

BWDDE

(Advantech WebAccess to DDE Server)

Device Driver Guide

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1. DDE (Dynamic Data Exchange) Device Driver

1.1 Introduction to BwDDE driver to DDE Servers

The BWDDE Device Driver is a DDE client and allows data to be read from and written to a DDE Server as if it were a PLC, controller or other device. This may be required if a device driver is not available for direct connection to the device, if the data is manually entered or other reasons.

Third party device drivers are often DDE Servers, including Kepware and Wonderware; using the BWDDE driver allows communication to most Kepware and Wonderware DDE servers and their associated device drivers.

There are other methods to communicate with DDE Servers and DDE Clients.

- You can use a Script or Pushbutton keymacro to write data to a DDE Servers. See the [Engineering Manual](#), section [14.2.2 Scripts and Keymacros as a DDEClient](#), for more information on using Scripts and Keymacros to communicate via DDE
- Advantech WebAccess can also be a DDE server to communicate. See the [Engineering Manual](#), section [14.2.1 Advantech Advantech WebAccess SCADA Node as DDE Server](#), for more information on Advantech WebAccess as a DDE Server.

A 3rd party DDE Server application must be accessible to the Advantech WebAccess SCADA node:

- The DDE Server application must be running on the SCADA Node PC

Or

- The DDE Server provides a Network DDE connection (NetDDE) available to the SCADA node. See the [Engineering Manual](#), section [14.2.6 NetDDE](#) for more information on NetDDE.

The Advantech WebAccess BWDDE driver to a database uses an API type comport. This is a virtual communications port. It does not need to match an actual COM port number. It is recommended to use a comport number above 2 to avoid conflicts with a real comport on the SCADA node (for example a serial comport).

1.2 Server|topic!item

The format of a DDE Request is **Server|topic!item**. Server is usually the program name (for example EXCEL). Topic is a logical grouping within the Program, (for example the Sheet name within EXCEL). Item is the piece of data (the tag in Advantech WebAccess or the Cell in EXCEL).

The Advantech WebAccess Tags are configured using the Item Names (and optionally the topic name) as the Address of the Advantech WebAccess Tag.

The Topic can be specified at one or two places: either in the Device Configuration or as part of the Tag Address.

1. If all tags use the same topic, then it is easiest to specify the Topic as part of the Device application.
2. If different tags use different Topics on this same device, then Topic can be specified as part of the Tag and omitted from the device.

The **Application** name is usually specified at the Device Properties Page. It is important to use the pipe delimiter | after the application name. For example,

- **Server|**

Device Property [Cancel]	
Device Name	Excel_Book1
Description	Book1.xls Sheet1
Unit Number	1
Device Type	BwDDE ▾
Application Map	EXCEL

Specify only Application Name for device if multiple Topics are used for all tags

The **Topic** can be specified at either the Device Properties Page (convenient if all tags use the same Topic) or as part of the Address of the Tag's Property. It is important to use the exclamation delimiter ! after the topic name.

- **Server|topic!**

Device Property		[Cancel]
Device Name	Excel_Book1	
Description	Book1.xls Sheet1	
Unit Number	1	
Device Type	BwDDE	
Application Map	EXCEL Sheet1!	

Specify Application/Topic fro device if only one topic used for all tags

or

- **topic!item**

Update Tag	
Tag Type	Point (analog)
Alarm	Alarm
Tag Name	RemoteSP
Description	RemoteSP Analog Value
Scan Type	Constant Scan
Address	Sheet1!RemoteSP

Specify Topic/Item for Address if Topic not specified at device level

The **Item** is always specified as Address of the Tag properties in Advantech WebAccess.

- **Item**

Update Tag	
Tag Type	Point (analog)
Alarm	Alarm
Tag Name	RemoteSP
Description	RemoteSP Analog Value
Scan Type	Constant Scan
Address	RemoteSP

Specify Item for address if Topic specified at Device Level

1.3 DDE interface to other DDE Servers, Drivers & SCADA / HMI

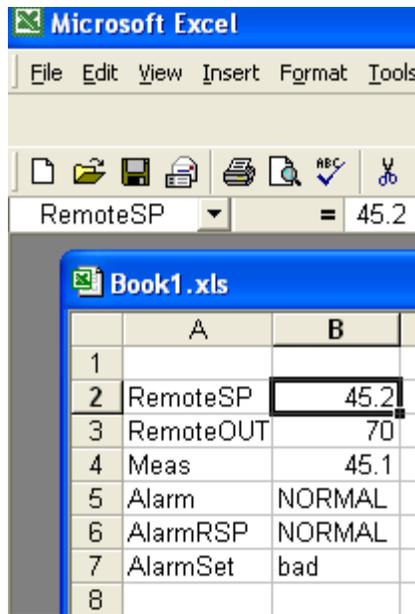
You can use the bwdde Driver to exchange data with other programs, HMI packages or their device drivers.

Common Application names, Topic and Items are listed in the Table below.

Program	Application 	Topic!	Item
Excel	Excel	<name of spreadsheet>	<name of cell>
Wonderware	view	tagname	<user defined>
Intellution	(local) dmdde	data	<user defined>
	(net) \\machine name\ndde\$	dmdata	<user defined>
RSView	rtdata	<user defined>	<user defined>
Citect	citect	<user defined>	<user defined>
Lookout	lookout	< file name>	<user defined>

1.3.1 Example EXCEL workbook as DDE Server

The following examples use the BWDDE device driver to communicate with an EXCEL spreadsheet (workbook) named Book1 running on the SCADA node. The Spreadsheet is named Sheet1 and has Cells named RemoteSP, RemoteOUT, Meas, Alarm, AlarmRSP and AlarmSet.



Example EXCEL workbook Book1.xls

Note that EXCEL is a DDE Server.

1.4 Configure an API Comport and a BWDDE Device

The steps, in summary, are:

1. Start Internet Explorer **Web Browser**.
2. Enter IP address of the **Project Node**.
3. Use **Advantech WebAccess Configuration**.
4. Open or Create a **Project**.
5. Configure a **SCADA node** (the PC that will connect to the automation hardware).
6. Configure a **Comport** for the SCADA Node that is an **API type** Comport by selecting ADD Comport from SCADA Node Properties.
7. For the **Interface Name**, select **API**. Wait for the page to update.

Update Comport		[Cancel]	Submit
Interface Name	API		
Comport Number	3		
Description	DDE local EXCEL		
Scan time	1	<input type="radio"/> MilliSecond	<input checked="" type="radio"/> Second <input type="radio"/> Minute
TimeOut	200	MilliSecond	
Retry count	3		
Auto Recover Time	60	Second	

Figure – API type comport to be used with BWDDE driver

8. Enter a **Comport Number**. This is a virtual communications port. It does not need to match an actual COM port number. It is recommended to use a comport number above 2 to avoid conflicts with a real comport on the SCADA node (for example a serial comport).
9. Configure **Scan Time, Timeout, Retry** and **Auto Recover**.
 See 1.3.2 [API Comport Properties](#) in the following section for more information.
10. Press **Submit** to save the API Comport properties.
11. Select the **API Comport** (Port 3 in the Example) from the left menu list.

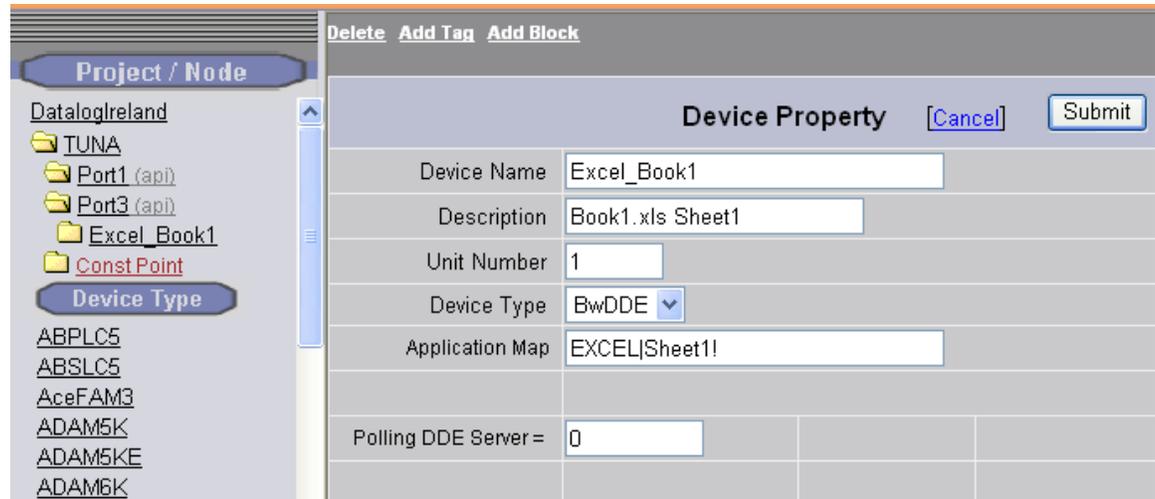
Project / Node	Comport Property	Delete	Add Device
DatalogIreland	Comport : DatalogIreland • TUNA • 3		
TUNA	Interface Name	API	
Port1 (api)	Comport Number	3	
Port3 (api)	Description	DDE local EXCEL	
Const Point	Scan time	1 Second	
Device Type	TimeOut	200 MilliSecond	
ABPLC5	Retry count	3	
ABSLC5	Auto Recover Time	60 Second	
AceFAM3			
ADAM5K			
ADAM5KE			
ADAM6K			

Figure – Example BWDEE on Port 3

1.5 Configure TAGS

1.5.1 Configure an Analog Tag

1. Use **Add Tag** to create tags from Device Properties page.



The screenshot shows the 'Device Property' configuration page for a BWDDE device. The page has a navigation pane on the left and a main configuration area on the right. The navigation pane shows a tree structure under 'Project / Node' with folders for 'TUNA', 'Port1 (api)', 'Port3 (api)', and 'Excel_Book1', and a 'Device Type' section listing various device models. The main configuration area has a header with 'Delete', 'Add Tag', and 'Add Block' buttons. Below the header is a 'Device Property' form with fields for 'Device Name' (Excel_Book1), 'Description' (Book1.xls Sheet1), 'Unit Number' (1), 'Device Type' (BwDDE), and 'Application Map' (EXCEL|Sheet1!). There is also a 'Polling DDE Server =' field with the value 0. 'Cancel' and 'Submit' buttons are located at the top right of the form.

Device Property	
Device Name	Excel_Book1
Description	Book1.xls Sheet1
Unit Number	1
Device Type	BwDDE
Application Map	EXCEL Sheet1!
Polling DDE Server =	0

Figure – Use Add Tag in BWDDE device property page

2. The **Create New Tag** page opens.

Create New Tag		[Cancel]	Submit
Parameter	A	Point	(analog)
Alarm	No Alarm		
Tag Name	RemoteSP		
Description	RemoteSP Value		
Scan Type	Constant Scan		
Address	RemoteSP		
Conversion Code	Number		
Start bit	0		
Length	16		
Signal Reverse	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Scaling Type	No Scale		
Scaling factor 1	0		
Scaling factor 2	0		
Log Data	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Data Log Dead Band	3		%

3. Select A for an **Analog Parameter** to match the type of data to be read or written (from the example above, select A).
4. Select ALARM to enable alarming for Analog or Discrete Tags. The page will refresh if ALARM is selected, so it is best select alarm first before entering any other data. You can always enable alarming after saving the Tag.
5. Enter a **Tag Name**. This is how users, graphic displays, scripts and dialog boxes will refer to the information. In the example it is RemoteSP, which is the same as the Item Name. The Tagname does not have to match the item name.
6. Optionally enter or modify the **Description**.
7. Modify the **Address**. The **Address** is the Item name from the DDE server, in this example is RemoteSP. The Topic is not specified here because in this example we specified the topic at the Device level.

See section 1.2 Server|topic|item for a discussion on where to specify the topic.

8. Optionally modify the **Scan Type**.

Constant Scan will scan at the configured Scan Rate of the Com Port.

Display Scan will read the Tag only if it appears in a Graphic Display, Real-Time Trend, Detail Display or Dialog Box (e.g. Point Info Dialog Box).

- Optionally modify the **Conversion Code**.

For a number (e.g. Analog tag), use the **Number**.

- For an Analog Tag, optionally modify the Scaling Type.

No Scale uses the value as it is entered in the database.

For more information see the [Engineering Manual, section 4.2.13](#) (Click on Help in the Project Manager [to open the Engineering Manual](#)).

Note – the BWDDE device driver ignores Start Bit and Length.

- For an Analog Tag, assign **Alarms, Scaling, Engineering Units, Description** and other features

Refer to the [Engineering Manual](#), section [4.2 Analog Tag Properties](#), for more information on configuring Analog Tags.

- Press **Submit** to save this Tag.

- Download** to the SCADA node and see if it works.

It is best to start with one tag. If there are multiple Tags, and one of the tags has a bad address, all tags will be marked as bad.

1.5.2 Configure an Discrete Tag (digital)

- Use **Add Tag** to create tags from Device Properties page.

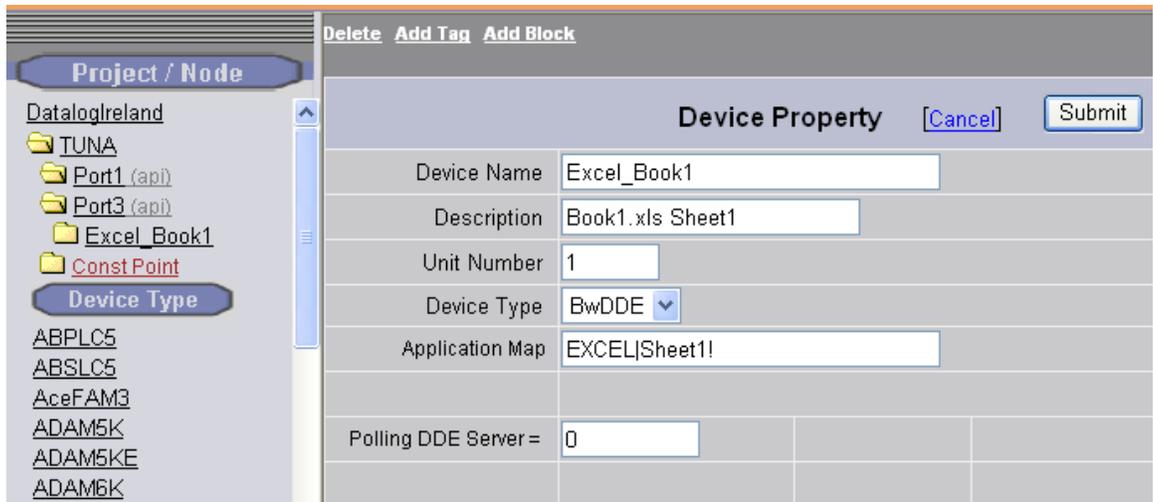


Figure – Use Add Tag in BWDDE device property page

- Create New Tag** page opens.

Create New Tag		[Cancel]	Submit
Tag Type	Point (discrete)		
Alarm	No Alarm <input type="button" value="v"/>		
Tag Name	Alarm		
Description	Description		
Scan Type	Constant Scan <input type="button" value="v"/>		
Address	Alarm		
Conversion Code	Text to match STATE 0 <input type="button" value="v"/>		
Start bit	0		
Length	1		

- Optionally enter a **Scan Type**.

Constant Scan will scan at the configured Scan Rate of the Com Port.

Display Scan will read the Tag only if it appears in a Graphic Display, Real-Time Trend, Detail Display or Dialog Box (e.g. Point Info Dialog Box).

- For the **Conversion Code**, select Text to match STATE 0 for this example. Otherwise select an appropriate Conversion Code based on how data is to be read or written to the DDE server.
 - Number** reads the value as a number, for example 0 or 1. The value must be entered as a 0 or a 1 for a two state Discrete. A discrete tag can read values from 0 to 7. See the Engineering manual for a description of multi-state discrete Tags, section [4.3.11 Length](#) and [4.3.21 State Descriptors 0 – 7](#).
 - Text to match STATE 0** reads the value from the DDE Server as a text string and compares it to the STATE 0 descriptor for this tag. If the two text strings match, then the State is set to zero (0). If they do not match, the state is set to 1. In this example, if the DDE Server returns a sting "NORMAL" for Alarm, then the state is set to 0.
 - Text to match STATE 1** reads the value from the DDE Server as a text string and compares it to the STATE 1 descriptor for this tag. If the two text strings match, then the State is set to 1. If they do not match, the state is set to zero (0).
- Enter a **State Descriptors** for State 0, State 1, State 2, etc. This is required if you used a conversion code **Text to match STATE**.

In the example, enter NORMAL and ALARM for the STATE0 and STATE1.

Conversion Code	Text to match STATE 0 <input type="button" value="v"/>
Start bit	<input type="text" value="0"/>
Length	<input type="text" value="1"/>
Signal Reverse	<input type="radio"/> Yes <input checked="" type="radio"/> No
Log Data	<input type="radio"/> Yes <input checked="" type="radio"/> No
Data Log Dead Band	<input type="text" value="3"/> %
Write Action Log	<input checked="" type="radio"/> Yes <input type="radio"/> No
Read Only	<input type="radio"/> Yes <input checked="" type="radio"/> No
Keep Previous Value	<input type="radio"/> Yes <input checked="" type="radio"/> No
Initial Value	<input type="text" value="0"/>
Security area	<input type="text" value="0"/>
Security level	<input type="text" value="0"/>
State 0	<input type="text" value="NORMAL"/>
State 1	<input type="text" value="ALARM"/>
State 2	<input type="text" value="NotUsed"/>
State 3	<input type="text" value="NotUsed"/>

State 0 Descriptor must match string from DDE Server if Text to match State 0 is used for conversion code.

The 'NotUsed' entry disables that state. States must be continuous.

If STATE 0 and STATE1 are used, then this is a Digital Tag (e.g. 2-State, one bit).

If STATE 0, STATE 1 and STATE 2 are used, then this is a 3-State Tag, (behaves as if two bits are read).

See the Engineering manual for a description of multi-state discrete Tags, section [4.3.11 Length](#) and [4.3.21 State Descriptors 0 - 7](#).

Note – the BWDDE device driver ignores Start Bit and Length.

6. Press **Submit** to save the Discrete Parameter.

7. **Download** and test if the tag works.

It is best to download your first tag of a given type. If there are multiple Tags, and one of the tags has a bad address, all tags will be marked as bad.

1.5.3 API Comport Properties

1.5.3.1 Comport Number

This is a virtual communications port. It does not need to match an actual COM port number. It is recommended to use a comport number above 2 to avoid conflicts with a real comport on the SCADA node (for example a serial comport).

1.5.3.2 Description

This is an optional field used for user reference.

1.5.3.3 Scan Time

If Polling DDE Server =0, then SCAN time is ignored and Report by Exception is used.

Polling DDE Server =1 then the DDE server is polled at this scan time.

This is the time in milliseconds, seconds, minutes or hours to scan. This must match the ability of the network and DDE to respond. Very large DDE server databases, with many items may take a long time to respond.

If the network or DDE server cannot respond as fast as the SCAN Time entered, Advantech WebAccess will scan at a slower rate.

1.5.3.4 Timeout

Timeout is the time waited before re-sending a communications packet that did not have a reply. Timeout is in milliseconds.

TimeOut specifies how long the software waits for a response to a data request, specifically to wait for a reply from one packet. A recommended value is 3 seconds, longer if the communication device is slow. This is protocol dependent: some protocols do not allow changes in time out.

Combined with Retry count, Timeout also determines time to consider a device or port as BAD. Timeout is the time to wait since last communication packet sent without a reply. Time is in milliseconds. The slow or poor quality communications require longer timeout. The faster the communications network or device, the shorter the timeout required. Shorter timeouts notify operators of communications failure more quickly.

1.5.3.5 Retry Count

Number of times to retry communications if no reply is received from a device. Combined with Timeout, also determines time to consider a device or port as BAD.

In addition, Indicates the number of times after the first attempt has failed that communication should be attempted before indicating a failure.

Specifically, how many times to send a single packet after the DSN or Database fails to respond to the first packet. After the retry count is exceeded, all the tags in the packet are marked with asterisks and the next packet of requests is sent. A reasonable value is 3 to 5 times. After this number of tries, the tags in this packet are marked as "fail to respond" (i.e. asterisks) and are disabled. In reality, increasing the number of retries hides failures on the part of the DSN or Database to respond to a request. Essentially, increasing the retries gives the DSN or Database more chances to reply.

1.5.3.6 Auto Recover Time

Auto Recover Time is the time to wait before attempting to re-establish communications with a BAD device or port.

If communications to the Database is unusually slow due to hardware, communications or network issues, you might consider increasing this value. If communications to the Database fails frequently, you may want to decrease this number in order to have Advantech Advantech WebAccess try to re-establish communications sooner.

If communications to the DSN Fails (i.e. exceeds Timeout), Advantech WebAccess will wait the 'Auto Recover Time' before trying to re-establish communications.

1.5.4 BWDDE Device Properties

1.5.4.1 Unit Number

This is a virtual number. Use whatever makes sense to your end user. This will appear in Detail Displays and Communication Status Display.

1.5.4.2 Application Map

Enter Application name as the **Application MAP** and, optionally, **Topic Name** separated by pipe|. If topic is specified, it should be followed by an exclamation!. For example EXCEL;Sheet1!

See section 1.2 Server|topic|item for a discussion on where to specify the topic.

1.5.4.3 Polling DDE Server

Use the default 0 for the **Polling DDE Server** to enable report by exception. Enter 1 for the **Polling DDE Server** to enable polling at the specified scan time of the communications port.

Most commonly, report by exception is used for DDE server (**Polling DDE Server =0**). User and Password

Some Databases require a user and password (SQL SERVER using SQL SERVER security, for example). If you need a **User** Name and **Password**, append these to the DSN name and Table name separated by semi-colons (;).

1.6 Tag Properties

1.6.1 Addresses

The **Address** is the Field Name or Column in the Database Table.

The **Address** is the Item name from the DDE server, in this example is RemoteSP. The Topic is not specified here because in this example we specified the topic at the Device level.

See section 1.2 Server|topic|item for a discussion on where to specify the topic.

1.6.2 Conversion Code

The conversion code is used to interpret the data as number, discrete state, or text.

For a number (e.g. Analog tag), use **Number**.

For a Discrete or Digital Tag, use **Number** or **Text to match STATE**.

For a Text or character data, use **Text**.

- a. **Number** reads the value as a number, for example 0 or 1. The value must be entered as a 0 or a 1 for a two state Discrete. A discrete tag can read values from 0 to 7. See the Engineering manual for a description of multi-state discrete Tags, section [4.3.11 Length](#) and [4.3.21 State Descriptors 0 – 7](#).
- b. **Text to match STATE 0** reads the value from the DDE Server as a text string and compares it to the STATE 0 descriptor for this tag. If the two text strings match, then the State is set to zero (0). If they do not match, the state is set to 1. In this example, if the DDE Server returns a string "NORMAL" for Alarm, then the state is set to 0.
- c. **Text to match STATE 1** reads the value from the DDE Server as a text string and compares it to the STATE 1 descriptor for this tag. If the two text strings match, then the State is set to 1. If they do not match, the state is set to zero (0).

1.6.3 Start Bit

The BWDDE driver ignores the Start Bit field for **Number** and **Text to match STATE** conversion codes.

1.6.4 Length

The BWDDE driver ignores the Length field for **Number** and **Text to match STATE** conversion codes. The Analog and Discrete Tags read the full text string from the DDE.

The Discrete Tags use the number of State Descriptors that are used to determine the number of States.

1.6.5 State 0, State 1, State 2, etc.

State Descriptors for State 0, State 1, State 2, through State 7 are used to determine the number of states for a discrete tag

The 'NotUsed' entry disables that state. States must be continuous.

If STATE 0 and STATE1 are used, then this is a Digital Tag (e.g. 2-State, one bit).

If STATE 0, STATE 1 and STATE 2 are used, then this is a 3-State Tag, (behaves as if two bits are read).

If STATE 0 through STATE 7 are used, then this is a 7-State Tag, (behaves as if three bits are read).

Note – the BWDDE device driver ignores Start Bit and Length.

1.7 Blocks

Currently, there are no pre-configured block types in the BWDDE driver. You must configure your own parameters and blocks

1.8 Troubleshooting

1.8.1 * [8000]

Possible causes are:

- An illegal Item Name. This usually is the case if the error occurs after adding another tag when previously there was no error. This often results in *[8000] for all tags.

- DDE or NetDDE miss-configured.
- DDE server not running (for example EXCEL is not running) or running another topic.
- DDE server on SCADA Node.
- Wrong User or Password for Windows security if using NetDDE to a remote PC.