



Modem Connectivity

V4.X

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Enable Modem Functionality

Modem Support

KepserverEx™ supports the use of modems on all serial communication drivers. Once modem operation has been enabled for a KepserverEx™ project, a set of predefined modem tags become available to client applications for modem monitoring and control. These modem tags provide control of phone number, dial, hang up, and auto answer mode. Additional modem tags provide status of the modem connection. Using these modem tags, client applications can be designed to control all aspects of a dialup modem connection. The built in Modem capabilities of KepserverEx will allow you to extend your system management and data gathering needs beyond the local facility.

Before accessing modem tags for use in an OPC/DDE client application, you must first enable modem functionality. A description on how to do so is described in the first section of this document. Following the Enable Modem section are two examples of implementing a modem connection using KepserverEx™. The first example is intended for those using a browsing **OPC client** to access Modem tags in the KepserverEx™. The OPC client used for this example is the OPC Quick Client™ (provided with KepserverEx™). The second example shows how to access Modem tags by way of DDE. In this case Microsoft Excel™ is used as the example **DDE client**.

NOTE: If you have not done so already, you need to configure a modem with the operating system before using KepserverEx™ modem operations. Consult your Windows™ and modem documentation on how to set up your modem in Windows control panel. In addition, we recommend that you use external modems on both the initiating and receiving modems. In testing, we found that some internal modems would not accept settings that were imperative for some KepserverEx™ drivers. External modems are also easier to replace if they fail.

Before Enabling the Modem

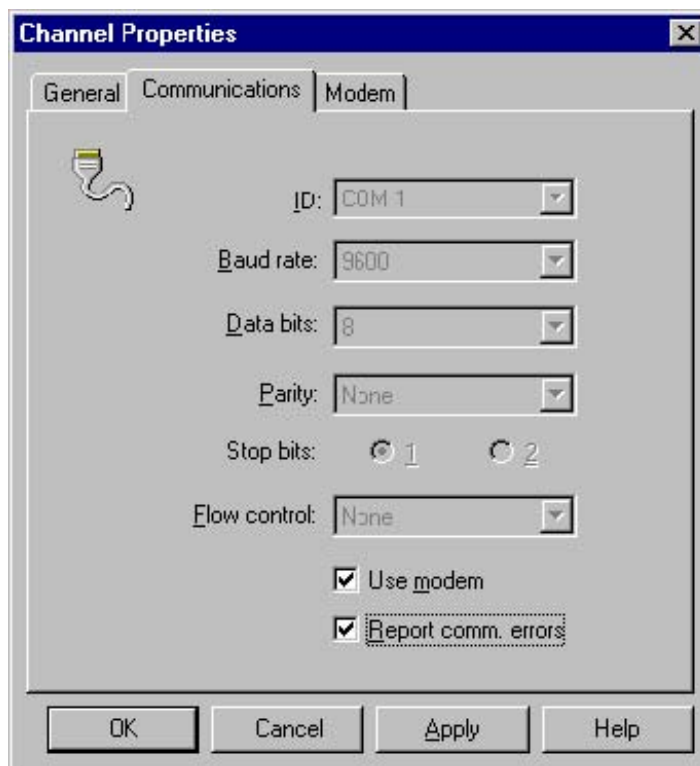
1. *Without* using the modem, first make a direct serial connection to the device or PLC using KepserverEx™ and the OPC Quick Client™. This will help verify that communication settings are correct between the server and the device or PLC and that your direct connect cable is good. Instructions to do so are located in the OPC Quick Client™ help file or you can view the **OPC Connectivity Guide** located on: www.kepware.com under *Support*.

Enabling Modem for Modem Tag Access

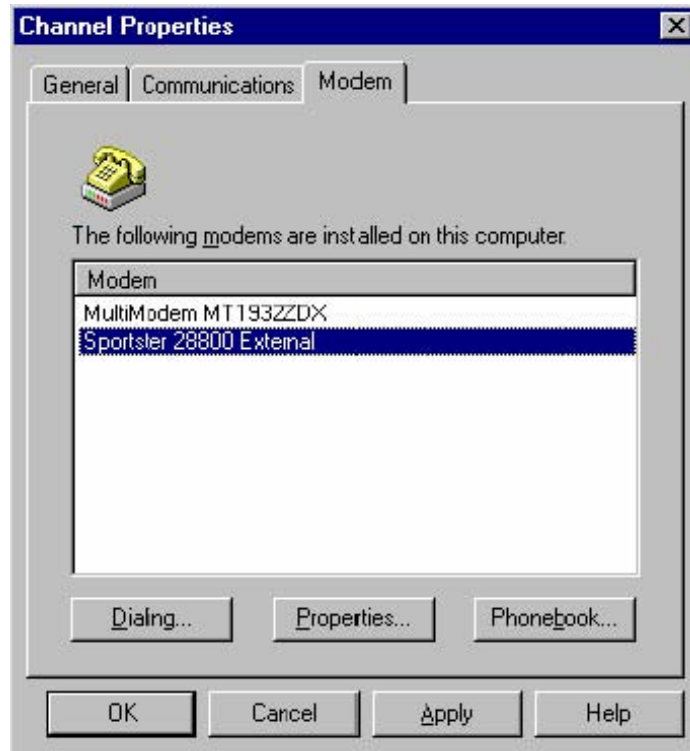
2. Right click on the *channel name* or choose **Edit** from the menu bar and select **Properties...** from the drop down menu.



3. Select the **Use modem** checkbox under the Communications page of the *Channel Properties* window.



4. Select the correct modem from the modem page, click apply, and choose Properties to make sure your modem is configured correctly.



5. After selecting a modem, you will be able to set dialing properties and modem properties for the channel. Refer to the KepserverEx™ help files on Channel Properties and modem support for more information on this topic.
6. Modem tags should now be available on the channel level for both OPC and DDE access.

Using a Modem in Your KepserverEx™ Project

At this point you will need to configure and setup the Initiating / Receiving modems. Refer to the KepserverEx™ help file on Modem Support to configure the Initiating and Receiving modems that you will use with your project. We strongly recommend using a terminal program like HyperTerminal™ to configure the Receive modem. Also, don't forget that if you have proven a direct connection first, you simply need to add a null modem connector to your direct connect cable. This cable and null modem will provide the connection between your Receive modem and PLC.

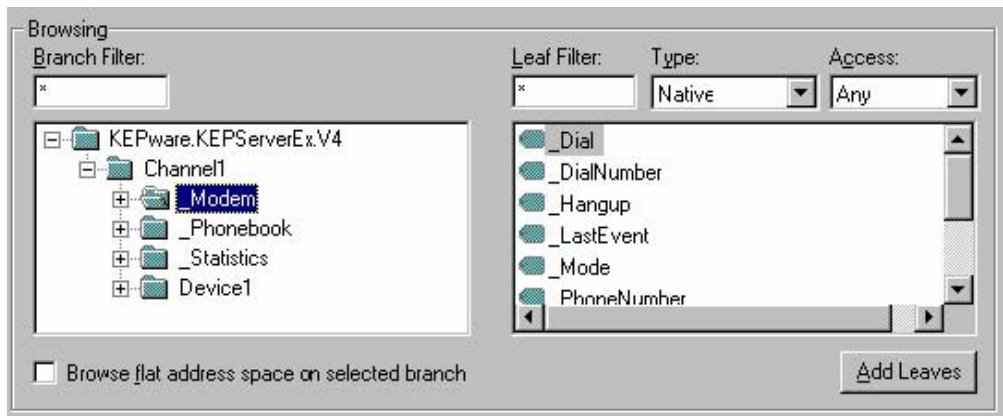
Access Modem Tags using OPC/DDE.

Browsing Modem Tags with an OPC Client

After enabling the modem on a channel in the KepserverEx™, predefined modem tags may now be browsed using an OPC client. In this example, OPC Quick Client™ is the browsing client.

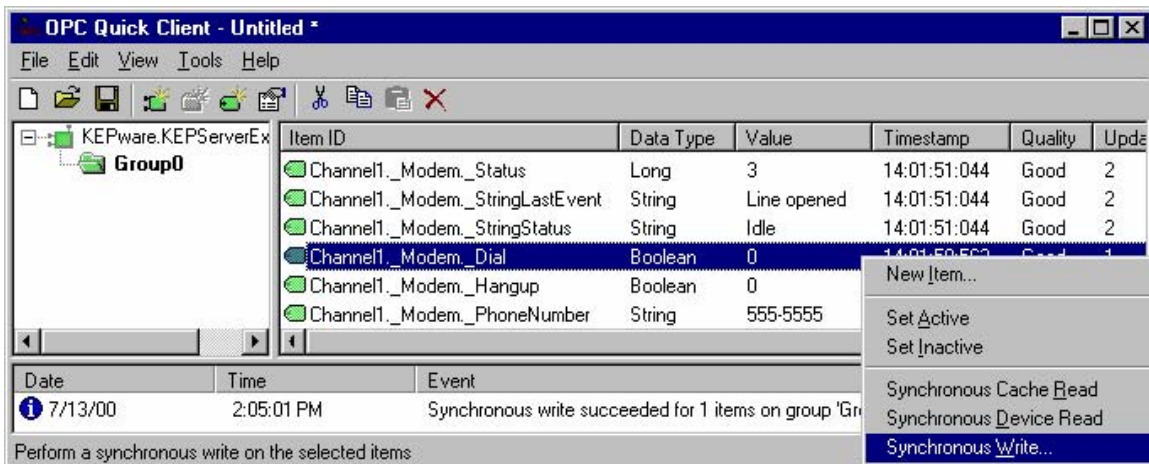
1. Create a connection to the KepserverEx™ with the OPC Quick Client™ by pressing the shortcut button labeled OPC on the KepserverEx™ toolbar. This will automatically bring up the client and connect it to the server. For more complete connection instructions view the OPC Quick Client™ help files or you can view the OPC Connectivity Guide located on: www.kepware.com under *Support*.
2. Once a connection has been made to the KepserverEx™, browse for tags in the folder entitled **_Modem** available at the channel level. This folder contains predefined tags necessary to control and monitor an attached modem.

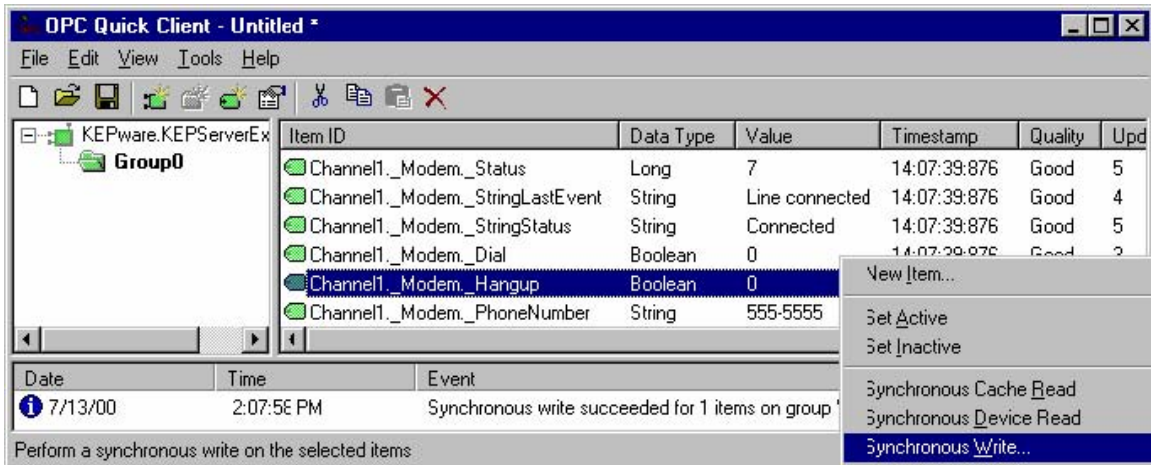
- The following are crucial tags needed to make a modem connection. Add these tag items using the OPC browser: **_Dial**, **_Hangup**, **_Status**, **_PhoneNumber**, **_StringLastEvent**, and **_StringStatus**.



NOTE: All modem operations are completely under the control of your client application. KepserverEx™ does not have built in polling routines that control connecting/disconnecting to remote devices. You can create modem applications that are as simple or as complex as your application requires. Using the control and scripting capabilities of your client, anything from auto dialing to polling routines can be created by manipulating the predefined modem tags.

- The final steps in making the modem connection is to either write the phone number you will use to connect the modems with into the **_Phonenumber** tag, or choose your predefined phone number tag in the file entitled **_Phonebook** using the OPC browser.
- Now write any number to the dial tag to dial the phone number. If your modems are configured correctly, your Initiating modem should dial and connect to the Receiving modem. Monitor the **_Status** tag to verify your connection status (check the **_StringStatus** tag for a string representation of the modem status). You decide how long you want to stay connected. If you have finished viewing data from a particular remote device or PLC, you can hang up your connection.





- To hang up the line, write a number to the `_Hangup` tag. At this point you can write a new phone number to the `_PhoneNumber` tag and dial a new site if you choose.

Accessing Modem Tags Using DDE

- Make sure the 'DDE connection to server' is enabled in the server (See KepserverEx™ Help 'DDE Options')
- Choose **Edit | Alias Map** from the KepserverEx™
- View the Help on using the Alias Map. The help will show how to access tags using two different access formats. For reasons indicated in the Alias Map help file, we strongly suggest creating an alias map and using the alias names format instead of full path names in you DDE application. If you decide to change the name of your channel or device, you will only have to reconfigure your alias map.

Reading and Writing with Modem Tags use a DDE Client

In DDE communications there are 3 pieces of that that are important. They are the application name of the DDE server, the Topic names in the server, and the item you want to look at whether it is a tag or a PLC address. The format is <application name>|<topic>!<item>.

In KepserverEx we provide 2 methodologies. The first is to use a global topic and identify the item in the server by using its fully qualified OPC item name i.e. <channel>.<device>.<tag or address>. The second way is to use the Alias Map in the server to map a topic to the device or group you are getting data from and then use the tag or address as the item. In Kepware the DDE application name is KEPDDE unless you change it in the Tools|Options DDE tab.

Using the Global Topic:

Syntax

=[Application or service name] |[Topic]! [Modem tag path]

Example

DDE Link = KEPDDE|_ddedata!Channel_1._Modem._Dial

Using an Alias:

Syntax:

= [Application or service name] |[Alias path name as topic] ! [Modem Tag Name]

Example

DDE Link =kepdde|Modem!_Dial

Available Modem Tags:

The modem tags allow you to control and monitor an attached modem. Operationally, KepserverEx™ knows very little about what you or your application may need for modem control. With this in mind KepserverEx™ does not imply any type of control over the modem. Using the predefined modem tags you can use the control or scripting capabilities of your client application to control KepserverEx's™ use of the selected modem. There are currently 9 built-in system tags available on each channel. They are as follows:

Tag	Description
_Dial	Writing any value to this tag initiates dialing of the current PhoneNumber . The write is ignored unless the current Status is 3 (Idle). An error is reported if the current phone number has not been initialized. Attempting to issue a dial command while the Mode tag is set to 2, incoming call only, will generate an error.
_DialNumber	"DialNumber" tag shows the phone number that is actually dialed, after any dialing preference translations have been applied such as the addition of an area code. This tag is intended for debugging purposes. It can provide useful feedback to an operator if phone numbers are entered manually.
_Hangup	Writing any value to this tag hangs up the current connection. The "Hangup" tag will also hang-up the current connection when an external device has called the server. Writes to the "Hangup" tag will be ignored if the Status <= 3 (Idle) meaning that there is no currently open connection.
_LastEvent	Whenever the Status changes, the reason for the change is set in this tag as a number. See Server help file for a list of the applicable codes.
_Mode	This allows for configuring the line for calling only, answering only, or both. Writing a 1 to the Mode tag sets the line for outgoing calls only, no incoming calls will be answered when in this mode. Writing a 2 to the Mode tag sets the line for incoming calls only, requests to dial out (writes to the Dial tag) are ignored. The default setting is 0, which allows for both outgoing and incoming calls. This value can only be changed when the Status is <= 3 (Idle).
_Status	This is the current status of the modem assigned to a channel. See Server help file for a list of the applicable codes.
_StringLastEvent	This contains a textual representation of the LastEvent tag value. See Server help file for a list of the applicable codes.
_StringStatus	This contains a textual representation of the Status tag value. See Server help file for a list of the applicable codes.

_PhoneNumber	<p>This is the current phone number that will be dialed. You can write to this value at any time, but the change is only effective if Status is <= 3 (Idle). If you write to the phone number while the status is greater than 3, the number is queued and as soon as the status drops to 3 or less, the new number will be transferred to the tag. The queue is of size 1 so only the last phone number written is remembered. The phone number should be in canonical format if you want the dialing preferences to be applied. If the canonical format is used, the resulting number that will be dialed (after dialing preferences have been applied) can be displayed as the DialNumber.</p> <p>Canonical format is the following: +<country code>[space](<area code>)[space]<phone number> example: +1 (207) 846-5881</p> <p>Note: The country code for the U.S. is 1.</p> <p>If the number is not in canonical form, dialing preferences will not be applied. The number you enter will be dialed exactly as you enter it.</p> <p>You can also enter a Phonebook tag name instead of a phone number. In this case the current value of the phonebook tag will be used.</p>
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Setting up Dial Scripting in the Client

As mentioned, KepsServerEx does not have built in polling routines and functions. It is the responsibility of the user to develop polling scripts in the client application. These scripts would manipulate the modem tags to control the modem connection. This makes the most sense, because it allows the user to use the native scripting capabilities of whatever client application he or she is familiar with. The following script shows an example of a possible dial routine that could be used:

Modem
Tags

```

If Status = 3 then
    DialTimer = DialTimer + 1;
EndIf;
If DialTimer = 120 then
    Dial = 1;
EndIf;
If Status = 7 then
    OnlineTimer = OnlineTimer + 1;
EndIf;
If OnlineTimer = 60 then
    Hangup = 1;
    OnlineTimer = 0;
    DialTimer = 0;
EndIf;

If AutoDial == 1 then

```

Modem Control Panel Example

This is an example of a modem control window (in an HMI client) used in conjunction with KepserversEx™. Remember, the server and driver cannot acquire data from the device if the modem connection is not established, so it is better to open your device data screens after a connection is made. The window below acquires and displays modem tags only. Another way to make the modem project more efficient is to disable the device in the server when the modem connection is not established and enable it when it is. By doing so, the server would not poll for device tags until a modem connection has been established. To do this you can write 0 or 1 (On/Off) to the System tag called ‘_Enabled’ in your project script.

The screenshot shows a window titled "ModemControl" with the following elements:

- Time/Date:** 14:56:58, 7-14-2000
- LastEvent:** 3 Line connected
- Status:** 7 Connected
- Vertical Indicator:** A vertical bar labeled "AUTO" is currently green.
- Timing:** DisConnect Time: 0, Connect Time: 0. Both have "Wait = 0" and "wait = 0" buttons.
- Statistics Table:**

	Successful	Failed
Reads	1148	0
Writes	0	0
- Reset Counts:** Dial Count: 0, Hangup Count: 0, Idle Count: 0, Connect Count: 0.
- Controls:** "Dial" and "Hangup" buttons, "Phone #:" field (101), "PhoneBook:" field (101), and "Load#" button.
- Monitoring:** "CLEAR" button, "Errors:" field (0), "Device:" field (Enabled), and "CallMode:" field (0 Calls In/Out).