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Introduction

For more detailed information about configuration or programming the equipment, consult the manufacturer documentation.

This document was designed to help you install, configure, and execute the SAIA driver with the SAIA – PCD2 device. The information is organized, as follows:

- **Chapter 1 Introduction:** Provides an overview of the SAIA driver documentation.
- **Chapter 2 Installing the Driver:** Explains how to install the hardware and software components required for the SAIA driver.
- **Chapter 4 Configuring the Device:** Explains how to configure SAIA device.
- **Chapter 5 Configuring the Driver:** Explains how to configure the communication driver, including the different permutations for configuration and the driver's default values.
- **Chapter 6 Executing the Driver:** Explains how to execute the driver to verify that you installed and configured the driver correctly.
- **Chapter 7 Troubleshooting:** Lists the most common error codes and explains how to fix the errors.
- **Chapter 8 Using the Application Sample:** Provides a sample application, which you can use to test the driver configuration.
- **Chapter 9 Revision History:** Provides a log of all modifications made to the driver.

 **Note:** This document assumes that you have read the “Driver Configuration” chapter of the *Studio Technical Reference Manual*.

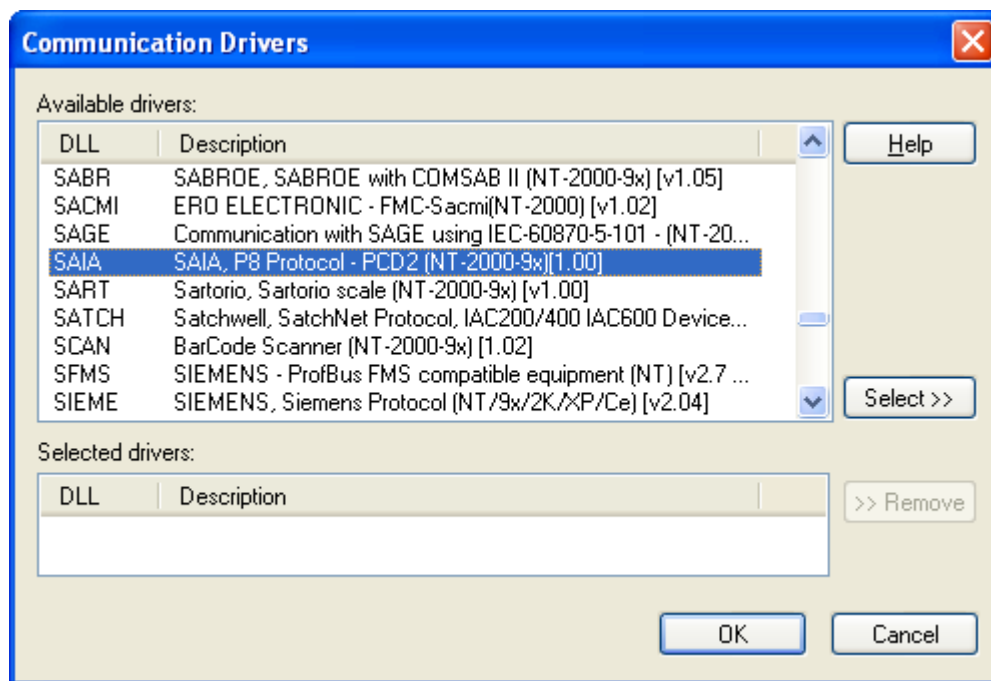
This document also assumes that you are familiar with the Windows NT/2000 environment. If you are unfamiliar with Windows NT/2000, we suggest using the **Help** feature (available from the Windows desktop **Start** menu) as you work through this guide.

Installing the Driver

When you install Studio v3.0 and higher, all of the communication drivers are installed automatically. You must select the driver that is appropriate for the applications you are using.

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

1. Execute Studio using one of the following methods:
 - Double-click the **Studio** shortcut icon from the desktop.
 - Click on the **Start** menu, select **Programs**, and when the **Studio Tools** submenu displays, select **Studio**.
2. When the *Studio* window opens, open the appropriate application from the Workspace pane.
3. From the main menubar, select **Driver...** from the **Insert** menu to open the *Communication drivers* dialog box as shown in the following figure.



4. Select the **SAIA driver** from the **Available Drivers** list and click the **Select>>** button.
5. When the SAIA driver displays in the **Selected Drivers** list, click the **OK** button to close the dialog.

Configuring the Device

The parameters related to serial communication should be filled according with the parameters configured in the equipment. The values used in the driver development are :

- **COM:** COM1
- **Baud Rate:** 9600
- **Data Bits:** 7
- **Stop Bits:** 1
- **Parity:** Even

Configuring the Driver

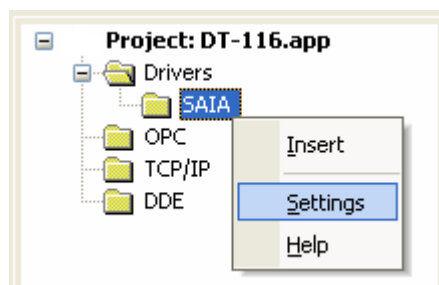
After you install the SAIA driver and open Studio, you can configure the driver.

You define the communication tags by completing the Standard Driver Worksheet.
The following sections provide instructions for setting the parameters and completing the worksheets.

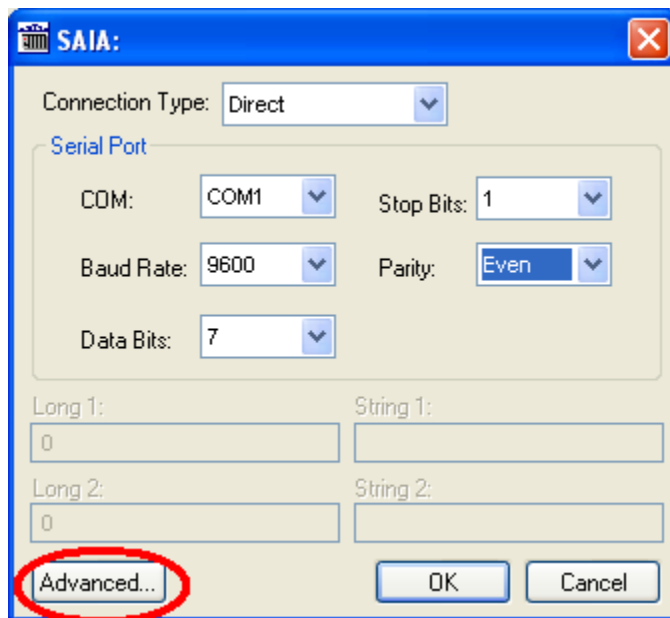
Setting the Communication Parameters

When you set the communication parameters, they are valid for all Driver Worksheets configured in the system. Use the following steps to configure the communication parameters for the driver:

1. From the *Studio* application window, click the **Comm** tab located below the Workspace pane.
2. From the Workspace pane, expand the **Drivers** folder.
3. Right-click on the **SAIA** subfolder and when the pop-up menu displays, (as shown in the following figure) select the **Settings** option.

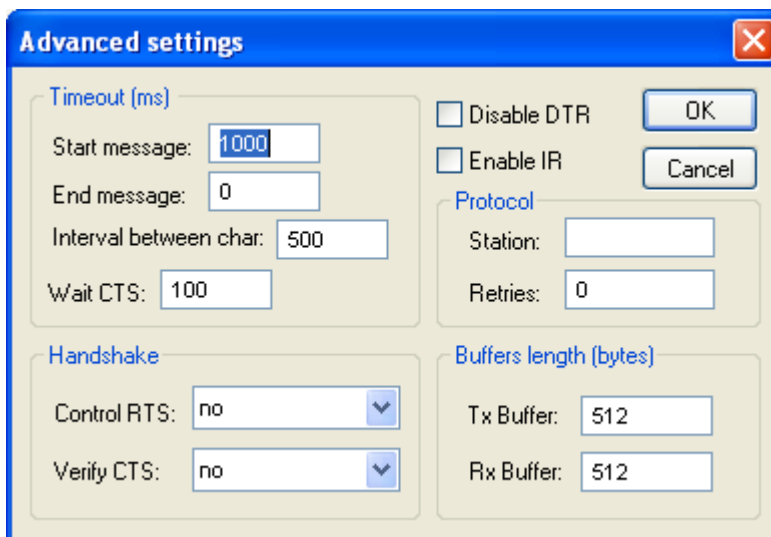


When the *Communication Parameters* dialog displays as follows:



, it can be pressed the Advanced Button and use the advanced parameters for communication RS 485 only :


4. Click on the **Advanced...** button in the *Communication Parameters* dialog. **These settings should be used only for communication in RS 485.** The *Advanced settings* dialog will display as follows:



5. Use the following table to set the **Control RTS** (Request to Send) parameter.

Parameter	Default Value	Valid Values	Description
Control RTS	No	<ul style="list-style-type: none"> ▪ no ▪ yes ▪ yes + echo 	Define if the RTS handshake signal is set before communication and if there is an echo in the communication. <ul style="list-style-type: none"> ▪ If you are using Windows 95 or CE with the correct RS 232 – RS 485 Converter (without RTS Control), specify the no option. ▪ If you are using Windows NT with the Cutler Hammer RS 232 – RS 485 Converter, you must specify the yes option. <p>Important: Setting this parameter incorrectly will prevent the driver from working correctly.</p>

 **Note:** Although you can configure other serial communication parameters from this dialog, you should not change any of the default parameters at this time except **Control RTS**. The parameters on the *Advanced settings* dialog are explained in detail in the *Studio Technical Reference Manual*.

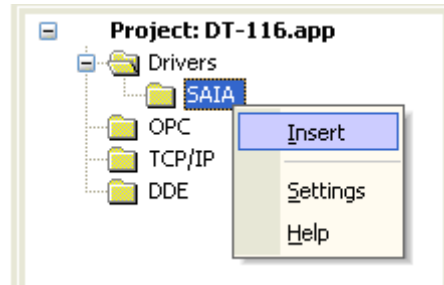
 **Tip:** Usually, you must change these parameters if you are using a DCE (Data Communication Equipment) converter (232/485, for example), modem, and so forth between the PC, driver, and the host. You must know the characteristics of the DCE before adjusting these parameters.

Configuring the Standard Driver Worksheet

This section explains how to configure a Standard Driver Worksheet to define communication tags. You can configure multiple Driver Worksheets, each of which is divided into a Header and a Body.

Use the following steps to create a new Standard Driver Worksheet:

1. From the *Studio* application window, select the **Comm** tab, located below the Workspace pane.
2. In the Workspace pane, expand the **Drivers** folder and right-click the **SAIA** subfolder.
3. When the pop-up menu displays (as shown in the following figure), select the **Insert** option.
- 4.



Tip: To optimize communication and ensure better performance for the system, it is important to group the tags in different driver sheets according to the events that trigger communication for each group of tags and to the periodicity for which each group of tags must be written or read. In addition, we recommend configuring the communication addresses into sequential blocks.

The *SAIA001.drv* worksheet displays (similar to the following figure).

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	Tag1	6		
2	Tag2	8.2		
*	<input type="text"/>			
*				
*				

All fields on the Standard Driver Worksheet are standard for all communication drivers; except for the **Station**, **Header**, and **Address** fields. This document explains only the Station, Header, and Address fields because they are specific to each communication driver. For detailed information about the configuring of the standard fields refer to the *Studio Technical Reference Manual*.

Proceed to the next section for an explanation about configuring the **Station** and **Header** fields.

Configuring the Station and Header Fields

This section explains the procedure for configuring the Station and Header fields. The following table describes the default and valid values for these two fields:

Parameter	Default Value	Valid Values	Description
Station	-	-	Not used.
Header	R00000	See next table	Defines the type of variable to be read or written from, or to, the device and references the initial address.

When specifying the Header parameter, you must comply with the following syntax:

<Type>:<Initial Address> or <Type><Num. Db>:<Elem. Db> (for example: R00010).

Where:

Type	Initial Address	Num. Db	Elem. Db
O (<i>Output</i>)	0 – 65535	Not Used	Not Used
I (<i>Input</i>)	0 – 65535	Not Used	Not Used
S (<i>Status</i>)	0 – 7	Not Used	Not Used
F (<i>Flag</i>)	0 – 65535	Not Used	Not Used
T (<i>Timer</i>)	0 – 4095	Not Used	Not Used
C (<i>Counter</i>)	0 – 4095	Not Used	Not Used
R (<i>Register</i>)	0 – 4095	Not Used	Not Used
K (<i>Clock</i>)	Not Used	Not Used	Not Used
D (<i>Display Register</i>)	Not Used	Not Used	Not Used
Z (<i>Data Block</i>)	Not Used	0 – 7999	0 – 16383

After you edit the **Header** field, the system checks that the syntax is valid. . If the syntax is invalid, the system automatically inserts the default value “R00000” into the **Header** field. If you type a Tag string between curly brackets {Tag} into this field, you must ensure that the Tag value and syntax are both correct or an Invalid Header error will result.

After specifying the **Header** field parameter, proceed to the next section for instructions about configuring the **Address** field.

Configuring the Address Field

The body of the Driver Worksheet allows you to associate each tag to its respective address in the device. In the **Tag Name** column, you must type the tag from your application database. This tag receives or sends values from, or to, an address on the device. The address field must comply with the following syntax:

<Offset or Parameter> or <Offset>.<Bit>(for example I5.2)

Where:

- **Offset:** The offset related with the Initial Address configured in the Header Field.
- **Bit:** Type the Bit Number (from 0 to 15) from the word address. (*optional parameter*)
- **Parameter:** Only for K operand, because it doesn't have a Initial Address.

🔗 **Note:** The operands S and D return a single value, it doesn't matter which is the address configured.

🔗 **Note:** The values of the operand K have the following meanings: 0=Week-Year, 1=Day-Week, 2=Year, 3=Month, 4=Day, 5=Hour, 6=Minute and 7=Second.

Sample of Address Configuration		
Tag name	Header Field	Address Field
Tag[1]	O00050	0
Tag[2]	O00050	1
Tag[3]	I00010	5
Tag[4]	I00010	6
Tag[5]	F00025	0
Tag[6]	F00025	3
Tag[7]	R00000	0
Tag[8]	R00010	1
Tag[9]	R00020	0.0
Tag[10]	R00030	0.1
Tag[11]	T0020	0
Tag[12]	T0020	1
Tag[13]	C0010	5
Tag[14]	C0010	6
Tag[15]	S0	0
Tag[16]	S7	0
Tag[17]	D	0
Tag[18]	K	0 (Week – Year)
Tag[19]	K	1 (Day – Week)
Tag[20]	K	2 (Year)
Tag[21]	K	3 (Month)
Tag[22]	K	4 (Day)
Tag[23]	K	5 (Hour)
Tag[24]	K	6 (Minute)
Tag[25]	K	7 (Second)
Tag[26]	Z0000:00000 (Db0, Element 0)	0 (Elem. 0)
Tag[27]	Z0000:00000 (Db0, Element 0)	1 (Elem. 1)
Tag[28]	Z0010:00005 (Db10, Element 5)	0 (Elem. 5)
Tag[29]	Z0010:00005 (Db10, Element 5)	1 (Elem. 6)
Tag[30]	Z0000:00000 (Db0, Element 0)	0.0 (Elem. 0, Bit 0)
Tag[31]	Z0000:00000 (Db0, Element 0)	0.1 (Elem. 0, Bit 1)

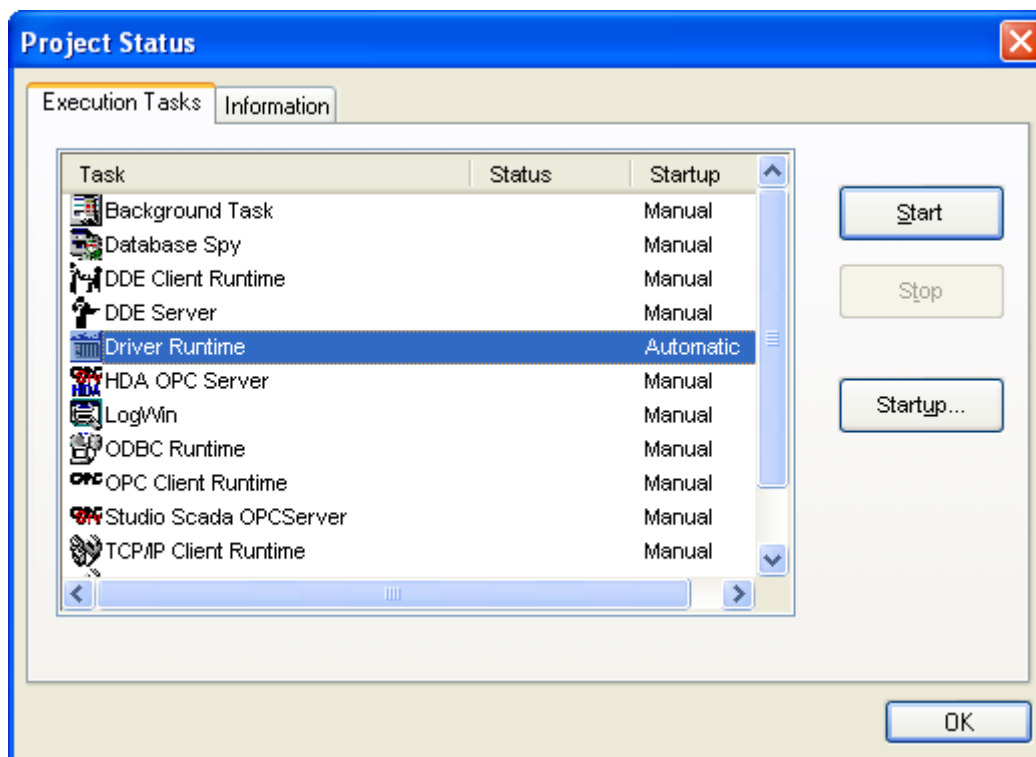
Executing the Driver

When you add the driver to a project, the system sets it automatically so the driver is ready to execute when you start-up the Runtime Environment.

To verify that the driver is enabled and will start correctly,

1. Select **Project** from the main menubar, and then select the **Status...** option from the menu to verify the Driver Runtime task.

The *Project Status* dialog box displays.



If you click on (highlight) the **Driver Runtime** line (as shown in the preceding figure), the **Startup...** button becomes active. You can click on the **Startup...** button to switch between Automatic and Manual Startup mode.

Troubleshooting

If the SAIA driver fails to communicate with the Allen Bradley device, the tag you configured for the **Read Status** or **Write Status** fields receives an error message. The error message contains an error code, which you can use to identify what type of failure occurred.

The following table describes all of the error codes:

Error Code	Description	Possible Causes	Procedure to Solve
0	OK	Communication without problems	None required
5	Protocol error	<ul style="list-style-type: none"> ▪ Wrong Parameter on the <i>Communication Parameters</i> dialog. ▪ Wrong cable or CPU in fault mode. 	<ul style="list-style-type: none"> ▪ Check <i>Communication Parameters</i> dialog. ▪ Check cable. ▪ Check CPU mode.
6	Invalid header	Wrong Header typed on the Driver Configuration worksheet.	Refer to the “Configuring the Station and Header Parameters” section for samples of valid Headers.
7	Invalid Command	Wrong try to read or write values.	Check the Header Field, Address Field and the Sample of Address Configuration table.
8	Invalid address	<ul style="list-style-type: none"> ▪ Timers and Counters files were not specified in their correct fields in the Addresses column. ▪ Wrong address syntax specified for the other files. 	Check Header field. <ul style="list-style-type: none"> ▪ If you use a TAG, check whether the TAG value is valid for the specified addresses. ▪ If you did not use a TAG, you might have changed the Header after configuring the Addresses and the addresses are invalid for the new Header.
9	Block size error	Offset specified for the Driver Configuration worksheet is too big and the message cannot be framed.	Change offsets or create a new worksheet.
10	Message sequence error	Error is another protocol error.	Check CPU status (high probability of a CPU error).

If you are unable to establish communication with the PLC, you must first 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 you successfully establish communication between the PLC Programming Software and the PLC, you can retest the supervisory driver.

When testing communication with Studio, you should first try using the application sample in the next chapter (if the sample is available for the driver), instead of using the new application that you are creating.

If you are unable to establish communication between the SAIA driver and the SAIA PCD-2 device, you can contact the Technical Support staff as described in the *Studio Technical Reference Manual*.

Using the Application Sample

Studio provides a configured project that you can use to test the driver. We strongly recommend that you perform some tests with this application sample before configuring a customized project, for the following reasons:

- To better understand the information discussed in this document.
- To verify that your configuration is working.
- To certify that the hardware used in the test (device + adapter + cable + PC) is in working condition *before* you start configuring the application.


 **Note:** The Application Sample is not available for all drivers.

You will find the Studio application sample on the installation CD-ROM in the following directory:

`\COMMUNICATION EXAMPLES\SAIA`

To perform the test, you must follow these steps:

1. Configure the device communication parameters using the manufacturer programmer software.
2. Open the `\COMMUNICATION EXAMPLES\SAIA` application.
3. Execute the application.
4. Display the application screen (which includes some information about the communication) by executing the Viewer module in Studio.

 **Tip:** You can use the application sample as a maintenance screen for the custom application.

Revision History

Doc. Revision	Driver Version	Author	Date	Description of Changes
A	1.00	Plínio M. Santana	Apr/23/2007	First driver version