SISTE Communication Driver

Driver for Serial Communication with
CP-3000 Sistema Devices

Contents

Introduction

The SISTE driver enables communication between the Studio system and Sistema CP-3000 devices with serial communication, according to the specifications discussed in this document.

This document was designed to help you install, configure, and execute the SISTE driver to enable communication with these devices. The information in this document is organized as follows:

- **Introduction**: Provides an overview of the SISTE driver documentation.

- **General Information**: Provides information needed to identify all the required components (hardware and software) used to implement communication between Studio and the SISTE driver.

- **Installing the Driver**: Explains how to install the SISTE driver.

- **Configuring the Driver**: Explains how to configure the SISTE driver.

- **Executing the Driver**: Explains how to execute the driver to verify that you installed and configured the driver correctly.

- **Troubleshooting**: Lists the most common error codes for this protocol and explains how to fix these errors.

- **Sample Application**: Explains how to use a sample application to test the SISTE driver configuration.

- **Revision History**: Provides a log of all modifications made to the driver and the documentation.

☞ **Notes:**

- This document assumes that you have read the "Development Environment" chapter in the Studio *Technical Reference Manual*.
- This document also assumes that you are familiar with the Windows NT/2000/XP environment.
  If you are unfamiliar with Windows NT/2000/XP, we suggest using the **Help** feature (available from the Windows desktop **Start** menu) as you work through this guide.

General Information

This chapter explains how to identify all the hardware and software components used to implement communication between the Studio SISTE driver and the Sistema CP-3000 devices.

The information is organized into the following sections:

- Device Characteristics
- Link Characteristics
- Driver Characteristics

Device Characteristics

To establish communication, you must use devices with the following specifications:

- **Manufacturer**: Sistema
- **Compatible Equipment**:
    - CP-3000

- **Programming Software**: None

- **Device Runtime Software**: None

For a list of the devices used for conformance testing, see "Conformance Testing".

Link Characteristics

To establish communication, you must use links with the following specifications:

- **Device Communication Port**: Serial COM Port
- **Physical Protocol**: Serial RS232
- **Logic Protocol**: Proprietary
- **Specific PC Board**: None

Driver Characteristics

The SISTE driver is composed of the following files:

- **SISTE.INI**: Internal driver file. *You must not modify this file*.
- **SISTE.MSG**: Internal driver file containing error messages for each error code. *You must not modify this file*.
- **SISTE.PDF**: Document providing detailed information about the SISTE driver.
- **SISTE.DLL**: Compiled driver.

✎ **Notes:**
- All of the preceding files are installed in the `/DRV` subdirectory of the Studio installation directory.
- You must use Adobe Acrobat® Reader™ (provided on the Studio installation CD-ROM) to view the SISTE.*PDF* document.

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

- Windows NT/2K/XP

For a list of the operating systems used for conformance testing, see "Conformance Testing".

Conformance Testing

The following hardware/software was used for conformance testing:

- **Driver Configuration**:

  – **COM Port**: COM 1
  – **Baud Rate**: 9600
  – **Data Bits**: 8
  – **Stop Bits**: 1
  – **Parity**: None
  – **0-Mono 1-Multi(Process.)**: 0

- **Cable**: According to specifications described in the "Link Characteristics" section

Driver Version	Studio Version	Operating System	Equipment
1.00	6.0	Win2K	Sistema CP-3000

Installing the Driver

When you install Studio version 6.0 or higher, all of the communication drivers are installed automatically. You must select the driver that is appropriate for the application you are using.

Perform the following steps to select the driver from within the application:

1. Open Studio from the **Start** menu.

2. From the Studio main menu bar, select **File** → **Open Project** to open your application.

3. Select **Insert** → **Driver** from the main menu bar to open the *Communication drivers* dialog.

4. Select the **SISTE** driver from the *Available Drivers* list (as shown in the following figure), and then click the **Select** button.
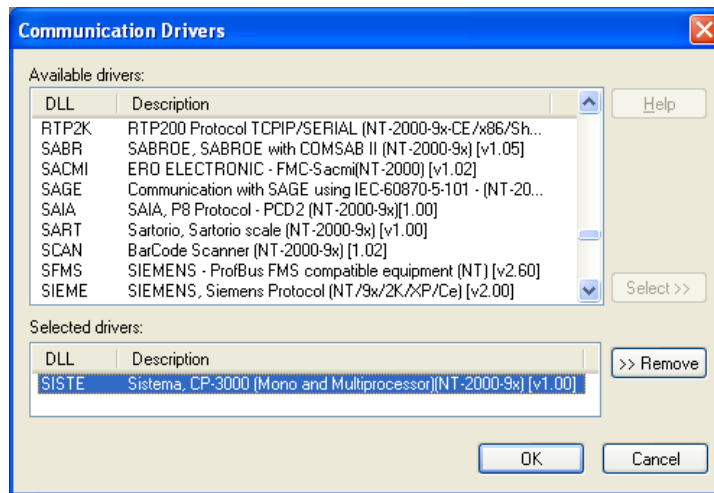
Communication Drivers Dialog Box

5. When the **SISTE** driver displays in the **Selected Drivers** list, click the **OK** button to close the dialog.

> ✎ **Note:**
> It is not necessary to install any other software on your computer to enable communication between the host and the device.

> ➲ **Attention:**
> For safety reasons, you must use special precautions when installing the physical hardware. Consult the hardware manufacturer's documentation for specific instructions in this area.

Configuring the Driver

After opening Studio and selecting the SISTE driver, you must configure the driver. Configuring the SISTE driver is done in two parts:

- Specifying communication parameters
- Defining tags and controls in the *STANDARD DRIVER SHEET*s (or Communication tables)

  Worksheets are divided into two sections, a *Header* and a *Body*. The fields contained in these two sections are standard for all communications drivers — except the **Station**, **Header**, and **Address** fields, which are driver-specific. This document explains how to configure the **Station**, **Header**, and **Address** fields only.

> ✍ **Note:**
>
> For a detailed description of the Studio *STANDARD DRIVER SHEET*s, and information about configuring the standard fields, review the product's *Technical Reference Manual*.

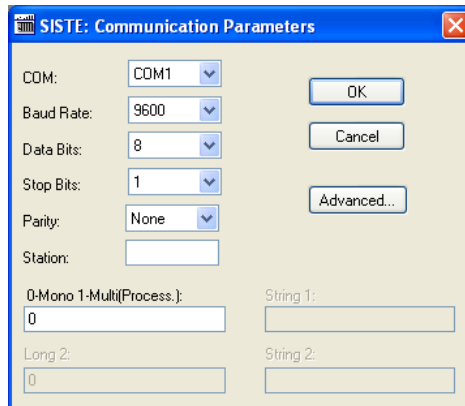
Setting the Communication Parameters

Use the following steps to configure the communication parameters, which are valid for all driver worksheets configured in the system:

1. From the Studio development environment, select the *Comm* tab located below the *Workspace*.
2. Click on the *Drivers* folder in the *Workspace* to expand the folder.
3. Right-click on the SISTE subfolder and when the pop-up menu displays, (as shown in the following figure) select the **Settings** option.
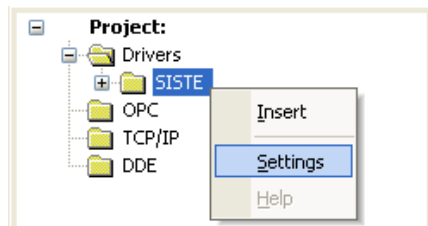
Select Settings from the Pop-Up Menu

The SISTE*: Communications Parameters* dialog displays (as follows).

Communication Parameters Dialog

4. Specify the custom parameters as noted in the following table:

Parameters	Default Values	Valid Values	Description
Station	0	Any number	Computer number in the network
0-Mono **1-Multi (Process.)**	0	0 or 1	0: Mono processor Protocol 1: Multi processor Protocol

> ✍ **Note:**
>
> The device must be configured with *exactly the same* parameters that you configured in the *SISTE Communication Parameters* dialog.

5. Click the **Advanced** button on the *Communication Parameters* dialog to open the *Advanced Settings* dialog and configure the settings that are necessary.

> ✍ **Notes:**
> - Do not change any of the other *Advanced* parameters at this time. You can consult the Studio *Technical Reference Manual* for information about configuring these parameters for future reference.
>
> - Generally, you must change the *Advanced* parameter settings if you are using a DCE (Data Communication Equipment) converter (232/485 for example), modem, and so forth between the PC, driver, and the host. You must be familiar with the DCE specifications before adjusting these configuration parameters.

<u>Configuring the Driver Worksheets</u>

This section explains how to configure the *STANDARD DRIVER SHEETs* (or communication tables) to associate application tags with the device addresses. You can configure multiple Driver Worksheets — each of which is divided into a *Header* section and *Body* section.

Configuring the *STANDARD DRIVER SHEET*

Use the following steps to create a new *STANDARD DRIVER SHEET*:

1. From the Studio development environment, select the *Comm* tab, located below the *Workspace* pane.
2. In the *Workspace* pane, expand the *Drivers* folder and right-click the *SISTE* subfolder.
3. When the pop-up menu displays (as shown in the following figure), select the **Insert** option.
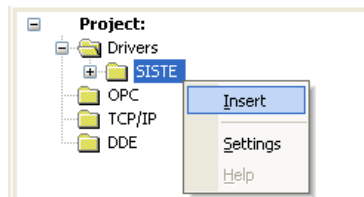
Inserting a New Worksheet

✎ **Note:**

To optimize communication and ensure better system performance, you must tie the tags in different driver worksheets to the events that trigger communication between each tag group and the period in which each tag group must be read or written. Also, we recommend configuring the communication addresses in sequential blocks to improve performance.

The *STANDARD DRIVER SHEET* displays (similar to the following figure).

STANDARD DRIVER SHEET

In general, all parameters on the Driver Worksheet (except the **Station**, **Header**, and **Address** fields) are standard for all communication drivers, but they will not be discussed in this document. For detailed information about configuring the standard parameters, consult the *Studio Technical Reference Manual*.

4. Use the following information to complete the **Station**, **Header**, and **Address** fields on this worksheet.

▪ **Station** field: Specify the device using the following syntax:

    <Station number>:<PLC Type>

Where:
– **Station number** is the remote PLC number. For R-NET processor, configure the node number. For serial communication processor use the SLOT number.
– **PLC Type** is the type of the remote PLC. Valid values: A15, A20, A30, A30E, A40 and A40E.

▪ **Header** field: Use the following information to define the type of variables that will be read from or written to the device and a reference to the initial address.

These variables must comply with the following syntax:

    <Slot DST>:<Slot SRC>:<Addr>:<Command>

Where:
– **Slot DST** is the SLOT destination number (octal).
– **Slot SRC** is the SLOT source number (octal).
– **Addr** is the initial register address which will be read or written. (octal)
– **Command** is the number of the command used to read or write. Valid commands: 46, 47, 50 and 72 (octal). This field is optional and it must be left blank if you are not using these commands.

To configure an worksheet for unsolicited messages, add "**U:**" as the prefix of the **Header** field and configure only the **<Station number>** in **Station** field. E.g.: **Header** U:0:0:10 and **Station** 1

After you edit the **Header** field, Studio checks the syntax to determine if it is valid. If the syntax is incorrect, Studio automatically inserts the default value in the **Header** field.

Also, you can type a tag string in brackets **{Tag}** into the **Header** field, but you must be certain that the tag's value is correct and that you are using the correct syntax, or you will get an invalid Header error.

The following table lists the commands that are valid for the SISTE driver.

Command	Tag Type	Read	Write	Comments
46	Integer		•	Write the number of nodes in network. When configuring the command 46 in the **Header** field, the value configured in the Address column (if any) is ignored. The value of the tag configured in the **Tag Name** column of the driver worksheet (Integer type) must be the number of nodes in network (decimal).
47	String		•	Write the node number, the number of nodes and configurations in network. When configuring the command 47 in the **Header** field, the value configured in the Address column (if any) is ignored. The value of the tag configured in the **Tag Name** column of the driver worksheet (String type) must be **<node number>:<number of nodes>:<config>** (e.g.: 2:5:10) Where: **<node number>** is the node number (decimal) **<number of nodes>** is the number of nodes (decimal) **<config>** is configuration code to determine protocol and timing parameters. (octal).
50	Integer	•		"Who are you?" command When configuring the command 50 in the **Header** field, the value configured in the Address column (if any) is ignored. You must configure fourteen tags (Integer type) in the driver worksheet to receive the values.
72	Any		•	Status of communication with the Gateway When configuring the command 72 in the **Header** field, the value configured in the Address column (if any) is ignored. Only one tag must be configured in the **Tag Name** column of the driver worksheet (any type). The status of the communication with the gateway is returned to the tag configured in the **Write Status** field of the driver worksheet (0 = OK; 50 = Error).
<blank>	Integer	•	•	Read or Write registers

▪ **Address** field: Use this field to associate each tag to its respective device address.

Type the tag from your application database into the **Tag Name** column. This tag will receive values from or send values to an address on the device. The address must comply with the following syntax:

<AddressOffset>.[Bit] (For example: *10*, *20*, *40*, *10.5*)

Where:

– **AddressOffset** is an offset added to the **Addr** parameter (configured in the **Header** field) to compose the group address.
– **Bit** (*optional parameter*) is the bit number to be read from or written to the device.

⮑ **Attention:**
You must not configure a range of addresses greater than the maximum block size (date buffer length) supported by each PLC within the same worksheet. The maximum data buffer length for this driver is 122 operands per *STANDARD DRIVER SHEET*.

Executing the Driver

After adding the SISTE driver to a project, Studio sets the project to execute the driver automatically when you start the run-time environment.

To verify that the driver run-time task is enabled and will start correctly, perform the following steps:

1. Select **Project → Status** from the main menu bar.

    The *Project Status* dialog box displays, as follows.
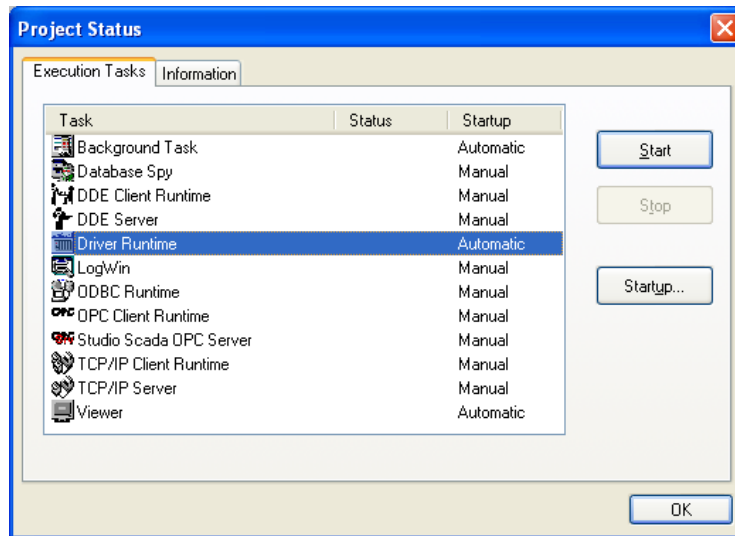
Project Status Dialog Box

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

    ▪ If the setting is correct, click **OK** to close the dialog box.

    ▪ If the **Driver Runtime** task is set to **Manual**, select the **Driver Runtime** line. When the **Startup** button becomes active, click the button to toggle the *Startup* mode to **Automatic**.

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

4. Start the application to run the driver.

Troubleshooting

If the SISTE driver fails to communicate with the device, the tag you configured for the **Read Status** or **Write Status** fields will receive an error code. Use this error code and the following table to identify what kind of failure occurred.

Error Code	Description	Possible Causes	Procedure to Solve
0	OK	Communication without problems	None required.
22	Block Size Error	Only 122 operands is allowed per Driver Worksheet.	Split the Driver Worksheet in two or more
20	Invalid Address	Specified an invalid address in the Driver Worksheet.	Check the address configured in Driver Worksheet.
30	Invalid Header	Specified an invalid header in the Driver Worksheet.	Check the header configured in Driver Worksheet.
40	Invalid operation	Try read or write an Unsolicited Driver Worksheet	You cannot read or write in these header
50	Error Gateway	Error communication with Gateway	- Check the configuration of the driver's communication parameters. - Check the equipment state.
60	No message	Invalid unsolicited message	Check Unsolicited messages
80	Invalid message	Invalid Message	- Check the configuration of the driver's communication parameters. - Check the equipment state.
-15	Timeout Start Message	- Disconnected Cables - PLC is turned off, in stop mode, or in error mode - Wrong station number - Wrong RTS/CTS control settings	- Check cable wiring - Check the PLC state – it must be RUN. - Check the station number - Check the configuration. See *Studio Technical Reference Manual* for information about valid RTS/CTS configurations.
-17	Timeout between rx char	- PLC in stop mode or in error mode - Wrong station number - Wrong parity - Wrong RTS/CTS configuration settings	- Check cable wiring - Check the PLC state – it must be RUN. - Check the station number - Check the configuration. See *Studio Technical Reference Manual* for information about valid RTS/CTS configurations.

> **Tip:**
> You can verify communication status using the Studio development environment *Output* window (*LogWin* module). To establish an event log for **Field Read Commands**, **Field Write Commands**, and **Serial Communication** right-click in the *Output* window. When the pop-up menu displays, select the option to set the log events. If you are testing a Windows CE target, you can use the Remote LogWin of Studio (**Tools → Remote Logwin**) to get the log events from the target unit remotely.

If you are unable to establish communication with the PLC, try to establish communication between the PLC Programming Tool and the PLC. Quite frequently, communication is not possible because you have a hardware or cable problem, or a PLC configuration error. After successfully establishing communication between the device's Programming Tool and the PLC, you can retest the supervisory driver.

To test communication with Studio, we recommend using the sample application provided rather than your new application.

If you must contact us for technical support, please have the following information available:

- **Operating System** (type and version): To find this information, select **Tools → System Information**.
- **Studio version**: To find this information, select **Help → About.**
- **Driver Version**: To find this information, read the full description of the driver on the **Communication Drivers** Dialog Box.
- **Communication Log**: Displays in the Studio *Output* window (or *LogWin* window) when the driver is running. Be sure to enable the **Field Read Commands**, **Field Write Commands**, and **Serial Communication** for the LogWin window.
- **Device Model** and **Boards**: Consult the hardware manufacturer's documentation for this information.

Sample Application

You will find a sample application for drivers in the **/COMMUNICATION EXAMPLES/<*Driver Name*>** directory. We strongly recommend that you check if there is a sample application for this driver and use it to test the driver before configuring your own customized application, for the following reasons:

- To better understand the information provided in the section of this document.
- To verify that your configuration is working satisfactorily.
- To certify that the hardware used in the test (device, adapter, cable, and PC) is working satisfactorily before you start configuring your own, customized applications.

> ✎ **Note:**
> This application sample is not available for all drivers.

Use the following procedure to perform the test:

1. Configure the device's communication parameters using the manufacturer's documentation.
2. Open and execute the sample application.

> ⇨ **Tip:**
> You can use the sample application screen as the maintenance screen for your custom applications.

Revision History

Doc. Revision	Driver Version	Author	Date	Description of changes
A	1.00	Fabio H. Y. Komura	May 03, 2004	Initial version