

TsTCP Communication Driver

Driver for *Ethernet* communication with
Studio Test Program

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Introduction

The TSTCP driver enables serial communication between the Studio system and remote devices using the TsTCP protocol, according to the specifications discussed in this document.

This document will help you to select, configure and execute the TSTCP driver, and it is organized as follows:

- **Introduction:** This section, which provides an overview of the document.
- **General Information:** Identifies all of the hardware and software components required to implement communication between the Studio system and the target device.
- **Selecting the Driver:** Explains how to select the TSTCP driver in the Studio system.
- **Configuring the Device:** Describes how the target device must be configured to receive communication from the TSTCP driver.

- **Configuring the Driver:** Explains how to configure the TSTCP driver in the Studio system, including how to associate database tags with device registers.
- **Executing the Driver:** Explains how to execute the TSTCP driver during application runtime.
- **Troubleshooting:** Lists the most common errors for this driver, their probable causes, and basic procedures to resolve them.
- **Sample Application:** Explains how to use a sample application to test the TSTCP driver configuration
- **Revision History:** Provides a log of all changes made to the driver and this documentation.

Notes:

- This document assumes that you have read the "Development Environment" chapter in Studio's *Technical Reference Manual*.
- This document also assumes that you are familiar with the Microsoft Windows NT/2000/XP/Vista environment. If you are not familiar with Windows, then we suggest using the Help feature (available from the Windows desktop Start menu) as you work through this guide.

General Information

This chapter identifies all of the hardware and software components required to implement communication between the TsTCP driver in Studio and remote devices using the TsTCP protocol.

The information is organized into the following sections:

- Device Specifications
- Network Specifications
- Driver Characteristics
- Conformance Testing

Device Specifications

To establish communication, your target device must meet the following specifications:

- **Manufacturer:** Indusoft
- **Compatible Equipment:** PC Running the SlaveTCP.exe program.
- **Programmer Software:** None

Network Specifications

To establish communication, your device network must meet the following specifications:

Device Communication Port: Ethernet
Device Runtime Software: SlaveTCP.exe

Driver Characteristics

The TsTCP driver package consists of the following files, which are automatically installed in the `\DRV` subdirectory of Studio:

- **TsTCP.INI**: Internal driver file. *You must not modify this file.*
- **TsTCP.MSG**: Internal driver file containing error messages for each error code. *You must not modify this file.*
- **TsTCP.PDF**: This document, which provides detailed information about the TsTCP driver.
- **TsTCP.DLL**: Compiled driver.

Note:
You must use Adobe Acrobat® Reader™ to view the `TsTCP.PDF` document. You can install Acrobat Reader from the Studio installation CD, or you can download it from Adobe's Web site.

You can use the TsTCP driver on the following operating systems:

- Windows NT/2000/XP/Vista
- Windows CE

Conformance Testing

The following hardware/software was used for conformance testing:

- **Configuration:**
 - **Protocol:** Proprietary over TCP/IP
 - **Software:** SlaveTCP.exe
 - **TCP Port:** 406

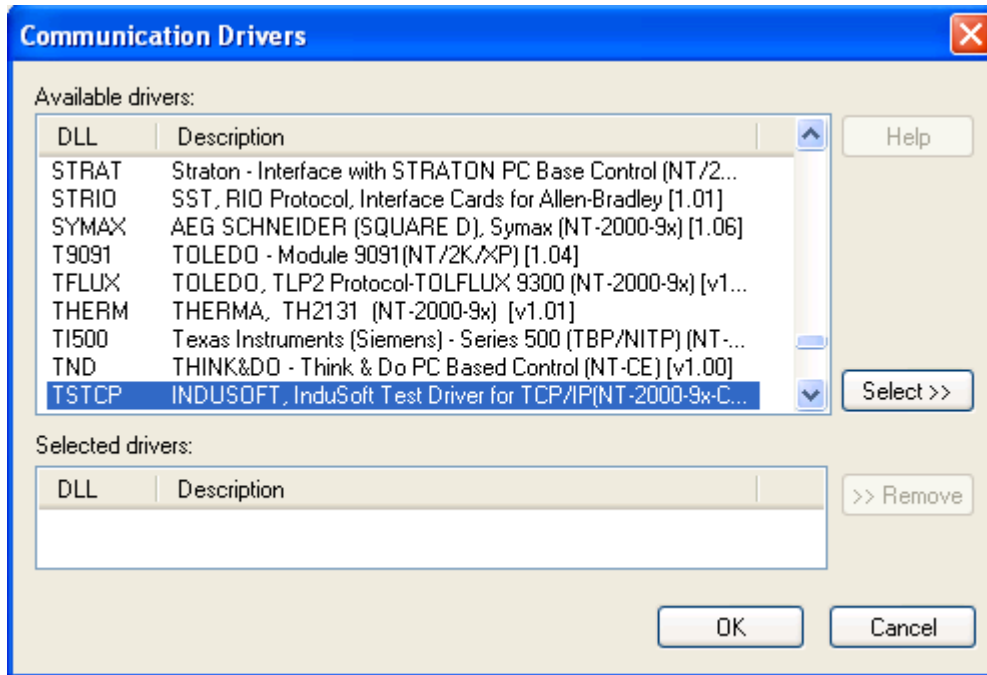
Note: The program SlaveTCP.exe could be founded in the Studio `\BIN` subdirectory.

Driver Version	Studio Version	Operating System (development)	Operating System (target)	Equipment
1.0	6.1+SP5	Windows XP + SP3	Windows XP + SP3	PC

Selecting the Driver

When you install Studio, all of the communication drivers are automatically installed in the `\DRV` subdirectory but they remain dormant until manually selected for specific applications. To select the TsTCP driver for your Studio application:

1. From the main menu bar, select **Insert** → **Driver** to open the *Communication Drivers* dialog.
2. Select the **TsTCP** driver from the *Available Drivers* list, and then click the **Select** button.



Communication Drivers Dialog

3. When the **TsTCP** driver is displayed in the **Selected Drivers** list, click the **OK** button to close the dialog. The driver is added to the *Drivers* folder, in the *Comm* tab of the *Workspace*.

Caution:
For safety reasons, you must take special precautions when installing any physical hardware. Please consult the manufacturer's documentation for specific instructions.

Configuring the Driver

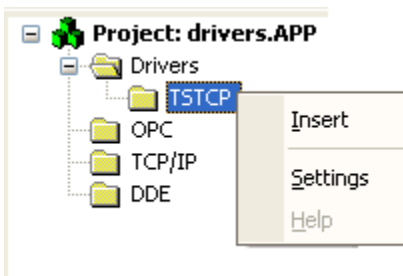
Once you have selected the TsTCP driver in Studio, you must properly configure it to communicate with your target device. First, you must set the driver's communication settings to match the parameters set on the device. Then, you must build driver worksheets to associate database tags in your Studio application with the appropriate addresses (registers) on the device.

Configuring the Communication Settings

The communication settings are described in detail in the “Communication” chapter of the *Studio Technical Reference Manual*, and the same general procedures are used for all drivers. Please review those procedures before continuing.

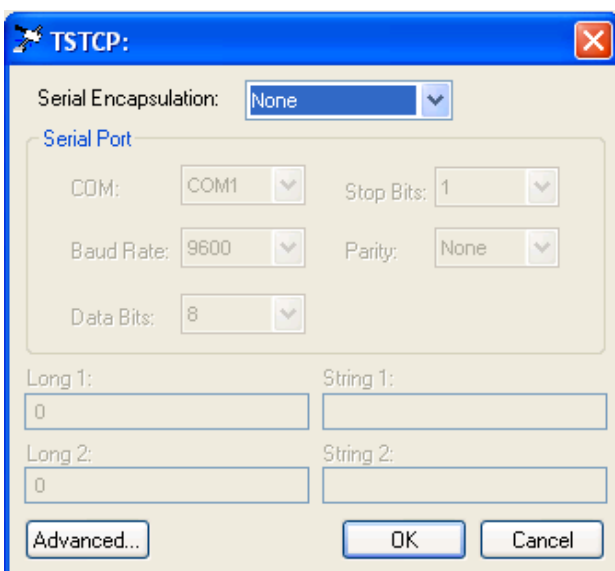
For the purposes of this document, only TsTCP driver-specific settings and procedures will be discussed here. To configure the communication settings for the TsTCP driver:

1. In the *Workspace* pane, select the *Comm* tab and then expand the *Drivers* folder. The TsTCP driver is listed here as a subfolder.
2. Right-click on the TsTCP subfolder and then select the **Settings** option from the pop-up menu. The *TsTCP: Communication Parameters* dialog is displayed:



Select Settings from the Pop-Up Menu

When selecting the Settings, there is the following dialog to configure:



TsTCP: Communication Parameters Dialog

3. In the *Communication Settings* dialog, configure the driver settings to enable communication with your target device. To ensure error-free communication, the driver settings must *exactly match* the corresponding settings on the device.

You do not need to change any other advanced settings at this time. You can consult the Studio *Technical Reference Manual* later for more information about configuring these settings.

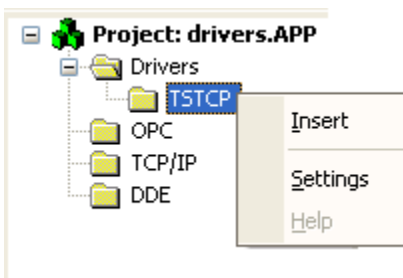
Configuring the Driver Worksheets

A selected driver includes one or more driver worksheets, which are used to associate database tags in Studio with registers on the target device. Each worksheet is triggered by specific application behavior, so that the tags /registers defined on that worksheet are scanned only when necessary – that is, only when the application is doing something that requires reading from or writing to those specific tags / registers. Doing this optimizes communication and improves system performance.

The configuration of these worksheets is described in detail in the “Communication” chapter of the Studio *Technical Reference Manual* and the same general procedures are used for all drivers. Please review those procedures before continuing.

To insert a new driver worksheet:

1. In the *Comm* tab, open the *Drivers* folder and locate the TsTCP subfolder.
2. Right-click on the TsTCP subfolder, and then select **Insert** from the pop-up menu:



Inserting a New Worksheet

A new TsTCP driver worksheet is inserted into the TsTCP subfolder, and the worksheet is opened for configuration:

TSTCP001.DRV

Description: Increase priority

Read Trigger: Enable Read when Idle: Read Completed: Read Status:

Write Trigger: Enable Write on Tag Change: Write Completed: Write Status:

Station: Header: Min: Max:

	Tag Name	Address	Div	Add
1	Tag[0]	0	0.000000	0.000000
2	Tag[1]	2	0.000000	0.000000
3	Tag[2]	9	0.000000	0.000000
+				

TsTCP Driver Worksheet

Note:
 Worksheets are numbered in order of creation, so the first worksheet is **TSTCP001.DRV**

Most of the fields on this worksheet are standard for all drivers; see the “Communication” chapter of the *Technical Reference Manual* for more information on configuring these fields. However, the **Station**, **Header**, and **Address** fields use syntax that is specific to the TsTCP driver.

3. Configure the **Station** and **Header** fields as follows:

-**Station** field: Specify the IP of the target TsTCP device, using the following syntax:

<IP> :< Port>, where the IP is the address where the TsTCP program is located.

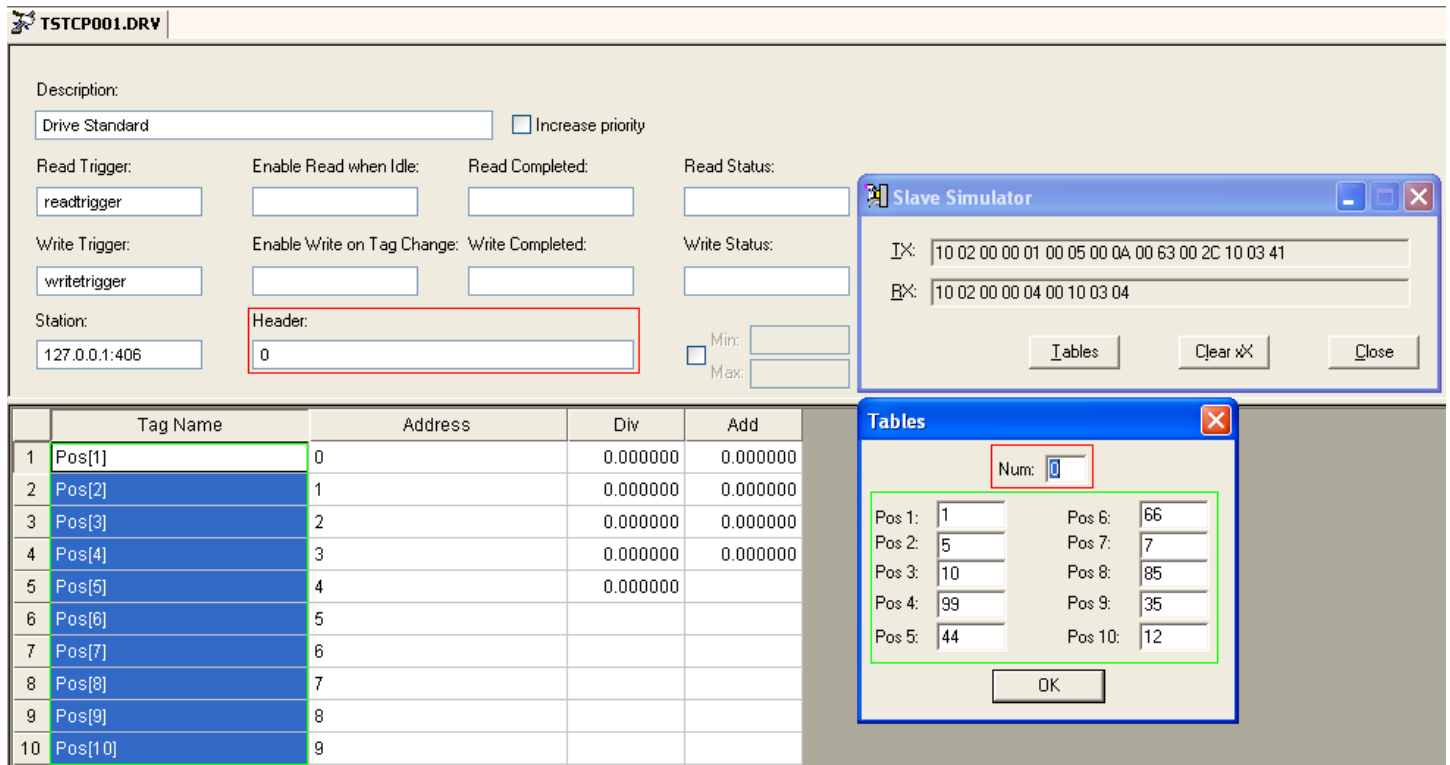
Example — **127.0.0.1:406**

Note: To communicate with TsTCP program you need to use the port **406**.

You can also specify an indirect tag (e.g. {station}), but the tag that is referenced must follow the same syntax and contain a valid value.

Caution:
 You cannot leave the Station field blank.

In the screenshot below, you can see the SlaveTCP.exe program (Slave Simulator) showing the TX and RX lines, as well as the table number 0 and the Positions from 1 to 10 and how we configure the driver worksheet to communicate with them:



- **Header** field: Specify the address of the first register of a block of registers on the target device.

The **Header** field uses the following syntax:

<Table>, where table is a number between 0 and 4

Example – 3

- **Address** field: Contains the number of positions to be read or write.

The **Address** field uses the following syntax:

<0-9>

Example — 8

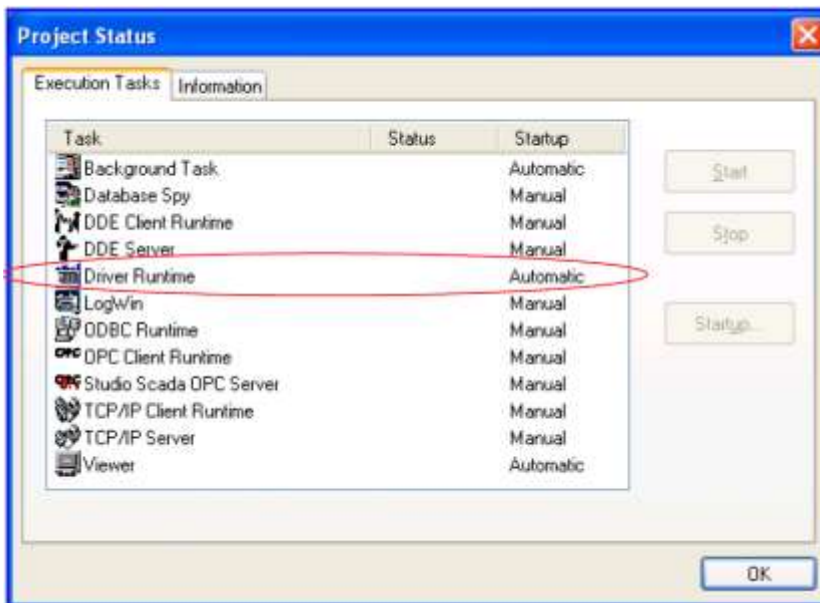
Note: The worksheet address and the Position on the table are shifted in 1. Thus, 0 on the Address means Pos 1 on the table. 1 on the address means Pos 2, and so forth.

Executing the Driver

By default, Studio will automatically execute your selected communication driver(s) during application runtime. However, you may verify your application's runtime execution settings by checking the *Project Status* dialog.

To verify that the communication driver(s) will execute correctly:

1. From the main menu bar, select **Project** → **Status**. The *Project Status* dialog displays:



Project Status Dialog

2. Verify that the *Driver Runtime* task is set to **Automatic**.

- If the setting is correct, then proceed to step 3 below.
- If the **Driver Runtime** task is set to **Manual**, then select the task and click the **Startup** button to toggle the task's *Startup* mode to **Automatic**.

3. Click **OK** to close the *Project Status* dialog.

4. Start the application to run the driver.

Troubleshooting

If the TSTCP driver fails to communicate with the target device, then the database tag(s) that you configured for the **Read Status** or **Write Status** fields of the Main Driver Sheet and Standard Driver Sheet will receive an error code. Use this error code and the following table to identify what kind of failure occurred.

0	Ok
1	Invalid Station
2	Invalid Header
3	Invalid Address
4	Invalid Block Size
5	Error Protocol
6	Invalid Check sum
7	Unexpected length of the answer
8	Error Connecting
9	Error Sending data

Sample Application

The driver TsTCP it's a test driver to help understanding the Studio Driver Toolkit for Ethernet communications, The SlaveTCP program simulates a TCP/IP enabled device with 5 tables of 10 positions each. Follow these steps to create a sample application with Indusoft and Slave simulator.

This driver does not have a sample application

Revision History

Doc. Revision	Driver Version	Author	Date	Description of Changes
A	1.0	Guilherme Oliveira	Feb/17/09	First Driver Version.