

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

KepserverEx Client Connectivity Guide

For Wonderware's Intouch



KTSM-00006

Copyright © 2001, Kepware Technologies

KEPWARE END USER LICENSE AGREEMENT AND LIMITED WARRANTY

The software accompanying this license agreement (the Software) is the property of Kepware Inc, and is protected by United States and International Copyright laws and International treaty provisions. No ownership rights are granted by this Agreement or possession of the Software. Therefore, you must treat the Licensed Software like any other copyrighted material (e.g., a book or musical recording), except that you may make a single copy for backup or archival purposes. Your rights and obligations in its use are described as follows:

1. You may use and display this software on a single computer.
2. You may make one copy of the software for archival purposes or you may copy the software onto your hard disk and hold the original for archival purposes.
3. You may not modify or attempt to reverse engineer the software, or make any attempt to change or even examine the source code of the software.
4. You may transfer the software to another computer using the utilities provided. However, the software must be used on only a single computer at one time.
5. You may not give or distribute copies of the software or written materials associated with the software to others.
6. You may not sub-license, sell, or lease the software to any person or business.

Return Policy

The original licensee of the software can return it within sixty (60) days of purchase. Please call us for a Return Material Authorization Number.

Limited Warranty

Kepware does not warrant that the Software will be error free, that it will satisfy your planned applications or that all defects in the Software can be corrected. If Kepware provides information or assistance regarding the use of the Software or otherwise, Kepware is not assuming the role of engineering consultant. Kepware disclaims responsibility for any errors or omissions arising in connection with engineering in which its Software or such information or assistance is used.

The foregoing is the sole and exclusive warranty offered by Kepware.

Kepware disclaims all other warranties, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, with regard to the licensed software and all accompanying materials.

In no event shall Kepware be liable for incidental or consequential damages, including lost profit, lost savings, lost opportunities, or other incidental or consequential damages arising out of the use or inability to use the licensed software, even if Kepware has been advised of the possibility of such damages.

Kepware's entire liability shall be, at Kepware's option, either (a) return of the price paid for the Software (or component), or (b) repair or replacement of the Software (or component) that does not meet Kepware's Limited Warranty and which is returned to Kepware within the warranty period. This shall be the sole and exclusive obligation of Kepware and your sole and exclusive remedy with respect to any such failure. The Limited Warranty is void if failure of the Software (or component) has resulted from accident, abuse or misapplication.

Support

Kepware provides *unlimited e-mail* support for all Software whether a demo or registered license. Kepware will provide a total of *two hours* free phone support for all registered Software after paying the applicable license fees. Kepware will provide *unlimited phone* support so long as you have paid Kepware any applicable maintenance or support fees and subject to the terms of those agreements. All corrections and maintenance releases will be made available through Kepware's Internet site. All major product releases of the Software are subject to upgrade fees. At no time will on-site support be provided without advance payment to Kepware for a minimum of two days on-site engineering support services, plus all expenses.

Trademarks

Microsoft[®] and Microsoft Excel[®] are registered trademarks, Windows[™] is a trademark of Microsoft Corporation.

32 Bit KepserverEx Connectivity Guide

Kepware Technologies

81 Bridge Street
Yarmouth, Maine 04096

Sales: (207) 846-5881

Technical Support: (207) 846-5881

Fax: (207) 846-5947

E-mail: Sales@kepware.com or
technical.support@kepware.com

Home Page: <http://www.Kepware.com>

Copyright © 2001, Kepware Technologies

Table of Contents

INTRODUCTION TO KEPSERVEREX	1
ACCESSING KEPSERVEREX	1
USING KEPSERVEREX DRIVERS	2
WONDERWARE'S INTOUCH® AS A FASTDDE® OR SUITELINK® CLIENT.....	3
CONNECT TO KEPSERVEREX WITH FASTDDE® OR SUITELINK®	3
<i>Verify FastDDE/SuiteLink Support in the Server.....</i>	<i>3</i>
<i>Add an Alias (DDE Topic)</i>	<i>4</i>
<i>Create an InTouch® project</i>	<i>5</i>
Add Access Name Links to your Project	6
Add Tags to the Tagname Dictionary	9
<i>Create a Window to Show the Device Values</i>	<i>10</i>
Add and Animate a Text Object.....	11
CHECK THE CONNECTION TO THE SERVER AND VIEW DATA	13
USING KEPWARE'S OPC QUICK CLIENT	15

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 we can talk to it. If you do not connect to the device be sure to check the error messages and look up their meaning in the help file.

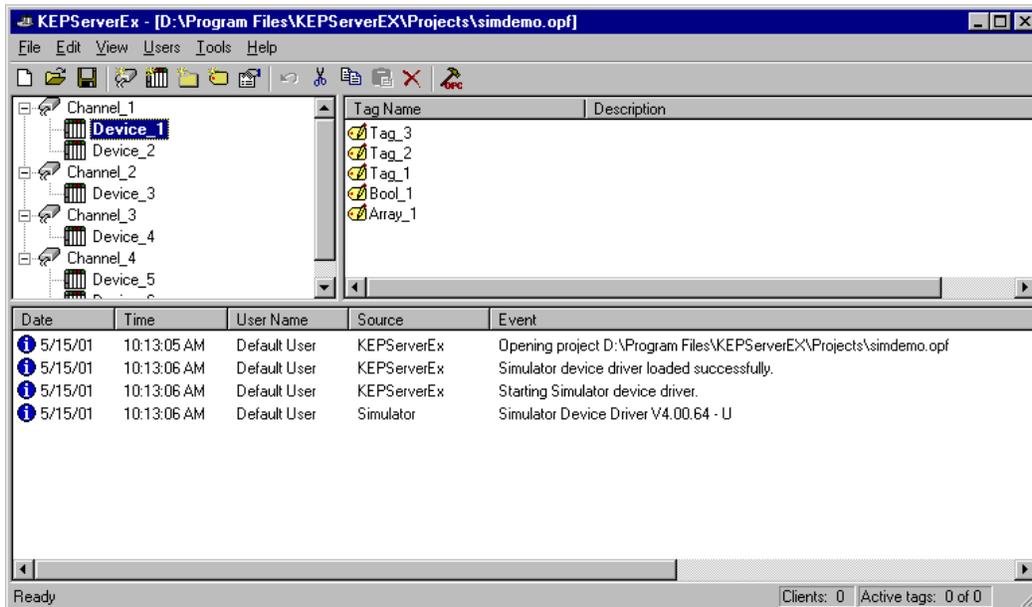
Wonderware's InTouch® as a FastDDE® or SuiteLink® Client

Connect to KepserverEx with FastDDE® or SuiteLink®

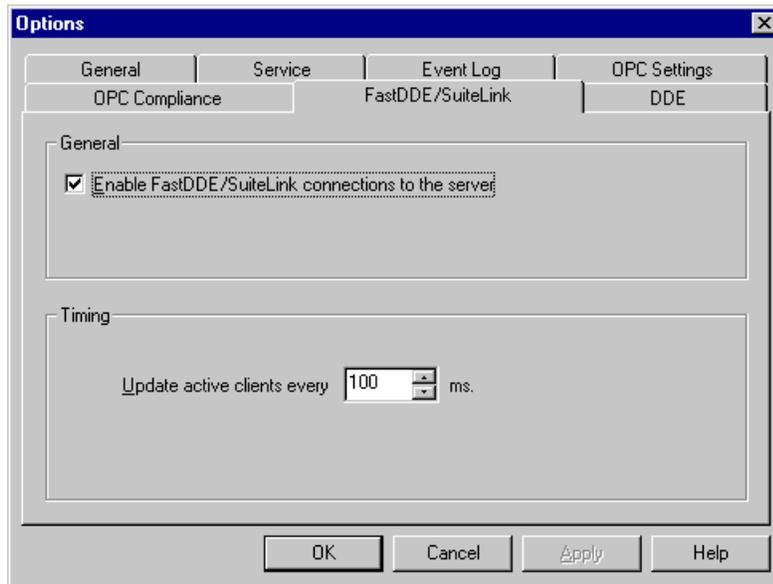
Wonderware provides several ways to connect to third party servers like KepserverEx. At the core of all Wonderware connectivity is FastDDE and SuiteLink. FastDDE and SuiteLink allow Wonderware applications such as InTouch to receive data from servers like KepserverEx. The following steps will show you how to create FastDDE and SuiteLink connections to KepserverEx. *For our example we used InTouch V7.1 and KepserverEx V4.40.154.*

Verify FastDDE/SuiteLink Support in the Server

1. Start up the KepserverEx “Simdemo.opf” project.



2. It is important to make certain that the server properly detected that you have Wonderware FS2000 Common Components or InTouch Runtime Components version 8.0 or higher installed, and that FastDDE and SuiteLink support has been enabled. You can verify this by selecting Tools|Options... from the server main menu.
3. If Wonderware or InTouch components were properly initialized on your PC and the server detects it, you should see the FastDDE/SuiteLink tab in the Options dialog box. Click the tab.



4. Verify that Enable FastDDE/SuiteLink connections to the server is checked. The client update rate is set to 100msec by default and can be changed at any time.
5. Click OK to close the Options dialog.

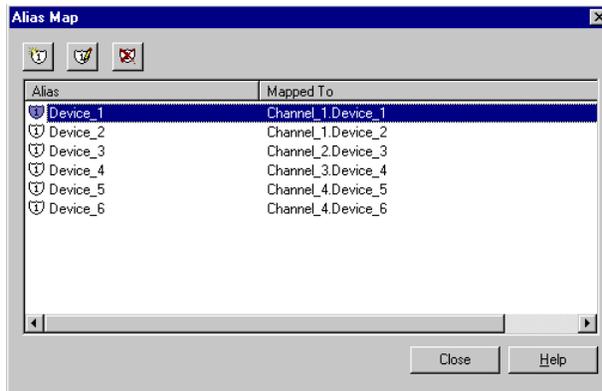
Add an Alias (DDE Topic)

You cannot use dynamic tags with tag groups. See the KepserverEx help file for an explanation of Dynamic and Static tags.

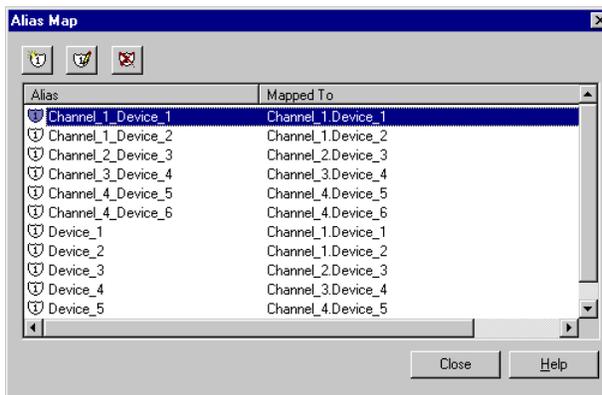
DDE connections consist of three components, an Application name, a Topic, and an Item. When connecting to KepserverEx via Fastdde or Suitelink the Application name will always be "Servermain". This name is automatically defined in the server and cannot be changed for Fastdde/Suitelink connections. There are two ways to reference the Topic component. The first way is via a Topic reference of "_ddedata". If you would like more info on this method please refer to the "How Do I..." section of the KepserverEx main help file. The preferred method to reference the DDE Topic is using the Alias Map feature of the server. The Alias Map is a special feature that simplifies the use of server data in DDE applications. Additionally, the Alias Map provides a mechanism for backwards compatibility with legacy Kepserver V3 applications. In this example we will merely explain how to create or use an Alias, if you would like more information please refer to the KepserverEx main help file.

If you are upgrading from a legacy Kepserver V3 project, simply select a file type of .kdp from the server File|Open menu option and then save your project into the new .opf format. When you do this, Alias references will be created automatically. To view these alias references select Edit|Alias Map... from the server main menu.

In the two examples below you will see aliases made to ensure backwards compatibility and you will see the aliases that the server automatically creates for a project. You will notice that in KepserverEx the automatic alias is a combination of the channel and device name. The server will modify these automatic aliases whenever you make changes to the Channel or Device name. For a detailed explanation on creating aliases see Designing a KepserverEx Project in the KepserverEx help file.



Alias map of imported legacy Kepserver V3 project file. Notice that the Alias name is the same as the device name.



Example of imported project after it has been re-opened. Notice that the server automatically creates an Alias composed of the channel and device name.

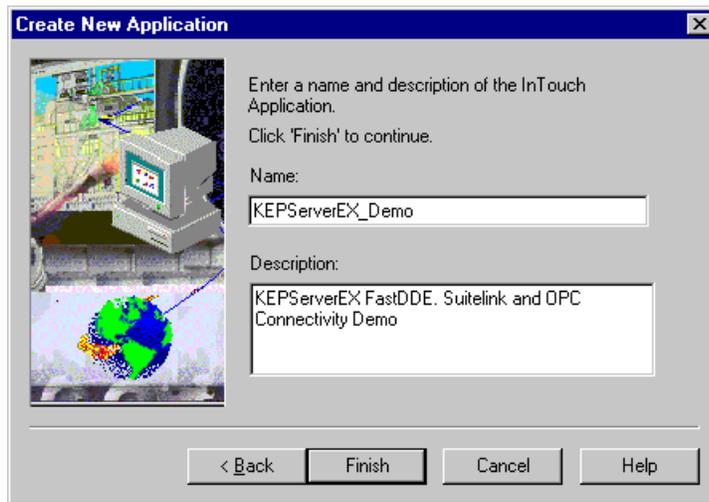
6. In this example we are using the sample KepserverEx project called “Simdemo.opf”, so you will not need to create an alias.

If you wish to learn how to create aliases for your device and group folders, then go to “Designing a KepserverEx Project” in the Server Help file.

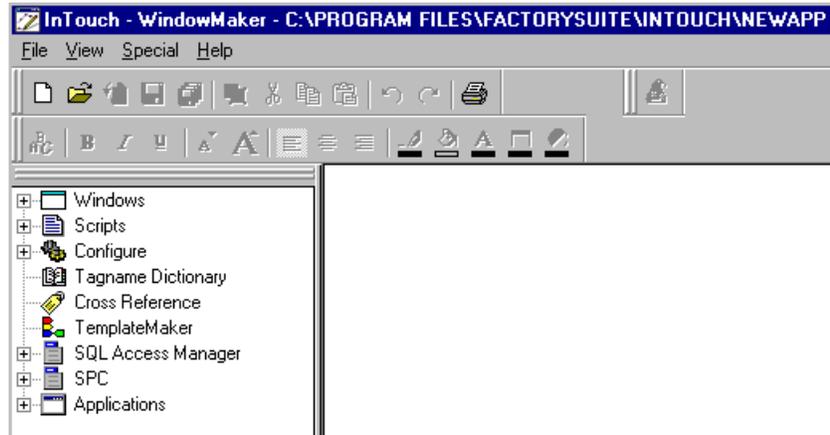
Create an InTouch® project

Now we need to create an InTouch Application Project. The InTouch project will act as the DDE client to the KepserverEx. If you are using the Simdemo.opf server project it will return simulated data to InTouch. If you are using one of the more than 50 actual device drivers in the server, the server will use the device driver to poll the PLC or device and return the data to the DDE client.

1. Start the InTouch Application Manager and then create a new project by selecting File|New... from the main menu.

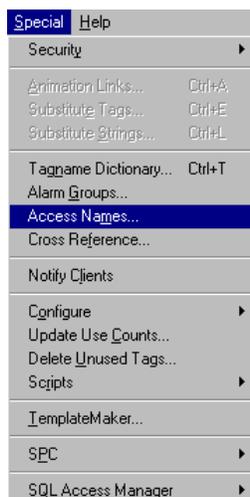


2. In the Create New Application dialog box enter a Name for your new InTouch project. You may also enter a Description if you wish. Once your are done, click Finish to continue and start InTouch WindowMaker.



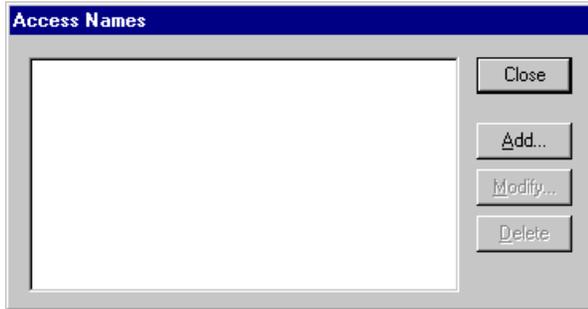
Add Access Name Links to your Project

Now that we have a new application we need to link it to Kepware's server.

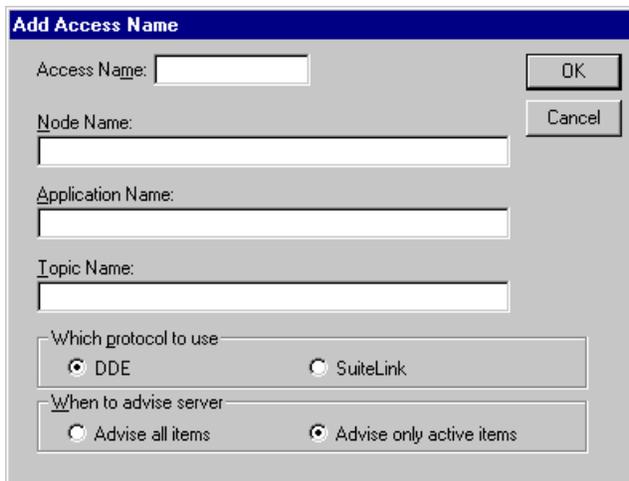


1. For multiple server devices, remember to create a separate Access Name for each Device in your KepserverEx project. In this example we will create a single Access Name, which will be linked to the first Device in the KepserverEx project (Device_1). To do this select Special|Access Names... in the WindowMaker main menu.

See the InTouch Users Guide and Reference Manuals for details on creating and using Access Names in applications.



2. Click on Add to add a new Access Name.



3. Enter a unique Access Name, we made ours “KEPServerEx_FS”. The Application Name will always be “Servermain”. The Topic Name will be the alias that we created for the first device “Device_1”. Leave the Node Name blank.
4. This will be a DDE connection so we will select that protocol option.
5. We will select Advise only active items. See the InTouch Users manual for an explanation of the two Advise options.

If we were connecting to a remote PC then we would enter its Name in Node Name.

Add Access Name

Access Name:

Node Name:

Application Name:

Topic Name:

Which protocol to use

DDE SuiteLink

When to advise server

Advise all items Advise only active items

6. Click OK to add the access name. For our example we will also add an access name for a SuiteLink connection.
7. For SuiteLink connections to other PC's you should enter a Node Name which will be the name of the PC that is running the server project you wish to connect to, otherwise leave it blank.

Add Access Name

Access Name:

Node Name:

Application Name:

Topic Name:

Which protocol to use

DDE SuiteLink

When to advise server

Advise all items Advise only active items

8. Once you have added all of the Access Names click Close to return to your project.

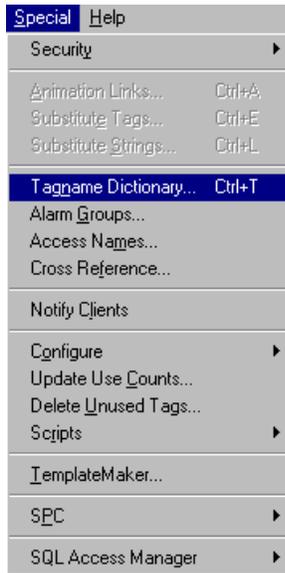
Access Names

KEPServerEX_FS

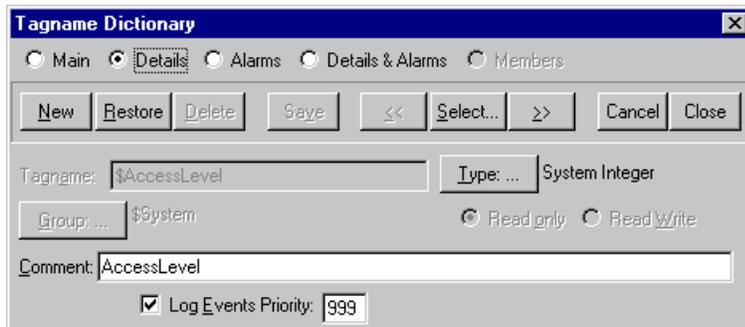
KEPServerEX_SL

Add Tags to the Tagname Dictionary

Now that we have created the links to the server we can add tags to the Tagname Dictionary.



1. Select Special|Tagname Dictionary... from the WindowMaker main menu.



2. In the Tagname Dictionary click on New to add a new tag.
3. Because we started adding tags while we were on an internal tag the new tag form opens with a tag type of Memory Integer. We will be using an Integer as well so click on Type ... and select I/O Integer from the list.
4. Next click on Access Name ... to select where the data for this tag will be coming from. We chose KEPServerEx_FS for this tag.
5. Enter a Tagname for the tag, we entered KEPServerEx_INT1 for this tag.
6. For the Item field at the bottom left of the tag property window, we used a reference of Tag_1. This tag had been pre-defined in the server Simdemo project and is called a User Defined tag. In the server the data type is defined as Short which is a signed 16-bit integer.
7. Click on Save to accept the new tag. At this point you can go to the next section and display data if you wish.

See the InTouch Users Guide and Reference Manuals for details on creating and using Tags in applications.

The screenshot shows the 'Tagname Dictionary' dialog box with the following settings:

- Buttons: New, Restore, Delete, Save, <<, Select..., >>, Cancel, Close
- Tagname: KEPServerEX_INT1
- Type: I/O Integer
- Group: \$System
- Read/Write: Read Write (selected)
- Comment: AccessLevel
- Log Data: Log Events: Retentive Value: Retentive Parameters:
- Initial Value: 0
- Min EU: -32768
- Max EU: 32767
- Deadband: 0
- Min Raw: -32768
- Max Raw: 32767
- Eng Units: (empty)
- Conversion: Linear (selected), Square Root
- Access Name: KEPServerEX_FS
- Item: Tag_1
- Use Tagname as Item Name: Log Deadband: 0

- Next we are going to add a second tag. This is an example of a dynamic tag.
- The new tag will have a Tagname of KEPServerEx_INT4_Dynamic and the item will be R200, which is a valid address within the server. We assigned this one to our SuiteLink node, Access Name KEPServerEx_SL.

The screenshot shows the 'Tagname Dictionary' dialog box with the following settings:

- Buttons: New, Restore, Delete, Save, <<, Select..., >>, Cancel, Close
- Tagname: KEPServerEX_INT4_Dynamic
- Type: I/O Integer
- Group: \$System
- Read/Write: Read Write (selected)
- Comment: AccessLevel
- Log Data: Log Events: Retentive Value: Retentive Parameters:
- Initial Value: 0
- Min EU: 0
- Max EU: 65535
- Deadband: 0
- Min Raw: 0
- Max Raw: 65535
- Eng Units: (empty)
- Conversion: Linear (selected), Square Root
- Access Name: KEPServerEX_SL
- Item: R200
- Use Tagname as Item Name: Log Deadband: 0

If you would like more info on Dynamic and User-Defined tags, please refer to the "Designing a KepserverEx Project (Step5)" of the server main help file.

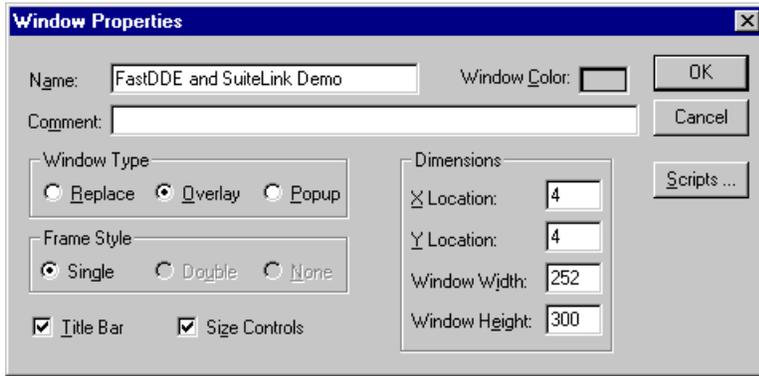
- Once you have added your tags click Close to close the Tagname Dictionary.

Create a Window to Show the Device Values

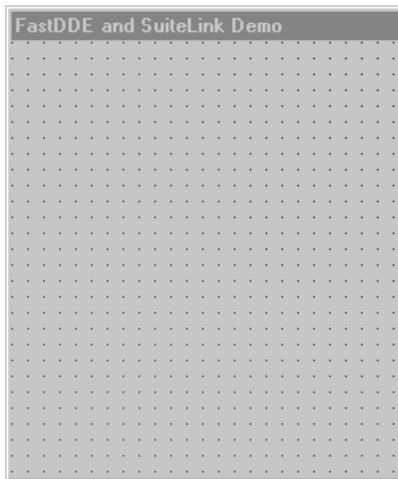
Now we need to display our data in our project.

- In the WindowMaker main menu click on New|Window to add a new window to the project.

See the InTouch Users Guide and Reference Manuals for details on creating windows in applications.



2. Give your window a name that will be displayed on the Title Bar, if checked, and click OK to accept the properties.



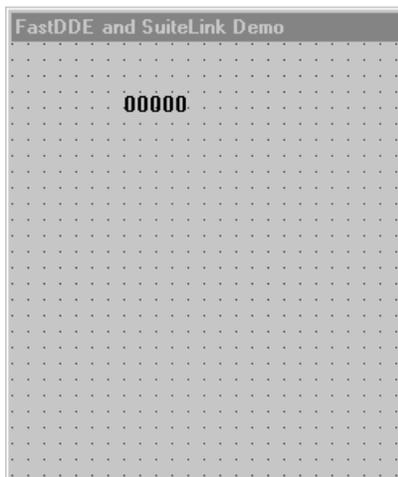
Add and Animate a Text Object

Now we need to add a text object to show the value of one of our tags.

3. On the WindowMaker Toolbar select the Text icon.



4. Click on the object window and create a data object by entering the maximum number of "0" digits that the item data will display.



- Double click on the new text object to add an animation link to it.
- For the purposes of our demo we are selecting Analog User Input under Touch Links.

The screenshot shows a configuration dialog box with several sections:

- Touch Links:**
 - User Inputs: Discrete, Analog, String
 - Sliders: Vertical, Horizontal
 - Touch Pushbuttons: Discrete Value, Action, Show Window, Hide Window
- Line Color:** Discrete, Analog, Discrete Alarm, Analog Alarm
- Fill Color:** Discrete, Analog, Discrete Alarm, Analog Alarm
- Text Color:** Discrete, Analog, Discrete Alarm, Analog Alarm
- Object Size:** Height, Width
- Location:** Vertical, Horizontal
- Percent Fill:** Vertical, Horizontal
- Miscellaneous:** Visibility, Blink, Orientation, Disable
- Value Display:** Discrete, Analog, String

- Clicking the Analog button will also check the use box and open the animation properties dialog for it.

The screenshot shows the 'Input -> Analog Tagname' dialog box with the following fields and options:

- Object type: Text
- Prev Link, Next Link, OK, Cancel buttons
- Tagname: [Empty text box]
- Key equivalent: Ctl, Shift, None
- Msg to User: [Empty text box]
- Keypad?: Yes, No
- Min Value: -32768, Max Value: 32767
- Input Only
- OK, Cancel, Clear buttons

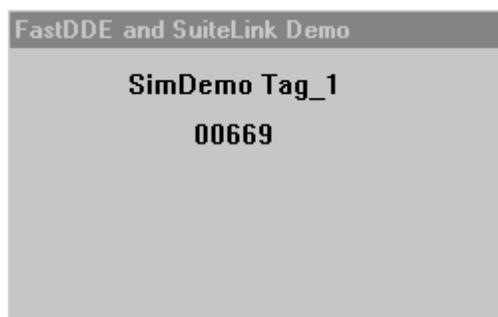
- Enter the Tagname to display, we chose to use Tag KEPServerEx_INT1.

The screenshot shows the 'Input -> Analog Tagname' dialog box with the 'Tagname' field containing the text 'KEPServerEX_INT1'. All other fields and options are the same as in the previous screenshot.

- Click OK to exit.

Check the Connection to the Server and View Data

1. To view active data, click on runtime in the upper right corner of WindowMaker. You should now see data ramping in the WindowViewer as well as an active client and items on the Connection Status Bar at the lower right edge of the KepserverEx project window.



2. If you do not see a ramping value, compare the configuration steps in this documentation to your project to verify that everything is configured correctly. Check the server Connection Status Bar to confirm that your InTouch application is connecting to the server, and then look in the Event window in the bottom of the server application view to check for error messages. If you have questions, please refer to the Support section of www.kepware.com for technical support assistance.

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.