

Siemens IOL_CALL with CPX I-Port Master for IO Link Devices

Over the Siemens IOL_CALL block The parameters can be modified by an IO Link device / read acyclic. Because on our CPX CTEL 2 M12-5POL-LK not a IODD can be included, is a parameterization of eg a Festo IO Link device (SDAT MO Link device (SDAT MHS M80-1L-SA-E-0.3-M8) only via this function module is possible

CPX-CTEL-2-M12-
5POL-LK
(part no.:2900543)

SDAT-MHS-M80-1L-
SA-E-0.3-M8
(part no:1531266)

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1 Components/ Software used

Type/Name	Version Software/Firmware	Date of manufacture
CPX-CTEL-2-M12-5POL-LK	Rev 2	---
SDAT-MHS-M80-1L-SA-E-0.3-M8	Rev 2	---
CPX-FB34	Rev 23	---
IM151-8F PN/DP CPU	FW 3.2.8	---
Siemens Step7	V5.5 + SP2	---

Table 1.1: Components/ Software used

1.1 Utilised manuals

SDAT-MHS-EN manual:

http://ademsp00.de.festo.net/net/de_de/SupportPortal/Downloads/351653/365160/8042043g1.pdf

CPX-CTEL-LK-EN manual:

http://ademsp00.de.festo.net/net/de_de/SupportPortal/Downloads/352738/339355/8034116g1.pdf

1.2 Utilised basic Siemens project

<http://support.industry.siemens.com/cs/#document/82981502?dti=0&lc=en-WW>

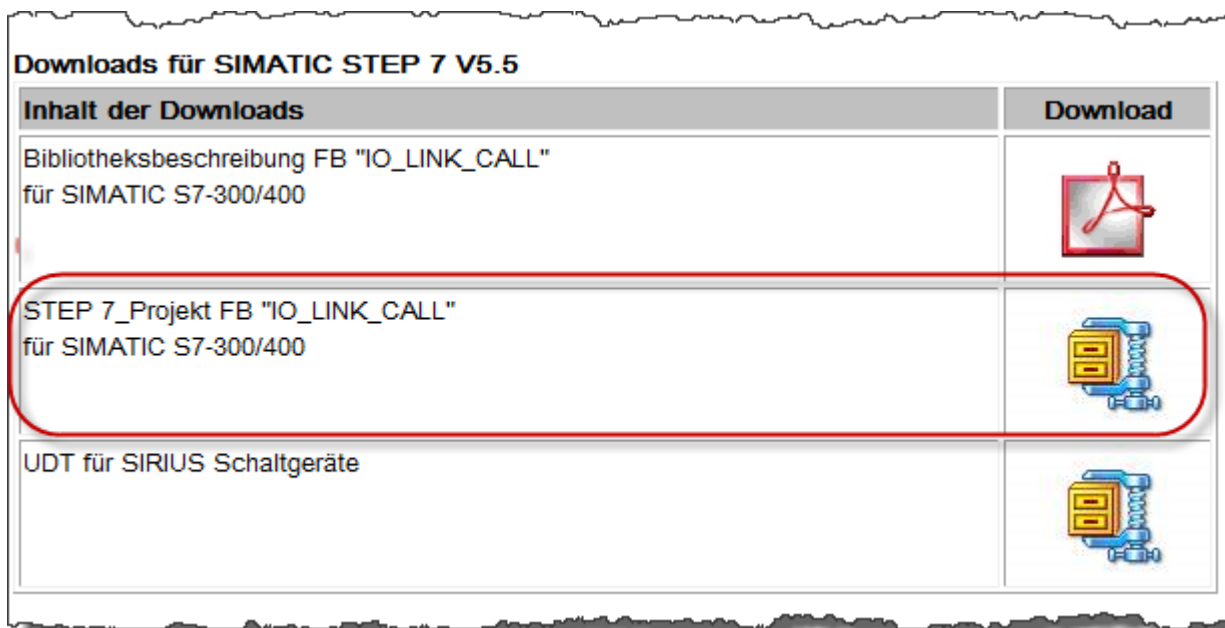


Figure 1.0: Screenshot of IO-Link-Call project

2 Introduction

2.1 The IOL Call module

The parameters of an IO-Link device can be acyclically changed/read with the IOL_CALL module.

In principle, the acyclic communication sequence looks like this:

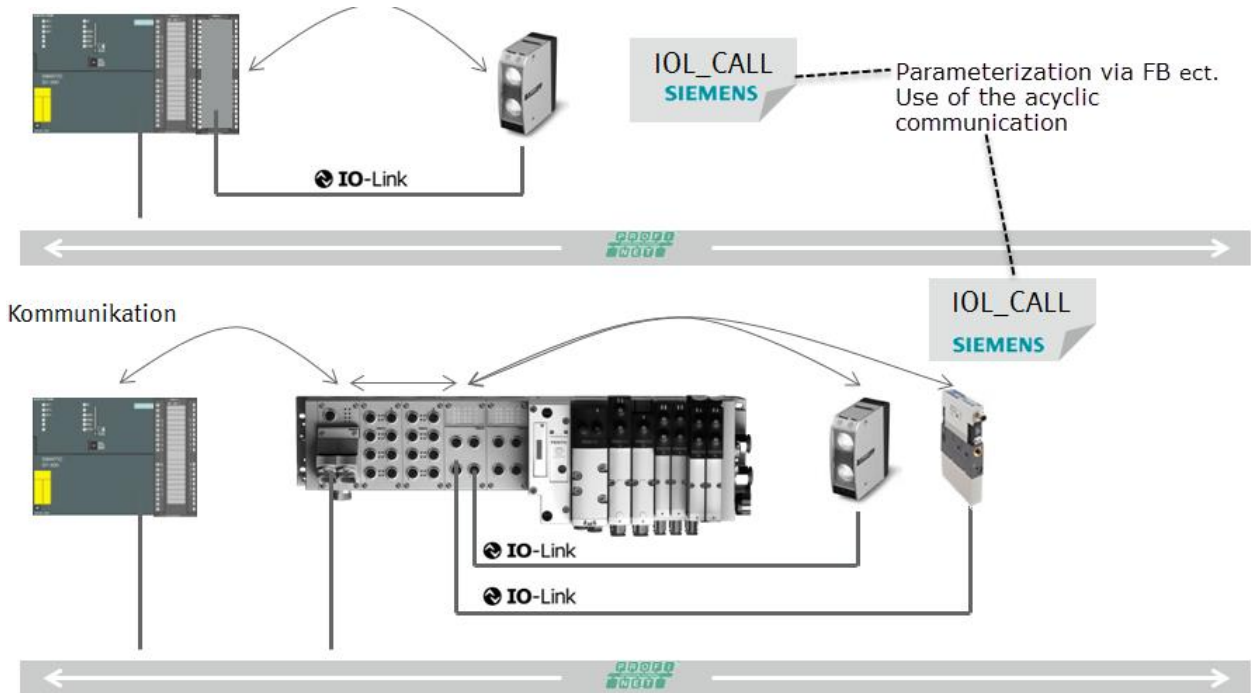


Figure 2.0: Communication sequence

2.2 The CPX-C-M12-5POL-LK I-Port Master for IO-Link devices

The CPX-CTEL...-LK has 2 communication ports (X1 & X2):

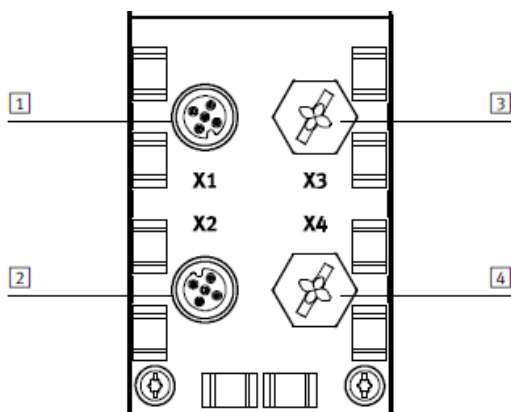
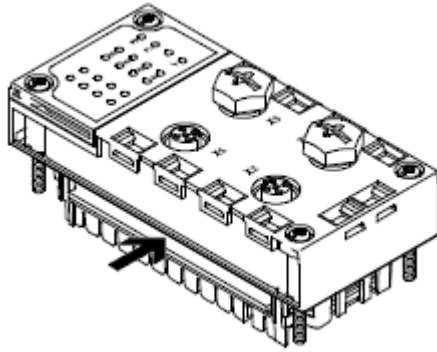


Figure 2.1: Communication ports

➔ And thus up to two IO-Link devices can be connected per port.

→ The I/O length of the connected device is determined with the DIL switch at the side.

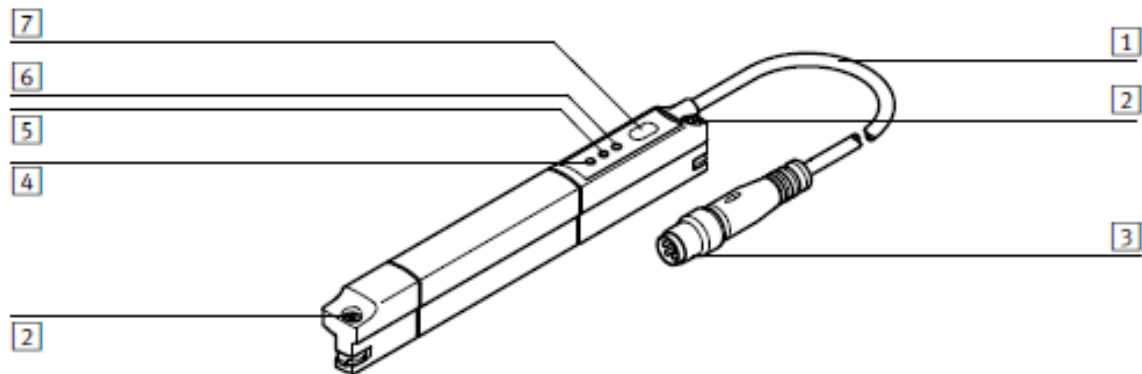


DIL-Schalter 1	S1.1	S1.2	Funktion
	OFF	OFF	4 Byte E/A
	OFF	ON	8 Byte E/A
	ON	OFF	12 Byte E/A
	ON	ON	16 Byte E/A

Figure 2.2: I/O length setting

2.3 The SDAT-MHS-M80-1L-SA-E-0.3-M8

The SDAT-MHS-...M8 is an IO-Link V1.1 position transmitter with a process data width of 2 bytes.



- | | |
|----------------------------------|---|
| 1 Connecting cable | 5 Green LED: Ready status display |
| 2 Mounting screw | 6 Yellow LED: Switching status display |
| 3 Plug M8, rotatable | 7 Operating key |
| 4 Red LED: Status display | |

Fig. 1 Control sections and connections

Figure 2.3: SDAT-MHS..

2.4 Why can the CPX-CTEL...-LK communicate with the SDAT-MHS...?

To a certain extent, IO-Link 1.1 master characteristics have been incorporated into the CPX-CTEL...-LK. If a 1.1 IO-Link device such as the SDAT-MHS... is connected, it will function. As a prerequisite, the device must not require IO-Link specification 1.1 characteristics for IO-Link communication, which are not incorporated into the CPX-CTEL...-LK.

Rough IO-Link overview			
IO-Link V1.0	CPX-CTEL...-LK	IO-Link V1.1	SDAT-MHS... V1.1
COM1: 4.8 kBaud	COM1: 4.8 kBaud	COM1: 4.8 kBaud	
COM2: 38.4 kBaud	COM2: 38.4 kBaud	COM2: 38.4 kBaud	
Optional: COM3: 230.4 kBaud	COM3: 230.4 kBaud	COM3: 230.4 kBaud	COM: 230.4 kBaud
Class A/B port	Class A/B port	Class A/B port	Class A port
	Parameters configuring function not implemented	New: Parameters configuring function i.e. parameters data are remanently stored to the master's memory.	Data storage implemented, i.e. when the master makes a parameters server available.
	Process data width: max. 16 bytes per port	New: Process data width of 32 bytes	Process data width: 2 bytes

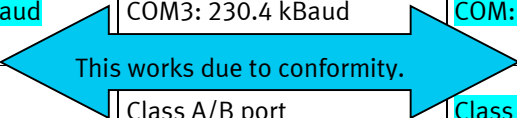
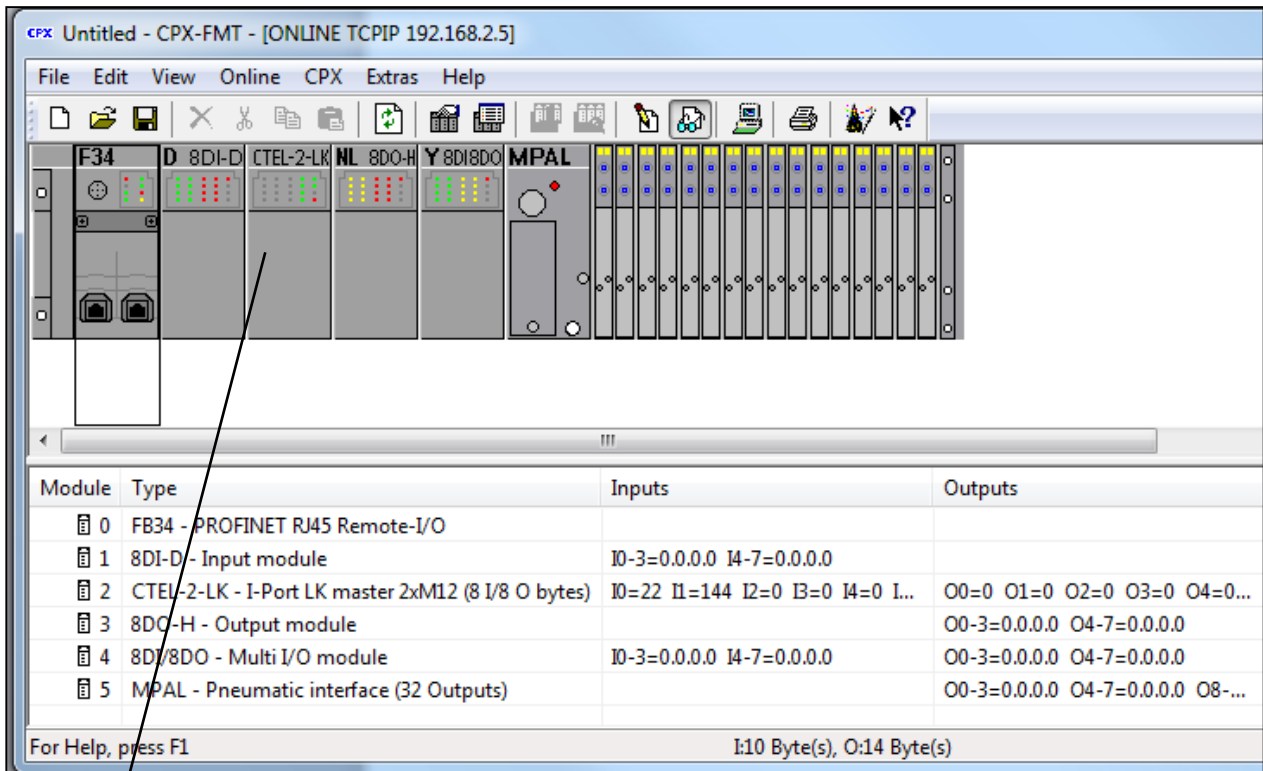


Table 2.1: Rough overview, IO-Link specification

3 Installation

3.1 How do I connect the CPX-CTEL...-LK to the SDAT-MHS...?



X1 Pinbelegung

Draufsicht	Pin	Belegung	Funktion
	1	24 V U _{EL/SEN}	Betriebsspannungsversorgung PS (Power System)
	2	24 V U _{VAL/OUT}	Lastspannungsversorgung PL (Power Load)
	3	0 V U _{EL/SEN}	Betriebsspannungsversorgung PS (Power System)
	4	C/Q	Kommunikation C/Q
	5	0 V U _{VAL/OUT}	Lastspannungsversorgung PL (Power Load)

Pin	Allocation	Plug
1	Operating voltage +24 V DC	M8x1, 4-pin
2	Analogue output 0...20 mA	
3	0V	
4	IO-Link/switching output (C/Q line)	

Figure 3.0: IO Link connection

4 Step 7 commissioning

4.1 HW Config

First of all, a new Step7 project is created and the Festo Profinet valve terminal is configured.

➔ After successful project downloading, the following online status prevails:

Slot	Module	Order number	I address	Q address	Diagnostic address:	Comment	Access
0	CPX	TN 197330			2041*		Full
X1	PN-IO Interface				2040*		Full
X1	Port 1				2039*		Full
X1	Port 2				2038*		Full
1	FB34 PNIO Module	TN 548751, CPX-FB34, Code F34			2037*		Full
2	8DI-D [8DI]	TN 541480, CPX-8DI-D, Code D	0				Full
3	CTEL-2-LK 8	TN 2900543, CPX-CTEL-2-LK, Code T45			2036*		Full
CTA	CTEL-2-LK 8				2036*		Full
Char	IO-Link 2/2		1...2	0...1			Full
Char							
4	8DO-H [8DO]	TN 550204, CPX-8DA-H, Code NL		2			Full
5	8DI/8DO [8DI/8DO]	TN 526257, CPX-8DI-8DO, Code Y	3	3			Full
6	MPAL DIL 4 [32DO]	TN 570783, VMPAL-EPL-CPX, Code L		4...7			Full
7							

Figure 4.0: Online STEP7, hardware configuration



Note

Details concerning successful **Profinet** commissioning are included in the CPX-Profinet manual:

http://www.festo.com/net/en-gb_gb/SupportPortal/Downloads/363636/349001/548760g1.pdf

4.2 Copying Siemens function blocks, for example

Just open the Siemens project in the Simatic Manager to this end, and copy the functions blocks etc. by means of drag and drop. The Siemens project can then be closed again.

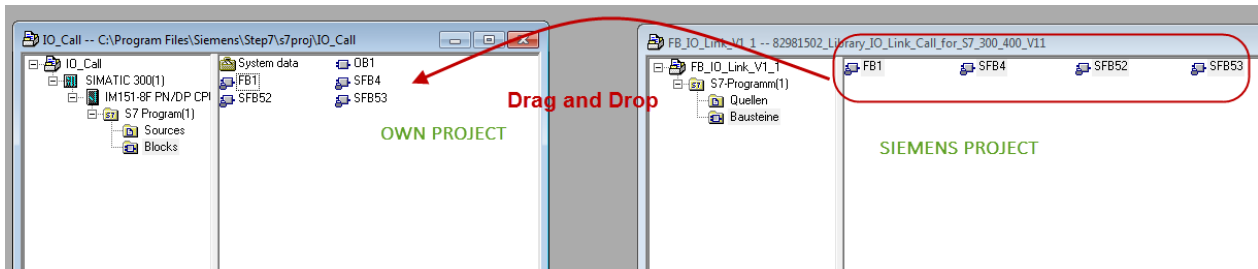


Figure 4.1: Copying function blocks

4.3 Creating a DB instance for FB1

In order to invoke Siemens FB1, a DB instance (data block) must be created:

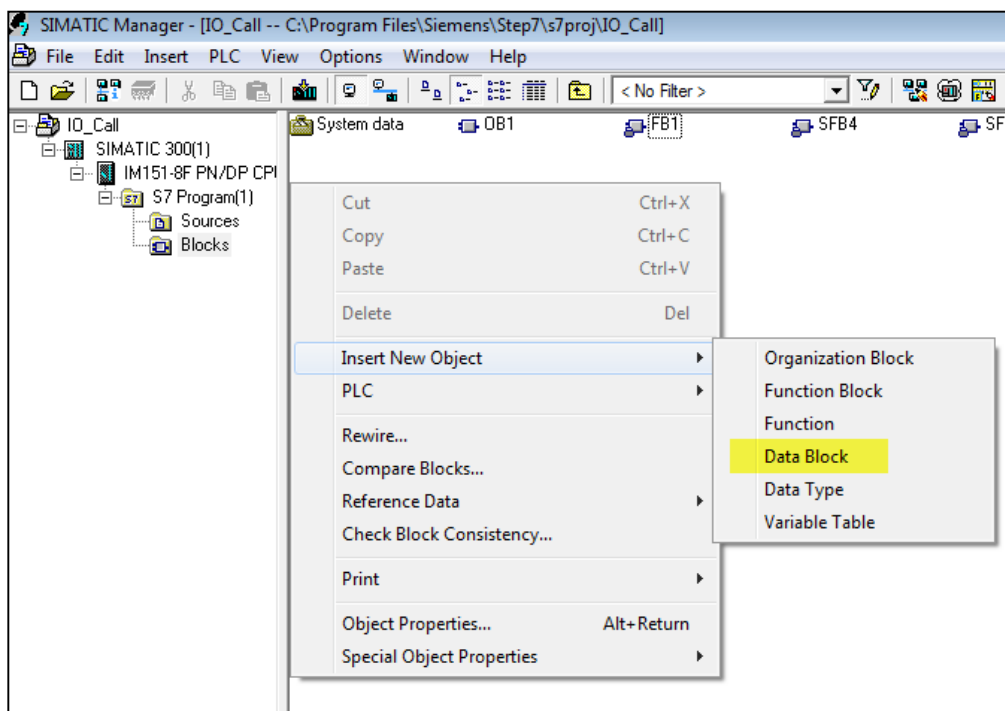


Figure 4.2: Creating a DB instance (1)

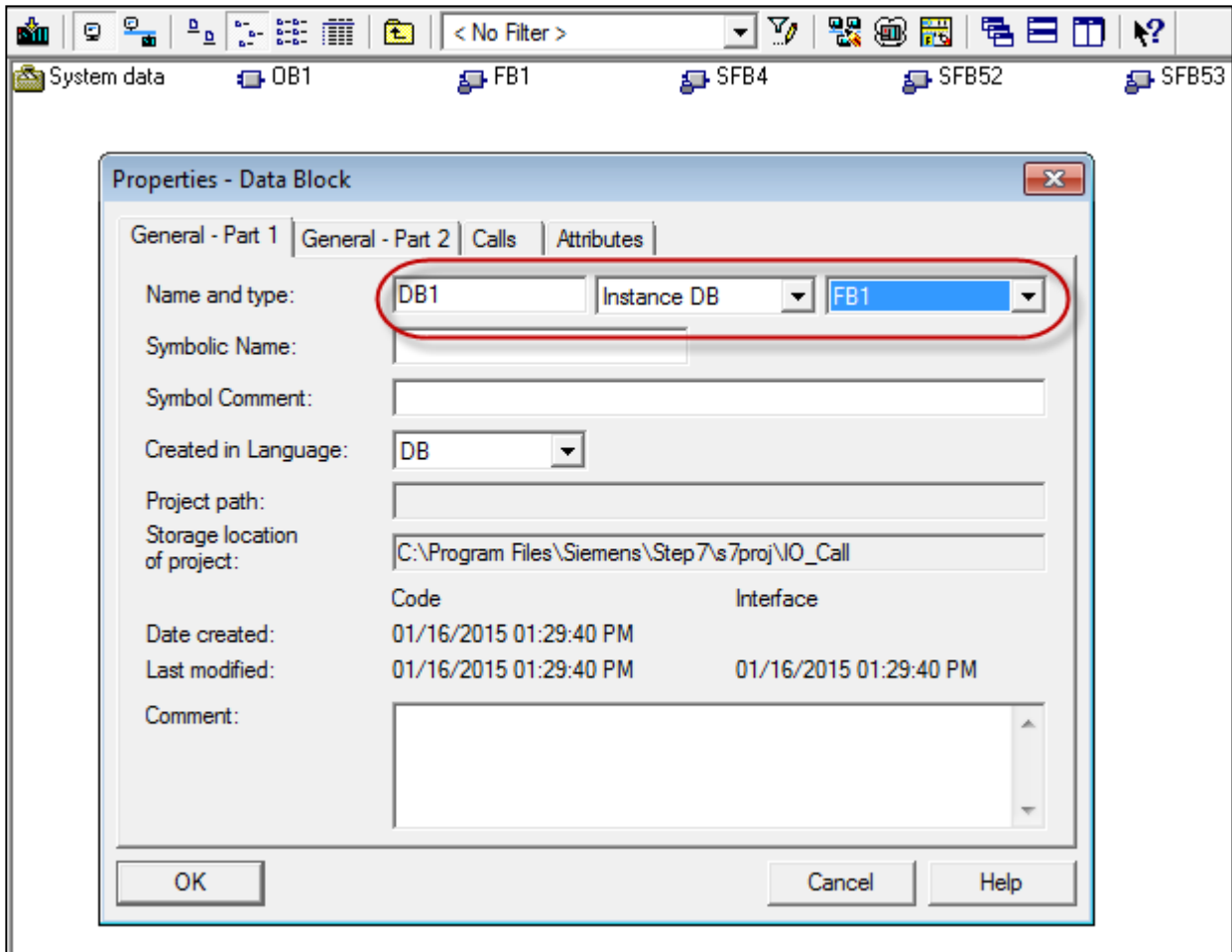


Figure 4.3: Creating a DB instance (2)

4.4 FB1 invocation in OB1

- a) Open OB1

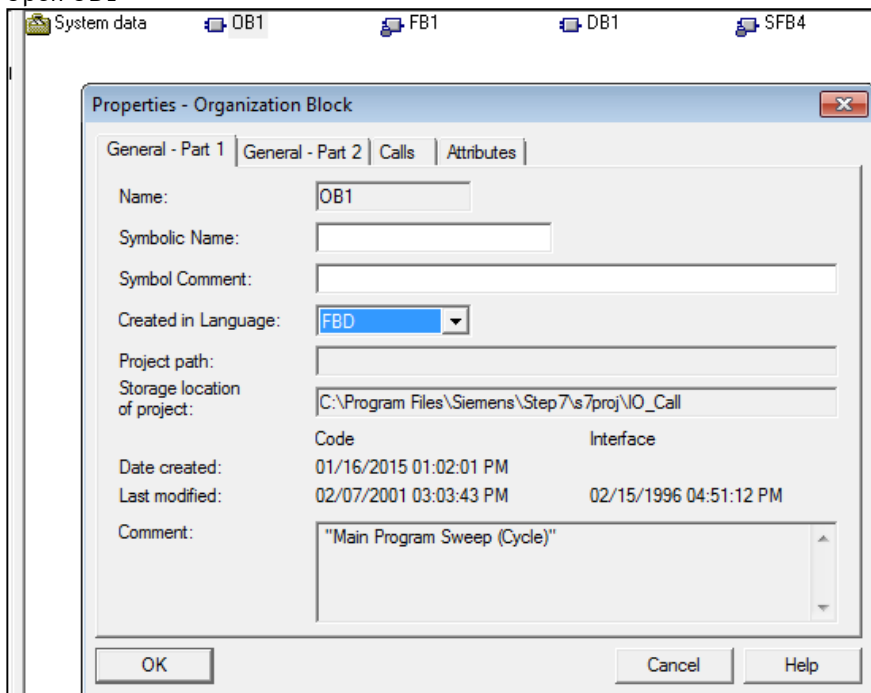


Figure 4.4: Opening OB1

a) Copy FB1 and link the module to DB1.

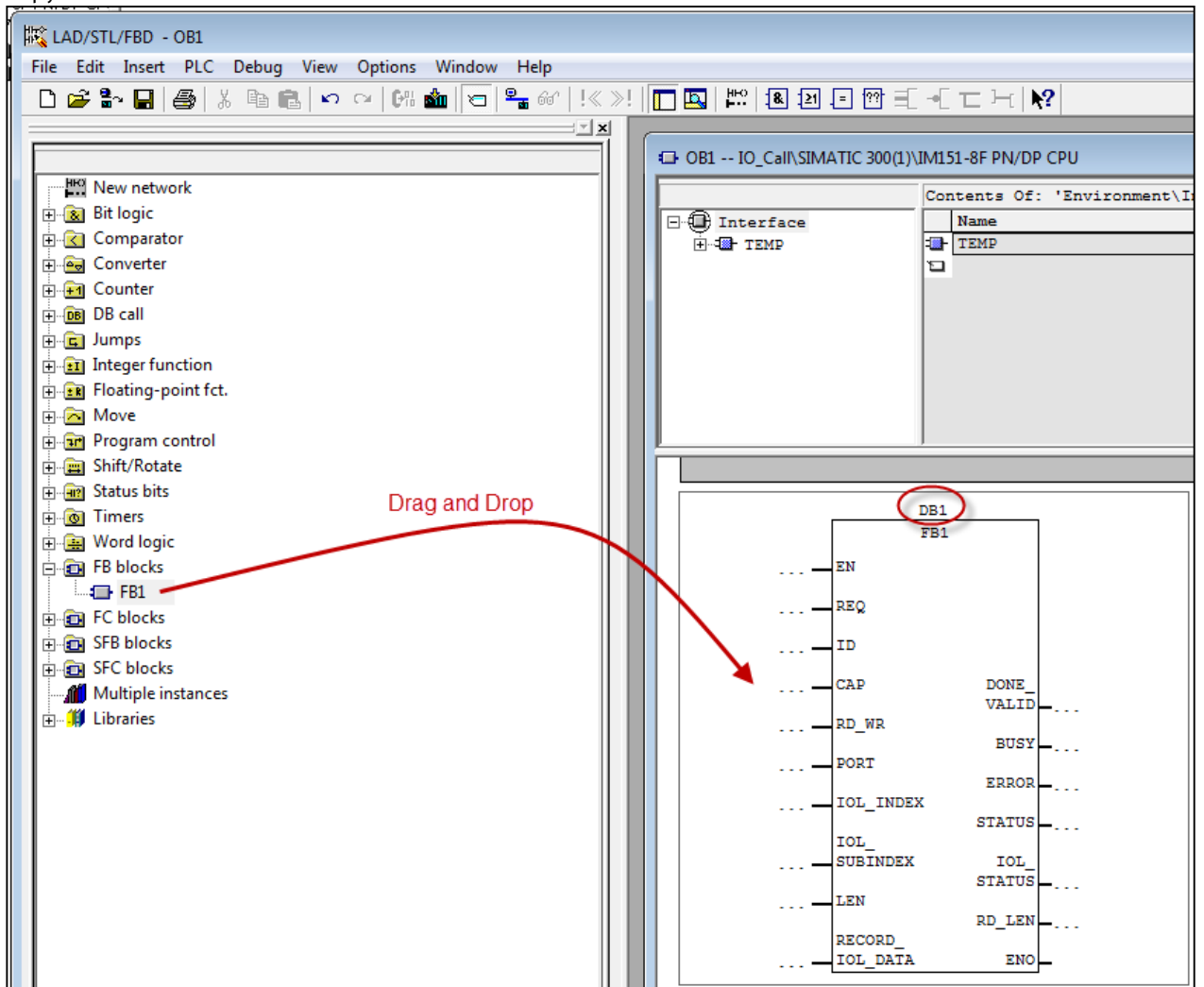


Figure 4.5. Creating Fb1

4.5 FB1 parameters

SIEMENS Standard IO-Link function block

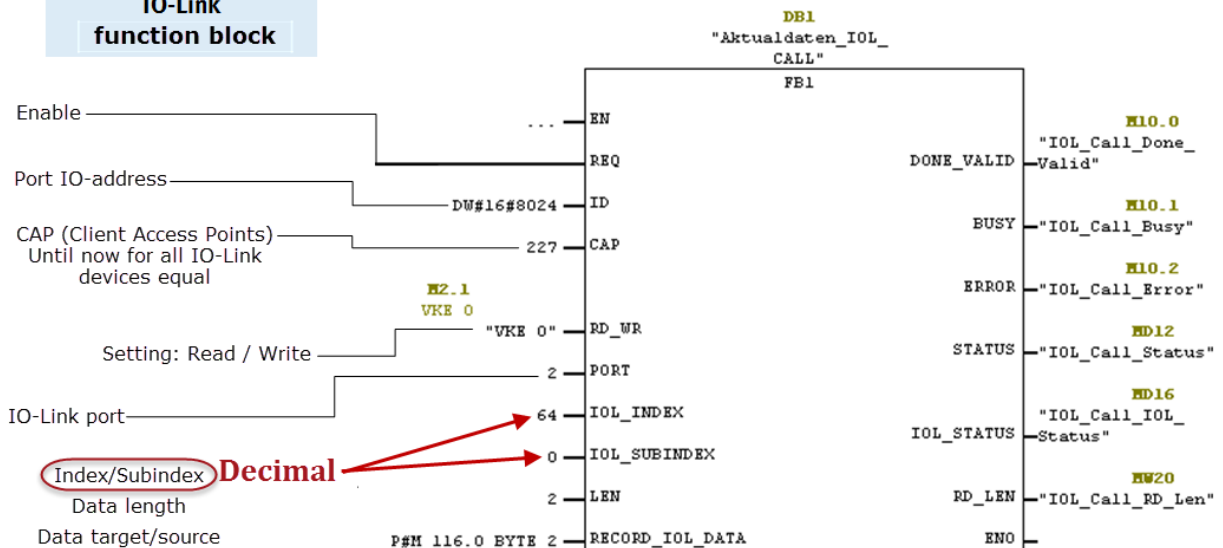


Figure 4.6. Fb1 description

4.6 Example: Reading process data via the IO-Link module

According to the SDAT-MHS... manual, the following is required:

- ➔ Index: 0x0028 = **40 dec**
- ➔ Subindex: 0x0000 = **0 dec**
- ➔ Data length: **2 bytes**

SDAT-MHS

Index	Sub-index	Name	Standardwert (Beispiel M50)	Zugriff ¹⁾			Länge	Format
				U	M	S		
0x0002	0	System Command	➔ Tab. 14	–	W	W	1 Byte	Unsigned Integer
0x000C	0	Device Access Locks ²⁾	0 = Unlocked 1 = Locked	R	R/W	R/W	2 Byte	Record
0x0010	0	Vendor Name	Festo AG & Co.KG	R	R	R	64 Byte	String
0x0011	0	Vendor Text	http://www.festo.com	R	R	R	64 Byte	String
0x0012	0	Product Name	SDAT-MHS-M50-1L-SA-E-0.3-M8	R	R	R	64 Byte	String
0x0013	0	Product ID ³⁾	1531265	R	R	R	64 Byte	String
0x0014	0	Product Text	Position Transmitter	R	R	R	64 Byte	String
0x0015	0	Serial-Number	12345678901	R	R	R	16 Byte	String
0x0016	0	Hardware Revision	REVxy	R	R	R	64 Byte	String
0x0017	0	Firmware Revision	REVxy	R	R	R	64 Byte	String
0x0018	0	Application Specific Tag ⁴⁾	***	R/W	R/W	R/W	32 Byte	String
0x0028	0	Process Data Input	➔ Tab. 11	R	R	R	2 Byte	Record

1) Berechtigungsgruppe U = User, M = Maintenance, S = Specialist; Zugriff R = Lesen, R/W = Lesen und Schreiben, – = Kein Zugriff

2) Bit 0: lock Parameter Write Access; Bit1: lock data storage; Bit3: lock local user interface (Bedientaste)

3) Festo-Teilenummer

4) Wert vom Anwender definiert

Tab. 13 Servicedaten

Figure 4.7. Object excerpt SDAT-MHS... Manual

This produces the following resulting parameters:

Slot	Module	Order number	I address	Q address
0	CPX	TN 197330		
X1	FN-I/O Interface			
X1 TP1 R	Port 1			
X1 TP2 R	Port 2			
1	FB34 PNIO Module	TN 548751, CPX-FB34, Code F34		
2	8DI-D [8DI]	TN 541480, CPX-8DI-D, Code D	0	
3	CTEL-2-LK 8	TN 2900543, CPX-CTEL-2-LK, Code T		
CTEL	CTEL-2-LK 8			
Channel 1	IO-Link 2/2		1...2	0..1
Channel 2				
4	8DO-H [8DO]	TN 550204, CPX-8DA-H, Code NL		2
5	8DI/8DO [8DI/8DO]	TN 526257, CPX-8DI-8DO, Code Y	3	3
6	MPAL DIL 4 [32DO]	TN 570783, VMPAL-EPL-CPX, Code L		4..7
7				

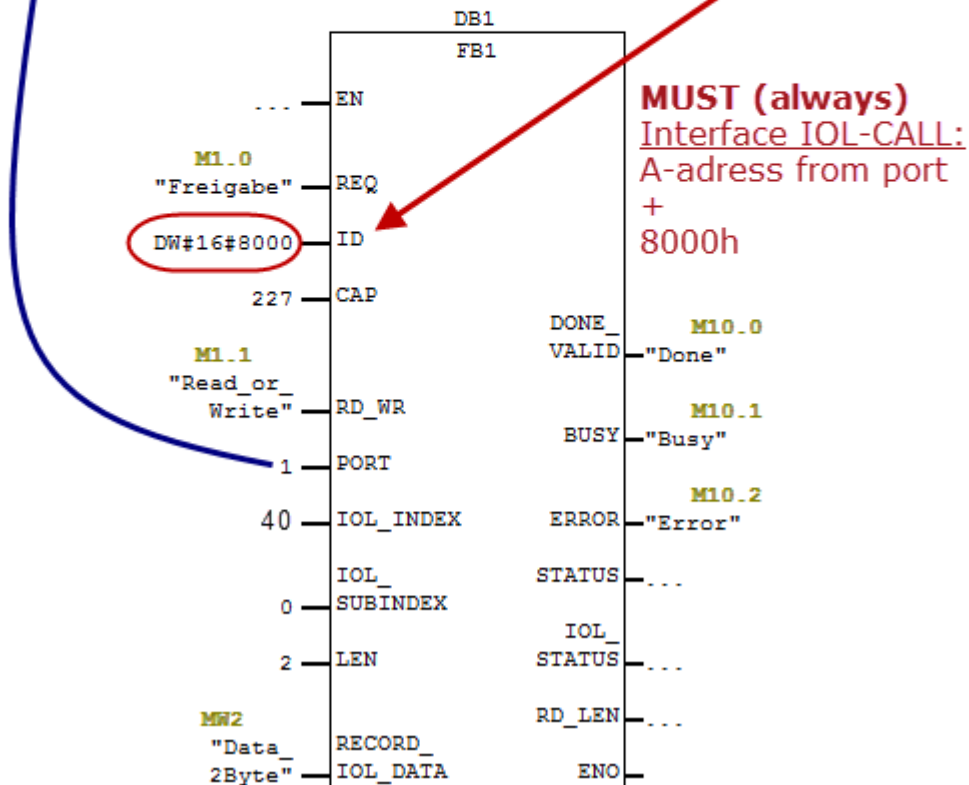


Figure 4.8. Sample parameters configuration for SDAT-MHS...

Step 7 commissioning

The program is then loaded to the PLC.

- ➔ The module is started with “Enable = True”.
- ➔ Process data are read with “M1.1 = False”.

Path: IO_Call\SIMATIC 300(1)\JM151-8F PN/DP CPU

Address	Display form	@Status value
1	DB 1	
2	FB 1	
3	MW 2	HEX W#16#3300
4	M 1.0	R001

Figure 4.9. Online FB1

In this case, comparison can be made online in the hardware configuration mode to determine whether or not the value is correct.

Monitor/Modify - IO-Link 2/2 - (R-/S4)

Online via assigned CPU services

Path: IO_Call\SIMATIC 300(1)\JM151-8F PN/DP CPU

Address	Symbol	Display format	Status value	Modify value
1	PIB 1	HEX	B#16#33	
2	PIB 2	HEX	B#16#00	
3	PQB 0	HEX	0x	
4	PQB 1	HEX	0x	

Slot 0 CPX
 Slot 1 FB34 PNIO Module
 Slot 2 8DI-D [8DI]
 Slot 3 CTEL-2-LK 8
 Slot 4 8DO-H [8DO]
 Slot 5 8DI/8DO [8DI/8DO]
 Slot 6 MPAL DIL 4 [32DO]

Run conditionally: Monitor, Modify, Trigger...

Run immediately: Status Value, Modify Value

Enable Peripheral Outputs, I/O Display

RUNNING

Figure 5.0. Online HW Config