WebAccess

Driver Configuration Manual

BWDDE (Data exchange with DDE Server)

BWDDEDrv.DLL Driver date: 2005/2/16

BWDDEXE.EXE Driver date: 2010/8/3

English Version 1.0

Revision History

Date	Version	Author	Reviewer	Description
2018-08-31	1.0	Joseph.Sun		Initial Release
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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 DDE Client, for more information on using Scripts and Keymacros to communicate via DDE
- WebAccess can also be a DDE server to communicate. See the Engineering Manual, section 14.2.1 WebAccess SCADA Node as DDE Server, for more information on WebAccess as a DDE Server.

A 3rd party DDE Server application must be accessible to the 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 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 WebAccess or the Cell in EXCEL).

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

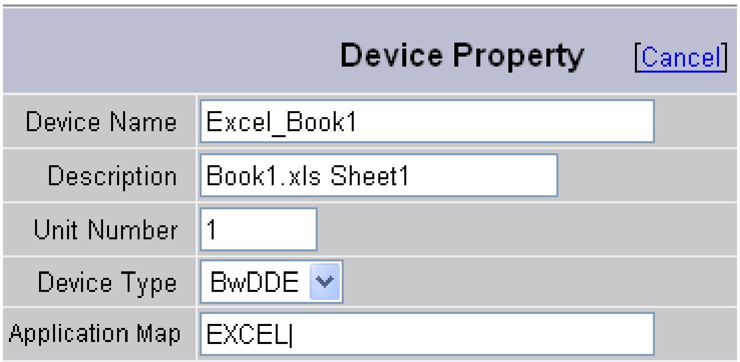
The Topic can be specified at one or two places: either in the Device Configuration or as part of the Tag Address.

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|**



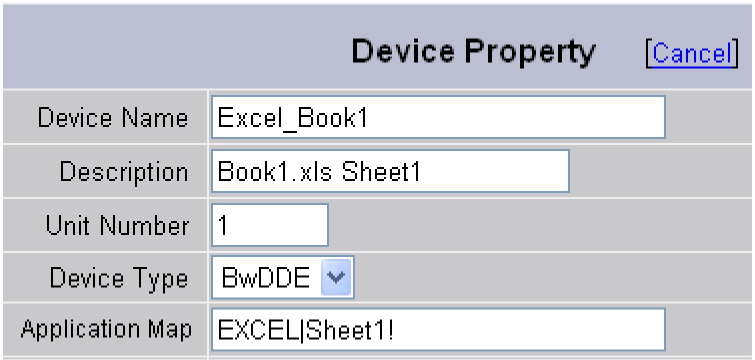
Device Property [Cancel]

Device Name	Excel_Book1
Description	Book1.xls Sheet1
Unit Number	1
Device Type	BwDDE
Application Map	EXCEL|

Figure 1.1 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!**



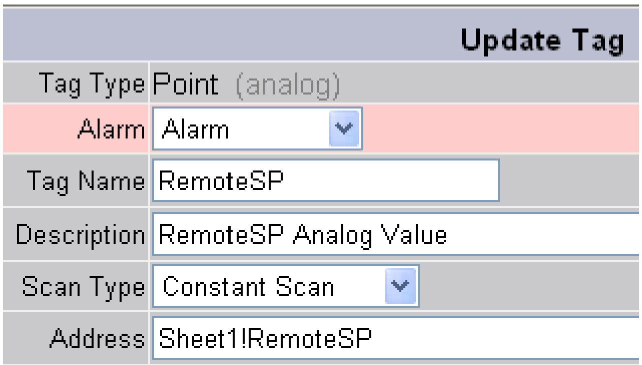
Device Property [Cancel]

Device Name	Excel_Book1
Description	Book1.xls Sheet1
Unit Number	1
Device Type	BwDDE
Application Map	EXCEL|Sheet1!

Figure 1.2 Specify Application|Topic for 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

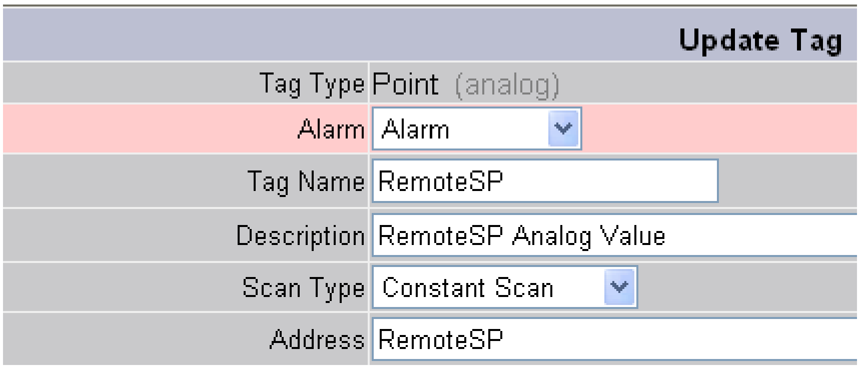
Scan Type Constant Scan

Address Sheet1!RemoteSP

Figure 1.3 Specify Topic|Item for Address if Topic not specified at device level

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

- **Item**



Update Tag

Tag Type Point (analog)

Alarm Alarm

Tag Name RemoteSP

Description RemoteSP Analog Value

Scan Type Constant Scan

Address RemoteSP

Figure 1.4 Specify Item for address if Topic specified at Device Level

1.3 DDE interface to other DDE Servers, Driver & 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.

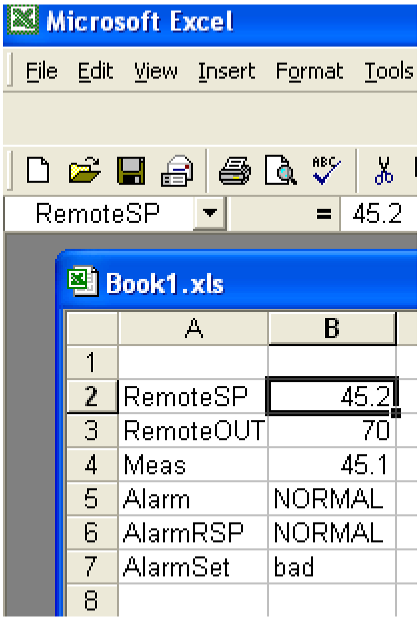
Program	Application|	Topic!	Item
Excel	Excel	<name of spreadsheet>	<name of cell>
Wonderware	view	tagname	<user defined>
Intellution	(local) dmdde	data	<user defined>
	(net) \\machine name\ndde$	dmdata	<user defined>
RSView	rtdata	<user defined>	<user defined>

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.

Please click right mouse button on the item cell, select "Define Name…" to define the cell name.
In this example, we want to do data exchange with "B2" (value 45.2) cell, it can be defined the name of B2 cell as "RemoteSP" first.



RemoteSP = 45.2

	A	B
1		
2	RemoteSP	45.2
3	RemoteOUT	70
4	Meas	45.1
5	Alarm	NORMAL
6	AlarmRSP	NORMAL
7	AlarmSet	bad
8		

Figure 1.5 Example EXCEL workbook Book1.xlsx

Note: That EXCEL is a DDE Server.

2. WebAccess Parameters & Configure

2.1 Configure an API Comport & a BWDDE Device

1. Start Internet Explorer **Web Browser**.

2. Enter IP address of the **Project Node**.

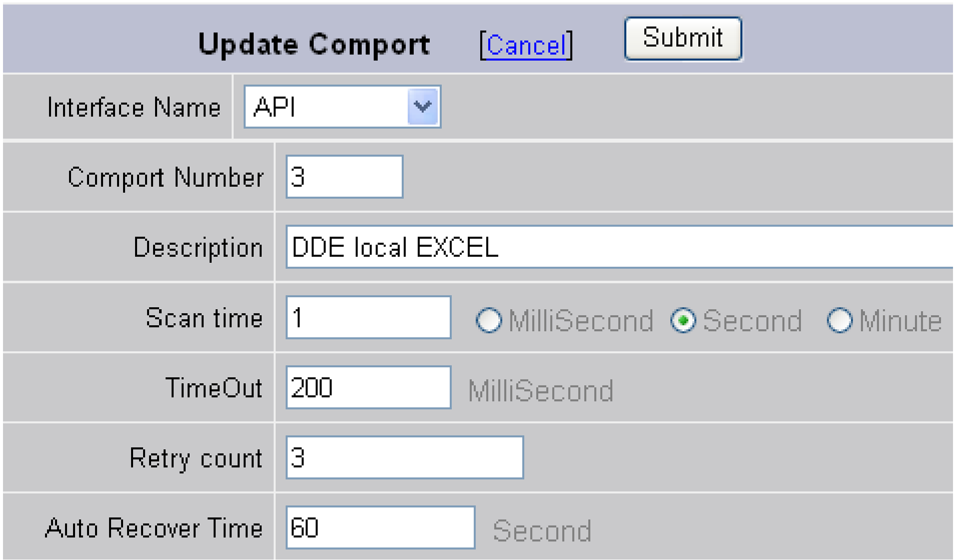
3. Use **WebAccess Configuration**.

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.



Interface Name	API
Comport Number	3
Description	DDE local EXCEL
Scan time	1 ○ MilliSecond ● Second ○ Minute
TimeOut	200 MilliSecond
Retry count	3
Auto Recover Time	60 Second

Figure 2.1 API type comport to be used with BWDDE driver

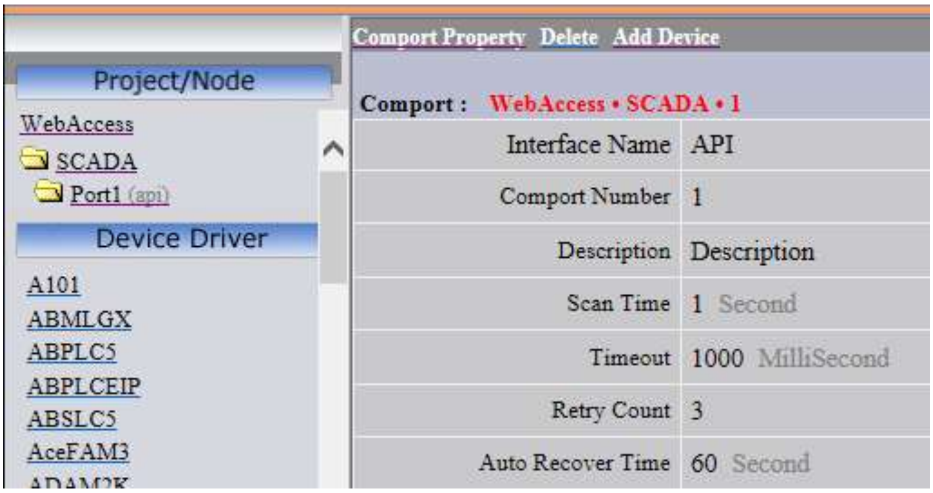
8. Enter a **Comport Number**. This is a virtual communications port. It does not need to match an actual COM port number. It is recommended to use a comport number above 2 to avoid conflicts with a real comport on the SCADA node (for example a serial comport).

9. Configure **Scan Time, Timeout, Retry** and **Auto Recover**.

   See 2.2 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 1 in the Example) from the left menu list.

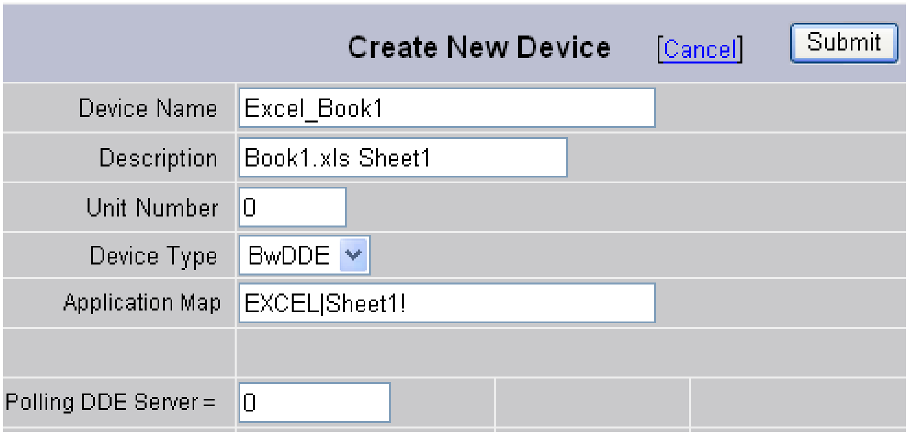


Comport : WebAccess • SCADA • 1

Interface Name	API
Comport Number	1
Description	Description
Scan Time	1 Second
Timeout	1000 MilliSecond
Retry Count	3
Auto Recover Time	60 Second

Figure 2.2 Example BWDEE on Port 1

12. Configure a BWDDE Device (determines the communications Protocol or Device Driver) using **Add Device**.



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

Figure 2.3 Example EXCEL as DDE Server / Application named EXCEL / Topic named Sheet1.(Note delimiters | and !)

13. Select the **Device Type** is **BWDDE.** Wait for the Page to update.

14. Enter a **Unit Number**. This is a virtual number. Use whatever makes sense to your end user.

15. 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.

16. 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)**.

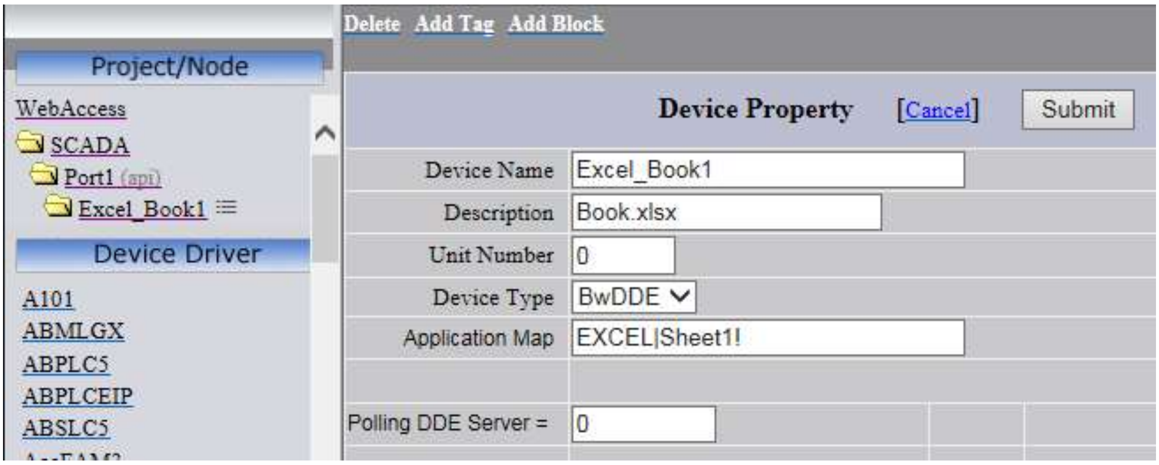
17. Press **Submit** to save the BWDDE device properties.

18. Go to next step to add Tags, (section 2.2 Configure Tags).

2.2 Configure TAGS

2.2.1 Configure an Analog Tag

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

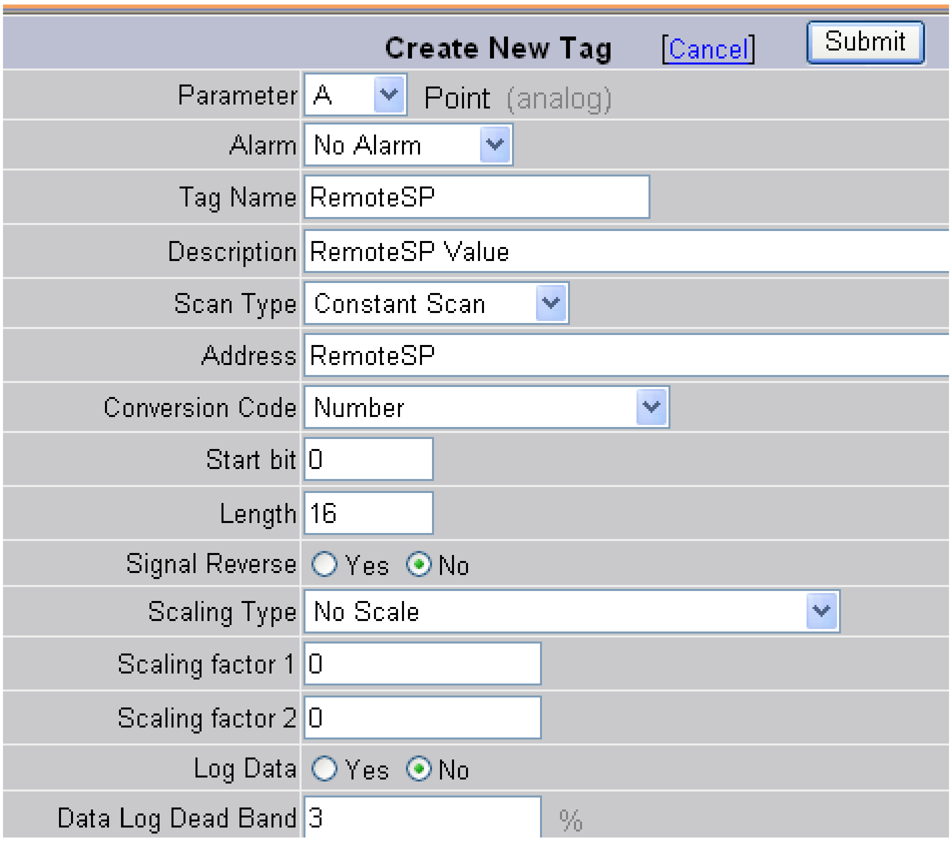


Device Property [Cancel] Submit

Device Name	Excel_Book1
Description	Book.xlsx
Unit Number	0
Device Type	BwDDE
Application Map	EXCEL|Sheet1!
Polling DDE Server =	0

Figure 2.4 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	○ Yes ● No
Scaling Type	No Scale
Scaling factor 1	0
Scaling factor 2	0
Log Data	○ Yes ● No
Data Log Dead Band	3 %

Figure 2.5 Set related tag property on configure page

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. Note: When using EXCEL as a DDE server, the **Address** can be set "cell name" that defined in EXCEL (Check section 1.3.1) or specific cell positon in EXCEL, for this example "R2C2" is the value that doing data exchange with BWDDE driver. Note: R -> ROW; C->column. (Check section 1.3.1)

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).

9. Optionally modify the **Conversion Code**.

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

10. 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.

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11. 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.

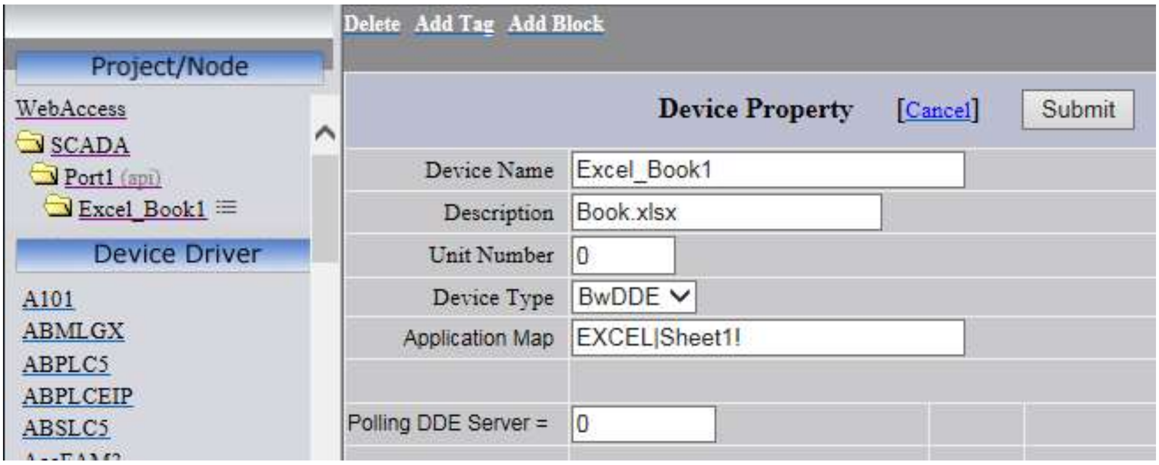
12. Press **Submit** to save this Tag.

13. **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.

2.2.2 Configure an Digital Tag

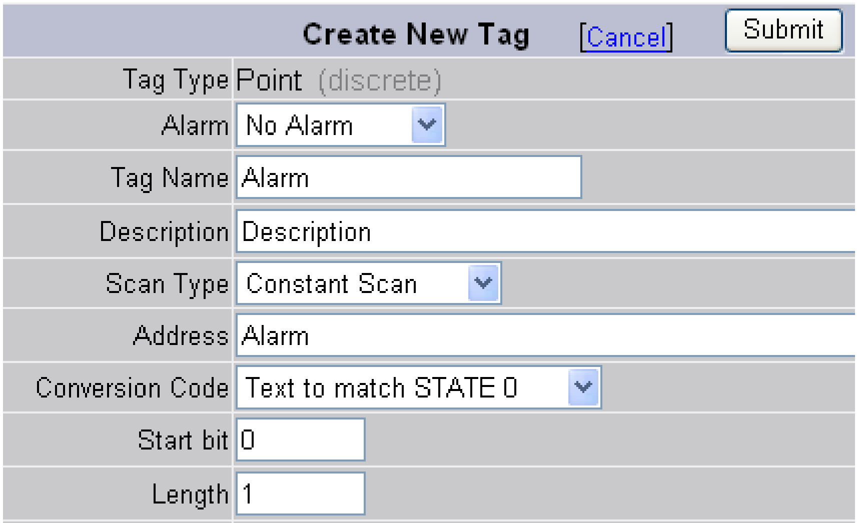
1. Use **Add Tag** to create tags from Device Properties page.



Device Name	Excel_Book1
Description	Book.xlsx
Unit Number	0
Device Type	BwDDE
Application Map	EXCEL|Sheet1!
Polling DDE Server =	0

Figure 2.6 Use Add Tag in BWDDE device property page

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



Tag Type	Point (discrete)
Alarm	No Alarm
Tag Name	Alarm
Description	Description
Scan Type	Constant Scan
Address	Alarm
Conversion Code	Text to match STATE 0
Start bit	0
Length	1

Figure 2.7 Set related tag property on configure page

3. 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).

4. 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.

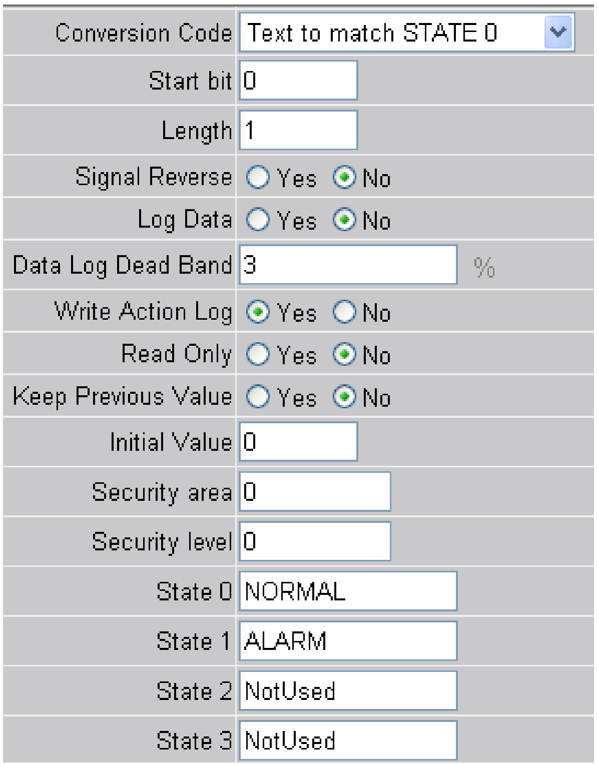
a. **Number** reads the value as a number, for example 0 or 1. The value must be entered as a 0 or a 1 for a two state Discrete. A discrete tag can read values from 0 to 7. See the Engineering manual for a description of multi-state discrete Tags, section 4.3.11 Length and 4.3.21 State Descriptors 0 – 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 to1. 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).

5. 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
Start bit	0
Length	1
Signal Reverse	○ Yes ● No
Log Data	○ Yes ● No
Data Log Dead Band	3 %
Write Action Log	● Yes ○ No
Read Only	○ Yes ● No
Keep Previous Value	○ Yes ● No
Initial Value	0
Security area	0
Security level	0
State 0	NORMAL
State 1	ALARM
State 2	NotUsed
State 3	NotUsed

Figure 2.8 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.

2.3 API Comport Properties

2.3.1 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).

2.3.2 Description

This is an optional field used for user reference.

2.3.3 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, WebAccess will scan at a slower rate.

2.3.4 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.

2.3.5 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.

2.3.6 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 WebAccess try to re-establish communications sooner.

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

2.4 BWDDE Device Properties

2.4.1 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.

2.4.2 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.

2.4.3 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 (;).

2.5 Tag Properties

2.5.1 Address

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.

2.5.2 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 to1. In this example, if the DDE Server returns a sting “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).

2.5.3 Start Bit

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

2.5.4 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.

2.5.5 State0, State1, State2…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.

2.6 Blocks

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

3. Error code

8100 Receive error

8200 Receive error

8400 Receive error

9001 Convert Error

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.