<div style="background:green;color:white">**AGRI Communication Driver**</div>

Driver for Serial Communication
with Devices Using EAP (Agri) Protocol

Contents

Introduction

The AGRI driver enables communication between the Studio system and AGRI devices using the EAP protocol communicating over Serial, according to the specifications discussed in this document.

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

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

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

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

- **Configuring the Driver**: Explains how to configure the AGRI 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 AGRI 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 AGRI driver and the AGRI 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**: Agri-Datalog
- **Compatible Equipment**:
  - CS950 series
  - AC2500 (only short parameter form)
  - EC100
  - CPM8
  - *Any device that is fully compatible with the EAP protocol through serial communication*

Link Characteristics

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

- **Physical Protocol**: RS485 (RS232 x RS485 converter needed) Serial
- **Logic Protocol**: EAP
- **Device Runtime Software**: None
- **Specific PC Board**: None

Driver Characteristics

The AGRI driver is composed of the following files:

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

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

- Windows 9x
- Windows 2000
- Windows NT

Conformance Testing

The following hardware/software was used for conformance testing:

- **Driver Configuration**:

  - **PLC Program**: N/A
  - **Modbus Port**: N/A
  - **Baud Rate**: 9600
  - **Protocol**: EAP
  - **Data Bits**: 8
  - **Stop Bits**: 1
 - **Parity**: None
  - **COM Port**: COM1

Driver Version	Studio Version	Operating System (Development)	Operating System (Target)	Equipment
1.04	6.1	Windows NT/2000/XP	Windows NT/2000/XP	Equipment: CS950A with an Intercom RS232xRS485 converter.

Installing the Driver

When you install Studio version 5.1 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 **AGRI** driver from the *Available Drivers* list (as shown in the following figure), and then click the **Select** button.
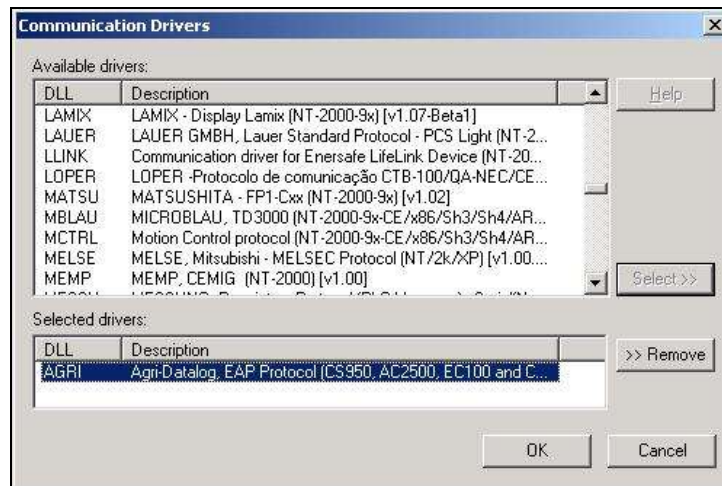
Communication Drivers Dialog Box

5. When the **AGRI** 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. However, to download the custom program to your device, you must install the AGRI programmer. Consult your AGRI programmer software documentation for installation instructions.

➲ **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 AGRI driver, you must configure the driver. Configuring the AGRI 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.
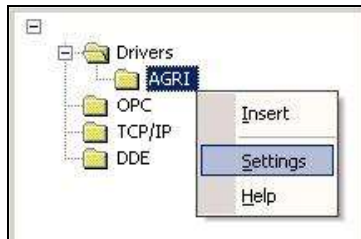

✎ **Note:**

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*.

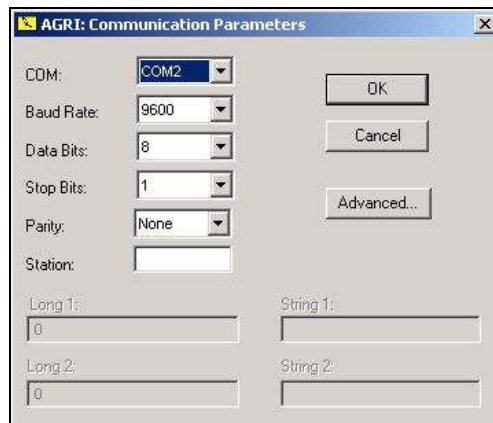## *Setting the Communication Parameters*

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 AGRI subfolder. When the pop-up menu displays (as shown in the following figure), select the **Settings** option.

Select Settings from the Pop-Up Menu

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

Communication Parameters Dialog

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

Parameters	Default Values	Valid Values	Description
Station	0	252 to 254	Address for PC Studio station.

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

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

> ✍ **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, the driver and the host. You must be familiar with the DCE specifications before adjusting these configuration parameters.

Configuring the Driver Worksheets

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 *AGRI* subfolder.
3. When the pop-up menu displays (as shown in the following figure), select the **Insert** option.
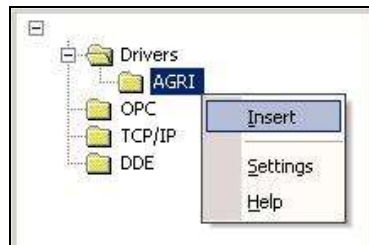
Inserting a New Worksheet

✐ **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: The following device addresses are predefined for use with EAP-devices:

Device	Address (hex)	Address (dec)
<broadcast>	00	0
CS-950	01-6F	1-111
Reserved	70-CF	112-207
CDS-03	D0-DF	208-223
CMP-08	E0-EF	224-239
Reserved	F0	240
AC-2500	F1-F7	241-247
EC-100	F8	248
Reserved	F9-FB	249-251
PC	FC-FE	252-254
Reserved	FF	255

Header field: Defines the type of variable to be read or written from or to the device, and the reference of the initial address. These variables must comply with the following syntax:

```
CS-950 or AC2500 or EC-100 orCMP-08
```

After you edit the **Header** parameter, the system checks the syntax. If the syntax is invalid, Studio automatically inserts the default value (DINT) into 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.

Address field: Use the information in the next table 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:

```
<Register Number>.<Length>
```

CELLOSTAT CS950A/G

PC	Name	Cat.	Length	Description
00H	PING	E	-	Test if device is ready, empty reply
01H	RESET	E	-	Reset the device
03H	PORT	M	2	State of the output ports
04H	STATUS	M	1	State of the device
06H	STORE	E	-	Store parameters to the eeprom
10H	T1	M	2	Temperature T1 all in 1/10° C
11H	T2	M	2	Temperature T2
12H	TV	M	2	Temperature TV (only CS-950A)
13H	TGV	M	2	Temperature TGV (only CS-950G)
14H	TGR	M	2	Temperature TGR (only CS-950G)
15H	TA	M	2	Temperature TA (defrosting temperature)
17H	RF	M	1	Relative humidity in %
20H	T1MIN	P	2	Set point T1min (room temperature minimum)
21H	T1MAX	P	2	Set point T1max
22H	TVMIN	P	2	Set point TVmin
23H	TVMAX	P	2	Set point TVmax
24H	ALMIN	P	2	Set point ALmin (alarm minimum)
25H	ALMAX	P	2	Set point ALmax (alarm maximum)
26H	TGVMIN	P	2	Set point TGVmin (glycol minimum)
27H	TGVMAX	P	2	Set point TGVmax (glycol maximum)
28H	THMIN	P	2	Set point THmin (heating minimum)
29H	THMAX	P	2	Set point THmax
2AH	RFMIN	P	1	Set point RFmin (relative humidity minimum)
2BH	RFMAX	P	1	Set point RFmax

Agri Controller 2500 (AC2500)

PC	Name	Cat.	Length	Description
00H	PING	E	-	Test if device is ready, empty reply
01H	RESET	E	-	Reset the device
0BH	TROOM	H*	1	Sets the room on which the following parameters reference to
0DH	GCO2	M	1	Measured CO_2 value of actual room
0EH	GO2	M	1	Measured O_2 value of actual room
0FH	GROOM	M	1	Actual (last measured) room
1DH	RLZ	M	32	All running times

22H	RSTATE	P	1	State of the room (0-3) reference to TROOM
23H	RCO2MAX	P	1	CO_2 Maximum reference to TROOM
24H	RCO2NOM	P	1	Set point CO_2 reference to TROOM
26H	RO2MIN	P	1	O_2 Minimum reference to TROOM
27H	RO2NOM	P	1	Set point O_2 reference to TROOM
68H	GCYCLEID	M	4	Measure cycle number (continuous)
69H	GP	M	2	Analyzed air pressure
1000H	LZADSO	M	2	Running time adsorber in reference to TROOM
1001H	FQADSO	M	2	Running frequency adsorber in reference to TROOM
1002H	LZAIR	M	2	Running time air valve in reference to TROOM
1003H	FQAIR	M	2	Running frequency air valve in reference to TROOM
1004H	LZOXI	M	2	Running time N_2 generator in reference to TROOM
1005H	FQOXI	M	2	Running frequency N_2 generator in reference to TROOM
1F02H	DATTIM	P	6	Date and time (Y, M, D, Hour, Min, Sek)

Energy Econom (EC55/EC100)

PC	Name	Cat.	Length	Description
00H	PING	E	-	Test if device is ready, empty reply
01H	RESET	E	-	Reset the device
03H	PORT	M	2	State of the output ports
04H	STATUS	M	1	State of the device
06H	STORE	E	-	Store parameters to the eeprom
11H	P	M	2	Actual measured power consumption
16H	PMAX	P	2	Set point maximal power consumption

Sequencer (CMP8/16/4+4GL/2+2GL)

PC	Name	Cat.	Length	Description
00H	PING	E	-	Test if device is ready, empty reply
01H	RESET	E	-	Reset the device
03H	PORT	M	2	State of the output ports
04H	STATUS	M	1	State of the device
06H	STORE	E	-	Store parameters to the eeprom
14H	RUNMAP	M	2	Shows in a bit mask what compressors/steps are running
15H	ERRMAP	M	2	Shows in a bit mask what compressors/steps have errors

Device Configuration

Because there are multiple devices that use the AGRIs protocol, we cannot define a standard device configuration.

Executing the Driver

After adding the AGRI 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.
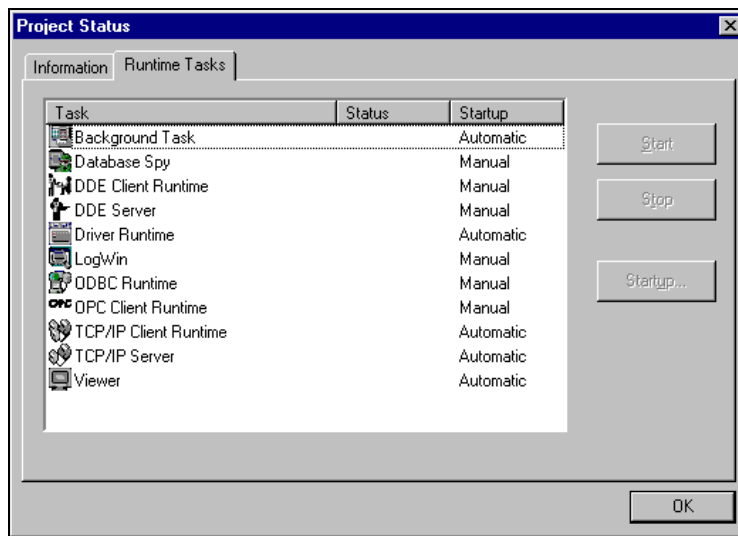
Project Status Dialog Box

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 AGRI 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 the failure that occurred.

Error Code	Description	Possible Causes	Procedure to Solve
0	OK	▪ Communication without problems	▪ None required.
7	Wrong Device Name	▪ The device name in Header field is wrong	▪ Type a valid device name.
8	Wrong Register Address	▪ The address type in Address field is wrong	▪ Valid addresses are 0 to 65535.
10	Invalid Parameter	▪ The address in the Address field is not valid to the PLC type.	▪ See the device specifications.
-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/AGRI** directory. We strongly recommend that you check for 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 each 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	1.01	Luis F. Espinosa C.	Jul/30/1999	First version of the driver
B	1.02	Eric Vigiani	Sep/28/2004	Implement command 00H allowing the user to specify the target address.
C	1.03	Eric Vigiani	May/02/2005	Modified AGRI driver to accept parameters code.
D	1.04	Eric Vigiani	Aug/10/2005	Fixed read problems.