

**Communication Driver ADAM**

Driver for serial communication with ADAM  
4000 Series devices using RS-232

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# 1 Introduction

The ADAM driver enables communication between Studio system and the ADAM 4000 Series devices using their Host protocol by RS 232, in accordance with the characteristics covered in this document.

This document contains 8 parts, as follow:

- Introduction: Provides an overview of the driver documentation.
  - General characteristics: Provides information necessary to identify all the required components (hardware and software) necessary to implement the communication and global characteristics about the communication.
  - Installation: Explains the procedures that must be followed to install the software and hardware required for the communication.
  - Driver configuration: Provides the required information to configure the communication driver such as the different permutations for configuration and its default values.
  - Execution: Explain the steps to test whether the driver was correctly installed and configured.
  - Troubleshooting: Supplies a list of the most common error codes for this protocol and the procedures to fix them.
  - Application Sample: Provides a sample application for testing the configuration the driver.
  - History of versions: Provides a log of all the modifications done in driver.
- ☞ Note: This document presumes that the user has read the chapter *Driver Configuration* of the Studio's Technical reference manual.

## 2 General Characteristics

### 2.1 Device Characteristics

- Manufacturer: Advantech
- Compatible Equipment
  - ADAM 40 Series

☞ Note: Please refer to section 2.4 to see the Equipment used in the standard conformance tests for this driver.

### 2.2 Link Characteristics

- Device communication port: RS232 port
- Physical protocol: RS232
- Logic protocol: ADAM Protocol
- Device Runtime software: None
- Specific PC Board: None
- Adapters / Converters: None.
- Cable Wiring: The same used to communicate with the ADAM Programming Software

## 2.3 *Driver Characteristics*

- Operating System:
  - Windows 9x
  - Windows 2000
  - Windows NT

☞ Note: Please refer to section 2.4 to see the Operating System used in the conformance tests for this driver.

The driver is composed of the following files:

- ADAM.INI: Internal file of the driver, it should not be modified by the user.
- ADAM.MSG: This file contains the error messages for each error code. It is an internal file of the driver, the user should not modify it.
- ADAM.PDF: This document provides detailed documentation about the driver.
- ADAM.DLL: This is the compiled library for the driver.

☞ Note: All the files above must to be in the subdirectory /DRV of the Studio's installation directory.

## 2.4 *Information about conformance testing*

- Unavailable information

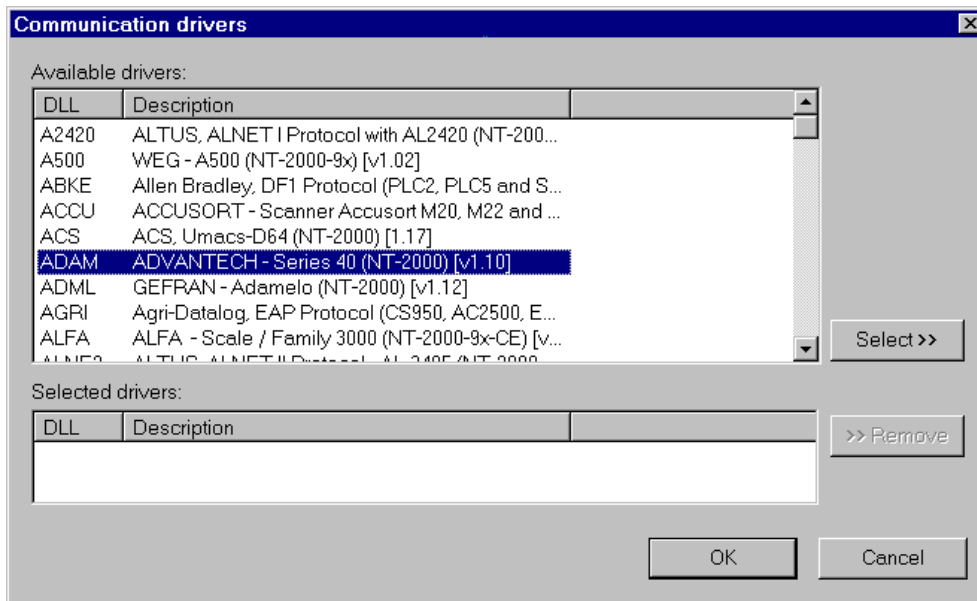
## 3 Installation

### 3.1 Installing the Driver

When you install the Studio v3.0 or higher, the communication drivers are already installed. You need now to select the driver at the applications where it will be used.

The steps to select the driver inside an application are:

1. Execute the Studio and select the proper application.
2. Select the menu *Insert + Driver...*
3. In the column **Available Drivers**, select the **ADAM Driver** and push the button **ADD>>>** (the driver ADAM must appear in the column **Selected Drivers**).
4. Press **OK**.



### 3.2 Other software requirements

None other software requirements are necessary to run this driver.

Note: Special precautions must be taken when installing the physical hardware. Refer to the hardware manufacturer documentation for specific instructions in this area.

## 4 Driver Configuration

After the driver is installed and selected in the Studio (see section 3.1), you should proceed to the driver configuration.

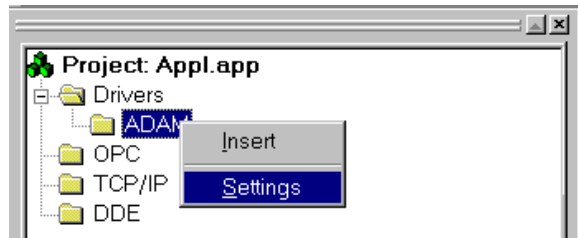
The driver configuration is two parts:

The Settings or Communication parameters, it is only one configuration to the whole driver, then you have the communication tables or Driver Worksheets, where the communication tags are defined.

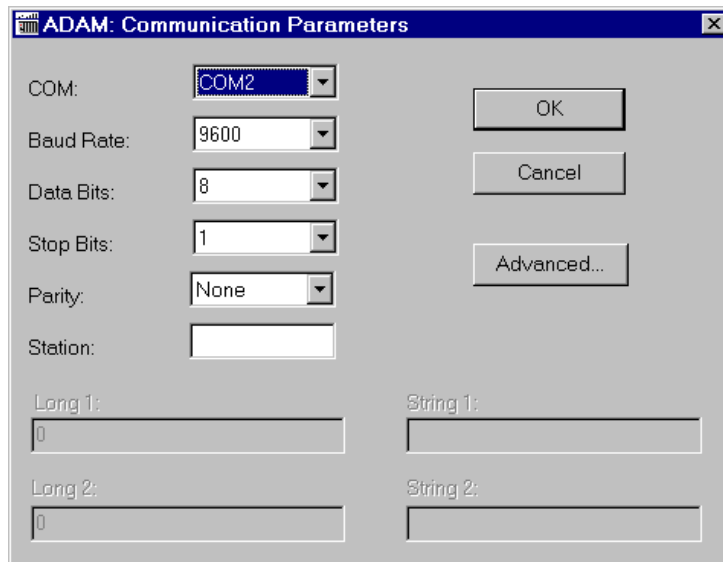
### 4.1 Settings - Communication Parameters

These parameters are valid for all driver worksheets configured in the system. To open the window for configuring the **Communication parameters**, follow these steps:

1. In the **Workspace** of the Studio environment, select the **Comm** table.
2. Expand the folder **Drivers** and select the subfolder **ADAM**.
3. Right click on the **ADAM** subfolder and select the option **Settings**.



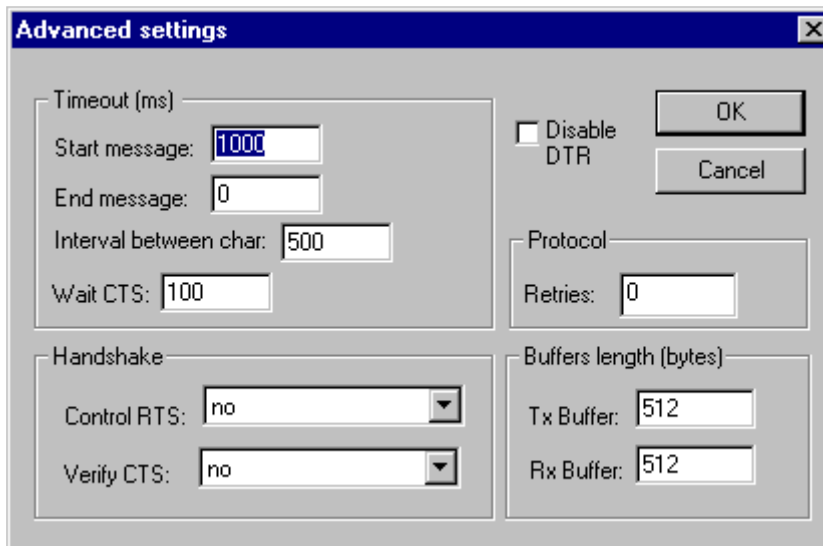
When selecting the Settings, there is the following dialog to configure:



Parameter	Default Value	Valid values	Description
COM	COM2	COM1 to COM8	Serial port of the PC used to communication with the device
Baud Rate	9600	110 to 57600bps	Communication rate of data
Data Bits	8	5 to 8	Number of data bits used in the protocol
Stop Bits	1	1or 2	Number of stop bits used in the protocol
Parity	None	even, odd, none, space or mark	Parity of the protocol
Station	0	0	Not used for this driver

Note: These Parameters must be just the same as the configured on the ADAM device.

By clicking on the button **Advanced...** in the window **Communication Parameters**, you open additional communication parameters.

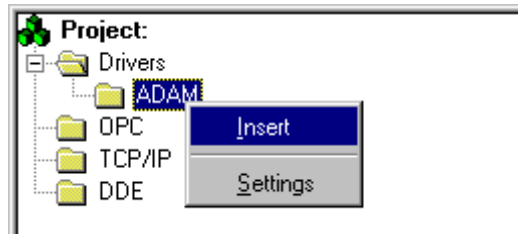


The Advanced setting parameters are explained at the Studio Technical Reference Manual, and you should keep the default values to all fields.

## 4.2 Driver Worksheet

It is possible to configure many driver worksheets, each one will be composed of a Header and Body. To create a new driver worksheet, follow these steps:

1. In the **Workspace** of the Studio environment, select the table **Comm**.
2. Expand the folder **Drivers** and select the subfolder **ADAM**.
3. Right click on the **ADAM** subfolder and select the option **Insert**.



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

When creating a communication table, you have the following window:

The screenshot shows the 'Adam001.drv' configuration window. It contains several input fields and checkboxes for configuring the driver. Below the fields is a table for defining communication tags.

	Tag Name	Address	Div	Add
1	Tag1[1]	#012		
2				
3				
4				
5				
6				

All entries at the Driver Worksheet, exception by the **Station**, **Header** and **Address** are standard to all communication drivers. You should refer to Studio Communication Driver documentation about the



configuration of the standard fields. This document describes the Station, Header and Address fields, which are specific to each communication driver.

### 4.3 Station and Header configuration

Parameter	Default Value	Valid values	Description
Station	-	-	Not Used
Header	-	-	Not Used

### 4.4 Address Configuration

The address field holds the text with the command to be sent . All the ADAM Manual commands are available.

The address cells complies to the following syntax:

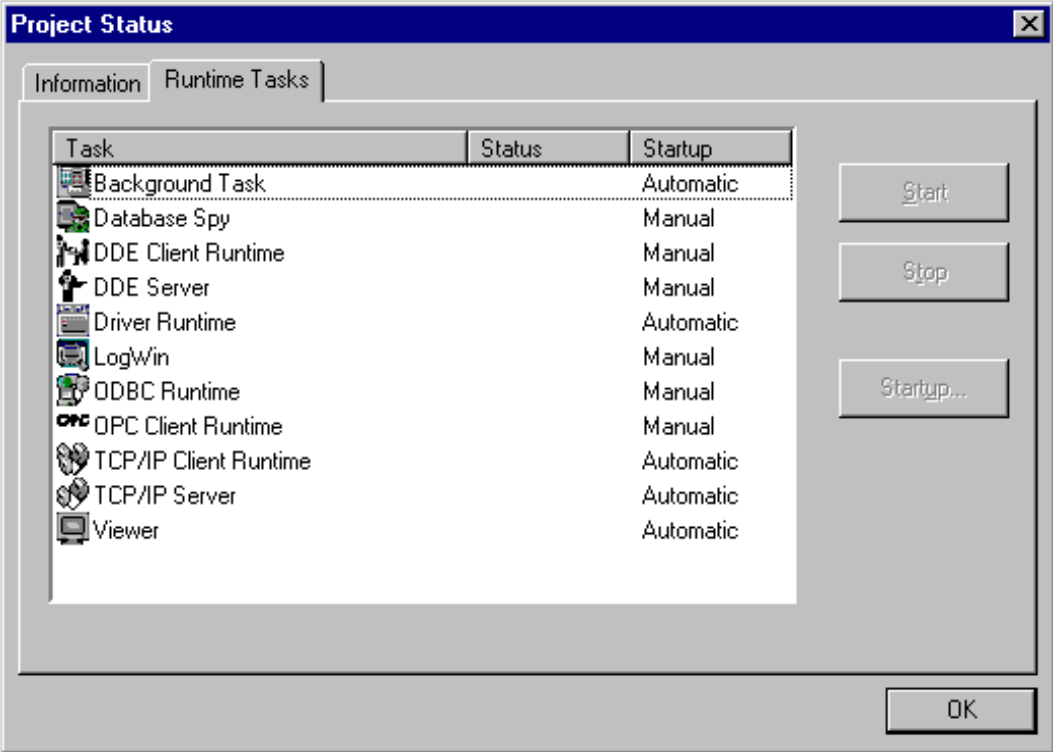
Sample of Addressing Configuration		
Command: Configuration - %AANNTTCCFF		
Configuration Item	Description	
AA	Analog Input Module Address (00-FF)	
NN	New Analog Input Module Address (00-FF)	
TT	Input Range:	
	20	Platinum -100 to 100C, Alfa = 0.00385
	21	Platinum 0 to 100C, Alfa = 0.00385
	22	Platinum 0 to 200C, Alfa = 0.00385
	23	Platinum 0 to 600C, Alfa = 0.00385
	24	Platinum -100 to 100C, Alfa = 0.003916
	25	Platinum 0 to 100C, Alfa = 0.003916
	26	Platinum 0 to 200C, Alfa = 0.003916
	27	Platinum 0 to 600C, Alfa = 0.003916
	28	Nickel -80 to 100
29	Nickel 0 to 100	
CC	Baud Rate	
	03	1200bps
	04	2400bps
	05	4800bps
	06	9600bps
	07	19.2kbps
08	38.4Kbps	

Data Format	
FF	Bit
	7 6 5 4 3 2 1 0
	-----
	<b>Not Used</b>
	00 - Engineering units
	01 - % of FSR
	10 - two's complement of hexa
	11 - Ohms
	-> <b>Check Sum</b> 0 - Disabled 1 - Enabled
-> <b>Integration Time</b> 0 - 50ms (Operation under 60 Hz power) 1 - 60ms (Operation under 50 Hz power)	
<b>Command: Other Commands</b>	
Command	Description
#AA	Analog Input reading where AA = Analog Input Module Address (00-FF)
\$AA0	Span Calibration where AA = Analog Input Module Address (00-FF)
\$AA1	Offset Calibration where AA = Analog Input Module Address (00-FF)
\$AA4	Synchronization Data Reading where AA = Analog Input Module Address (00-FF)
\$AA2	Configuration reading where AA = Analog Input Module Address (00-FF). The Tags that are going to receive the values must be String Type Tags.
#AA3	Configuration reading where AA = Analog Input Module Address (00-FF). The Tags that are going to receive the values must be Real Type Tags.
\$AAF	Firmware version reading where AA = Analog Input Module Address (00-FF)
\$AAM	Module Name reading where AA = Analog Input Module Address (00-FF)
CUSTOM COMMAND	In this case, the driver will compose a customized command to send to the modules appending the content of <b>Tag Name</b> (tag type string) to the string in <b>Address</b> . Ex.: <ul style="list-style-type: none"> <li>• Tag Name = tag_str = "-9808"</li> <li>• Address = "#02"</li> <li>• Command = "#02-9808"</li> </ul> It works only with Write command.

### 4.5 Device Configuration

## 5 Execution

- When installing the driver, it is automatically selected to execute when you start-up the Runtime Environment. To verify the if the driver is correctly enabled to start, use the menu option **Project + Status...**, and verify the task Driver Runtime



## 6 Troubleshooting

After each attempt to communicate using this driver, the tag configured in the field **Read Status** or **Write Status** will receive the error code regarding the kind of failure that occurred. The error messages are:

Error Code	Description (*)	Possible causes	Procedure to solve
0	OK	Communication without problems	-
11	Invalid Address	Invalid value typed at the Address Field	Check the Address field syntax and compare it with the valid ones described above
13	Invalid Module Response	An invalid response has been sent by the module.	Check all the wiring and grounding installation. Usually, this is a ground problem.
14	Invalid Command	Unavailable command	Command typed at the address field is not available. Type a valid one.
-15	Timeout waiting start a message.	<ul style="list-style-type: none"> <li>- Disconnected cables</li> <li>- PLC turned off, or in Stop or error mode</li> <li>- Wrong Station number</li> <li>- Wrong RTS/CTS control settings.</li> </ul>	<ul style="list-style-type: none"> <li>- Check the cable wiring</li> <li>- Check the PLC state. It must be RUN</li> <li>- Check the station number.</li> <li>- Check the right configuration. See on the section 2.2 the different RTS/CTS valid configurations.</li> </ul>
-17	Timeout between rx char.	<ul style="list-style-type: none"> <li>- PLC in stop or error mode</li> <li>- Wrong station number</li> <li>- Wrong parity</li> <li>- Wrong RTS/CTS configuration settings</li> </ul>	<ul style="list-style-type: none"> <li>- Check the cable wiring</li> <li>- Check the PLC state. It must be RUN</li> <li>- Check the station number.</li> <li>- Check the right configuration. See on the section 2.2 the different RTS/CTS valid configurations.</li> </ul>

Note: The results of the communication may be verified in the **output** Window of the Studio's environment. To set a log of events for **Field Read Commands**, **Field Write Commands** and **Serial Communication** click with the right button of the mouse on the output window and chose the option setting to select these log events. When testing under a Windows CE target, you can enable the log at the unit (Tools/Logwin) and verify the file celog.txt created at the target unit.

When you are not able to establish the communication with the PLC, you should first of all establish the communication between the PLC Programming Tool and the PLC. Very frequently the communication it is not possible due to a hardware or cable problem, or due an error or lack of configuration at the PLC. Only after the communication between the PLC Programming Software and the PLC is working fine, you can test again the supervisory.

When testing the communication with the Studio, you should first use the application sample described at item 7, instead of the new application that you are creating.

If is required to contact technical support, please have the following information available:

- Operating System (type and version): To find this information use the Tools/System Information option
- Project information: It is displayed using the option Project/Status from the Studio menu
- Driver version and communication log: Available from Studio Output when running the driver
- Device model and boards: please refer to hardware manufacture's documentation

## 7 Application Sample

The Studio contains a configured project to test the driver. It is strongly recommended to do some tests with this application before beginning the configuration of the customized project, for the follow reasons:

- To understand better the information covered in section 4 of 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 conditions before beginning the configuration of the applications.

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

The Studio application is in the directory: **/COMMUNICATION EXAMPLES/<Driver Name>**

To perform the test, you need to follow these steps:

- Configure the device communication parameters using manufacturer programmer software..
- Open the application **/COMMUNICATION EXAMPLES/<Driver Name>**
- Execute the application
- To display the following screen with some information about the communication, please execute the Viewer module in the Studio.

☞ Note: The application for testing may be used like a maintenance screen for the custom application.

## 8 History of Versions

Version	By	Date	Description of changes
1.01	Sergio Andre Poon	30-jul-1999	▪ First driver revision
1.11	Sergio A. Poon	09-May-2000	▪ Modified to accept command #AA3 to read CJC value