device name
SetTime	W	OPC table “settime” attribute.	OLE Date tag (VT_DATE); sets the device and/or system time. Writing the SetTime tag for an Optichrom device results in a Optichrom TOD(Time of Day) broadcast. This will synchronize the date/time on all the Optichrom devices connected to the network. Write format: Time may be entered in 12 or 24-hour format 06/11/2003 01:28 pm or 6-11-2003 13:28
Application.Tag – Example: Appxxx.AlarmMsg (xxx = Application ID)			
CurrStrm	R	CurrStrm - OPC table “nextstream” attribute.	4-byte integer (VT_I4) that contains the number of the stream currently being analyzed by the application
Name	R	Name - Application table “application_name” attribute.	String (VT_BSTR) that contains the name of this application (Optichrom is always “App001”)
RunState	RW	RunState - OPC table “runstatus” attribute.	4-byte integer (VT_I4) that sets the state of this application. 0 = This application is in HOLD 1= This application is in the RUN state 2 = This application is in the CALibration state 4 = Optichrom loss of communication with OPC Server Other values are not allowed. Write format: range 0 – 2 0 = Sets application to HOLD state 1 = Sets application to RUN state (Write 7, Read 1) 2 = Sets application to CAL state

Tag Name	Access Type	Database Location (Source)	Description
Stream.Tag – Example: Strmxxx.AlarmMsg (xxx = Stream ID)			
AlarmMsg	R	AlarmMsg - OPC table "alarmmsg" attribute.	String tag (VT_BSTR) that contains the highest priority WARNING or FAULT error message for this stream
AlarmStatus	R	AlarmStatus - OPC table "alarmstatus" attribute.	4-byte integer (VT_I4) tag that contains the current stream alarm status. 0 = OK, Normal 1 = WARNING ALARM this stream 2 = FAULT ALARM this stream 3 = WARNING & FAULT ALARM this stream
CycleLength	R	OPC table "cyclelength" attribute.	4-byte integer (VT_I4): Stream cycle length in seconds
DataReady	R	MOS internally generated when the SampleTime tag is updated	Boolean (VT_BOOL): Set to a '1' at the end of the analysis cycle. It is reset after a user defined period between 5 - 25 seconds. The default is 10 seconds.
Enable	RW	Enable - OPC table "enable" attribute.	Boolean tag (VT_BOOL): Sets this stream ENABLE/DISABLE state 0 = This stream DISABLED 1 = This steam ENABLED Write format: 0 or 1
Force	RW	Force - OPC table "force" attribute.	Boolean tag (VT_BOOL): Forces this stream to run repeatedly 0 = Normal Stream Sequencing 1= Force this stream to run next Write format: 0 or 1
Name	R	Name - OPC table "streamname" attribute.	String (VT_BSTR): Stream name
RunEvent	RW	RunEvent - OPC table "runevent" attribute.	4-byte integer (VT_I4) Runs a stream-dependent event. Example: To run EVT32 in the analyzer, write 32 to this tag. Write format: Positive integer in the range 1- 32535
SampleTime	R	SampleTime - OPC table "lastreceived" attribute	Date tag (VT_DATE) Contains the time the sample was injected for the associated components (results) on this stream. Updated at the end of the analysis cycle with the date/time the stream analysis was started.
Component.Tag – Example: Compxxx.AlarmMsg (xxx = Component ID)			
Name	R	Name - Result table "result_name" attribute.	String tag (VT_BSTR): Contains the name of this component
Value	R	Value - OPC table "results" attribute.	4-byte real tag (VT_R4): Contains the value of the component

Appendix A - DCOM Logging

DCOM logging can be a useful troubleshooting tool when experiencing DCOM errors. By default Windows disables DCOM logging. You can enable error logging by changing the registry and then restarting the DCOM process (OPC Client/Server) that you want to examine. The DCOM process that you want to examine determines whether you have to restart the computer.

To turn on DCOM error logging, follow these steps:

1. Click Start, click **Run**, type **regedit**, and then click **OK**.
2. Locate the **HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Ole** registry subkey.
3. Right-click the Ole value, point to New, and then click **DWORD Value**.
4. Type **ActivationFailureLoggingLevel**, and then press ENTER. Double-click **ActivationFailureLoggingLevel**, type 1 in the Value data box, and then click **OK**.
5. Right-click the Ole value, point to New, and then click **DWORD Value**.
6. Type **CallFailureLoggingLevel**, and then press ENTER. Double-click **CallFailureLoggingLevel**, type 1 in the Value data box, and then click **OK**.
7. Restart the DCOM program, and then examine the System log and the Application log for DCOM errors (Event Viewer).
8. The error messages in the Windows event log contain information that you can use to help resolve the DCOM issue.

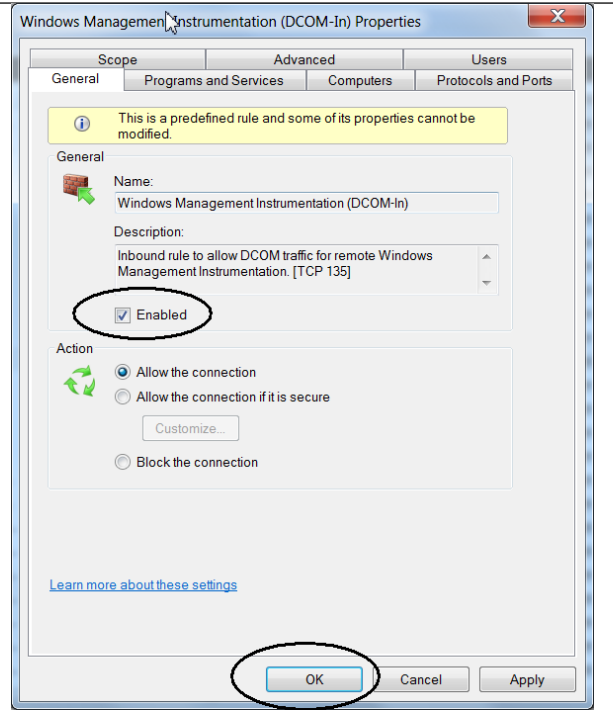
You can turn off DCOM error logging by changing the **ActivationFailureLoggingLevel** value and the **CallFailureLoggingLevel** value to zero.

Appendix B - Configuring Windows Firewall

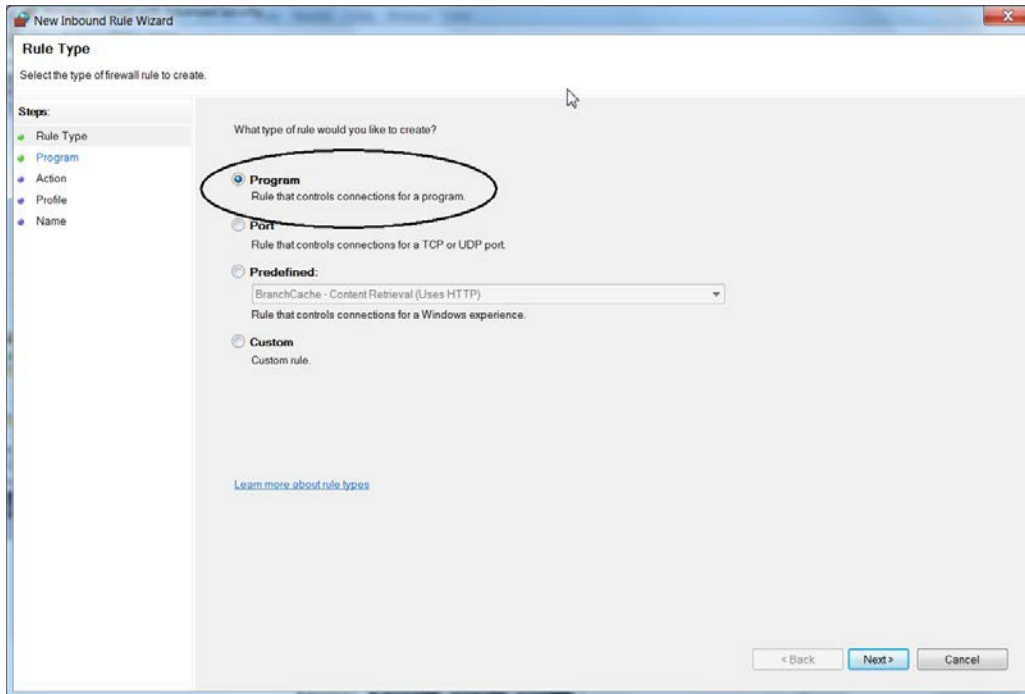
By default, Windows blocks inbound connections from other computers. To allow OPC Clients to connect to MaxumOPCServer, Windows Firewall must be configured to allow inbound messages from the client. If the client and server are located on different computers you must configure Windows Firewall on both machines. If the client and server are used on the same computer, there is no need to configure Windows firewall.

Step 1: Open Windows Firewall Management Console. Select **Start** then type **wf.msc** in the **Search programs and files** box.

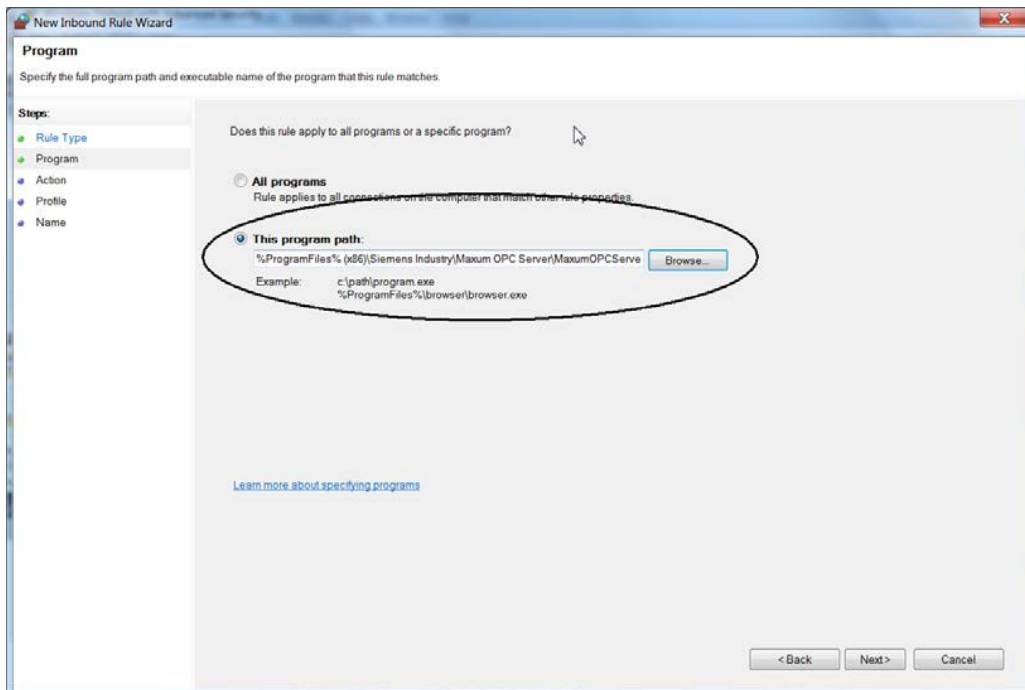
Step 2: In the left pane select **Inbound Rules** then browse and select the **Windows Management Instrumentation (DCOM-In)** rule. Right click and select Properties from the pop-up menu. From the **General** tab check the **Enabled** check-box and then click on **OK**.



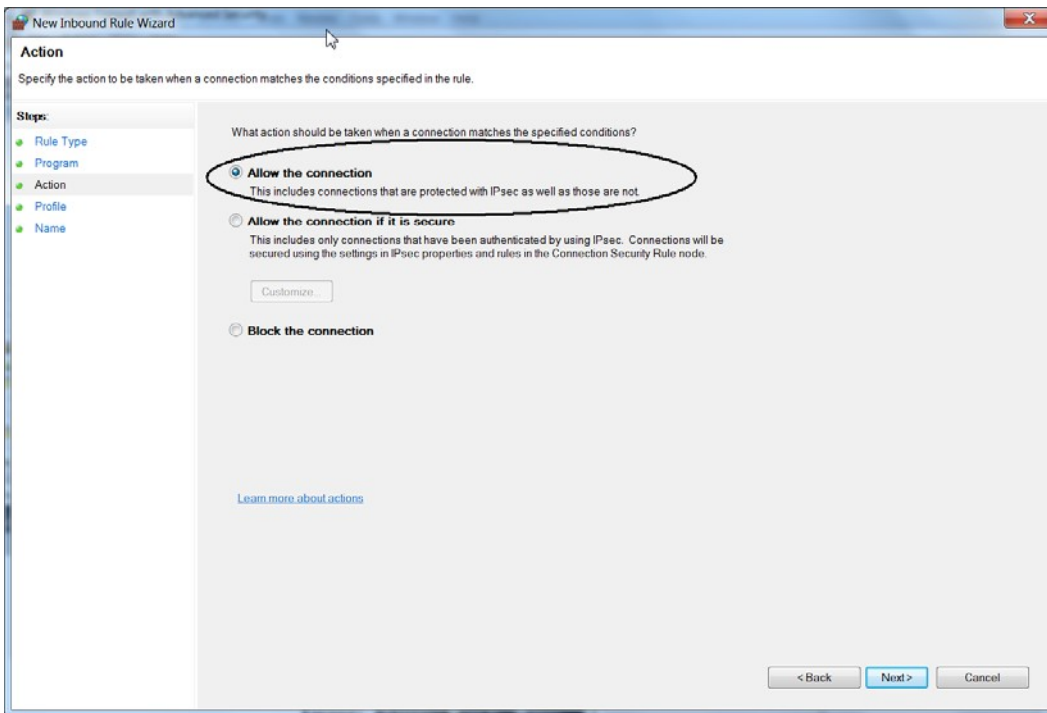
Next, right click on **Inbound Rules** and select **New Rule...** from the pop-up menu. Set the **Program** radio button then click **Next**.



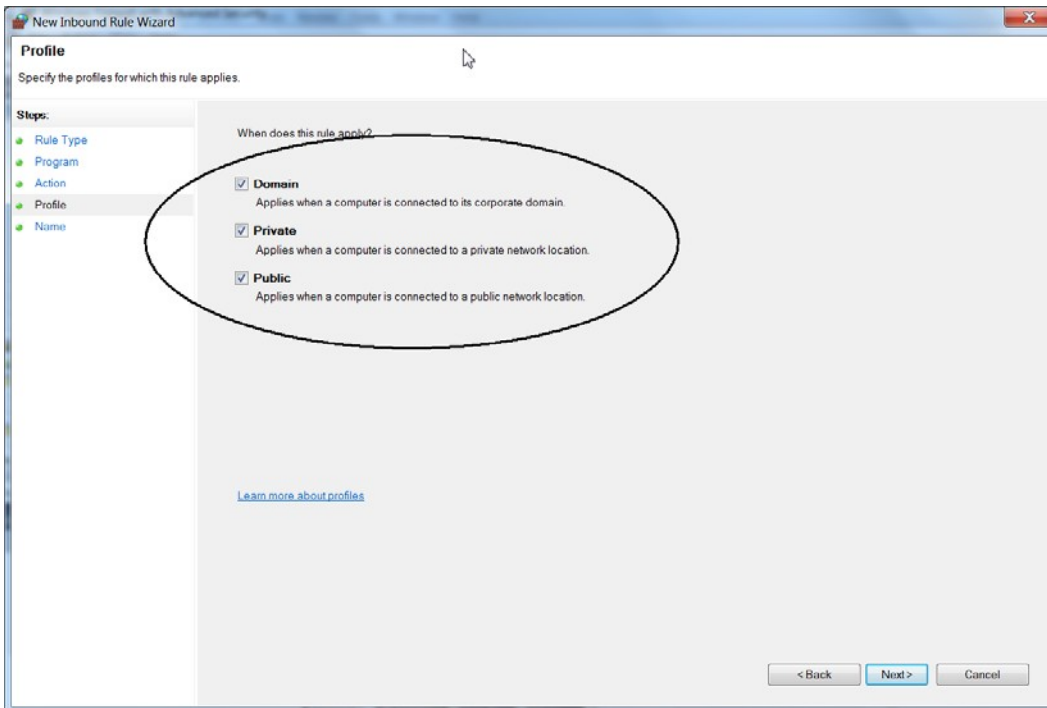
Under **This program path:** browse to the **MaxumOPCServer.exe** file and select **Next**.



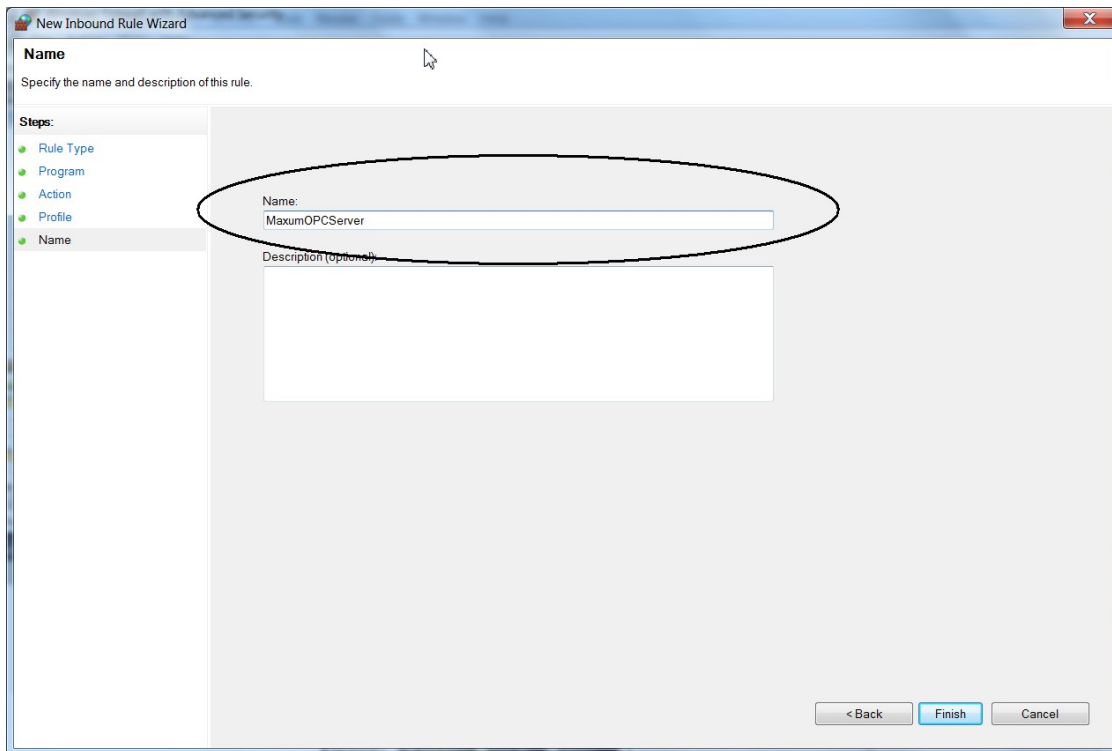
Set the **Allow the connection** radio button and then select **Next**.



On the Profile screen check **Domain**, **Private**, and **Public** check boxes then select **Next**.



Give the inbound rule a name MaxumOPCServer and select **Finish**.



IMPORTANT: An inbound rule to allow connections must exist for every OPC server running on the computer. This includes the OPC Foundation's **OPCEnum.exe** program. OPCEnum is used by an OPC Client application to discover and/or connect to OPC servers on a remote machine. OPCEnum acts as a 'proxy' application to access important registry information on the remote computer. If an OPC client can not browse the list of servers on a remote machine, it is typically a result of authentication failure to the OPCEnum application.

Appendix C - OPC Test Client

A simple OPC Client is provided with each installation of Maxum OPC Server. The FactorySoft OPC Client is useful for testing and troubleshooting OPC servers and OPC connections.

The Client is installed in the \Program Files (x86)\Siemens Industry\Client directory. To access the FS Client add a shortcut to the Desktop or select **Start, Run...**, **Browse** to the **OPC Client.exe**, and click on **OK** to start the program.

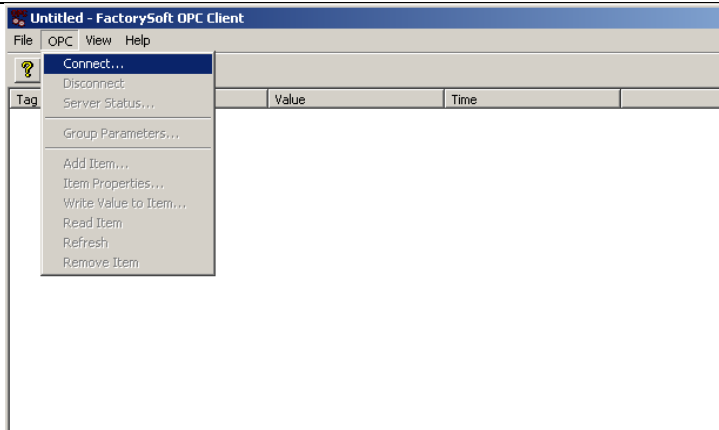
<p>From the main menu connect to an OPC Server. Select OPC->Connect... (See Figure C--1)</p>	
--	--

Figure C-1

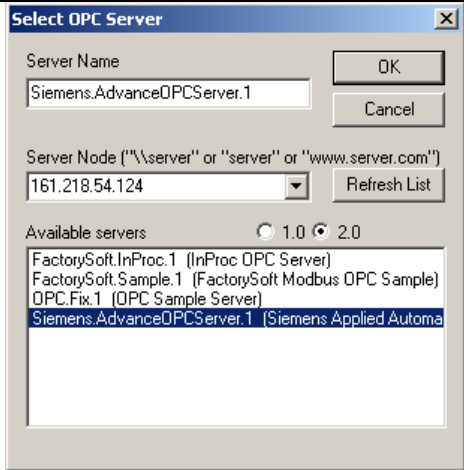
<p>When the Select OPC Server dialog box is displayed enter the IP address of the remote device in the Server Node combo box (if the OPC Server and OPC Client are running on the same machine leave the box empty) then click on the Refresh List box. (See Figure C-2) The OPC Client launches the OPC Foundation List Server (OPCEnum.exe) on the OPC Server machine. If the command is successful a list of the available OPC Servers is displayed in the Available Servers list box. If an Access is Denied error message is displayed it may mean that the DCOM Security settings are not properly setup on either the OPC Server or OPC Client machine. Refer to the appropriate section of this manual for more information on DCOM settings.</p> <p>To connect, double click on the Server name in the Available servers list box or select the Server name and click on OK. If no error messages are returned the connection is complete and the OPC group object was automatically created.</p>	
--	---

Figure C-2

The next step is to define which of the OPC Items available in the OPC Server to add to the Client's group. From the main menu select **OPC->Add Item**. (See Figure C-3)

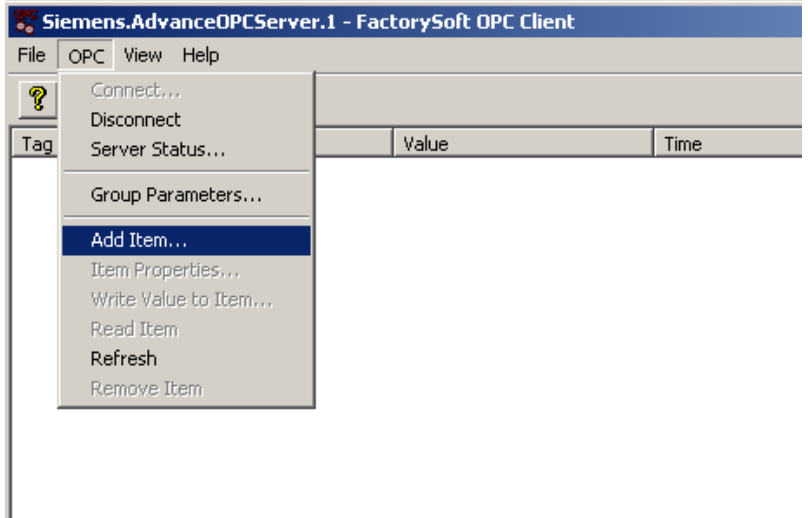


Figure C-3

The Add Item dialog box is displayed with the defined devices, groups, and tags in the **Browse items** list box. (See Figure C-4)

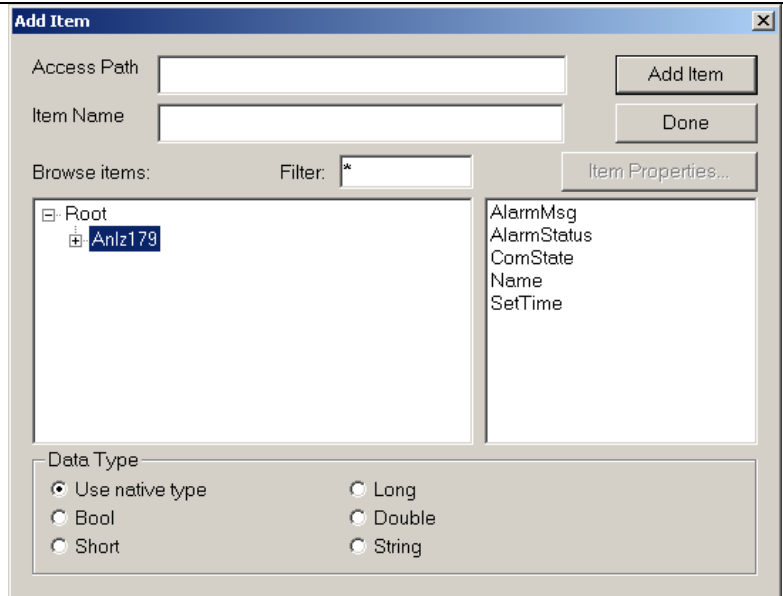


Figure C-4

Select a device or folder in the **Browse items** list box and the associated tags are displayed in the right pane. To add a tag to the OPC Client group select the tag in the right pane then click on the **Add Item** button or double click the item. Click the **Done** button to save the OPC item to the Client's group. (See Figure C-5)

The OPC Client has subscribed to the tags displayed in the main window and the values will be automatically updated based on a change in data value.

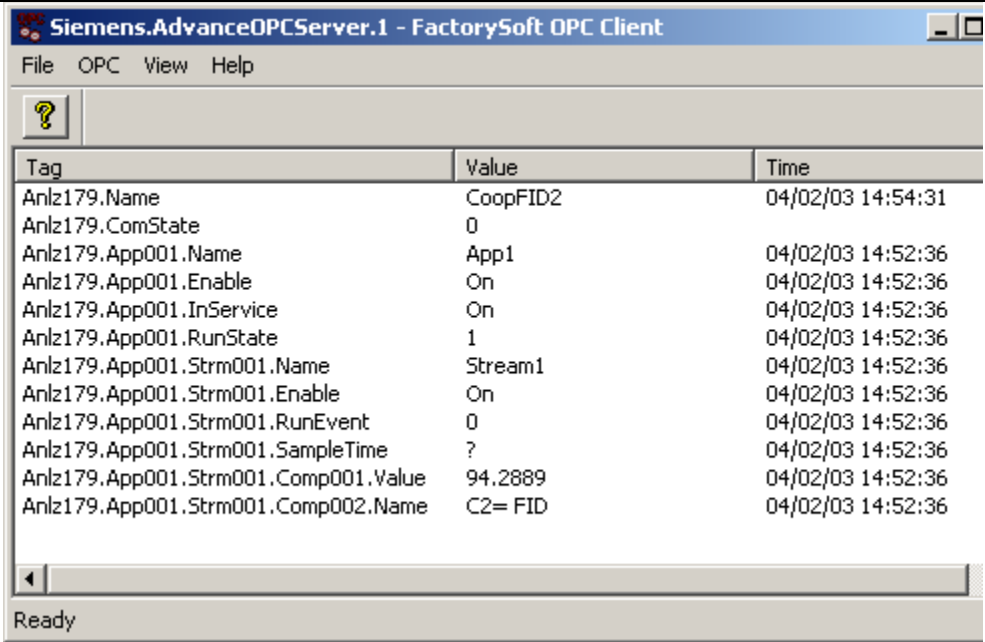


Figure C-5

To read an OPC Item property, to force a read refresh, or to write an OPC Item supporting write access right click on the OPC item and select the appropriate command from the popup menu. (See Figure C-6)

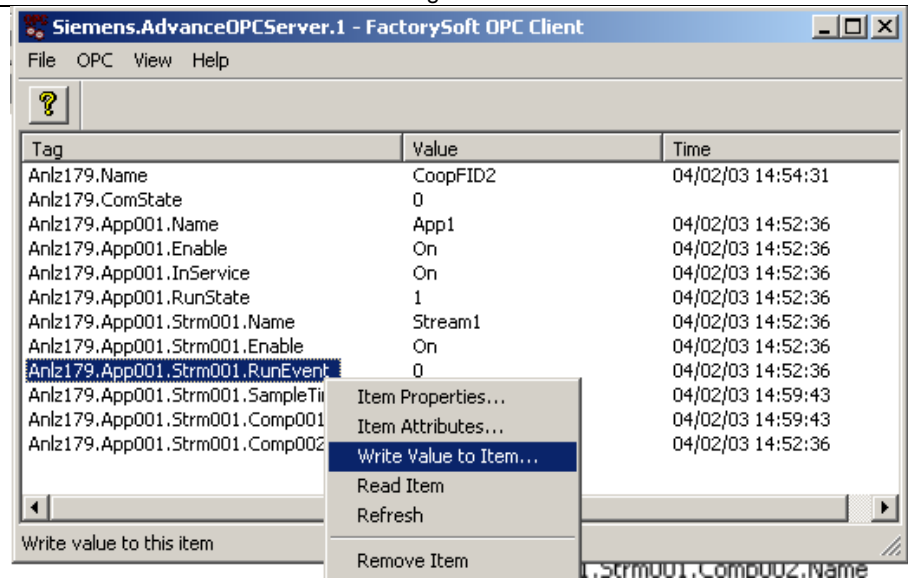


Figure C-6

If you are unable to establish a connection to Maxum OPC server or browse and add tags to OPC Client read through this section. Most problems connecting to OPC server relate to the DCOM settings on either the host or the client machine.

Unable to Find a remote OPC Server	First, check that you are able to communicate with the remote OPC Server machine from the client machine. Select Start->All Programs->Accessories->Command Prompt. At the command prompt type 'ping xxx.xxx.xxx.xxx'. Replace the xxx.xxx.xxx.xxx with the IP address of the remote machine. If the remote machine fails to respond to the ping there is a communication problem between the two machines. If the remote machine replies to the ping request then there is a problem with the OPC Foundation Core Components. Re-install or repair the OPC Foundation Core Components.
"Class not registered" Error	If you get this error while attempting to query Maxum OPC Server the OPC Foundation Core Components have not been installed correctly. Install the OPC Foundation Core Components.
Unable to Query the Server	If you are able to connect to Maxum OPC Server but the OPC Tags (Items) aren't display the most common cause is incorrectly configured local DCOM security settings. Review the DCOM settings.
Unable to Connect to Server	If the OPC Client sees Maxum OPC Server yet it is unable to connect to it, the problem is most likely with your DCOM configuration. Review the Distributed COM section in this manual.
Unable to Create a Group	If you are able to connect to Maxum OPC Server but are unable to create a group, the problem is most likely with your local DCOM configuration. Review the Distributed COM section in this manual.
Error While Querying Interface	If you get this error while attempting to add a group to a connected client object, the local DCOM security settings are not permitting the OPC server to connect to the OPC client.

Appendix D - Automation Client Example

A working example of an Automation Client program is included with the Maxum OPC Server installation program. The Client program is written in Excel – VBA and can be used as a starting point in writing your own OPC Client application. The Excel Client program is located in:

Program Files\Siemens Industry\Client and is titled **AutomationClientEx.xls**. The program is an Excel macro and therefore requires that the Microsoft Excel program is loaded on your machine.

Background:

The OPC Data Access Automation Interface defines a standard by which automation applications can access process data. This interface provides the same functionality as the custom interface, but in an “automation friendly” manner. The Automation Client can be written in Visual Basic or Visual Basic for Application (VBA). The Automation Client uses a ‘wrapper’ DLL provided by the OPC Foundation (OPCDAAuto.DLL) to communicate with the Custom interface provided by the Maxum OPC Server. The OPC Foundation specification for the Data Access Automation Interface Standard is included with the Maxum OPC Server installation and the OPCDAAuto.DLL was installed automatically with the OPC Server installation. The Automation Interface document defines the methods and parameters plus some examples to write an Automation Client. Use the example client program as is or as a guide in writing your own OPC Client.

How to run the example Automation Client:

First, execute the AutomationClientEx.xls program. This should start the Microsoft Excel program on you PC. The following dialog box will be displayed in Excel: (See Appendix C)

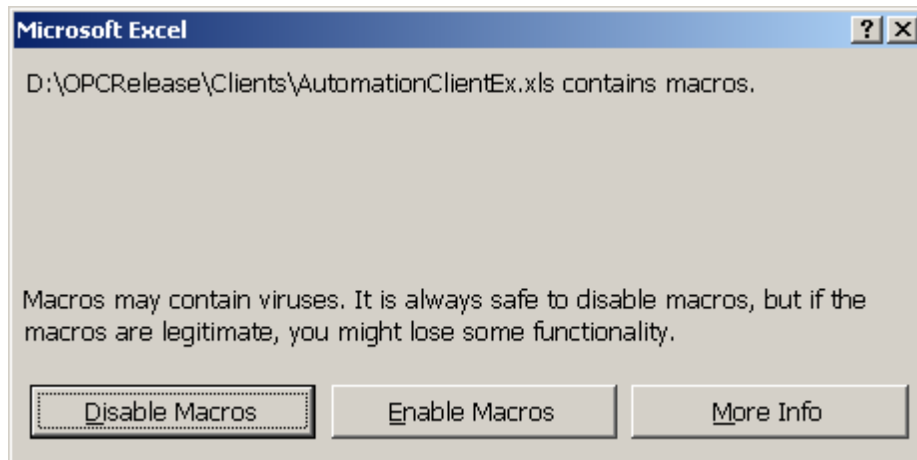


Figure D-1

Click on the Enable Macros button.

The Advance Automation Client screen will be displayed similar to Figure D-2

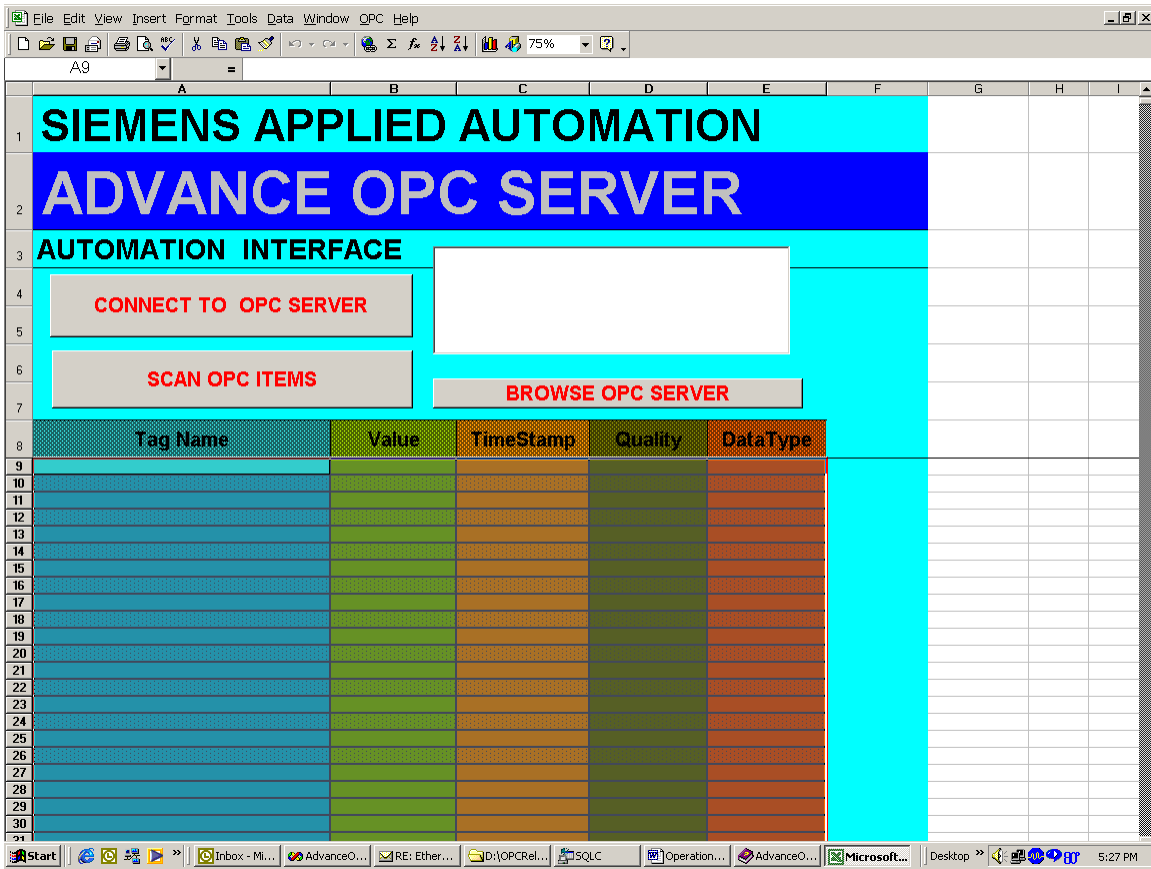


Figure D-2

Click on the CONNECT TO OPC SERVER button. The CONNECT to OPC Server Dialog box will be displayed. (See Figure D-3) Enter the IP address of the Maxum OPC Server then press the REFRESH NODE SERVER LIST button. The client program will use the OPC List Server located on the PC where the Maxum OPC Server is running to display a list of all the available OPC Servers in the SERVER LIST list box. Select Siemens.MaxumOPCServer.1 and click on the CONNECT TO SERVER button.

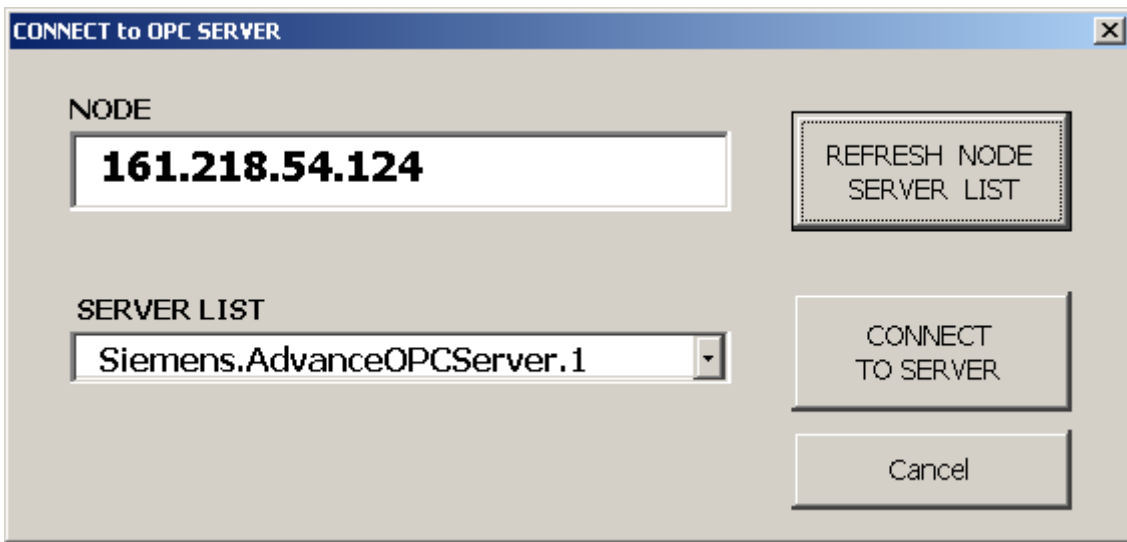


Figure D-3

Then select the BROWSE OPC SERVER button (Figure D-2) to display a list of all the available OPC Items or Tags or Variables available at the OPC Server. (See Figure D-4)

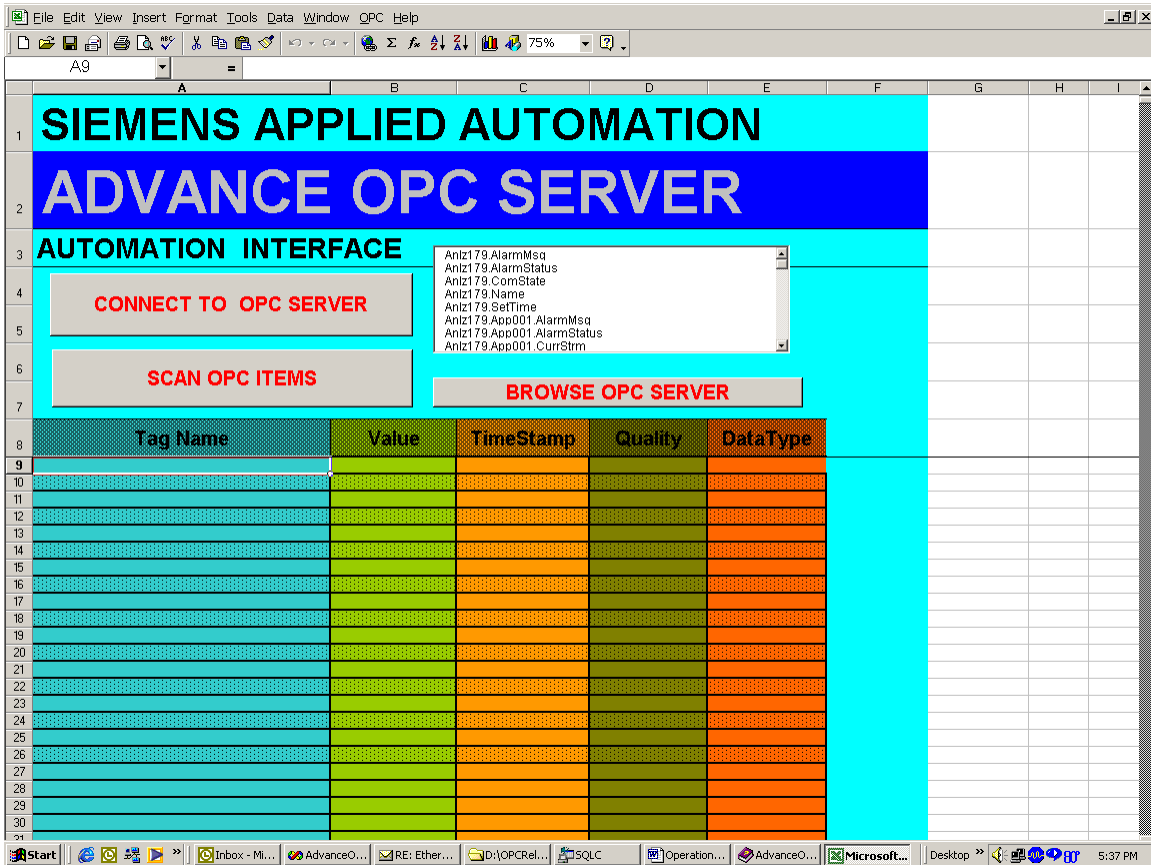


Figure D-4

Select the OPC Items you wish to subscribe to from the Browse list box. If applicable use the scroll box to scroll down the available list. Double click on each item you want to subscribe to.

The selected items will appear in the spreadsheet under the Tag Name column. (See Figure D-5)

The screenshot shows a software window titled 'OPC Help' with a menu bar (File, Edit, View, Insert, Format, Tools, Data, Window, OPC, Help) and a toolbar. The main area is a spreadsheet with columns A through I and rows 1 through 31. The spreadsheet content is as follows:

1	SIEMENS APPLIED AUTOMATION				
2	ADVANCE OPC SERVER				
3	AUTOMATION INTERFACE				
4	CONNECT TO OPC SERVER		<input type="text" value="Anlz179.App001.Strm001.SampleTime"/> <input type="text" value="Anlz179.App001.Strm001.SeAlarm"/> <input type="text" value="Anlz179.App001.Strm001.Comp001.Name"/> <input type="text" value="Anlz179.App001.Strm001.Comp001.Value"/> <input type="text" value="Anlz179.App001.Strm001.Comp002.Name"/> <input type="text" value="Anlz179.App001.Strm001.Comp002.Value"/> <input type="text" value="Anlz179.App001.Strm001.Comp003.Name"/> <input type="text" value="Anlz179.App001.Strm001.Comp003.Value"/>		
5					
6	SCAN OPC ITEMS		BROWSE OPC SERVER		
7					
8	Tag Name	Value	TimeStamp	Quality	DataType
9	Anlz179.Name				
10	Anlz179.ComState				
11	Anlz179.AlarmStatus				
12	Anlz179.App001.CurrStrm				
13	Anlz179.App001.RunState				
14	Anlz179.App001.Strm001.SampleTime				
15	Anlz179.App001.Strm001.Comp001.Name				
16	Anlz179.App001.Strm001.Comp001.Value				
17	Anlz179.App001.Strm001.Comp002.Name				
18	Anlz179.App001.Strm001.Comp002.Value				
19	Anlz179.App001.Strm001.Comp003.Name				
20	Anlz179.App001.Strm001.Comp003.Value				
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

The taskbar at the bottom shows the Start button, several open applications (Inbox, AdvanceO..., RE: Ether..., D:\OPCRel..., SQLC, Operation..., AdvanceO..., Microsoft...), and the system tray with the time 5:41 PM.

Figure D-5

Click on the SCAN OPC ITEMS button to subscribe and update the selected OPC Items values. (See Figure D-6)

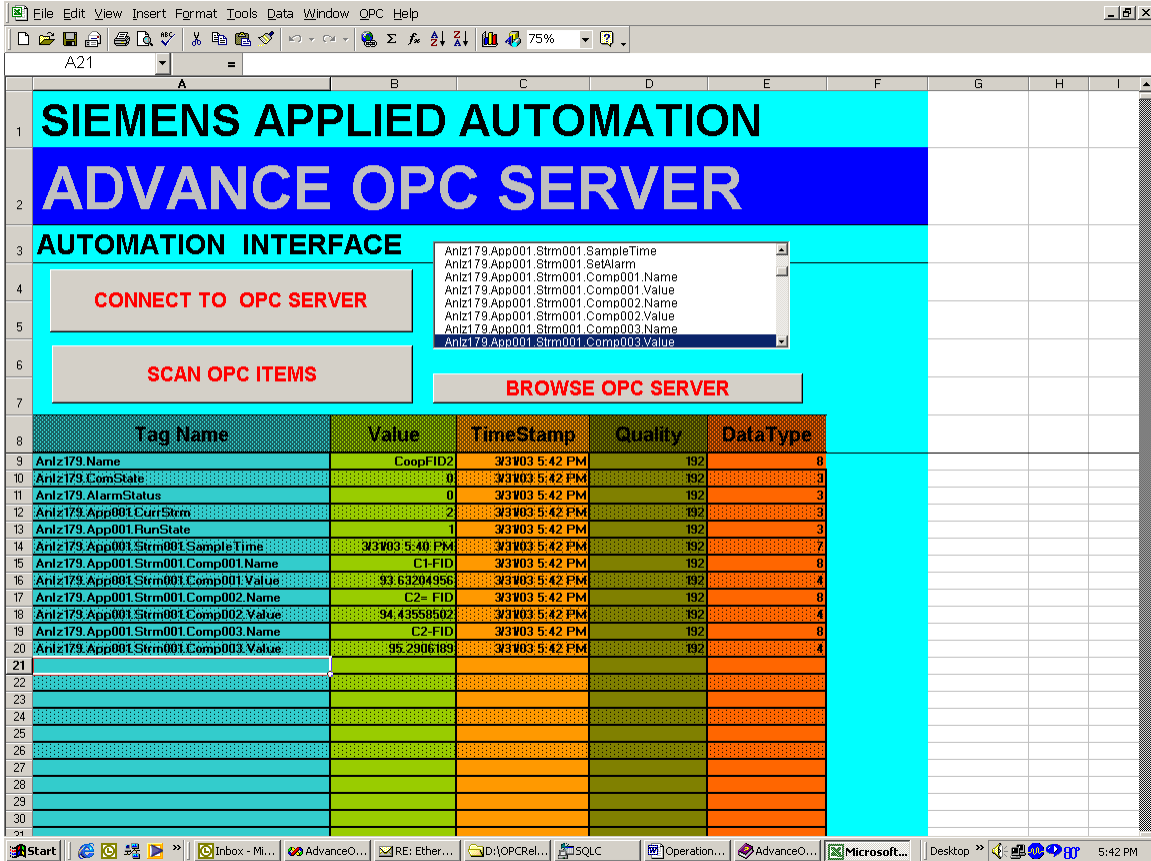


Figure D-6

The selected items will be updated at the end of each analyzer cycle.

From the main menu select **Tools->Macro->Visual Basic Editor** to display the AutomationClientEx macro.

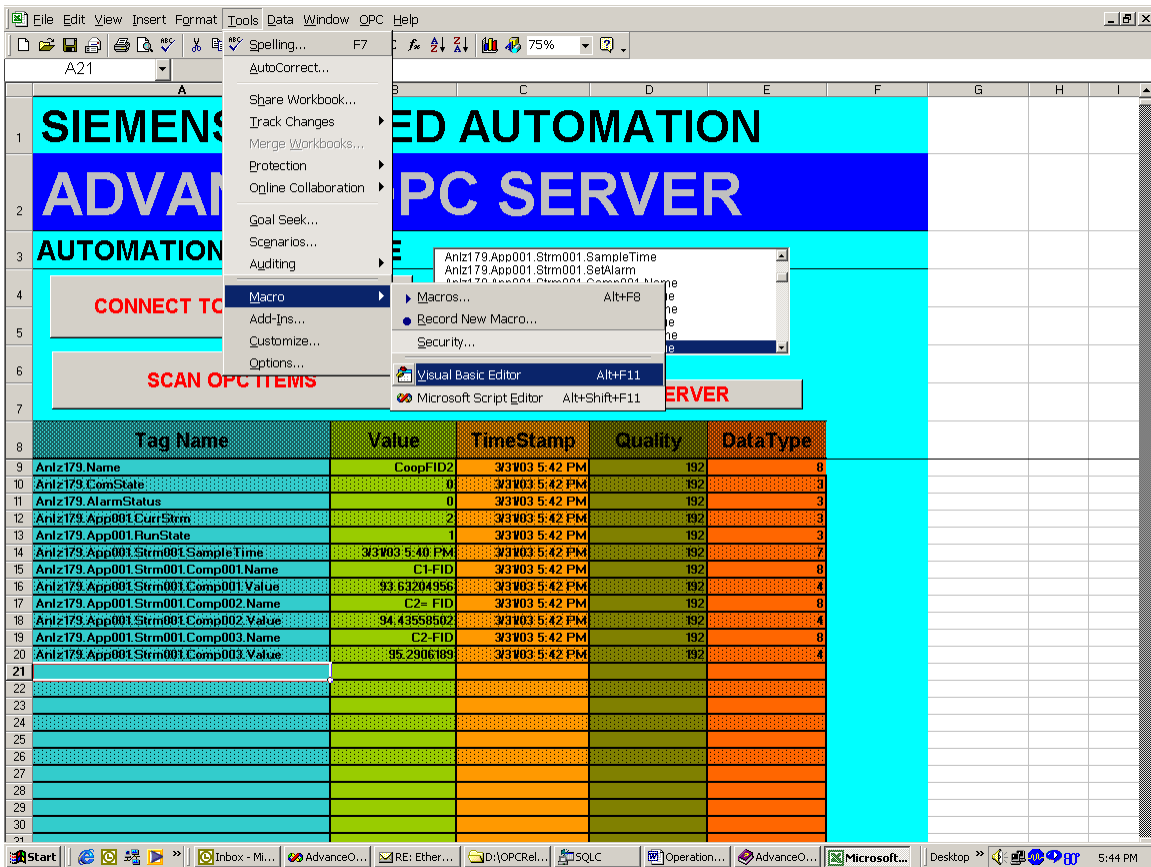
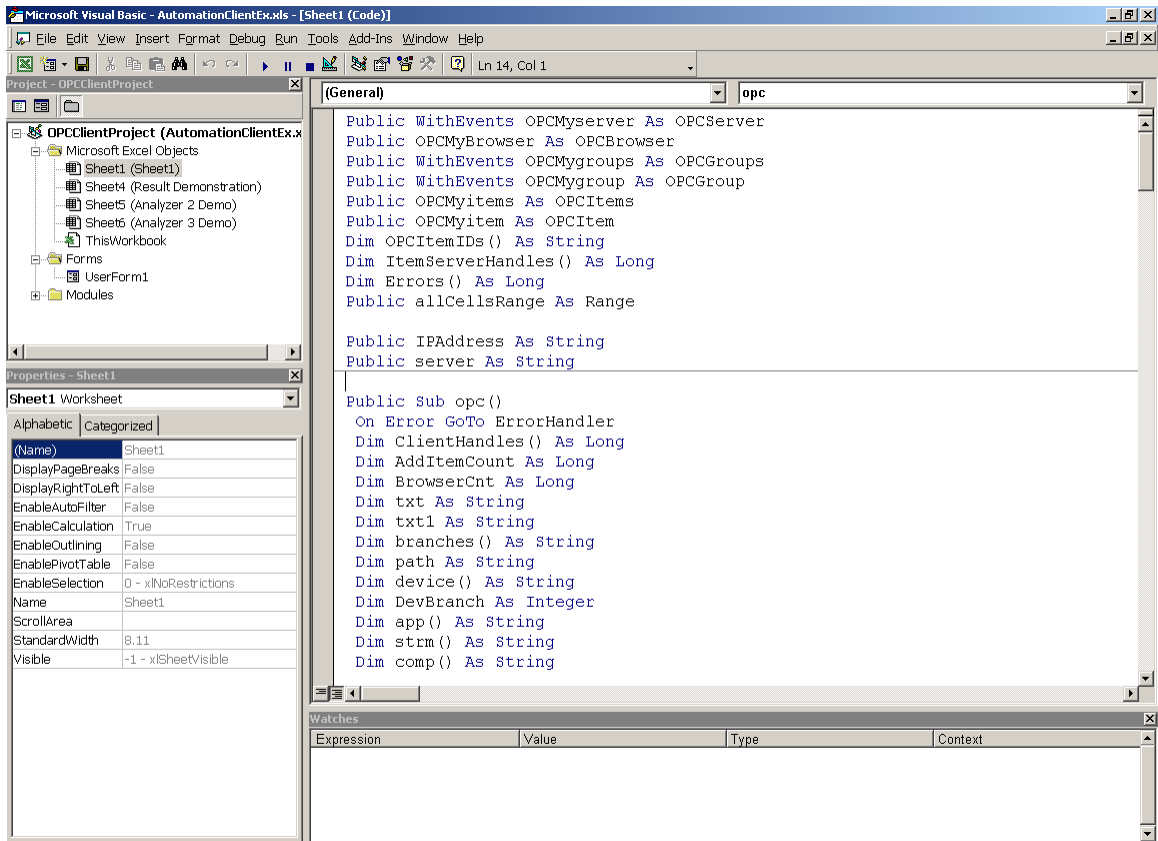


Figure D-7



D-1. Client Code Descriptions

Please refer to the OPC Foundation document titled "**Data Access Automation Interface Standard**". This document was installed under the Maxum OPC Server directory.

\Siemens Applied Automation\DOC\OPCDAAuto.doc or it can be obtained from the OPC Foundation web site at www.OPCFUNDATION.org. The following example was written using VBA (Visual Basic Applications)

Define the Server/Group/Item Objects

First define the OPCServer Automation object, the OPCGroups and OPCGroup objects, and the OPCItems and OPCItem objects. The WithEvents syntax enables the object to support the declared events for the particular object.

```
Public WithEvents OPCMyserver As OPCServer
Public OPCMyBrowser As OPCBrowser
Public WithEvents OPCMygroups As OPCGroups
Public WithEvents OPCMygroup As OPCGroup
Public OPCMyitems As OPCItems
Public OPCMyitem As OPCItem
Dim OPCItemIDs() As String
Dim ItemServerHandles() As Long
Dim Errors() As Long
Public allCellsRange As Range
Public IPAddress As String
Public server As String
```

Create The OPCserver Object

Create a new OPCServer object and make a list of all the available OPC Servers located on the specified machine using the OPCServer object method GetOPCServers.
(Sheet1.OPCMyserver.GetOPCServers(Sheet1.IPAddress))

```
Public Sub CommandButton1_Click()
    Dim servers() As String
    Set Sheet1.OPCMyserver = New OPCServer
    If UserForm1.TextBox1.value <> "" Then
        Sheet1.IPAddress = UserForm1.TextBox1.value
    Else
        Sheet1.IPAddress = "127.0.0.1"
    End If
    On Error GoTo ErrorHandler
    servers = Sheet1.OPCMyserver.GetOPCServers(Sheet1.IPAddress)
    UserForm1.ComboBox1.Clear
    Sheet1.ListBox1.Clear
    For I = 1 To UBound(servers)
        UserForm1.ComboBox1.AddItem servers(I)
    Next I
    UserForm1.ComboBox1.DropDown
```

```

UserForm1.ComboBox1.SelText = UserForm1.ComboBox1.List(0, 0)

If UserForm1.ComboBox1.value <> "" Then
    Sheet1.server = UserForm1.ComboBox1.value
End If

Exit Sub
ErrorHandler:
MsgBox ("Can't connect to OPC Server, check IP address")

End Sub

```

Connect to the specified OPC Server and add a Group object.

Using the server object (OPCMyserver) execute the *connect* method with input parameters server name (Sheet1.server) and server IP address (Sheet1.IPAddress) . Then *Add* an OPCGroup object (Group1) using the OPCGroups property of the server object. Create the Browser object using the *CreateBrowser* method of the server object.

```

Public Sub CommandButton2_Click()
If Sheet1.server = "" Then GoTo endl
If Sheet1.IPAddress = "" Then GoTo endl
    Sheet1.OPCMyserver.connect Sheet1.server, Sheet1.IPAddress
On Error GoTo ErrorHandler
    Set Sheet1.OPCMygroups = Sheet1.OPCMyserver.OPCGroups
    Set Sheet1.OPCMygroup = Sheet1.OPCMygroups.Add("Group1")
    Set Sheet1.OPCMyBrowser = Sheet1.OPCMyserver.CreateBrowser
    Sheet1.allCellsRange.Select
    Sheet1.allCellsRange.ClearContents

    UserForm1.Hide
endl:
Exit Sub

ErrorHandler:
MsgBox ("Access denied, check DCOM access settings on both server and client.")

End Sub

```

Create And Add Items To The OPCItems Object

Using the OPCGroup object (OPCMyGroup) method OPCItems create the OPCItem object and add OPCItems to the group using the AddItems method.

```

Public Sub OPC()
    On Error GoTo ErrorHandler
    Dim ClientHandles() As Long
    Dim AddItemCount As Long
    Dim BrowserCnt As Long

```

```

Dim txt As String
Dim txt1 As String
Dim branches() As String
Dim path As String
Dim device() As String
Dim DevBranch As Integer
Dim app() As String
Dim strm() As String
Dim comp() As String
Dim branchCnt As Long
Dim ret As Boolean

If OPCMygroup.OPCItems.count > 0 Then
    OPCMygroup.IsActive = False
    OPCMygroup.IsSubscribed = False
    OPCMyitems.Remove OPCMygroup.OPCItems.count, ItemServerHandles, Errors
End If

ReDim ClientHandles(UBound(OPCItemIDs))
For X = 1 To CInt(UBound(OPCItemIDs))
    ClientHandles(X) = X + 1
Next X

Set OPCMyitems = OPCMygroup.OPCItems
OPCMyitems.AddItem UBound(OPCItemIDs), OPCItemIDs, ClientHandles,
ItemServerHandles, Errors
If Errors(1) <> 0 Then
    MsgBox "Error"
End If

```

Set The Group Active And Subscribe To The Group Data

When the IsActive Groupproperty is set to TRUE , the OPC server reads out registered items. When the IsSubscribed property is set to TRUE, the DataChange event is called back on data change. The OPCItem object method **READ** is used to read the item values into the group variables.

```

OPCMygroup.IsActive = True
OPCMygroup.IsSubscribed = True

Private Sub OPCMygroup_DataChange(ByVal TransactionID As Long, ByVal NumItems As
Long, ClientHandles() As Long, ItemValues() As Variant, Qualities() As Long,
TimeStamps() As Date)
    Dim anItem As OPCItem
    Dim row As Integer
    Dim col As Integer

    Worksheets("Sheet1").Activate

    For X = 1 To NumItems

```

```

Range("A9:E9").Select
Range("A9").Activate
Set anItem = OPCMyItems.Item(ClientHandles(X) - 1)
anItem.Read OPCDevice
row = ClientHandles(X) - 2
col = 0
ActiveCell.Offset(row, col).Activate
ActiveCell.NumberFormat = "General"
ActiveCell.value = anItem.ItemID
ActiveCell.Offset(0, 1).Activate

Select Case anItem.CanonicalDataType
    Case 3
        ActiveCell.NumberFormat = "General"
    Case 7
        ActiveCell.NumberFormat = "m/d/yy h:mm AM/PM"
    Case 8
        ActiveCell.NumberFormat = "General"
        ActiveCell.HorizontalAlignment = xlRight

End Select

ActiveCell.value = anItem.value
ActiveCell.Offset(0, 1).Activate
ActiveCell.NumberFormat = "m/d/yy h:mm AM/PM"
ActiveCell.value = anItem.TimeStamp
ActiveCell.Offset(0, 1).Activate
ActiveCell.NumberFormat = "General"
ActiveCell.value = anItem.Quality
ActiveCell.Offset(0, 1).Activate
ActiveCell.NumberFormat = "General"
ActiveCell.value = anItem.CanonicalDataType
Next X
Range("A9").Activate
End Sub

```

Additional Information Resources

1. The OPC Foundation web sites located at www.OPCfoundation.org or www.OPCEurope.org
2. Book, *OPC - Fundamentals, Implementation and Application*, 2., published by Huthig Fachverlag ISBN-3-7785-2883-1, English, Amazon.com
3. Book, "Inside COM", Dale Rogerson / Microsoft Press, ISBN:1572313498, Amazon.com
4. Web site, www.microsoft.com/com/wpaper/, site includes whitepapers on COM/DCOM

Glossary

Client –

In the Client / Server model the client is defined as a requestor of services. The Server is defined as a provider of services.

COM – Component Object Model.

COM is an "industry-standard" software architecture supported by Microsoft and many other companies. COM solves is the standard way for Windows program modules (applications) to communicate with each other. COM is a protocol that connects one software module (application) with another and then drops out of the picture.

COM is a binary standard that specifies how objects interact with each other. A COM object is accessed exclusively through one or more sets of interfaces. An interface is a set of functions or methods. The COM standard not only specifies the binary object standard, it also defines a series of standard interfaces that provide common functionality. The OPC-DA specification defines several COM objects and their associated interfaces. These objects and interfaces provide a standard for real-time information exchange between software applications and process hardware.

The Maxum OPC Server uses Microsoft COM/DCOM/OLE technology to communicate with clients.

Component –

Typically a component is defined as an analysis peak result. For Maxum and Advance Optichrom analyzers analysis peak values are stored in the Result table. Every Component or Result has certain attributes associated with the Result value. For the OPC Server every Component must have a name, value and trtval defined. The trtval attribute determines if the result is visible to the OPC Server and defines the result's reference number.

NOTE: Any database variable can be placed in the Result table and assigned a name and trtval.

DCOM – The Distributed Component Object Model

DCOM extends COM to networks (remote objects). It is a new, highly optimized protocol, where remote components appear to be local.

Domain –

In Windows NT/2000/XP network security terms, a Domain is a group of machines that have reason to work together. Examples include Sales domain, Engineering domain, Account domain. Typically a Domain Server is setup that provides name and password authentication for the Users and Groups in the Domain list. Multiple domains may or may not be able to access one another unless a special relationship called a Domain Trust Relationship has been setup. A Domain user consists of the Domain name + user name.

Domain User/Groups –

In Windows NT/2000/XP network security terms, a Domain User or Group account can be used on any computer that is a member of the Domain. Authentication of the user name plus password is handled by the Primary Domain controller. It's easier to setup the DCOM permissions on both the OPC Server and Client with a Domain account as opposed to a Local User/Group account.

Group(s) –

In Windows NT/2000/XP security terms, a Group contains one to many Users A Group account is easier to maintain when user names or access permissions will change frequently. Its easier to add/delete Users from a Group when granting temporary access for maintenance reasons. Proper use of Groups is a good way to reduce long-term maintenance costs.

Local User/Groups –

In Windows NT/2000/XP network security terms, a Local User or Group account is known only to the machine the account is setup on. Local accounts cannot access another machine unless the identical Local account

(username plus password) was setup on both machines. Its typically easier to setup and use a Domain account with OPC Server and remote Clients.

OPC – OPC (OLE for Process Control)

OPC is based on Microsoft's OLE, COM (component object model) and DCOM (distributed component object model) technologies, OPC consists of a standard set of interfaces, properties, and methods for use in process-control and manufacturing-automation.

OPC is an industry standard created by the OPC Foundation in collaboration with Microsoft corporation. The OPC Foundation is an organization with over 300 members world-wide consisting of nearly all the major control systems, instrumentation, and process control systems providers.

The objective of the OPC Foundation is to develop an open, flexible, plug-and-play standard that allows instrumentation suppliers to develop standard form device drivers that "serve" the data to any application supporting an OPC client interface.

Query –

A query is a request for information from a database. In the Client / Server model the client is the requestor and the server responds with the information from the database. A database query can be fixed or active. A fixed query is evaluated exactly once and the resulting data is sent back to the client. An Active query is a procedure established on a set of data where subsequent changes in the data result in updates being sent to the requestor until the query is closed or shutdown.

Server –

In the Client / Server model the Server is defined as a provider of services. The Client is defined as a requestor of services.

User(s) –

In Windows security terms, a User is a login name + password combination used to gain access (sign on) to the Windows machine.

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