

OMRONSLK DIRECT Communication Server

for Microsoft Windows
and InTouch Applications

**User Manual
Ver 1.x Rev 4.10
DR 045 10
DR 045 11**

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OMRONSLK DIRECT I/O Server

Overview

The **Omron SYSMAC LINK DIRECT Communication Server** (hereafter referred to as the “OMRONSLK Server” or “OMRONSLK” or “Server”) is a Microsoft Windows NT 32-bit application program that acts as a communication protocol *Server* and allows other Windows application programs access to data from **Omron** PLCs using SYSMAC LINK protocol. The Server can access to data from C-series as well as from CV-series PLCs. Any Microsoft Windows program that is capable of acting as a **DDE**, **FastDDE**, **SuiteLink** or **OPC Client** may use the OMRONSLK Server.

The OMRONSLK Server requires a SYSMAC LINK Support Board connected to the **Omron** SYSMAC LINK System by coaxial cable. The *Server* accesses the Support Board **directly** and therefore it is not necessary to use the MS-DOS drivers (SYSMAC LINK BIOS and SYSMAC LINK Driver) supplied by **Omron**. The *Server* supports up to 62 nodes (including Support Board), connected in the SYSMAC LINK System Network. The OMRONSLK Server supports PLC Memory Areas accessible by *CV-mode (FINS) commands*. The OMRONSLK Server uses WinRT kernel driver to access the SYSMAC LINK Support Board.

There are two different OMRONSLK Server versions described in this manual:

- Server version (ordering number DR 045 10), supporting SuiteLink, FastDDE and DDE protocols; this version hereafter is referred to as the “**Suite Link & DDE**” version.
- Server version (ordering number DR 045 11), supporting OPC and DDE protocols; this version hereafter is referred to as the “**OPC & DDE**” version;

The separate installation package is supplied for each version of the Server. In all cases the name of Server executable file is **OMRONSLK.EXE**. All further information in this manual is same for all versions of the Server, with the exception of few points where communication protocol specific features are explained.

Communication Protocols

Dynamic Data Exchange (DDE) is a communication protocol developed 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 Wonderware InTouch and Microsoft Excel can simultaneously be both a client and a server.

FastDDE provides a means of packing many proprietary Wonderware DDE messages into a single Microsoft DDE message. This packing improves efficiency and performance by reducing the total number of DDE transactions required between a client and a server. Although Wonderware's FastDDE has extended the usefulness of DDE for our industry, this extension is being pushed to its performance constraints in distributed environments.

The OMRONSLK Server “Suite Link & DDE version” supports the FastDDE Version 3 - an extension to Wonderware’s proprietary FastDDE Version 2. This extension supports the transfer of Value Time Quality (VTQ) information. The original DDE and FastDDE Version 2 formats are still supported, providing full backward compatibility with older DDE clients. FastDDE Version 3 works on Windows 9x systems as well as Windows NT systems.

NetDDE extends the standard Windows DDE functionality to include communication over local area networks and through serial ports. Network extensions are available to allow DDE links between applications running on different computers connected via networks or modems. For example, NetDDE supports DDE between applications running on IBM compatible computers connected via LAN or modem and DDE-aware applications running on non-PC based platforms under operating environments such as VMS and UNIX.

SuiteLink uses a TCP/IP based protocol and is designed by Wonderware specifically to meet industrial needs such as data integrity, high-throughput, and easier diagnostics. This protocol standard is only supported on Microsoft Windows NT 4.0 or higher. SuiteLink is not a replacement for DDE, FastDDE, or NetDDE. The protocol used between a client and a server depends on your network connections and configurations. SuiteLink was designed to be the industrial data network distribution standard and provides the following features:

- Value Time Quality (VTQ) places a time stamp and quality indicator on all data values delivered to VTQ-aware clients.
- Extensive diagnostics of the data throughput, server loading, computer resource consumption, and network transport are made accessible through the Microsoft Windows NT operating system Performance Monitor. This feature is critical for the scheme and maintenance of distributed industrial networks.
- Consistent high data volumes can be maintained between applications regardless if the applications are on a single node or distributed over a large node count.
- The network transport protocol is TCP/IP using Microsoft’s standard WinSock interface.

OPC (OLE for Process Control) is an open interface standard to provide data from a data source and communicate the data to any client application in a common standard way. The OPC is based on Microsoft OLE, COM and DCOM technologies and enables simple and standardized data interchange between the industrial or office sector and the production sector. From general point of view many aspects of OPC are similar to DDE, but main difference is in the implementation by using Microsoft's COM (Component Object Model) technology. It enables fast exchange with process automation data and OPC open interface allows access to data from OPC Server in same standard way from OPC client applications supplied by different developers.

For more information on the basics of OPC, please refer to the **OPC Specification**. The OPC Data Access Custom Interface Specification is maintained by **OPC Foundation**, the current specification is 2.04 dated September 2000.

The OPC support for OMRONSLK Server “OPC & DDE” version is implemented based on **FactorySoft OPC Server Development Toolkit** and it conforms to OPC Data Access Custom Interface Specification 2.04. The OMRONSLK Server “OPC & DDE” version is tested for compliance and is compatible with OPC Foundation OPC Data Access Compliance Test Tool.

The Suite Link, FastDDE (Version 3) and DDE support for OMRONSLK Server “Suite Link & DDE” version is implemented by **Wonderware I/O Server Toolkit** ver. 7.0 (060).

The FastDDE (Version 2) and DDE support for OMRONSLK Server “OPC & DDE” version is implemented by **Wonderware I/O Server Toolkit** ver. 5.0 (008).

Accessing Remote Items via the Server

The communication protocol addresses an element of data in a conversation that uses a three-part naming convention that includes the **application name**, **topic name** and **item name**. The following briefly describes each portion of this naming convention:

application name

The name of the Windows program (server) that will be accessing the data element. In the case of data coming from or going to OMRON Controllers via this Server, the application portion of the address is **OMRONSLK**.

topic name

Meaningful names are configured in the Server to identify specific devices (PLCs). These names are then used as the topic name in all conversations to that PLC. The OMRONSLK Server considers each node within a SYSMAC LINK Network to be a separate topic. For example, **PLC1**.

Note! You can define multiple topic names for the same PLC to poll different points at different rates.

item name

A specific data element within the specified topic. For the OMRONSLK Server, an item is a Controller Memory area parameter. C-series PLCs contain following Memory areas (all supported by the OMRONSLK Server): Input/Output register area bits and words, Latching Relay area bits and words, Holding Relay area bits and words, Auxiliary Relay area bits and words, Completion flags for Timers/Counters, Present Values for Timers/Counters, Data Memory area words. The OMRONSLK Server supports following CV-series PLCs Memory areas: CIO, G and Auxiliary Relay area bits and words, Timer Completion flags, Counter Completion flags, Timer Present Value, Counter Present Value, Data Memory area words, Transition Area flags, Step Area Flag status, Step Area status, Step timer Present Value, Expansion area (Current bank) word contents, Action Area Flag status, Register Area contents IR words, Register Area contents DR words.

The term "point" is used interchangeably with the term "item" in this User Manual. For more information on item/point names, see the "Item Names" section later in this manual.

Installing the OMRONSLK Server

Installing the Server

The OMRONSLK Server installation package can be supplied:

1. As a self-extracting archive (04510xxx.EXE for “Suite Link & DDE” version or 04511xxx.EXE for “OPC & DDE” version) 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 OMRONSLK Server from the self-extracting archive, run the 04510xxx.EXE or 04511xxx.EXE and proceed as directed by the OMRONSLK Server Setup program.

To **install** the OMRONSLK Server from CD or distribution disks, on MS Windows (NT or 2000):

1. Insert the CD with Klinkmann Software into CD drive or insert the OMRONSLK Server 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 “OMRONSLK SL and DDE Server” or “OMRONSLK OPC and DDE Server” and click on “Setup...”.
5. Proceed as directed by the OMRONSLK Server Setup program.

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

OMRONSLK.EXE	The OMRONSLK Server Program. This is a Microsoft Windows 32-bit application program.
OMRONSLK.HLP	The OMRONSLK Server Help file.
OMRONSLK.CFG	An example configuration file.
LICENSE.TXT	Klinkmann Automation software license file.
KLSERVER.DLL	Dynamic Link Library necessary for “OPC & DDE”version of the Server.
WWDLG32.DLL	Dynamic Link Library necessary only for “OPC & DDE”version of the Server.

To **uninstall** the OMRONSLK Server, start Control Panel, select “Add/Remove Programs” and select the “OMRONSLK SL and DDE Server” or “OMRONSLK OPC and DDE Server” from the list of available software products. Click on “Add/Remove...” and proceed as directed by the UnInstallShield program.

Notes:

1. The OMRONSLK Server “Suite Link & DDE” version is developed with Wonderware I/O Server Toolkit (ver 7.0) and needs the **Wonderware FS2000 Common Components** to be installed on computer where the OMRONSLK Server is running. The Wonderware FS2000 Common Components are installed automatically when any of Wonderware FS2000 Components (e.g. InTouch or some Wonderware I/O server) is installed.
2. If OMRONSLK Server “Suite Link & DDE” version will run on PC where Wonderware FS2000 Common Components are not installed then a special **I/O Server Infrastructure installation package** can be obtained from Klinkmann Automation (see **Installing the I/O Server Infrastructure** section below). This I/O Server Infrastructure installation package contains the minimum set of software needed to run the OMRONSLK Server “Suite Link & DDE” version and these infrastructure files must be install prior to executing the OMRONSLK Server.
3. The HASP key is needed for full time running of OMRONSLK Server. The HASP Driver setup is performed during the Server setup. Without HASP Driver installed the OMRONSLK Server will run only 1 hour (with all features enabled).

Installing the I/O Server Infrastructure

The I/O Server Infrastructure installation package can be supplied:

1. As a self-extracting archive (IOServerInfrastructure.exe) if downloaded from Klinkmann’s web site.
2. On one distribution disk (floppy).

To **install** the I/O Server Infrastructure from the self-extracting archive, run the IOServerInfrastructure.exe and proceed as directed by the I/O Server Infrastructure Setup program.

To **install** the I/O Server Infrastructure from the distribution disk, on MS Windows NT:

1. Insert the I/O Server Infrastructure disk into a floppy drive A: or B:.
2. Select the **Run** command under the **Start** menu.
3. Type “A:SETUP” or “B:SETUP”.
4. Click on **OK**.
5. Proceed as directed by the I/O Server Infrastructure Setup program.

To **uninstall** the I/O Server Infrastructure, start Control Panel, select “Add/Remove Programs” and select the “IO Server Infrastructure” from the list of available software products. Click on “Add/Remove...” and proceed as directed by the UnInstallShield program.

Note: The I/O Server Infrastructure installation will be rejected if Wonderware FS2000 Common Components are already installed on same computer.

Starting the OMRONSLK Server

Before starting the Server, the Support Board on your computer must be set as a Sysmac Link network node (see "SYSMAC LINK Support Board Operation Manual"). After starting your computer use the SYSMAC LINK Support Software (SLSS) to set Sysmac Link system parameters (if parameters are not set previously). After the Sysmac Link system parameters are set then reload the computer.

Start MS Windows NT and OMRONSLK Server. If necessary, change the Server configuration values. They must match with hardware (Support Board and nodes) settings.

Start your client program. Check the Support Board indicators: RUN, INS, SD and RD must light. If indicators indicate error then Server does not communicate with system. The message about errors may be displayed on the computer screen or logged to the WWLogger and (or) to OMRONSLK Internal Logger.

If communication **fails**, restart the OMRONSLK Server and client program. If communication fails again, check the system settings with DOS Support Utility SLKUTYIB.EXE (see "SYSMAC LINK Support Board Operation Manual").

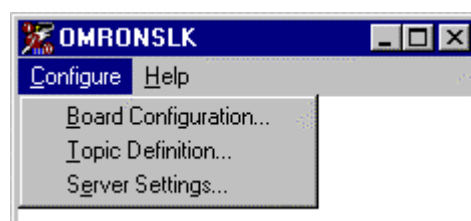
Configuring the OMRONSLK Server

After the OMRONSLK Server is initially installed, a little of configuration is required. Configuring the Server automatically creates an **OMRONSLK.CFG** file that holds all of the topics (nodes) definitions entered, as well as the communication port configurations. This file will be placed automatically in the same directory in which **OMRONSLK** is located unless the path where the configuration file will be placed is specified via the */Configure/Server Settings...* command.

To perform the required configurations, start up the OMRONSLK program. If the Server starts up as an icon, double-click on the icon to open the server's window. The following will appear:



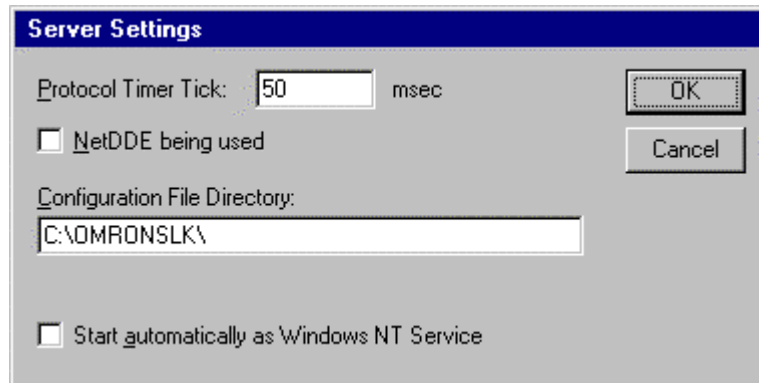
To access the commands used for the various configurations, open the */Configure* menu:



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 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 Configure/Server Settings... command. The "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 one message is sent to the network and one reply from network is processed). This should be approximately 2 to 4 times faster than rate desired to update data from the **Omron** network.

NetDDE being used

Select this option if you are networking using NetDDE.

Configuration File Directory

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

Note: Only the "path" may be modified with this field. The configuration file is always named **OMRONSLK.CFG**.

Note: There is no limit to the number of configuration files created, although each must be in a separate directory. When using the OMRONSLK Server with **InTouch**, it is good practice to place the configuration file in the application directory.

Start automatically as Windows NT Service

Enabling this option will cause the OMRONSLK Server "Suite Link & DDE" version to start as a Windows NT service.

Windows NT offers the capability of running applications even when a user is not logged on to the system. This is valuable when systems must operate in an unattended mode. Enabling this option and rebooting the system will cause the Server to run as a Windows NT service. However, to view configuration information or to reconfigure the Server, the user must log on to the system. Any Server related problems that may arise such as missing adapter cards, licensing failures or device drivers not loading will not be visible to

the user until a log on is performed. Disabling this option and rebooting the system will cause the Server to run as a Windows NT application program once again.

Notes:

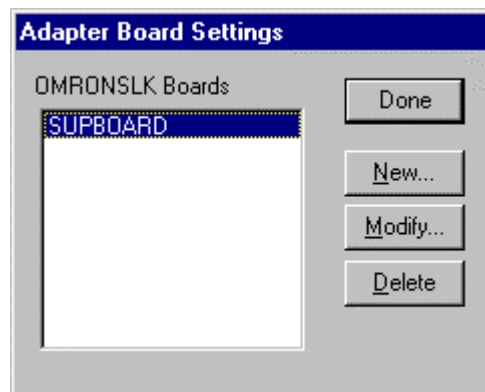
1. The **Start automatically as Windows NT Service** feature can be activated only with OMRONSLK Server "Suite Link & DDE" version. To start the OMRONSLK Server "OPC & DDE" version as Windows NT Service, refer to **Running OMRONSLK "OPC & DDE" version as Windows NT Service** section of this manual.

2. The Service Startup configuration can be changed by MS Windows NT **Control Panel/Services** configuration dialogs. The **Allow Service to Interact with Desktop** checkbox in "Service" dialog box must be checked (the "Service" dialog box can be invoked by pressing the "Startup" button on "Services" dialog box when Service **OMRONSLK_IOServer** is selected). If **Allow Service to Interact with Desktop** is not selected then OMRONSLK Server full functionality is not ensured (e.g. the Server configuration can not be changed, no message boxes will be displayed, etc.).

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

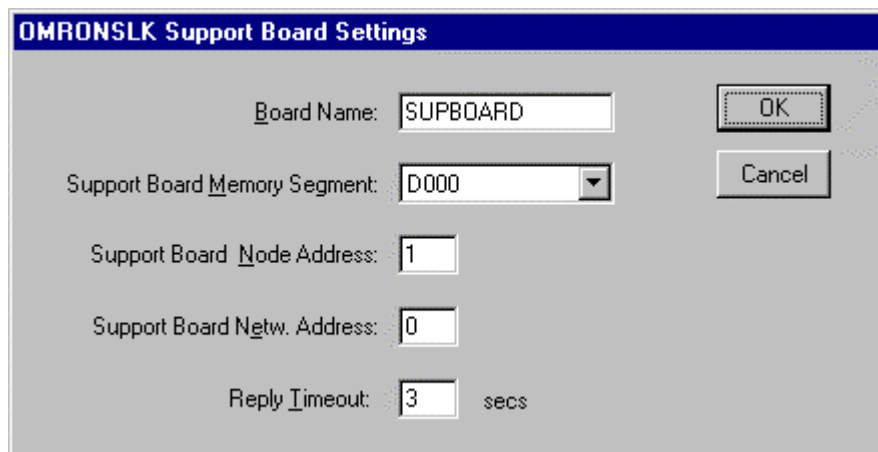
Board Configuration Command

To configure the SYSMAC LINK Support Board, invoke the `/Configure/Board Configuration...` command. The "Adapter Board Settings" dialog box will appear:



Select the Support Board and click on **Modify** to examine the characteristics of the selected Board.

The "OMRONSLK Support Board Settings" dialog box will appear:



The following describes each dialog field in this dialog box:

Board Name

This field is used to enter the Support Board name.

Support Board Memory Segment

This field is used to enter the segment address, in hexadecimal, for the area of RAM memory that is used as a buffer between computer and the Support Board. The entered value must be consistent with the memory buffer address selected on the Support Board (see "SYSMAC LINK Support Board Operation Manual"). To select a necessary Support Board Memory Segment click on the combo box button and make your choice from list box.

Note: *The default Support Board Memory Segment address is D800.*

Support Board Node Address

This field is used to enter the Support Board node address (each SYSMAC LINK Unit or Board in a Network must have its own unique node address between 01 and 62). The Board Node Address must be consistent with the node address set on the Support Board by the node address switches. Attention should be paid to selecting a node address that will not conflict with other devices in the system.

Note: *The default Board Node Address is 1.*

Support Board Network Address

Enter the Local Network Address (each network in the system is assigned a unique network address between 1 and 127). The entered value must be consistent with the network address assigned in the routing tables. When communicating only with nodes in the Local Network (network where the Support Board is installed) you can set Board Network Address to zero.

Note: *The default Board Network Address is 0.*

Reply Timeout

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

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

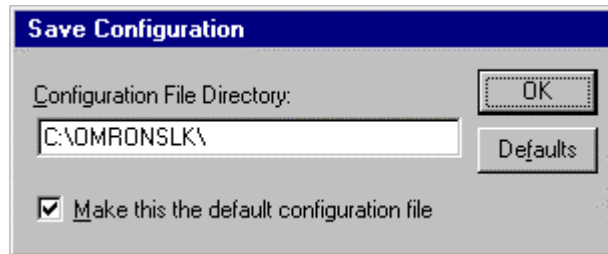
Once all entries have been made, select **OK** to process the configuration for the communication port.

Select **Done** in the "Adapter Board Settings" dialog box when Support Board configuration has been performed.

Note: *You will need to reboot the computer to activate board settings if you changed "Support Board Memory Segment" for existing board.*

Saving OMRONSLK 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 OMRONSLK Server to find the configuration file automatically each time it is started.

Configuration File Location

When the OMRONSLK Server starts up, it first attempts to locate its configuration file by, first checking the **WIN.INI** file for a path that was previously specified. If the path is not present 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:

OMRONSLK /d:c:\directoryname

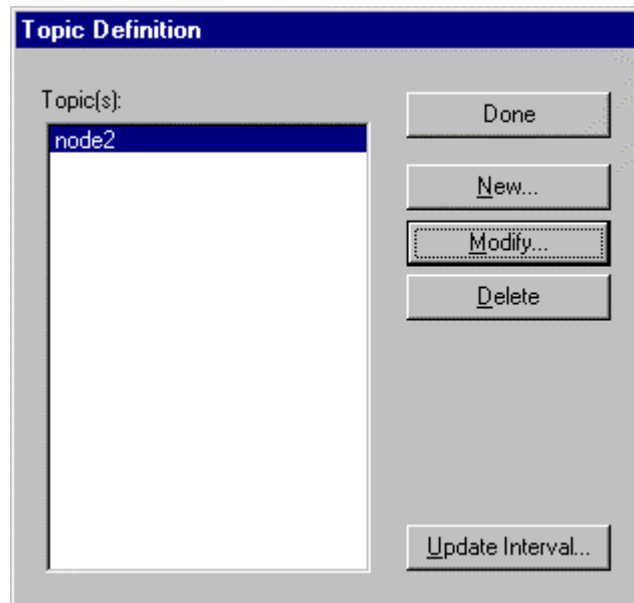
Note: *There is no limit to the number of configuration files that may be created, although each must be in a separate directory.*

Topic Definition Command

The user provides each node with an arbitrary name that is used as the Topic Name for all references to the node.

The following steps are taken to define the topics (nodes) attached to the **Omron** network:

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 "OMRONSLK Topic Definition" dialog box will appear:

3. Enter the **Topic Name**.

Note: If using *InTouch* the same Topic Name is to be entered in the "Add Access Name" dialog box described in the **Using the OMRONSLK Server with InTouch** section.

4. Choose the **Support Board** to associate it with the topic. (Additional topics may be associated with the same Support Board at a later time.) **Note:** If this is the first time a Support Board has been configured, the user will be prompted to save it to an existing directory.
5. Enter the value in the **Node Address** field (each SYSMAC LINK Unit or Board in a Network must have its own unique node address between 01 and 62). The Board I/O Address must be consistent with the node address set on the SYSMAC LINK Unit by the node address switches. Attention should be paid to select a node address that would not conflict with other devices in the system.
6. Enter the value in the **Network Address** field (each network in the system is assigned a unique network address between 1 and 127). When communicating with a node on another (Remote) network, the entered value must be consistent with the network address assigned in the routing tables. Board Network Address in this case must be non-zero (see **Board Configuration** command). The network address of 0 indicates the *local* network. **Note:** The default Network Address is 0.
7. Set the **Update Interval** field to indicate the frequency the items/points on this topic will be read (polled); at this frequency all this topic messages must be sent to the network and replies must be received and processed.
8. Enter the value of the **PLC Access Timeout** (in milliseconds). This is a delay what Server can make in communication with the selected PLC after each read or write command execution. The default value of **PLC Access Timeout** is 0 (zero). Enter non-zero value in the **PLC Access Timeout** field only if you consider that selected PLC is not fast enough to correctly react to the Server's frequently processed requests.

The Server processes topics sequentially and therefore there can not be some timing problems for a separate PLC if Server communicates with a group of PLCs. If Server processes only one topic or group of topics within same PLC Address then this PLC is accessed more frequently. Even in this case the Server makes a short pause (depending of Server configuration) after each request/response processing. The main timing problems for PLC can cause the writing of separate Bit status into Word areas (for C-series PLCs - into CIO, LR, HR and AR areas; for CV-series PLCs - into CIO, G and A areas (see **Item Names** section). Writing the Bit status into Word area is performed by executing the following sequential steps:

- reading of corresponding Word value from PLC memory,
- setting a Bit to be written into the Word value,
- writing the changed Word value into PLC memory.

If **PLC Access Timeout** is 0 milliseconds then Server tries to execute all steps as fast as Omron network can do it (with no pauses between processing steps). It can put the selected PLC into hard timing conditions.

When unsuccessful Bit writing time by time happens then it is important to recognize the reason of fault. Most possible fault reason usually is a bad communication; therefore at first recognize whether communication is going correctly. Check the **ShowBadWrites** option in the Server System Menu. Now the Server logs (to WWLogger and (or) to OMRONSLK Internal Logger) the information about each unsuccessful write command if network communication error happens. If communication is processed correctly (no information about fault in WWLogger file and (or) in OMRONSLK Internal Logger file), but write command is not executed then the possible fault reason may be the hard timing conditions in the accessed PLC. In this case the setting non-zero value for **PLC Access Timeout** can make topic processing more reliable.

Note: By setting the **PLC Access Timeout** to non-zero value you can seriously reduce the real data update rate for selected topic as well as for topics with the same PLC Address.

Do not configure great **PLC Access Timeout**. To increase the timeout between Bit writing steps - configure the **PLC Access Timeout** a bit greater as Protocol Timer Tick value (see **Server Settings Command** section).

Note: If Server processes a group of topics with the same PLC Address and each of topic is configured to different **PLC Access Timeout** then Server takes into account the greatest of all configured values and attaches it to all topics with the same PLC Address.

9. Enter the values of **FINS Command Maximum Size** for relevant data part of read and write command. Each value from 16 to 512 bytes is valid. Default value is 512 bytes. The greater value is configured the faster data update rate can be achieved. Therefore reduce the **FINS Command Maximum Size** value only if selected PLC has timing problems to process great amount of data in a short time period.

All Omron PLCs support the requests of maximum length, but not all models can process a lot of such requests without communication errors. If a PLC time by time reports an error message to valid read or write command then one of possible error reasons can be too long command. In such case it is recommended to reduce the **FINS Command Maximum Size** for the selected PLC. The smaller Read **FINS Command Maximum Size** must be set for topics configured to process Multiple Memory Area Read commands. For write messages the value of FINS Command Maximum Size is relevant if WIN.INI entries **MultiWrite=1** or **MultiWrite=2** are used (see **WIN.INI entries** section).

Note: The maximum size of FINS command in SYSMAC LINK network is 542 Bytes (for both request and response) including command header and data part of command. The OMRONSLK Server operates with maximum of 512 bytes for relevant data part of command. The real maximum length of each command's relevant data part depends on the request and/or response structure what can be different for different commands. Values configured for **FINS Command Maximum Size** limit the length of data part either for request or response command depending on which command (request or response) contains greater number of Bytes.

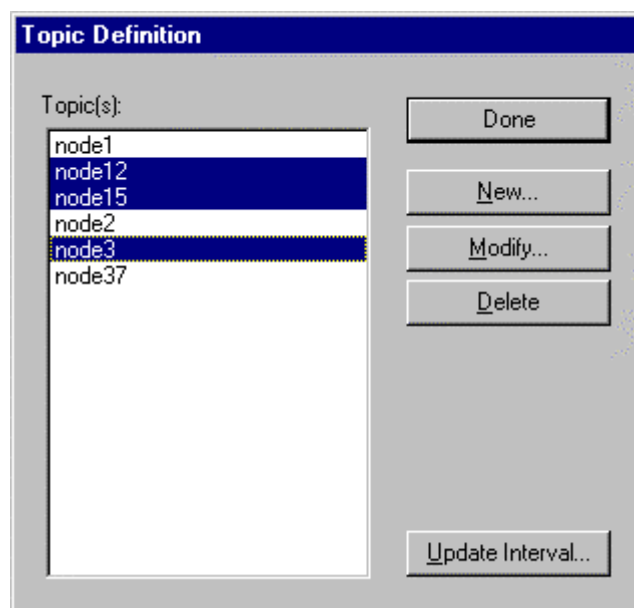
10. Select the **Controller type** (C-series or CV-series).

11. For CV-series Controller select model type. To select Controller model type click on the combo box button and make your choice from list box.
12. Check or uncheck the **Multiple Memory Area Read** check box to choose the type of FINS read commands used for this topic. If **Multiple Memory Area Read** is unchecked (default setting) then Server uses Memory Area Read FINS commands and maximum 256 consecutive words can be read from this topic by one command. If **Multiple Memory Area Read** is checked then Server uses Multiple Memory Area Read FINS commands and maximum 128 non-consecutive words (also from different memory areas) can be read from this topic by one command (*this mode does not support floating point values as well as memory areas with forced status*).

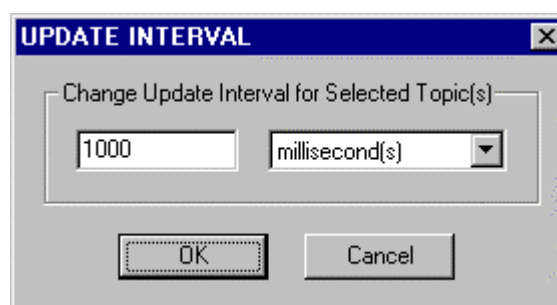
Once all entries have been made, click on **OK**.

Update Interval for Multiple Topics

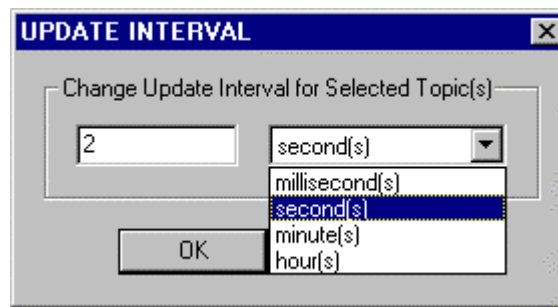
The OMRONSLK Server supports the possibility to enter the new **Update Interval** value for multiple Topics in a single operation. At first these multiple Topics must be selected in the "Topic Definition" dialog box by holding the CTRL key while clicking on the selected ones:



Then click on **Update Interval...**. The "UPDATE INTERVAL" dialog box will appear:



Enter the new value in the **Update Interval** field and select the appropriate time measuring units (milliseconds, seconds, minutes or hours):



Click on **OK** to change the **Update Interval** value for all selected Topics or click on **Cancel**. The "Topic Definition" dialog box will appear again.

The **Update Interval** can be changed also at run-time (for each Topic separately, not for several ones at once) after Topic is activated by client application (see description of **UPDATEINTERVAL** item in *Item Names* section).

Select **Done** when configuration for all Topics has been performed.

Item Names

Within the OMRONSLK Server, item/point naming depends on Memory Area naming conventions of Omron C-series and CV-series PLCs and possible read or write command messages. The Server supports the fixed set of item names, each of them generally may be described as:

PnS

where **n** - specifies the Memory area word/bit address of the specific word, flag or bit;
P - optionally used prefix, one or two characters before Memory area address, and designates the type of Memory area;
S - optionally used suffix (suffixes), one or two characters after address; characters "**F**" or "**f**" indicates forced status of word, flag or bit (not supported for C-series Omron PLCs); characters "**B**" or "**b**" indicates that item value is set for Binary Coded Decimal (BCD) transmission; characters "**S**" or "**s**" indicates that Integer item value is interpreted as signed integer (value limits -32768 ... 32767), corresponding item without suffix "**S**" or "**s**" is interpreted as unsigned short integer (value limits 0 ... 65535); characters "**R**" or "**r**" indicates that two sequential words (addresses n and n+1) are interpreted as one real floating point value (not supported if Multiple Memory Area Read FINS commands are used). For example, DM0 area in the PLC contains value 00 00 (hex) and DM1 area contains value 3F 00 (hex); in this case item DM0R is interpreted as real floating point item with value 0.5 (got from areas DM0 and DM1). Suffix "**R**" ("**r**") can be used only with items, indicating memory areas word contents:
 for C-series PLCs - CIO area words, LR area words, HR area words, AR area words, PV words and DM area words;
 for CV-series PLCs - CIO area words, G area words, A area words, Timers/Counters PV words (item names PT and PC), DM area words, Step Timer Present value words (item name ST), Expansion area (item name E) words, Register areas (item names IR and DR) words, AR area words, PV words and DM area words.

If two suffixes "**F**" ("**f**") and "**B**" ("**b**") are used simultaneously then character "**B**" ("**b**") must be the last. BCD is not valid for forced words.

If suffixes "**B**" ("**b**") and "**S**" ("**s**") are used simultaneously, the Server indicates item/point name error. Signed/unsigned designation does not affect value interpretation for bits and forced words, yet the Server does not indicate item/point name error if suffix "**S**" or "**s**" is used for bits or forced words. In any case suffix "**S**" ("**s**") must be the last character in the item name.

Suffix "**R**" or "**r**" can not be used simultaneously with "**B**" ("**b**") or "**S**" ("**s**") or "**F**" ("**f**") suffixes.

C-series PLCs

The following table lists the supported item names for the **C-series** PLCs:

Memory area	Item name	Tag Type	Range	Value Range (*)
Input/Output register area CIO (Bit status)		Discrete	00000... 51115(**)	0, 1
Input/Output register area CIO (Word contents)		Integer	0... 511(**)	0...65535 (-32768...32767)
Latching Relay area (Bit status)	LR	Discrete	LR0000... LR6315	0, 1
Latching Relay area (Word contents)	LR	Integer	LR0... LR63	0...65535 (-32768...32767)
Holding Relay area (Bit status)	HR	Discrete	HR0000... HR9915	0, 1
Holding Relay area (Word contents)	HR	Integer	HR0... HR99	0...65535 (-32768...32767)
Auxiliary Relay area (Bit status)	AR	Discrete	AR0000... AR2715	0, 1
Auxiliary Relay area (Word contents)	AR	Integer	AR0... AR27	0...65535 (-32768...32767)
Completion flags for Timers/Counters	TC	Discrete	TC0... TC511	0, 1
Present Values for Timers/Counters	PV	Integer	PV0... PV511	0...65535 (-32768...32767)
Data Memory area	DM	Integer	DM0... DM9999	0...65535 (-32768...32767)

Point names, corresponding to Input/Output register area CIO, are without prefix.

(*) Value range 0...65535 - for unsigned integers (item/point without suffix "**S**" ("**s**"));
value range -32768...32767 - for signed integers (item/point with suffix "**S**" ("**s**")).

(**) Represented memory area range is for C200HS type controller. For models C200H, C1000H and C2000H - accessible memory area ranges are 00000...25515 for Discrete items and 000...255 for Integer items. **Do not operate with items representing areas out of your PLC memory area range!** It will lead to communication failures, because the Server recognizes item name error only if item name goes out of range represented in the item names table.

Each word/bit address **n** in the item name specifies a specific bit or word. If item corresponds to separate Bit status of **LR**, **HR**, **AR** or Input/Output register area CIO, the rightmost two digits of the address specify bit 00 to 15.

The word address in this case is specified by the leftmost three digits (for Input/Output register area CIO) or the leftmost two digits (for **LR**, **HR** or **AR** items). Therefore every item name, representing Bit status, must contain at least 5 digits (for Input/Output register

area CIO) or 4 digits (for **LR**, **HR** and **AR** items). If necessary, item name can contain leading zeroes.

Item name, representing Word contents, must contain at least 1 digit.

Completion flags for Timers/Counters (**TC**), Present Values for Timers/Counters (**PV**) and Data Memory (**DM**) areas item names also contain at least 1 digit; bit number in this case is not specified.

The **configuration** of the types of **data** can be as follows:

Flag or Bit Status	0: Bit is OFF;
	1: Bit is ON;

Word Contents or Present Value PV contains two Bytes: the first Byte - contents of Bits 0 to 7, the second Byte - contents of Bits 8 to 15.

Note: All C-Series item types are Read/Write, except Completion flags for Timers/Counters, which type is Read Only.

The following examples show the correct format for item names for C-series PLCs:

- 00201 - CIO area (Bit status), word address 2, bit number 1;
- 211 - CIO area (Word contents), word address 211;
- LR6210 - Latching Relay area (Bit status), word address 62, bit number 10;
- DM21 - Data Memory area (Word contents), word address 21.

CV-series PLCs

The following table lists the supported item names for the **CV-series** PLCs:

Memory area	Item name	Tag Type (*)	Range	Value Range (****)	Value Range with Forced Status
Input/Output register area CIO (Bit status)		Discrete/Integer	000000...255515	0, 1	0, 1, 2, 3
Input/Output register area CIO (Word contents)		Integer	0... 2555	0...65535 (-32768...32767)	-2147483648 ... 2147483647
Area G (Bit status)	G	Discrete/Integer	G00000...G25515	0, 1	0, 1, 2, 3
Area G (Word contents)	G	Integer	G0... G255	0...65535 (-32768...32767)	-2147483648 ... 2147483647
Auxiliary Relay area A (Bit status)	A	Discrete	A00000...A51115	0, 1	-
Auxiliary Relay area A (Word cont.)	A	Integer	A0... A511	0...65535 (-32768...32767)	-
Timer Completion flags TIM	T	Discrete/Integer	T0... T1023(**)	0, 1	0, 1, 2, 3
Counter Completion flags CNT	C	Discrete/Integer	C0... C1023(**)	0, 1	0, 1, 2, 3
Timer Present Value	PT	Integer	PT0... PT1023(**)	0...65535 (-32768...32767)	-
Counter Present Value	PC	Integer	PC0... PC1023(**)	0...65535 (-32768...32767)	-
Data Memory area	DM	Integer	DM0... DM24575(***)	0...65535 (-32768...32767)	-
Transition Area flags	TN	Discrete/Integer	TN0... TN1023(**)	0, 1	0, 1, 2, 3
Step Area Flag status	SA	Integer	SA0... SA1023(**)	0, 1, 2, 3	-
Step Area status	SS	Integer	SS0... SS1023(**)	0, 1, 2, 3	-
Step timer Present Value	ST	Integer	ST0... ST1023(**)	0...65535 (-32768...32767)	-
Expansion area (Current bank)	E	Integer	E0... E32765	0...65535 (-32768...32767)	-
Action Area Flag status	AC	Discrete	AC0... AC2047	0, 1	-
Register Area contents IR	IR	Integer	IR0...IR2	0...65535 (-32768...32767)	-
Register Area contents DR	DR	Integer	DR0...DR2	0...65535 (-32768...32767)	-

Item names, corresponding to Input/Output register area CIO, are without prefix.

(*) If two Tag Types ("Discrete/Integer") are given in the table for the same item, it means, that item with unforced status has the first type (Discrete), but item with forced status - the second type (Integer).

(**) Represented memory area ranges are for CV1000, CV2000 and CVM1-CPU11-E type controllers. For models CV500 and CVM1-CPU01-E - accessible memory area ranges are 00000...51115 for Discrete items and 0...511 for Integer items. **Do not operate with items representing areas out of your Controller memory area range!** It will lead to communication failures, because the Server recognizes item name error only if item name goes out of range represented in the item names table.

(***) Represented memory area ranges are for CV1000, CV2000 and CVM1-CPU11-E type controllers. For models CV500 and CVM1-CPU01-E - accessible memory area ranges are 0...8191 for Integer Items.

(****) Value range 0...65535 - for unsigned integers (item without suffix "**S**" ("**s**")); value range -32768...32767 - for signed integers (item with suffix "**S**" ("**s**")).

If there are not represented values in the column "Value Range with Forced Status", the Server does not support corresponding Memory area with forced status.

Each word/bit address **n** in the item name specifies a specific bit or word. If item corresponds to separate Bit status of **G**, **A** or Input/Output register area CIO, the rightmost two digits of the address specify bit 00 to 15.

The word address in this case is specified by the leftmost four digits (for Input/Output register area CIO) or the leftmost three digits (for **G** or **A** items). Therefore every item name representing Bit status, must contain at least 6 digits (for Input/Output register area CIO) or 5 digits (for **G** and **A** items). If necessary, item name can contain leading zeroes. Item name, representing Word contents, must contain at least 1 digit. All item names, except Input/Output register area CIO and areas **G** and **A**, also contain at least 1 digit; bit number in this case is not specified.

The **configuration** of the various types of **data** can be as follows:

Flag or Bit Status	0: Bit is OFF; 1: Bit is ON;
Flag or Bit Status with Forced Status	0: Bit is OFF but not Forced; 1: Bit is ON but not Forced; 2: Bit has been forced OFF; 3: Bit has been forced ON;
Step Status	0: INACTIVE; 1: HALT; 2: PAUSE; 3: EXECUTE;

Word Contents or Present Value PV with **Unforced Status** contains two Bytes: contents of Bits 0 to 15.

Word Contents or Present Value PV with **Forced Status** contains four Bytes: the first Byte - contents of Bits 0 to 7; the second Byte - contents of Bits 8 to 15; the third Byte - Forced/not forced designation for Bits 0 to 7; the fourth Byte - Forced/not forced designation for Bits 8 to 15; (ON = Forced).

Item names **TN**, **SA**, **SS**, **ST** and **AC** are valid with following Omron PLC models: CV500, CV1000 and CV2000.

Item name **E** is valid with CV1000 and CV2000 Omron PLC models.

Item names **IR** and **DR** are valid with following Omron PLC models: CV1000, CV2000 and CVM1-CPU11-E.

Note: Following point types for CV-Series are **Read only**:

*Timer Completion flags,
Counter Completion flags,
Transition Area flags,
Step Area Flag status,
Step Area.*

*All other point types are **Read/Write**.*

Note: You can force values into Timer Completion flags, Counter Completion flags and Transition Area flags memory areas of CV-series PLCs using point names with suffix "**F**" or "**f**".

The following examples show the correct format for item names for CV-series PLCs:

002113 - CIO area (Bit status), word address 21, bit number 13;

211 - CIO area (Word contents), word address 211;

TN200F - Transition Area flag with Forced status, address 200;

SS0007 - Step Area status, address 7 (address in item name contains leading zeroes, but number of digits in item name does not exceed the limit according to table);

AC6 - Action Area Flag status, address 6.

DM3R - real floating point item, value is taken from words DM3 and DM4.

Monitoring and Controlling Communication with a PLC

For each topic, there are following additional items offered by OMRONSLK Server to monitor and control the communication with PLC.

STATUS

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

From **InTouch** the state of communication may be read by defining an I/O Discrete tagname and associating it with the topic configured for the PLC and using **STATUS** as the item name.

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

=OMRONSLK|topic!STATUS

UPDATEINTERVAL

The **UPDATEINTERVAL** item is an Integer type Read/Write item used to access the currently set Update Interval (see *Topic Definition Command* section). It indicates the current requested update interval (in milliseconds). The value of this item can be read through DDE or Suite Link. Client can poke new values to this item. The range of valid values is from 10 to 2147483647 milliseconds. The value of zero indicates that no items on this topic are updated. The write commands are still executed (new values written to PLC) if **UPDATEINTERVAL** value is 0.

Note: By poking a value of zero to the **UPDATEINTERVAL** item, a client can stop all update activities on the corresponding topic without having to deactivate the items.

MAXINTERVAL

The **MAXINTERVAL** item is an Integer type Read Only item used to access the measured maximum update interval (in milliseconds) of all items for the corresponding topic for the last completed poll cycle. The range of valid values is from 0 to 2147483647 milliseconds.

The **UPDATEINTERVAL** and **MAXINTERVAL** items can be used to tune the performance of communication.

ITEMCOUNT

The **ITEMCOUNT** item is an Integer type Read Only item used to access the number of active items in the corresponding topic. The range of valid values is from 0 to 2147483647.

ERRORCOUNT

The **ERRORCOUNT** item is an Integer type Read Only item used to access the number of active items with errors in the corresponding topic. The range of valid values is from 0 to 2147483647.

ERRORITEMS

The **ERRORITEMS** item is an Integer type Read/Write Only (unique for each topic) used to access the total number of items with invalid item names (these items are rejected by Server). The **ERRORITEMS** value can be reseted by writing 0 to this item. The range of valid values is from 0 to 2147483647.

WRITECOUNT

The **WRITECOUNT** item is an Integer type Read Only item used to access the number of write commands (messages) waiting for execution. The range of valid values is from 0 to 2147483647.

For example, in following way the **WRITECOUNT** item can be used to avoid the increasing of memory occupied by not executed write commands:

- activate the hot link with **WRITECOUNT** item and start to monitor it;
- activate new write command (by poking new value) only if value of **WRITECOUNT** becomes equal to 0, e.g. all previous write commands are executed and memory occupied by them is freed.

SUSPEND

Special Read/Write Discrete Item **SUSPEND** may be used to control the communication with a separate topic. If application changes **SUSPEND** value from 0 to 1 then then communication with topic is suspended. If **SUSPEND** value is changed back to 0 then communication with this topic is resumed.

Note: If topic is suspended by setting **SUSPEND** value to 1, then Server rejects all new write values to this topic, i.e. no new write messages are created after **SUSPEND** value has changed from 0 to 1.

Using the OMRONSLK Server with OPC Clients

The “**OPC & DDE**” version of OMRONSLK Server is accessible from OPC Clients.

There are following general steps needed to access an OPC item from OMRONSLK Server:

1. Run OPC Client application and select the “OMRONSLK OPC and DDE Server” from the list of available OPC Servers. If OMRONSLK Server currently is not running, it will start automatically.
2. Create a new group (or topic if Wonderware OPCLink application is used).
3. If OPC Client supports the validating of items, validate the item before adding it.
4. Add the item. Depending on OPC Client it can be done in several different ways, for example:
 - a) By entering separately the access path to topic name (valid topic name configured in OMRONSLK Topic definition) and separately the item name.
 - b) By entering the full path to item name in the format **TopicName.ItemName** where **TopicName** is the valid topic name configured in OMRONSLK Topic definition.
 - c) By browsing the server address space.

By default the OMRONSLK Server is installed and used as a local OPC Server - both OPC Server and OPC Client reside on same computer. The OMRONSLK Server can run also as a remote OPC Server – in this case OPC Server and OPC Client are located on separate computers. Accessing the remote OPC Server is same as for local OPC Server, but some DCOM (Distributed COM) configuration is required before accessing the remote OPC Server. The DCOM configuration must be done both on OPC Server and OPC Client computers.

Configuring DCOM

To access OMRONSLK Server as a remote OPC Server, it is necessary to install OMRONSLK Server on both (OPC Server and OPC Client) computers. Also the DCOM must be configured on both computers.

After Server installation the System Administrator must configure DCOM by **Dcomcnfg.exe** (or Dcomcnfg32.exe for Win9x) system tool. This utility is located in the Windows system directory – e.g. in \WinNT\system32\ or \Win9x\system\.

Below is a simple example how to configure DCOM on NT Workstations for OPC Server computer (computer name *JohnB*) and on OPC Client computer (computer name *SteveL*).

Action	Remote OPC Server Computer name – <i>JohnB</i>	OPC Client Computer name – <i>SteveL</i>
Install the OPC Server.	✓	✓
Run Dcomcnfg.exe	✓	✓
Invoke Default Properties and set Default Authentication Level to <i>(None)</i> , Default Impersonation Level to <i>Impersonate</i> .	✓	✓
Select OPC Server from Applications list and click on the Properties... button. Click on the Location tab, uncheck Run application on this computer , check Run application on the following computer and browse the remote computer <i>JohnB</i> .		✓
Edit Security settings: 1) set the following custom access permissions : NETWORK, SYSTEM, <i>SteveL</i> ; 2) set the following custom launch permissions : INTERACTIVE, SYSTEM, NETWORK, <i>SteveL</i> ; 3) be sure the Default Configuration Permissions contain SYSTEM.	✓	
Click on the Identity tab and select The	✓	

interactive user.		
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Before starting a remote OPC Server, be sure the OPC Server computer and OPC Client computer can access each other on the network. The “Remote Procedure Call” Service should be started on OPC Server computer.

Now remote OPC Server is accessible for OPC Client on computer *SteveL*. To allow the access to more OPC Clients, configure DCOM on each OPC Client computer.

The following table contains most frequent errors when configuring DCOM.

Error message	Possible reason
DCOM not installed	DCOM has not been installed
Server execution failed	<ol style="list-style-type: none"> 1) OPC Server can not be started 2) Identity for OPC server not properly configured 3) OPC Server is not located on a local hard disk 4) OPC Server path in registry is too long or uses LFN (Long File Names) 5) DCOMCNFG Location is not set to Run on this computer.
Class not registered	OPC Server has not been registered
RPC server is unavailable	<ol style="list-style-type: none"> 1) Remote Procedure Call service is not running on the OPC Server computer 2) Invalid computer name for remote OPC Server 3) Make sure TCP/IP is installed properly
Interface not supported	<ol style="list-style-type: none"> 1) Permission not granted to OPC Client 2) Guest account disabled
Access is denied	<ol style="list-style-type: none"> 1) DCOM security not configured properly 2) OPC Server application not located on local hard disk 3) SYSTEM account in DCOMCNFG must have Access, Launch and Configure privileges
Error 80070776	Network error - TCP/IP has not been configured properly
Catastrophic failure	<ol style="list-style-type: none"> 1) Trying to access an object before it is created 2) Unhandled exception is occurs on the OPC Server
Not enough storage	SYSTEM account in DCOMCNFG must have Access, Launch and Configure privileges

Running OMRONSLK “OPC & DDE” version as Windows NT Service

To install OMRONSLK Server “OPC & DDE” version to run as **Windows NT Service**, the OMRONSLK Server must be started with command line parameter `"/Service"`:

OMRONSLK /Service

After this the “OMRONSLK OPC & DDE Server” NT Service will be installed with Startup type “Manual”. The Service Startup configuration can be changed by MS Windows NT *Control Panel/Services* configuration dialog boxes. The **Allow Service to Interact with**

Desktop checkbox in “Service” dialog box must be checked (the “Service” dialog box can be invoked by pressing the “Startup” button on “Services” dialog box when Service **OMRONSLK OPC & DDE Server** is selected). If **Allow Service to Interact with Desktop** is not selected then OMRONSLK Server full functionality is not ensured (e.g. the Server configuration can not be changed, no message boxes will be displayed, etc.).

To use OMRONSLK Server “OPC & DDE” version as Windows NT Service you may need to configure DCOM. For details of configuring DCOM refer to *Configuring DCOM* section of this manual. If “OMRONSLK OPC & DDE Server” NT Service will be accessed only from local OPC clients (i.e. OMRONSLK Server will not be used as a remote OPC Server), then **custom access** and **launch permissions** “NETWORK” are not needed.

To uninstall “OMRONSLK OPC & DDE Server” NT Service, at first the Service must be stopped by *Control Panel/Services/Stop* and then OMRONSLK Server must be started manually with command line parameter `"/DelService"`:

OMRONSLK /DelService

After this the OMRONSLK Server “OPC & DDE” version will be still registered and accessible to OPC clients.

Using OMRONSLK with OPCLink Server

The Wonderware OPCLink I/O Server (hereafter referred to as “OPCLink”) is a Microsoft Windows application program that acts as a communication protocol converter and allows other Windows application programs access to data from local or remote OPC servers. OPCLink connects to OPC servers, converts client commands to OPC protocol and transfers data back to clients using DDE, FastDDE, or Suite Link protocols.

Please refer to *Wonderware OPCLink Server and OPC Browser User’s Guide* for details how to install, start and use the OPCLink Server. The following information in this section covers only the most important points about using “OPC & DDE” version of OMRONSLK Server with OPCLink Server.

OPCLink Topic Definition

The **Topic Definition** option from OPC Link Configure menu is used to create, modify, or delete OPCLink topic definitions. If OPC Link will communicate with OMRONSLK Server then there must exist one or more topics defined for OMRONSLK Server. There are following important fields on the “OPCLink Topic Definition” dialog box:

Topic Name

Enter a unique name (e.g. **PLC2**) for the PLC in this field. If using InTouch then same Topic Name is to be entered in the "Add Access Name" dialog box when defining the Access Names for OPCLink Server in InTouch WindowMaker.

OPC Server Name

Select the name of the OPC server (**OMRONSLK.OPC_Server**) that will be used by this topic. The list box shows the registered OPC servers in the system.

OPC Path

Enter the name of the OPC path (e.g. **node2**.) used by this topic. This OPC path is the first part of a full OPC item name string common to all items that will be used in this topic. The available OPC paths for OMRONSLK Server can be obtained by clicking on “Browse” button (this allows to view the OMRONSLK Server’s exposed address space).

Update Interval

Enter the frequency (in milliseconds) that the server will acquire data for the items/points associated with this topic. If 0 (zero) is entered here, OPCLink will not gather data from OMRONSLK Server.

Browse

Clicking on this button initiates the browsing through exposed address space of OMRONSLK Server. All currently available item/point names (including data area names and range of addresses) and names of pre-defined (additional) items will appear on “Browse OPC items:” window in alphabetical order.

Accessing OMRONSLK Items via the OPCLink Server

The communication protocol addresses an element of data in a conversation that uses a three-part naming convention that includes the **application name**, **topic name** and **item name**. The following briefly describes each portion of this naming convention:

application name

The name of the Windows program (server) that will be accessing the data element. In the case of data coming from or going to OMRONSLK Server “OPC & DDE” version, the application portion of the address is **OPCLINK**.

topic name

Meaningful names are configured to identify specific devices (PLCs). These names are then used as the topic name in all conversations to that device (PLC). This must be same name as **Topic Name** entered in the “OPCLink Topic Definition” dialog box, for example, **PLC2**.

Note! You can define multiple topic names for the same PLC to poll different points at different rates.

item name

A specific data element within the specified topic. The OPCLink Server item syntax follows the following rules. The item names must start with:

- d – discrete value
- i – integer value
- r – real value
- m – message value

The item name added to the OPC path of the topic (without the heading type letter) must give a fully qualified OPC item name for the OMRONSLK Server. Some examples of possible item names acceptable by OPCLink Server/OMRONSLK Server connection:

d002113

discrete

CIO area (Bit status), word address 21, bit number 13;

iDM100

integer

Data Memory area word 100

rDM3R

real

real floating point item, value is taken from Data Memory area words DM3 and DM4

Using the OMRONSLK Server with Suite Link and DDE Clients

The “**Suite Link & DDE**” version of OMRONSLK Server is accessible from Suite Link clients (e.g. InTouch) and DDE clients (e.g. Excel). The “**OPC & DDE**” version of OMRONSLK Server is accessible from DDE clients.

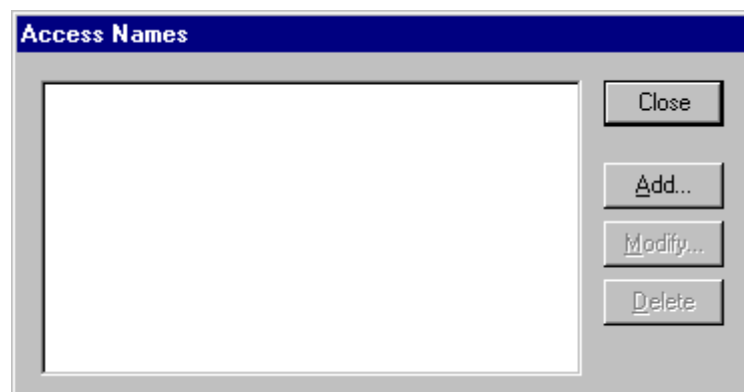
Using the OMRONSLK Server with InTouch

To access items/points on **Omron** PLCs from **InTouch**, the Access Names and Tag names should be defined in **WindowMaker**.

Defining the Access Names

InTouch uses **Access Names** to reference real-time I/O data. Each Access Name equates to an I/O address, which can contain a **Node**, **Application**, and **Topic**. In a distributed application, I/O references can be set up as global addresses to a network I/O Server or local addresses to a local I/O Server.

To define the Access Names in WindowMaker node invoke the */Special/Access Names...* command. The "Access Names" dialog box will appear.



Click on **A**dd.... The "Add Access Name" Dialog Box will appear:

The screenshot shows a dialog box titled "Add Access Name". It contains the following fields and options:

- Access Name:** node2
- Node Name:** PC14
- Application Name:** omronslk
- Topic Name:** node2
- Which protocol to use:**
 - DDE
 - SuiteLink
- When to advise server:**
 - Advise all items
 - Advise only active items

Buttons for "OK" and "Cancel" are located on the right side of the dialog.

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 an Access Name Definition:

Access Name

In the Access Name box type the name you want InTouch to use to this Access Name. (For simplicity, use the same name that you will use for the **Topic Name** here.)

Node Name

If the data resides in a network I/O Server, in the Node Name box, type the remote node's name.

Application Name

In the Application Name box, type the actual program name for the I/O Server program from which the data values will be acquired. In case the values are coming from the OMRONSLK Server the OMRONSLK is used. Do not enter the .exe extension portion of the program name.

Topic Name

Enter the name defined for the topic in the OMRONSLK Server to identify the topic the OMRONSLK Server will be accessing.

The Topic Name is an application-specific sub-group of data elements. In the case of data coming from OMRONSLK Server program, the topic name is the exact same name configured for the topic in the OMRONSLK Server.

Note: This will usually be the same as the "Access Name", although, if desired, they may be different. However, it must be the same name used when the topics were configured in section **Configuring the OMRONSLK Server**.

Which protocol to use

Select the protocol (DDE or Suite Link) that you are using.

When to advise server

Select **Advise all items** if you want the Server program to poll for all data whether or not it is in visible windows, alarmed, logged, trended or used in a script. Selecting this option will impact performance, therefore its use is not recommended.

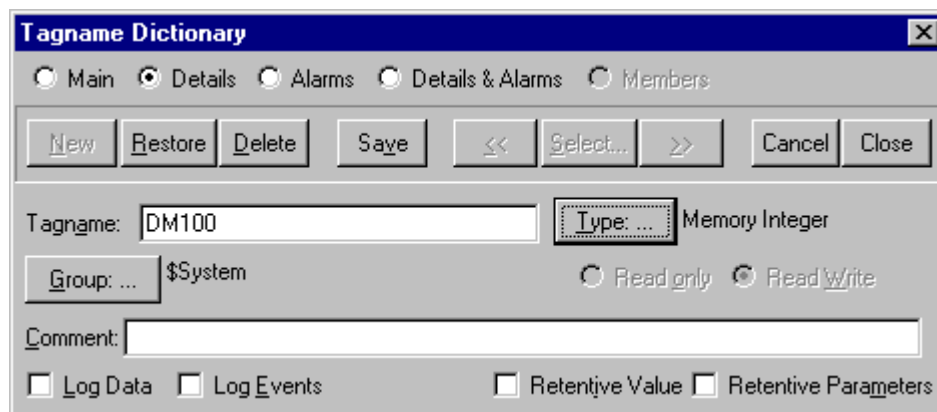
Select **Advise only active items** if you want the Server program to poll only points in visible windows and points that are alarmed, logged, trended or used in any script.

Click **OK** to accept the new Access Name and close the "Add Access Name" dialog box. The "Access Names" dialog box will reappear displaying the new Access Name selected in the list.

Click **Close** to close the "Access Names" dialog box.

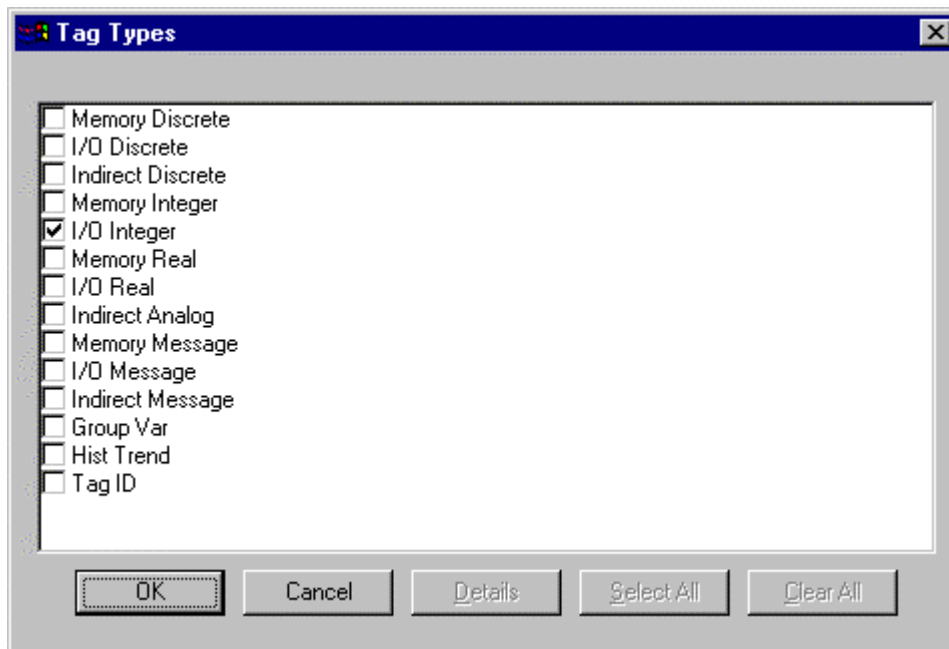
Defining the Tag names

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



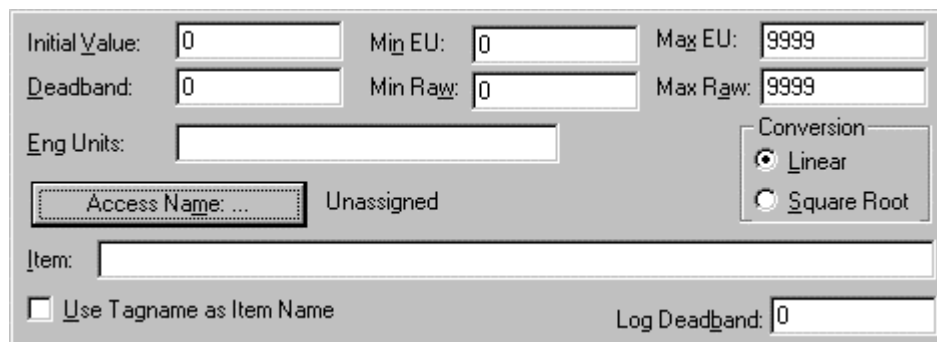
Click on **New** and enter the **Tag Name**. (The tag name defined here is the name **InTouch** will use. The OMRONSLK Server does not see this name.)

Select the tag type by clicking on the **Type:...** button. The "Tag Types" dialog box will appear:



To access OMRONSLK items, the type must be **I/O Discrete**, **I/O Integer** or **I/O Real**. Select the Tag type.

The "Details" dialog box for the tag name will appear:



Select the Access Name for OMRONSLK Server by clicking on the **Access Name:...** button. The "Access Names" dialog box will appear:



Select the appropriate Access Name and click on **Close**. (If the Access Name has not been defined as previously described, click on **Add** and define the Access Name now.) The "Details" dialog box will appear displaying the selected 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
Access Name: ... node2				<input checked="" type="radio"/> Linear <input type="radio"/> Square Root	
Item:	<input type="text"/>				
<input type="checkbox"/> Use Tagname as Item Name				Log Deadband: <input type="text" value="0"/>	

For integers and reals fill in the **Min EU**, **Max EU**, **Min Raw** and **Max Raw** fields. These fields control the range of values, which 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** equal to **Max Raw**.

Enter the OMRONSLK item 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
Access Name: ... node2				<input checked="" type="radio"/> Linear <input type="radio"/> Square Root	
Item:	<input type="text" value="DM100"/>				
<input type="checkbox"/> Use Tagname as Item Name				Log Deadband: <input type="text" value="0"/>	

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

Where applicable, the **Use Tagname as Item Name** option may be selected to automatically enter the tag name in this field. **Note:** *The tag name can only be used if it follows the conventions listed in the **Item Names** section.*

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

Monitoring the Status of Communication with InTouch

InTouch supports built-in topic names called **DDEStatus** and **IOStatus**, which are used to monitor the status of communication between the Server and InTouch. For more information on the built-in topic names DDEStatus and IOStatus, see your online "InTouch User's Guide".

The status of communication between the Server and InTouch can be read into **Excel** by entering the following DDE reference formula in a cell on a spreadsheet (in following examples **node2** is the Topic Name configured for OMRONSLK Server):

=view|DDEStatus!node2

or

=view|IOStatus!node2

Notes on Using Microsoft Excel

Data from OMRONSLK topics (nodes) may be accessed from Excel spreadsheets. To do so, enter a formula like the following into a cell on the spreadsheet.

=OMRONSLK|topic!item

Sometimes, Excel requires the topic and/or item 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 names described in the **Item Names** section.

Reading Values into Excel Spreadsheets

Values may be read directly into Excel spreadsheets by entering a DDE formatted formula into a cell, as shown in the following examples:

=OMRONSLK|'node2'!'125515'
=OMRONSLK|'node3'!'SA1000'
=OMRONSLK|'node10'!'IR2'

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

Writing Values to OMRONSLK 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("OMRONSLK","topicname")
=POKE(channel,"itemname", Data_Reference)
=TERMINATE (channel)
=RETURN()

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

channel=INITIATE("OMRONSLK ","topicname")

Opens a channel to a specific topic name (defined in the Server) in an application with name OMRONSLK (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 (actual location in the Omron PLC) 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 specified like described in the **Item Names** 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 **node2** item **DM100**:

```
PokeMacro -Ctrl a
=INITIATE("OMRONSLK","node2")
=POKE(A2,"DM100",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.

Notes on Improving Server Performance

1. The timing problems

The combination of two timing values ("Protocol Timer Tick" value from "Server Settings" dialog box and "Update Interval" value from "OMRONSLK Topic Definition" dialog box) and total number of send messages for each topic determine the performance of the Server.

In all cases number of messages sent to the network multiplied by "Protocol Timer Tick" must fit into "Update Interval" for all topics. For example, if there are two topics with 5 messages in one topic and 6 messages in second, "Update Interval" for both topics is 1000 milliseconds and "Protocol Timer Tick" is 50 milliseconds then total Server work time is

$50 * 5 + 50 * 6 = 250 + 300 = 550$ milliseconds, but in this case if total amount of information sent/received to/from the SYSMAC Link network is great and also processing of received data is time consuming then there would be heavy conditions for other Windows applications (no time to work between each 50 milliseconds).

For a great InTouch applications (with 500 items and more) it is recommended to increase "Protocol Timer Tick" value to 100 milliseconds and "Update Interval" value to 1500 milliseconds - this will allow other Windows applications run at better timing conditions.

2. The using of PLC memory areas

In most cases the OMRONSLK Server uses FINS commands to exchange information in SYSMAC Link network and the maximum size of message received from the network is 256 words. Depending on client application there are two possible choices for each topic (node):

(1) If **Multiple Memory Area Read** (see *Topic Definition Command*) is not used then maximum 256 consecutive words can be read by one command. The Server uses the following system to create read commands: memory area's words 0...255 are read in first command, words 256...511 in the second, etc. The data only from one memory area can be read by one read command. In this case the optimal using of PLC memory is very important - there must be as few as possible commands sent to the network and it is strongly recommended to use consecutive memory addresses for items/points - this will considerably improve the performance of the Server. This choice is recommended if large amount of consecutive data must be read from few memory areas.

(2) If **Multiple Memory Area Read** is used then maximum 128 non-consecutive words (also from different memory areas) can be read by one command (this mode does not support floating point values). This choice is recommended if non-consecutive data must be read from different memory areas.

Note: *Not all Omron PLCs support the **Multiple Memory Area Read** command. Refer to appropriate Omron PLC user manual for more information.*

There is no FINS command for **direct bit writing** to Omron PLCs. To write the bit value to the CIO, LR, HR, AR areas (for C-series PLCs) and to CIO, G and A areas (for CV-series PLCs) the Server at first reads a word (including the corresponding bit) from the PLC. Then according to new bit value this received word is modified and written back to

PLC. It means that 16 bits are written to PLC instead of 1 bit. If PLC program changes this word contents between above mentioned read and write commands then it will cause PLC program incorrect execution. It is recommended to write the whole word (where it is possible) instead of separate bit writing - it will improve the performance of the Server.

Note: *The results will be unpredictable if you use the OMRONSLK Server to write to discretets which are also being used in a ladder logic program. For better results, avoid this practice.*

3. Some suggestions for processing of alarms (Discrete values)

The following actions are recommended if different time intervals must be used to read Integer and Discrete values:

- create two different topics for the same PLC and use greater "Update Interval" for topic with Integers (for example 2000 milliseconds) and smaller "Update Interval" for topic with Discretets (for example 500 milliseconds);
- if possible then put together all Discretets in one memory area at consecutive addresses (may be in the PLC program) to minimize number of read messages sent at smaller "Update Interval".

4. Other suggestions

For great InTouch applications it is recommended to decrease the amount of log information used for historical trending - historical trends are stored on the disk and therefore disk read/write operations will take more time as permissible. If there are problems with the speed of screen redrawing then possible solutions would be the decreasing of total amount of redrawn information (specially texts) or the increasing of Server timing values "Protocol Timer Tick" and "Update Interval".

Troubleshooting

WIN.INI entries

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

```
[OMRONSLK]
WriteRetryIndefinitely=0
ConfigurationFile=C:\INTOUCH\
WinIconic=0
WinFullScreen=0
WinTop=112
WinLeft=0
WinWidth=200
WinHeight=168
ShowEvents=1
ShowSend=0
ShowReceive=0
ShowErrors=1
MultiWrite=0
SlowPollInterval=15
ShowAllRejectedWrites=0
ReleaseBoardTime=2000
MsBoxAlwaysOnTop=1
ConsecutiveWriteErrors=3
```

The **MultiWrite** entry is used to enter the data writing principles for the Server. The following values can be entered.

- (1) If **MultiWrite=0** then for each new write value a separate write message is created. The values in the PLC are changed by the Server in the same sequence as they are changed in the user (client) application. In this case the data update rate is low if application changes values very frequently.
- (2) If **MultiWrite=1** then the same message can be used for the writing of new values into the consecutive memory addresses for the same memory area (for example, into DM0, DM1, DM2...). Up to 124 consecutive values can be included in the same write command. The new value can be added only to the end of last write message (last message in the list of pending write messages). Therefore some values may be written into the PLC memory simultaneously even if the client application changes them step-by-step. In this case the writing speed can be seriously increased.

For example, the client application sequentially changes the values of following 248 items: DM0, DM1, ... , DM247 and the values of following 248 items: 500R, 502R, ... , 994R. In this case the Server creates only four write messages to write the new values for all the changed items. If the values of the same Items are changed in the following sequence: DM0, 500R, DM1, 502R, DM2, ... then Server creates a separate write message for the each new write value.

(3) If **MultiWrite=2** then Server tries to include the new write value into the some of previously created messages **ignoring the sequence** of data changing in the client application.

Important! *If MultiWrite=2 then maximum writing speed is achieved, but this option is not recommended if data changing sequence is important for PLC program!*

The **MsBoxAlwaysOnTop** entry. If no active nodes are connected to the Support Board then Board settings are invalid or there are some other reasons why the Server can not access the Support Board. In this case the message box with the following text: "Cannot insert Support Board into the network - you must check the network" appears on the computer screen. While the message box is on the screen the Server tries to access the Board (to reinitialize the communication). The reinitialization actions are performed periodically after some time-out set as an item **SlowPollInterval** value. It is a time consuming process that affords the performance of other applications making them very slow. If **MsBoxAlwaysOnTop=1** then this message box can not be overlapped by other MS Windows applications.

When reinitialization process is performed successfully then message box disappears. If the "OK" button is pressed then message box disappears and the Server performs the next reinitialization action immediately. If it is unsuccessful then message box appears again.

The **ConsecutiveWriteErrors** entry is used to enter the number of consecutive unsuccessful write retries for one write command. If after **ConsecutiveWriteErrors** the write command still is not executed then write command is deleted from the list of active (pending) write messages and write is finally rejected. The unsuccessful bit writing is performed **ConsecutiveWriteErrors + 1** times. If the total amount of messages in the list of active write messages exceed 300 then every write message is performed only once not taking into account the **ConsecutiveWriteErrors** value.

The **WriteRetryIndefinitely** entry is used to disable the deleting of pending write messages when *slow poll mode* is started. As default (no **WriteRetryIndefinitely** entry in WN.INI or **WriteRetryIndefinitely=0**) all write messages for this topic are deleted when topic enters the slow poll mode. To disable this the following entry can be used:

WriteRetryIndefinitely=1

Note! *Be careful when using this setting if PLC is switched off but client application continues to generate new values to be written to this PLC - it can cause the computer memory overflow with memory allocated for write messages.*

The **ShowAllRejectedWrites** option is useful when communication with a separate topic (topics) is suspended by Item SUSPEND (see **Item Names** section) and the Server rejects each write to this topic (topics). If **ShowAllRejectedWrites=1** then information

about each rejected write value is reported to WWLogger and (or) to OMRONSLK Internal Logger. If **ShowAllRejectedWrites=0** (default) then Server rejects each write to suspended topic(s) without logging any information.

The **ReleaseBoardTime** entry is used to enter the time (in milliSeconds) the Server will wait a response from the Network if an application stops an access to the current topic, but the requested data from the corresponding PLC has not received yet. Response is waiting for communication stability, not for data extract. It is recommended to leave the default value (2000 milliSeconds) while communication is stable.

The **SlowPollInterval** entry is used to enter the slow poll mode update interval (in seconds). The slow poll mode will be set for the topic that either does not respond or for consecutive response errors. If the Server reinitializes the communication with the Board then **SlowPollInterval** value is used as a reinitialization retries interval.

The default values (they are used if WIN.INI file does not contain these entries) are the following: **ConsecutiveWriteErrors=3**, **SlowPollInterval=15**, **ReleaseBoardTime=2000**, **MultiWrite=0**, **ShowAllRejectedWrites=0** and **MsBoxAlwaysOnTop=1**.

Troubleshooting menu

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

Suspend Protocol / Resume Protocol - these choices permit you to turn protocol processing on and off, what means that you can suspend access to the PLC.

Show Send - if checked then all outgoing user data is displayed in hexadecimal format.

Show Receive - if checked then all incoming user data is displayed in hexadecimal format.

Show Errors - if checked then all information about errors is displayed.

ShowEvents - if checked then Server logs the information about situations when the total number of active (pending) write messages exceeds 300. It may happen when the Server has timing problems when executing write commands. When such warnings appear then it is recommended to modify the Server timing settings or to reduce the total amount of write data in the client application. Otherwise the possibility of losing write data increases.

Information about suspended and resumed topics is displayed if **ShowEvents** is checked.

ShowBadWrites - if checked then Server displays information about all situations when data write commands are not executed successfully and after **ConsecutiveWriteErrors** retries the write is rejected and write message is deleted from list of active (pending) write messages. This option (if checked) is effective even if other error logging is stopped.

- Verbose** - if checked then all information about errors (except errors indicated in other choices) is displayed. This option is useful for getting additional information about error situations:
- When this option is checked simultaneously with the option **Show Errors** then outgoing user data as well as incoming user data is displayed in addition to the error report. For some types of errors the Server gives explanation of possible error reason.
- If client application closes communication with a topic then the Server immediately deletes all this topic's messages from message lists. If write messages are still in the list of active (pending) messages these write messages are deleted not trying to perform them. If **Verbose** option is checked simultaneously with the option **ShowBadWrites** then information about not performed and deleted write messages is displayed.
- Show Logger** - if checked then OMRONSLK Internal Logger is activated and all debug information is going to OMRONSLK Internal Logger. The OMRONSLK Internal Logger file is named in the format:
OMRONSLK_YYYYMMDD.LOGn
where **YYYY** is a year, **MM** is a month, **DD** is a day and **n** is a order number of consecutive OMRONSLK Internal Logger file, starting from 1 (the OMRONSLK Internal Logger file maximum size is 16 MB; if there is more information logged then next consecutive file is created, e.g. there can be consecutive files OMRONSLK_19990413.LOG1, OMRONSLK_19990413.LOG2, etc.).
- Dump** - displays all information about board, active topics and data items.
- DumpScreen** - if checked information about active topics and messages is displayed in OMRONSLK main window.

All debugging information (except **DumpScreen** option) is displayed via the Wonderware Logger or (and) OMRONSLK Internal Logger if **Show Logger** is checked, which must be active for these commands to work.

Warning: if you check **Show Send** and/or **Show Receive** debug output grows very fast.

KLINKMANN AUTOMATION
OMRONSLK DIRECT Server
Revision History

Mar 94	Rev 1.0	First Release
Apr 94	Rev 2.0	Added BCD support
May 94	Rev 3.0	Added signed/unsigned integers and Data Link support
Jun 94	Rev 3.1	Improvement of FINS Commands
Sep 94	Rev 3.2	Corrected processing of writing of Bit values
Jan 95	Rev 3.3	Extended range of accessed CIO area for C-series PLC
Jun 95	Rev 4.0	Windows NT support added. Server configuration dialog boxes changed
Sep 95	Rev 4.1	Corrected memory area ranges for CV-series PLC
July 96	Rev 4.2	Multiple Memory Area Read added for NT version
Oct 96	Rev 4.3	Modification of manual contents Chapters: Files on the OMRONSLK Distribution Disks Installing the OMRONSLK Server
Dec 96	Rev 4.4	Troubleshooting options added
Apr 97	Rev 4.5	SUSPEND Item added, troubleshooting options added
Aug 97	Rev 4.6	Minor changes. Manual file name changed.
Dec 98	Rev 4.7	Suite Link support added. Installing the Server section changed. New items for monitoring and controlling communication with a PLC added. User manual layout changed. Modifications in the manual text.
May 99	Rev 4.8	OPC support added.
Jan 2001	Rev 4.9	OPC compliance information added.
Mar 2002	Rev 5.0	Installation from CD information added.