Application Note

AN2010

DLS/FLS

S7 connection by RS422

V 1.02
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Abstract

This application shows how to display a measured distance value on a standard external numeric digital display. Description of the wiring and sensor configuration are included as well as two samples are given.

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Table of content

1 Introduction

To connect a DLS-Distance sensor with a Siemens S7 PLC different issues must be considered. This instruction describes the necessary steps to connect the DLS sensor and run the sample program. This includes the wiring, the configuration and the description of the sample program, which is available under www.dimetix.com. It is essential, that you have some experience in programming of a Siemens S7 PLC.

This sample including its documentation is provided with no warranty for any problems this sample may cause.

1.1 Hardware requirements of the PLC

To successfully run the sample program, you must use a Siemens S7 PLC with a extension card for the RS232/RS422 communication (CP340-RS 422/485; Type: 6ES7 340-1CH00-0AE0).

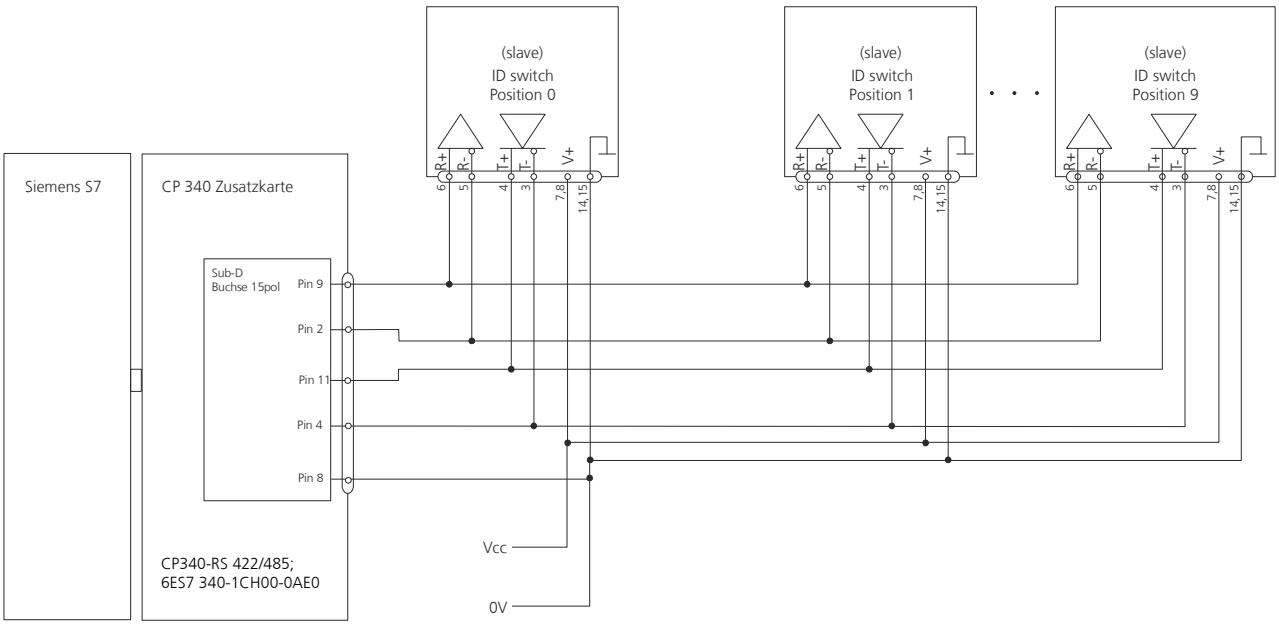
1.2 DLS Laser distance sensor configuration

The CP340 communication card limits the data transfer to 9600 baud and the configuration of the DLS Sensor must be changed. With the DLS/FLS utility software (available on www.dimetix.com) change the communication parameters to

Setting 6: 9600Baud, 7 Data bits, Parity Even

All other settings of the DLS-Sensor remain the same.

1.3 Wiring

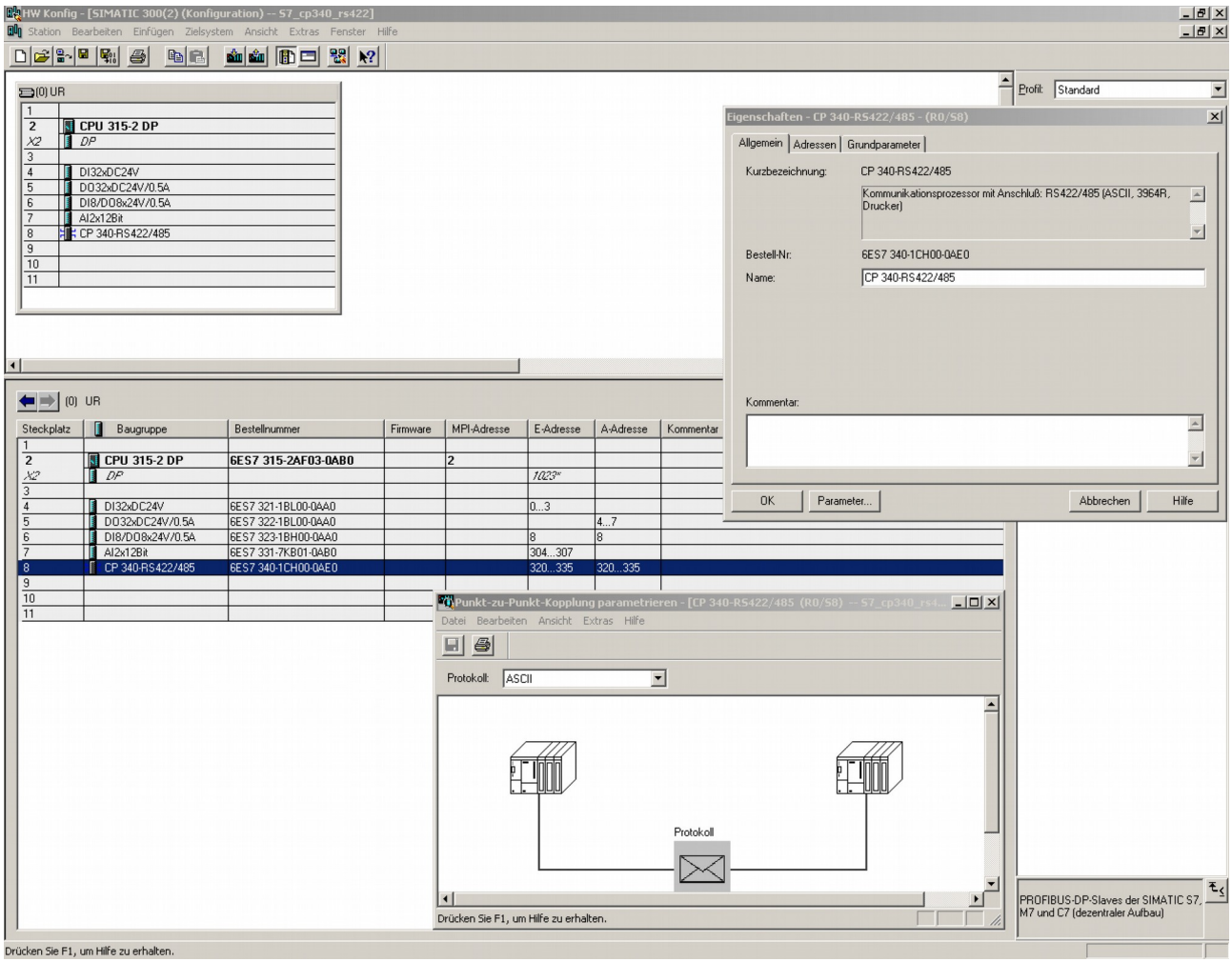


Picture 1 Cable connection

Connect the DLS Sensor to the CP340 communication card according to the diagram bellow.

2 CP340 communication card configuration

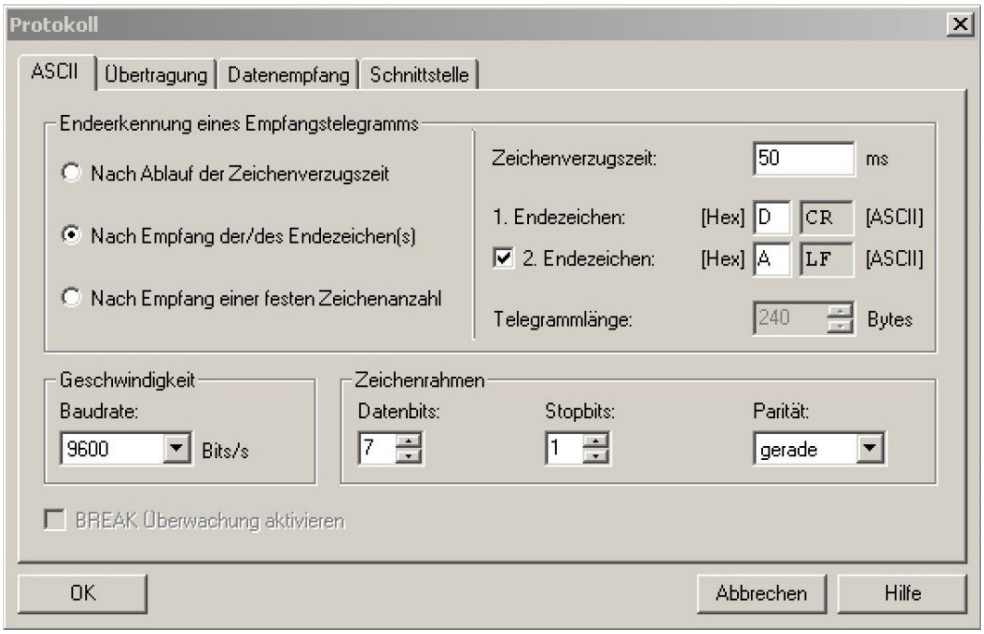
Mount the CP340 card in accordance with the instruction included to the card package and run the setup for the card (also included in the CP340 card package). Start the hardware configurator and select the correct part number for the CP340 card. Double click "properties" the assigned address will be displayed. Please write this address down, you will need it later in chapter 3. Next, do the following steps:



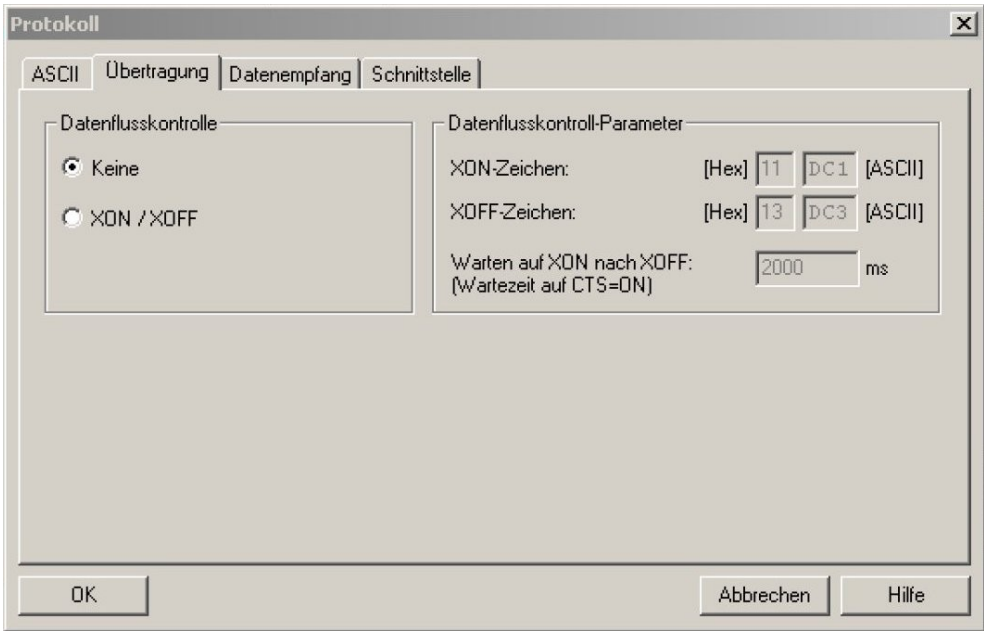
Picture 2 Protocol configuration

Click to "parameters" and select ASCII protocol (Picture 2)

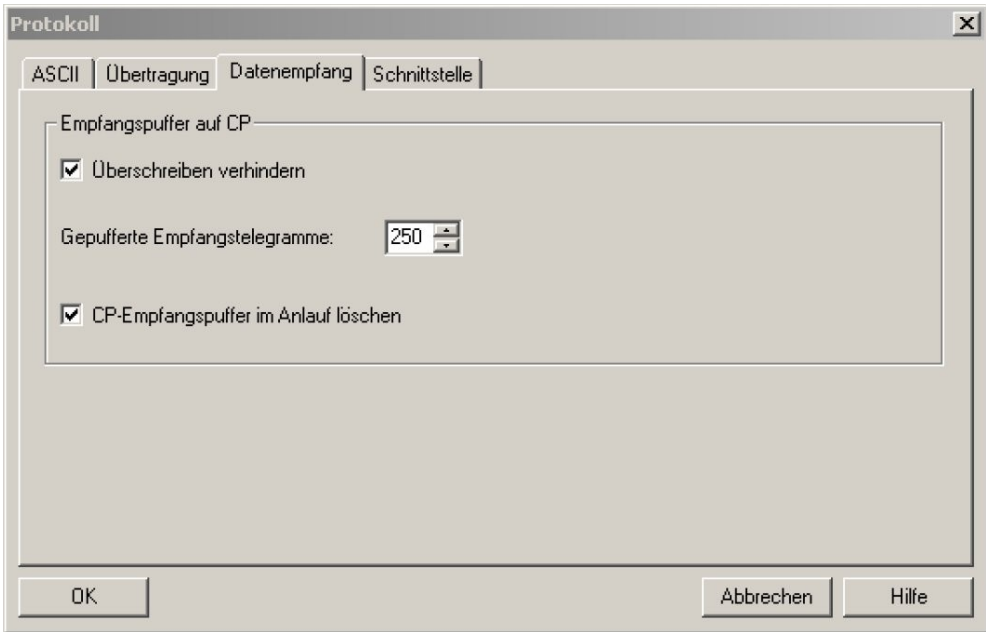
- Double click on the envelope to define the protocol. Set the configuration exact to the settings as shown in the pictures 3 to 6. It is essential that all settings are correct, otherwise the communication will not work.



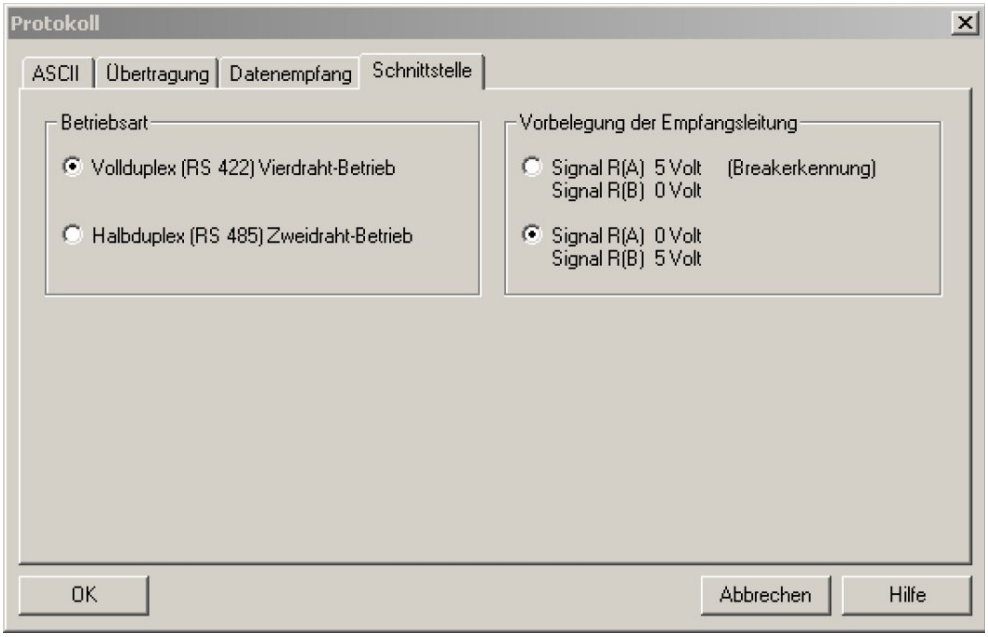
Picture 3 ASCII configuration



Picture 4 Transmission



Picture 5 Receive



Picture 6 Interface

After all the settings are done save the configuration and download it to the CP340 card.

3 Sample program installation

Unarchive the sample project S7_cp340_dls.zip with the S7 programming environment and copy all blocks (except the system data) into your project. The sample program is available on www.dimetix.com.

The following blocks make up the sample project:

- FC10 Status messages and communication blocks (For debug purposes only; In OB1 deactivated)
- FC11 FC with SEND FC
- 12 FC with RECEIVE
- DB2, DB 3 Instance-DBs for standard Fbs
- DB10 DB for sending
- DB20 DB for receiving
- OB1 Cyclic OB
- OB100 restart (warm start)-OB
- FB2, FB3 standard-FBs for RECEIVE, SEND

double click on "OB100" and insert the component address of the CP340, which you wrote down earlier. Download your project.

4 DLS-Distance sensor control

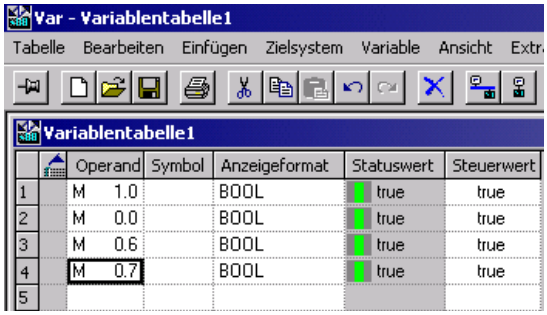
4.1 Sending

MerkerWort 0: In MW0, switch Merker 0.0 (Communication ON) ON.

MerkerWort 1: Switch desired command to ON.

M1.0	=	Distance measurement	correspond to DLS-Command: s0g
M1.1	=	Laser ON	correspond to DLS-Command: s0o
M1.2	=	CLEAR/STOP command	correspond to DLS-Command: s0c
M1.3	=	Laser OFF	correspond to DLS-Command: s0p
M1.4	=	read out buffer (tracking with buffering)	correspond to DLS-Command: s0q
M1.5	=	start tracking with buffering	correspond to DLS-Command: s0f

The selected command is executed when a positive edge on Merker 0.6 occurs. While the command transmition the TxD LED on the CP340 card is blinking. An additional positive edge on Merker 0.6 triggers the selected command again. The program allows only one selection at a time. Picture 6 shows the variable control.



Picture 7 Variable control

4.2 Receiving

MerkerWort 0: Switch Merker 0.7 (Enable receive) of the MW0 ON.

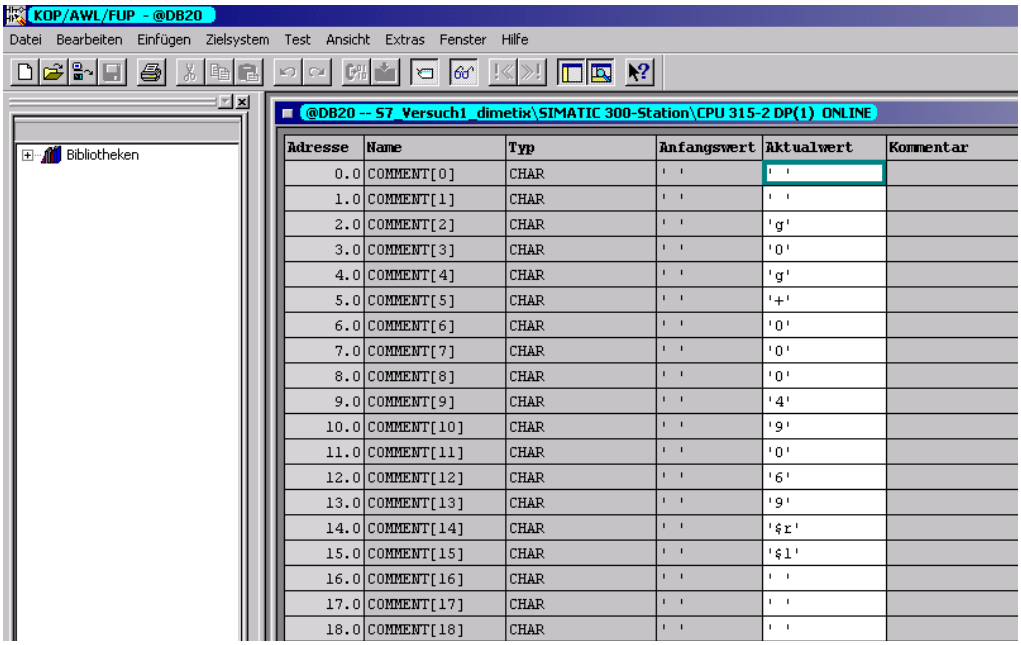
Open "DB20" and switch from the declaration view to the data view. Change "DB20" to online. After triggering a command with a positive edge at Merker 0.6 the DB20 shows the received data (See Picture 7). While the CP340 receives data, you will see the RxD LED blinking.

The following picture shows the answer string. It contains the following elements:

gNg+ Header N=Module identification number

MMMMMMMM M=measured distance in 1/10 of a millimeter

$r $l Terminator (<CR><LF>)



Picture 8 Data receive

5 Diagnostic

Wrong handling, incorrect wiring or inconsistent configuration result in a sample program, which will not work properly. Please consult the Siemens documentation for instruction how to debug such problems..

Status messages of the communication components

The FC10 is deactivated in OB1. It has no influence on the function of the communication. The FC10 is made to debug communication problems. Uncomment the entry in OB1 and you can use this block. The following signals will be analyzed:

M8.0	=	„Done“ of a successful SEND
M8.1	=	„Error“ of a unsuccessful SEND
M8.2	=	„BR“ of a SEND
M8.4	=	„Done“ of a successful RECEIVE
M8.5	=	„Error“ of a unsuccessful RECEIVE
M8.6	=	„BR“ of a RECEIVE

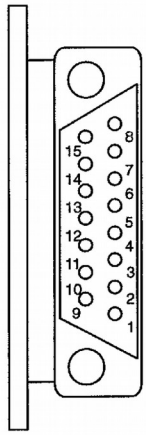
6 Appendix

B.3 X27 (RS 422/485)-Schnittstelle des CP 340-RS 422/485

Pinbelegung

In der folgenden Tabelle finden Sie die Pinbelegung der 15poligen Sub-D-Buchse in der Frontplatte des CP 340-RS 422/485.

Tabelle B-3 Pinbelegung der 15poligen Sub-D-Buchse der integrierten Schnittstelle des CP 340-RS 422/485

Buchse auf CP340-RS422/485*	Pin	Bezeich-nung	Eingang/ Ausgang	Bedeutung	DLS/FLS Signal	DLS/FLS PIN
	1	–	–	–		
	2	T (A)	Ausgang	Sendedaten (Vierdraht-Betrieb)	R-	5
	3	–	–	–		
	4	R (A)/T (A)	Eingang Ein-/Ausgang	Empfangsdaten (Vierdraht-Betrieb) Empfangs-/Sendedaten (Zweidraht-Betrieb)	T-	3
	5	–	–	–		
	6	–	–	–		
	7	–	–	–		
	8	GND	–	Betriebserde (potentialfrei)	14, 15	
	9	T (B)	Ausgang	Sendedaten (Vierdraht-Betrieb)	R+	6
	10	–	–	–		
	11	R (B)/T (B)	Eingang Ein-/Ausgang	Empfangsdaten (Vierdraht-Betrieb) Empfangs-/Sendedaten (Zweidraht-Betrieb)	T+	4
	12	–	–	–		
	13	–	–	–		
	14	–	–	–		
	15	–	–	–		

* Ansicht von vorne