

LON DDE Server

for Microsoft Windows
and InTouch Applications

**User Manual
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LON DDE Server

The **LON DDE Server** (hereafter also referred as the "LON_DDE Server") is a Microsoft Windows 32-bit application program that acts as a DDE (Dynamic Data Exchange) Server and allows other Windows application programs access to data from the LONWorks network nodes. The LON DDE Server runs on the IBM PC or compatible computer used as a host processor connected to a LONWorks Serial LonTalk Adapter (SLTA). The EIA-232(RS-232) serial interface is used for data exchange between the Server and SLTA. The LON DDE Server is primarily intended for use with **Wonderware InTouch**, but it may be used by any Microsoft Windows program that is capable of acting as a DDE *Client*.

The Server can be used **only** to access the data from the nodes installed in the LONWorks network. The Server cannot be used for LONWorks network installation and configuration. The special network management tools (e.g. Echelon™ LonMaker or LonBuilder) must be used for the installation and configuration of LONWorks network.

What is DDE?

DDE is a complete communication protocol designed by Microsoft to allow applications in the Windows environment to send/receive data and instructions to/from each other. It implements a *client-server* relationship between two concurrently running applications. The *server* application provides the data and accepts requests from any other application interested in its data. Requesting applications are called *clients*. Some applications such as **InTouch** and Excel can simultaneously be both a *client* and *server*.

To obtain data from another application the *client* program opens a channel to the *server* application by specifying three things: the *server application name*, the **topic name** and the specific **item name**. For example, in the case of Excel, the application name is "Excel", the topic name is the name of the specific spreadsheet that contains the data and the item name is the specific cell on the spreadsheet. With **InTouch** the application name is "View", the topic name is the word "Tagname" when reading/writing to an **InTouch** tagname and the item name is a specific tagname in the **InTouch** Data Dictionary.

When a client application sets up a link to another DDE program, it requests the *server* application to *advise* the client whenever a specific item's value changes. These data links will remain active until either the *client* or *server* program terminates the link or the conversation. They are a very efficient means of exchanging data because when the link has been established no communication occurs until the specified data value changes. **InTouch** uses DDE to communicate with I/O device drivers and other DDE application programs.

Accessing a Remote DDE Item from LON_DDE

The DDE protocol identifies an element of data by using a three-part address, including: **Application**, **Topic** and **Item**.

Application refers to the name of the Windows program (server) that knows how to access the data element. In the case of data coming from or going to LON_DDE, the application portion of the DDE address is **LON_DDE**.

Topic is an application, specific sub-group of data elements. The LON_DDE Server considers each LONWorks network node be a separate topic. The user creates a meaningful name for it and uses this name as the topic name for DDE references.

Item indicates a specific data element within the specified topic. For the LON_DDE Server, an item is a LONWorks network variable name. (The item/point names are defined by the Server as described in the **Item (Point) Naming** section.)

Note. In some cases, the term "point" is used interchangeably with the term "item".

Installing the LON_DDE Server

The LON_DDE Server installation package can be supplied:

1. As a self-extracting archive 23010xxx.EXE if downloaded from Klinkmann's web site (the xxx is the current (latest) version of the Server).
2. From installation on CD.
3. On two or three distribution disks (floppies).

To **install** the LON_DDE Server from the self-extracting archive, run the 23010xxx.EXE and proceed as directed by the LON_DDE Server Setup program.

To **install** the LON_DDE Server from CD or distribution disks (floppies), on MS Windows (NT, 2000, XP or 95 (98)):

1. Insert the CD with Klinkmann Software into CD drive or insert LON_DDE Disk1 into a floppy drive A: or B:.
2. Select the **Run** command under the **Start** menu.
3. Run STARTUP.EXE if installing from CD or SETUP.EXE if installing from distribution disks (floppies).

4. If installing from CD: select "Protocol Servers (DDE, SuiteLink, OPC)", find "LON DDE Server" and click on "Setup...".
5. Proceed as directed by the LON DDE Server Setup program.

When installation is finished, the subdirectory specified as a folder where to install the LON DDE Server will contain the following files:

LON_DDE.EXE	The LON DDE Server Program. This is a Microsoft Windows 32-bit application program.
LON_DDE.HLP	The LON DDE Server Help file.
LON_DDE.CFG	An example configuration file.
LICENSE.TXT	Klinkmann Automation software license file.
WWCOMDLG.DLL	Dynamic Link Library necessary for LON DDE Server.

To **uninstall** the LON DDE Server, start Control Panel, select "Add/Remove Programs" and select the "LON DDE Server" from the list of available software products. Click on "Add/Remove..." and proceed as directed by the UnInstallShield program.

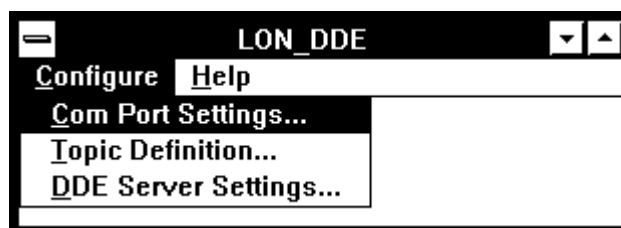
Note:

The HASP key is needed for full time running of LON DDE Server. The HASP Driver setup is performed during the Server setup. Without HASP Driver installed, the LON DDE Server will run only 1 hour (with all features enabled).

Configuring the LON_DDE Server

After the LON_DDE Server is initially installed, a small amount of configuration is required. Configuring the Server automatically creates a **LON_DDE.CFG** file which holds all the topic (node) definitions entered, as well as the communication port configurations. This file will be automatically placed in the same directory where **LON_DDE** is located unless the path where the configuration file will be placed is specified through the */Configure/DDE Server Settings...* command.

To perform the required configurations, start the LON_DDE program. If the Server starts up as an icon, then double click on the icon opens the server's window. To access the commands used for various configurations, open the */Configure* menu:



There is also one very important setting used to specify the LONWorks network **domain ID length**. This setting can be specified in the following way.

The first time you run the LON_DDE Server configuration, most of the items in the following list will automatically appear in the WIN.INI file. It is usually in the MS Windows system directory, e.g. C:\WINNT. It is an ASCII file and can be altered manually if you wish with any text editor, for example MS Windows Notepad (*Do not use a program that formats text, such as MS Word or Write unless the file is saved as DOS text*). The following is a typical entry for the LON_DDE Server:

```
[LON_DDE]
ConfigurationFile=C:\LON_DDE\
ValidDataTimeout=120000
WinIconic=0
WinFullScreen=0
WinTop=268
WinLeft=584
WinWidth=384
WinHeight=112
```

To specify the LONWorks network **domain ID length**, the following line can be added to the WIN.INI file [LON_DDE] section:

```
DomainIDLen=n
```

where **n** is the appropriate LONWorks network **domain ID length** value (possible values are 0, 1, 3 and 6), e.g. the line

```
DomainIDLen=1
```

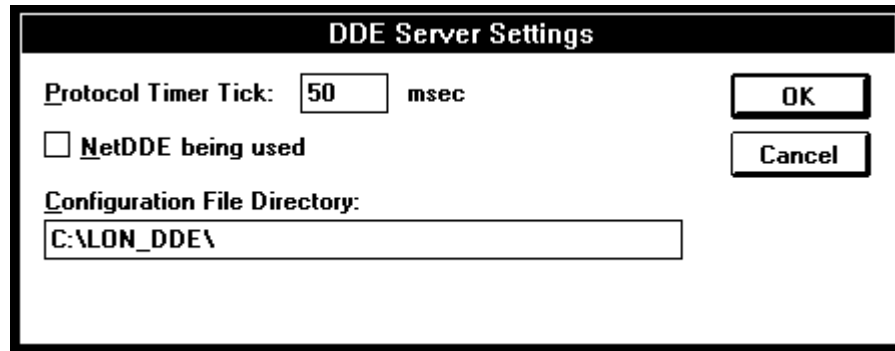
sets the LONWorks network **domain ID length** value equal to 1.

The LONWorks network **domain ID length** default value is 6, i.e. in this case there is no need to add this line to WIN.INI file.

DDE Server Settings Command

A number of parameters that control the internal operation of the Server can be set. In most cases, the default settings for these parameters provide a good performance and do not require changing. However, they can be changed to fine-tune the Server for a specific environment.

To change the Server's internal parameters, invoke the */DDE Server Settings...* command. The "DDE Server Settings" dialog box will appear:



The following describes each field in this dialog box:

Protocol Timer Tick

This field is used to change the frequency at which the Server checks for work to do. At this frequency the Server tries to send one data request to SLTA and receive one reply from SLTA. If send/response cycle is too long then more than one activation of the Server is necessary in order to process it.

If the computer is busy or some other MS Windows application takes over it then the Server is active more rarely than setting in the **Protocol Timer Tick**.

Note. The default value is 50. If the value is lower than 50 entered, the Server uses 50 milliseconds.

NetDDE being used

Select this option if you are in network using NetDDE.

Configuration File Directory

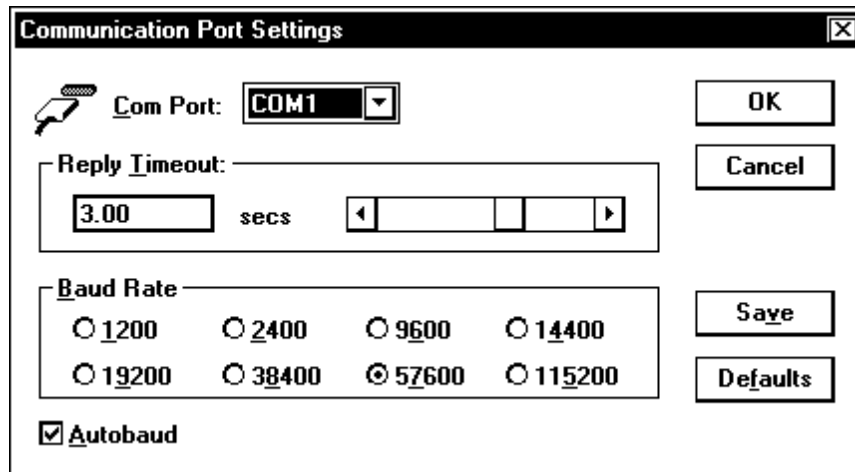
This field is used to specify the path (disk drive and directory) in which LON_DDE will save its current configuration file. The LON_DDE Server will use this path to load the configuration file the next time it is started.

Notes. Only the "path" may be modified with this field. The configuration file is always named **LON_DDE.CFG**. There is no limit to the number of configuration files created, although each must be in a separate directory. When using the LON_DDE Server with **InTouch**, it is a good practice to place the configuration file in the application directory.

Once all entries have been made, click on **OK**.

Com Port Settings Command

This command is used to configure the communication port that will be used to communicate with the SLTA. Invoke the `/Com Port Settings...` command. The "Communication Port Settings" dialog box will appear:



Select the Com Port and examine the characteristics of the selected Port. To select a necessary Com Port click on the combo box button and make your choice from the list box.

The following describes each field in this dialog box:

Reply Timeout

This field is used to enter the amount of time (in seconds) the SLTA using the selected communication port will be given to reply to commands from the Server.

Note: *The default value of 3 seconds should be sufficient for most configurations.*

Baud Rate

This setting depends on the type of SLTA used. Other communication parameters - 8 data bits, one stop bit, no parity - can not be changed. The default setting is 38400.

Autobaud

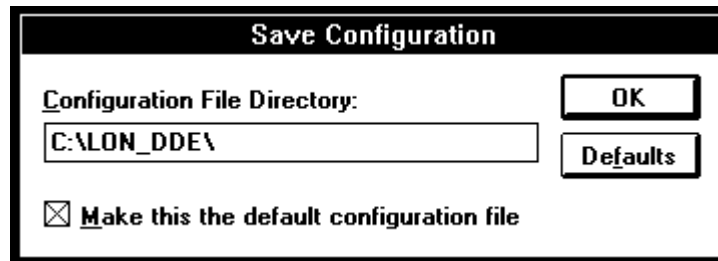
This setting is used to support the automatic baud rate detection on SLTA. If this setting is ON (checked) then also autobaud detection should be enabled on SLTA. If this setting is OFF (unchecked) then the baud rate configured on SLTA should match the **Baud Rate** setting used by LON_DDE Server.

Note: *The SLTA should be reseted (switched OFF/ON) if automatic baud rate detection is used and **Baud Rate** setting value has been changed.*

When all entries have been made, select **OK** to process the configuration for the communication port. To reset the default values, click on **Defaults**.

Saving LON_DDE Configuration File

If the configuration file does not currently exist, or a new configuration path has been specified, the Server will display the "Save Configuration" dialog box:



This dialog box displays the path where the Server is going to save the current configuration file. The path may be changed if necessary. Also, the path can optionally be recorded in the **WIN.INI** file by selecting the "**Make this the default configuration file**" option. Doing so will allow the LON_DDE Server to find the configuration file automatically each time it is started.

Configuration File Location

When the LON_DDE Server starts up, it attempts to locate its configuration file by, first checking the **WIN.INI** file for a path that was previously specified. If there is no path in the **WIN.INI** file, the Server will assume that the current working directory is to be used.

To start the Server from an application directory configuration file other than the default configuration file a special switch (**/d:**) is used. For example, invoke the **/File/Run** command and enter the following:

LON_DDE /d:c:\directoryname

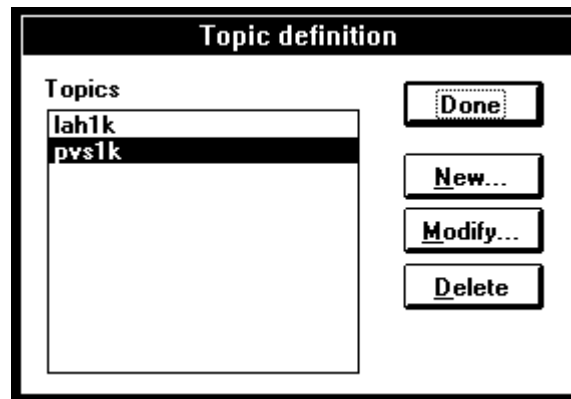
Note. *There is no limit to the number of configuration files that may be created, although each must be in a separate directory.*

Topic Definition Command

The user provides LONWorks network node with an arbitrary name that is used as the DDE topic for all references to the node.

The following steps are taken to define the Topics attached to the LON_DDE.

1. Invoke the `/Configure/Topic Definition...` command. The "Topic definition" dialog box will appear:



2. To modify an existing topic, select the topic name and click on **Modify**. To define a new topic, click on **New**. The "LON_DDE Topic Definition" dialog box will appear:

3. Enter the **Topic Name** that corresponds to the DDE Topic Name. (The DDE Topic Name is entered the "DDE Access Name Definition" dialog box described in the **Using the LON_DDE Server with InTouch** section.)

4. Select the **Type of Topic**, possible choices are **Single Node** or **Group of Nodes**. If *Group of Nodes* is selected then only group messages are supported.
5. Select the **Data Receive Type**, possible choices are **Poll** data or **Unsolicited** data. If *Type of Topic* is *Group of Nodes*, then only *Unsolicited* data is supported.
6. Enter the **Subnet Address** of node if *Type of Topic* is *Single Node*, possible values are from 1 to 255;
7. Enter the **Node Address** or **Group Address** (if *Type of Topic* is *Group of Nodes*); possible values are from 0 to 127. If *Node Address* is 0 then this Topic can be used only to send broadcast messages to all this Topic subnet nodes;
8. Click on the **Com Port** button to associate a communication port with the topic. (Additional topics may be associated with this communication port later.)
Note. *If the com port has been configured for the first time, the user will be prompted to save it in an existing directory.*
9. Set the **Update Interval** - the period in seconds, at which poll messages will be sent to SLTA. The real update interval can be considerably larger if many LONWorks network nodes are connected to SLTA or the computer is too busy.
Note. *The default Update Interval is 3 seconds.*

If the some LONWorks network node is not responding four times (node switched off or SLTA have some communication problems with node) then this Topic is changed to **Slow Poll Mode** - the *Update Interval* is increased 5 times and data requests to this node now are sent at this interval (e.g. if *Update Interval* value is 3 seconds then in *Slow Poll Mode* it will be changed to 15 seconds). If SLTA is switched off or there are some communication problems with SLTA, all Topics on corresponding Communication Port are changed to *Slow Poll Mode*. If communication is restored then also the *Update Interval* is restored. In *Slow Poll Mode* the DDE Discrete item **STATUS** value is changed to 0.

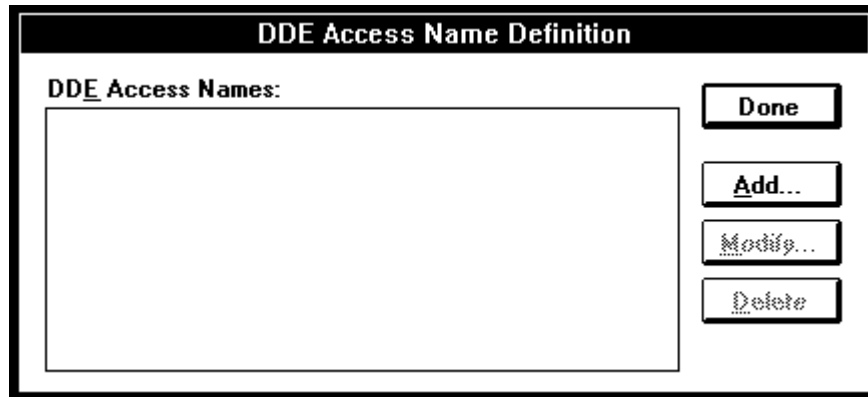
Note: *At each new topic activation (usually when DDE client initiates DDE links with LON_DDE Server) the Server reads this topic node's Self Documentation. It can take a considerable amount of time if there are many nodes activated simultaneously (e.g. it can take approx. 10...15 seconds at 57600 bps to read node's Self Documentation if Self Documentation occupies 1.2 kilobytes). There will be no data values transferred to DDE client until this initial Self Documentation is obtained from node.*

Note: *The **ValidDataTimeout** setting (in milliseconds, default value for LON_DDE Server is 120000 milliseconds or 2 minutes) in the WIN.INI file [LON_DDE] section determines the amount of time allowed for the Server to supply data to DDE client for the first time. If it takes longer then **ValidDataTimeout** milliseconds then Server will not acknowledge the DDE request from the client. If there are many nodes simultaneously then the **ValidDataTimeout** setting should be increased to allow the Server to read the Self Documentation from all nodes - first data from node is coming only after this node's Self Documentation has been obtained.*

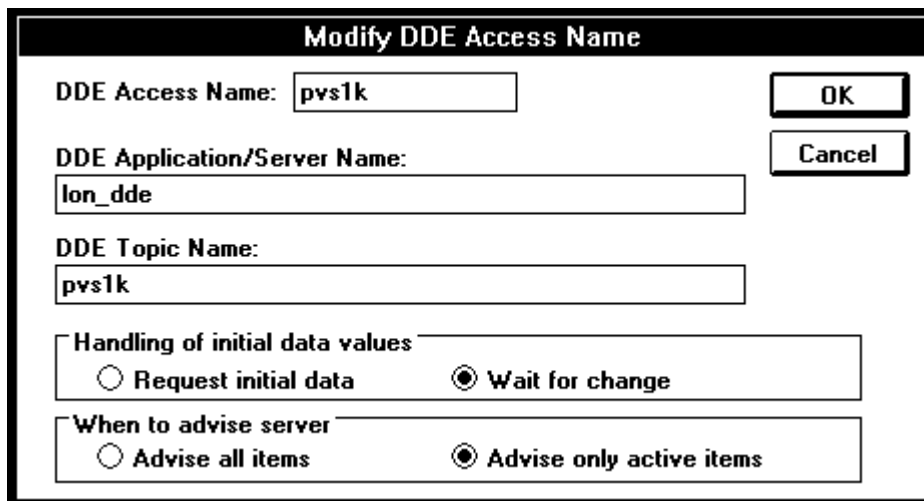
Using the LON_DDE Server with InTouch

To access items/points on a LONWorks network node from **InTouch**, the following steps (all performed in **WindowMaker**) are required:

1. To define the DDE Access Names in WindowMaker for node invoke the `/Special/DDE Access Name...` command. The "DDE Access Name Definition" dialog box will appear:



2. Click on **Add**. The "Add DDE Access Name" Dialog Box will appear:



Note. If **Add** is selected this dialog box will be blank when it initially appears. Data has been entered here to illustrate the entries that are made.

The following fields are required entries when entering a DDE Access Name Definition:

DDE Access Name

Enter an arbitrary name that will be used by **InTouch** to refer to the topic. For simplicity, it is recommended that the name defined for the topic in LON_DDE also is to be used here.

DDE Application/Server Name

Enter the application name, **LON_DDE**, which has been used by DDE Server in order to access the SLTA.

DDE Topic Name

Enter the name defined for the topic in LON_DDE to identify the LONWorks network node the LON_DDE Server will be accessing.

Request Initial Data

This option may be selected if the Server does not return data values immediately after a window is displayed. This option is not applicable to the LON_DDE Server.

Wait for Change

This option should be selected when the DDE application is the LON_DDE Server.

Advise all Items

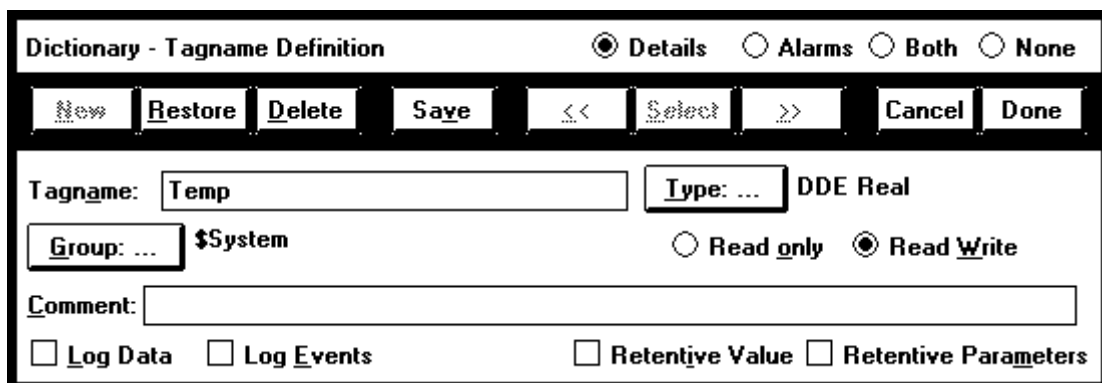
This option may be selected if the Server is to poll for all data whether or not they are in visible windows, alarmed, logged or trended. The use of the option is not recommended.

Advise only active Items

Selecting this option will cause the LON_DDE Server to poll only points in visible windows and points that are alarmed, logged or trended.

Defining the Tagnames

To define the Tagnames associated with the new "DDE Access Name", invoke the */Special/Tagname Dictionary* command (in **WindowMaker**). The "Dictionary - Tagname Definition" dialog box will appear:



Dictionary - Tagname Definition Details Alarms Both None

Tagname: DDE Real

\$System Read only Read Write

Comment:

Log Data Log Events Retentive Value Retentive Parameters

Click on **New** and enter the **Tagname**. (The tagname defined here is the name **InTouch** will use. The LON_DDE Server does not see this name.)

Select the tag type by a click on the **Type** button. The "Choose tag type..." dialog box will appear:

Choose tag type...			
Group Var	Hist Trend	Tag ID	Memory Message
Memory Discrete	Memory Integer	Memory Real	DDE Message
DDE Discrete	DDE Integer	DDE Real	Indirect Message
Indirect Discrete	Indirect Analog		

To access LON_DDE items, the type must be **DDE Discrete**, **DDE Integer**, **DDE Real**, or **DDE Message**. Select the DDE type.

The "Details" dialog box for the tagname will appear:

Initial Value:	<input type="text" value="0"/>	Min EU:	<input type="text" value="0"/>	Max EU:	<input type="text" value="9999"/>
Deadband:	<input type="text" value="0"/>	Min Raw:	<input type="text" value="0"/>	Max Raw:	<input type="text" value="9999"/>
Eng Units:	<input type="text"/>			Conversion <input checked="" type="radio"/> Linear <input type="radio"/> Square Root	
DDE Access Name:...		Unassigned			
Item:	<input type="text"/>				
<input type="checkbox"/> Use Tagname as Item Name		Log Deadband: <input type="text" value="0"/>			

Select the LON_DDE topic (LONWorks network node) by a clicking on the **DDE Access Name: ...** button. The

"DDE Access Name Definition" dialog box will appear:

DDE Access Name Definition							
DDE Access Names:	<input type="button" value="Done"/> <input type="button" value="Add..."/> <input type="button" value="Modify..."/> <input type="button" value="Delete"/>						
<table border="1"> <tbody> <tr> <td>lah1k</td> </tr> <tr> <td>pvs1k</td> </tr> <tr> <td> </td> </tr> <tr> <td> </td> </tr> <tr> <td> </td> </tr> <tr> <td> </td> </tr> </tbody> </table>	lah1k	pvs1k					
lah1k							
pvs1k							

Select the appropriate topic name and click on **Done**. (If the DDE Access Name has not been defined as previously described, click on **Add** and define the DDE topic now.)

The "Details" dialog box will appear displaying the selected DDE Access Name:

Initial Value:	<input type="text" value="0"/>	Min EU:	<input type="text" value="0"/>	Max EU:	<input type="text" value="9999"/>
Deadband:	<input type="text" value="0"/>	Min Raw:	<input type="text" value="0"/>	Max Raw:	<input type="text" value="9999"/>
Eng Units:	<input type="text"/>				Conversion <input checked="" type="radio"/> Linear <input type="radio"/> Square Root
DDE Access Name:...	<input type="text" value="pvs1k"/>				
Item:	<input type="text"/>				
<input type="checkbox"/> Use Tagname as Item Name					Log Deadband: <input type="text" value="0"/>

For integers fill in the **Min EU**, **Max EU**, **Min Raw** and **Max Raw** fields. These fields control the range of values that will be accepted from the server and how the values are scaled. If no scaling is desired, **Min EU** should be equal to **Min Raw** and **Max EU** to **Max Raw**.

Enter the LON_DDE item/point name to be associated with this tagname in the **Item** field in the "Details" box:

Initial Value:	<input type="text" value="0"/>	Min EU:	<input type="text" value="0"/>	Max EU:	<input type="text" value="9999"/>
Deadband:	<input type="text" value="0"/>	Min Raw:	<input type="text" value="0"/>	Max Raw:	<input type="text" value="9999"/>
Eng Units:	<input type="text"/>				Conversion <input checked="" type="radio"/> Linear <input type="radio"/> Square Root
DDE Access Name:...	<input type="text" value="pvs1k"/>				
Item:	<input type="text" value="r2"/>				
<input type="checkbox"/> Use Tagname as Item Name					Log Deadband: <input type="text" value="0"/>

(Refer to the **Item (Point) Naming** section below for complete details.)

Where applicable, the **Use Tagname as Item Name** option may be selected automatically, enter the tagname in this field.

Note. The tagname can be used only if it follows the conventions listed in the **Item (Point) Naming** section.

Once all entries have been made, click on the **Done** button (in the top dialog box) to accept the new tagname. To define additional Tagnames click on the **Add** button. To return to the **WindowMaker** main screen, select **Done**.

Item (Point) Naming

The LON DDE Server supports the following DDE item/point naming system for accessing to the LONWorks network variables. The DDE item/point naming system depends on the **Type of Topic**:

1) if *Type of Topic* is **Single Node**:

[F]A[.b][S]

2) if *Type of Topic* is **Group of Nodes** or *Type of Topic* is **Single Node** and *Node Address* is 0:

B[S]

where:

F - optionally used character which indicates the necessity to convert raw values to scaling values; for details see the **LON_DDE Server Data Conversation File** section;

A - index address, possible values are from 0 to 255;

B - selector address, possible values are from 0 to 3FFF (hex);

.b - optionally used bit address, possible values are from 0 to 15;

S - optionally used character to indicate the signed interpretation of data; by default data are interpreted as unsigned.

Notes.

1. Data can be read from inputs and outputs and written to inputs.
2. Direction and number of network variables will be read from LONWorks network nodes. Number of network variables can be smaller than maximum of possible index address.
3. If the *Type of Topic* is **Group of Nodes** or *Type of Topic* is **Single Node** and *Node Address* is 0 then only input network variables can be accessed.
4. If the *Type of Topic* is **Group of Nodes** new value will be written to all this group's nodes with given selector address.
5. If the *Type of Topic* is **Single Node** and *Node Address* is 0 new value will be written to all this subnet nodes with given selector address.
6. To change the individual bit in some network input variable at first the value of input network variable containing the necessary bit is read using index address, then the selector address is determined by using Network Management Message "Query Net Variable Config" and then the changed value is written back to the network using by the selector address.
7. The DDE Type depends on format of scaling values. For details see the **LON_DDE Server Data Conversation File** section. If returned value is raw then possible DDE Type is **DDE Discrete** for bit addressing and **DDE Integer** for other addressing types.
8. Both uppercase and lowercase letters can be used.

Item/Point Naming Examples

The following examples show the correct format for item/point names:

- 8 - index address is 8;
- 4.8 - 8th bit in index address 4;
- 11S - index address is 11, raw data will not convert, signed data;
- T1 - 1st index address, raw data will convert to text string;
- r3s - 3rd index address, raw data will convert to floating point value, signed data;
- 3ffa - selector address is 3ffa (hex), write only.

Node "STATUS" Item

For each topic, there is a built-in discrete item that indicates the state of communication with the LONWorks network node. The discrete item (**Status**) is set to **0** when communication with the node fails and set to **1** when communication is successful.

From **InTouch** the state of communication with the node may be read by defining a DDE Discrete tagname and associating it with the topic configured for the node and using **Status** as the *Item* name.

The screenshot shows a configuration dialog box for a DDE item. It contains the following fields and options:

- Initial Value:** Radio buttons for **On** and **Off**. The **Off** option is selected.
- Input Conversion:** Radio buttons for **Direct** and **Reverse**. The **Direct** option is selected.
- On Msg:** A text box containing **DDE Initialized**.
- Off Msg:** A text box containing **DDE Uninitialized**.
- DDE Access Name:** A text box containing **pvs1k**.
- Item:** A text box containing **STATUS**.
- Use Tagname as Item Name:** An unchecked checkbox.

From **Excel**, the status of the communication may be read by entering the following formula in a cell:

=LON_DDE|topic!STATUS

Notes on Using Microsoft Excel

Data from LON_DDE topic (LONWorks network node) may be accessed from Excel spreadsheets. It is recommended to use DDE cold links between Excel and LON_DDE Server, because the specific initial data (Self Documentation) reading from each activated DDE topic (node) takes a considerable amount of time usually not acceptable when using hot links. Also there should be some delay between initiation of DDE channel (link) and first data requests from this topic.

Reading Values into Excel Spreadsheets

To set up a hot link, enter a formula like the following into a cell on the spreadsheet.

```
=LON_DDE|topic!item
```

Sometimes, Excel requires the topic and/or item/points to be surrounded by apostrophes.

In the formula, **topic** must be replaced with one of the valid topic names defined during the Server configuration process. Replace **item** with one of the valid item/point names described in the **Item (Point) Naming** section.

When entering a formula like the following one into a cell on the spreadsheet (trying to set up a hot link):

```
=LON_DDE|'node1'!'r2'
```

usually the DDE time-out occurs and no values are received from LON_DDE Server (“#NAME?” error value is displayed in a cell). The receiving of values then can be initiated (after Self Documentation is received from this node) by selecting the each cell with DDE address and then clicking the enter box or pressing <Enter> on the formula bar.

A cold link can be set up by creating an Excel macro from where Excel could make requests from the LON_DDE Server. For example, the following Excel 5.0 VBA macros can be used to request the DDE item “r0” from topic “node1” and write it into R1C1 on spreadsheet CELLS.XLS (in following example the cell R1C2 is used to store DDE channel number):

```
Sub Initiate()  
    Cells(1, 2).Value = Application.DDEInitiate(“LON_DDE”, “node1”)  
End Sub  
  
Sub RequestData()  
    Cells(1, 1).Value = Application.DDERequest(Cells(1, 2).Value, “r0”)  
End Sub  
  
Sub Terminate()  
    Application.DDETerminate Cells(1, 2).Value  
End Sub
```

At first, the DDE channel (link) is created by executing the **Initiate** macro. Then (after Self Documentation is received from this node) the **RequestData** macro can be executed as many times as necessary to obtain values from node1. The DDE channel (link) is closed by executing **Terminate** macro.

Note: Refer to the Microsoft Excel manual for complete details on entering Remote Reference formulas for cells.

Writing Values to LON_DDE Points

Values may be written to the Server from Microsoft Excel by creating an Excel macro that uses the **POKE** command. The proper command is entered in Excel as follows:

```
channel=INITIATE("LON_DDE","topicname")
=POKE(channel,"itemname", Data_Reference)
=TERMINATE (channel)
=RETURN()
```

The following describes each of the above **POKE** macro statements:

```
channel=INITIATE("LON_DDE","topicname")
```

Opens a channel to a specific topic name (defined in the Server) in an application with name LON_DDE (the executable name less the .EXE) and assigns the number of that opened channel to **channel**.

Note: By using the **channel=INITIATE** statement the word **channel** must be used in the **=POKE** statement instead of the actual cell reference. The "**applicationname**" and "**topicname**" portions of the formula must be enclosed in quotation marks.

```
=POKE(channel,"itemname", Data_Reference)
```

POKEs the value contained in the **Data_Reference** to the specified item name (LONWorks network actual variable) via the **channel** number returned by the previously executed **INITIATE** function. **Data_Reference** is the row/column ID of the cell containing the data value. For "**itemname**", use some of the valid item names described in the **Item (Point) Naming** section.

```
=TERMINATE(channel)
```

Closes the channel at the end of the macro. Some applications have a limited number of channels. Therefore they should be closed when finished. **Channel** is the channel number returned by the previously executed **INITIATE** function.

```
=RETURN()
```

Marks the end of the macro.

The following is an example of Excel macro used to poke value from cell B2 to topic **node1** item **r2**:

```
PokeMacro -Ctrl a
=INITIATE("LON_DDE","node1")
=POKE(A2,"r2",B2)
=ON.TIME(NOW()+0.01,"TerminateDDEChannel")
=RETURN()
```

```
TerminateDDEChannel
=TERMINATE(A2)
=RETURN()
```

Note: Refer to the Microsoft Excel manual for complete details on entering Remote Reference formulas for cells.

LON_DDE Server Data Conversation File

This text file (**CONVERT.CFG**) will be read at Server startup and contains information how to convert non-raw data. Also on startup the Server will read the SNVT type IDs (SNVT) from each node. If data from current item/point needs conversation then Server will compare the item/point SNVT with SNVTs from Data Conversation File. If equal SNVT is found then raw value will be converted to scaled value using the corresponding format and, if necessary, constants.

The Data Conversation File can be created and edited by any ASCII text editor (e.g. Notepad, MS Write).

The Conversation File should be located in the same directory as the configuration file.

An example of Data Conversation File

!No	SNVT_type ID	format	scaling			comment
			a	b	c	
1	21	real	1.0	-2.0	0.0	!This is a comment
2	106	int	1.0	0.0	0.0	! 5th line
3	5	disc				! binary value
4	36	text("%c")				! ASCII character
5	116	text("%m")ON/OFF				! Enumerated expressions
13	105	REAL 1.04 -2.0 0.0				!it is not an invalid row !

Description of Elements

No	- unique variable identifier, used only as an order number;
SNVT_type_ID	- unique standard network variable type ID;
format	- formats of returned values;
scaling	- constants for the conversation of raw values to scaling values.
!	- start of comment.

Each Data Conversation File element must be separated by spaces or tabs, the maximum length of one row is 80 characters. The maximum length of file element *format* is 32 characters. Both uppercase and lowercase letters can be used. If LON_DDE Server has

problems when working with Data Conversation File then all warnings and errors are displayed through the Wonderware Logger.

Formats of Returned Values

disc

The returned value is 0 if raw data is zero and 1 if raw data is non-zero. The DDE Type is **DDE Discrete**. The Item/point name must start with prefix 'd' - e.g. **D4**.

int

The returned value is integer. The DDE Type is **DDE Integer**. The conversation of raw values to integer values is performed by the following expression:

$$\text{integer_value} = (\text{int})((\text{raw_value}) * a) * 10^b + c$$

The Item/point name must start with prefix 'i' - e.g. **I1**.

real

The returned value is floating point value. The DDE Type is **DDE Real**. The conversation of raw values to floating point values is performed by the following expression:

$$\text{floating_point_value} = (\text{real})((\text{raw_value}) * a) * 10^b + c$$

The Item/point name must start with prefix 'r' - e.g. **r3s**.

text("...")

The returned value is ASCII character or NULL terminated ASCII string. The DDE Type is **DDE Message**. Possible text formats are:

text("%c") - an ASCII character;

text("%d") - a NULL terminated ASCII string representing an integer number;

text("%f") - a NULL terminated ASCII string representing a floating point number;

text("%m") - a NULL terminated ASCII string representing an enumeration literal; in this case

the format must contain also all possible literals, e.g.

text("%m")OFF/LOW/MED/HIGH/ON

causes the following conversations: if raw data is 0 then string "OFF" is returned, if 1 then "LOW", if 2 then "MED", if 3 then "HIGH" and if 4 then "ON".

The Item/point name must start with prefix 't' - e.g. **T0**.

Both direct and opposite conversations are possible .

Troubleshooting menu

The following debugging choices are appended to the Server's System Menu (the menu that appears when you click on the "-" box in the upper left hand corner of the Server's window):

- Suspend Protocol/Resume Protocol** - these choices permit you to turn protocol processing on and off, what means that you can suspend access to LONWorks network nodes.
- Show Send** - if checked then all outgoing user data is logged in hexadecimal format.
- Show Receive** - if checked then all incoming user data is logged in hexadecimal format.
- Show Errors** - if checked then all information about errors is logged.
- Verbose** - if **Verbose** is checked then real update time of each active topic is displayed on the LON_DDE Server main window and also the node's Self Documentation is logged to WWLogger at each new topic activation;
if **Verbose** is not checked then the number of active messages is displayed on the LON_DDE Server main window.
- Dump** - all information about ports, topics, messages and data items are logged. This can be used to find out how many messages are actually sent to the network.
- DumpScreen/ClearScreen** - these choices permit or forbid the displaying of information about com ports, state of SLTA and topics (nodes), number of active messages on the LON_DDE main window.

All debug information is displayed through the Wonderware Logger, which must be active for these commands to work.

Note.. If **Show Send** and/or **Show Receive** is checked then debug output grows very fast and it is possible that computer becomes very slow.

KLINKMANN AUTOMATION
LON_DDE Server
Revision History

Feb 97	Rev 1.0	First Release
Mar 98	Rev.1.1	Modification of manual contents Chapters:
Jul 98	Rev.1.2	Files on the LON_DDE Distribution Diskette Autobaud selection added. WIN.INI entry "DomainIDLen" added. "Topic definition" section modified. Integer and floating point data conversation formulas corrected in the "Formats of Returned Values" section. "Notes on Using Microsoft Excel" section modified.
Mar 2002	Rev 1.3	Installation from CD information added.