

# Function Description

## TTL I/O

### **APCLe-1711, CPCIs-1711 and APCI-1710**

Multifunction counter board, optically isolated



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## Warning!

The following risks result from the improper implementation of the board and from use contrary to the regulations:



**Personal injury**



**Damage to the board, the PC and peripherals**



**Pollution of the environment.**

- Protect yourself, others and the environment!
- Read the safety precautions (yellow leaflet) carefully!  
If this leaflet is not enclosed with the documentation, please contact us and ask for it.
- Observe the instructions of this manual!  
Make sure that you do not forget or skip any step!  
We are not liable for damages resulting from the wrong use of the board.
- Pay attention to the following symbols:



### NOTICE!

Designates hints and other useful information.



### NOTICE!

Designates a possibly dangerous situation.

If the instructions are ignored, the board, the PC and/or peripherals may be **destroyed**.



### WARNING!

Designates a possibly dangerous situation.

If the instructions are ignored, the board, the PC and/or peripherals may be **destroyed** and persons may be **endangered**.

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## Chapter overview

In this manual, you will find the following information:

Chapter	Content
1	Function description including block diagram and pin assignment
2	Standard software: Information on the API software functions
3	List of technical data and limit values
4	Appendix with index
5	Contact and support address

This document solely describes the function "TTL I/O".

For general information on the **APCLe-/CPCIs-1711** or **APCI-1710**, please read the respective Technical Description of these boards (see PDF links). It contains, for example, the chapter "Inserting and installing the board" that supports you in commissioning.

# 1 Function description

Via the 50-pin header, TTL signals can be connected to the board.



## NOTICE!

In case other signals are connected, these have to correspond to the TTL level to prevent the board from being damaged.

Please also note that the ports are not optically isolated and that the board may be destroyed due to external voltage peaks!

Signals PA0 to PA7, PB0 to PB7 and PC0 to PC7 are connected in parallel to all four function modules of the board. To avoid malfunction, the “TTL I/O” function can be loaded only in one function module.

### Features:

- For each function module 3 ports (A, B, C) with 8 digital inputs/outputs each (set as inputs after the reset)
- For each function module 1 Port (D) with 2 digital inputs/outputs (set as outputs after the reset)

## 1.1 Board versions with “TTL I/O” function



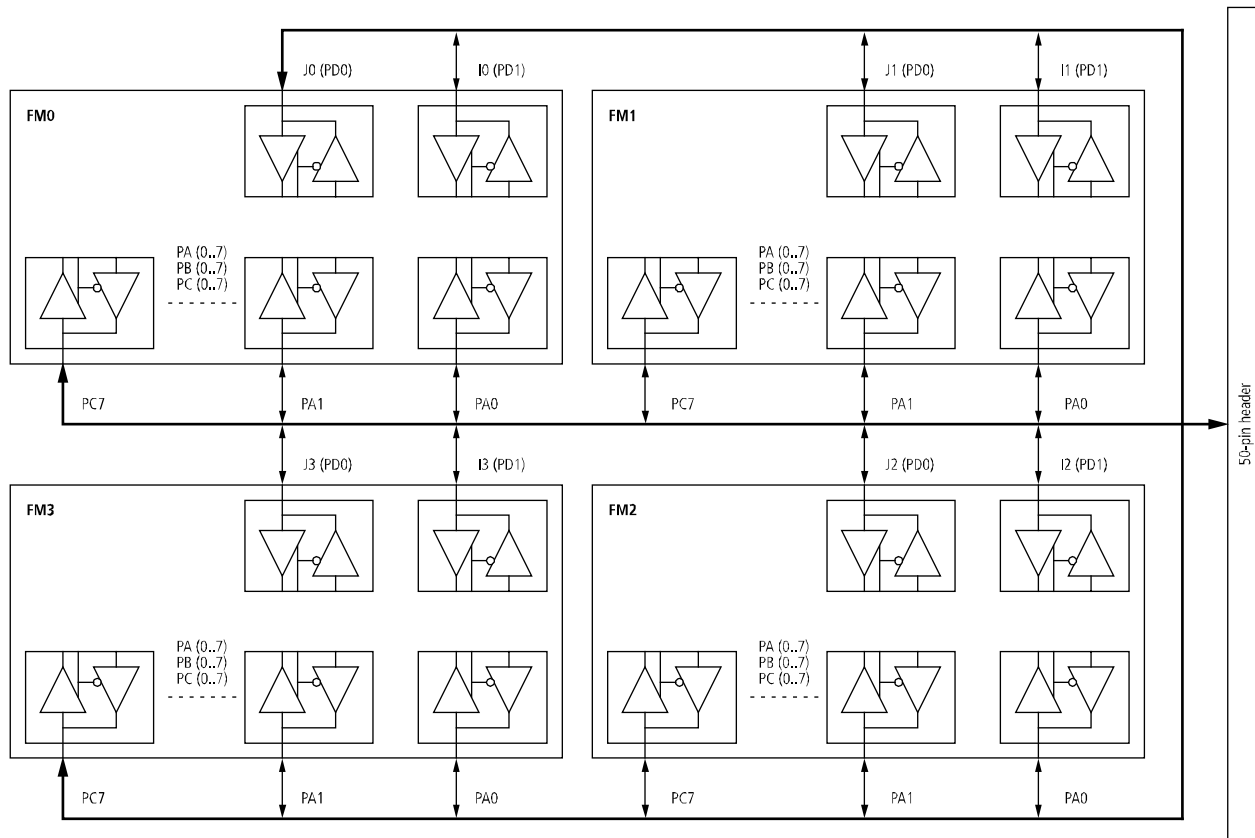
## NOTICE!

The “TTL I/O” function can be used with every version of the **APCLe-1711**, **CPCIs-1711** or **APCI-1710**.

The I/O specifications of the different board versions are available in the Technical Description of the **APCLe-/CPCIs-1711** or **APCI-1710** (see PDF links).

## 1.2 Block diagram

**Fig. 1-1: Block diagram: “TTL I/O” function**



## 1.3 Used signals

Ports A, B and C of each function module (FM0 to FM3) each have eight inputs and outputs. In addition, each function module has two inputs and outputs (I and J) of port D, which can only be used for the “TTL I/O” function.

**Table 1-1: Used signals**

Pin name	Signal type	Function
PA0 to PA7	TTL	Input or output (after the reset: input)
PB0 to PB7	TTL	Input or output (after the reset: input)
PC0 to PC7	TTL	Input or output (after the reset: input)
GND	PC GND	GND, not optically isolated
Kx	TTL	Please do not connect anything!
Ix (PD0)	TTL	Input or output (after the reset: output)
Jx (PD1)	TTL	Input or output (after the reset: output)

Pin name	Signal type	Function
V. ext	PC +3.3 V ( <b>APCLe-/CPCIs-1711</b> ) PC +5 V ( <b>APCI-1710</b> )	Voltage supply

x = Number of the function module (0-3)

## 1.4 Pin assignment

**Fig. 1-2: Pin assignment: 50-pin header and 50-pin D-Sub male connector**

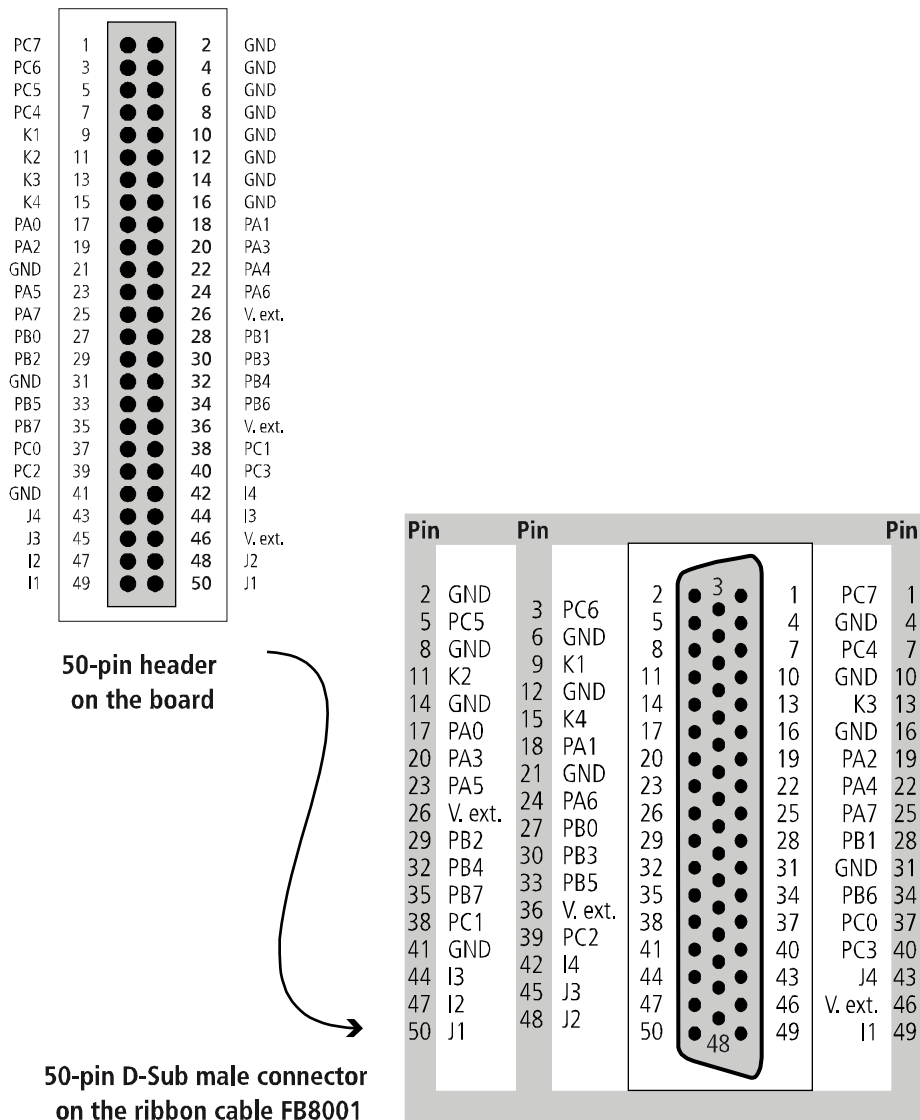




Table 1-2: Pin assignment: 50-pin D-Sub male connector and 50-pin header

	FB8001	Board
Pin name	Pin No. (50-pin D-Sub male connector)	Pin No. (50-pin header)
GND	2	
GND	4	
GND	6	
GND	8	
GND	10	
GND	12	
GND	14	
GND	16	
GND	21	
GND	31	
GND	41	
I1 <sup>2</sup>	49	
I2 <sup>2</sup>	47	
I3 <sup>2</sup>	44	
I4 <sup>2</sup>	42	
J1 <sup>2</sup>	50	
J2 <sup>2</sup>	48	
J3 <sup>2</sup>	45	
J4 <sup>2</sup>	43	
K1	9	
K2	11	
K3	13	
K4	15	
PA0	17	
PA1	18	
PA2	19	
PA3	20	
PA4	22	

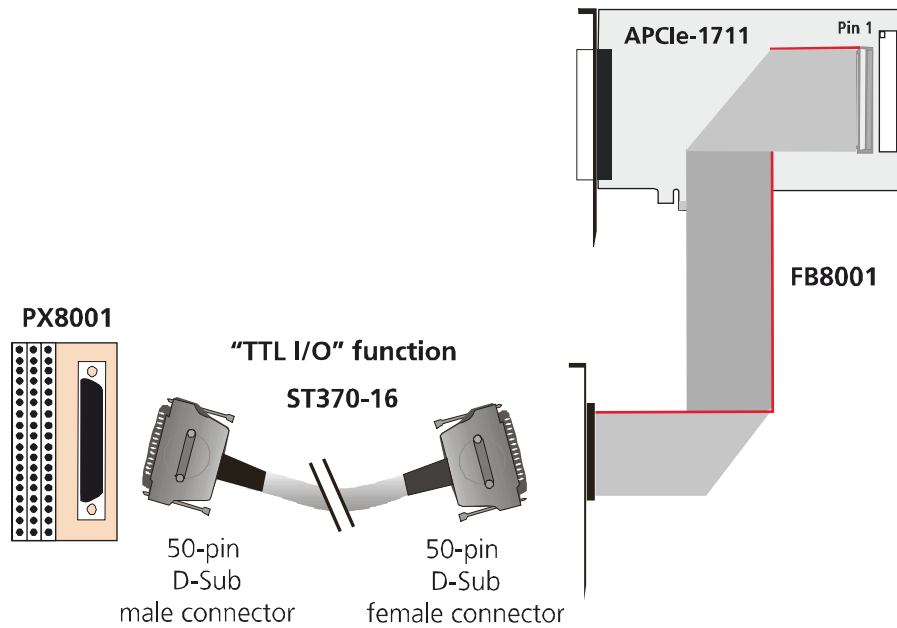
Pin name	Pin No. (50-pin D-Sub male connector)	Pin No. (50-pin header)
PA5	23	
PA6	24	
PA7	25	
PB0	27	
PB1	28	
PB2	29	
PB3	30	
PB4	32	
PB5	33	
PB6	34	
PB7	35	
PC0	37	
PC1	38	
PC2	39	
PC3	40	
PC4	7	
PC5	5	
PC6	3	
PC7 <sup>1</sup>	1	
V. ext.	36	
V. ext.	46	
V. ext.	26	

1: PA, PB and PC: Pull-up resistor to 3.3 V (**APC1e-/CPC1s-1711**) or 5 V (**APCI-1710**)

2: PD: Serial resistor 100  $\Omega$

## 1.5 Connecting the accessories (cables and screw terminal panel)

**Fig. 1-3: APCle-1711: Connecting the accessories**



**Fig. 1-4: CPCIs-1711: Connecting the accessories**

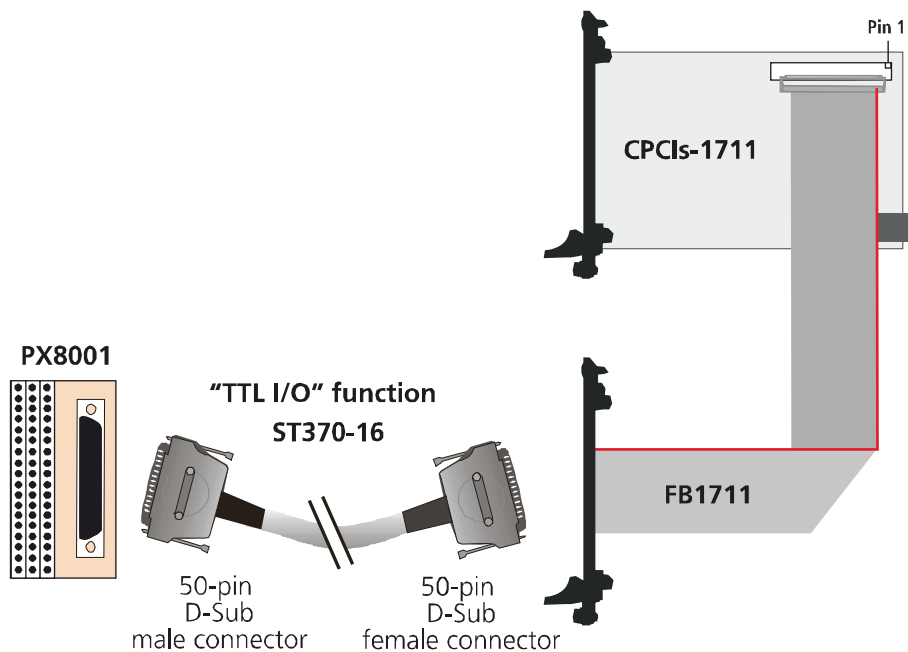
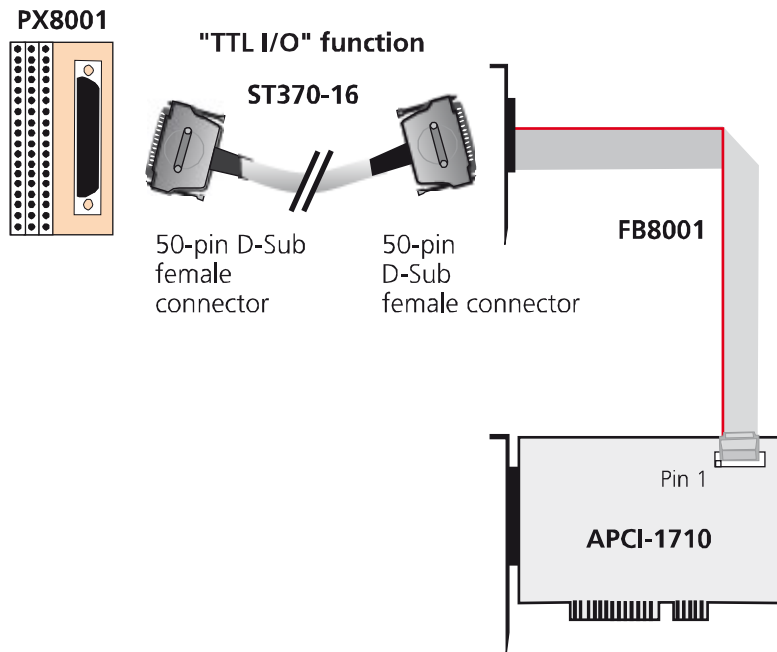


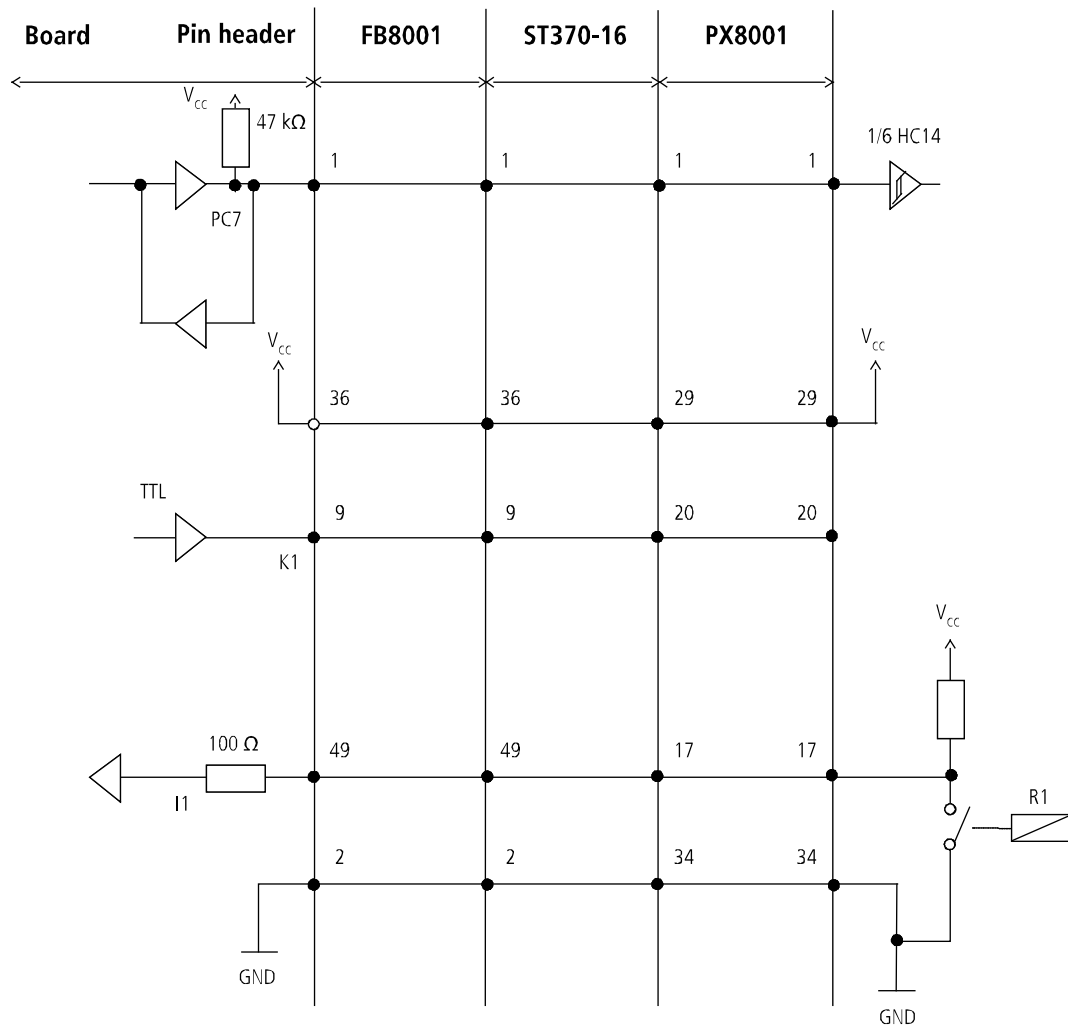
Fig. 1-5: APCI-1710: Connecting the accessories

**NOTICE!**

Plug the **FB8001** or **FB1711** cable into the connector by inserting the red (or blue or black) cable lead into pin 1.

## 1.6 Connection example

Fig. 1-6: Connection example



Ports A, B and C are each set to  $V_{CC}$  via a pull-up resistor (47 kΩ).

## 2 Standard software

The API software functions supported by the board are listed in an HTML document. A description of how to access the respective file can be found in the document "Quick installation PC boards" (see PDF link), in the chapter "Standard software".

### 3 Technical data and limit values

#### 3.1 Digital inputs and outputs (50-pin header)



#### NOTICE!

The TTL inputs and outputs are not optically isolated. Please make sure that no signal from the peripherals is connected to the inputs and outputs when the PC system is switched off or being booted up or shut down. This can be realised by means of a relay or tri-state circuit between the peripherals and the TTL inputs and outputs.

Moreover, the TTL outputs must be protected against short-circuit through the connected signals.

#### APC1e-1711, CPC1s-1711

Max. input voltage:	4 V (PC supply voltage = 3.3 V $\pm$ 5%)
Max. output current:	40 mA (no short-circuit protection)
<b>Signal thresholds:</b>	
Input logic 1:	1.7 V min.
Input logic 0:	0.8 V max.
Output logic 1:	2.4 V min. (PC supply voltage $\geq$ 3 V)
Output logic 0:	0.45 V max. (PC supply voltage $\geq$ 3 V)

#### APCI-1710

Max. input voltage:	4.75 V (PC supply voltage = 5 V $\pm$ 5%)
Max. output current:	25 mA (no short-circuit protection)
<b>Signal thresholds:</b>	
Input logic 1:	2 V min.
Input logic 0:	0.8 V max.
Output logic 1:	2.4 V min. (PC supply voltage $\geq$ 4.75 V)
Output logic 0:	0.45 V max. (PC supply voltage $\geq$ 4.75 V)

## 4 Appendix

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## 5 Contact and support

**Do you have any questions? Write or call us:**

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**Manual and software download from the Internet:**

<https://drivers.addi-data.com>