SPA Bus Communication Server

for Microsoft Windows
and InTouch Applications

**User Manual
Ver 1.x Rev 2.3
DR120 10
DR120 11**

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SPA Bus Communication Server

Overview

The **SPA Bus Communication Server** (hereafter referred to as the "SPA Server" or "SPA" or "Server") is a Microsoft Windows application program that acts as a communication protocol server and allows other Windows application programs to access to data from SPA bus devices. The SPA bus consists of one IBM PC or compatible computer as a master and several slaves. The IBM PC is connected to the physical SPA bus via serial communication using Bus Connection Module. For fibre optic connections the SPA-ZC 22 unit can be used. The interface to Bus Connection Module can be RS-485 (RTS lines must present) or RS-232. If RS-485 is used then RS-232/RS-485 converter (e.g., OPTO22 AC7A/B Adapter Card) or IBM serial adapter card (e.g., OPTO22 AC37 Remote Bus Adapter Card) can be used. The Server is also capable to communicate with SACO 100M device. In this case there is no need for the RS2-32/RS-485 converter.

There are two different SPA Server versions described in this manual:
- Server version (ordering number DR 120 10) supporting SuiteLink, FastDDE and DDE protocols; this version hereafter is referred to as the "***Suite Link & DDE***" version.
- Server version (ordering number DR 120 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 **SPA.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 SPA 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 standardised 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 SPA 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 SPA 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 SPA 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 SPA Server "OPC & DDE" version is implemented by **Wonderware I/O Server Toolkit** ver. 5.0 (008).

Accessing Remote Items via the SPA 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 SPA bus devices, the application portion of the address is **SPA**.

topic name
Meaningful names are configured in the Server to identify specific devices. These names are then used as the topic name in all conversations to that device. For example, **spa02**. *Note. You can define multiple topic names for the same device to poll different items at different rates.*

item name
Item is a specific data element within the specified topic. For the SPA Server, an item is an individual point (Input, Output, Setting, Variable, Memory message) in the SPA bus device (The item/point names are fixed by the SPA Server as described in the **Item Names** section).
Note. In some cases, the term "point" is used interchangeably with the term "item".

Installing the SPA Bus Server

Installing the Server

The SPA Bus Server installation package is supplied as a Microsoft Installer file DR12010_xxx.msi (for "Suite Link & DDE" version) or DR12011_xxx.msi (for "OPC & DDE" version), where xxx is the current (latest) version of SPA Bus Server.

To install the SPA Server, run the DR12010_xxx.msi (for "Suite Link & DDE" version) or DR12011_xxx.msi (for "OPC & DDE" version) and proceed as directed by the SPA Bus Server Setup Wizard. The installation is simple and straightforward, only it is important to select the correct protection (**HASP key** or **software license**) in "Custom Setup" dialog:

The HASP key or software license key is needed for full time running of SPA Bus Server. The **HASP key** is an USB key (dongle) to be installed into PC USB port and needs the SafeNet Sentinel LDK Run-time Environment (HASP HL Runtime Package) to be installed and running – see details in "Licensing by using HASP HL key" section below. The **software license key** is a 16-character alphanumeric "computer-dependent" string, provided after purchasing the SPA Bus Server (for more information, see "Software license key" section below. Without HASP key installed or software license key entered, the SPA Bus Server will run one hour in demo mode. After purchasing the SPA Bus Server, the appropriate HASP key or software license key is provided and no re-installation of SPA Bus Server is needed.
In case "HASP Device driver" and "HASP Files" **are not selected** then HASP USB key will not be supported and only the **software license** will be available (files needed for HASP USB key will not be installed):
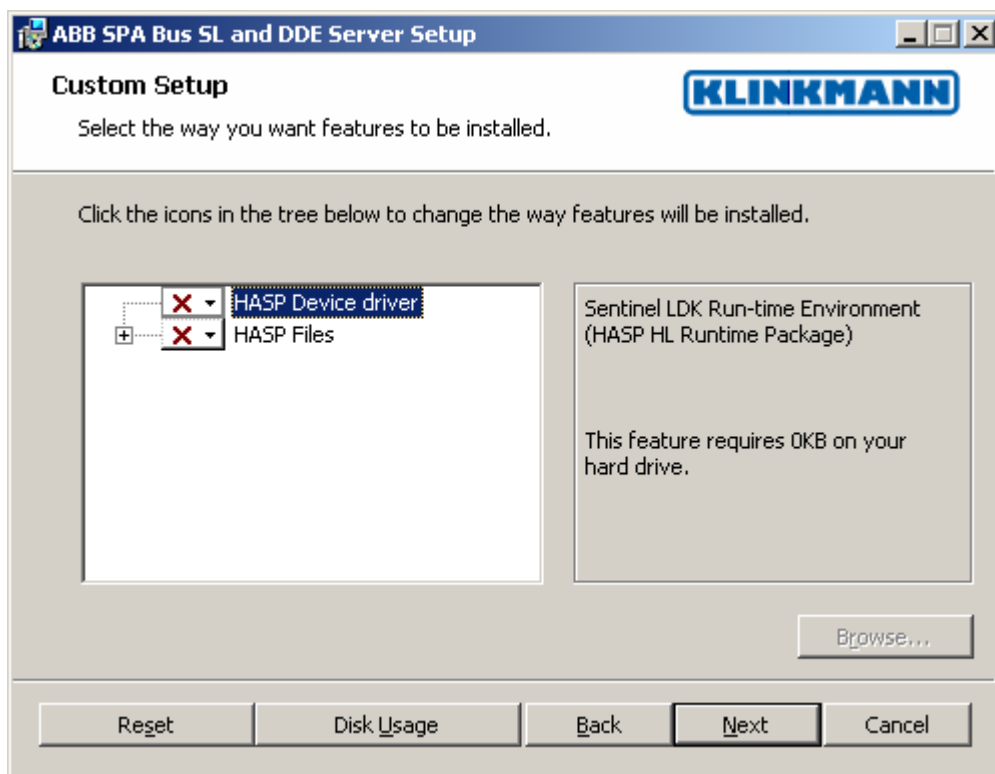
In case "HASP Device driver" and "HASP Files" **are selected** then HASP USB key will be supported and both HASP-key and software license will be available (files needed for HASP USB key will be installed):
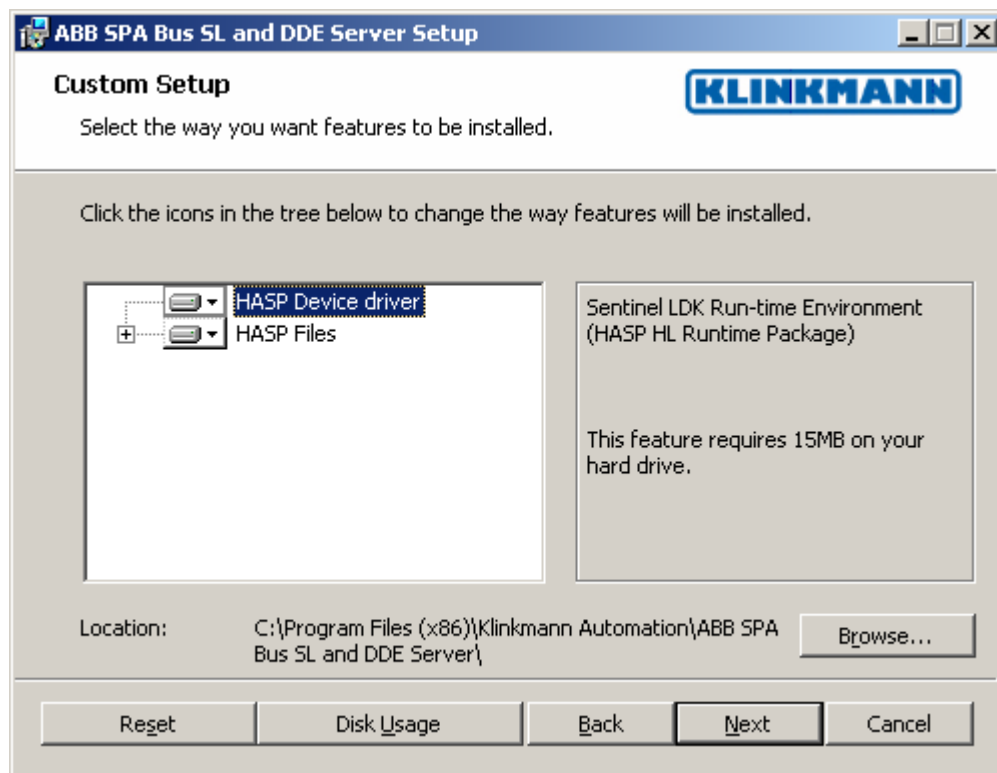
Note: In case the SafeNet Sentinel LDK Run-time Environment (HASP HL Runtime Package) is already installed on your computer (separately or by some other software) then it can be disabled:
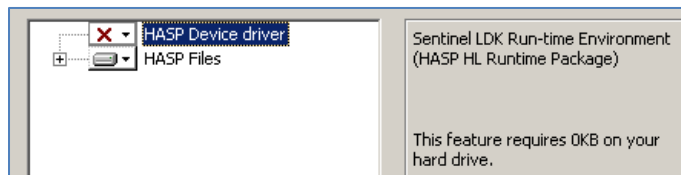
When installation is finished, the subdirectory specified as a folder where to install the SPA Server files will contain the following files:

SPA.EXE   The SPA Server Program. This is a Microsoft Windows 32-bit application program.

SPA.CHM   The SPA Server Help file.

SPA.CFG   An example configuration file.

UNIT.DEF   An example unit definition file.

hasp_windows_44 42.dll   Dynamic Link Library installed only if "HASP Files" is selected during the installation in "Custom Setup" dialog.

haspdinst.exe   Sentinel LDK Run-time Environment Installer (HASP HL

Runtime Package), copied to SPA Server folder only if "HASP Device driver" is selected during the installation in "Custom Setup" dialog.

LICENSE.RTF   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.

In case the "HASP Device driver" is selected during the installation in "Custom Setup" dialog, the Sentinel LDK Run-time Environment (HASP HL Runtime Package) is installed during the SPA Server installation (and will be uninstalled during the SPA Bus Server uninstallation). The presence of Sentinel LDK Run-time Environment can be checked after the SPA Bus Server installation by looking-up in Control Panel / Administrative Tools Services – the Service "Sentinel Local License Manager" must be started.

Notes:
*1. The SPA Bus Server "Suite Link & DDE" version is developed with Wonderware I/O Server Toolkit (ver 7,2,1,6) and needs the **Wonderware FS 2000 Common Components** to be installed on computer where the SPA Server is running. If using Wonderware InTouch 8.0 or newer, install the FS 2000 Common Components **before** installing InTouch (see also Wonderware Tech Notes 404 and 313). The Wonderware FS2000 Common Components are installed automatically when any of Wonderware product (e.g. InTouch or some Wonderware I/O server) is installed.*
*2. If SPA Bus 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 SPA Bus Server and these infrastructure files must be install prior to executing the SPA Bus Server. The **I/O Server Infrastructure** does not support using SPA Bus Server as a Windows Service and remote access to SPA Bus Server (when DDE/SuiteLink Client is not located on same computer as SPA Bus Server).*

To **uninstall** the SPA Bus Server, start Control Panel, select "Uninstall a program" ("Add/Remove Programs" on XP/2003) and select the "ABB SPA Bus SuiteLink and DDE Server" or "ABB SPA Bus OPC and DDE Server" from the list of available software products. Click on "Uninstall" ("Add/Remove…" on XP/2003) and proceed as directed by the Uninstall Wizard.

Licensing by using HASP HL key

The following should be done to enable the licensing by HASP HL key:

- The "HASP Device driver" and "HASP Files" are selected during the SPA Bus Server installation in "Custom Setup" dialog – that causes correspondingly haspdinst.exe and hasp_windows_4442.dll files are copied to SPA Bus Server folder and Sentinel LDK Run-time Environment (HASP HL Runtime Package) is installed and started, enabling the SPA Bus Server can detect the HASP HL USB dongle;
- insert the received HASP key into USB port, and **wait** until "Installing device driver software" message disappears and "Device driver software installed successfully" message appears;
- start SPA Bus Server and check - if "Sofware key or HASP HL key not found!" message does not appear then it means everything is done correctly and SPA Bus Server runs in full mode with licensing by HASP HL key enabled.

Software license key

SPA Bus Server supports the "computer dependent" **software licensing**. The following steps are required to enable it:

1) Start SPA Bus Server, click on "Help" menu item (also short-cut Alt+H can be used) and pop-up menu with "Help" menu commands will appear:
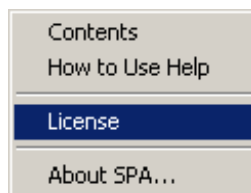
Select "License" and "License" dialog will appear:
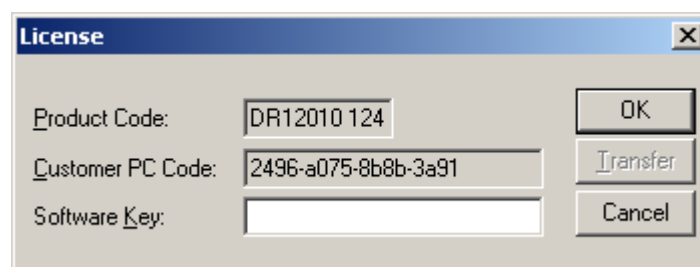
2) Here the "Customer PC Code" is "computer-dependent" string generated by SPA Bus Server and it is unique for this computer. Write it down or Copy/Paste to e-mail when ordering the SPA Bus Server.

3) After purchasing the SPA Bus Server, you will get the software license key - 16-character alphanumeric string. Open the "License" dialog again and Copy/Paste it to "Software Key" field:
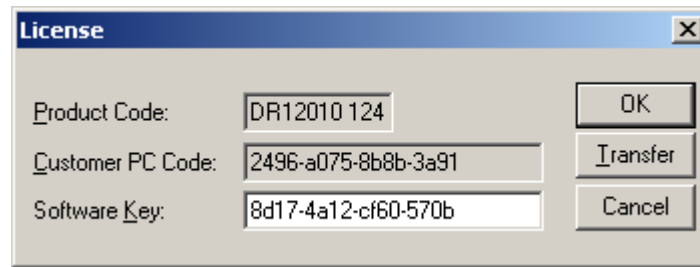
4) Click OK and restart SPA Bus Server. SPA Bus Server software license now is enabled.

Note – the "Software Key" string is saved to MS Windows system directory (e.g. C:\Windows) WIN.INI file [SPA] section to enable it is automatically detected at SPA Bus Server next start-up.

Transferring the software license to other computer

The transfer of Software License Key might be needed in very rare situations when it is necessary to move Klinkmann software to other computer (or operation system change is planned for same computer). Such transfer PERMANENTLY removes the Software License Key, so be very careful when deciding to use this option.

The following steps are required to transfer the Software License Key:

1) Start the SPA Bus Server. For SPA Bus Server "Suite Link & DDE" version, the ArchestrA SMC Log Viewer (or Wonderware Logger) must be started. For SPA Bus Server "OPC & DDE" version, the SPA Internal Logger and "Log to File" should be enabled (see "Troubleshooting menu" and "Internal Logger"sections at the end of this manual). Select Help/License from main menu and click the "Transfer" button on "License" dialog:
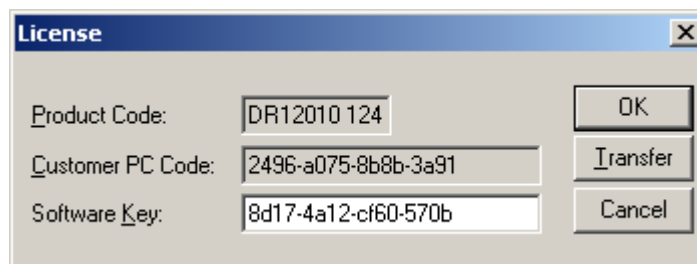
2) Confirm the transfer of Software License Key by clicking on Yes button:
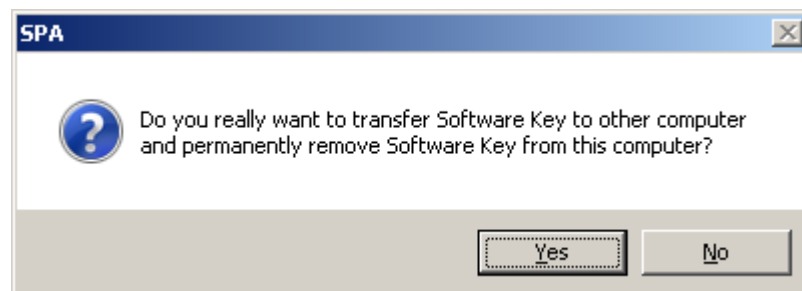
The "License" dialog now will contain the empty "Customer PC Code" and "Software Key" fields:
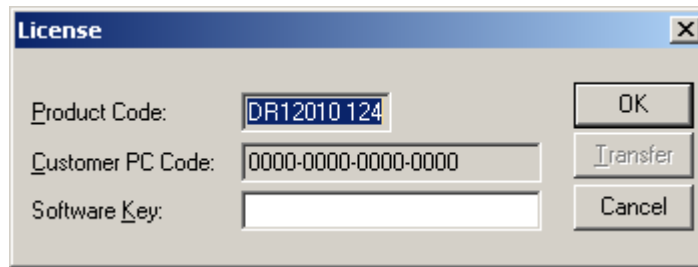
3) Take the screenshot from ArchestrA SMC Logger or SPA Internal Log file window containing the "Software License Key removal message", like below:
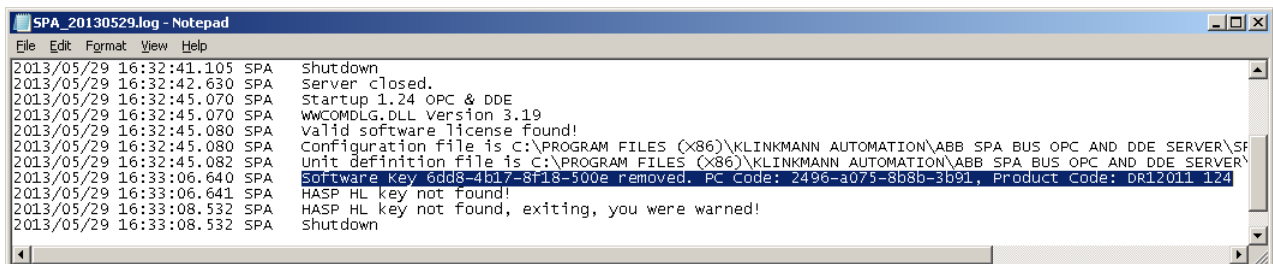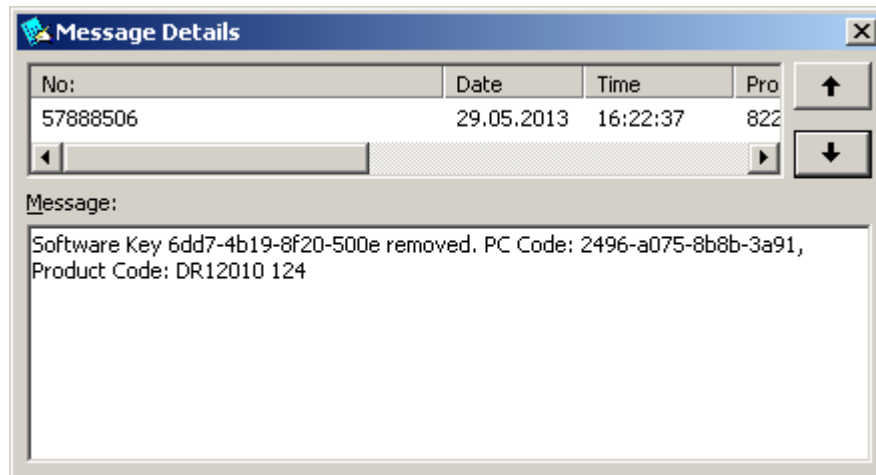
or take the string with "Software License Key removal message" directly from ArchestrA SMC Logger or SPA Internal Log file, like following:

Software Key 6dd7-4b19-8f20-500e removed. PC Code: 2496-a075-8b8b-3a91, Product Code: DR12010 124

4) Provide the obtained "Software License Key removal message" screenshot or string together with new "Customer PC Code" when applying for new Software License Key without purchasing the new license (in situations when it is necessary to move Klinkmann software to other computer or operation system change is planned).

Note!
Without providing the "Software License Key removal message" screenshot or string, the new Software License Key will not be assigned.

Installing the I/O Server Infrastructure

The I/O Server Infrastructure installation package is supplied as a self-extracting archive (IOServerInfrastructure.exe) and can be downloaded from Klinkmann's web site.

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 **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. The I/O Server Infrastructure does not support using SPA Server as a Windows Service and remote access to SPA Bus Server (when DDE/SuiteLink Client is not located on same computer as SPA Bus Server).*

Configuring the SPA Server

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

To perform the required configurations, start up the SPA. If the Server starts up as an icon, double-click on the icon to open the server's window. To access the commands used for the various configurations, open the */Configure* menu:
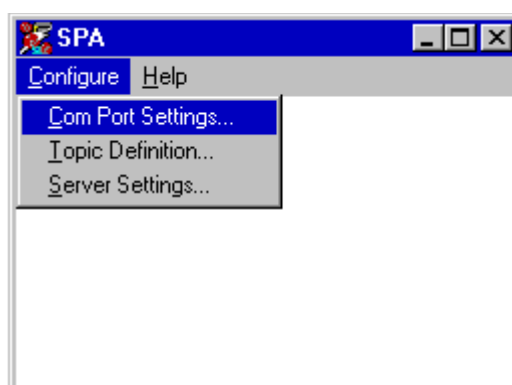
Server Settings Command

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 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 /*Configure/Server Settings...*
command. The "Server Settings" dialogue box will appear:
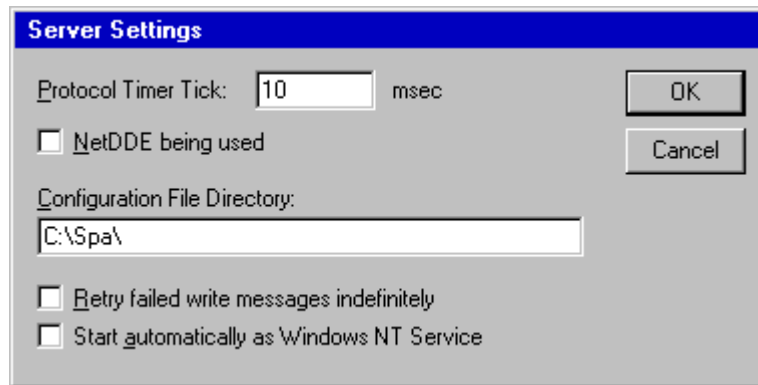
The following describes each field in this dialogue box:

Protocol Timer Tick
This field is used to change the frequency at which the Server checks for work to do. This
should be approximately 2 to 4 times the fastest rate desired to update data from the SPA
bus devices.

NetDDE being used
Select this option if you are in network using NetDDE.

Configuration File Directory
The first field is used to specify the path (disk drive and directory) in which SPA will save
its current configuration file. SPA will use this path to load the configuration file the next
time it is started.
Notes.
1. *Only the "path" may be modified with this field. The configuration file is always named*
   SPA.CFG.
2. *There is no limit to the number of configuration files created, although each must be in
   a separate directory. When using the SPA Server with* **InTouch***, it is a good practice
   to place the configuration file in the application directory.*

Retry failed write messages indefinitely
This field is used to disable the deleting of pending write messages when *slow poll mode*
on some topic is started. As default all write messages for this topic are deleted when
topic enters the slow poll mode.
Note. *Be careful when using this setting if SPA device is switched off, but client
application continues to generate new values to be written to this device -- it can cause
the computer memory overload with memory allocated for write messages.*

Start automatically as Windows NT Service
Enabling this option will cause the SPA 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 <u>a</u>utomatically as Windows NT Service** feature can be activated only with SPA Server "Suite Link & DDE" version. To start the SPA Server "OPC & DDE" version as Windows NT Service, refer to **Running SPA "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 **A<u>l</u>low Service to Interact with Desktop** checkbox in "Service" dialogue box <u>must be checked</u> (the "Service" dialogue box can be invoked by pressing the **Sta<u>r</u>tup…** button on "Services" dialogue box when Service **SPA_IOServer** is selected). If **A<u>l</u>low Service to Interact with Desktop** is not selected then SPA Server full functionality is not ensured (e.g. the Server configuration can not be changed, no message boxes will be displayed, etc.).*

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

Configure Communication Port Command

This command is used to configure the communication port that will be used to communicate with the SPA bus devices. Invoke the menu item */Configure/Com Port Settings...*

The "Communication Port Settings" dialogue box will appear:

The following describes each field in this dialogue box:

Com Port

This field is used to select a communication port.
Note. *The default Communication port is COM1.*

Reply Timeout

This field is used to enter the amount of time (in seconds) all SPA bus devices 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.*

Line Idle Time

This field is used to enter the delay time between the last character of the SPA bus devices reply messages and the start of the SPA DDE Server next message, this gives more time for the devices' software and hardware to turn around from transmitting to receiving.
Note. *The default Line Idle Time is 5 ms.*

Baud Rate

The selected Baud Rate must match the setting used in the SPA bus.
Note. *The default Baud Rate is 9600.*

Parity
The selected Parity must match the setting used in the SPA bus.
Note. The default setting is Even parity.

Data Bits
The selected Data Bits must match the setting used in the SPA bus.
Note. The default setting is 7 Data Bits.

Echo
This field must be checked if echo comes back to the port. The echo can be generated by some RS-232/RS-485 converters or by the SACO 100M device.
Note. The default setting is no echo.

Time and Date sending
These fields are used to enable or disable Date and/or Time transfers to all SPA bus devices and to enter the intervals between Date/Time transfers. Date/Time transfer should not be enabled if the SACO 100M device is connected to this port.
Note. The default settings are 60 seconds for Date and Time transfers and 10 seconds for Time transfer.

When all entries have been made, click on **Done** to process the configuration for the communication port.

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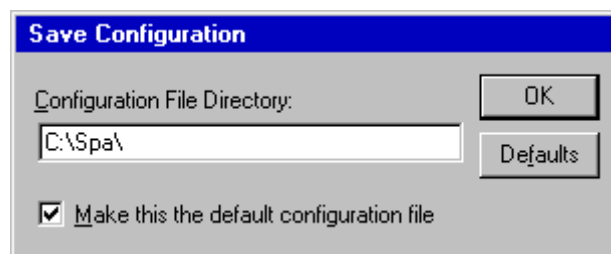
This dialogue box displays the path where the Server is going to save the current configuration file. The path may be changed if necessary. Also, the path can optionally be recorded in the **WIN.INI** file by selecting the **Make this the default configuration file** option. Doing so it will allow the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

Configuration File Location

When the SPA 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 from the **File Manager** or **Program Manager** and enter the following:

> **SPA /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 SPA bus device with an arbitrary name that is used as the topic name for all references to the device.

The following steps are taken to define the topics attached to the SPA bus device:

1. Invoke the menu item /*Configure/Topic Definition…* The "Topic Definition" dialogue box will appear:
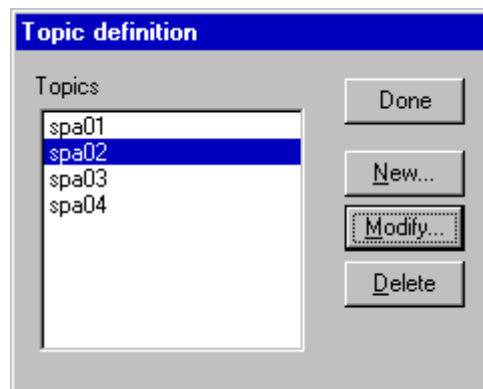
2. To modify an existing topic, select the topic name and click on **Modify**. To define a new topic, click on **New**. The "Topic Definition" dialogue box will appear:

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

4. Click on the **ComPort** button to associate a communication port with the topic.
Note: Additional topics may be associated with the same communication port later.

5. Select the corresponding **SPA Device**. These devices (units) should be defined in the Unit Definition File. For details see the **SPA Server Unit Definition File** section.
Note: There must be at least one SPA unit defined in the SPA Server Unit Definition File, otherwise the SPA Server will not work.

6. Enter a unique, same as set on connected SPA device, **Station Number.** The range of **Station Number** is 0…999, except 900.

7. Set the **Update Interval** field to indicate the frequency (in milliseconds) the items on this topic will be read (polled). The default value is 1000 milliseconds.

8. Check or uncheck the **Poll Events** checkbox. If **Poll Events** checkbox is checked then events of this Station are requested (polled) at event **Update Interval**. If this checkbox is not checked then no event polling is performed.

9. Set the event **Update Interval** field to indicate the frequency (in milliseconds) the events will be polled from this Station.

10. Set the **Send <u>D</u>ate & Time** to enable or disable Date and Time transfers and enter interval between Date/Time transfers. Date/Time transfer may be enabled only if the topic corresponds to SACO 100M device and should not be enabled for other SPA bus devices.

11. Set the event **<u>F</u>ile Name**. Enter file name where events will be saved. Several topics may use the same event file. If this field is left blank or **Poll <u>E</u>vents** checkbox is not checked then events are not recorded to the file. If some event is received then this event data is written into the file. Events are stored as character strings, each event is stored in one row in the following format:

P TTT YYYY/MM/DD HH:MM:SS Event Value

> Where:
> **P TTT** -- Port number and Station Number; these fields are necessary because several topics may use the same event file;
> **YYYY/MM/DD HH:MM:SS** -- date and time when event was received;
> **Event** -- received event; event can contain its own time; (Refer to **SPA bus Communication Protocol** for event formats.)
> **Value** – data value for analogue events.

12. Enter the value in the **Maximum Number of Items in Read Command** field to indicate how many data items can be requested in one read command. If this field contains 1 then only one data item will be requested by one read command; this choice should be used if request of several consecutive data items in one read command can cause error responses (for example, if some requested data is not available). If value in this field is greater than 1 then up to **Maximum Number of Items in Read Command** items will be requested by one read command. The default value is 1.
Note. If the **<u>Maximum Number of Items in Read Command</u>** *value is too great for given SPA device (Station reply with error message "Message from master too complicated for the slave" and quality of some values is bad), then decrease this value.*

13. Click on the **Ok** button.

Item Names

The SPA Server uses an item/point naming convention, based on the format of SPA bus master messages. The SPA Server item names also must fit inside the range of data categories and bus codes defined in the SPA Server Unit Definition File (see **SPA Server Unit Definition File** section below) for the appropriate unit (device). The Unit Definition File is read at SPA Server start-up and all item names are checked for correspondence with data defined in the Unit Definition File, i.e. if item does not match with information included in the Unit Definition File then item is rejected even if the item name syntax is correct.

The item names used in the SPA Server generally may be described as:

DTc.m:p

where:

D -- Data category. Possible values for data category can be:

I, i	-- Input
O, o	-- Output
S, s	-- Setting
V, v	-- Variable
M, m	-- Memory

T – Data Type of item. Possible values can be:

D, d	-- Discrete, values: 0, 1;
I, i	-- Integer, value range: --2147483648 ... +2147483647;
R, r	-- Real, value range: --9999999999. 9999999999 ... +9999999999.9999999999;
M, m	-- Message, maximal length 131 bytes, can contain ASCII characters (from 0x20 to 0x7E) except CR (0x0D), LF (0x0A), ">", "<", ":", "/" and "&";

c -- channel number, value can be 0 ... 999;
m -- data number, value can be 1 ... 999999;
:p -- optionally suffix to indicate the precision of data for write commands. The **p** value can be from 0 to 10 and if item name does not contain the suffix **:p** then default value is 2 for Real items and 0 for Integer items. All unnecessared 0-digits and decimal point will be removed from write command. If necessary the data value will be rounded.

For Reals the precision is the number of digits after decimal point, e.g., if value to write is 123.123456 and precision is :4 then the write command will contain the value 123.1235. If value to write is 0.01034 and precision is :3 then the write command will contain the value 0.01 and if precision is :0 then only integer part of value will be written.

For Integers the precision can be used if the number of leading zeroes has some importance for the slave. In this case the precision is the number of data value digits in the write command including leading zeroes, e.g., if value to write is 123 and precision is :5 then the write command will contain the value 00123. The precision is effective only for positive (value equal or greater than zero) integer values.

There are also following additional items:

> **F, f**　　　 -- Slave identification code, Message;
>
> **An**　　　 -- Alarms, Message, Read Only, where **n** is a channel number, **n** value can be 0 ... 999. These items are used for requesting the current alarms for the channel.

Supported data categories, the range of channels, data numbers and value limits depend on SPA unit (device) associated with the topic. To know which channels and bus codes (i.e., data categories and data numbers) are supported by specific SPA unit (device), refer the documentation of SPA unit (device). These parameters must be described in the SPA Server Unit Definition File. For details see **SPA Server Unit Definition File** section.

Monitoring and Controlling Communication with a SPA device

For each topic, there are following build-in items offered by SPA Server to monitor and control the communication with SPA device.

STATUS

For each topic, there is a built-in discrete item that indicates the state of communication with device. The discrete item **STATUS** is set to **0** when communication fails and set to **1** when communication is successful. The **STATUS** value is set to 0 after 3 consecutive unsuccessful retries to communicate with this device.

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 device 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:

> **=SPA|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, Suite Link or OPC. Client can poke new values to this item. The range of valid values is from 10 to 2147483647 milliseconds.

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) and items with valid names but with non-existing address in SPA device. 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 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.*

Item/Point Naming Examples
The following examples show the **valid** item names:

```
ID0.1        -- Discrete input 1, channel 0;
OR6.90    -- Real output 90, channel 6;
SD999.5   -- Discrete setting 5, channel 999;
SR1.5:3    -- Real setting 5, channel 1, precision 3;
VI455.999999        -- Integer variable 999999, channel 455;
MM85.154-- Message type memory item 154, channel 85;
F           -- Slave identification code;
A0          -- Alarms from channel 0;
STATUS   -- Communication status.
```

The following examples show the **invalid** item names:

        ID2.0, SI2.0, MM2.1000000 -- Data number is out of range;
        OI1000.2, VD1203.2, A2001 -- Channel number is out of range;
        IU0.16, Md2.8, Sr10.1   -- Invalid data type;
        d110, w183, l10, U22, m001 -- Invalid data category.

SPA Server Unit Definition File

The SPA Server Unit Definition File (file name **Unit.def**) contains the list of supported SPA units, available data categories and bus codes for each unit. This file will be read at Server startup. This file should be located in the same directory as the SPA Server configuration file.The general format of the Unit Definition File is the following:

        {SPA unit} comment
        [Data category]   comment
        Name   Access rights   Data Type   Min value   Max value !comment

The following describes each field in this file.

{SPA unit}
The definition of SPA unit. Unit names defined inside {} will be displayed as a selectable SPA device names at topic configuration time. One unit definition can be common for several data category definitions. The maximal length of SPA unit name is 16 characters.

[Data category]
The definition of data category. The cata category must be one character (a...z, both uppercase and lowercase letters can be used). One data category definition can be common for several bus code definitions.

Bus code definition
The parameter definition contains 7 data fields and optional comment field:

1. **Name** - the bus code; it consists of data category character and data number (from 1 to 3 digits, leading zeros allowed);
2. **Access rights** - the access rights of bus code:
    r - Read Only;
    w - Write Only;
    r/w - Read and Write;
3. **Data type**:
    disc - Discrete;
    int - Integer;
    real - Real;
    string - Message;
4. **Min channel** - the minimum number of channel;
5. **Max channel** - the maximum number of channel;
6. **Min value** - the minimum write value for integer or real parameters; not supported if Data type is Discrete or Message;

7. **Max value** - the maximum write value for integer or real parameters or the maximum length of string for Message type parameters; not supported if Data type is Discrete;
! -- the start character of comment.

One or more spaces or tabs should separate the fields of bus code definition. The maximum length of one row is 125 characters and there must be <CR> <LF> at the end of each row. Both uppercase and lowercase letters can be used.

The Unit Definition File can be created and edited by some text editor (e.g. MS Notepad) or also by MS Excel. In second case the Unit Definition File must be saved as a text file ("Unit.txt") by using tabs as delimiters of columns and then renamed to "Unit.def".

If SPA Server has problems on processing of the Unit Definition File, all warnings and errors will be logged to the Wonderware Logger and/or SPA Internal Logger.

Using the SPA Server with Suite Link and DDE Clients

The "Suite Link & DDE" version of SPA Server is accessible from Suite Link clients (e.g., InTouch) and DDE clients (e.g., Excel).

Using the SPA Server with InTouch

To access to items on SPA bus devices 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" dialogue box will appear.
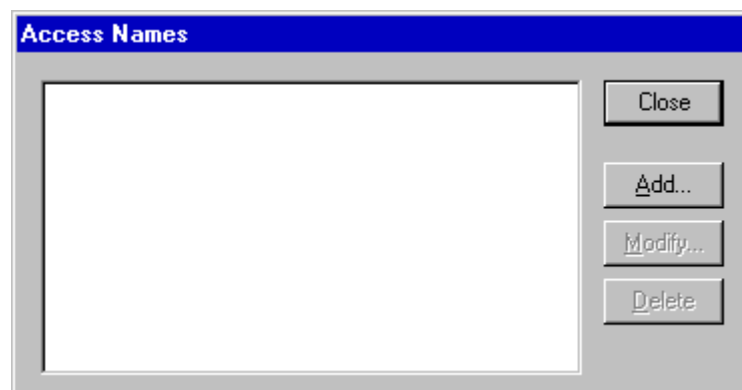
Click on **Add…**. The "Add Access Name" dialogue box will appear:

*Note. If **Add** is selected, this dialogue 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
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 SPA also be to be used 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 SPA Server the SPA is used. Do not enter the .exe extension portion of the program name.

Topic Name
Enter the name defined for the topic in the SPA Server to identify the topic the SPA Server will be accessing. The Topic Name is an application-specific sub-group of data elements. In the case of data coming from a SPA Server program, the topic name is the exact same name configured for the topic in the SPA 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 SPA Server**.*

Which protocol to use
Select the protocol (**DDE** or **SuiteLink**) 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" dialogue box. The "Access Names" dialogue box will reappear displaying the new Access Name selected in the list.

Click **Close** to close the "Access Names" dialogue 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 " dialogue box will appear:
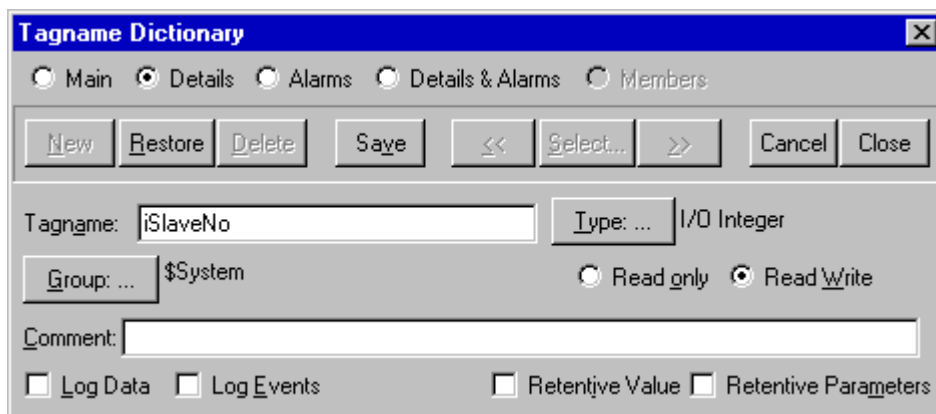
Click on **New** and enter the **Tagname**. (The tagname defined here is the name InTouch will use. The SPA Server does not see this name.)

Select the tag type by clicking on the **Type: …** button. The "Tag Types" dialogue box will appear:
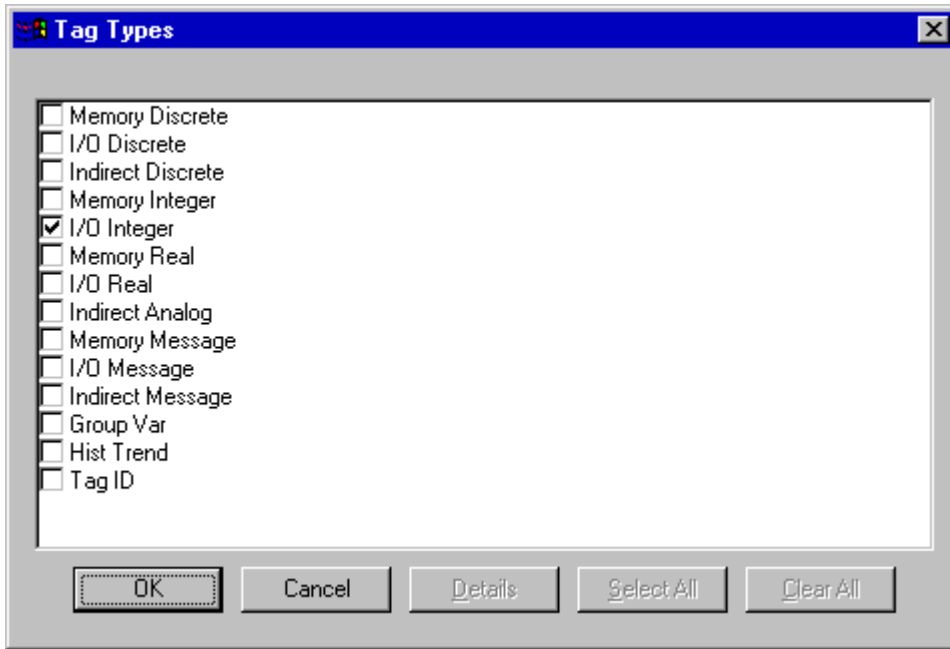
To access SPA device items, the type must be **I/O Discrete**, **I/O Integer**, **I/O Real** or **I/O Message**. Select the Tag type.

The "Details" dialogue box for the tagname will appear:
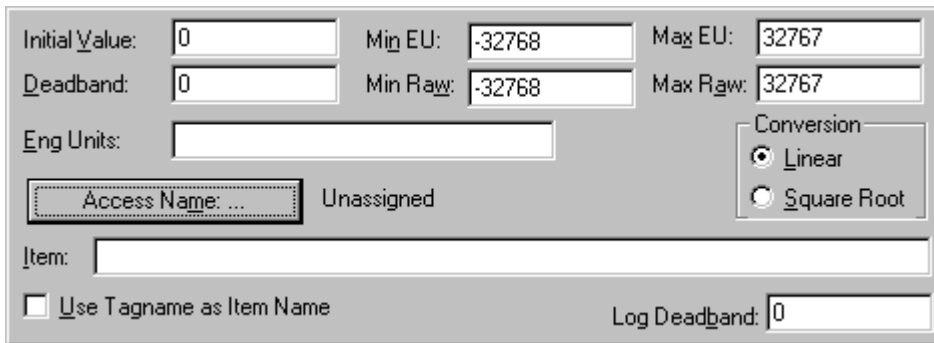
Select the Access name for SPA Server by clicking on the **Access Na̲me: …** button. The "Access Names" dialogue box will appear:
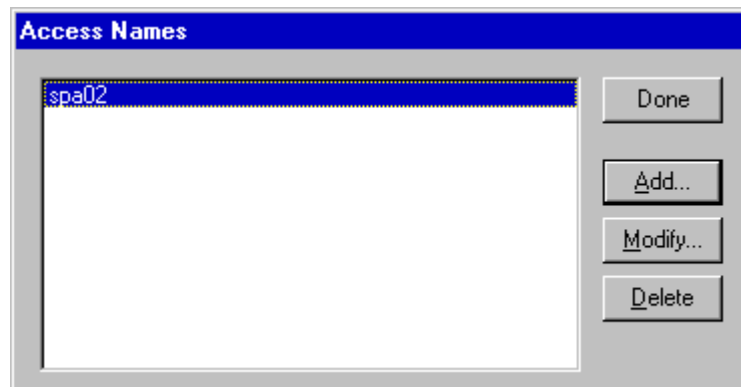
Select the appropriate Access Name and click on **Close**. (If the Access Name has not been defined as previously described, click on **Add…** and define the Access Name now.)

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

For integers fill in the **Mi̱n EU**, **Ma̱x EU**, **Min Ra̱w** and **Ma̱x Ra̱w** 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, **Mi̱n EU** should be equal to **Min Ra̱w** and **Ma̱x EU** equal to **Max Ra̱w**.

Enter the SPA item name to be associated with this tagname in the Item: field in the "Details" box:

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

Where applicable, the **U̱se Tagname as Item Name** option may be selected to enter automatically 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 **Sa̱ve** button (in the top dialogue box) to accept the new tag name. 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** that are used to monitor the status of communications 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 **spa02** is the Topic Name configured for SPA Server):

> **=view|DDEStatus!spa02**

or

> **=view|IOStatus!spa02**

Using the SPA Server with OPC Clients

The "OPC & DDE" version of SPA Server is accessible from OPC Clients (e.g., Wonderware OPCLink I/O Server) and DDE clients (e.g., Excel).

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

1. Run OPC Client application and select the "SPA OPC and DDE Server" from the list of available OPC Servers. If SPA 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 SPA 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 SPA Topic definition.
    c) By browsing the server address space.

The SPA Server support item filtering by data category, data type and channel number

By default the SPA Server is installed and used as a local OPC Server -- both OPC Server and OPC Client reside on same computer. The SPA 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 SPA Server as a remote OPC Server, it is necessary to install SPA 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 – *JohnB*	OPC Client Computer name – *SteveL*
Install the OPC Server.	✓	✓
Run Dcomcnfg.exe	✓	✓
Invoke **Default Properties** and set **Default Authentication Level** to *(None)*, **Default Impersonation Level** to *Impersonate.*	✓	✓
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 *JohnB*.		✓
Edit **Security** settings: 1) set the following **custom access permissions**: NETWORK, SYSTEM, *SteveL*; 2) set the following **custom launch permissions**: INTERACTIVE, SYSTEM, NETWORK, *SteveL*; 3) be sure the **Default Configuration Permissions** contain SYSTEM.	✓	
Click on the **Identity** tab and select **The interactive user**.	✓	

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	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	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	1) Permission not granted to OPC Client 2) Guest account disabled
Access is denied	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	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 SPA "OPC & DDE" version as Windows NT Service

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

SPA /Service

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

To use SPA 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 "SPA OPC & DDE Server" NT Service will be accessed only from local OPC clients (i.e. SPA Server will not be used as a remote OPC Server), then **custom access** and **launch permissions** "NETWORK" are not needed.

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

SPA /DelService

After this the SPA Server "OPC & DDE" version will be still registered and accessible to OPC clients.

Using the SPA 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 SPA 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 SPA Server then there must be one or more topics defined for SPA Server. There are following important fields on the "OPCLink Topic Definition" dialogue box:

Topic Name
Enter a unique name (e.g. **Controller1**) for the SPA device in this field. If using InTouch then same Topic Name is to be entered in the "Add Access Name" dialogue box when defining the Access Names for OPCLink Server in InTouch WindowMaker.

OPC Server Name
Select the name of the OPC server (**SPA.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. **SPA02.**) 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 SPA Server can be obtained by clicking on **Browse** button (this allows to view the SPA 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 SPA Server.

Browse

Clicking on this button initiates the browsing through exposed address space of SPA Server. The starting addresses of each available data area and names of pre-defined (additional) items will appear on "Browse OPC items:" window in alphabetical order.

Accessing SPA 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 SPA Server "OPC & DDE" version, the application portion of the address is **OPCLINK**.

topic name

Meaningful names are configured to identify specific devices. These names are then used as the topic name in all conversations to that device. This must be same name as **Topic Name** entered in the "OPCLink Topic Definition" dialogue box, for example, **Controller1**.

Note. *You can define multiple topic names for the same SPA device 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

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

> **ivi0.200** – integer variable 200, channel 0
> **did1.1** – discrete input 1, channel 1

Notes on Using Microsoft Excel

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

=SPA|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:

=SPA|'topic1'!'SR2.16'
=SPA|'SACO16D1'!'ID0.1'
=SPA|'unit7'!'VI8.5'

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

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

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

channel=INITIATE("SPA ","topicname")
Opens a channel to a specific topic name (defined in the Server) in an application with name SPA (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 specific data element on the SPA bus 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 **node1** item **iv0.3**:

PokeMacro -Ctrl a
=INITIATE("SPA","node1")
=POKE(A2,"iv0.3",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

Troubleshooting

WIN.INI entries

The first time you run the SPA 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 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 SPA Server:

[SPA]
ProtocolTimer=10
ConfigurationFile=C:\SPA
WinIconic=0
WinFullScreen=0
WinTop=110
WinLeft=0
WinWidth=200
WinHeight=170
ShowSend=0
ShowReceive=0
ShowErrors=1
DumpScreen=1
SlowPollRetries =3
SlowPollInterval=120
WriteRetryIndefinitely=0

The **SlowPollRetries** entry is used to enter the number of consecutive error retries for one topic. If after **SlowPollRetries** there is still no successful response from SPA device, then this topic is changed to *slow poll mode*. The WIN.INI file **SlowPollInterval** entry is used to enter the slow poll mode update interval (in seconds).

Entering into slow poll mode is reported to WWLogger and (or) to SPA Internal Logger by following string:

"Entering slow poll mode on topic <TOPICNAME>, port <PORTNAME>."

Leaving the slow poll mode is reported to WWLogger and (or) to SPA Internal Logger by following string:

"Leaving slow poll mode on topic <TOPICNAME>, port <PORTNAME>."

The default values (they are used if WIN.INI file does not contain these entries) are **SlowPollRetries** equal to 5 and **SlowPollInterval** equal to 60 seconds.

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'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 the SPA bus.

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

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

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

Show Rejected Writes -- if checked then information about rejected write messages is logged.

Show Logger -- if checked then SPA Internal Logger is activated and all debug information is going to SPA Internal Logger. The SPA Internal Logger file is named as: **SPA_YYYYMMDD.LOGn**, where **YYYY** is a year, **MM** -- month, **DD** -- day and **n** -- order number of consecutive SPA Internal Logger file, starting from 1. The maximum size of SPA Internal Logger file is 16 MB; if there is more information logged then next consecutive file is created, e.g. there can be consecutive files SPA SPA_19991013.LOG1, SPA_19991013.LOG2, etc.

Dump -- displays all information about opened ports, active topics and data items.

Dump Devices -- displays all information about successfully defined SPA devices, data categories and bus codes in the Unit Definition File.

Dump Screen -- if checked then information about active read messages are displayed on the Server main window. Can be used for debugging purposes.

All debugs (except **DumpScreen**) are displayed by the Wonderware Logger or (and) SPA Internal Logger if **Show Logger** checked, which must be active for these commands to work.

***Note**. If you check **Show Send** and/or **Show Receive** then debug output grows very fast.*

Internal Logger

To enable the SPA Internal Logger, check the **Show Logger** option at the SPA Server System Menu (see *Troubleshooting menu* section above) - this command can be used to start/stop the Internal Logger. The Internal Logger window looks like following:
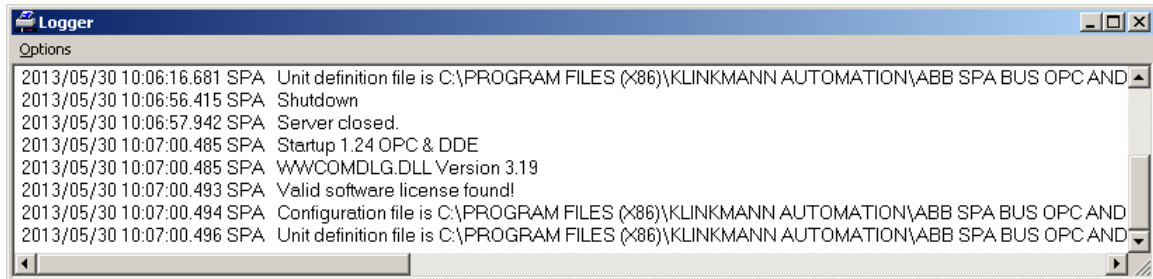
To save Internal Logger information to file, select *Options/Disk Options…* from Internal Logger main menu – the "Disk Options" dialog box will appear:
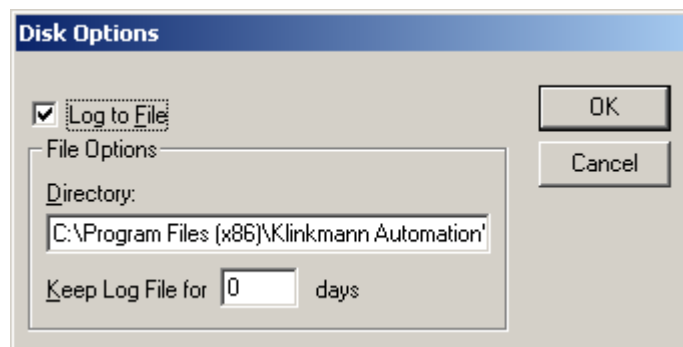
The following can be entered in this dialog box:

Log to File
If checked then Internal Logger information will be saved to Internal Logger File. The SPA Internal Logger file name is created in the following format:

SPA _YYYYMMDD.LOGn

where **YYYY** is a year, **MM** is a month, **DD** is a day and **n** is a order number of consecutive SPA Internal Logger file, starting from 1. The SPA 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 SPA_20030228.LOG1, SPA_20030228.LOG2, etc.

Directory
Enter the path where to keep the Internal Logger File.

Keep Log File for
Here the number of days how long to keep the Internal Logger File can be entered. After this number of days expires, the corresponding Internal Logger File will be automatically deleted. The default value **0** keeps Internal Logger Files forever - in this case they can be deleted manually.

Options/Font
To configure the font used by Internal Logger, select *Options/Font…* from Internal Logger main menu - the "Font" dialog box will appear:
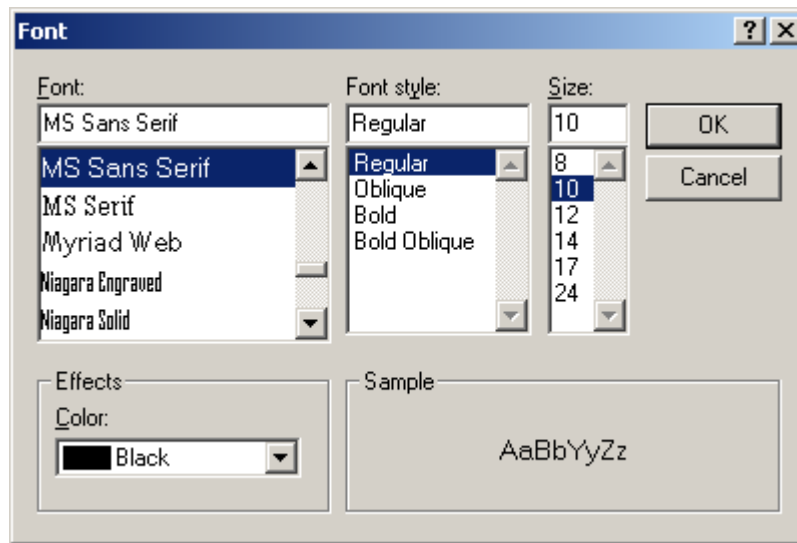
KLINKMANN AUTOMATION
SPA Bus Communication Server
Revision History

Mar 95	Rev 1.0	Release 1.0. The Server is tested with SACO 16D1 and OPTO22 AC7A/B Adapter Card. The SACO 16D1 unit is not supporting **M** and **A** data categories and therefore these data categories are tested only by simulating.
Apr 96	Rev 1.1	NT version added. Dialogue boxes changed.
Aug 96	Rev 1.2	Error status and write only DDE items added.
Sep 96	Rev 1.3	Bitmap images changed. Corrections in the text.
Jan 97	Rev 1.4	Event processing modified.
Apr 97	Rev 1.5	Data precision added for writing of real and integer values.
Jun97	Rev 1.7	Line Idle Time added.
Sep 97	Rev 1.8	Manual file name changed. Minor changes.
Nov 99	Rev 2.0	Completely new manual. Suite Link and OPC added. Installation changed. Unit Definition File added.
Jan 2001	Rev 2.1	OPC compliance information added.
Mar 2002	Rev 2.2	Installation from CD information added.
May 2013	Rev 2.3	"Installing the SPA Bus Server" section modified, "Licensing by using HASP HL key" and "Software license key" sub-sections added. "Internal Logger" section added.