Connecting UniOP CoDeSys Controllers

This Technical Note contains the information needed to connect via serial communication UniOP to controllers based on the 3S CoDeSys system.
The CoDeSys communication driver is associated to the Designer file D32UPLC175.DLL.

Contents

1. Introduction 2
2. Controller Setup 2
3. The Data Field Properties dialog box 3
4. Data Formats 4
5. RDA, Alarms, Mailbox and Data Transfer 5
6. Communication Parameter Setting 5
Appendix A. Communication Error Codes 6

1. Introduction

To create a Designer project for communication with controller based on CoDeSys, select the driver "CoDeSys" from the list of available communication drivers in the Configure Controller dialog box.

***Note**: In case the CoDeSys is not shown in the list, make sure that the file D32UPLC175.DLL is present in the Designer folder and then press the Refresh button.*

2. Controller Setup

Figure 1 below shows the "Controller Setup..." dialog box for the CoDeSys driver.

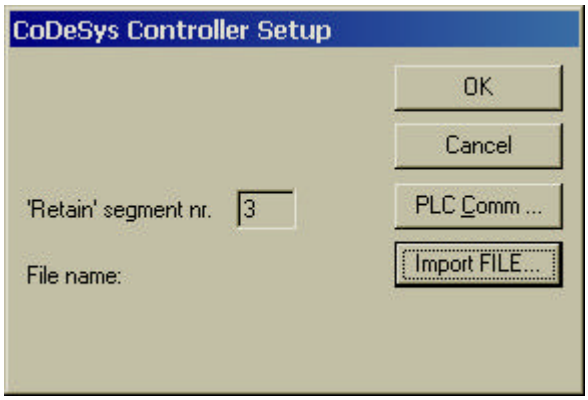

Figure 1 – Controller Setup Dialog Box

The option "Retain segment nr" enables user to define the Retain segment number configured in the PLC in order to match the programming software settings.

The "Import FILE" button allows importing the PLC's application file with parameter definitions. This symbol file has the extension .SYM and is created by the programming software of the PLC at compilation time.
Symbol file creation must be enabled in the PLC programming software in order to generate the file. Under the CoDeSys programming software, to enable symbol file generation, select "Project\Option\Symbol configuration" and mark the check box "Dump symbol entries" like shown in the picture below.

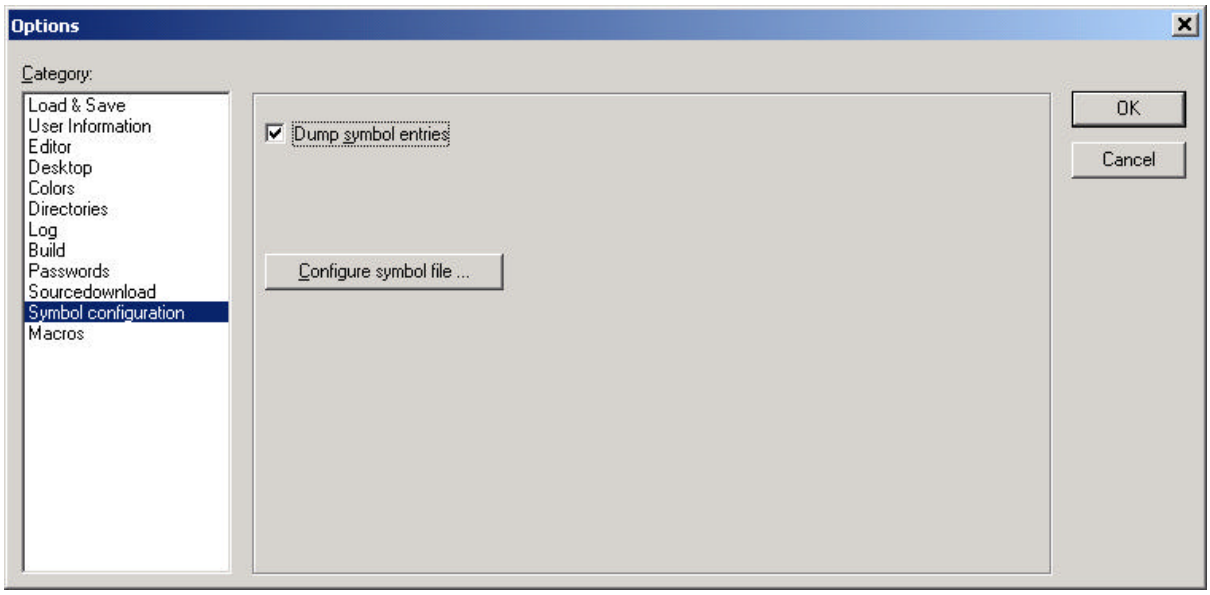

Figure 2 – Symbol configuration

Connection to the PLC is always point-to-point (one operator panel connected to one PLC).

3. The Data Field Properties dialog box

The CoDeSys Data Field Properties dialog box is shown in the figure below.

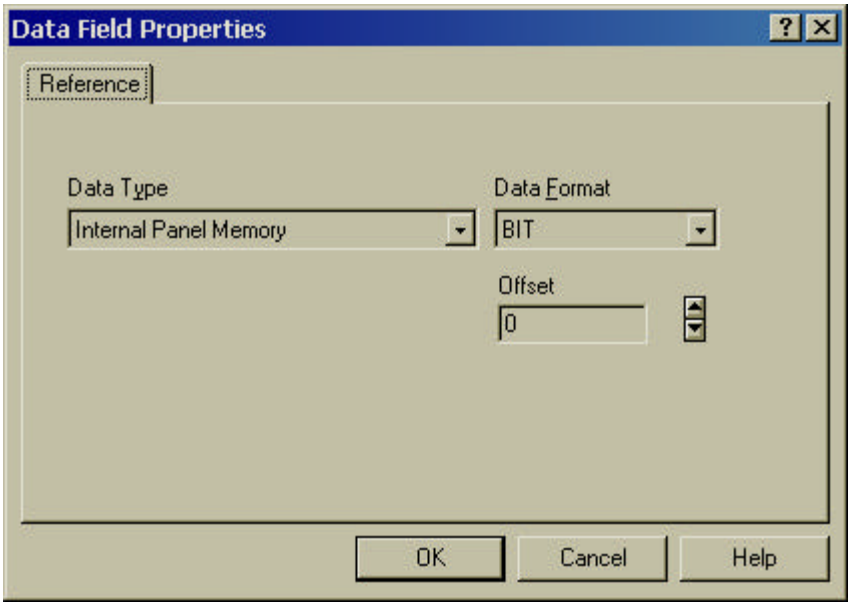

Figure 3 – The Data Field Properties dialog box

The “Data Type” combo box is used to select the memory area to be referenced.
The following memory areas can be selected:

Name	Offset range
PLC Memory	0-65535
PLC Input	0-65535
PLC Output	0-65535
PLC Retain	0-65535
PLC Parameters	(*)
Internal Panel Memory	0-511

PLC Memory, PLC Input, PLC Output, PLC Retain
This is the controller's general-purpose memory. Code number (POURef) for PLC Retain is adjustable in Controller Setup.

PLC Parameters
In order to access PLC Parameters, the user needs to import parameters from the symbol file using the appropriate command in the Controller Setup dialog box.

Internal Panel Memory
This is a memory area internal to the UniOP panel and does not have any relation with the controller's memory. Any access to this area does not generate any message on the serial line.

4. Data Formats

The CoDeSys communication driver handles standard as well controller-specific data formats, such as those needed for the TIME and POINTER data types.

All standard data types are available both in 'normal' and 'inverted' low-level data storage. This will make possible to connect to controllers that are based both on high-endian and little-endian data formats.

Some comments on special data types are given below.

1) Designer provides the special Data Format "TIME" and "TIME INV". Values read from the PLC will be displayed in the following format: 1h2m3s4ms.
Data entry for TIME variables can be done only using macro command "STEP" available in Designer Macro Editor, with appropriate step sizes:

	Use step size:
hours	3600000
minutes	60000
seconds	1000
milliseconds	1

2) Designer will threat POINTER type data as DWORD when presenting its Data Format in the user interface.

Please remind that special data types do not support scaling and cannot be used in UniNet clients.

5. RDA, Alarms, Mailbox and Data Transfer

All available data types, except PLC Parameters, can be used as reference for RDA, Alarms, Mailbox and Data Transfer.

6. Communication Parameter Setting

Communication parameters for serial communication can be adjusted by clicking the “PLC Comm...” button in the “Controller Setup” dialog box.
The default communication parameters are defined as follows:

	Default value
Speed	19200 baud
Start bits	1
Data	8
Parity	None
Stop bits	1

Appendix A. Communication Error Codes

Current communication status is displayed on the system page of the UniOP. Beside the string, describing current state of the communication (OFF, ON, ERR), there is an additional error code representing the last (which may be not the current one) error encountered. The codes are:

Code	Description	Notes
00	No error	There are no communication errors and there have been no errors since start-up.
04	Negative ACK	NAK returned by the controller while UniOP is waiting for ACK, or invalid data in frame.
05	Time out (receiving)	No response received form the controller within the timeout period.
06	Response error	Wrong response telegram structure.
07	General communication error	General un-known communication error.
11	Line error	Wrong bad baud rate, parity, etc.
12	Checksum error	Wrong checksum received from the controller.

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