Tech-note

Connecting UniOP to CoDeSys Controllers via Ethernet

This Technical Note contains the information required to connect via Ethernet communication UniOP to controllers based on the 3S CoDeSys PLC system.
The CoDeSys ETH communication driver is delivered with the Designer file D32uplc212.dll.

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1 Introduction

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

***Note**: In case the CoDeSys ETH is not shown in the list, make sure that the file D32uplc212.dll is present in the Designer folder and then press the Refresh button.*

2 CoDeSys Parameters and Designer’s Tags

This chapter describes how to import CoDeSys PLC parameter information into Designer using the TagEditor.

When configuring PLC using the manufacturer’s configuration software, make sure to enable Symbol file creation (file with .SYM extension). It can be done under the CoDeSys programming software, by selecting “Project\Option\Symbol configuration” and mark the check box “Dump symbol entries” as shown in the picture below.

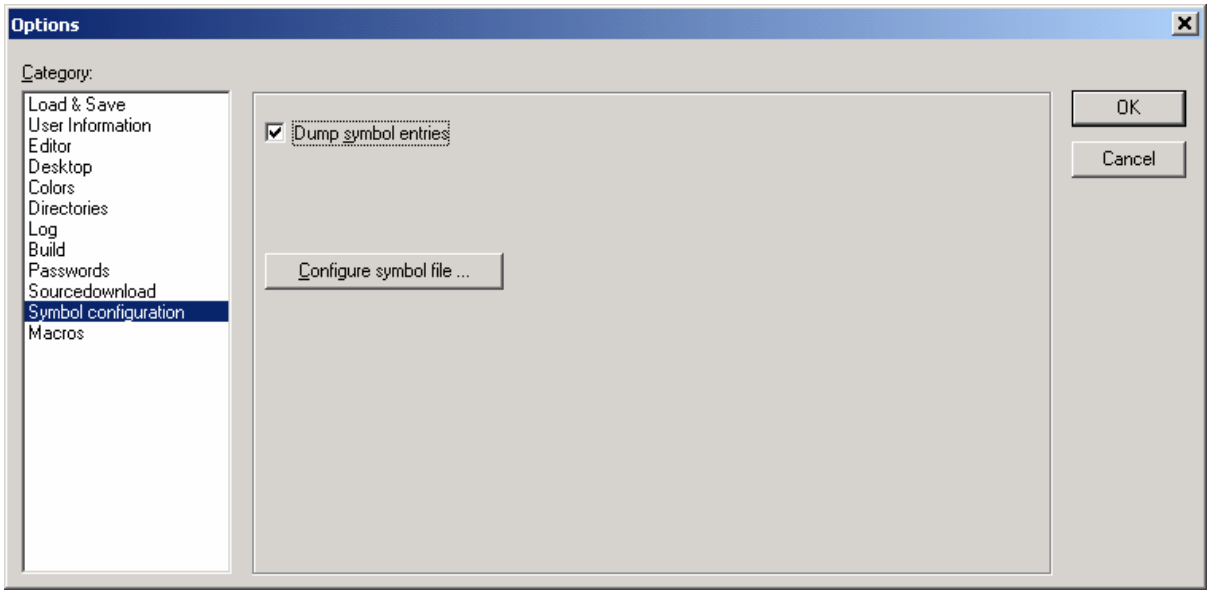

Figure 1 – Symbol configuration

Click then on the “Configure symbol file…” button and make sure the “Export variables of object” check box is marked as shown in the following picture.
We recommend to un-check the check box and mark it again to be sure about the proper settings.

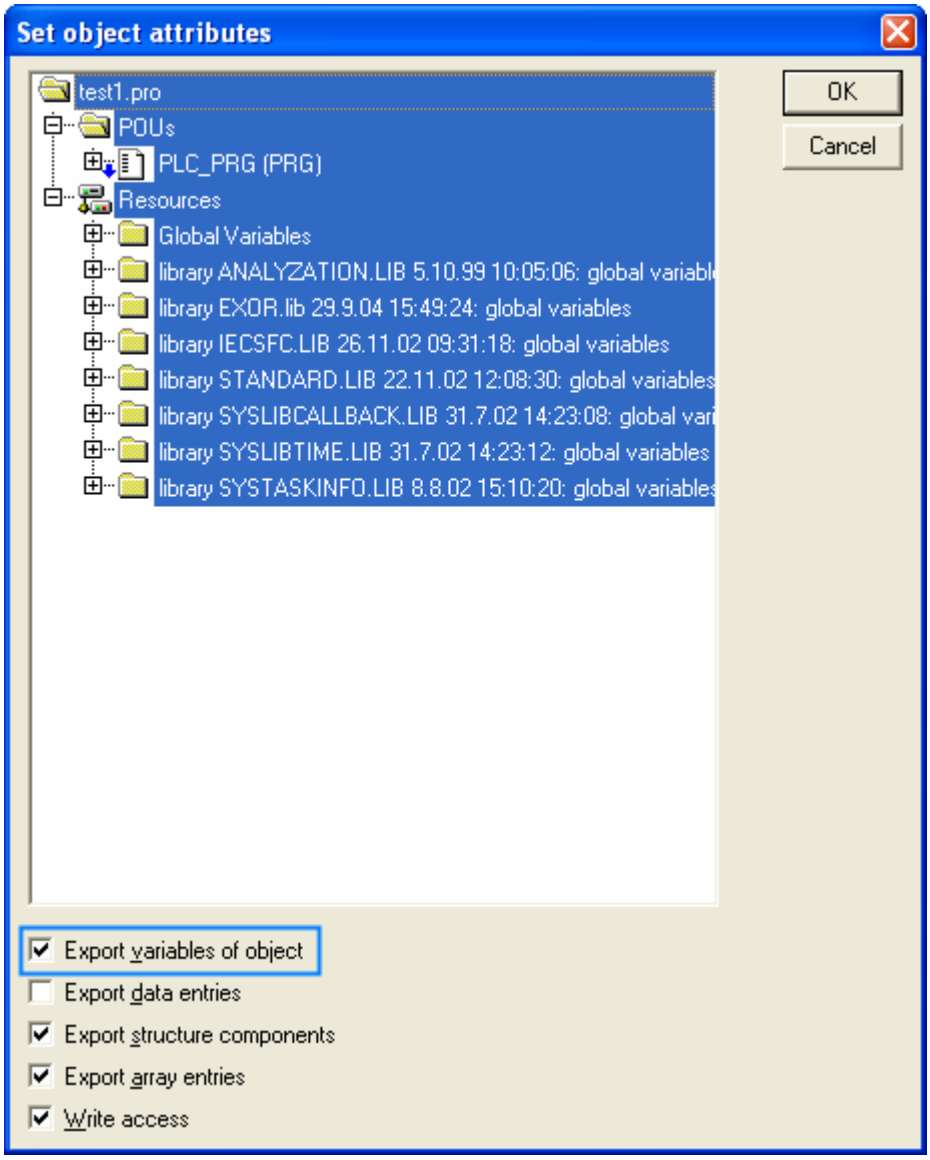

Figure 2

TagEditor can be used to import parameters contained in the file exported by the CoDeSys software. TagEditor will prepare the Tag Database (.MDB file) which can be used in standard way from Designer's UI to import Tags. For more details on how to import MDB file, please check the Designer manual.

3 Setting-up the Communication with Designer

3.1 Controller Setup

Figure 3 below shows the "Controller Setup..." dialog box for the CoDeSys ETH driver.

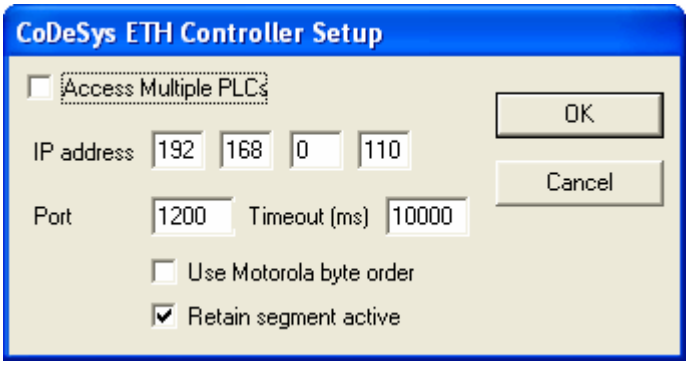

Figure 3 – Controller Setup Dialog Box

The Ethernet IP address of the controller connected to the UniOP must be defined in the “IP address” field.

The “Port Number” parameter allows to change the port number. Default value for this parameter is set to 1200 and it corresponds to the default setting of CoDeSys ETH controllers.

The option “Use Motorola byte order” defines the byte order that will be used by UniOP’s communication driver when sending communication frames to the PLC.
This is not applied to the byte order of the Data *Received From/Sent To* controller! To obtain right Data byte order, make sure to use appropriate “Data Format”, for instance: WORD, or WORD INV. (Data Format can be selected in Data Field Properties dialog box described in chapter 4. Also, check chapter 5 for more details about Data Formats).

The checkbox “Retain segment active” activates or deactivates usage of the retain segment defined in POURef 3.
The user must be aware that when this option is checked, no automatic reallocation of already defined fields which uses POURef 3 segment is done. So, in the moment of checking this option, warning message appears.

The protocol allows the connection of multiple controllers to one operator panel. To set-up multiple connections, check “Access Multiple Drives” checkbox in the Controller Setup dialog box.

3.2 Panel Setup

The UniOP panel must have a unique IP address assigned to it. The IP address for UniOP may be entered in the Panel Setup dialog box under the tab “External Devices”. Enter the IP address in the field “Ethernet Board” as shown in Figure 3 below.
Alternative methods of specifying the panel’s IP address are also available.

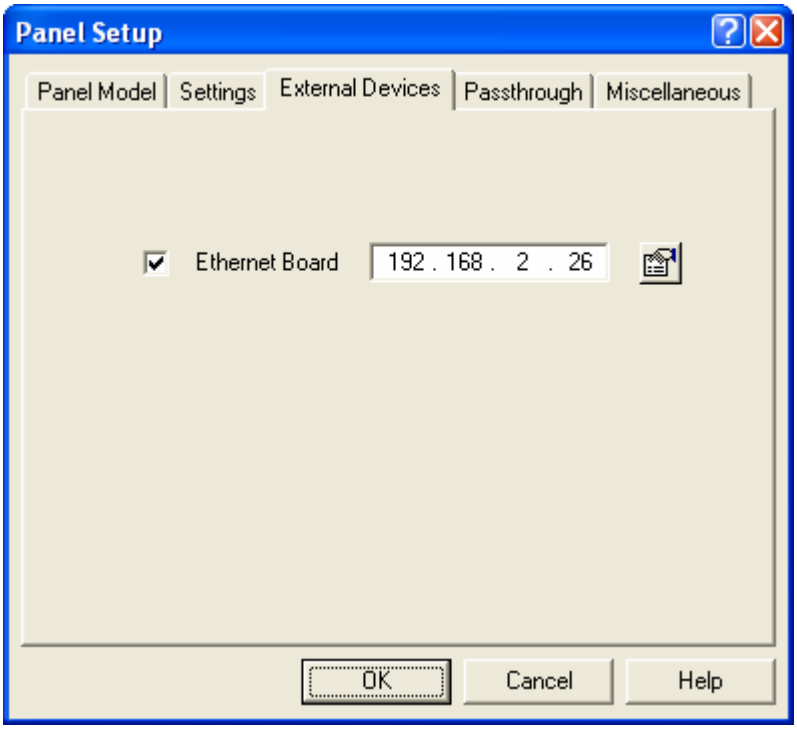

Figure 4 - UniOP panel IP Address

4 The Data Field Properties dialog box

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

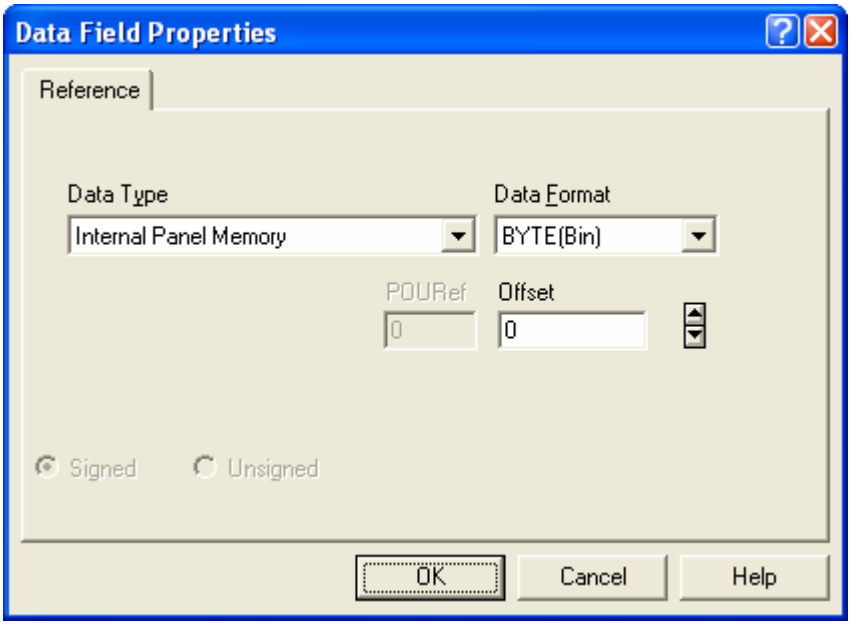

Figure 4 – The Data Field Properties dialog box

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
Internal Panel Memory	0-511
PLC Memory	0-65535
PLC Input	0-65535
PLC Output	0-65535
PLC Retain	0-65535
PLC Parameters	0-65535

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.

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, as described in previous chapter.

5 Data Formats

The CoDeSys ETH 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 treat POINTER type data as DWORD when presenting its Data Format in the user interface.

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

6 RDA, Alarms, Mailbox and Data Transfer

All available data types, can be used as reference for RDA, Alarms, Mailbox and Data Transfer. NOTE: Data Type PLC Parameters can be used for such purpose only if PLC's memory is configured in appropriate way. To check this, see Designer manual and appropriate memory mappings for each of these purposes.

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 unknown communication error.
09	Send Timeout	Timeout when sending data frame to controller
12	Checksum error	Wrong checksum received from the controller.