# DDE Client Driver

©2015 Kepware, Inc.

# Table of Contents

**Table of Contents** ........................................................................................... 2

    DDE Client Driver Help ..................................................................................... 3

    Overview ...................................................................................................... 3

**Driver Setup** ................................................................................................. 4

    ReinitializeDDE Tag ........................................................................................ 5

**Data Types Description** ................................................................................... 6

**Address Descriptions** ..................................................................................... 7

**Error Descriptions** ......................................................................................... 8

    Address <address> is out of range for the specified device or register. .................................. 9

    Array support is not available for the specified address: <address>. ..................................... 9

    Data Type <type> is not valid for device address <address>. ............................................ 9

    Device address <address> contains a syntax error. ....................................................... 9

    Device address <address> is not supported by model <model name>. .................................. 9

    Device address <address> is read only. .................................................................. 9

    Missing address. ........................................................................................... 10

    Device <device name> is not responding. ............................................................... 10

    Unable to write to <address> on device <device name>. Error code <error code>. .................... 10

    DDE data error on link <server name>, <topic name>, <item name> detected. ........................ 11

    DDEML failed to initialize. ................................................................................ 11

    DDEML reports low memory error. ...................................................................... 11

    Failed to connect server <server name> topic <topic name>. ........................................... 12

    Failed to establish hot link to <server name>, <topic name>, <item name>. ........................... 12

    Reinitialization failed. ..................................................................................... 13

    Server <server name> topic <topic name> disconnected ............................................... 13

**Index** ........................................................................................................ 14

## DDE Client Driver Help

Help version 1.018

**CONTENTS**

**Overview**
What is the DDE Client Driver?

**Driver Setup**
How do I configure the DDE Client Driver to communicate with DDE servers?

**Data Types Description**
What data types are supported by this driver?

**Address Descriptions**
How do I address a data location on a DDE server?

**Error Descriptions**
What error messages are produced by the DDE Client Driver?

## Overview

The DDE Client Driver provides a reliable way to connect DDE Clients to OPC Client applications, including HMI, SCADA, Historian, MES, ERP, and countless custom applications.

### Features

- The server provides single-point management of multiple DDE servers through OPC.
- The DDE Client Driver can communicate with any server that supports the standard CF TEXT DDE data format. It automatically reconnects when DDE servers are brought back online.
- Clients may reside on remote machines and communicate with this driver via OPC or NetDDE; however, the current version of this driver cannot access data from DDE servers running on remote machines.

**Note:** A ReinitializeDDE Tag is provided for the resolution of DDE communication failures. For more information, refer to **ReinitializeDDE Tag**.

## Driver Setup

In the DDE Client Driver, the device in the OPC server project does not necessarily correspond to a physical device on a network. The device is actually a DDE client program that collects data provided by the various DDE servers on the system.

**Important:** The DDE Client Driver only supports one channel with one device (or one DDE client program). That device may be used to communicate with any number of physical devices through the DDE server applications, however. Furthermore, the OPC server project can have additional channels that use other drivers.

**Important:** For the DDE Client Driver to connect to DDE servers, the runtime must be allowed to interact with the desktop. For more information, refer to the "How To... Allow Desktop Interactions" section of the main server help file.

### DDE Server Communications

Users may change the DDE Server Communication parameters at any time by right-clicking on the DDE Client Driver device and then selecting **Properties** | **DDE Server Communications**.
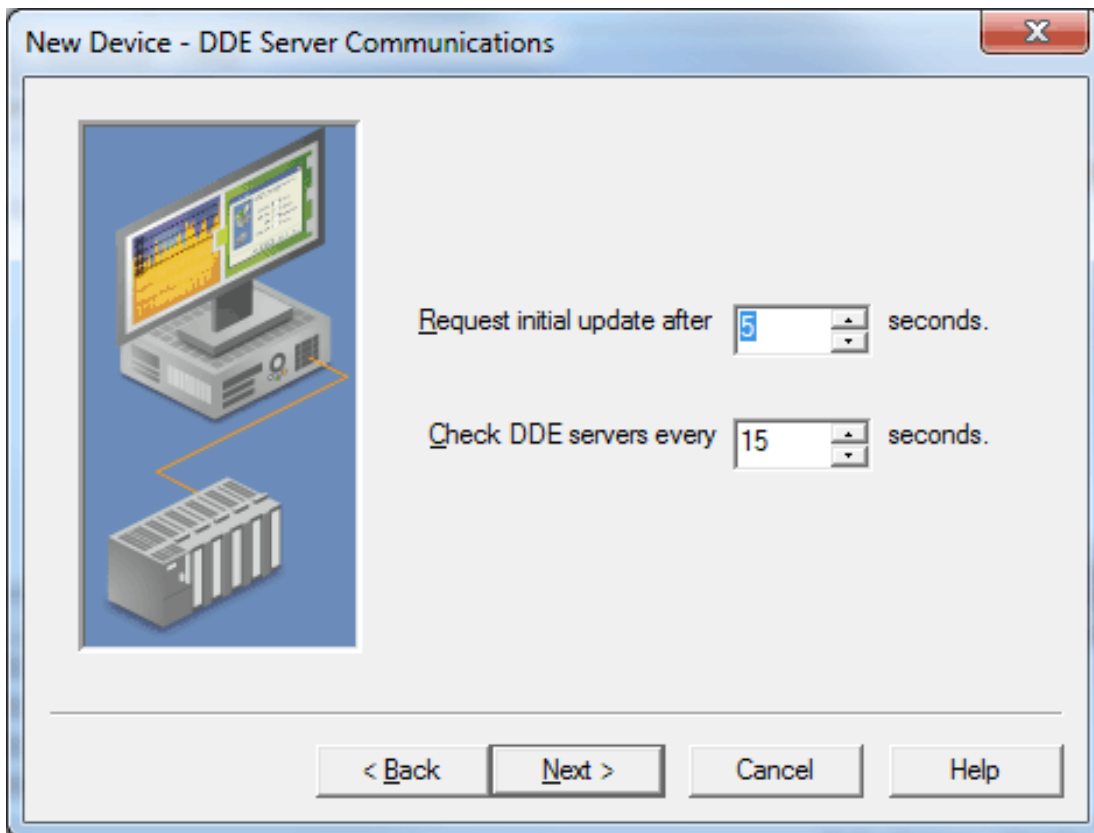


Descriptions of the parameters are as follows:

- **Request initial update after *x* seconds:** This parameter specifies the amount of time that the driver should wait for a link's initial update before ensuring it an explicit request. This setting is useful for DDE servers that do not automatically send their clients an item's current value once a link to that item is made.

  **Note:** Some DDE servers perform poorly when updates are requested while a large number of links are being created. It is recommended that a larger value be specified for these servers in order to allow time for all links to be created before the driver begins issuing requests for initial updates. Servers that automatically send initial updates when links are created should work well with any value.

- **Check DDE servers every *x* seconds:** This parameter specifies the amount of time that the driver will wait before checking whether all DDE links have received a data update. The valid range is 0 to 300 seconds. A value of zero disables the link check. The default setting is 15 seconds.

  **Notes:**

1. This driver uses hot links, where a DDE server only passes data to the driver when the data value has changed. This provides a significant performance advantage over the alternative request/response loop approach because DDE transactions can be time consuming. The disadvantage of this method is that the driver may not receive notice that a DDE server has become unavailable (such as in an abnormal shutdown). Because of this possibility, users should configure the driver to check the DDE links. When checking a link, the driver makes an explicit request for data from the DDE server. If the DDE server does not respond to this request, the driver will attempt to reconnect. If the attempt fails, a message will be placed in the OPC server's Event Log, and the driver will continue attempting until the problem is resolved.

2. If a value of zero is chosen, the ReinitializeDDE Tag may need to be used in order to rebuild all links after a DDE server is brought back up. For more information, refer to **ReinitializeDDE Tag**.

### Defining Tags

A tag must be created for each DDE item that will be available to OPC clients. For information on specifying the link between a tag and an item provided by a DDE server, refer to **Address Descriptions**.

## ReinitializeDDE Tag

The DDE Client Driver is usually able to automatically establish a hot link whenever a DDE server makes a properly addressed item available. It can also detect when that item becomes unavailable. In rare cases, it may be necessary to reinitialize the driver in order to properly link with DDE items after a communications breakdown. This operation is initiated by writing True (any non-zero value) to the ReinitializeDDE Tag. Success or failure will be reported in the OPC server's Event Log. Common causes of failure include one or more tags with an invalid address, and DDE servers that are not currently running.

**Note:** The ReinitializeDDE Tag is automatically created by the driver, and is located through the client's tag browser in the "<device name>.InternalTags" group. If the OPC Quick Client is launched from the OPC server, the ReinitializeDDE Tag will be placed at the device level.

## Data Types Description

| Data Type | Description |
|---|---|
| Boolean | Single bit |
| Byte | Unsigned 8-bit value<br><br>bit 0 is the low bit<br>bit 7 is the high bit |
| Char | Signed 8-bit value<br><br>bit 0 is the low bit<br>bit 6 is the high bit<br>bit 7 is the sign bit |
| Word | Unsigned 16-bit value<br><br>bit 0 is the low bit<br>bit 15 is the high bit |
| Short | Signed 16-bit value<br><br>bit 0 is the low bit<br>bit 14 is the high bit<br>bit 15 is the sign bit |
| DWord | Unsigned 32-bit value<br><br>bit 0 is the low bit<br>bit 31 is the high bit |
| Long | Signed 32-bit value<br><br>bit 0 is the low bit<br>bit 30 is the high bit<br>bit 31 is the sign bit |
| Float | 32-bit Floating point value.<br><br>The driver interprets two consecutive 16-bit registers as a Floating point value by making the second register the high word and the first register the low word. |
| Double | 64-bit Floating point value |
| String | Zero terminated character array. This driver limits string lengths to 256 characters. |

**Note:** The default data type is DWord.

## Address Descriptions

The DDE Client Driver supports standard DDE addressing. An example of the syntax is as follows:

*<DDE Service Name>|<Topic Name>!<Item Name>*

Descriptions of the elements are as follows:

- **DDE Service Name:** The name that an application exposes for DDE communication. It is often the same as the application name.
- **Topic Name:** The name that an application gives to a logical grouping of addressable items.
- **Item Name:** The name of the specific data item associated with a topic.

**Notes:**

1. An example of the syntax is "Excel|Sheet3!R1C1". This example demonstrates how to access a value from a Microsoft Excel spreadsheet. The DDE service name is "Excel," the topic name is the name of the sheet that will be accessed ("Sheet3"), and the item name is the spreadsheet cell that will be accessed ("R1C1" for row 1 and column 1). These same principles can be applied to any DDE server.

2. For a specific DDE server application's service, topic and item names, refer to its documentation.

**Addressing Notes**

1. The address is not case sensitive.

2. An equal sign (=) may precede an address, but will be ignored by the driver.

3. Single quotation marks will not be removed before an address is passed to the DDE server application. For example, "Excel|'Sheet3'!R1C1" will not work because there are no single quotes in the worksheet name. Instead, the address should be "Excel|Sheet3!R1C1".

4. Spaces are valid and will be passed to the DDE server application. For example, "Excel|Test Sheet!R1C1" is valid. There is a space between Test and Sheet.

5. This driver cannot address data on remote machines using NetDDE; thus, any address containing the string "ndde$" is invalid. The client application can access the data collected by this driver via NetDDE and OPC.

6. The DDE Client Driver will accept any address that has valid syntax, but it will not tell if the specified DDE server, topic, and item are available until a tag is made active by a client application. If a link for that tag cannot be made at that time, the tag's data quality will be set to bad and an appropriate error message will be placed in the OPC server's Event Log. For more information, refer to **Error Descriptions**. service name; however, users may experience difficulties establishing links to these items.

7. Although the OPC server can also act as a DDE server, users should not attempt to access its items with this driver. Any address using the default service name of the OPC server will not be accepted. This should not present a problem because the purpose of this driver is to provide OPC connectivity to other DDE servers via the OPC server and this driver. This driver allows users to connect to items in the OPC server in order to change its default DDE

## Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

**Address Validation**

**Address &lt;address&gt; is out of range for the specified device or register.**
**Array support is not available for the specified address: &lt;address&gt;.**
**Data Type &lt;type&gt; is not valid for device address &lt;address&gt;.**
**Device address &lt;address&gt; contains a syntax error.**
**Device address &lt;address&gt; is not supported by model &lt;model name&gt;.**
**Device address &lt;address&gt; is read only.**
**Missing address.**

**Device Status Messages**

**Device &lt;device name&gt; is not responding.**
**Unable to write to &lt;address&gt; on device &lt;device name&gt;. Error code &lt;error code&gt;.**

**DDE Client Driver Specific Messages**

**DDE data error on link &lt;server name&gt;, &lt;topic name&gt;, &lt;item name&gt; detected.**
**DDEML failed to initialize.**
**DDEML reports low memory error.**
**Failed to connect server &lt;server name&gt; topic &lt;topic name&gt;.**
**Failed to establish hot link to &lt;server name&gt;, &lt;topic name&gt;, &lt;item name&gt;.**
**Reinitialization failed.**
**Server &lt;server name&gt; topic &lt;topic name&gt; disconnected.**

### Address <address> is out of range for the specified device or register.

**Error Type:**
Warning

**Possible Cause:**
A tag address that contains the DDE service name of the OPC server has been entered.

**Solution:**
The OPC server should not use the DDE Client Driver to serve data to itself.

### Array support is not available for the specified address: <address>.

**Error Type:**
Warning

**Possible Cause:**
A tag address that has been specified statically contains an array reference for an address type that doesn't support arrays.

**Solution:**
Re-enter the address in the client application to remove the array reference or correct the address type.

### Data Type <type> is not valid for device address <address>.

**Error Type:**
Warning

**Possible Cause:**
A tag address that has been specified statically has been assigned an invalid data type.

**Solution:**
Modify the requested data type in the client application.

### Device address <address> contains a syntax error.

**Error Type:**
Warning

**Possible Cause:**
A tag address that has been specified statically contains one or more invalid characters.

**Solution:**
Re-enter the address in the client application.

### Device address <address> is not supported by model <model name>.

**Error Type:**
Warning

**Possible Cause:**
A tag address that has been specified statically references a location that is valid for the communications protocol but not supported by the target device.

**Solution:**
Verify that the address is correct; if it is not, re-enter it in the client application. Also verify that the selected model name for the device is correct.

### Device address <address> is read only.

**Error Type:**
Warning

**Possible Cause:**

A tag address that has been specified statically has a requested access mode that is not compatible with what the device supports for that address.

**Solution:**
Change the access mode in the client application.

## Missing address.

**Error Type:**
Warning

**Possible Cause:**
A tag address that has been specified statically has no length.

**Solution:**
Re-enter the address in the client application.

## Device <device name> is not responding.

**Error Type:**
Serious

**Possible Cause:**

1. The serial connection between the device and the host PC is broken.

2. The communication parameters for the serial connection are incorrect.

3. The named device may have been assigned an incorrect Network ID.

4. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device setting.

**Solution:**

1. Verify the cabling between the PC and the device.

2. Verify that the specified communication parameters match those of the device.

3. Verify that the Network ID given to the named device matches that of the actual device.

4. Increase the Request Timeout setting so that the entire response can be handled.

## Unable to write to <address> on device <device name>. Error code <error code>.

**Error Type:**
Serious

**Possible Cause:**

1. The serial connection between the device and the host PC is broken.

2. The communication parameters for the serial connection are incorrect.

3. The named device may have been assigned an incorrect Network ID.

4. For more information, refer to the specific error code in the table below.

**Solution:**

1. Verify the cabling between the PC and the device.

2. Verify that the specified communication parameters match those of the device.

3. Verify that the Network ID given to the named device matches that of the actual device.

4. For more information, refer to the specific error code in the table below.

| Error Code | Description |
|---|---|
| 0x0000 | DMLERR_NO_ERROR |
| 0x4000 | DMLERR_ADVACKTIMEOUT |
| 0x4001 | DMLERR_BUSY |
| 0x4002 | DMLERR_DATAACKTIMEOUT |
| 0x4003 | DMLERR_DLL_NOT_INITIALIZED |
| 0x4005 | DMLERR_EXECACKTIMEOUT |
| 0x4006 | DMLERR_INVALIDPARAMETER |
| 0x4008 | DMLERR_MEMORY_ERROR |
| 0x4009 | DMLERR_NOTPROCESSED |
| 0x400A | DMLERR_NO_CONV_ESTABLISHED |
| 0x400B | DMLERR_POKEACKTIMEOUT |
| 0x400C | DMLERR_POSTMSG_FAILED |
| 0x400D | DMLERR_REENTRANCY |
| 0x400E | DMLERR_SERVER_DIED |
| 0x4010 | DMLERR_UNADVACKTIMEOUT |

## DDE data error on link <server name>, <topic name>, <item name> detected.
**Error Type:**
Serious

**Possible Cause:**

1. The driver was unable to convert CF_TEXT data from a DDE server to a numerical type.

2. An attempt was made to write a string that is too long.

**Solution:**

1. Ensure that the DDE server is configured to send numerical data (in CF_TEXT format) if the client is expecting numerical data.

2. Ensure that strings are within length requirements.

**See Also:**
**Data Types Description**

## DDEML failed to initialize.
**Error Type:**
Fatal

**Possible Cause:**
The Microsoft Windows DDE Management Library .dll failed to register the DDE Client Driver properly.

**Solution:**
Shut down all unnecessary applications and restart the OPC server project.

## DDEML reports low memory error.
**Error Type:**
Serious

**Possible Cause:**

The Microsoft Windows DDE Management Library dll has exceeded its resource limit due to a prolonged race condition. This occurs when the server outruns the client.

**Solution:**

1. If possible, decrease the update rate of the DDE server.

2. Reduce the size of the OPC server project.

## Failed to connect server <server name> topic <topic name>.

**Error Type:**
Serious

**Possible Cause:**

1. The address is incorrect.

2. The DDE server is not running.

3. The DDE server does not support the specified topic.

**Solution:**

1. Ensure that the address is correct.

2. Ensure that the DDE server is running.

3. Ensure that the DDE server supports specified topic.

4. If a zero has been specified as the server check interval, use the ReinitializeDDE Tag.

**See Also:**
**Driver Setup**
**ReinitalizeDDE Tag**

## Failed to establish hot link to <server name>, <topic name>, <item name>.

**Error Type:**
Serious

**Possible Cause:**

1. The address is incorrect.

2. The DDE server is not running.

3. The DDE server does not support the specified item.

**Solution:**

1. Ensure that the address is correct.

2. Ensure that the DDE server is running.

3. Ensure that the DDE server supports specified item.

4. If a zero has been specified as the server check period, use the ReinitializeDDE Tag.

**See Also:**
**Driver Setup**
**ReinitalizeDDE Tag**

## Reinitialization failed.

**Error Type:**
Serious

**Possible Cause:**
One or more links could not be made.

**Solution:**
Check to see if the server in question is running and supports the specified topic and item.

## Server <server name> topic <topic name> disconnected

**Error Type:**
Serious

**Possible Cause:**
The specified DDE server has stopped running.

**Solution:**

1. Restart the DDE server in question.

2. If a zero has been specified for the server check period, use the ReinitializeDDE Tag.


**See Also:**
**Driver Setup**
**ReinitalizeDDE Tag**

# Index

## A

## B

## D

## E

## F

## L