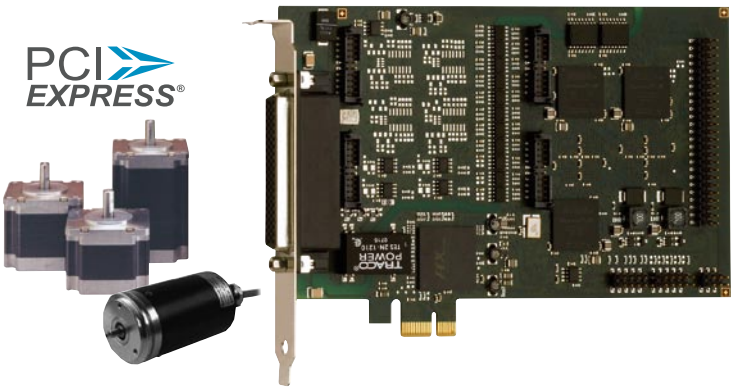
Multifunction counter board, optically isolated, fast counter inputs – programmable, for PCI Express

New!*



APCIe-1711

Available functions:

incremental counter, SSI synchronous serial interface, counter/timer, pulse acquisition, frequency, pulse width, period duration, velocity measurement, PWM, BiSS-Master, digital inputs and outputs, ...

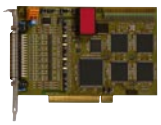
Function selection through software

Optical isolation

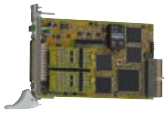
TTL, RS422, 24 V

Customized functions

RoHS 2002/95/EC



Also for PCI
See page 70



Also for CompactPCI™
See page 126

The board APCI-1710 is a fast multifunction and multi-channel counter board for the PCI Express bus. The strengths of this board are its wide range of applications and high precision and reliability for though industrial applications.
With this board you can realise many different applications on the same hardware base. The board is supplied with a pool of functions which provides the user with maximum efficiency yet minimum space and parts requirement. The functions are individually configured for each channel through the supplied software. The flexible programming facilities on this board allow many different user applications to be quickly and easily developed and reconfigured as further requirements arise. Thanks to the FPGA board structure, further counting applications can be realised through software adaptation. Contact us!

Features

- 32-bit data access
- Up to 5 MHz input frequency
- Signals in TTL or RS422 mode (APCIe-1711), 24 V signals (APCIe-1711-24 V)
- Four onboard function modules
- Programmable functions

Functions

- Incremental counter for the acquisition of incremental encoders (90° phase-shifted signals)
- SSI synchronous serial interface. The SSI function is an interface for systems which allow an absolute position information via serial data transfer.
- Customized functions
- Counter/timer (82x54)
- pulse acquisition
- Frequency measurement
- Pulse width modulation (PWM)
- Period duration measurement
- Velocity measurement
- BiSS-Master
- Digital inputs and outputs
- Edge time measurement (ETM)

Available channels for all four function modules

- 12 channels for digital inputs, optically isolated
- 16 channels, programmable either as digital inputs or outputs, optically isolated
- 4 digital power outputs, optically isolated

Available lines for each function module

8 lines are available for each function module.
The multifunction counter board APCIe-1711 is available in different versions:

APCIe-1711	16 x RS422/TTL inputs and outputs, 12 x 24 V inputs, 4 x 24 V outputs
APCIe-1711-24V	28 x 24 V inputs, 4 x 24 V outputs
APCIe-1711-5V-I	16 x RS422/TTL inputs and outputs, 12 x TTL-inputs, 4 x 24 V outputs

Safety features

- Creeping distance IEC 61010-1
- Optical isolation 1000 V
- Noise neutralization of the PC supply

Applications

- Event counting
- Position acquisition
- Motion control
- Batch counting
- ...

Software drivers

A CD-ROM with the following software and programming examples is supplied with the board.

Standard drivers for:

Linux, Windows Vista™ (32-bit)/XP/2000
Real-time drivers for Windows Vista™ (32-bit)/XP/2000.
On request: RTX drivers

Samples for the following compilers:

Depending on the function, the samples are not always available for each compiler. You fill find a detailed list on the web.

- Microsoft VC++ 5.0
- Borland C++ 5.01
- Visual Basic 5.0 • Delphi 4

Drivers for the following software packages:

LabVIEW 5.01 (depending on the function)
On request: DasyLab 6/7 • Diadem 6
Current driver list on the web: www.addi-data.com

The software functions can be adapted to your application on request. The board can also be implemented for other application softwares.

LabVIEW™

*Preliminary product information

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ADDI-DATA® SPIRIT OF EXCELLENCE

Multifunction counter board, optically isolated, fast counter inputs – programmable, for PCI Express

New!*

APCIe-1711

Wide range of applications through the free combination of functions

4 function modules quickly and easily programmable with numerous functions

Each of the four modules is programmed with one function. You can program 4 times the same function or freely combine 4 different functions.

Configuration example 1			
Function module 0	**Function module 1**	**Function module 2**	**Function module 3**
Incremental counter	Incremental counter	Pulse acquisition	Timer/ counter

Configuration example 2			
Function module 0	**Function module 1**	**Function module 2**	**Function module 3**
SSI	SSI	Incremental counter	Digital I/O

Available functions

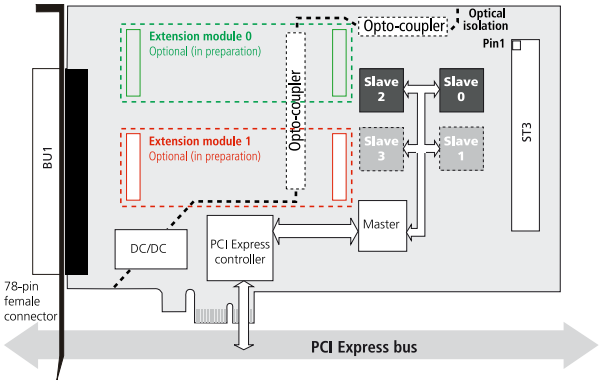
Acquistion of incremental encoders (1 x 32-bit or 2 x 16-bit)
SSI (max. 3 encoders per module)
Counter/Timer (3 counters similar to 82 C 54)
Pulse counter (4 x 32-bit counter per module)
Chronos (chronometer)
TOR (pulse counter with time slices)
Digital I/O (8 I/O, 24 V, TTL, RS422)
PWM (pulse width modulation, 2 x per module)
BiSS-Master (fast sensor interface)
ETM (Timer interface for period duration measurement, edge time, ...)
TTL (TTL-I/O, without isolation)
Customized functions

Programmable onboard modules

Each module can be programmed with the function of your choice. You can operate simultaneously up to 4 different functions on one board. If your application must be modified, you can load a new function quickly and easily.

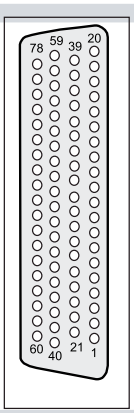
Customer-tailored modifications,
designed to suit your needs.
Hardware and software, firmware, PLDs, ...
Contact us!

Simplified block diagram



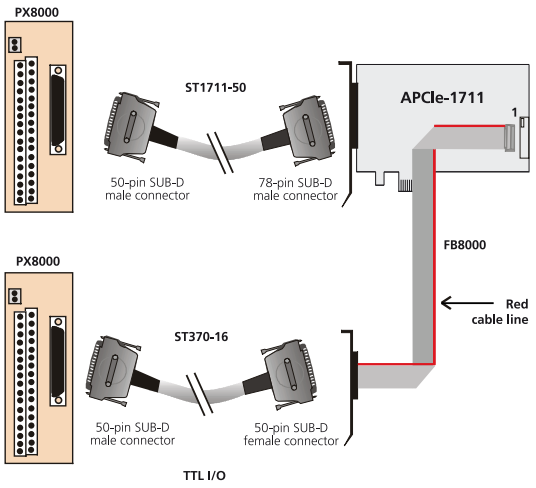
Pin assignment – 78-pin SUB-D female connector

Pin		Pin			Pin		Pin
78	EM0	59	EM0		EM0	39	EM0 20
77	EM0	58	EM0		EM0	38	EM0 19
76	EM0	57	EM0		EM0	37	EM0 18
75	EM1	56	EM0		EM1	36	EM1 17
74	EM1	55	EM1		EM1	35	EM1 16
73	EM1	54	EM1		EM1	34	EM1 15
72	+24V supply	53	EM1		GND	33	EM1 14
71	H3	52	Uref/24Vsupply		F3	32	E3 13
70	D3-	51	G3		B3-	31	A3- 12
69	D3+	50	C3-		B3+	30	A3+ 11
68	H2	49	C3+		F2	29	E2 10
67	D2-	48	G2		B2-	28	A2- 9
66	D2+	47	C2-		B2+	27	A2+ 8
65	H1	46	C2+		F1	26	E1 7
64	D1-	45	G1		B1-	25	A1- 6
63	D1+	44	C1-		B1+	24	A1+ 5
62	H0	43	C1+		F0	23	E0 4
61	D0-	42	G0		B0-	22	A0- 3
60	D0+	41	C0-		B0+	21	A0+ 2
		40	C0+				GND 1



EM = Extension module

ADDI-DATA connection



* Preliminary product information

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SPIRIT OF EXCELLENCE

Multifunction counter board, optically isolated, fast counter inputs – programmable, for PCI Express

New!*

Function incremental encoder

1 to 2 incremental encoders can be connected to the module programmed with this function.

- 90° phase-shifted input signals (displacement measurement systems)
- Motion control
- Pulse width and frequency measurement
- Incremental encoder acquisition
- Tolerance measurement
- Velocity measurement
- Rotation measurement

Possible configurations:

- 1 counter channel with a 32-bit counting depth, for TTL or differential incremental encoders (option 24 V: APCIe-1711-24 V)
- 2 counter channels with a 16-bit counting depth for TTL or differential incremental encoders (option 24 V: APCIe-1711-24 V)
- 1 input for reference point logic
- 1 input which can be used as error input
- 1 input as usual dig. input or for reference point logic
- 2 inputs to latch the counter value
- Fast counting

Function range of the counter component

- Simple, double, quadruple analysis of 2 phase-shifted clock pulses (A, B)
- Direction recognition for upwards or downwards counting
- Hysteresis circuit for the absorption of the first pulse after a change in rotation; switchable
- 2 x 32-bit data latches, indiv. programmable for internal or ext. strobe
- The operating mode is defined by an internal mode register, loadable and readable through the data bus.
- Strobe inputs, which can be triggered either through 2 external pins (24 V input) or by writing in a register
- Interrupt indication triggered through the external strobe inputs
- Compare logic

Used signals

On connector	Polarity	Function
Ax +/-	Diff./TTL/24 V*	A signal of the 1st incremental encoder
Bx +/-	Diff./TTL/24 V*	B signal of the 1st incremental encoder
Cx +/-	Diff./TTL/24 V*	INDEX signal of the incremental encoder in 32-bit mode
Cx +/-	Diff./TTL/24 V*	A signal of the 2nd incremental encoder in 16-bit mode.
Dx +/-	Diff./TTL/24 V*	Error signal input in 32-bit mode.
Dx +/-	Diff./TTL/24 V*	B signal of the 2nd incremental encoder in 16-bit mode
Ex	24 V/5 V optional	Usual digital input, readable through register, can control the reference point logic
Fx	24 V/5 V optional	Digital input, which latches the counter 16/32-bit in the first latch register. Can also generate an interrupt.
Gx	24 V/5 V optional	Digital input, which latches the counter 16/32-bit in the second latch register. Can also generate an interrupt.

x: Number of the function module (See pin assignment page 43)

* 24 V with the APCIe-1711-24 V

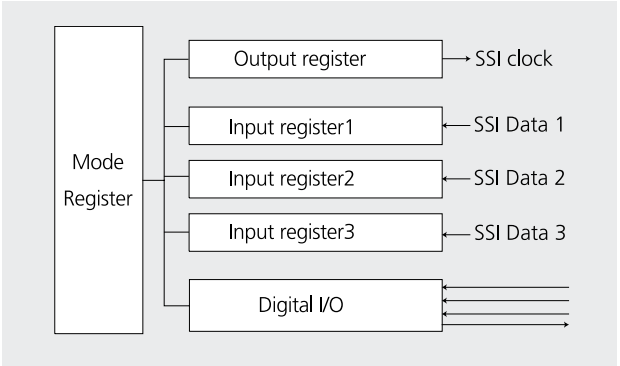
Function synchronous serial interface (SSI)

The function module is programmed as a synchronous serial interface. The SSI function is an interface for systems which allows an absolute position information through serial data transfer.

Typical application examples:

- Acquisition of displacement measurement systems
- Axis control
- Tolerance measurement ...

Block diagramm of the SSI



Connection of 1 up to 3 SSI encoders per function module:

- Common clock pulse for the 3 interfaces (depending on the clock frequency, line length and input drivers of the sensors)
- The clock frequency is software programmable
- The number of data bits is programmable, which allows a flexible resolution.
- GRAY to BINARY convertion possible

The interface includes:

- Three independent SHIFT registers, which can be read through the data bus
- Clock and pulse generator
- Function and control logic

Used signals

On connector	Polarity	Function
Ax +/-	Diff.	Clock output signal for the SSI encoders
Bx +/-	Diff./TTL/24 V*	DATA input 1 for the first encoder
Cx +/-	Diff./TTL/24 V*	DATA input 2 for the second encoder
Dx +/-	Diff./TTL/24 V*	DATA input 3 for the third encoder
Ex	24 V/5 V optional	Digital input 1
Fx	24 V/5 V optional	Digital input 2
Gx	24 V/5 V optional	Digital input 3
Hx	24 V/5 V optional	Digital output

x: Number of the function module (See pin assignment page 43)

* 24 V with the APCIe-1711-24 V

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Multifunction counter board, optically isolated, fast counter inputs – programmable, for PCI Express

New!*

Free programming of the functions

- Acquisition of incremental encoders (1 x 32-bit or 2 x 16-bit)
- SSI (max. 3 encoders per module)
- Counter/timer (3 counters similar to 82 C 54)
- Pulse counter (4 x 32-bit counters per module)
- Chronos (chronometer)
- TOR (pulse counter with time slices, ...)
- Digital I/O (8 I/O, 24 V, TTL, RS422)
- PWM (pulse width modulation, 2 x per module)
- BiSS-Master (fast sensor interface)
- ETM (Timer interface for period duration measurement, edge time, ...)
- TTL (TTL I/O without isolation)
- Customized functions

Signals

Digital I/O signals, TTL or RS422, 24 V

Inputs

Differential inputs or outputs (A, B, C, D)		
Differential inputs, 5 V/3.3 V:	16 (can be used as inputs or outputs)	
Nominal voltage:	3.3 VDC	
Common mode range:	+12 / -7 V	
Input sensitivity:	200 mV	
Input hysteresis:	50 mV	
Input impedance:	12 kΩ	
Terminal resistor:	120 Ω (not supplied)	
Max. input frequency:	5 MHz (at nominal voltage) depending on the function	
Mass-related inputs, 24 V (channels E, F, G):		
Number of inputs:	12	
Nominal voltage:	24 VDC	
Logic input levels:	Unominal:	24 V
	UH max.:	30 V
	UH min.:	19 V
	UL max.:	14 V
	UL min.:	0 V
Maximal input frequency:	1 MHz (at nominal voltage) depending on the function	

Outputs

Nominal voltage:	3.3 VDC
Maximum output frequency:	5 MHz (diff. outputs) depending on the function
Max. number of outputs:	16 (if they are not used as diff. inputs)
Digital outputs, 24 V:	
Output type:	High-side (load at ground)
Number of outputs:	4
Nominal voltage:	24 VDC
Supply voltage range.	17 V to 30 VDC (via 24 V ext. pin)
Maximum current for 4 outputs:	90 mA per output / 270 mA for all outputs (PTC)
Overtemperature:	165 °C (all outputs switch off)
Overtemperature protection (24 V outputs)	

Technical data

Version APCI-1710-24 V

24 V inputs (channels A to D).
This board version is intended for the connection of 24 V encoders.
Only 24 V signals can be connected to the inputs.

Nominal voltage:	24 VDC	
Max. input frequency:	1 MHz (at nominal voltage) depending on the function	
Logic input levels : (Standard)	Unominal:	24 V
	UH max.:	30 V
	UH min.:	19 V
	UL max.:	14 V
	UL min.:	0 V

All functionalities with port A, B, C, D cannot be used as outputs.
See the manuals of the functions!

Safety

Optical isolation:	1000 V

EMC – Electromagnetic compatibility

The product complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the norm from the EN 61326 series (IEC 61326). The limit values as set out by the European EMC directive for an industrial environment are complied with. The respective EMC test report is available on request.

PC system requirements and environmental conditions

Dimensions:	168 x 98 mm
System bus:	Acc. to PCI Express base specification, Revision 1.0a (PCI Express r1.0a)
Space required:	1-/4-lane PCI Express slots
Operating voltage:	+ 3.3 V / + 12 V from the PC +24 V ext.
Current consumption APCIe-1711:	3.3 V / 340 mA 12 V / 80 mA typ.
Front connector:	78-pin SUB-D female connector
Additional connector:	50-pin SUB-D male connector
Temperature range:	0 to 60 °C (with forced cooling)

Ordering information

APCIe-1711

Multifunction counter board, optically isolated, fast counter inputs – programmable, for PCI Express
Incl. technical description and software drivers.

APCIe-1711: Isolated counter board with programmable functions
APCIe-1711-24V: 24 V instead of differential input signals (A, B, C, D).
APCIe-1711-5V-I: 5 V inputs (E, F, G) instead of 24 V

Accessories

PX 8000: Screw terminal panel with housing for DIN rail
ST1711-50: Standard round cable, shielded, twisted pairs, 2 m, 78-pin male connector to 50-pin male connector

For the TTL I/O function
ST370-16: Standard round cable, shielded, twisted pairs, 2 m
FB8000: Ribbon cable

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