

S7-300 Setup with the ABR

Note: The ABR is PROFINET compatible but not PROFINET certified.

The CPU315-2 PN/DP PROFINET IO-Controller has a very small memory size allocated for data coming to and from PROFINET devices, by default the size is only 128 bytes each.

For some reason, when connecting the ABR device to the PROFINET configuration, the PLC chooses 256 as the starting byte location for both input and output. This is well beyond the allocated range of input/output memory that the PLC has set aside.

There are two ways to fix this problem: select a user-defined address for the ABR connection that is within the default 128 byte area, or change the size of the input/output area. For this CPU, the maximum size is 2048 bytes.

User-defined Addressing

In the image below we see the initial problem. The PLC has decided to give the ABR input and output addresses starting at byte 256. This will not work in a default PLC (whose input and output memory allocation is only 128 bytes).



We can make use of "User-defined Addressing" and change the starting memory location for the ABR by hand. Click on the "I Address" table entry, then click "Addresses".



MP/DP PN-D PN-D PO PO	Short Description:	Virtual 64 Byte Input Virtual input module, 64 byte data	<u>^</u>
	Name:	Writual 64 Byte Input	
" (1) ABR3000	Comment:		
Module Order number I Addres ABR3000 PN ABR3000 Addres 7 /A / / / / / / / / / / / / / / / / / / /	Q addres		Cancel Help

As we can see, the default value the PLC gave the ABR is 256 (at left). The ABR needs 64 bytes of space for its Virtual Input Module. Choose a starting number between 0 and 64 to make the full ABR memory table fit into the PLC's default 128 byte allocation.

Properties - Virtual 64 Byte Input - (R-/S2)	Properties - Virtual 64 Byte Input - (R-/S2)
General Addresses Parameters	General Addresses Parameters hputs Stat: D Process image: End: 63 OB1 PI 💌
OK Cancel Help	OK Cancel Help



Here we see the ABR data coming into the PLC correctly.

Tal	🔓 Var - @Variable table1 💦 👘 💷 💌 Table Edit Insert PLC Variable View Options Window Help										
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		©Varia a	ible ta	IDIEL ONLINE							
	-	Add	iress	Display format	Status value	Modify valu					
1		IB	0	HEX	B#16#02						
2		IB	1	HEX	B#16#02						
3		IB	2	HEX	B#16#18						
4		IB	3	HEX	B#16#0D						
5		L									
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Increase the Size of the CPU Process Image Input/Output Areas

The other way to fix our problem is to increase the allocation of PLC memory that can be used by PROFINET devices. In the HW Config program, right click on the CPU, then select "Object Properties".



🙀 HW Config - [SIMATIC 300(1) (Configuration) Comm_Test]								
Station Edit Insert PI	C View Ontions Window Heln							
┍┑┍╩╺╩∼╔╕╔┉╽╱╡	Сору	Ctrl+C						
	Paste	Ctrl+V						
(0) UR	Insert Multi-Controller Device							
1 PS 3075 2 CPU 31	Replace Object							
X1 MPI/DP	Add Master System							
X2 PN-10 X2 P1 R Port 1	Disconnect Master System							
X2 P2 R Port 2	Master System Isochronous Mode							
3	Insert PROFINET IO System							
5	Disconnect PROFINET IO System							
6	PROFINET IO Domain Management							
7	PROFINET IO Topology							
9	PROFINET IO Multi-Controller Devices							
10	PROFINET IO LLDP Mode							
	PROFINET IO Isochronous mode							
	Specify Module							
	Delete	Del						
	Go To	+						
•	Filter Assigned Modules							
(0) UR	Monitor/Modify							
Slot 🚺 Module 🕳	Edit Symbols							
1 S 307 5	Object Properties	Alt+Return						

Click on the "Cycle/Clock Memory" tab.

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Cycle/Clock Memory	Retentive Memory Inten	rupts Time-of-Day Interrupts	Cyclic Interrupt
Diagnostics/Clock	Protection	Communication	Web
General	Startup	Synchronous Cycle	Interrupts
Short Description:	CPU 315-2 PN/DP		
0.1 N //	384 KB work memory; 0.0 connection; S7 Communic Controller; supports RT/IF PROFINET CBA; PROFIN	15ms/1000 instructions; PROFINI cation (loadable FBs/FCs); PROF RT; PROFINET interface and 2 p NET CBA-Proxy; TCP/IP transpor	ET A TINET IO- orts; MRP; t protocol; +
Order No./ firmware:	6ES/315-2EH14-0AB0/	V3.Z	
Name:	CPU 315-2 PN/DP		
Plant Designation:	[
Location Designation:			
Comment:			
			*
			*

Notice that the default settings for "Size of process-image input area" and "Size of process-image output area" are both 128 bytes.

Diagnostics/Clock Protecti General Startup		on	Communication	Web		
			Interrupts			
ycle/Clock Memory Retentive Memory		Interrupts	Time-of-Day Interrupts	upts Cyclic Interrupts		
Cycle	29- 					
🔽 Update OB1 pro	cess image cyclically					
Scan cycle monitorin	ng time [ms]:	150				
Minimum scan cycle	time [ms]:	0				
Scan cycle load from	n communication [%]:	20				
Prioritized OCM of	communication					
Size of the process-i	mage input area:	128	1			
Size of the process-i	mage output area:	128				
OB85 - call up at I/C) access error:	No OB85 call up 👻				
- Clock Memory						
Manager budge		0	1			
I MEMORY DYCE:		and the second sec				



Change one or both to a higher number (maximum 2048). This will increase the PLC memory space that can be allocated to PROFINET devices.

General Startup Synchronous Cycle Interrupts Cycle/Clock Memory Retentive Memory Interrupts Time-of-Day Interrupts Cyclic Interrupts Cycle Image: Cycle Clock Memory Interrupts Time-of-Day Interrupts Cyclic Interrupts Cycle Image: Cycle Clock Memory Interrupts Time-of-Day Interrupts Cyclic Interrupts Cycle Image: Cycle Clock Memory Interrupts Interrupts Cycle Clock Memory Size of the process-image input area: 1024 Interrupts Interrupts OB85 - call up at I/O access error: No OB85 call up Image: Clock Memory Clock Memory Image: Clock Memory Image: Clock Memory	Diagnostics/Clock	Protecti	on	Communication	Web		
Cycle/Clock Memory Retentive Memory Interrupts Time-of-Day Interrupts Cyclic Interrupts Cycle ✓ Update 0B1 process image cyclically Scan cycle monitoring time [ms]: 150 Minimum scan cycle time [ms]: 0 Scan cycle load from communication [%]: 20 Prioritized OCM communication 1024 Size of the process-image output area: 1024 OB85 - call up at I/O access error: No OB85 call up ✓ Clock Memory 0	General	Startup		Synchronous Cycle	Interrupts		
Cycle ✓ Update 0B1 process image cyclically Scan cycle monitoring time [ms]: 150 Minimum scan cycle time [ms]: 0 Scan cycle load from communication [%]: 20 Prioritized OCM communication 1024 Size of the process-image output area: 1024 OB85 - call up at I/O access error: No OB85 call up Clock Memory	Cycle/Clock Memory	Retentive Memory	Interrupts	Time-of-Day Interrupts	Cyclic Interrupts		
✓ Update 0B1 process image cyclically Scan cycle monitoring time [ms]: 150 Minimum scan cycle time [ms]: 0 Scan cycle load from communication [%]: 20 ○ Prioritized OCM communication 5ize of the process-image input area: Size of the process-image output area: 1024 OB85 - call up at I/O access error: No OB85 call up Clock Memory		()					
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Scan cycle load from communication [%]: 20 Prioritized OCM communication	Minimum scan cycle	time [ms]:	0				
Prioritized OCM communication Size of the process-image input area: 1024 Size of the process-image output area: 1024 OB85 - call up at I/O access error: No OB85 call up Clock Memory Clock memory Memory byte:	Scan cycle load from	communication [%]:	20				
Size of the process-image input area: 1024 Size of the process-image output area: 1024 OB85 - call up at I/O access error: No OB85 call up Clock Memory Clock memory Memory byte: 0		communication					
Size of the process-image output area: 1024 OB85 - call up at I/O access error: No OB85 call up Clock Memory Clock memory Memory byte: 0	Size of the process-ir	mage input area:	1024				
OB85 - call up at I/O access error: No OB85 call up	Size of the process-ir	mage <mark>output area:</mark>	1024				
Clock Memory Clock memory Memory byte: 0	OB85 - call up at I/O	access error:	No OB85 call up 💌				
Memory byte:	- Clock Memory						
Memory byte:	Clock memory						
	Memory byte:		0				
					11 322		

After that change, the ABR data can now be mapped to input byte starting at 256 and we can see the data in the PLC.

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١Ē		Address	Display format	Status value	Modify valu					
	1	IB 256	HEX	B#16#02						
2	2	IB 257	HEX	B#16#02						
	3	IB 258	HEX	B#16#18						
4	4	IB 259	HEX	B#16#0D						
1	5									
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-	-	T NORA	TTC 200 M3.				No.		le co l	
2			999	n ()	- 32	K/A		Access of the local division of the local di	EN	10: