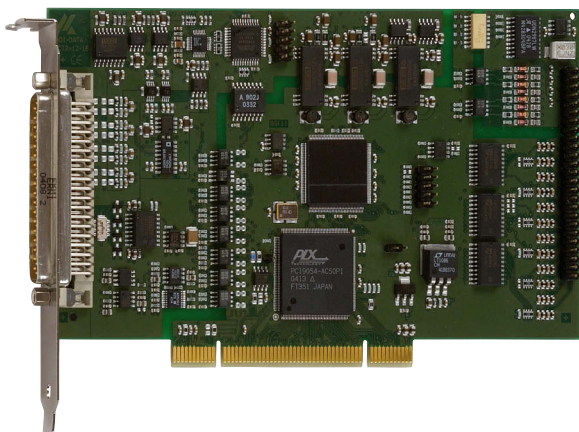# Analog input board, optically isolated, 16/8/4 SE or 8/4/2 diff. inputs, 16-bit

APCI-3016

PCI 3.3 V or 5 V

Optical isolation 1000 V

16/8/4 SE or 8/4/2 diff. inputs

16-bit resolution, 200 kHz

PCI DMA, programmable gain

Trigger functions

Timer/counter/watchdog

8 optically isolated dig. I/O, 24 V, 24 TTL I/O

RoHS 2002/95/EC

PCI 32-bit

Windows
64/32-bit drivers

LabVIEW™

LabWindows/CVI™

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

Features

- PCI 3.3 V or 5 V

Analog inputs
- 16/8/4 SE or 8/4/2 diff. inputs, optically isolated
- Resolution: 16-bit
- Throughput: 200 kHz
- Voltage inputs: 0-10 V, ±10 V, 0-5 V, ±5 V, 0-2 V, ±2 V, 1-1 V, ±1 V, freely programmable through software for each channel
- Current inputs: 0-20 mA (option) can be combined freely with voltage inputs
- Gain PGA x1, x2, x5, x10 freely programmable through software for each channel

Analog acquisition
- Different input modes:
  1) Simple mode
  2) Scan modes
  3) Sequence modes
  4) Auto Refresh mode
- Trigger functions:
  - Software trigger or
  - external trigger: the analog acquisition (single or sequence) is started through the signal on digital input 0 from 0 V to 24 V
- Onboard FIFO (for 512 Analog values)
- PCI-DMA for analog data acquisition

24 V digital I/O
- 24 V digital I/O enable a high interference distance and a long distance between signal transmitter and data acquisition
- 4 digital inputs, 24 V, optically isolated
- 4 digital outputs, 24 V, optically isolated

TTL I/O
- 24 digital TTL inputs/outputs
- Port1: inputs / Port2: outputs / Port3: I/O
- All I/O are at 5 V through pull-up resistors
- Easy programming through I/O read and write commands

Timer/Counter
- 3 / 3, 16-bit
Watchdog
- 1, 16-bit

Safety features

- For more protection in noisy industrial environment
- Optical isolation 1000 V min.
- Creeping distance IEC 61010-1
- Circuit part of the analog acquisition is separated from the circuit part of the digital function
- Overvoltage protection ± 40 V (analog inputs)
- Protection against high-frequency EMI
- Input filters
- Noise neutralisation of the PC supply
- Connection of the I/O-signals through robust industry-standard 37-pin D-Sub connector

Applications

- Industrial process control
- Industrial measurement and monitoring
- Multichannel data acquisition
- Control of chemical processes
- Factory automation
- Acquisition of sensor data
- Laboratory equipment
- Current measurement
- Instrumentation

Software

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

Standard drivers for:
- Linux
- 32-bit drivers for Windows 8 / 7 / Vista / XP / 2000
- Signed 64-bit drivers for Windows 8 / 7 / XP
- Real-time use with Linux and Windows on request

Drivers and samples for the following compilers and software packages:
- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi • LabVIEW • LabWindows/CVI

ADDIPACK functions:
Analog input • Digital input • Digital output
Watchdog • Timer • Counter

On request:
Further operating systems, compilers and samples.

Driver download: www.addi-data.com, download menu

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Specifications

Analog inputs

Number of inputs:	16/8/4 SE or 8/4/2 differential inputs
Resolution:	16-bit
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Input ranges:	Software-programmable for each channel 0-10 V, ±10 V, 0-5 V, ± 5 V, 0-2 V, ± 2 V, 0-1 V, ± 1 V 0-20 mA optional
Gain:	Software programmable (x1, x2, x5, x10)
Throughput:	200 kHz
Trigger:	Through software, timer, external event (24 V input)
Data transfer:	Data to the PC through FIFO memory, Interrupt at EOC (End Of Conversion), DMA transfer at EOC
Interrupts:	End of conversion, at timer overrun, End of scan

Digital I/O

Number of I/O channels:	4 digital inputs, 24 V 4 digital outputs, 24 V
Logical "0" Level:	0-14 V
Logical "1" Level:	19-30 V
Optical isolation:	1000 V through opto-couplers from PC to peripheral
Outputs	High Side, 50 mA

TTL I/O

Number of TTL I/O channels:	24
Programming:	Through write/read commands

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.

Physical and environmental conditions

Dimensions:	175 x 99 mm
System bus:	PCI 32-bit 3.3/5V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot for analog inputs, 1 slot opening for digital I/O with FB8001
Operating voltage:	+5 V, ±5 % from the PC
Front connector:	37-pin D-Sub male connector
Additional connector:	50-pin male connector for connecting the dig. I/O
Temperature range:	0 to 60 °C (with forced cooling)

Screw terminal panel PX901-AG
with cable ST010

Connection box PX_BNC
with cable ST010

Simplified block diagram

Pin assignment – 37-pin D-Sub male connector

DIFF	SE	Pin	SE	DIFF
An. input 0 (+)	An. input 0	20 / 1	An. input 8	An. input 4 (+)
An. input 1 (+)	An. input 1	21 / 2	An. input 9	An. input 5 (+)
An. input 2 (+)	An. input 2	22 / 3	An. input 10	An. input 6 (+)
An. input 3 (+)	An. input 3	23 / 4	An. input 11	An. input 7 (+)
An. input 3 (–)	An. input 7	24 / 5	An. input 15	An. input 7 (–)
An. input 2 (–)	An. input 6	25 / 6	An. input 14	An. input 6 (–)
An. input 1 (–)	An. input 5	26 / 7	An. input 13	An. input 5 (–)
An. input 0 (–)	An. input 4	27 / 8	An. input 12	An. input 4 (–)
	An. signal GND	28 / 9	An. signal GND	
	An. signal GND	29 / 10	An. signal GND	
		30 / 11	An. signal GND	
		31 / 12		
		32 / 13		
		33 / 14		
		34 / 15		
	An. signal GND	35 / 16	An. signal GND	
	An. signal GND	36 / 17	An. signal GND	
	An. signal GND	37 / 18	An. signal GND	
	An. signal GND	19	An. signal GND	

Pin assignment – 50-pin male connector

Assignment	Pin		Assignment
Output 3	1	2	Input 3+
Input 3-	3	4	Output 2
Input 2+	5	6	Input 2-
Output 1	7	8	Input 1 +
Input 1-	9	10	Output 0
Input 0+	11	12	Input 0-
GND 0	13	14	+24 V
Not connected	15 to 24		Not connected
GND	25	26	GND
TTL 15	27	28	TTL 23
TTL 7	29	30	TTL 14

Assignment	Pin		Assignment
TTL 22	31	32	TTL 6
TTL 13	33	34	TTL 21
TTL 5	35	36	TTL 12
TTL 20	37	38	TTL 4
TTL 11	39	40	TTL 19
TTL 3	41	42	TTL 10
TTL 18	43	44	TTL 2
TTL 9	45	46	TTL 17
TTL 1	47	48	TTL 8
TTL 16	49	50	TTL 0

ADDI-DATA connection

Ordering information

APCI-3016

Analog input board, optically isolated, 16/8/4 SE or 8/4/2 diff. inputs, 16-bit. Incl. technical description and software drivers.

Versions

APCI-3016-16:	16 SE/8 diff. inputs, 16-bit
APCI-3016-8:	8 SE/4 diff. inputs, 16-bit
APCI-3016-4:	4 SE/2 diff. inputs, 16-bit

Options

Please indicate the number of channels
Option SF:	Precision filter for 1 single-ended channel
Option DF:	Precision filter for 1 diff. channel
Option PC:	Current input 0(4)-20 mA for 1 channel **PC-SE**: for Single-ended **PC-Diff**: for differential

Accessories

PX901-A:	Screw terminal panel with transorb diodes, for connecting the analog inputs
PX901-AG:	Same as PX901-A with housing for DIN rail
PX_BNC:	BNC connection box for connecting the analog inputs
ST010:	Standard round cable, shielded, twisted pairs, 2 m
ST011:	Standard round cable, shielded, twisted pairs, 5 m
PX8001:	Screw terminal panel for connecting the digital I/O, for DIN rail
FB8001:	Ribbon cable for digital I/O
ST370-16:	Standard round cable, shielded, twisted pairs, 2 m