FCD 300



Application note

AS-i and Siemens DP/AS-i link 20E



Drives Solutions

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Introduction

This application note describes how to set up an AS-i system between a Danfoss FCD 300 frequency converter and Profibus DP/AS-i Link 20E gateway from Siemens. DP/AS-i Link 20E is a gateway that translate from Profibus DP to AS-i bus. It is assumed that you are already familiar with the Simatic S7 system. In this instruction the STEP 7 software version 5.1 is used.

This note describes:

- System description
- Configuring the AS-i network
- Command interface
- Controlling the FCD 300 AS-i

NOTE!:
The examples does not describe all the functions needed for a real application, for example error handling.

Only the steps which are required in order to establish communication between the FCD 300 AS-i bus and the DP/AS-i Link 20E gateway are shown.

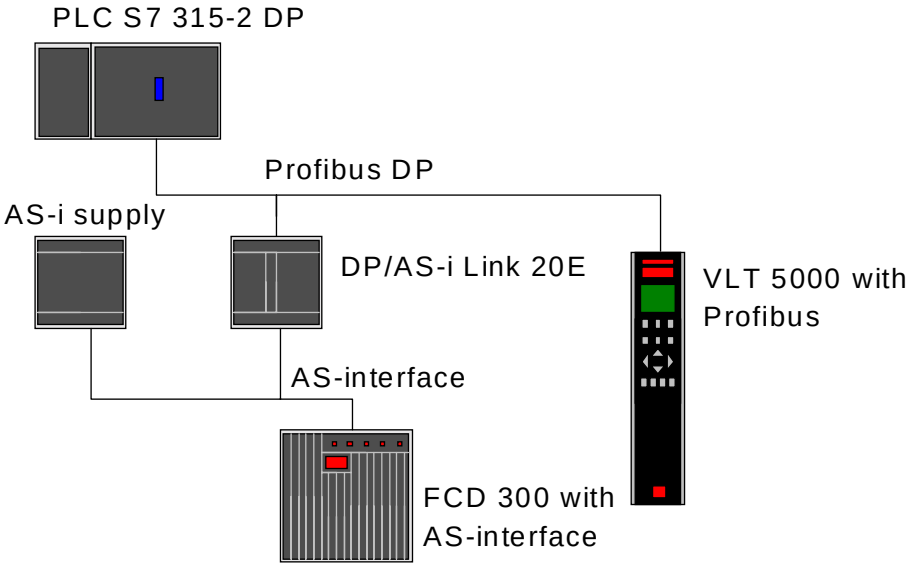
Details of some of the components/software:
FCD 300 with AS-i bus - sw. version 0.83.
DP/AS-i Link 20E version 6GK1 415-2AA01
PLC S7-315-2 DP
S7 Manager version 5.1

System description

The drawing shows the system in this note.
On the Profibus network the stations are programmed in the following way:

S7 PLC 315-2 DP:	Address number 0
DP/AS-i Link 20E:	Address number 5
VLT 5000:	Address number 9

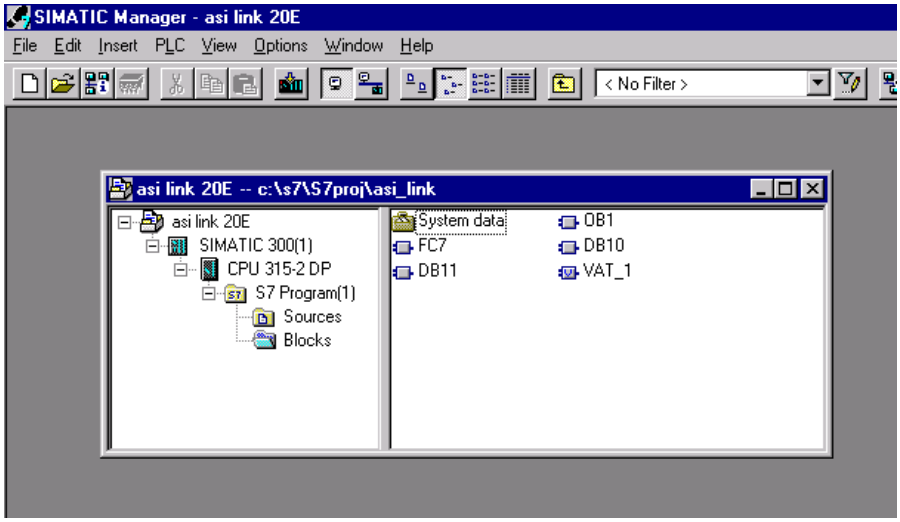
On the AS-i networks the FCD 300 is programmed to AS-i address number 7.



■ Configuring the AS-i network

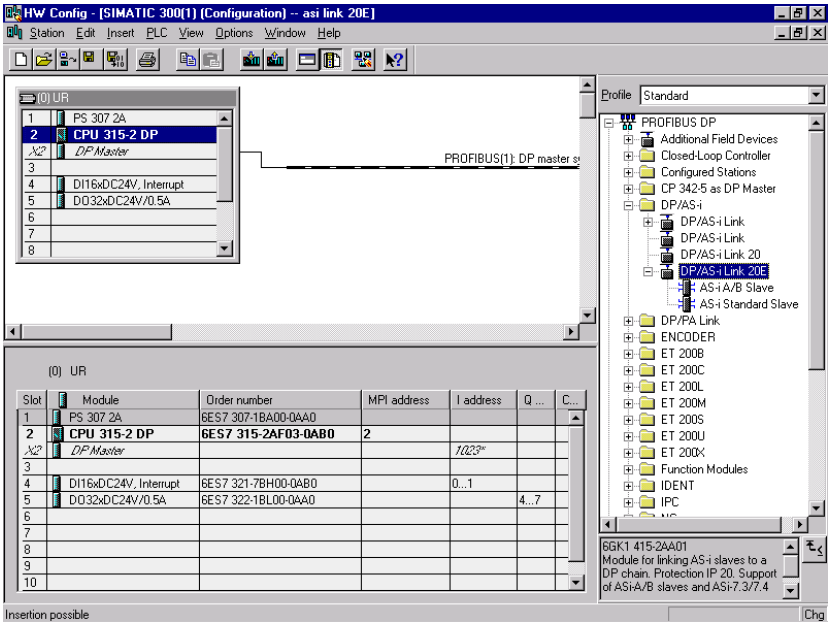
In this example we will only have one FCD 300 set up to AS-i address 7 and the DP/AS-i Link 20E gateway is set up to address 5 on the Profibus network.

Start the S7 Manager and create a new project.



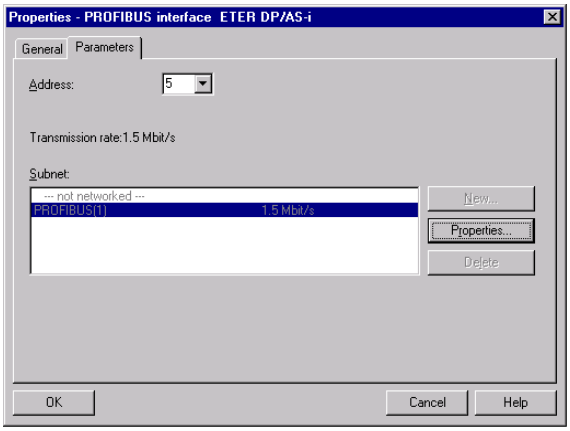
Open Hardware configuration in S7 Manager to configure the system.

Insert a Profibus network. In Hardware profile you will find the GSD file for the DP/AS-i Link 20E gateway. Drag and drop the DP/AS-i Link 20E to the Profibus network.

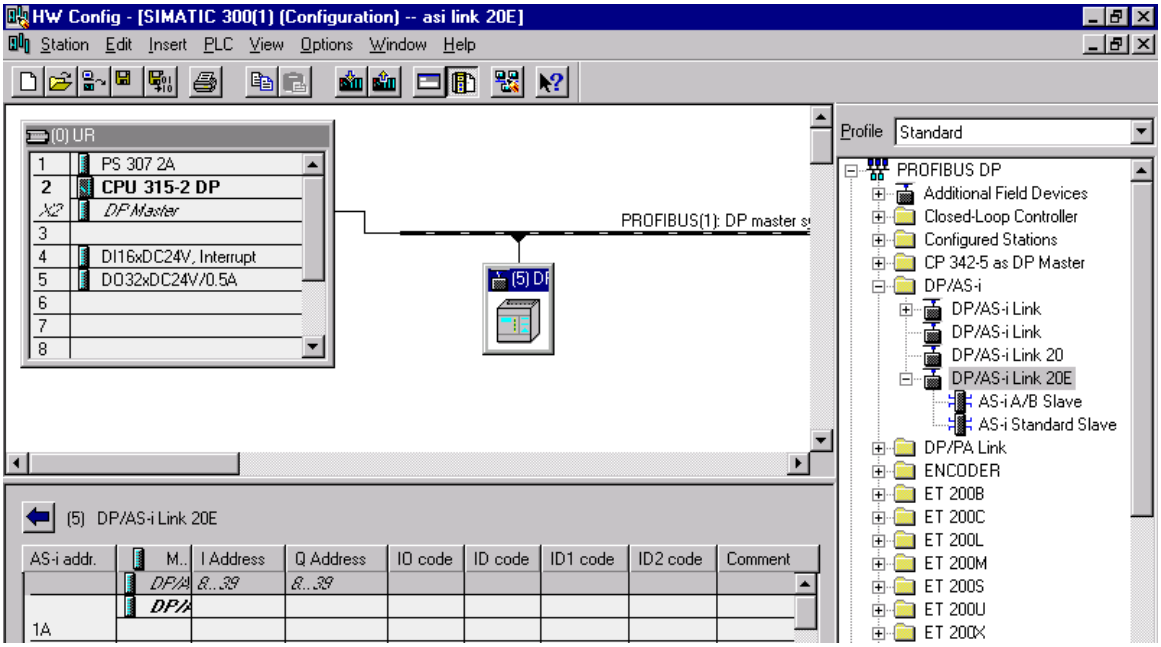


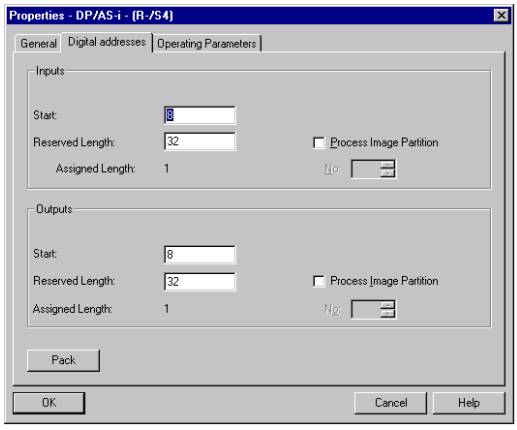
■ Configuring the AS-i network

Give the DP/AS-i Link 20E a Profibus address. Note that this address must also be programmed into the DP/AS-i Link 20E gateway, see the DP/AS-i Link 20E manual.



Click on OK

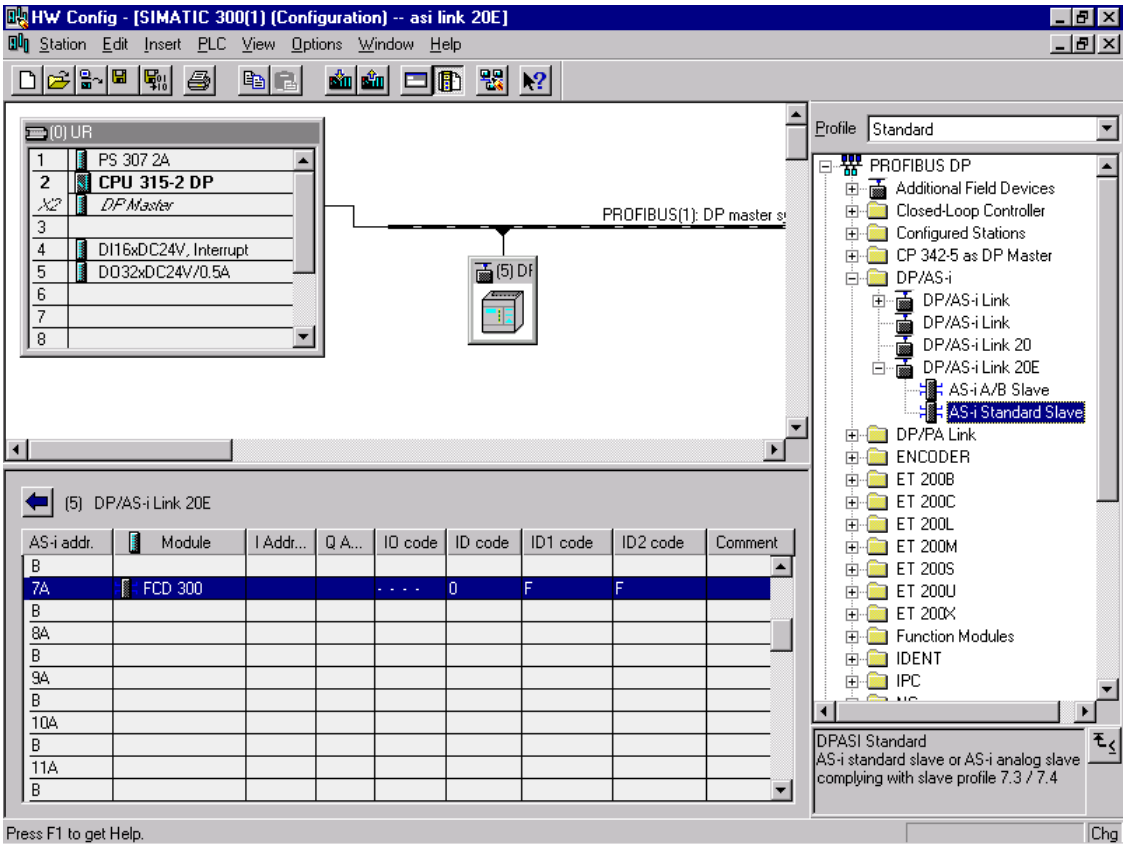


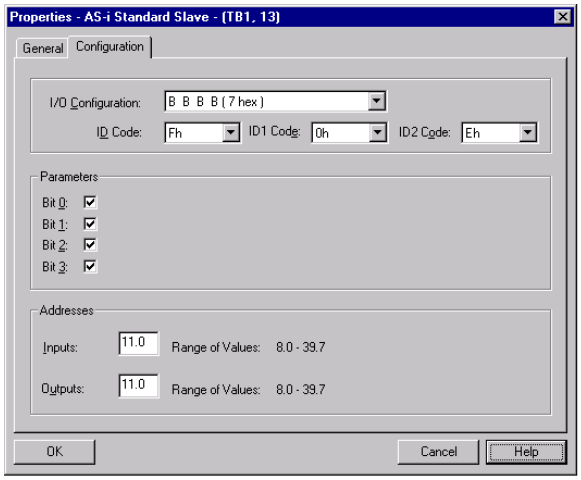


Open the properties for the DP/AS-i Link 20E to specify the start address of the gateway.
The start address and the reserved length shows where the DP/AS-i Link 20E is map to in the I/O area.

■ Configuring the AS-i network

FCD 300 AS-i bus interface supports the AS-i protocol version 2.11 and the profile is a 7.F.0.E. This profile is a standard profile.
Drag and drop the AS-i Standard Slave to the slave number where the FCD 300 is present. Here the FCD 300 is setup to AS-i adress 7.





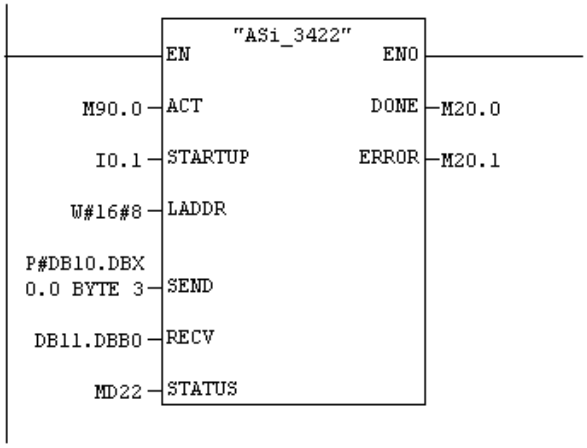
Double click on the FCD 300 at address 7A and the Properties of the AS-i slave will pop-up.
Choose 7.F.0.E in Configuration and ID code 0-2.

In Addresses the input and output area of the four data bits is set up. The output bits will be at Q 11.0 - 11.3 and the input bits at I 11.0 - 11.3.
In parameter 811 - 814 *Control Word config bit 00-03* you can choose which function should be on each bit.
The function of the input bits is depending on which AS-i parameter that are chosen.

Download the hardware configuration to the PLC.

Command interface

Together with the DP/AS-i Link 20E a convenient command interface is attached called ASI_3422. With this interface AS-i parameter and data bits can be change between the S7 master and FCD 300. See the FCD 300 AS-i manual for more detailed information on the AS-i parameters and data bits.



With ACT the command interface is started.
LADDR is the start address of the DP/AS-i Link 20E in the S7 address area. See page 3.
With SEND an AS-i parameter change can be done via a data block. Here it is specified to send 3 bytes starting from Data block 10 byte 0.
RECV is the receive buffer for command response.

Controlling the FCD 300 AS-i

The FCD 300 can now be controlled via a Variable Table in the S7 Manager. AS-i parameter changes are done in DB10.DBB 0-2 and a Data bit changes in Q 11.0-11.3.
The response of an AS-i parameter will be in DB11.DBB 0 and the FCD 300 status bits are mapped to I 11.0 -11.3.

@VAT_1 -- asi link 20E\SIMATIC 300(1)\CPU 315-2 DP\S...

	Address	Symbol	Disp	Status value	Modify value
1	DB10.DBB 0		HEX	B#16#02	B#16#02
2	DB10.DBB 1		HEX	B#16#07	B#16#07
3	DB10.DBB 2		HEX	B#16#02	B#16#02
4					
5	DB11.DBB 0		HEX	B#16#02	
6					
7	I 11.0	"Bit 0 Ready"	BIN	2#1	
8	I 11.1	"Bit 1 Remote"	BIN	2#1	
9	I 11.2	"Bit 2 Run"	BIN	2#1	
10	I 11.3	"Bit 3 Warning"	BIN	2#0	
11					
12	Q 11.0	"Bit 0 Start"	BIN	2#1	2#1
13	Q 11.1	"Bit 1 Quick Stop"	BIN	2#1	2#1
14	Q 11.2	"Bit 2 Preset ref. LSB"	BIN	2#0	2#0
15	Q 11.3	"Bit 3 Preset ref. MSB"	BIN	2#0	2#0
16					

In DB10.DBB 0 the AS-i command is set up.
02 Hex means Write_Parameter. See the DP/AS-i Link 20E manual for more detail information.
In DB10.DBB 1 the slave address is set up. In this example we write to slave address number 07.
The AS-i parameter is set up in DB10.DBB 2.
02 Hex means that the FCD is running in Setup number 2. See the FCD manual.

NOTE!:
To be able to change setups via this AS-i command parameter 004 *Active setup* must be set to *Multi setup* [5].

The FCD 300 is in parameter 811-814 programmed to following factory seeting:

Par. 811 *Control Word bit 00*:	Ramp stop start
Par. 812 *Control Word bit 01*:	Quick stop
Par. 813 *Control Word bit 02*:	Preset ref. LSB
Par. 814 *Control Word bit 03*:	Preset ref. MSB

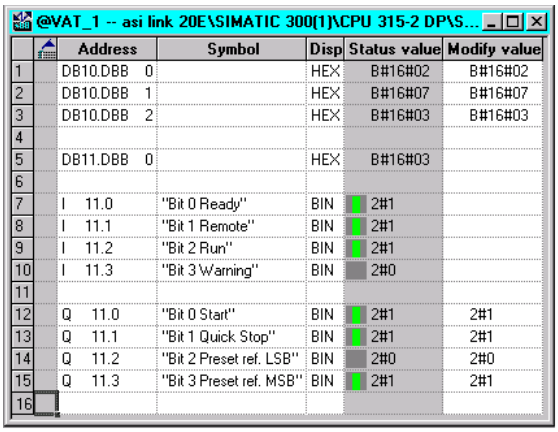
In the above example the control word shows that the FCD 300 has start signals on bit 00 and 01.
By this configuration the reference is selected to be preset reference 1 by bit 02 and 03.
In this example the actual reference would be the setting in parameter 215 *Preset reference 1* as bit 02 and 03 are set to 0.

In AS-i parameter 02 the status word will be:

Bit 00	Ready
Bit 01	Remote
Bit 02	Run
Bit 03	Warning

The status word shows that the FCD 300 is ready, remote operation and the motor is running.

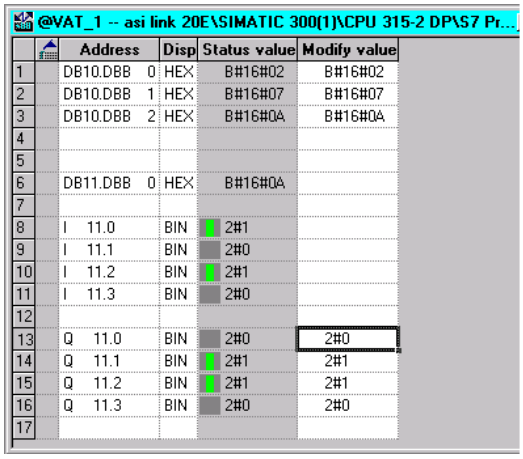
■ Controlling the FCD 300 AS-i



@VAT_1 -- asi link 20E\SIMATIC 300(1)\CPU 315-2 DP\S...

	Address	Symbol	Disp	Status value	Modify value
1	DB10.DBB 0		HEX	B#16#02	B#16#02
2	DB10.DBB 1		HEX	B#16#07	B#16#07
3	DB10.DBB 2		HEX	B#16#03	B#16#03
4					
5	DB11.DBB 0		HEX	B#16#03	
6					
7	I 11.0	"Bit 0 Ready"	BIN	2#1	
8	I 11.1	"Bit 1 Remote"	BIN	2#1	
9	I 11.2	"Bit 2 Run"	BIN	2#1	
10	I 11.3	"Bit 3 Warning"	BIN	2#0	
11					
12	Q 11.0	"Bit 0 Start"	BIN	2#1	2#1
13	Q 11.1	"Bit 1 Quick Stop"	BIN	2#1	2#1
14	Q 11.2	"Bit 2 Preset ref. LSB"	BIN	2#0	2#0
15	Q 11.3	"Bit 3 Preset ref. MSB"	BIN	2#1	2#1
16					

In this example the setup is changed to Setup 3 in the FCD 300 via an AS-i parameter change.
The reference is selected to be preset reference 3 in parameter 217 *Preset reference 3*.



@VAT_1 -- asi link 20E\SIMATIC 300(1)\CPU 315-2 DP\S7 Pr...

	Address	Disp	Status value	Modify value
1	DB10.DBB 0	HEX	B#16#02	B#16#02
2	DB10.DBB 1	HEX	B#16#07	B#16#07
3	DB10.DBB 2	HEX	B#16#0A	B#16#0A
4				
5				
6	DB11.DBB 0	HEX	B#16#0A	
7				
8	I 11.0	BIN	2#1	
9	I 11.1	BIN	2#0	
10	I 11.2	BIN	2#1	
11	I 11.3	BIN	2#0	
12				
13	Q 11.0	BIN	2#0	2#0
14	Q 11.1	BIN	2#1	2#1
15	Q 11.2	BIN	2#1	2#1
16	Q 11.3	BIN	2#0	2#0
17				

In this example the FCD is changed to reference mode A hex. In this mode the reference is transmitted to the FCD 300 as a 4 bit reference which can be selected in 15 steps between par. 204 *Min. reference* and par. 205 *Max. reference*.
The reference resolution is 7.14 %.
0 Hex forces a stop and 1 Hex gives a start command without a reference.

NOTE!:
Parameter 215 *Preset reference 1* is always added to the reference set by the bus.

The input bits will in this mode indicates the Main Actual Value in 16 steps.
The Main Actual Value resolution is 6.67 %.

XREF__BC
NOT LOADED ON RIP

FCD 300



Application note

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