1.1 IF789

1.1.1 General Information

The IF789 interface module is an aPCI module and can be installed in all corresponding interface module slots (e. g. in the CP360).

The IF789 is a Powerlink interface module. It can be used as a managing or controlled node. The connection is made via an RJ45 port.

The module is also equipped with an X2X Link interface.

1.1.2 Order Data

Model Number	Short Description	Image
	Interface Module	
3IF789.9	aPCI interface module, 1 ETHERNET Powerlink module, managing or controlled node, 1 X2X link master interface, electrically isolated, terminal block (1 x TB704) must be ordered separately.	
	Required Accessory	
0TB704.9	Accessory terminal block, 4-pin, screw clamp, 1.5 mm²	
0TB704.91	Accessory terminal block, 4-pin, cage clamps, 2.5 mm²	

Table 1: IF789 order data

1.1.3 Technical Data

Product ID	IF789
Short Description	
Communication Module	1 x X2X link master, 1 x ETHERNET Powerlink managing or controlled node
interfaces	
Interface IF1 Type Design	 X2X Link Master 4-pin multipoint connector
Interface IF2 Fieldbus Type Design Transfer Rate Cable Length	 ETHERNET Powerlink 100 Base-T (ANSI/IEEE 802.3) Shielded RJ45 port 100 MBit/s Max. 100 m between two stations (segment length)
General Information	
Status Display	Send/receive data for IF1 Status of the Powerlink station, network activity, link/collision for IF2
Diagnostics Data Transfer (IF1) Station Status (IF2) Bus Function (IF2)	 Yes, with status LEDs and software status Yes, with status LED and software status Yes, with status LED and software status
Electrical Isolation PLC - IFx IF1 - IF2	 Yes Yes
Power Input 3.3 V 5 V Total	 2.3 W 0.5 W 2.8 W
Certification	CE, C-UL-US, GOST-R
Mechanical Characteristics	
Slot	Insert e.g. in CP360
Protection	IP20
Operating/Storage Temperature	0°C to +60°C / -25°C to +70 °C
Humidity	5 to 95% (non-condensing)
Note	Order 1 x TB704 terminal block separately

Table 2: IF789 technical data

1.1.4 Additional Technical Data

Name	IF789
IF1 Interface, X2X Link Master	
Number of Stations	Max. 253
Distance Between Two Stations	Max. 100 m
Network Topology	Line
Internal Bus Supply	No
Bus Termination Resistor	Internal
IF2 interface, ETHERNET Powerlink	
In/Out Buffer	20 KB [1]

Table 3: IF789 additional technical data

1) Beginning with firmware version V 50. Before that 11 KByte.

1.1.5 Operational and Connection Elements

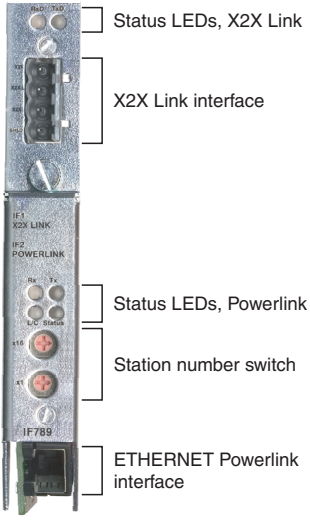


Figure 1: IF789 operational and connection elements

1.1.6 Status Display X2X Link Interface

Image	LED	Color	Description
X2X Link 	RXD	Orange	The module receives data via the X2X Link interface.
	TxD	Orange	The module sends data via the X2X Link interface.

Table 4: IF789 status display X2X Link interface

1.1.7 Status Display ETHERNET Powerlink Interface

Image	LED	Color	Description
ETHERNET Powerlink 	Status	Red/Green	See section "Status LED", on Page 6.
	Tx	Orange	The Powerlink station is sending data.
	Rx	Orange	The Rx LED is always lit when Powerlink activity is present on the bus.
	L/C	Red/Green	Green ... Link Red ... Collision

Table 5: IF789 status display ETHERNET Powerlink interface

Status LED

Boot Phase

The red LED is lit during booting. After the initialization routines are executed without errors, the status LED changes from red to green.

Operation

During operation, the status LED indicates the following states:

Status LED		Status of the Powerlink Station
Green	Red	
On	Off	The Powerlink station is running with no errors.
Off	On	A fatal system error has occurred. The error type can be read using the PLC logbook. It concerns an irreparable problem. The system cannot properly carry out its tasks. This status can only be changed by resetting the module.
Blinking Alternately		The Powerlink managing node failed. This error code can only occur in controlled node operation. i.e. the set station number lies within the range $01 - $FD.
Off	Blinking	System failure. The red blinking LED signals an error code (see Section"System halt error codes", on Page 7).

Table 6: IF789 status LED

System halt error codes

The error is displayed via the red status LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms long. Error code outputs are repeated cyclically after 2 seconds has passed.

Legend: • ... 150 ms
– ... 600 ms
Pause ... 2 s delay

Error description	Error Code Displayed by Red Status LED									
Stack Overflow	•	•	•	•	Pause	•	•	•	•	Pause
RAM Error	•	•	•	–	Pause	•	•	•	–	Pause
Undefined Address: Access to a Non-Existent Address.	•	•	–	•	Pause	•	•	–	•	Pause
Instruction Fetch Memory Abort: Invalid Memory Access During Instruction Fetch (e. g. UINT access of an uneven address).	•	•	–	–	Pause	•	•	–	–	Pause
Data Access Memory Abort: Invalid Memory Access During Data Access (e. g. UINT access of an uneven address).	•	–	•	•	Pause	•	–	•	•	Pause
Error when Programming the FPGA.	•	–	–	•	Pause	•	–	–	•	Pause
Invalid Station Number (e. g. $FE or $FF)	•	–	–	–	Pause	•	–	–	–	Pause

Table 7: IF789 system failure error codes

1.1.8 ETHERNET Powerlink Station Number

Figure 2: IF789 station number switch

The station number for the Powerlink station is set using both number switches. Station numbers are permitted between $00 and $FD.

Switch Position	Description
$00	Operation as managing node.
$01 - $FD	Station number for Powerlink station. Operation as controlled node.
$FE	Reserved, switch position is not permitted.
$FF	Reserved, switch position is not permitted.

Table 8: IF789 station number

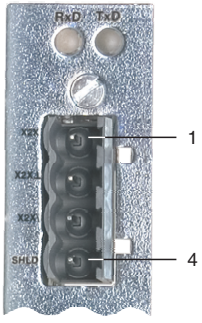
1.1.9 ETHERNET Powerlink Interface (IF2)

Figure 3: IF789 ETHERNET Powerlink interface (IF2)

Pin	Assignment	
1	RXD	Receive Data
2	RxD\	Receive Data\
3	TxD	Transmit Data
4	Termination	
5	Termination	
6	TxD\	Transmit Data\
7	Termination	
8	Termination	

Table 9: IF789 pin assignment for ETHERNET Powerlink interface (IF2)

1.1.10 X2X Link Interface (IF1)

<table>
<tr><th>Interface</th><th>Description</th><th colspan="2">Pin Assignments</th></tr>
<tr><td rowspan="6">Application Interface
X2X Link
 

4-pin multipoint connector</td><td rowspan="6">The electrically isolated X2X Link is a 4-pin multipoint connector.

LEDs show on the interface whether data is being received (RxD) or sent (TxD).</td><td>Terminal</td><td>X2X Link</td></tr>
<tr><td>1</td><td>X2X</td></tr>
<tr><td>2</td><td>X2X⊥</td></tr>
<tr><td>3</td><td>X2X\</td></tr>
<tr><td>4</td><td>SHLD</td></tr>
<tr><td colspan="2">SHLD ... Shield</td></tr>
</table>

Table 10: IF789 X2X Link interface (IF1)

1.1.11 Firmware

SG3

The IF789 module is not supported. The IF686 module can be used for these targets.

SG4

The firmware is a component of the PLC operating system of B&R Automation Runtime™. It is loaded to the IF789 module during every restart.