
Kepware Products for Windows 95™, 98™, 2000™,
NT™, And XP™

KepserverEx Client Connectivity Guide

For Trihedral VTS



KTSM-00025

Version 1.0.1

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32 Bit KepserverEx Connectivity Guide

Version 1.0.3

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Introduction to KepserverEx

KepserverEx is a 32 bit windows application that provides a means of bringing data and information from a wide range of industrial devices and systems into client applications on your windows PC. KepserverEx falls under the category of a "Server" application. It is very common to hear the term "client/server application" in use across many software disciplines and business segments. In the industrial market, it has usually come to mean the sharing of manufacturing or production data between a variety of applications ranging from human machine interface software and data historians, to large MES and ERP applications.

Regardless of the business segment served, client/server applications have one thing in common: a standardized method of sharing data. In the industrial segment, many client/server technologies have been developed over the last ten years. Initially, some of these technologies were proprietary. In many cases these proprietary client/server architectures were in wide use but remained unavailable to third party applications. Early in the development of windows, Microsoft provided a generic client/server technology called DDE or Dynamic Data Exchange. DDE did provide a basic architecture that would allow many windows applications from a wide range of vendors to share data, but there was one problem. DDE was not designed for the industrial market. It lacked much of the speed and robustness desired in an industrial setting. However, this did not stop DDE from becoming a dominant client/server architecture, largely due to its availability in most windows applications. In time, variations on Microsoft's DDE were developed by some of the leading vendors in the market. These variations addressed some of the speed and reliability issues of DDE but many people in the industrial segment agreed that a better system needed to be developed.

With the advent of 32 bit Operating Systems, and the use of Ethernet to provide communications between devices, there was a need for quicker and cleaner data transfer between software applications. This is where OPC saw its birth into the industry.

OPC (OLE for Process and Control) servers provide a standardized method of allowing multiple industrial applications to share data in a quick and robust manner. The OPC server provided in this package has been designed to meet the demanding requirements found in the industrial environment.

This OPC server has been designed as a two-part program. The primary component provides all of the OPC and DDE connectivity as well as the user interface functions. The second part is comprised of plug-in communications drivers. This two-part design allows you to add multiple communications options to your SCADA application while utilizing a single OPC server product thus reducing your learning curve as your project grows.

OPC technology reflects the move from closed proprietary solutions to open architectures that provide more cost-effective solutions based on established standards.

Accessing KepserverEx

A Windows based client application must be used to view data from the KepserverEx application. In this section we will cover the basics of connecting a number of common OPC clients to KepserverEx. While we cannot possibly cover every client application that exists, we believe that after reviewing this document you should be able to deal with most client applications.

The intention of this section is to show connectivity to KepserverEx. It is assumed that you have already either configured your KepserverEx application by selecting the appropriate driver and settings or you have run the Simulator demo (Simdemo.opf) which is included with KepserverEx. For simplicity, the Simdemo project will be used for all examples contained in this section.

Before beginning any of the examples, start the KepserverEx application by selecting it from your Start Menu or from its desktop icon. Once the server is loaded, use the File|Open command to

load the “Simdemo” project. The KepserverEx application is always active once you have opened an existing project or configured at least one channel and device in a new project. After you have selected a project, in this case the Simdemo project, KepserverEx will automatically load this project when an OPC client application invokes KepserverEx’s OPC server component.

Users have always had the ability to create what we refer to as “user defined tags” in their KepserverEx application. Prior to OPC, defined tags gave a DDE application designer the ability to create a label for device data. Assume register 1000 contained the value of parts made, without defined tags a DDE application would have directly accessed register 1000. Using defined tags a label can be created like “PartsMade”. Now the DDE application could access the data via this new label, removing the machine level knowledge from the client application and keeping it at the server level where it belongs. This label, while useful for DDE is a necessity for OPC clients. For OPC clients, defined tags take on a greater role. Like the DDE example, defined tags allow you to create labels for your device data and keep the configuration of those tags in the server. OPC clients have a major advantage over DDE clients. OPC clients can browse the defined tags you create in your KepserverEx application, which allows you to simply point and click on a tag to add it to your OPC client project.

OPC Tag Browsing allows you to see a list of the defined tags you have created in your KepserverEx application, directly within your OPC client application.

For more information on defined tags see the “Designing a Project” section of the KepserverEx help file, which can be accessed from the Help/Contents menu selection of the KepserverEx application.

Using KepserverEx Drivers

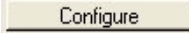
Part of the innovative design of Kepware’s OPC/DDE Server Technology is the separation of the Hardware Protocol Driver from the Server Technology. This separation allows the user to use one or more drivers in the server at the same time. Each driver has its own help file which provides information on devices supported, communications parameters, cabling, addressing, and error messages.

The driver help file should contain all of the information you will need to connect your device to the PC so that you can talk to it via the KepserverEx. If you do not connect to the device be sure to check the error messages and look up their meaning in the help file.

VTSTM as an OPC Client

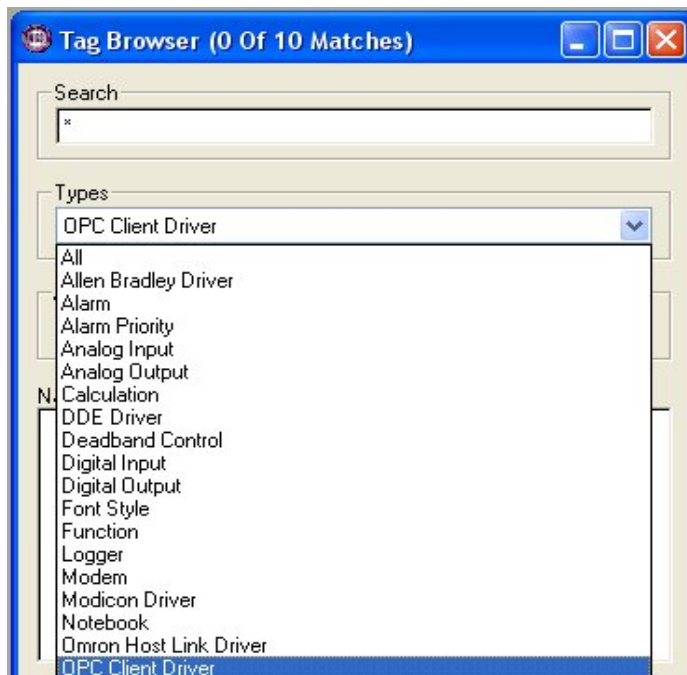
The following steps will show you how to connect to KepserverEx from Visual Tag System 7.1 as an OPC client.

Connect to the Server from VTSTM

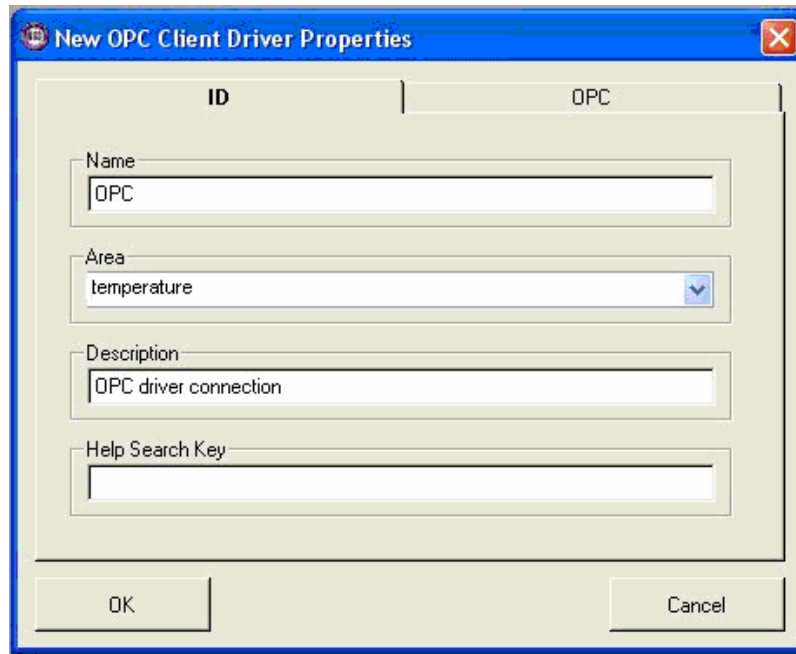
To create an OPC connection to KepserverEx using VTS 7.1, open the VTS project and click the configure button  in the upper right of the **Overview** window. On the newly

activated toolbar, click the **Browser** button  to open the **Tag Browser** window. In the **Tag Browser** window locate the **Types** dropdown menu bar and select **OPC Client Driver**.

KepserverEx is capable of being an OPC or DDE server to VTS. If you define an OPCClient object in Lookout, then KepserverEx will be an OPC server to it. Likewise, if you define a DDE object in Lookout, KepserverEx will be a DDE server

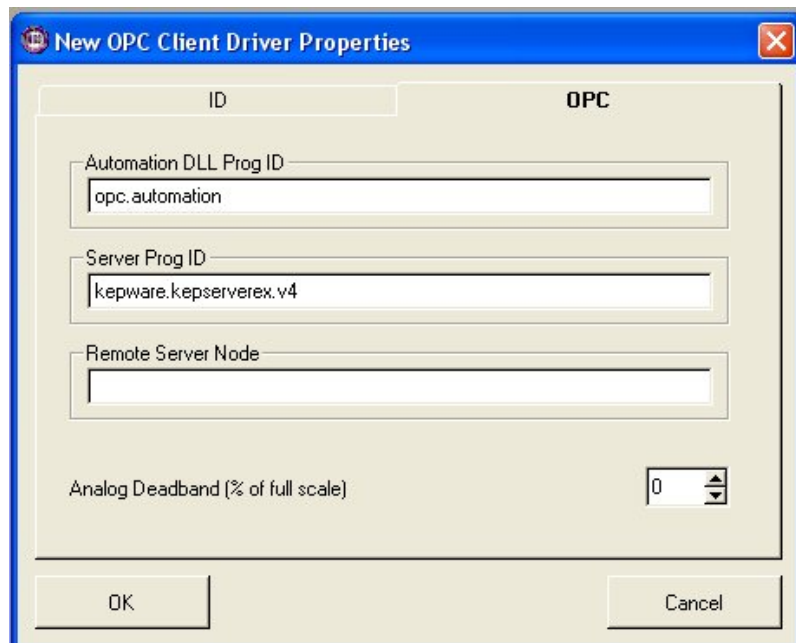


Click the New button to open the OPC Client Driver Properties window. Enter a name for the driver and press enter. (Always press the “ENTER” key when entering text in the text boxes to ensure it registers with the program.) In the Area drop down box enter a unique name that will be easily identifiable when creating tags later. The Area name is used for organizing and linking tags later in the project creation process; in this example we will use *temperature*. The Description field is optional, however we recommend adding a description for organizational purposes. This field is useful when browsing connections and tags in the browser window.



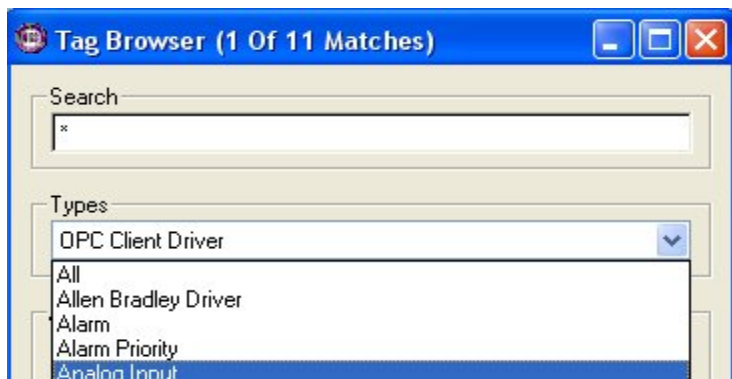
The dialog box is titled "New OPC Client Driver Properties". It has two tabs: "ID" and "OPC". The "ID" tab is currently selected. It contains four text input fields: "Name" with the value "OPC", "Area" with a dropdown menu showing "temperature", "Description" with the value "OPC driver connection", and "Help Search Key" which is empty. At the bottom are "OK" and "Cancel" buttons.

The **Driver ID** section is now complete. Click the **OPC** tab. In the **Automation DLL Prog ID** text box enter “**opc.automation**”. In the **Server Prog ID** field enter, “**Kepware.kepserverex.v4**”. The **Server Prog ID** is different for Kepserver Enterprise. The **Server Prog ID** can be found by launching the OPC Quick Client from the server, right clicking the server name at the root of the browsing tree and viewing its properties. This is all that is required for a local OPC connection. If connecting to a remote server the **Remote Server Node** must be entered. (Note: Remote Server Nodes can be either the remote machine name or IP Address.) Click OK to finish the driver setup.

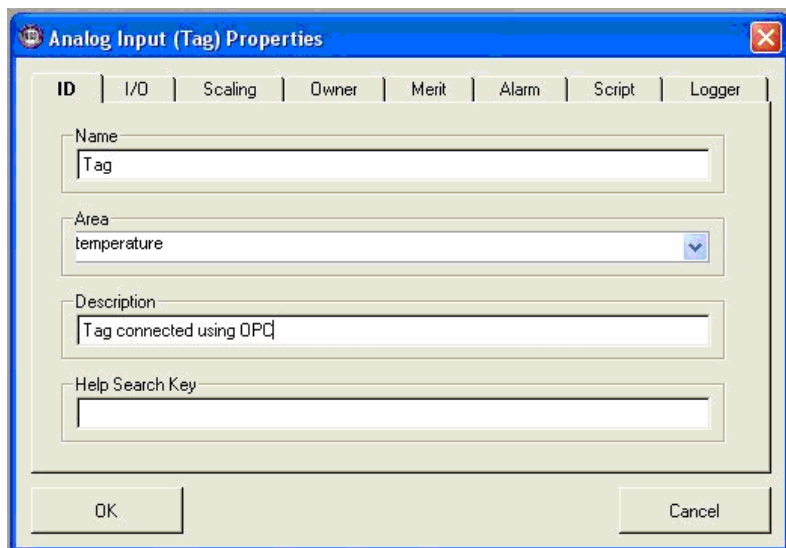


The dialog box is titled "New OPC Client Driver Properties". It has two tabs: "ID" and "OPC". The "OPC" tab is currently selected. It contains three text input fields: "Automation DLL Prog ID" with the value "opc.automation", "Server Prog ID" with the value "kepware.kepserverex.v4", and "Remote Server Node" which is empty. Below these fields is a numeric spinner for "Analog Deadband (% of full scale)" set to "0". At the bottom are "OK" and "Cancel" buttons.

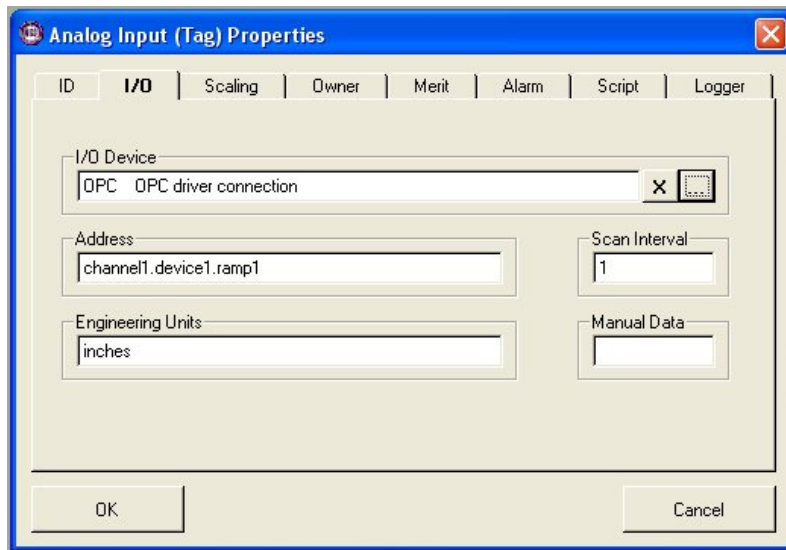
To create tags select **Analog Input** from the **Types** drop down menu in the **Tag Browser** window.



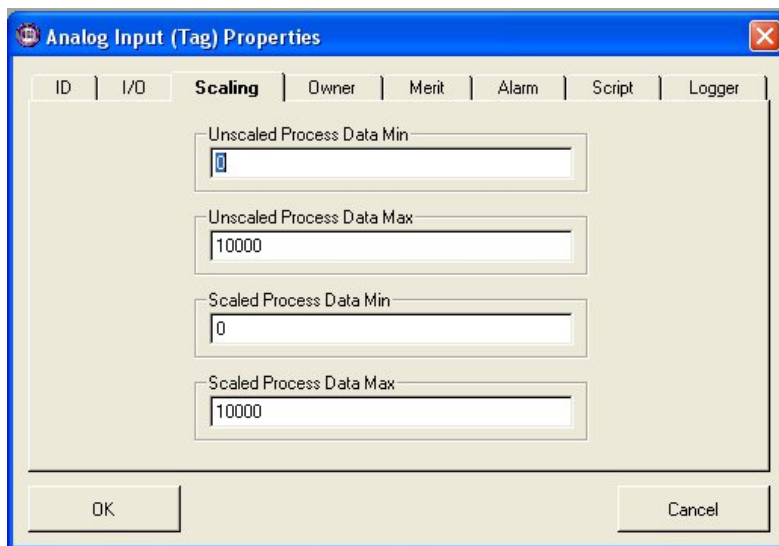
Click New to open the Analog Input Properties window. Enter a unique name for the tag in the **Name** text box and press enter. In the **Area** drop down menu select the name entered in the driver identification setup; we used *temperature* as an example. The **Area** name links tags to the driver. The **Description** field is optional, however we recommend adding a description for organizational purposes. This field is useful when browsing connections and tags in the browser window.




Click the **I/O** tab. The **I/O Device** text box should read, “No Tag Selected.” Click the “...” button to the right of the text box to browse for the I/O Device. Select the OPC device created earlier by double clicking the name, or by highlighting the name and clicking the **select** button located in the bottom right of the window. In the **Address** text box, enter the address of the tag located in the KepserverEx. This should be entered in the following format:
<channelname.devicename.tagname>. (Do not use <,> symbols in **Address** name; those are strictly for clarification purposes). For example, **channelA.simulator.r0001** is an acceptable **Address** name. This is all that is required in the **I/O** tab. The remaining features are optional.



Choose the **Scaling** tab to set up data handling for the tag. Enter the raw data values for the server tag in the **Unscaled Process Data Min** and **Unscaled Process Data Max** fields. Enter any scalar requirements in the **Scaled Process Data Min** and **Scaled Process Data Max** fields. Click OK to close the window.



Select the tag name in the **Tag Browser** window and click the **Draw** button  in the lower right corner of the window. Select the **Meter 3** object, and choose a location on the workspace to place the object.




Data should be viewable from the display meter. This completes the OPC connection setup.

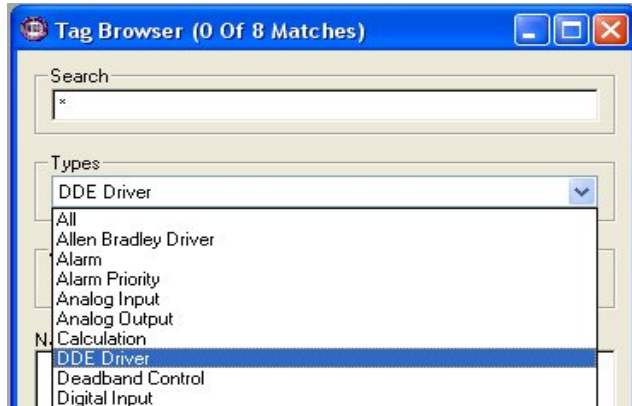
VTSTM as a DDE/NetDDE Client

The following steps will show you how to connect to KepserverEx from Visual Tag System 7.1 as a DDE or NetDDE client.

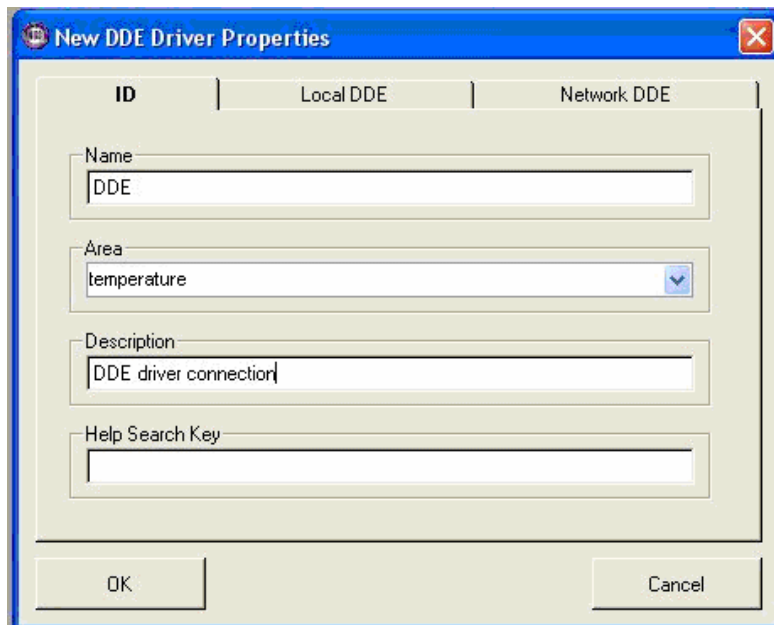
Connect to the Server from VTSTM

To create a DDE, or a NetDDE connection to KepserverEx using VTS 7.1, open a VTS project and click the configure button  in the upper right of the **Overview** window. On

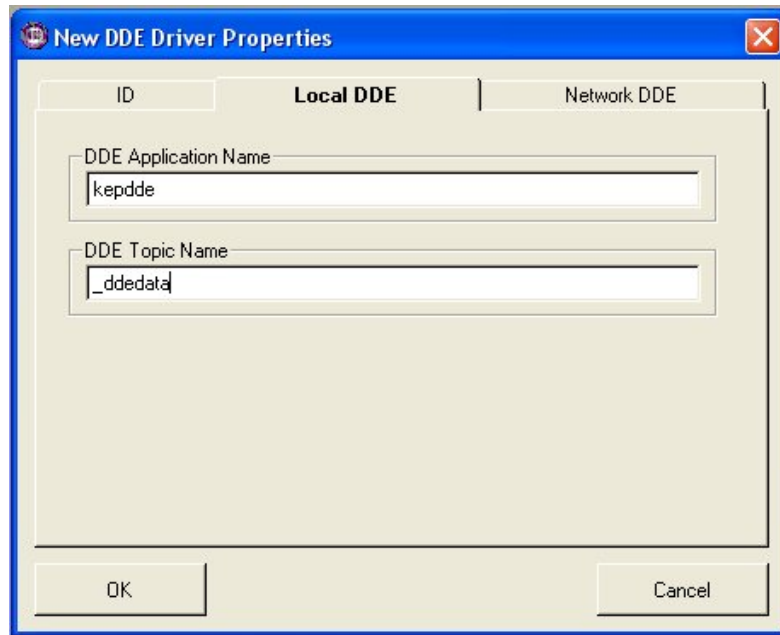
the newly activated toolbar, click the **Browser** button  to open the **Tag Browser** window. In the **Tag Browser** window locate the **Types** dropdown menu bar and select **DDE Driver**.



Click the **New** button to open the **New DDE Driver Properties** window. Enter a name for the driver and press enter. (**Always press the “ENTER” key when entering text in the text boxes to ensure it registers with the program.**) Enter a unique name in the Area drop down box that will be easily identifiable when creating tags later. The **Area** name is used for organizing, and linking tags later in the project creation process; in this example we will use *temperature*. The **Description** field is optional, however we recommend adding a description for organizational purposes. This field can be useful when browsing connections and tags in the browser window.

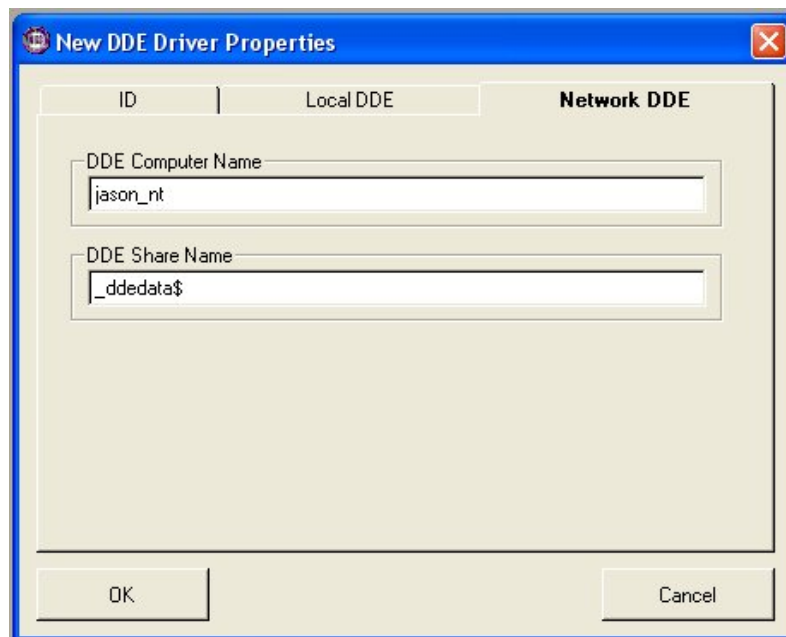


The **Driver ID** section is now complete. Click the **Local DDE** tab. In the **DDE Application Name** box enter the service name for the KepserverEx. The default name is **kepdde**, (this information can be found in the server Tools->Options->DDE tab in the **service name** text box). Enter the **DDE Topic Name** “_ddedata”. Click OK to finish the driver setup.



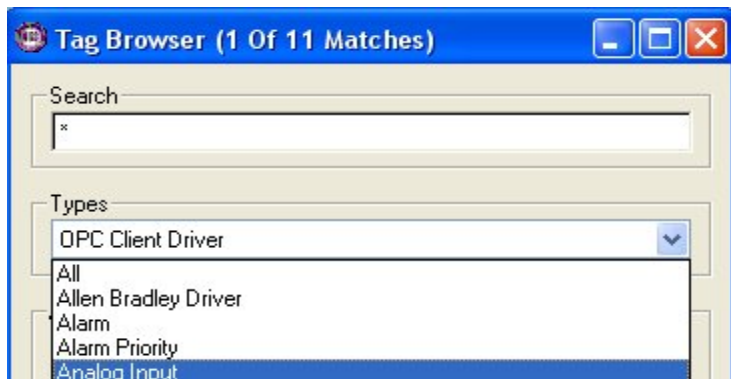
The screenshot shows the 'New DDE Driver Properties' dialog box with the 'Local DDE' tab selected. The 'DDE Application Name' field contains 'kepdde' and the 'DDE Topic Name' field contains '_ddedata'. The 'ID' and 'Network DDE' tabs are also visible.

To set up a **Network DDE** driver, select the **Network DDE** tab. In the **DDE Computer Name** text box enter the name of the machine running the remote server. (Note: IP addresses in the DDE Computer Name field do not seem to be supported. Use only the computer name for this type of connection.) In the **DDE Share Name** text box enter “_ddedata\$”. Click OK to complete the driver setup.

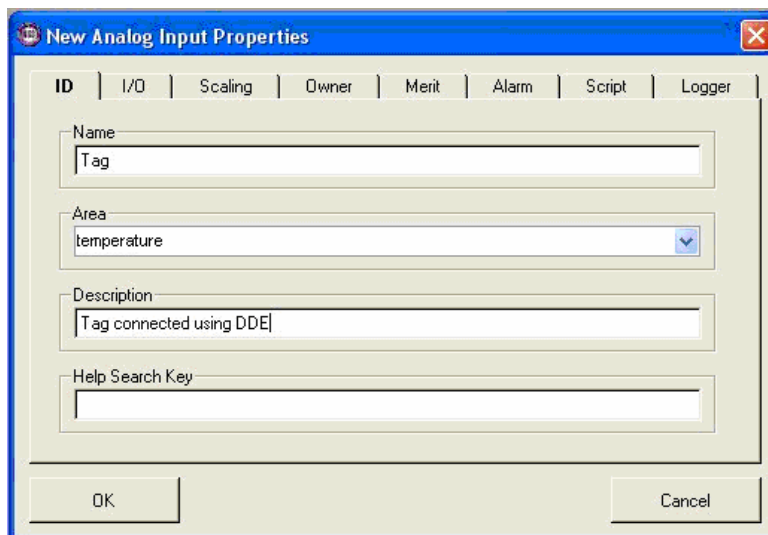


The screenshot shows the 'New DDE Driver Properties' dialog box with the 'Network DDE' tab selected. The 'DDE Computer Name' field contains 'jason_nt' and the 'DDE Share Name' field contains '_ddedata\$'. The 'ID' and 'Local DDE' tabs are also visible.

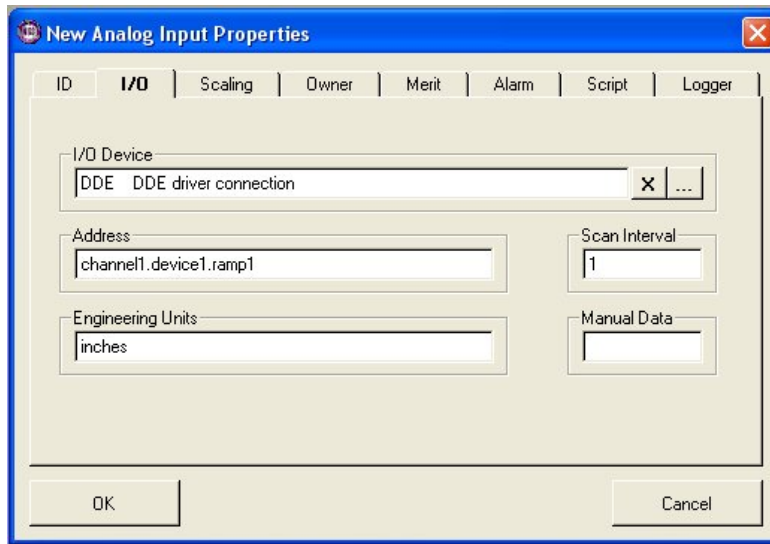
To create tags select **Analog Input** from the **Types** drop down menu in the **Tag Browser** window.



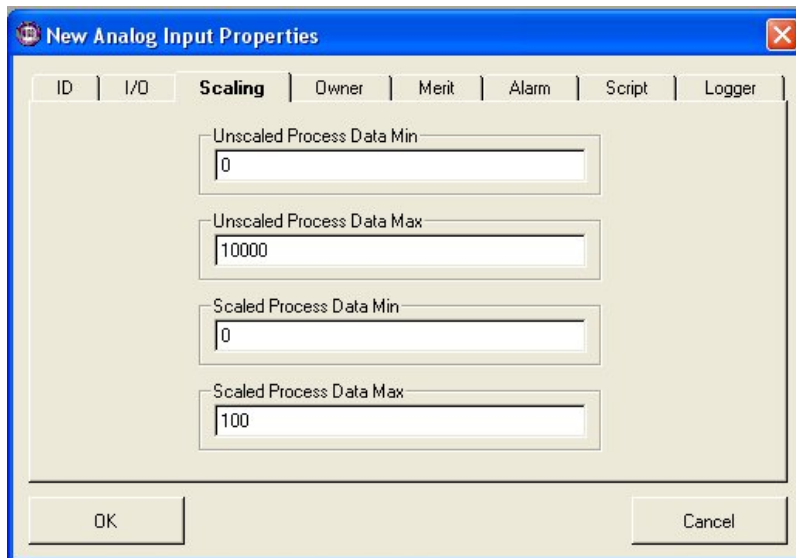
Click **New** to open the Analog Input Properties window. Enter a unique name for the tag in the **Name** text box and press enter. In the **Area** drop down menu, select the name entered in the driver identification setup; we used *temperature* as an example. The **Area** name links tags to the driver. The **Description** field is optional, however we recommend adding a description for organizational purposes. This field is useful when browsing connections and tags in the browser window.




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Data should be viewable from the display meter. This completes the DDE/NetDDE connection setup.

Using Kepware's OPC Quick Client

Kepware provides an OPC client application for testing purposes with each installation of KEPServerEX. For more information on Kepware's **OPC Quick Client**, please see the OPC Quick Client help file.