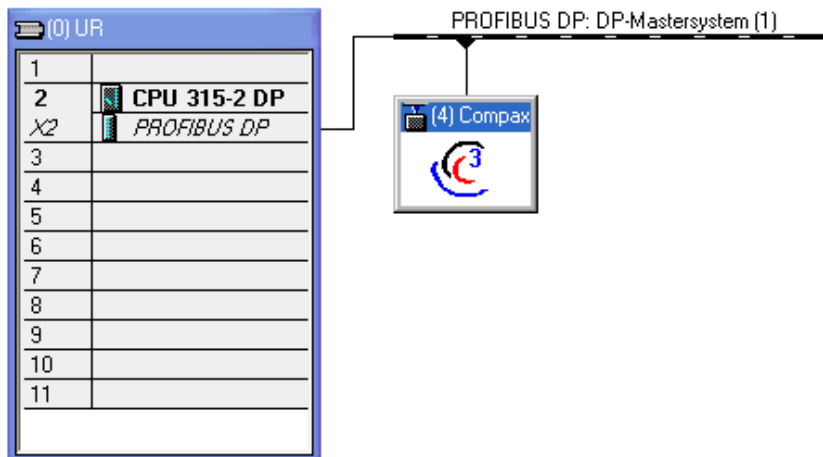


Last update: 19.06.2008 Klaus Zimmer
Application example:

C3 I20 T30 / T40 ArrayManager



June 08

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1 introduction

1.1 Product liability

1.1.1 Nonwarranty clause

Parker Hannifin - Automation Group - does not give any guarantee that the modules for SIMATIC S7 at hand will function properly under all conditions. From today's point of view there is generally no Software that will work properly under all conditions and requirements. The manufacturer therefore shall not be liable for direct and indirect damages of all kinds caused by the use of the software modules, even if the modules are used in accordance with the description in the manual at hand.

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1.2 Device assignment

1.2.1 This manual applies to the following devices:

- Compax3S025V2 + supplement
- Compax3S063V2 + supplement
- Compax3S100V2 + supplement
- Compax3S025V2 + supplement
- Compax3S063V2 + supplement
- Compax3S100V2 + supplement
- Compax3S150V2 + supplement
- Compax3S015V4 + supplement
- Compax3S038V4 + supplement
- Compax3S075V4 + supplement
- Compax3S150V4 + supplement
- Compax3S300V4 + supplement
- Compax3H050V4 + supplement
- Compax3H090V4 + supplement
- Compax3H125V4 + supplement
- Compax3H155V4 + supplement

1.2.2 With the supplement:

- F10 (Resolver)
- F11 (SinCos®)
- F12 (linear and rotary direct drives)
- I20
- T30
- T40

1.2.3 and the Master plc:

- SIMATIC S7-300 or
- SIMATIC S7-400
- with integrated PROFIBUS DP Master (e. g. CPU315-2DP)

2 purpose of the Block

2.1 overview

Absolute	Symbol	Comment	Vers.	Datum	device	application
FB40	C3ArrayManager	C3 I20 T30 / T40 Manager for reading and writing objects	V0.1	2004-04-29 07:44:14 PM	C3 I20 T30 / T40	Recipe - Array read / write

2.2 restrictions and application

The block is used to transfer tags, which are not very often changed. There's a possibility to transfer in both directions. The more often changed tags should be transferred with cyclic channel (PZD).

Now you've the possibility to transfer lots of more tags with *ArrayManager* over the acyclic channel. The block is writing or reading any number of tags from 1 to 288. The actualisation time is increasing with the number of tags.

3 adjustment

3.1 Compax3 Configuration

With C3ServoManager few following adjustments:

At folder:

\\ communication \ PROFIBUS DP - node settings
[PLC -> Compax3]

The input parameters are up to the user.

[Compax3 -> PLC]

The output tags are up to the user.

Caution: don't use the same tag in both ways in same direction, otherwise it could force the to be flashing with tow values.

[Operation Mode Settings]

Acyclic process data channel / Parameter channel

Select with "PKW"

Error response on fieldbus failure is up to user.

At folder:

\\ communication \ scaling factors Y2/Y4

The variables of the first two columns (col1, col2) are as C3 "REAL" -Variables declared. Via Fieldbus they are transferred throw "INT"- (col1) resp. "DINT"- (col2) Variables. The ArrayManager is transferring them into SIMATIC "real" variables.

The adjustment of the decimal point is done with:

Y2 - Array_col2
 Y4 - Array_col1

The adjustment of scaling factors is up to user according to the Application, for a meaningful adjustment you've the following array of values:

- For col2
 - Values: -32768 ... 32767
 - Default setting: "1 decimal place"
 - Suggestion values: 0... 4 decimal places

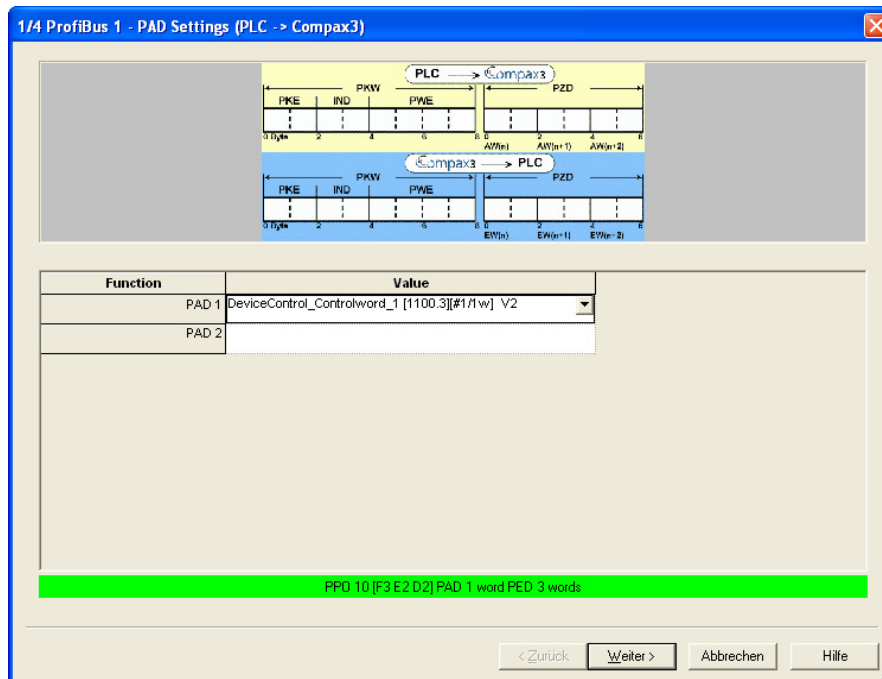
- For col1
 - Values: -2147483648 ... 2147483647
 - Default setting: "3 Decimal places"
 - Suggestion values: 0... 6 decimal places,

So, if you need a high amount of values use column 1. This two mentioned scaling factors are correlated the to first two columns (col1, col2). They're used in same way equal you transfer via PZD or PKW. The other settings are not used with *ArrayManager*.

3.2 Compax3 Hardware

DIP-Switch: Bus address
 Bus plug: ``ON / OFF`` Bus- termination resistance

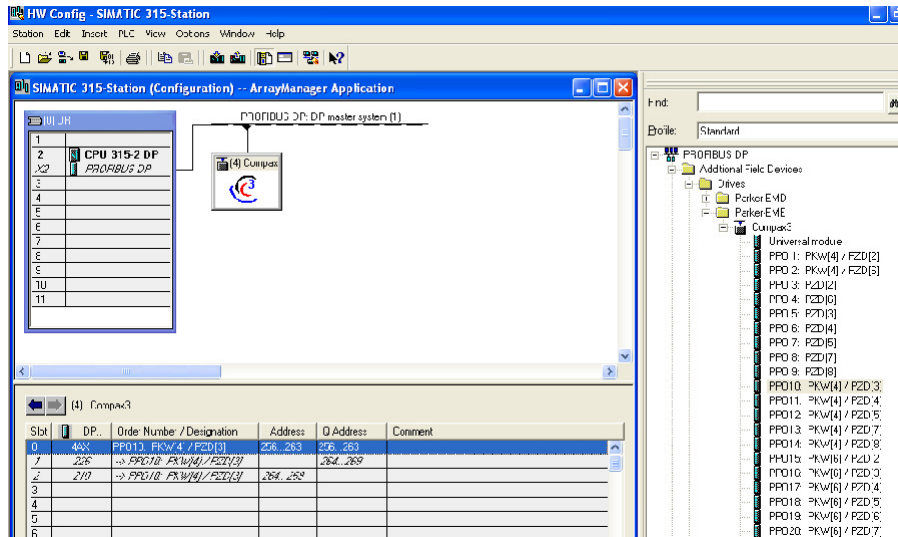
3.3 Compax3 configuration



pic 1 communication - PROFIBUS DP node settings

3.4 SIMATIC - HW Config

Correlated to PPO-Type (see pic 2 communication - PROFIBUS DP node settings - is shown in C3-Manager wizard) use the type at *SIMATIC - HW Config* .



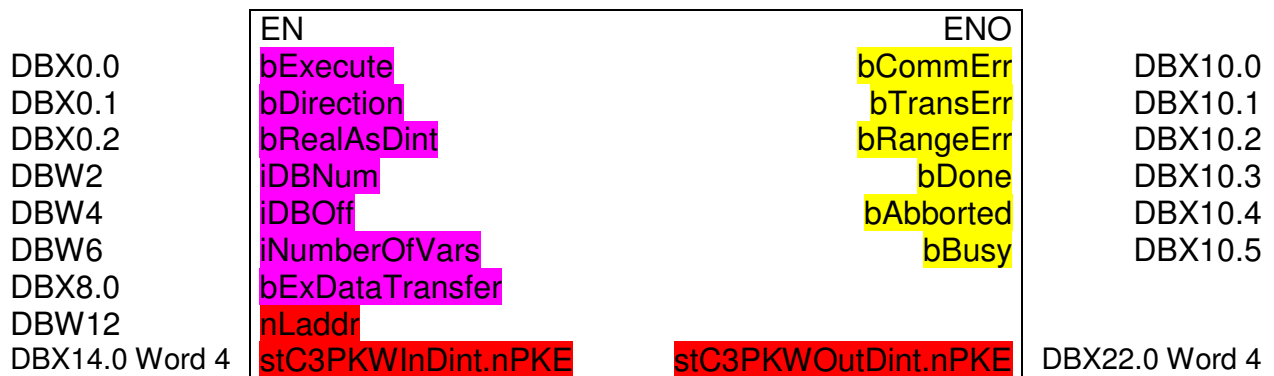
pic 3 SIMATIC - HW Config

Edit the Start address of PKW (here 256) in Instance Variable <nLaddr> (DB40.DBW12).

3.5 Application interface of "ArrayManager"

3.5.1 Schematic drawing for in- and output

DB40



3.5.2 Declaration of In- and Output

Parameter	Declaration	Type	description
-----------	-------------	------	-------------

Parameter	Declaration	Type	description
bExecute	IN	BOOL	Start transfer with rising edge, that must be "high" during complete transfer (reset with bDone = 1)
bDirection	IN	BOOL	=0 Upload, =1 Download
BRealAsDint	IN	BOOL	=0 col. 1 and 2 are transferred to / from REAL at S7 =1 col. 1 and 2 are transferred to / from DINT or INT (e.g. for special dates out of a HMI-device)
iDBNum	IN	INT	DB Number with Variables
iDBoff	IN	INT	Start address in iDBNum
iNumberOfVars	IN	INT	number of Variables for transfer
bExDataTransfer	IN	BOOL	=0 integrated DP interface (communication with SFC14 / SFC15) =1 external DP- interface (communication with FC1 / FC2)
bCommErr	OUT	BOOL	=1 communication failure (out of SFC14 / SFC15)
bTransErr	OUT	BOOL	=1 Format-, Commando failure with transfer to C3
bRangeErr	OUT	BOOL	=1 at - amount of Variables < 1 or > 288 - number of rows < 1 or > 32 - number of columns < 1 or > 9
bDone	OUT	BOOL	=1 if transfer finished and bExecute = 1
bAborted	OUT	BOOL	=1 if transfer not finished but bExecute = 0
bBusy	OUT	BOOL	=1 if transfer active
nLaddr	STATIC	WORD	Default = W#16#100, Start address C3-Slave at HW Config, necessary if bExDataTransfer = 0
StC3PKWInDint.nPKE	STATIC	Word 4	Local input area for external CP.
StC3PKWOutDint.nPKE	STATIC	Word 4	Local output area for external CP.

3.5.3 sequence of process data

1. setting of inputs of the block

- <nLaddr> (Parameter from HW Config)
- <bDirection> (write o read)
- <iDBNum> and <iDBoff> (pointer of Start address of Data block)
- <iNumberOfVars> (number of variables for transferring)

2. settings of Parameters of the Data block

- To transfer one variable a data set is needed. This data set contains three tags: two pointers (Row, Column) and the value. For Row / Column each on byte is needed for value 4 byte is reserved.
- It is up to the user how much Variables (1 ... 288) and in which order they are transferred.
- Each column of the C3 array is correlated one data type which is not possible to be changed.
 - 1. column REAL transferred as INT
 - 2. column REAL transferred as DINT
 - 3. - 5. column INT
 - 6. - 9. column DINT
- that means: with the pointers is also the format fixed.
- Each data set contains a value area with 4 bytes despite that is not used in any case (e.g. INT).
- For engineering data blocks it is advisable to use the following data blocks

C3ArrayItemREAL	UDT 42	C3 type Definition C3 REAL Col 1 .. 2
C3ArrayItemDINT	UDT 43	C3 type Definition C3 DINT Col 3 .. 5
C3ArrayItemINT	UDT 44	C3 type Definition C3 INT Col 6 .. 9
C3ArrayItem_one_line	UDT 50	C3 type Definition C3 Declare of one line in Array

3. If transfer direction is from plc to C3 fill the data values in data block
4. Force the input
 - *<bExecute>*
 - to "1": transfer is active!
5. If the output
 - *<bDone>*
 - has reached the value "1" transfer is done. The input
 - *<bExecute>*
 - should be reseted to "0".
6. If there are values transferred form c3 to plc: now it is possible to read them out of data block

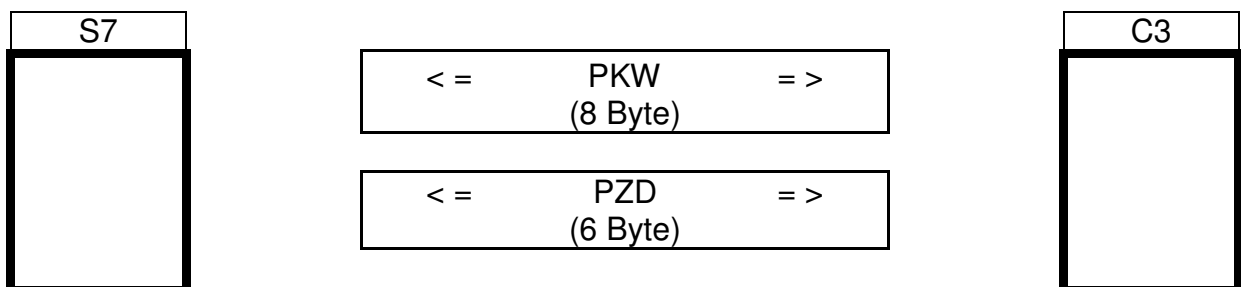
3.6 setting for external Master

- the function block is only possible with S7 plc with integrated PROFIBUS DP master: Without the block is not suitable.
- If this interface is used for another purpose and the connection to c3 should be realised with an external communication processor (cp342-5) the function block is possible to be used with following settings:
 - For running the CP 342-5 there're to functions: FC1 / FC2 (DP_SEND / DP_RECV, out of SIMATIC Standard library).
 - Put at DP_SEND the global output t area, and at DP_RECV the global input area.
 - attention! These global areas included the data's of all bus slaves.
 - The local field of c3 must be transferred to the field at DB40 (e.g. via SFC20 BLKMOV).
 - The local input and output field could be indentified with SIMATIC - HW Config.

4 Application example

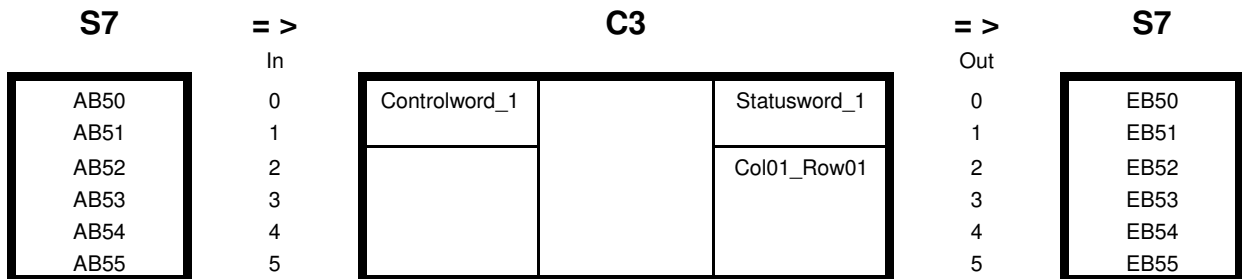
4.1 Overview of the connection:

Connection between one plc SIMATIC S7 300 as PROFIBUS DP Master and one drive C3 I20 T30 as PROFIBUS DP Slave.



4.2 cyclic channel (PZD)

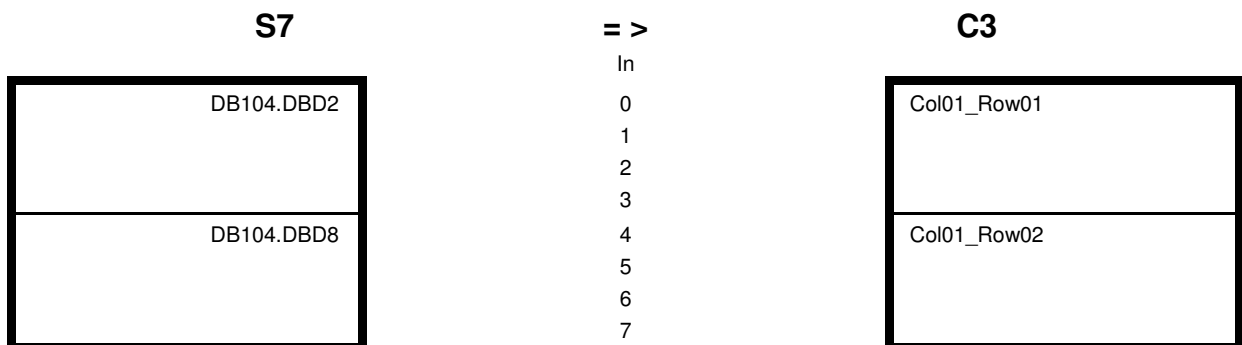
The In- and output parameters are at the C3 CoDeSys Program available. They are transferred in the S7 to the in- and output data EB50... EB55 respectively AB50 ... AB55 with the functions FC51 / FC99.



S7		C3					
	Format	Format	Bus	Obj.	PNU	Format	CoDeSys
AW50	Word	V2		1100.3	1		C3Plus.DeviceControl_Controlword_1
EW50	Word	V2		1000.3	2		C3Plus.DeviceState_Statusword_1
ED52	DINT	Y4		1901.1	130	REAL	C3Array.Col01_Row01

4.3 Acyclic channel (PKW)

Via the 8 Byte PKW interface are 2 variables of the recipe array transferred to the C3. With an endless sequence is the transfer continuously repeated. This is done from the functions FC31, FC40, FB40, FC41, FC42, FC43, FC44.



S7		C3					
	Format	Format	Bus	Obj.	PNU	Format	CoDeSys
DB104.DBD2	REAL	Y4		1901.1	130	REAL	C3Array.Col01_Row01
DB104.DBD8	REAL	Y4		1901.2	131	REAL	C3Array.Col01_Row02