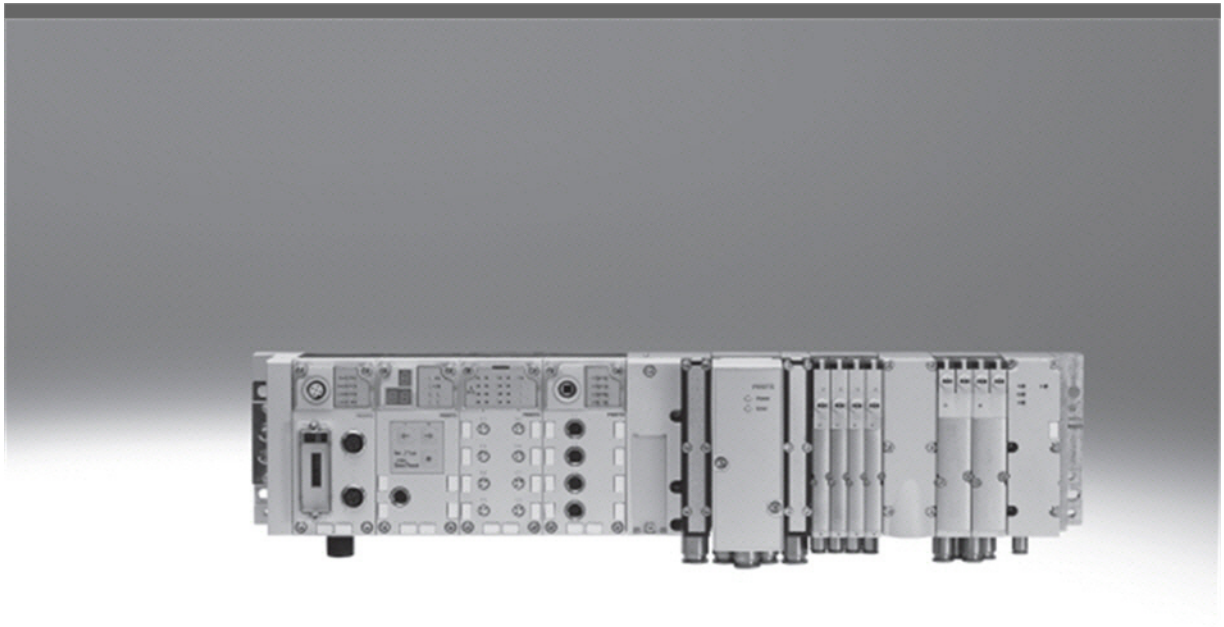


APN 043
Festo
CPX Technology Modules



Application Note

Jetter

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1 Engineering a CPX Terminal on the JX2 System Bus

Introduction

The CPX terminal by Festo can be equipped with a great variety of different modules. Besides the well-established digital and analog I/O modules, technology modules can be connected to a CPX terminal. These technology modules serve as interface for axes or distributed expansion modules.

Jetter controllers of the JC-3xx series are able to automatically detect and commission technology modules connected to the CPX terminal. This application note covers the data exchange between JC-3xx controllers and technology modules via registers.

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Product Description - Festo CPX-CMAX-1

CPX-CMAX-1

The CPX-CMAX is a servo-pneumatic positioning system for controlling pneumatic drives. It is connected to a CPX terminal and controls the positions of different pneumatic drive systems (linear or rotatory). It is protected to IP65.



Designation	Description
CPX-CMAX-1	Servo-pneumatic positioning controller

Technical Specifications

Number of CPX-CMAX-1 modules on the CPX terminal	4 max.
Size of cyclic I/O data	8 bytes
Number of entries in object 0x6100	4
Number of entries in object 0x6300	4

Minimum Requirements

The technology module CPX-CMAX-1 can be connected to the JX2 system bus of the following controllers and modules by Jetter AG:

Controller / Module	Software version (or higher)
JC-340	V 1.10.0.00
JC-350	V 1.10.0.00
JC-360	V 1.10.0.00

Product Description - Festo CPX-CMPX

CPX-CMPX

The CPX-CMPX is an electronic end-position controller for pneumatic drives. It allows fast travel between the mechanical end stops, stopping gently and without impact in the end position.



Designation	Description
CPX-CMPX	Electronic end-position controller

Technical Specifications

Number of CPX-CMPX modules on the CPX terminal	5 max.
Size of cyclic I/O data	6 bytes
Number of entries in object 0x6100	3
Number of entries in object 0x6300	3

Minimum Requirements

The technology module CPX-CMPX can be connected to the JX2 system bus of the following controllers and modules by Jetter AG:

Controller / Module	Software version (or higher)
JC-340	V 1.10.0.00
JC-350	V 1.10.0.00
JC-360	V 1.10.0.00

Product Description - Festo CPX-CP-Interface

CPX-CP Interface

The CPX-CP Interface is for connecting expansion modules of the CP/CPI installation system to the CPX terminal.



Designation	Description
CPX-CPI	Interface for modules of the CP/CPI installation system

Technical Specifications

Number of CPX-CPI modules on the CPX terminal	1
Size of cyclic I/O data	2 bytes per string 8 bytes max.
Number of entries in object 0x6100	1 entry per string
Number of entries in object 0x6300	1 entry per string

Minimum Requirements

The technology module CPX-CP Interface can be connected to the JX2 system bus of the following controllers and modules by Jetter AG:

Controller / Module	Software version (or higher)
JC-340	V 1.03.0.00
JC-350	V 1.03.0.00
JC-360	V 1.10.0.00

Engineering a CPX Terminal on the JX2 System Bus

Module Position of the CPX-CP Interface

Mount the CPX-CP Interface as the rightmost module of the CPX terminal. This way, registers can easily be assigned to cyclic I/O data.

CPX Technology Modules - Restrictions

When using CPX technology modules on the CPX-FB14 the following restrictions have to be observed:

- The minimum hardware revision and software version numbers must be observed.
 - The CPX terminal occupies up to three I/O module numbers on the JX2 system bus. These I/O module numbers are therefore not available to other modules.
 - The number of analog I/Os connected to the CPX-FB14 is reduced.
-

Restrictions when Connecting Analog I/Os

Digital I/Os (without CPX-CP Interface)	Size of cyclic I/O data	Max. number of analog I/Os
Yes	≤ 8 bytes	8
Yes	≤ 16 bytes	4
Yes	≤ 24 bytes	0
No	≤ 8 bytes	12
No	≤ 16 bytes	8
No	≤ 24 bytes	4
No	≤ 32 bytes	0

Assigning Registers to Cyclic I/O Data

Introduction

The controller automatically handles data exchange between registers and cyclic I/O data from the CPX terminal. The user has to determine the assignment of cyclic I/O data from the CPX technology modules to the registers on the controller. To do so, the user needs the following information:

- The order in which the CPX technology modules are connected
- Size of cyclic I/O data of CPX technology modules

Cyclic I/O Data

For information on cyclic I/O data refer to the documentation provided by Festo AG & Co. KG.

Determining the First Register Number

Depending on the set module number of the CPX-FB14 register numbering starts from a certain register number. The following table shows how to calculate the first register number which is indicated by x:

Digital I/Os	x =
Yes	Module number - 69
No	Module number - 70

8-Bit Register Assignment to Cyclic I/O Data

Registers for Input Data	Registers for Output Data	Cyclic I/O Data
R 200005(x)20	R 200006(x)20	Byte 1
...
R 200005(x)27	R 200006(x)27	Byte 8
R 200005(x+1)20	R 200006(x+1)20	Byte 9
...
R 200005(x+1)27	R 200006(x+1)27	Byte 16
R 200005(x+2)20	R 200006(x+2)20	Byte 17
...
R 200005(x+2)27	R 200006(x+2)27	Byte 24
R 200005(x+3)20	R 200006(x+3)20	Byte 25
...
R 200005(x+3)27	R 200006(x+3)27	Byte 32

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16-Bit Register Assignment to Cyclic I/O Data.

Registers for Input Data	Registers for Output Data	Cyclic I/O Data
R 200005(x)10	R 200006(x)10	Byte 1 ... 2
R 200005(x)12	R 200006(x)12	Byte 3 ... 4
R 200005(x)14	R 200006(x)14	Byte 5 ... 6
R 200005(x)16	R 200006(x)16	Byte 7 ... 8
R 200005(x+1)10	R 200006(x+1)10	Byte 9 ... 10
R 200005(x+1)12	R 200006(x+1)12	Byte 11 ... 12
R 200005(x+1)14	R 200006(x+1)14	Byte 13 ... 14
R 200005(x+1)16	R 200006(x+1)16	Byte 15 ... 16
R 200005(x+2)10	R 200006(x+2)10	Byte 17 ... 18
R 200005(x+2)12	R 200006(x+2)12	Byte 19 ... 20
R 200005(x+2)14	R 200006(x+2)14	Byte 21 ... 22
R 200005(x+2)16	R 200006(x+2)16	Byte 23 ... 24
R 200006(x+3)10	R 200006(x+3)10	Byte 25 ... 26
R 200006(x+3)12	R 200006(x+3)12	Byte 27 ... 28
R 200006(x+3)14	R 200006(x+3)14	Byte 29 ... 30
R 200006(x+3)16	R 200006(x+3)16	Byte 31 ... 32

32-Bit Register Assignment to Cyclic I/O Data.

Registers for Input Data	Registers for Output Data	Cyclic I/O Data
R 200005(x)00	R 200006(x)00	Byte 1 ... 4
R 200005(x)02	R 200006(x)02	Byte 3 ... 6
R 200005(x)04	R 200006(x)04	Byte 5 ... 8
R 200005(x+1)00	R 200006(x+1)00	Byte 9 ... 12
R 200005(x+1)02	R 200006(x+1)02	Byte 11 ... 14
R 200005(x+1)04	R 200006(x+1)04	Byte 13 ... 16
R 200005(x+2)00	R 200006(x+2)00	Byte 17 ... 20
R 200005(x+2)02	R 200006(x+2)02	Byte 19 ... 22
R 200005(x+2)04	R 200006(x+2)04	Byte 21 ... 24
R 200005(x+3)00	R 200006(x+3)00	Byte 25 ... 28
R 200005(x+3)02	R 200006(x+3)02	Byte 27 ... 30
R 200005(x+3)04	R 200006(x+3)04	Byte 29 ... 32

Example: CPX-CMAX-1 and CPX-CP-Interface

Task

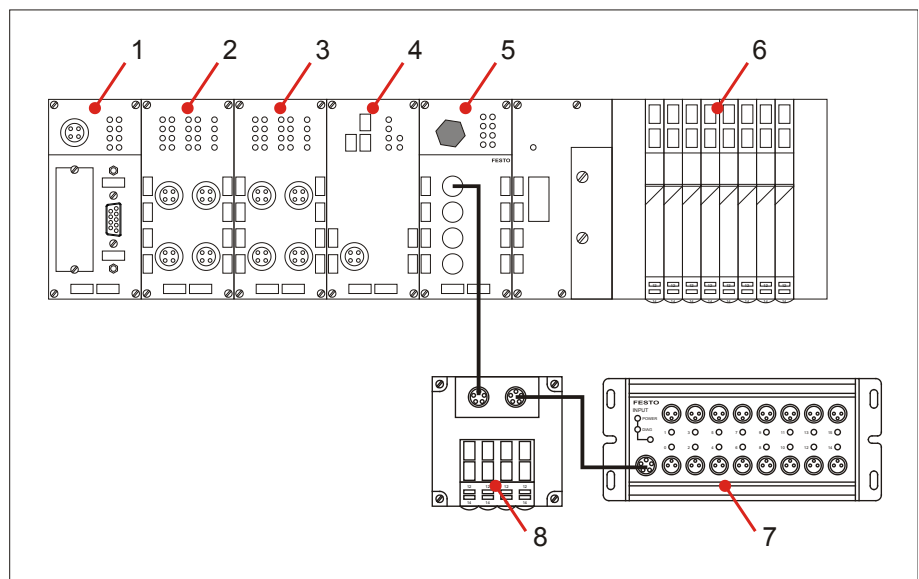
Several modules are connected to a CPX terminal. The cyclic I/O data of these modules are to be assigned to registers:

- 1 x CPX-FB14 with module number 70
- 1 x CPX-8DE
- 1 x CPX-8DA
- 1 x CPX, CMAX-1, operating mode: record selection
- 1 x CPX-CP-Interface with one valve terminal and input module on string 1
- CPA valves are directly connected to the unit

Solution

The CPX terminal is equipped with digital I/Os. Thus, $x = 70 - 69 = 1$. Therefore, the first register number of CPX technology modules is R 200005110, or R 200006110.

Sample Configuration



Number	Part	Cyclic Input Data	Cyclic Output Data
1	CPX-FB14	-	-
2	CPX-8DE	R 200005000 IN 200007001	-
3	CPX-8DA	-	R 200006000 OUT 200007001
4	CPX-CMAX-1	R 200005110	R 200006110
5	CPX-CP Interface	R 200005210	R 200006210
6	CPA valves	-	R 200006000 OUT 200007009
7	CPE	R 200005200 IN 200007201	-

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Number	Part	Cyclic Input Data	Cyclic Output Data
8	CPV	-	R 200006200 OUT 200007201

Variable Declaration in JetSym STX

The following variables have to be declared for a CPX-CMAX in operating mode "Record Selection":

```
Var
// Output data from CPX-CMAX perspective
// Byte 1
CCON:  Int At %VL 200005120;
// Byte 2
CPOS:  Int At %VL 200005121;
// Byte 3
SatzNr: Int At %VL 200005122;

// Input data from CPX-CMAX perspective
// Byte 1
SCON:      Int At %VL 200006120;
// Byte 2
SPOS:      Int At %VL 200006121;
// Byte 3
SatzNr:    Int At %VL 200006122;
// Byte 4
RSB:       Int At %VL 200006123;
// Byte 5..8
HauptIstWert: Int At %VL 200006104;
End_Var;
```

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