Wonderware® Siemens SIMATIC NET S5/TI-500 I/O Server

User's Guide

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Wonderware Corporation

Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server User's Guide

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Trademarks

Contents

Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server

Introduction

The Wonderware® Siemens SIMATIC NET® S5/TI-500 I/O Server (referred to as the server through the remainder of this user's guide) is a Microsoft® Windows™ application program that acts as a communication protocol server. It allows other Windows application programs access to data within the Siemens SIMATIC-S5 and TI505 family of PLCs. The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server allows the PC to access a Siemens PLC through a Siemens Communication Processor directly connected to the SIMATIC-S5 or TI505 backplane.

While the server is primarily intended for use with Wonderware InTouch® (version 3.01 and later), it may be used by any Microsoft Windows program capable of acting as a DDE, FastDDE, or SuiteLink™ client.

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 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.

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 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.

Accessing Remote Items via the I/O 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 Siemens equipment via this server, the application portion of the address is **S5TI500**.

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, **S115**.

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

item name

A specific data element within the specified topic. For example, when using this server, an item can be a relay, timer, counter, register, etc., in the PLC.

Note The item/point names are predefined by the server. The term "point" is used interchangeably with the term "item" in this user's guide.

For more information on item/point names, see the "Item Names" section in this user's guide.

Getting Started Quickly with the I/O Server

This section briefly describes the components and procedures required to prepare the Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server for use. Detailed descriptions can be found in the manuals provided by Siemens and sections of this user's guide.

Required Hardware and Software

The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server is designed to work with several different network cards supported by Siemens SIMATIC NET. Please refer to instructions included with the Siemens supplied driver software and card configuration tools for details how to install and setup these cards. Additional documents are available in Technical Notes and articles on the Comprehensive Support CD and Web Site.

The Siemens driver software should be loaded and the cards configured using their configuration tools before operating the server. The server can be configured without the driver software loaded or the cards configured, but this is error-prone because the server can not suggest valid configuration options.

The Siemens driver supports multiple CPs on a NT system. The server can work with the following cards:

- CP1413
- CP1613
- CP1411
- regular network card (e.g. 3Com-card)

It does not support other bus systems (L2, PROFIBUS, etc.) or SIMATIC NET programming ports.

Required Driver Configuration

Siemens driver configuration is required at both ends of the PLC communication link. The PC with its CP card and one or more PLCs with their CP cards must all be configured to work together before operating the server.

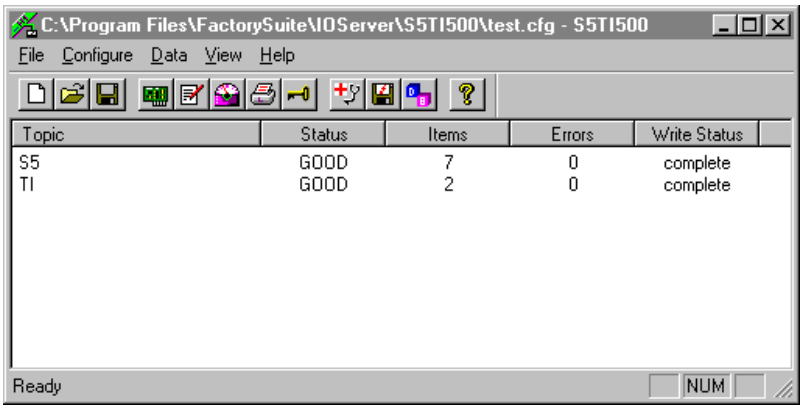
For instructions on how to set up the Siemens Components please refer to the manuals included with the Siemens supplied driver software and card configuration tools.

Note For each PLC CP data link block configured, make a note of the Job Type, Ethernet Address, Local and Remote TSAP-Ids, since this information will be needed when configuring the server’s topics.

The server can be run to generate server (also called topic) configuration files without any cards or drivers installed. This is not recommended as it eliminates most of the server’s ability to detect configuration errors.

S5TI500 Main Window

Double-click on the server's icon to start.



When the server starts, the main window appears.

The current configuration file and its full path are displayed in the main window title bar. If any topic is active, it will appear in the client area of this window called the Topic monitor list.

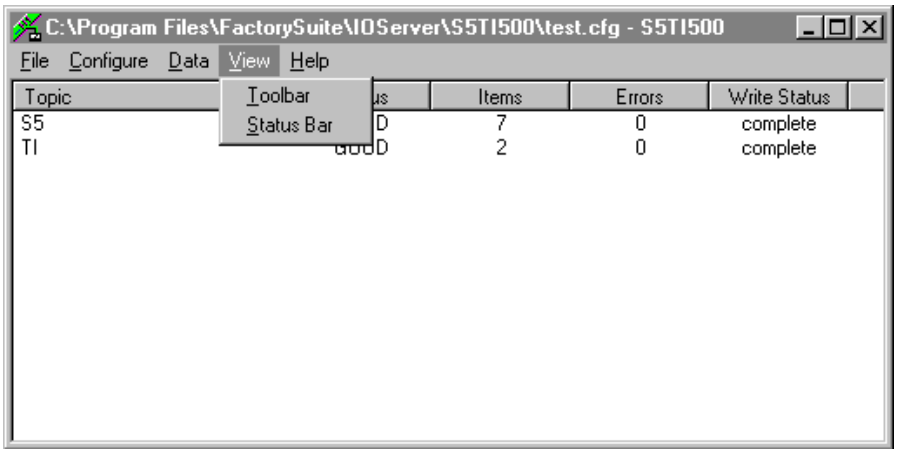
View Menu

The **View** menu has two options that change the appearance of the main window. Both options are enabled or disabled by selecting the menu option. A check next to the option indicates the option is enabled.

Toolbar option adds (when enabled) or removes the toolbar (small buttons) located below the menu.

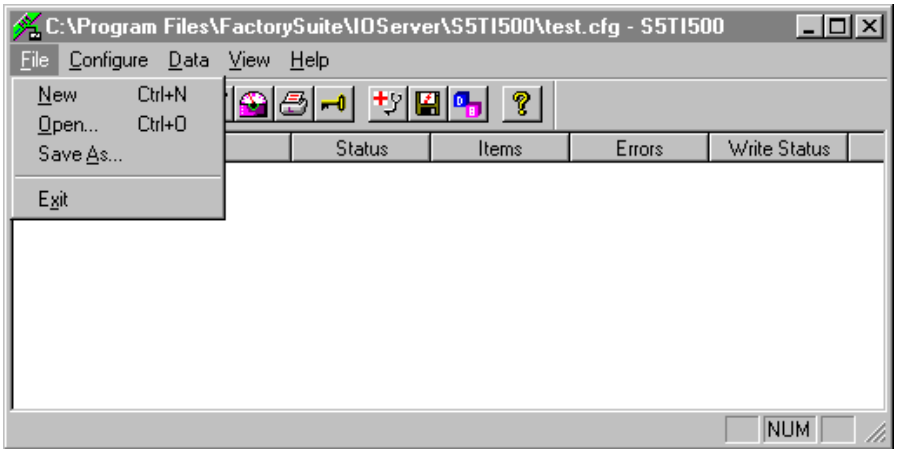
Status Bar option adds (when enabled) or removes the status indication bar located at the bottom of the window.

The main window shown above has both options enabled. The main window shown below has both options disabled.



I/O Server File Menu

File menu options deals with loading and saving the internal topic configuration database.



New

Clears the internal topic database for a new topic configuration. This menu is disabled when the server is active (a client is connected).

Open

Replaces the internal topic database with the information contained in the user selected topic configuration file. This file is automatically loaded the next time the server is started. This menu is disabled when the server is active (a client is connected).

Save As

Saves the internal topic database under a new name. This command is only needed if you want to save the configuration under a different name. If you edit the internal topic database, the data is stored automatically in the current configuration file. This menu is disabled when the server is active (a client is connected).

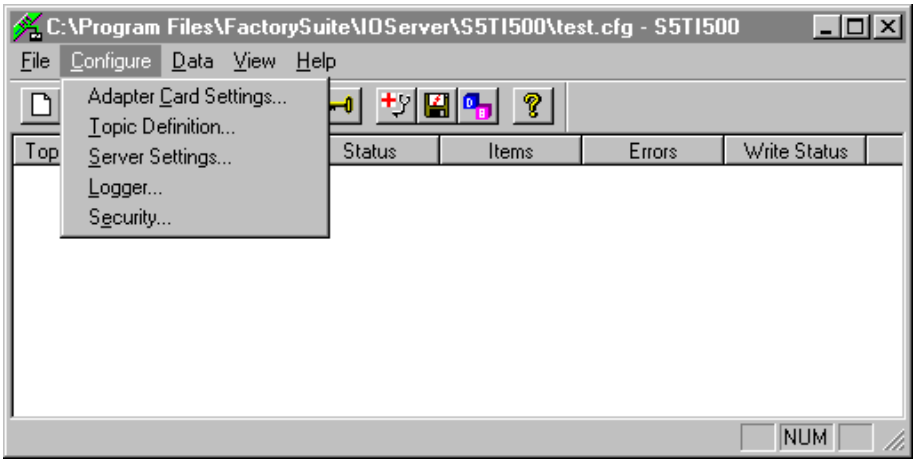
Exit

Terminates the server.

Configuring the I/O Server

Once the server has been installed, some configuration is required. Configuring the server automatically saves the data in a configuration file. If no configuration file is selected, you are prompted to select a filename.

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

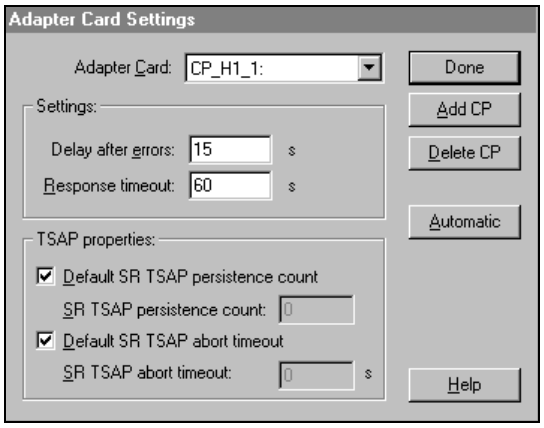


Note If any of the options appear grayed, these options are not available with this software version.

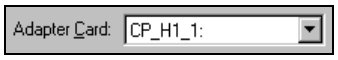
Configuring an Adapter Card

Use the **Adapter Card Settings** option from the Configure menu to create, modify, or delete adapter card definitions. Adapter card definitions are used to associate configured adapter cards in the PC with communication related timing settings. Each configured adapter card can have, at most, one adapter card definition. The server cannot use an adapter card without an adapter card definition. Creating an adapter card definition does not configure the Siemens driver software or CP data link blocks. Deleting an adapter card definition does not destroy any of the Siemens configurations.

When the **Adapter Card Settings** option is selected, the **Adapter Card Settings** dialog box appears:

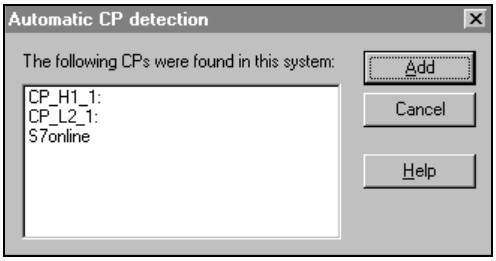


Adapter Card Settings



The **Adapter Card** listbox displays the names of all configured adapter card definitions. Select an existing adapter card definition from the listbox to modify its associated communication settings; the listbox is initially empty. To add or remove adapter card definitions from the listbox use the **Automatic, Add CP,** or **Delete CP** buttons.

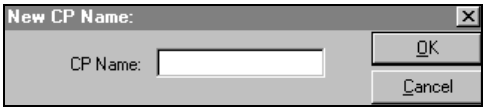
Click **Automatic** to scan your PC for installed and configured adapter cards (CPs). The following dialog box appears:



Select all CPs (adapter cards) that the server will use. A CP must communicate to the PLC using Industrial Ethernet or TCP/IP to be used with this server. Do not use CPs for other bus systems (L2, Profibus, etc.) or the SIMATIC NET programming port (S7online).

Click **Add** to create adapter card definitions for all selected CPs and add them to the **Adapter Card** listbox. Adding an adapter card definition to the **Adapter Card** listbox generates default values for the associated communication settings; there is usually no need to change these settings. If an adapter card definition already exists for a selected CP a warning displays and the communication settings will NOT reset to default values.

Click **Add CP** to add adapter card definitions to the **Adapter Card** listbox . The following dialog box will appear:



Enter the name of a configured CP (adapter card) in the PC. The name must match the corresponding CP name configured in the SIMATIC NET PG/PC interface configuration. Please refer to the instructions included with the Siemens supplied driver software and card configuration tools for additional information.

Click **OK** to add it to the **Adapter Card** listbox.

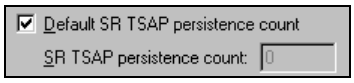
Click **Delete CP** to remove adapter card definitions from the **Adapter Card** listbox. If the adapter card definition is referenced by one or more topics it will not be deleted and a warning displays.

Note The following dialog options control the communication settings for the adapter card definition currently selected in the **Adapter Card** listbox.

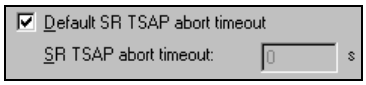
Enter the amount of time (in seconds) the server will delay before retrying an unsuccessful I/O operation for all topics that use the selected **Adapter Card**. This delay is sustained only when a PLC fails to respond. When PLCs are responding normally, there is no penalty.

Enter the amount of time (in seconds) the server will wait for response on any SIMATIC NET driver operations for all topics that use the selected **Adapter Card**. In normal operation, this timeout should never occur on SEND or RECEIVE connections so this value should be reasonably large. The timeout is valuable for establishing unsolicited

(passive) connections. In this case, make sure the PLC opens the connection within this time interval.

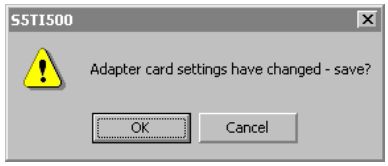


This option allows control of the persistence count (number of retries) used by the SIMATIC NET Send/Receive interface for all topics that use the selected **Adapter Card**. Enable the option (check the box) to use the Siemens default values, disable (leave box unchecked) to enter a value.



This option allows control of the abort timeout used by the SIMATIC NET Send/Receive interface for all topics that use the selected **Adapter Card**. Enable the option (check the box) to use the Siemens default value, disable (leave box unchecked) to enter a value (in seconds).

If any of the communication settings are changed they can be saved by selecting the **Adapter Card** listbox (does not close the dialog) or clicking **Done** (closes the dialog). The following dialog box appears:



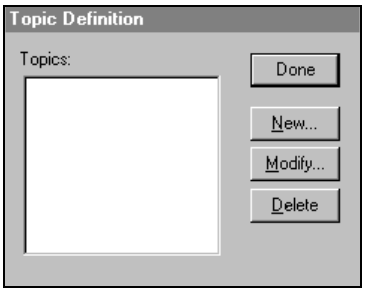
Click **OK** to save the communications settings.

Note If this is the first configuration performed for the server, the **Save Configuration** dialog box appears prompting you to save the configuration file.

Click **Done** to leave the **Adapter Card Settings** dialog.

Configuring a Topic Definition

Use the **Topic Definition** option from the Configure menu to create new, modify, or delete topic definitions. One or more topic definitions must exist for each PLC that the server communicates with. Each topic definition must contain a unique name for the PLC associated with it. When this option is selected, the **Topic Definition** dialog box appears:



Topic Definition

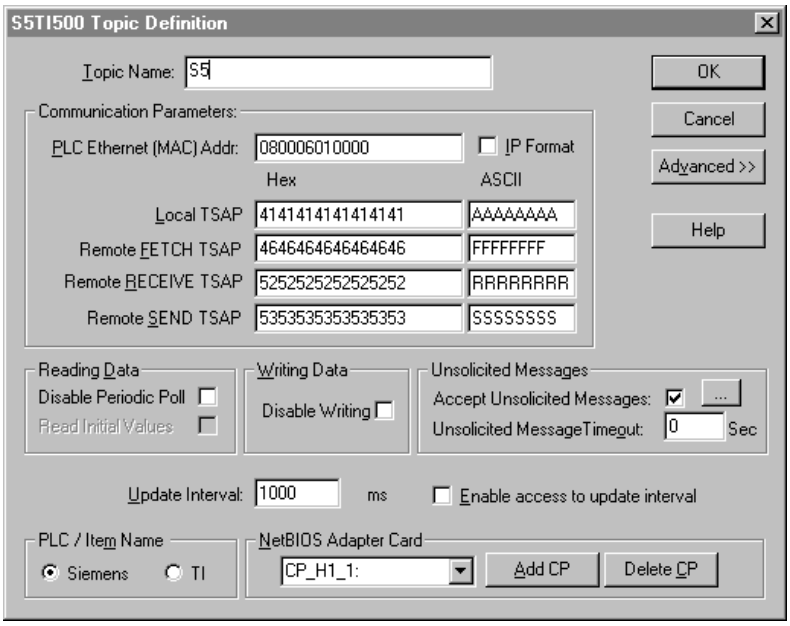
Note Once topics have been defined, their names are listed in the **Topics** section of this dialog box.

Click **Done** to close the dialog box and accept any new definitions, modifications or deletions made.

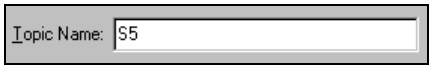
To modify or view an existing topic definition, select its name in the list and click **Modify**. The **S5TI500 Topic Definition** dialog box (described below) appears displaying the selected topic definition.

To delete an existing topic definition, select its name in the list and click **Delete**. A message box appears prompting you to confirm the deletion.

To add a new topic definition, click **New**. The **S5TI500 Topic Definition** dialog box appears:

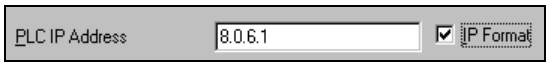


S5TI500 Topic Definition



Enter a unique name for the topic in the **Topic Name** field..

Note When communicating with InTouch, this **exact** name is used as the topic name in the Access Name definition.

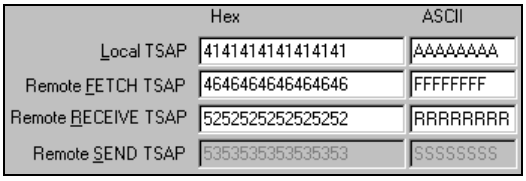


Enter the Ethernet address of the PLC that will be accessed by this topic. If **IP Format** option is enabled, enter a valid IP address (as described below).

Note This is the same address previously entered on the System Identification screen during configuration of the Communication Processor. Please refer to the instructions included with the Siemens supplied driver software and card configuration tools for details.

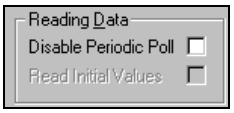
Enable (select) the **IP Format** option to connect via TCP/IP and allow the **PLC Ethernet (MAC) Addr** value to be entered as an IP address. When enabled, the **PLC Ethernet (MAC) Addr** value must evaluate to a valid IP address (as described below) or a warning is displayed.

Note Valid IP address requirement: Only the first four digit pairs of the Ethernet address are used for the IP address. The last two number pairs must be zero to evaluate to a valid IP address.

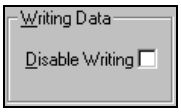


Enter the values used when configuring the corresponding data link blocks in the PLC's Communication Processor. Please refer to the instructions included with the Siemens supplied driver software and card configuration tools for details.

Note The **Remote SEND TSAP** option is only available if **Accept Unsolicited Messages** is enabled.



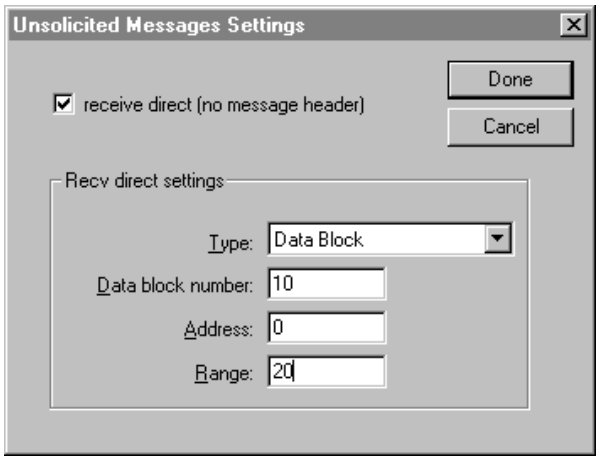
These options control the data polling. If **Disable Periodic Poll** is enabled, the **Update Interval** is set to 0 and data will not be polled. The **Read initial values** option is active only when **Disable Periodic Poll** is enabled. Enable **Read initial values** to force the server to read item data once upon item activation.

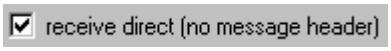


Click the **Disable Writing** checkbox if no data will be written using this topic. When **Disable Writing** is enabled, the server will reject any client pokes to this topic.

The values in the **Unsolicited Messages** box control handling of unsolicited messages. If **Accept Unsolicited Messages** is enabled, the server will passively wait for a connect request from the PLC on the **Remote Send TSAP** connection. Connection timeout is controlled by the **Response Timeout** setting in the adapter card definition selected for this topic via the **NetBIOS Adapter Card** listbox. Once connection is established the server expects the PLC to send unsolicited data for all active items using this topic. Updates of incoming data are checked on a periodic basis. If items are not updated within the **Unsolicited Message Timeout** (in seconds), their quality indicators are set to bad. A value of "0" disables the timeout monitoring.

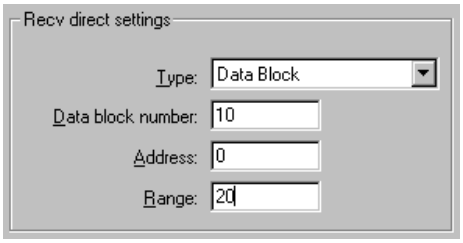
Clicking the ellipse button (**…**) displays the **Unsolicited Messages Settings** dialog.





With **receive direct** it is possible to read values from S7 PLC's via TCP/IP without RFC1006 with the S5TI500 I/O server.

Check this option to receive unsolicited messages from an S7 PLC.



The values in the **Recv direct settings** box control handling of incoming messages via **receive direct** that do not contain a S5 specific message header.

Type: This setting declares the item syntax that must be used in the client.
The item syntax then is exactly the same as for the corresponding data type in a regular item.

Data block number: If **Type** is **Data Block**, this setting declares the data block number to be used in the item syntax. This setting is enabled only if **Type** is **Data Block**

Address: Start address within the selected memory area (**Type**).
This can be used to declare the first transmitted byte not to be byte "0" in the target.

Range: Number of bytes submitted in the message
Example:

Type: Flags
Address: 100
Range: 20

results in the valid items FB100 to FB119

Note Receive direct is not necessary for a pure Step5 communication. These settings shall only be used to receive unsolicited messages from a S7 PLC.

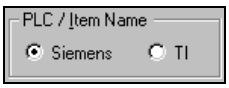
In current versions of S7 TCP/IP communication processors and CPU's it is possible to send messages without RFC1006. Only these messages can be read with the S5TI500 I/O server by using these settings.
These messages are **read-only** !

Enter the frequency (in milliseconds) that the server will acquire data for the items/points associated with this topic. If set to zero, the server will not poll the PLC to gather data.

Note Different items/points can be polled at different rates in a PLC by defining multiple topic names for the same PLC and setting a different **Update Interval** in each of the topics.

Enable this option to allow client modification of the update interval while the server is in operation. If enabled, a client can read and write the update interval on this topic using the item name **UPDATEINTERVAL**. If disabled, the client can only read the **Update Interval** configured for the topic.

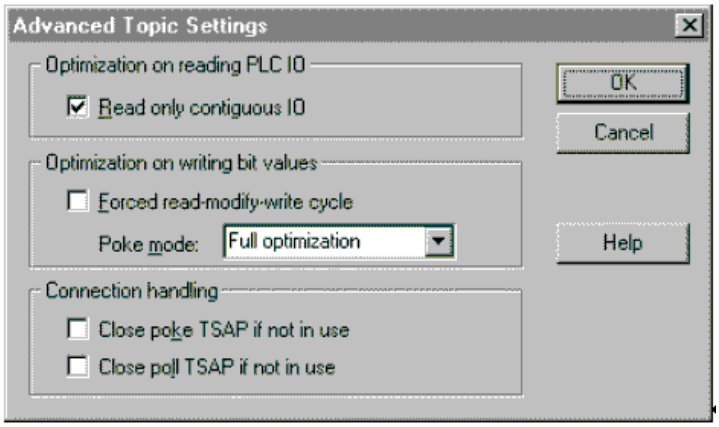
Note The actual update interval for the slowest item on this topic can be read using the item name **MAXINTERVAL**. This gives you an indication of the performance of your configuration during operation.



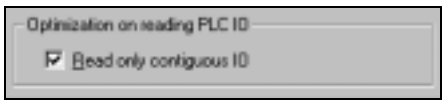
Select the type of PLC this topic will support. The PLC type also determines which item names this topic will accept as valid.

Select an adapter card definition (CP) for use by the topic in making connections to the PLC. The list of adapter card definitions in the listbox can be increased and decreased by using the **Add CP** and **Delete CP** buttons. Click **Add CP** to bring up the **New CP Name** dialog box. This dialog box is described in the **Configuring an Adapter Card** section of this users guide. Adding a CP generates an adapter card definition with default values for its communication settings. Deleting a CP is only possible if the adapter card definition is not selected in any other topics.

Click **Advanced** to open the **Advanced Topic Settings** dialog box.



This dialog box controls optimization and connection handling and should only be used by experienced users.



Enable this option to instruct the server to read only contiguous input/output address ranges.

In some Siemens PLCs (like the 135U), the range of points do not necessarily have to be contiguous. If all points are activated, the server normally blocks the address ranges to minimize message traffic. If these ranges contain invalid input/output addresses, the blocked message will fail and no data will be acquired. Enabling this option forces the server to generate blocks that contain only active (valid) items.

Enable this option to force all read-modify-write activities to immediately read before writing the data. If not enabled, the server may take the read value from its database of the last read value which may be old.

This option is only available if the topic's **PLC/Item Name** selection is **Siemens**.

Some S5 item types require a read-modify-write cycle for poking data:

- bit items
- left byte / right byte
- left byte KF/ right byte KF

The Industrial Ethernet communication protocol for the S5 PLC does not allow writing bits individually or bytes in word addresses ranges. If the user performs a poke on these items the server must know the value of the complete byte/word in the case of bits and the value of the complete word in the case of left/right byte (KF). The server may take these values from its database if they have been acquired already and **Forced read-modify-write cycle** is disabled. In all other cases the value is read immediately before masking in the poked values and writing it to the PLC.

Note If the PLC or other devices connected to the PLC change data that is subject to read-modify-writes by the server, it is strongly recommended to separate objects by putting every bit/byte into a different work. The read-modify-write cycle takes a definite amount of time and leads to overwriting of data if the PLC changes values during this cycle.

Select the appropriate poke mode from the **Poke mode** listbox.

The 3 available options control the behavior of the server with respect to optimization on poke data. The server may combine several poke values into one message on the bus to device depending on this setting.

Control mode: This mode preserves the order of poke values and allows no folding of write values. It is the most restrictive mode and allows combining poke values to one message on the bus only if the poke order is preserved and each item has only one value in each message. This mode should be used for control clients like InBatch and InControl. It can also be used for scripting.

Transition mode: This mode preserves the poke order but allows folding on poke values on a single item except for the first, second and last value. This preserves transitions where a value changes back to the original value via several intermediate values. But it also prevents overloading the bus with unnecessary traffic of intermediate values that may occur when moving InTouch sliders. **This mode is the default mode**.

Full optimization: This mode does not preserve the poke order and writes only the last value of a series of pokes to one item. Use this mode when the poke values are not dependent on each other in the PLC and only the last value is processed. This mode can be used for recipe downloads etc.

Note: The highest performance will be achieved with the full optimization mode. But preserving the poke order and writing each individual poke value is performed in the control mode only.

Example: Poking 8 values to 3 items (FB1, FB2, FB3) rapidly in succession:

FB1 = 1, FB2 = 2, FB3 = 3, FB3 = 4, FB3 = 5, FB3 = 6, FB3 = 7, FB1 = 8
results in 6 messages in the control mode (all values are poked in the correct order)
MSG1(FB1 = 1, FB2 = 2, FB3 = 3)
MSG2(FB3 = 4)
MSG3(FB3 = 5)
MSG4(FB3 = 6)
MSG5(FB3 = 7)
MSG6(FB1 = 8)

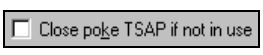
4 messages in the transition mode (intermediate values of FB3 are folded)

MSG1(FB1 = 1, FB2 = 2, FB3 = 3)
MSG2(FB3 = 4) [second value of FB3]
MSG5(FB3 = 7) [last value of FB3]
MSG6(FB1 = 8)

and 1 message in full optimization mode (only the last values of each item are poked)

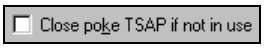
MSG1(FB1 = 8, FB2 = 2, FB3 = 7)

Note: In all three cases the end value for each item in the PLC is identical FB1 = 8, FB2 = 2, FB3 = 7.



Enable this option to save communication resources if pokes occur rarely on this topic.

The server opens a poke connection (**Remote RECEIVE TSAP**) as soon as the first value is poked from any topic using this connection. Keeping this connection open allows fast processing of future pokes but it consumes resources in the SIMATIC NET



Enable this option to save communication resources if pokes occur rarely on this topic.

The server opens a poke connection (**Remote RECEIVE TSAP**) as soon as the first value is poked from any topic using this connection. Keeping this connection open allows fast processing of future pokes but it consumes resources in the SIMATIC NET driver. The server will close this connection if all topics using the connection have enabled this option and none have pending pokes. If any topic using this connection has not enabled this option the connection is kept open after the first poke.

Enable this option to save communication resources. The option is only available when **Disable Periodic Poll** is enabled.

The server opens a poll connection (**Remote FETCH TSAP**) as soon as the first item is activated on any topic using this connection. If any items are polled periodically the connection is kept open. If all topics using this connection enable this option, the poll connection is not opened at all (if all topics disabled **Read Initial Values**) or it is closed immediately after reading the initial values.

Click **OK** to save changes and return to **S5TI500 Topic Definition** dialog.

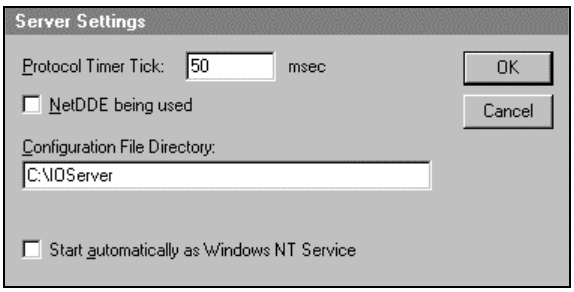
Click **Cancel** to return to **S5TI500 Topic Definition** dialog without saving changes.

Configuring the I/O Server Settings

Use the **Server Settings** option from the Configure menu to change the protocol timer, network using Wonderware NetDDE, change the default configuration file path, or to enable the server to start automatically as a Windows NT service.

Note When configuring the server on Windows NT, the user must be logged on with system administrator privileges. This will ensure that updates to the system registry may be performed.

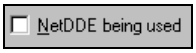
When the **Server Settings** option is selected, the **Server Settings** dialog box appears:



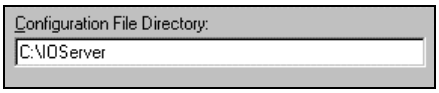
Server Settings

Enter the frequency (in milliseconds) that the server is to check for data to process. This should be approximately two to four times faster than the fastest rate desired to update data from the equipment.

Note The default protocol timer tick value will vary between servers.

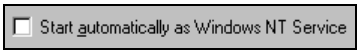


Select this option if you are networking using Wonderware NetDDE.



To create a new default configuration file, enter the complete path for the directory in which the file is to be saved in this field. This new path will automatically be written to the **WIN.INI** file and the server will use this path to load its configuration file the next time it is started.

Note There is no limit to the number of configuration files created. However, each must be saved under a different name. For more information on the Configuration File, see “Saving the I/O Server’s Configuration File“ in this user’s guide..



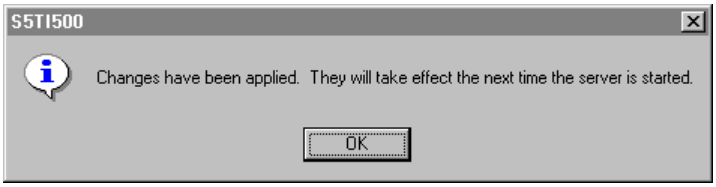
Enabling this option causes the server to start as a Windows NT service.

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.

Note It is highly recommended that the server is configured and communicating successfully prior to running it as a Windows NT service.

Click **Cancel** to close the dialog box without saving changes.

Click **OK** to accept the server settings. The following message box appears:

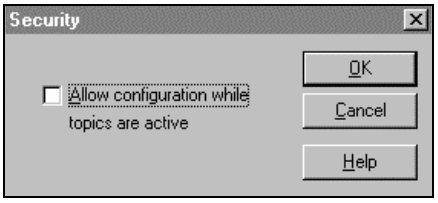


Click **OK** to close the dialog box.

Note You must restart the server for the changes to take effect.

Configuring Security

Use the **Security** option from the configure menu to control server configuration changes.



Security

When the server is not active (no clients connected), all server configuration options are available for modification.

The default setting for **Allow configuration while topics are active** is disabled. When disabled, all topics are viewable but locked against changes while the server is active (a client is connected).

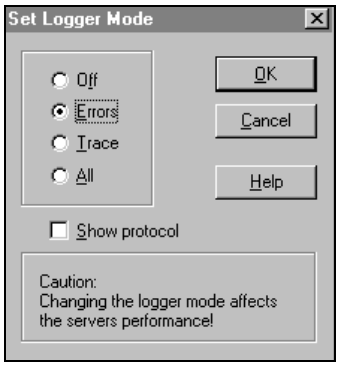
Enable **Allow configuration while topics are active** to allow write access to some parameters of the topic configuration while the server is active. This server supports write access to **Update Interval, Disable Periodic Poll,** and **Forced Read-Modify-Write Cycle**. You cannot add, delete, rename, or change other parameters of a topic configuration.

Click **OK** to save changes and close the dialog box.

Click **Cancel** to close the dialog box without saving changes.

Configuring Logger

Use the **Logger** option from the configure menu to set the working logger mode of the server. The options controlled by this dialog box are NOT retained in the configuration file.



Set Logger Mode

Note Each time the server starts, the logger mode will default to **Errors**.

Select **Off** to disable normal server logging.

Select **Errors** for normal operation logging to the Wonderware Logger.

Select **Trace** to log errors and all activation/deactivation activities including calls to the S5TI500.

Select **All** to log all activities including single item value updates.

Enable **Show protocol** to add PLC communication message data to the selected logger mode.

Click **OK** to use changes and close the dialog box.

Click **Cancel** to close the dialog box without changing current settings.

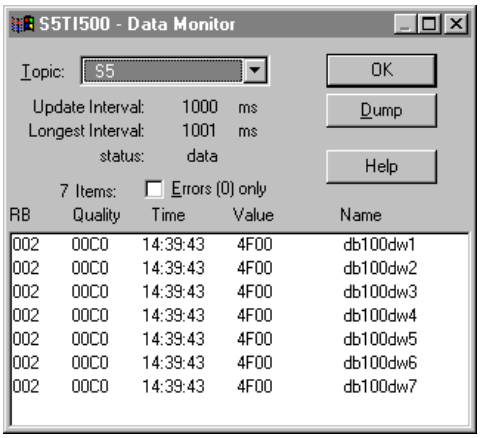
Note When logging activity increases, the server's performance degrades.

I/O Server Data Menu

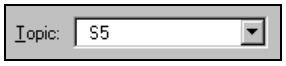
The Data menu contains two commands, **Monitor** and **Dump Active Data**, that are used for diagnostic purposes during runtime (when a client is attached). The third command, **DB Dump**, is used to transfer the internal topic database to InTouch.

Data Monitor

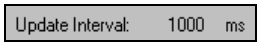
Use the **Monitor** option from the data menu to display information about a selected topic with active items or errors. The information is updated as it changes. This is a useful tool for tracking down errors, for determining performance and to validate item values. When the **Monitor** option is selected, the **S5TI500 Data Monitor** dialog box appears.



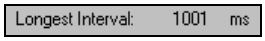
S5TI500 - Data Monitor



This drop down list box allows you to select any of the active topics. A preceding asterisk **(*)** indicates that at least one item in this topic has an error while a preceding pound sign **(#)** indicates bad status.



This field displays the current configured update interval of the topic. This value changes whenever the value is poked via I/O.



This field displays the current update interval of the slowest item of the topic. This value is measured for each poll cycle and each received cyclic service indication. If this value drastically differs from the desired update interval the communication media is not fast enough to satisfy the load.

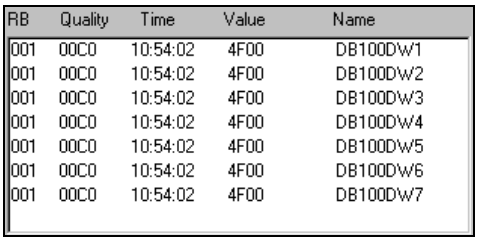
Note Both values, update interval and longest interval, are accessible via the I/O. You can create an InTouch performance meter by displaying these values graphically for each topic. If I/O access is enabled, you can even tune the bus performance conveniently from InTouch.

This displays the status of the connection to the corresponding remote FETCH TSAP (poll TSAP). The status can take the following values:

*	open	open request pending
	open	open (local initialization)
*	connA	active connection request pending
*	connP	passive connection request pending
	conn	connected
	data	data mode
*	close	close request pending
	closed	idle (closed)
	<empty string>	TSAP has not been created yet

The status display is online so you can monitor the TSAP status changes according to your topic TSAP connection handling settings (advanced settings: Close poll TSAP if not in use).

This field displays the number of active items and the number of items with errors (in parenthesis). If you check this box only items with errors will be displayed in the item data list box.



RB	Quality	Time	Value	Name
001	00C0	10:54:02	4F00	DB100DW1
001	00C0	10:54:02	4F00	DB100DW2
001	00C0	10:54:02	4F00	DB100DW3
001	00C0	10:54:02	4F00	DB100DW4
001	00C0	10:54:02	4F00	DB100DW5
001	00C0	10:54:02	4F00	DB100DW6
001	00C0	10:54:02	4F00	DB100DW7

The item list box adapts to the size of the dialog box. So you can resize it for your personal needs. The server will save the size and position.

The item data list box displays information about each item. The box is divided into 5 columns. The first column displays the poll request block number the item data is acquired through. Items with the same request block number are blocked into the same message. The second column displays the data quality. The third column shows the timestamp of the last update of that item. The fourth column shows the raw item value prior to conversion in HEX. Only message data are displayed as an ASCII string. The last column contains the item name.

There are six basic data quality states an item can have:

Data quality good 00C0

Data communications are good. Data is good.
The register was read or written without any problems converting the data.

Clamp hi 0056

Data communications are good. Data is not good.
The data is clamped at high limit.
The register was read or written OK but it was necessary to clamp its value to a limit.
The value is larger than the maximum allowed.
A string is truncated.
Example: A floating point value is clamped to FLT_MAX.

Clamp lo 0055

Data communications are good. Data is not good.
The data is clamped at low limit.
The register was read or written OK but it was necessary to clamp its value to a limit.
The value is smaller than the minimum allowed.

Cannot convert 0040

Data communications are good. Data is not good.
The data could not be converted.
The server may return either a constant in place of the data or return quality information alone.
The data is not useable, it is not known whether the value is too large or too small.
Incorrect data type.
Floating point not-a-number.
Example: 0x000a in a PLC BCD register.

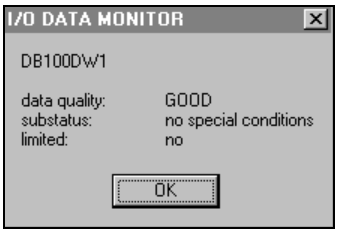
No access 0004

Bad, Configuration Error.
Data communications are good. Data cannot be sent and/or received.
Cannot access the item.
The item does not exist.
The item is not available.
The server is able to communicate with the PLC but is not able to access the register.
The server determined the point is not valid.
The PLC responds that the register does not exist, cannot be read, or cannot be written.
Cannot access a fenced, write-protected, or read-only item.
The PLC is in a mode which does not permit access to this item.
Incorrect number of data bytes (but the message is otherwise good).
Invalid command or invalid op code (but the message is otherwise good).
The PLC is busy. The server gave up retrying.

No communication 0018

Data communications are down.
Cannot access the PLC due to a communications error.
The topic is in slow poll (or equivalent) mode.
The PLC does not exist and/or is not responding.
There is no link validating message.
Lack or resources in the server. A TSR (or driver) cannot allocate memory.
Lack of resources in the communications link.
The communications link is off-line.
All communications channels are in use.
The network is unable to route the message to the PLC.

Click on an item line to open a dialog box displaying the item properties:



Click **OK** to return to the **S5TI500 - Data Monitor** dialog box.

Click **Dump** to dump the contents of the monitor window into an ASCII text file. The resulting file can be loaded into Excel or any standard text editor. All columns are separated by tabs. After the dump is complete, a message box containing the newly created ASCII text file name displays.

The server automatically generates the ASCII text file name and sets the files location using the following pattern:

<current working directory>\datmonXX.txt

Where XX is a two digit number between 00 and 99. S5TI500 increments the number each time a file is dumped.

Note Existing files with the same name are erased.

Click **OK** to return to the **S5TI500 - Data Monitor** dialog box.

Note Monitoring the items may affect the server performance.

Dumping Active Data to a File

Use the **Dump Active Data** option from the data menu to dump information on topics with active items into an ASCII text file. The resulting file can be loaded into Excel or any standard text editor. All columns are separated by tabs.

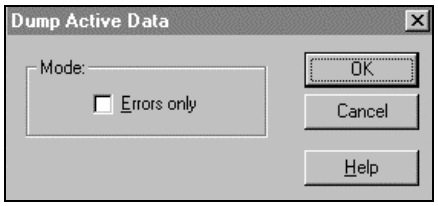
The server automatically generates the ASCII text file name and sets the files location using the following pattern:

<current working directory>\datdmpXX.txt

Where XX is a two digit number between 00 and 99.

The server increments XX each time a file is dumped.

When the **Dump Active Data** option is selected, the **Dump Active Data** dialog box will appear.



Dump Active Data

Enable **Errors only** option to dump topics with errors.

Click **Cancel** to close dialog without creating dump file.

Click **OK** to start the dump.

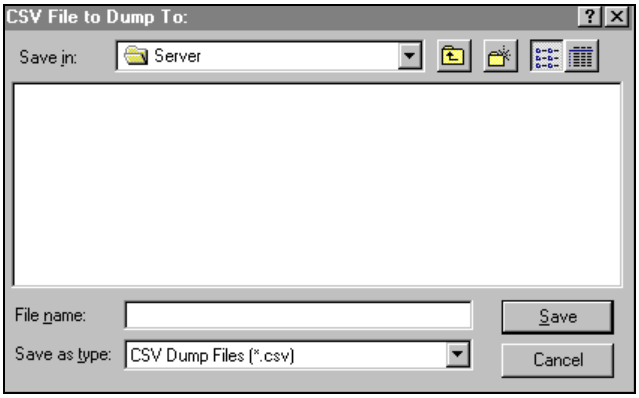
After the dump is complete, a message box containing the newly created ASCII text file name is displayed.

Note Existing files with the same name are erased.

Dumping Topic Database to a File

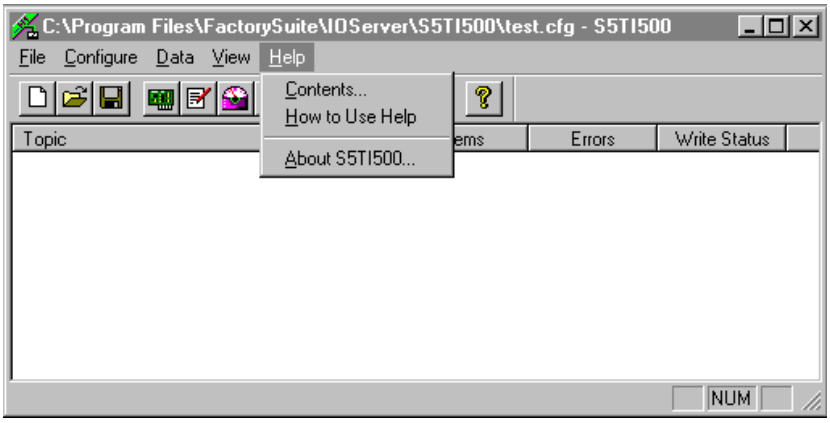
Use the **DB Dump** option from the data menu to dump the internal topic database into a CSV format file. Wonderware's DbLoad utility can use the resulting file to automatically generate InTouch access names.

Create the file by selecting a directory and filename using the standard dialog shown below.



Accessing I/O Server Help

The Help menu contains three options that are used to access help for the server.



The following briefly describes the Help menu options.

Contents

This option is used to display the table of contents for the Help file.

How to Use Help

This option is used to access a list of basic instructions for using the Help file.

About S5TI500

This option is used to access miscellaneous information regarding the server, such as the software version, the copyright information, license information, etc.

Your FactorySuite system license information can be viewed through the license viewing utility that is launched from the **About** dialog box.

For more information on the license viewing utility, see your *FactorySuite System Administrator's Guide*.

Item Names

The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server supports two item naming conventions, Siemens SIMATIC S5 and Siemens SIMATIC TI. Selection of an item naming convention is made when configuring a topic definition. This allows support of a network containing both S5 and TI PLCs.

Siemens SIMATIC S5 PLC Item Naming

The S5 item naming convention is based on the two letter data type identifiers used in programming Siemens PLCs. One exception, the Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server, accepts both German and English standard identifiers.

The following tables represent the Item Naming for the Wonderware Siemens SIMATIC S5 PLC. The ranges specified below may vary according to the type of controller being used.

Data Blocks (Datenbausteine)

Data Format	Item/Point	Suffix	Data Type	Range
Bit	DB*x* D*y.z*		Discrete	0 or 1
String	DB*x* S*y.v*		Message	Length: 0 to 131
Left Byte	DB*x* DL*y*		Integer	0 to 255
		KF	Integer	-128 to 127
Right Byte	DB*x* DR*y*		Integer	0 to 255
		KF	Integer	-128 to 127
Word	DB*x* DW*n*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3
Double Word	DB*x* DD*m*		Integer	-2147483648 to 2147483647
		BCD	Integer	-9999999 to 9999999
		BCDU	Integer	0 to 99999999
		KG	Real	Floating Point

Note All Data Blocks are Read/Write (x=1 to 65,535, y=0 to 65,535, n=0 to 65,535, m=0 to 65,534, z=0 to 15, v=0 to 131, v=length of character string). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will process a write (POKE) to a Data Block. Pokes on strings with an odd number of characters will **not** be processed although they can be read.

Flag Bytes (Merker)

Data Format	Item/Point	Suffix	Data Type	Range
Bit	F*x.y*		Discrete	0 or 1
	M*x.y*		Discrete	0 or 1
Byte	FB*x*		Integer	0 to 255
	MB*x*		Integer	0 to 255
		KF	Integer	-128 to 127
Word	FW*n*		Integer	0 to 65535
	MW*n*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3
Double Word	FD*m*		Integer	-2147483648 to 2147483647
	MD*m*		Integer	-2147483648 to 2147483647
		BCD	Integer	-9999999 to 9999999
		BCDU	Integer	0 to 99999999
		KG	Real	Floating Point

Note All Flags are Read/Write (x=0 to 65,535, y=0 to 7, n=0 to 65,534, m=0 to 65,532). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will process a write (POKE) to a Flag Byte.

Input Bytes (Eingänge)

Data Format	Item/Point	Suffix	Data Type	Range
Bit	I*x.y*		Discrete	0 or 1
	E*x.y*		Discrete	0 or 1
Byte	IB*x*		Integer	0 to 255
	EB*x*		Integer	0 to 255
		KF	Integer	-128 to 127
Word	IW*n*		Integer	0 to 65535
	EW*n*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3
Double Word	ID*m*		Integer	-2147483648 to 2147483647
	ED*m*		Integer	-2147483648 to 2147483647
		BCD	Integer	-9999999 to 9999999
		BCDU	Integer	0 to 99999999
		KG	Real	Floating Point

Note All Inputs are Read Only (x=0 to 65,535, y=0 to 7, n=0 to 65,534, m=0 to 65,532). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will **not** process a write (POKE) to an Input byte.

Output Bytes (Ausgänge)

Data Format	Item/Point	Suffix	Data Type	Range
Bit	Q*x.y*		Discrete	0 or 1
	A*x.y*		Discrete	0 or 1
Byte	QB*x*		Integer	0 to 255
	AB*x*		Integer	0 to 255
		KF	Integer	-128 to 127
Word	QW*n*		Integer	0 to 65535
	AW*n*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3
Double Word	QD*m*		Integer	-2147483648 to 2147483647
	AD*m*		Integer	-2147483648 to 2147483647
		BCD	Integer	-9999999 to 9999999
		BDCU	Integer	0 to 99999999
		KG	Real	Floating Point

Note All Outputs are Read Only (x=0 to 65,535, y=0 to 7, n=0 to 65,534, m=0 to 65,532). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will not process a write (POKE) to an Output Byte.

System Data Area (Bereich Systemdaten)

Data Format	Item/Point	Suffix	Data Type	Range
Word	RS*x*		Integer	0 to 65535
	BS*x*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3

Note All System Data Area types are Read Only (x=0 to 65,535). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will not process a write (POKE) to a System Data Area.

Peripheral Bytes (Peripherie)

Data Format	Item/Point	Suffix	Data Type	Range
Byte	PB*x*		Integer	0 to 255
		KF	Integer	-128 to 127
Word	PW*n*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3

Note All Peripheral Bytes are Read Only (x=0 to 65,535, n=0 to 65,534). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will not process a write (POKE) to a Peripheral Byte. Output modules are not readable.

Counters

Data Format	Item/Point	Suffix	Data Type	Range
Word	C*x*	None	Integer	0 to 999
	Z*x*	None	Integer	0 to 999

Note All Counters are Read Only (x=0 to 255). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will not process a write (POKE) to a Counter.

Timers

Data Format	Item/Point	Suffix	Data Type	Range
Word	T*x*	None	Real	0.00 to 999.3

Note All Timers are Read Only (x=0 to 255). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will not process a write (POKE) to a Timer.

Absolute Memory

Data Format	Item/Point	Suffix	Data Type	Range
Word	AS*x*	None	Integer	0 to 32767

Note All Absolute Memory words are Read Only (x=0 to 65,535). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will not process a write (POKE) to a Memory word.

Expanded Data Blocks

Data Format	Item/Point	Suffix	Data Type	Range
Bit	DX*x* D*y.z*		Discrete	0 or 1
String	DX*x* S*y.v*		Message	Length: 0 to 131
Left Byte	DX*x* DL*y*		Integer	0 to 255
		KF	Integer	-128 to 127
Right Byte	DX*x* DR*y*		Integer	0 to 255
		KF	Integer	-128 to 127
Word	DX*x* DW*n*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3
Double Word	DX*x* DD*m*		Integer	-2147483648 to 2147483647
		BCD	Integer	-9999999 to 9999999
		BCDU	Integer	0 to 99999999
		KG	Real	Floating Point

Note All Expanded Data Blocks are Read/Write (x=1 to 65,535, y=0 to 65,535, n=0 to 65,535, m=0 to 65,534, z=0 to 15, v=0 to 131, v=length of character string). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will process a write (POKE) to an Expanded Data Block. Some PLCs do not have expanded data blocks.

Expanded Peripheral Bytes (Erweiterte Peripherie)

Data Format	Item/Point	Suffix	Data Type	Range
Byte	OB*x*		Integer	0 to 255
		KF	Integer	-128 to 127
Word	OW*n*		Integer	0 to 65535
		KF	Integer	-32768 to 32767
		BCD	Integer	-999 to 999
		BCDU	Integer	0 to 9999
		KC	Integer	0 to 999
		KT	Message	0.0 to 999.3

Note All Expanded Peripheral Bytes are Read Only (x=0 to 65,535, n=0 to 65,534). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server will not process a write (POKE) to an Expanded Peripheral Byte. Some PLCs do not have expanded peripheral bytes.

Optional Conversion Suffix Examples

The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server always communicates to its clients bit items in discrete format and normally communicates byte, word, and double word items in unsigned integer format (except for timers which are real format). The Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server allows certain item names conversion suffixes that force special Siemens PLC internal formats to standard client communication formats. Refer to the Siemens Manual for valid input ranges.

Note Conversion suffixes are not allowed on Counter or Timer items.

BCD[U]

Treats the data stored in the Siemens PLC as an unsigned 2/4 byte (4/8 decimal digit) BCD entity and converts it to integer format. For example, 0x1234 in the PLC would be returned to a client as 1234 (decimal) if declared as a BCDU item.

Format: *XWx* **BCD[U]**

Where: *XWx* is a valid word type item name, including address.

Examples: **DB12DW10BCD**
MW195BCDU or **FW195BCDU**
EW15BCD or **IW15BCD**
AW95BCD or **QW95BCD**
PW195BCD
BS295BCD or **RS295BCD**
AS2195BCD
DX12DW10BCD
OW195BCD

KG

Treats the data stored in the Siemens PLC as a Siemens 4 byte floating point entity and converts it to real format.

Format: *XDy***KG**

Where: *XDy* is a valid double word type item name, including address.

Examples: **DB12DD10KG**
MD8KG or **FD8KG**
ED15KG or **ID15KG**
AD95KG or **QD95KG**
DX12DD10KG

KT

Treats the data stored in a Siemens PLC as a 2 byte timer constant (3 BCD digits plus range digit) and converts it to message (text string) format. For example, 0x2456 in the PLC would be returned to a client as "456.2" (text string). Do not confuse this timer constant conversion type with timer items. Timer items are not the same as timer constants. This conversion would typically be used on a word sized item stored in a data block.

Format: *XWx***KT**

Where: *XWx* is a valid word type item name, including address.

Examples: **DB12DW10KT**
BS295KT or **RS295KT**
AS2195KT
DX12DW10KT

KC

Treats the data stored in the Siemens PLC as an unsigned 2 byte (3 decimal digit) counter constant and converts it to integer format. For example, 0x0123 in the PLC would be returned to a client as 123 (decimal). Do not confuse this counter constant conversion with counter items. Counter items are not the same as counter constants. This conversion would typically be used on a word sized item stored in a data block.

Format: *XWx***KC**

Where: *XWx* is a valid word type item name, including address.

Examples: **DB12DW10KC**
BS295KC or **RS295KC**
AS2195KC
DX12DW10KC

KF

Treats the data stored in the Siemens PLC as a signed 2 byte integer entity and converts it to integer format. For example 0x809B in the PLC would be returned to a client as -32613 (decimal).

Format: *XWx***KF**

Where: *XWx* is a valid word type item name, including address.

Examples: **DB12DW10KF**
MW195KF or **FW195KF**
EW15KF or **IW15KF**
AW95KF or **QW95KF**
PW195KF
BS295KF or **RS295KF**
AS2195KF
DX12DW10KF
OW195KF

Siemens SIMATIC TI PLC Item Naming

The following table represents the TI item naming convention. This convention attempts to match item names to the programming software variable names.

The TI Syntax is:

<data element mnemonic><address><suffix>

or:

DCP<drum>:<step>

The valid address ranges for the corresponding items depend largely on the type of TI PLC and its specific configuration.

Data Element List

Variable Name	Data Format	Mnemonic	Read/Write
Variable Memory	Integer	V	R/W
Constant	Integer	K	R/W
Discrete Input	Boolean	X	R/W
Discrete Output	Boolean	Y	R/W
Control Register	Boolean	C	R/W
Discrete Input Packed	Boolean	XP	Read Only
Discrete Output Packed	Boolean	YP	Read Only
Control Register Packed	Boolean	CP	Read Only
Word Input	Integer	WX	R/W
Word Output	Integer	WY	R/W
Timer/Counter Preset	Integer	TCP	R/W
Timer/Counter Current	Integer	TCC	R/W
Drum Step Preset	Integer	DSP	R/W
Drum Step Current	Integer	DSC	R/W
Drum Count Preset	Integer	DCP	R/W
System Status Words	16-bit	STW	R/W
Drum Current Count	32-bit	DCC	Read Only
Variable Memory	Real	VF	R/W
Constant Memory	Real	KF	R/W
Loop Status	16-bit	LS	Read Only
Loop Mode	16-bit	LM	R/W
Gain	Real	LKC	R/W
Reset Time (Minutes)	Real	LTI	R/W
Rate Time (Minutes)	Real	LTD	R/W
High Alarm Limit	Real	LHA	R/W
Low Alarm Limit	Real	LLA	R/W
Process Variable	Real	LPV	R/W

Data Element List (continued)

Variable Name	Data Format	Mnemonic	Read/Write
PV High Limit	Real	LPVH	R/W
PV Low Limit	Real	LPVL	R/W
Orange Deviation Alarm Limit	Real	LODA	R/W
Yellow Deviation Alarm Limit	Real	LYDA	R/W
Sample Rate (Seconds)	Real	LTS	R/W
Setpoint	Real	LSP	R/W
Output (Percent)	Real	LMN	R/W
V-flags	16-bits	LVF	R/W
C-flags	32-bits	LCF	R/W
RAMP/SOAK Status Flags	16-bits	LRSF	Read Only
Error	Real	LERR	Read Only
Bias	Real	LMX	R/W
High-High Alarm Limit	Real	LHHA	R/W
Low-Low Alarm Limit	Real	LLLA	R/W
Rate-of-Change Alarm Limit	Real	LRCA	R/W
Setpoint High Limit	Real	LSPH	R/W
Setpoint Low Limit	Real	LSPL	R/W
Alarm Deadband	Real	LADB	R/W
Raw High Alarm Limit	Integer	LHAR	R/W
Raw Low Alarm Limit	Integer	LLAR	R/W
Raw Process Variable	Integer	LPVR	R/W
Raw Orange Dev Alarm Limit	Integer	LODAR	R/W
Raw Yellow Dev Alarm Limit	Integer	LYDAR	R/W
Raw Output	Integer	LMNR	R/W
Raw Setpoint	Integer	LSPR	R/W
Raw Error	Integer	LERRR	Read Only
Raw High-High Alarm Limit	Integer	LHHAR	R/W
Raw Low-Low Alarm Limit	Integer	LLLAR	R/W
Raw Alarm Deadband	Integer	LADBR	R/W
Raw Bias	Integer	LMXR	R/W
Raw Setpoint Low Limit	Integer	LSPLR	R/W
Raw Setpoint High Limit	Integer	LSPHR	R/W
Most-Sig Word Loop C-flags	Integer	LCFH	R/W
Least-Sig Word Loop C-flags	Integer	LCFL	R/W
Derivative Gain Limiting Coef.	Real	LKD	R/W

Data Element List (continued)

Variable Name	Data Format	Mnemonic	Read/Write
RAMP/SOAK Step Number	Integer	LRSN	R/W
Loop Alarm Acknowledge Flags	Integer	LACK	R/W
High Alarm Limit	Real	AHA	R/W
Low Alarm Limit	Real	ALA	R/W
Process Variables	Real	APV	R/W
PV High Limit	Real	APVH	R/W
PV Low Limit	Real	APVL	R/W
Orange Deviation Alarm Limit	Real	AODA	R/W
Yellow Deviation Alarm Limit	Real	AYDA	R/W
Sample Rate in Seconds	Real	ATS	R/W
Setpoint	Real	ASP	R/W
V-flags	16-bits	AVF	Read Only
C-flags	32-bits	ACF	R/W
Error	Real	AERR	Read Only
High-High Alarm Limit	Real	AHHA	R/W
Low-Low Alarm Limit	Real	ALLA	R/W
Rate-of-Change Alarm Limit	Real	ARCA	R/W
Setpoint High Limit	Real	ASPH	R/W
Setpoint Low Limit	Real	ASPL	R/W
Alarm Deadband	Real	AADB	R/W
Raw High Alarm Limit	Integer	AHAR	R/W
Raw Low Alarm Limit	Integer	ALAR	R/W
Raw Process Variable	Integer	APVR	R/W
Raw Orange Dev Alarm Limit	Integer	AODAR	R/W
Raw Yellow Dev Alarm Limit	Integer	AYDAR	R/W
Raw Setpoint	Integer	ASPR	R/W
Raw Alarm Deadband	Integer	AADBR	R/W
Raw Error	Integer	AERRR	Read Only
Raw High-High Alarm Limit	Integer	AHHAR	R/W
Raw Low-Low Alarm Limit	Integer	ALLAR	R/W
Raw Setpoint Low Limit	Integer	ASPLR	R/W
Raw Setpoint High Limit	Integer	ASPHR	R/W
Most-Sig Word Alarm C-flags	Integer	ACFH	R/W
Least-Sig Word Alarm C-flags	Integer	ACFL	R/W
Analog Alarm Ack Flags	Integer	AACK	R/W

Special Case Memory

Special case memory exists for V-Memory, K-Memory, STW-Memory, WX and WY-Memory. In all cases the item syntax is the same:

Variable Name	Data Format	Item Name	Read/Write
32-bit Integer	Integer	X#D	R/W
± 16-bit Integer	Integer	X#S	R/W
Real (IEEE format)	Real	X#R or X#.	R/W
Real (IBM format)	Real	X#P	R/W
BCD Decimal	Integer	X#B	R/W
Memory Bit	Integer	X#:bb	R/W
*Null-Terminated String	Message	X#-#C	R/W
*Length Byte Followed by String	Message	X#-#P	R/W
*String Padded on the Right with Blanks	Message	X#-#	R/W

Where: X = synonym for V, K, STW, WX, or WY

* Do not use spaces before or after the hyphens in these Message type variables. Each register (#) holds 2 characters. (*bb*) = 1-16.

Note In a Message type variable, a hyphen must be used to separate character ranges. Otherwise, the variable may be interpreted as an Integer type variable. See examples below:

V2-6 **String Blank-Padded on the Right**
Message type variable containing 10 characters.

V3-3 **String Blank-Padded on the Right**
Message type variable containing 2 characters.

Predefined Item/Point Names

All S5TI500 topics have predefined item/point names to monitor and control communication properties.

UPDATEINTERVAL Item

The **UPDATEINTERVAL** item is used to access the currently set update interval. It is the same value displayed in the monitor window of the S5TI500 server. It indicates the currently requested update interval in milliseconds. If the corresponding topic is configured for "Enable I/O access to update interval", a client can poke new values into this item. In any case the value can always be read through I/O. The range of valid values differs with respect to the topic settings. The value of zero indicates that no items on that topic are updated.

I/O Type: INTEGER

ACCESS: READ, WRITE (if configured)

RANGE: 1..2147483647

0 (topic inactive, no items are updated)

Note By poking a value of zero into the update interval item a client can conveniently stop all update activities on the corresponding topic without having to deactivate the items.

MAXINTERVAL Item

The **MAXINTERVAL** item is used to access the measured maximum update interval in milliseconds of all items of the corresponding topic for the last completed poll cycle. It is the same value displayed in the monitor window of the S5TI500 server under "Longest Interval". This item is read only. The value of the slowest item is displayed.

I/O Type: INTEGER

ACCESS: READ

RANGE: 0..2147483647

Note Use the **UPDATEINTERVAL** and **MAXINTERVAL** items to conveniently tune the performance of the communication via I/O.

STORESETTINGS Item

The **STORESETTINGS** item is used to make the temporary update interval changes via I/O permanent. If the client pokes a value of 1 into the **STORESETTINGS** item the currently set update interval is written to the servers configuration file. If the update interval has been changed via I/O and **STORESETTINGS** is not poked to 1 the server will use the original update interval for that topic the next time it is started. Reading the item will always give 0.

I/O Type: DISCRETE
ACCESS: READ, WRITE
RANGE: 0, 1

Note Use this item to conveniently store your optimized configuration via I/O.

ITEMCOUNT Item

The **ITEMCOUNT** item is used to access the number of active items in the corresponding topic. It is the same value displayed in the monitor window of the S5TI500 server under "Items". This item is read only.

I/O Type: INTEGER
ACCESS: READ
RANGE: 0..2147483647

Note Use the **ITEMCOUNT** item to monitor the number of currently active items.

ERRORCOUNT Item

The **ERRORCOUNT** item is used to access the number of active items that have errors in the corresponding topic. It is the same value displayed in the monitor window of the S5TI500 server under "errors ( ) only". If the communication status of a topic is bad, all items have errors (item count equals error count). This item is read only.

I/O Type: INTEGER
ACCESS: READ
RANGE: 0..2147483647

Note Use the **ERRORCOUNT** item to monitor if there are any badly configured items or invalid item values. This is the case if the topic status is 1 and **ERRORCOUNT** is not zero.

WRITECOMPLETE Item

The **WRITECOMPLETE** item is used to access the state of pending write activities on the corresponding topic. If the topic is opened the value of the **WRITECOMPLETE** item is initially 1 indicating all write activities are complete - no pokes are pending. If values are poked into any items of the topic the value of the **WRITECOMPLETE** item changes to 0 indicating write activity is currently in progress. If the server has completed all write activities the value of the **WRITECOMPLETE** item changes to 1 if all pokes were successful or to -1 if at least one poke has failed. If the value of the **WRITECOMPLETE** item is not zero the client can poke 1 or -1 to it (poke a 1 to clear errors or a -1 to test a client reaction on write errors).

I/O Type: INTEGER

ACCESS: READ/WRITE

RANGE: -1,0,1

Note Use the **WRITECOMPLETE** item to serialize a sequence of poke values into a single item or to monitor success or failure of poking into one or more items.

READCOMPLETE Item

The **READCOMPLETE** item is used to access the state of initial reads on all items in the corresponding topic. If the topic is opened and no item is advised, the value of the **READCOMPLETE** item is 0. After all activated items have been read once, the **READCOMPLETE** item changes to 1. If at least one item could not be read the **READCOMPLETE** item alters to -1 indicating there have been read errors.

If at least one new item is advised now **READCOMPLETE** changes to 0 and after this/these item(s) has/have been read it changes to 1 or -1 again.

Poking a 0 to this item resets the internal read states of all items in this topic. This resets the **READCOMPLETE** item to 0. If all items are read again after this poke, the **READCOMPLETE** item changes back to 1 or -1.

I/O Type: INTEGER

ACCESS: READ/WRITE

RANGE: -1,0,1

POLLNOW Item

Poking a 1 to the predefined **POLLNOW** item forces all items within this topic to be read immediately. This is useful if you want to get the newest values from the device, regardless of its update interval. You can use this if you want to trigger the reads within a topic by your own.

I/O Type: DISCRETE

ACCESS: READ/WRITE

RANGE: 0,1

Note You can use **POLLNOW** and **READCOMPLETE** for measuring of the longest interval. Create a topic with update interval 0. Poke POLLNOW to 1 and READCOMPLETE to 0 and store the actual time. Then wait until READCOMPLETE changes back to 1. The difference between the current time and the stored time equals the update interval.

Monitoring the Status of Communications with a PLC

For each topic name (PLC), there is a built-in discrete item that can be used to monitor the status of communications with the PLC. The discrete item, **Status,** is set to **0** when communication with the PLC fails and is set to **1** when communication is successful.

Using the Status Item in Excel

The status of the PLC communications can be read into Excel by entering the following DDE reference formula in a cell on a spreadsheet:

=S5TI500|S115!Status

Monitoring the Status of an I/O Conversation

WindowViewer supports built-in topic names called **DDEStatus** and **IOStatus** that can be used to monitor the status of specific I/O conversations. For example, let's assume that **WindowViewer** (VIEW) is communicating with the Wonderware Siemens SIMATIC NET S5/TI-500 I/O Server to a PLC that has been defined in the server with **S115** for its topic name. The discrete items, **DDEStatus** and **IOStatus** are set to 0 when this I/O conversation has failed and set to 1 when this I/O conversation is successful.

Using DDEStatus and IOStatus in Excel

The status of communication between the PLC and InTouch can be read into Excel by entering the following DDE reference formula in a cell on a spreadsheet:

=view|DDEStatus!S115

or

=view|IOStatus!S115

Reading Values from the I/O Server into Excel

Values may be read directly into Excel spreadsheets from the server by entering a DDE formula into a cell using the following format:

=applicationname|topicname!itemname

Example formula:

=S5TI500|S115!EW4

where:

S5TI500	Is the name of the server application name.
S115	Is the exact topic name defined in the server for the PLC.
EW4	Is the actual location in the PLC that contains the data value. This is the item name.

In this example, each time the value of **EW4** changes in the PLC, the server will automatically send the new value to the cell containing the formula in Excel.

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

Writing Values to the I/O Server from Excel

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("applicationname","topicname")

=POKE(channel,"itemname", Data_Reference)

=TERMINATE (channel)

=RETURN()

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

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

Opens a channel to a specific topic name (defined in the server) in a particular application name (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 "application name" and "topic name" 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 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.

=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.

Note Refer to the **.XLM** sample Excel poke macro provided on the server program disk. Also refer to the Microsoft Excel manual for complete details on entering Remote Reference formulas for cells.

Troubleshooting I/O Server Communication Problems

This section provides you with some simple steps that can be taken to ascertain and correct communication problems. The problems described here represent the most probable causes of communication failure.

Note This is a general troubleshooting guide and for the sake of brevity we cannot cover every possible source of communication problems.

Debugging Communication Between InTouch and an I/O Server

This section explains the most common error situations that can occur when attempting to establish communication between InTouch and a server.

Servers are Window applications that communicate with I/O, PLCs, and/or other data sources. If a server supports either the Microsoft Dynamic Data Exchange (DDE) or the Wonderware SuiteLink protocol, it is capable of communicating with the Wonderware InTouch program.

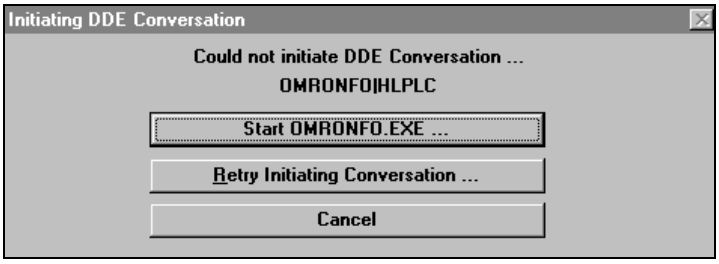
Note All Wonderware Version 7.0 or later servers support both DDE and SuiteLink. However, the SuiteLink protocol is only supported on the Windows NT (Version 4.0 or later) operating system.

Servers respond to data requests made by other applications. Requesting applications are called clients. When WindowViewer acts as a client and requires the value of an item, it contacts the server and requests the item's value. The server will report the value and update WindowViewer only if a change occurs. All WindowViewer data requests provide information relating an item to a register, coil number, or I/O data point understood by the server. The server uses the information to automatically handle all messages to and from I/O, hardware devices (PLC), and/or other data sources.

Note We highly recommend starting all the servers required by the InTouch application before starting WindowViewer. InTouch (versions prior to 7.0) will display the **Initiating DDE Conversation** message box for each uninitiated conversation.

For example:

If you start up WindowViewer and cannot successfully establish a conversation with a server, the following Initiating DDE Conversation dialog box will appear:



The information in the second line indicates that you have at least one I/O type tagname defined in your Tagname Dictionary that is associated with an Access Name that defines OMRONFO as the Application Name, and HLPLC as the Topic Name. Make note of exactly how the application and topic names are spelled.

- This example only applies when using a version of InTouch prior to InTouch 7.0.

To troubleshoot communication problems between WindowViewer and the server, perform the following steps as listed below.

- **Verify the I/O Server is running.**

1. Start the server program.
2. Verify the server is running by checking to see if it is in the Windows Task List.

On Windows NT, click the right mouse button on the Windows Taskbar and select Task Manager from the menu. Click the Applications tab to view all currently running applications. Or press the CTRL+SHIFT+ESC keys.

On Windows 95, press the ALT+TAB keys while holding down the ALT key.

On Windows 3.1 or Windows for Workgroups, press the CTRL+ESC keys.

- **If the I/O Server is running, verify the I/O Server's program name is correct in all WindowMaker Access Name definitions.**

1. Switch to (or start) WindowMaker. Select Access Names from the Special Menu, the Access Name Definitions dialog box appears listing all Access Names defined in the WindowMaker.
2. In the Access Names list, select the Access Name referencing the server and click Modify. The Modify Access Name dialog box will appear.
3. Verify the server's program name in the Application Name box is correct. If it is wrong then correct it and click OK , else click Cancel.
   - The server's exact "executable name" must be typed in the Application Name box in all Access Name definitions. The ".exe" extension is not used.
   - If you are debugging a remote tagname reference, also verify that the node name for the remote computer in the Node Name box is correct.
4. Repeat steps 2 & 3 and verify the server program name is correct in all Access Names that use it.

- **If you still cannot establish a conversation, verify the exact topic name used in the WindowMaker Access Name definitions are defined in the I/O Server program.**

1. Close WindowViewer if it is running. (The server cannot be configured if WindowViewer is running.)
2. Start the server program.
3. From the server’s Configure menu, select Topic Definition, the Topic Definition dialog box appears listing all topic names defined in the server.

4. Verify that the topic name exists and is spelled exactly the same (including spaces) as the topic name referenced in the WindowMaker Access Name definition.

   - Blank spaces cannot follow the topic name in either the server's Topic Definition or the Access Name definition.

5. If the topic name is different, either correct it in the server or switch to WindowMaker and correct it in the Access Name definition.

6. Once you performed the above procedure, restart WindowViewer and switch to the server program. Data should now appear in the server's program window to indicate that WindowViewer and the server are communicating.

   - The data in the server's program window indicates the read and write messages that the server is sending to and receiving from the PLC. (These are not error messages, only status messages are written to the server's program window.)

7. If no data appears in the server's program window, switch to the Wonderware Logger to check for error messages. For example, a common error message is:

   "Error for DDE: OMRONFO|HLPLC!<null>("item") Advise failed"

   This message appears when the item defined in one or more tagnames is invalid for the server.

   - InTouch tagnames use specific naming conventions when accessing data from a server. The valid item names for all Wonderware servers are documented in their respective User's Guides. Typically, the item naming conventions used by each server are consistent with the names used by the equipment manufacturer.

   - For more information on the Wonderware Logger, see your online FactorySuite System Administrator's Guide.

- **If you are still experiencing problems, continue with the following troubleshooting section.**

Debugging Communication Between SuiteLink and an I/O Server

If you have successfully applied the debug techniques listed in the previous section and are still experiencing communication problems to a server that is attempting to communicate using the SuiteLink protocol, perform the following steps as listed below:

- **Verify the I/O Server supports the Wonderware SuiteLink protocol, that is, the I/O Server is version 7.0 or above.**

- **Try communicating to the I/O Server using the DDE protocol. If this is not possible, then proceed to the next troubleshooting section otherwise continue with the following steps:**

1. Verify Microsoft's TCP/IP stack is installed and configured properly.

   - SuiteLink uses the Microsoft TCP/IP stack for its communications even if the client application and the server reside on the same node.

2. If you do not have an Ethernet card to bind to the TCP/IP stack, install the Microsoft Loop Back Adapter.

3. Install the Microsoft TCP/IP stack.

Debugging Communication Between an I/O Server and a PLC

This section provides you with simple steps to diagnose and correct server to PLC communication problems. The debug techniques listed below address both serial and board servers. Disregard any information that is not applicable to the server type that you are using.

When attempting to establish communication between a server and a PLC, if no data appears in the server's program window and the data items are not updating in WindowViewer, switch to the Wonderware Logger and check for error messages.

For more information on the Wonderware Logger, see your online FactorySuite System Administrator's Guide.

For example, some of the most common errors that may appear in the Wonderware Logger for serial servers are:

Response Timeout
WCRET =-2
WakeUp=-2
Receive Overrun
Framing Errors

Note Unless specified otherwise, most serial communication based servers are full duplex. If you require a server for half duplex (one that monitors the CTS and RTS lines) or if you are not sure whether the PLC's protocol is full or half duplex, call your PLC supplier.

Also, during in-house server testing, we have found that the communication cards that use the National 16450 and 16550 UARTs seem to be less susceptible to level and timing problems. Cards based on other chips may work, but we recommend using the National cards. Some of the highly integrated UART chips (most notably, Winbond and UMC) have a tendency for their transmitters to hang, requiring re-initialization of the UART. If this occurs, you may have to restart the server or execute the Reinitialize I/O command from the Special menu in WindowViewer.

- **Check your cabling to the PLC.**

  Is it wired correctly? Check for shorts, loose wires, broken wires, crossed wires, and so on.

  A continuity tester can be helpful here.

- **Verify the I/O Server's serial configuration settings (Parity, Stop Bits, Baud Rate, Handshaking and so on) against the settings in the hardware device.**

- **Verify the communication port is working properly in Windows.**

  1. Close the server program.

     If you are using a server that requires a TSR, you will not be able to verify that the port is functioning properly while the TSR is running. Stop all TSRs then continue with this procedure. If you confirm that the port functions properly without the TSR running, change your software interrupt (IRQ) to another number, for example, change 60 to 62.

- Also, if you are using an AT type computer, two devices cannot share interrupts. Verify that the communication port you are using has a unique interrupt setting.

2. On Windows 3.1 or Windows for Workgroups, start the Terminal program. On Windows 95 or Windows NT, start the HyperTerminal program.
3. Configure the Terminal (or HyperTerminal) program to use the same communication port with the same settings (baud rate, parity, stop bits and so on) as the hardware device.
4. Connect a null modem cable to a second computer's port.
5. On the second computer, start and configure the Terminal (or HyperTerminal) program with the same settings as the first computer.
6. Verify that you can send data between the two computers.
   - If you do not have two computers and the computer you are using has another port, start two instances of the Terminal (or HyperTerminal) program with each configured to their own port, then try communicating between them.
   - If you have an external modem, connect the modem to the communication port that you are testing and see if you can dial out.
7. If the communication port does not appear to be functioning properly, check your environment files (**AUTOEXEC.BAT**, **CONFIG.SYS**, **SYSTEM.INI**, and **WIN.INI**). Look for suspicious programs or drivers that might be taking control of the port or its interrupt before the server is loaded. Always try to keep your environment files as clean as possible. If you are in doubt about an entry, comment it out.
8. If the previous step was unsuccessful, try another communications port or another computer.

Note A common misconception is that if you can connect to a PLC with a DOS program, that the same communication port will work in Windows - this is not the case! Windows is an entirely different environment than DOS.

- **What type of UART is on the COM port?**

  If it is not a 16550, then you must lower your baud rate to 9600 or slower. Only the 16550 UART can sustain continuous, error free communications at speeds higher than 9600 baud. Other UARTs may work at speeds faster than 9600 baud, but errors may be written to the Wonderware Logger. For example, "Receive Overruns." To determine which UART you have, enter MSD at a DOS prompt, then choose COM Ports from the MSD menu.

- **If you are running Windows for Workgroups, verify the following:**

  1. Verify the following lines are added to the [386 enh] section of your system.ini file that is located in your \Windows directory:

     ```
     EMMEXCLUDE=A000-EFFF
     COMxFIFO=0
     ```

     Where x specifies the COM port number. You need to add a separate COMxFIFO line for each serial port using a 16550 UART chip.

  2. If you are running Windows for Workgroups (Version 3.1 or later), you need to download SERIAL.386 (this file fixes a Microsoft bug) from the Wonderware Bulletin Board System (949-727-0726) or from the Wonderware WEB site at: http://wondertech.wonderware.com.

- The file is 10620 bytes and has a date of 2/17/94. It is contained in a self-extracting zip file called wg1001.exe. The file is located in the "PatchFix Library" on the Wonderware BBS in the File Transfers / Patchfix area.
- The Wonderware Web site requires that you register before you will be given access.

3. If (1. and 2.) above do not work, verify the value of the ComBoostTime parameter in your SYSTEM.INI file. This parameter represents the number of milliseconds that a virtual machine can process a COM interrupt. (The default value is 2.) We do not recommend that you normally change this setting however, if you are receiving errors such as "Receive Overruns" or "WCRE=-2", try increasing the value to 20.

➢ **Verify the parameters for WWCOMTSR.**

Do not specify a receive and/or transmit buffer size of 8!

For example:

Correct:
COM1:0 COM2:1,2048,2048
COM1:0 COM2:1

Incorrect:
COM1:0 COM2:1,8,8

➢ **Does your computer crash when you try to communicate through the COM port?**

If so, verify that each TSR has a unique software interrupt.

- There is a utility, ShowSoft, available on the Knowledge Base CD that can assist you in determining the software interrupts that are available.

➢ **Does your computer lock up?**

Verify the COM port's IRQs do not conflict with each other or with any other communication boards in the computer.

➢ **If the PLC or field device has more than one COM port, verify that you are connected to the correct port.**

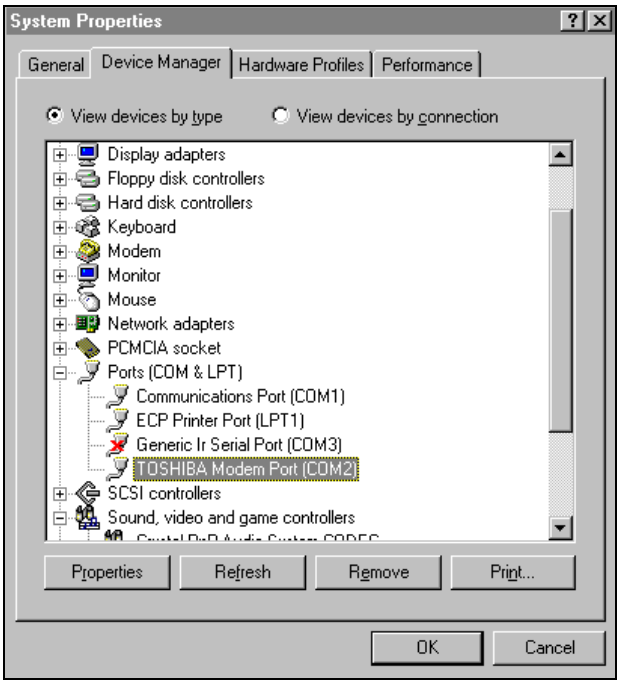
The COM port on your computer uses the RS-232 hardware communication standard. Meaning, you must connect the cable from the COM port to an RS-232 compliant device.

Note A common mistake is to connect to an RS-422 or RS485 port on the PLC. To do this, you need an RS232 to RS422/485 conversion device.

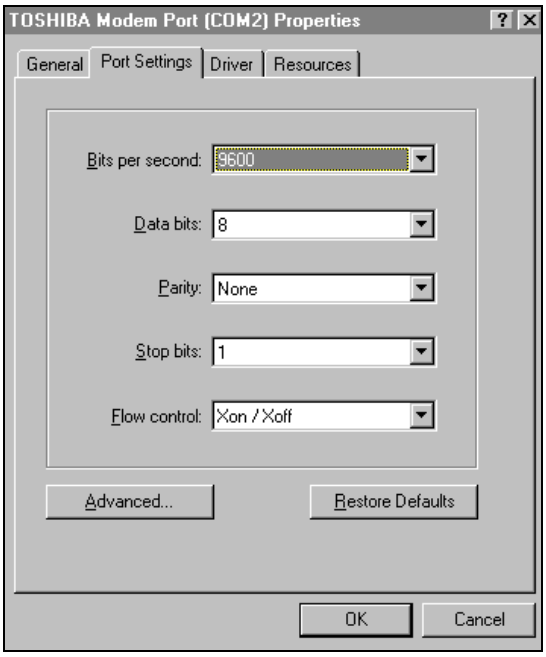
If possible, use an external converter instead of a board-based converter that plugs into a slot in the computer. A board-based converter is typically more difficult to get working for inexperienced users. If a board-based converter is not set up properly, it can conflict with other communication boards in the computer such as, internal modems.

➢ **If you are using the Windows 95 operating system, verify the following:**

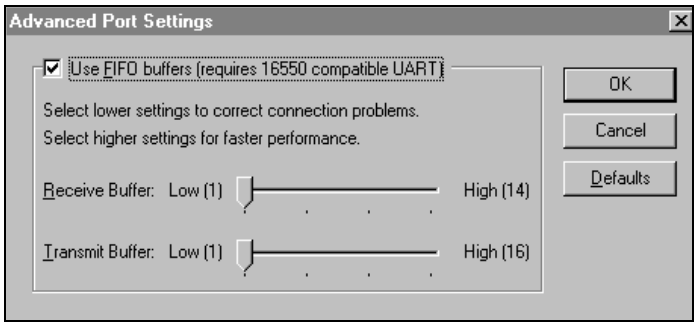
1. Click Start on the Windows Taskbar. Point to Settings, then click Control Panel in the menu. The Control Panel dialog box will appear.
2. Double-click the System icon. The System Properties dialog box will appear. Click the Device Manager tab and select the COM port that you are using for the server. For example:



4. Click Properties. The Properties dialog box will appear. Click the Port Settings tab.



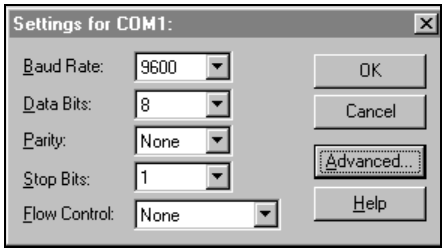
6. Click Advanced. The Advanced Port Settings dialog box appears:



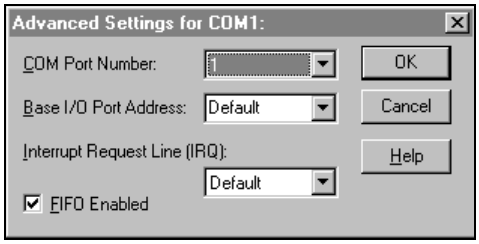
6. Lower the default Receive Buffer and Transmit Buffer settings to their minimum. Lowering these settings may solve I/O communication problems for portable computers (notebook, or laptops) and framing errors for standard computers.
7. If you are using a 16550 UART chip, select the Use FIFO buffers (requires 16550 compatible UART) option. If you are not using a UART chip, make sure this option is not selected.

➢ **If you are using the Windows NT operating system, verify the following:**

1. Click Start on the Windows task bar. Point to Settings, then click Control Panel in the menu. The Control Panel dialog box will appear.
2. Double-click the Ports icon, the Ports dialog box will appear.
3. Select a port and click the Settings button. The Settings for COMx dialog box appears:



4. Click Advanced. The Advanced Settings for COMx dialog box appears:



5. Set the Interrupt Request Line (IRQ) value to the minimum. Lowering this setting may solve I/O communication problems for portable computers (notebook, or laptops) and framing errors for standard computers.
6. If you are using a 16550 UART chip, select the FIFO Enabled option. If you are not using a UART chip, make sure this option is not selected.

➢ **How long is your RS-232 cable?**

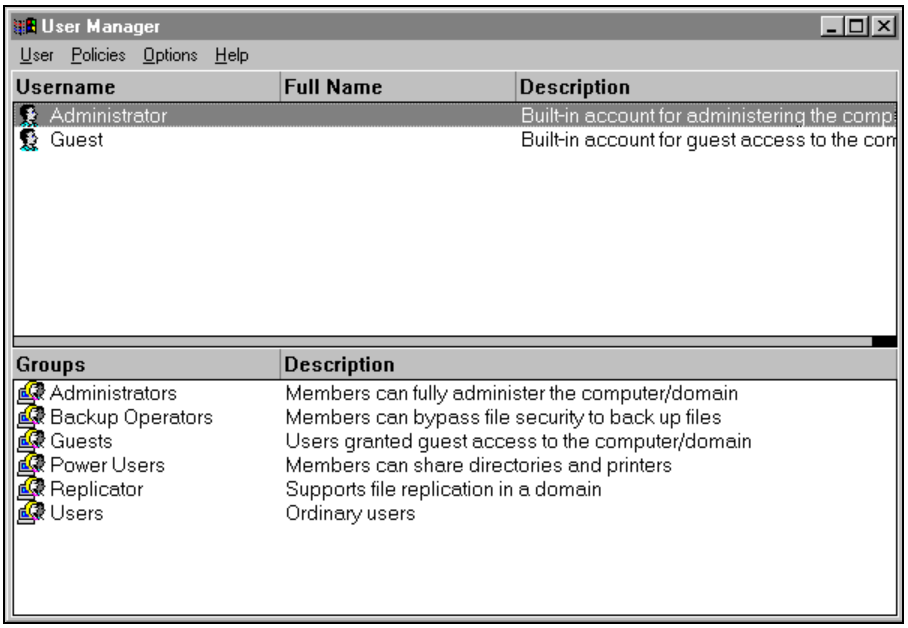
Fifteen meters (fifty feet) is the maximum practical length for the RS-232 standard.

- **Try using a different COM port for the I/O Server.**

- **If you are installing an I/O Server or configuring a board based I/O Server on a computer that is running the Windows NT operating system, verify that you are logged on with Administrator privileges.**

  Without Administrator privileges, the server and Server Install program cannot make the necessary edits to the Windows NT Registry during installation or board configuration of the server.

  1. Click Start on the Windows Taskbar. Point to Programs, then point to Administrative Tools (Common), and click User Manager in the menu. The User Manager dialog box will appear:



  2. Double-click the Username you typed in during log on.
  3. If the User Properties dialog box does not appear, you do not have Administrator privileges.
  4. If the User Properties dialog box does appear, click on the Groups button and verify "Administrators" is in the "Member of:" list.

- **If you experience occasional or random communication errors in the Wonderware Logger, for example, "Response Timeouts," check for noise.**

  Do the physical cables run past any known noise sources such as photocopiers, fluorescent lamps, fans, pumps, motors or generators? Are your cables properly shielded from its environment? With radio modems and satellite link ups, occasional communications errors in the Wonderware Logger are normal and to be expected as long as they do not adversely impact the flow of data.

- **Increase the Reply Timeout setting in the I/O Server to a value between 5 and 10 seconds.**

  Some communications errors result from not allowing the PLC or field device enough time to respond to the server's request for data.

- **Verify the PLC is properly configured and the cable is good by using the programming software for the PLC.**

  When testing, run the programming software and communicate with the server at the same time.

  - The ability to perform this test depends upon the type of PLC that you are using.

- **Reinstall the I/O Server and verify that you are using the latest version.**

  We continually improve our servers and using the latest version will guarantee the best results.

  - New versions of the Wonderware I/O Servers are released regularly on the Knowledge Base CD and they are also available to Comprehensive Support customers on the Wonderware Bulletin Board System (949-727-0726) or from the Wonderware WEB site at: http://wondertech.wonderware.com.

- **Move the I/O Server's configuration file to another location on the computer's hard drive. This will clear all configuration for the I/O Server, then reconfigure the I/O Server.**

  - Wonderware server configuration files are typically named exactly the same as the server's executable name but with the .CFG extension, e.g. OMRONFO.CFG. Refer to the Configuration File section of the server user's guide for the exact name of the configuration file.

- **If possible, reinstall the Windows operating system.**

  Some of the files that are installed on your computer or the NT registry may have been corrupted or accidentally modified.

- **If these troubleshooting suggestions do not solve your problem, there may be a problem with your computer. There are many subtle differences between the various computer hardware brands. Try using a computer that is a different brand and select one that meets the following criteria:**

  1. A different PC manufacturer. If this is not possible, try a different PC model from the same manufacturer.
  2. The computer does not use an OEM (Original Equipment Manufacturer) version of Microsoft Windows. When you start up Windows, only the Microsoft Windows logo should display, not a logo from a hardware manufacturer. We highly recommend you use only a Microsoft Windows product. Contact your vendor to determine if installing an off-the-shelf copy of Microsoft Windows will cause any problems.

- **If you feel you have tested all possible situations that may be causing your failed I/O communications, contact your local Wonderware distributor for technical support.**

  - For more information on obtaining technical support, see your online *FactorySuite System Administrator's Guide*.

Special Wonderware Logger Messages

The following messages may appear in the Wonderware Logger. They can be very useful in debugging communication problems.

- **The following logger messages can occur in error situations if log errors (default) is selected in the logger settings.**

  - **ERROR: Cannot initialize: <cpname> (SetSR()=<err code>)**

    Error code <err code> while initializing adapter card. Check Siemens manual for the error code and check the SIMATIC NET installation.

  - **No Siemens Simatic Net driver found.\nSwitching to off-line mode!**

    No Siemens SIMATIC NET driver is installed. Server operates off-line.

  - **ERROR: timeout on TSAP (Addr/TSAP: <address>/<rem TSAP>)<millisecs> msec"**

    The SIMATIC NET software did not respond. Check installation and connection.

  - **ERROR: poking item: <item name>(<topic name>)**

    Writing a value to an item failed.

  - **POKE: invalid value, clamp at high limit for item: <item name> on <topic name>**

  - **POKE: invalid value, clamp at low limit for item: <item name> on <topic name>**

    An invalid value has been specified for poking data. Value is clamped and transfered to the PLC.

  - **POKE ERROR: invalid value, cannot convert for item : <item name> on <topic name>**

    An invalid value has been specified for poking data. Value cannot be converted and write operation is aborted. After all write operations are completed the "writecomplete" item will go to -1.

  - **TIMEOUT(<seconds>s): for unsolicited item: <item name> on <topic name>**

    The PLC did not update an item in a topic that is configured as unsolicited.

  - **<error text>(<cpname><locTSAP><PLCaddr><remTSAP>)<TSAP operation> (rb=<rb number> - <rb info>)**

    General error message describing the failure of a TSAP activity. Check remote device for troubleshooting and check the Siemens manual for error codes.

  - **Error invalid topic name: <topic name>**

    Topic name does not exist. Change topic name or configure correct topic.

- **Invalid item name: <item name> (<topic name>)**

  Item name does not exist. Check for correct item name.

- **Received request block: <rb number1> does not match requested request block: <rb number2>! Discarding message**

  Requested request block number does not match request. Can occur on closing connection while acquiring data.

- **Write complete (ERROR) – item: <item name> on <topic name>**

  A write operation has failed on item with <item name>.

- **New status (<topic name>): 0 (ERROR)**

  Connection to PLC has gone bad.

➢ **The following logger messages can occur in normal operation mode if log trace is selected in the logger settings. These messages show the general activity of the server. Note: it can slow down the servers performance:**

- **(<cpname><locTSAP><PLCaddr><remTSAP>)<TSAP operation> (rb=<rb number> - <rb info>**

  General TSAP activity (connecting, exchanging data etc.).

- **TRACE: Topic allocated: <topic name>**

  A topic has been created (client has connected on this topic).

- **TRACE: Free topic: <topic name>**

  A topic has been freed (client has disconnected on this topic).

- **TRACE: Item <item name> created on <topic name>**

  An item has been created in the server.

- **Activating item <item name> on <topic name>**

  An item has been activated in the server. A client has advised/requested data.

- **Deactivating item <item name> on <topic name>**

  An item has been deactivated in the server. A client has unadvised data.

- **New value for device - item: <item name> on: <topic name>**

  A client performed a write operation on an item.

- **Write complete (OK) - item: <item name> on: <topic name>**

  The write operation was completed successfully on the protocol. The PLC has confirmed the reception of data.

- **The following logger messages can occur in normal operation mode if log all is selected in the logger settings. These messages show the all of the servers activities. Note: it can slow down the servers performance:**

  - **New <data type> value: <value> for item: <item name> on <topic name>**

    An item was updated with a new value from the PLC.

  - **Write complete item: 0**

    A client has initiated write operation and the server signals the processing of poke values by setting the "write complete" item to zero

- **The following logger messages can occur in normal operation mode if "show protocol" is selected in the logger settings. These messages show the sent and received messages. Note: it can slow down the servers performance:**

  - **<plcaddr> <send/recv>: <message> <message type> <data>**

    example for message traffic.

    1998/08/20 16:58:38.332/-0099:00AB/S5TI500 /080006010135 SEND: 000000FF 12 0002 FF 00000000 40 00 00FF OPEN REQUEST

    1998/08/20 16:58:38.332/-0099:00AB/S5TI500 /080006010135 RECV: 000000FF 12 0002 FF 00000000 40 00 0001 OPEN REQUEST

    1998/08/20 16:58:38.332/-0099:00AB/S5TI500 /080006010135 SEND: 000000FF 2A 0002 FF 00000000 40 01 00FF CONNECT REQUEST

    1998/08/20 16:58:38.332/-0099:00AB/S5TI500 /VA1: 00 00 00 00 00 0000 00453E28 0000 0000 000A 00 0000 00000000 0000

    1998/08/20 16:58:38.332/-0099:00AB/S5TI500 /TA: 00 08 50 43 50 43 50 43 50 43 0B 49 0000 08 00 06 01 01 35 FE 00 08 46 53 50 53 46 53 50 53

    1998/08/20 16:58:38.342/-0099:00AB/S5TI500 /080006010135 RECV: 000000FF 2A 0002 FF 00000000 40 01 0001 CONNECT REQUEST

    1998/08/20 16:58:38.342/-0099:00AB/S5TI500 /VA1: 00 00 00 00 00 0000 00453E28 0000 0000 000A 00 0000 00000000 0000

    1998/08/20 16:58:38.342/-0099:00AB/S5TI500 /TA: 00 08 50 43 50 43 50 43 50 43 0B 49 0000 08 00 06 01 01 35 00 00 08 46 53 50 53 46 53 50 53

    1998/08/20 16:58:38.382/-0099:00AB/S5TI500 /080006010135 SEND: 000000FF 2E 0003 FF 00000000 40 06 00FF SEND EOM DATA

    1998/08/20 16:58:38.382/-0099:00AB/S5TI500 /VA2: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 000A 00 0001 D24FE0 10 0000 00 44D817

    1998/08/20 16:58:38.382/-0099:00AB/S5TI500 /5335100103050308020000020002FF02

    1998/08/20 16:58:38.412/-0099:00AB/S5TI500 /080006010135 RECV: 000000FF 2E 0001 FF 00000000 40 07 0003 RECEIVE DATA

    1998/08/20 16:58:38.412/-0099:00AB/S5TI500 /VA2: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 000A 12 0001 D167A8 1000 0000 00 44D7F6

    1998/08/20 16:58:38.412/-0099:00AB/S5TI500 /5335100103060F0300FF07020002FF020039

    ...