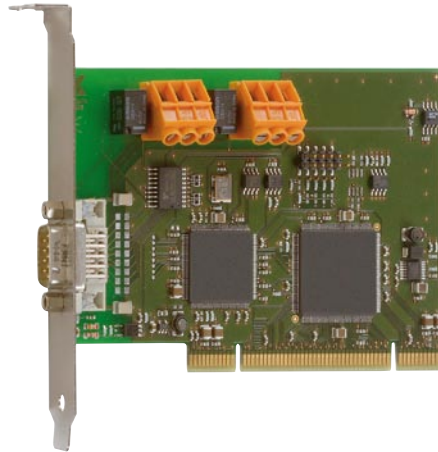


Watchdog board, optically isolated, 4 watchdogs/timers



PCI 32-bit

Also for
PCI EXPRESS[®]
see APCLe-040
page 100



Signed 64-bit drivers for
Windows 7/XP



LabVIEW™



LabWindows/CVI™

Maximise the reliability of your telecom, ISP, Voice Mail, File Server or industrial systems under Windows operating systems with the APCI-035 PCI watchdog board.

The board is equipped with 4 watchdogs for simultaneous soft- and hardware monitoring. In this way, external devices can be monitored (e. g. alarm systems, PLCs) and controlled (e. g. modems, dialing devices).

In addition, the PCI watchdog board APCI-035 has a two-level alarm system and can initiate a hardware reset in case of emergency. The principle is based on the computer software having to send signals to the board at regular intervals.

If the board does not receive an expected signal within a certain period of time, the first alarm level is activated. The emergency program is started which determines the cause and tries to remove the error. If this fails, the operating system and, if necessary, external devices are prepared for the hardware reset. The second alarm level is automatically triggered after a defined timeout.

The internal PC temperature can be monitored through the onboard temperature sensor.

Features

- PCI 3.3 V or 5 V

Watchdog

- 4 watchdogs/timers
- 1 trigger channel/gate input (24 V)
- Activation through software
- Configuration through software, readable
- Can be triggered through software or digital input
- Time base for the watchdog/timer: μ s, ms, s, min
- Two completely separated programmable alarm levels: Level 1 generates an interrupt or switches the warning relay, level 2 switches the reset relay.
- With the two-level alarm, the operating system can be warned through an interrupt that a hardware reset is going to take place. There is then enough time to close the active tasks.
- The alarm time can be read back at any time, so that the time remaining for further tasks can be established.
- Switching time of the reset relay: 2 s

Defined state after booting

- The watchdogs are switched off through the system reset

Diagnostic

- The status of the 4 watchdogs is readable
- 1 digital input (watchdog trigger or timer gate)
- Watchdog 1 can switch 2 software-controlled relays

APCI-035

4 watchdogs/timers

2 relays with change-over contacts

1 digital input, 24 V

2 alarm levels

Temperature monitoring

from - 45 °C to + 135 °C

Safety

- Optical isolation 500 V

Temperature measurement

- 1 temperature onboard sensor
- Alarm function when a programmable limit value is exceeded

Applications

- Control of industrial PC-based process
- Time measurement • Temperature monitoring
- Timer-driven software applications

Software

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

Standard drivers for:

- 32-bit drivers for Windows 7/Vista/XP/2000 (real-time)
- Signed 64-bit drivers for Windows 7/Vista/XP

Drivers and samples for the following compilers and software packages:

- .NET
- Microsoft VC++ • Borland C++
- Visual Basic • Delphi
- LabVIEW • LabWindows/CVI

ADDIPACK functions

Watchdog • Timer • Temperature

On request:

Further operating systems, compilers and samples.

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

In preparation

The software **Watch & Act**® monitors the software and hardware levels of the PC or server on which it is installed. System services can be stopped or restarted as needed. Combined with the watchdog board APCI-035, it is possible to monitor the complete system, i. e. in case of error the PC or server can be rebooted. It is also possible to watch external devices such as diagnostic or monitoring systems and to control modems or other dialing devices.

Specifications

APCI-035

Addressing:	32-bit
Addressing range:	256 Byte
Interrupt:	through BIOS
Optical isolation:	500 V (from the PC to the peripheral)

Watchdog/timer

Depth:	8-bit
Switching time of the reset relays:	2 s
4 x programmable watchdogs/timers:	Time selectable from 2 µs to 255 min
Time units:	µs, ms, s, min

Temperature monitoring

Accuracy:	± 2 °C
Measurement range:	-45 °C to 135 °C (real range of application 0-60 °C)
Resolution:	8-bit

Relay data

Type of contacts:	2 change-over contacts
Max. switching voltage:	60 VDC, 48 VAC
Max. switching current:	1 A
Max. switching capacity:	62.5 VA, 30 W
Min. permissible load:	1 mA / 5 VAC
Nominal load:	1 A 24 VDC
Contact resistance:	< 100 mΩ
Contact material:	Ag + Au-plated
Responding time:	max. 5 ms, typ. 2.5 ms
Release time:	max. 5 ms, typ. 0.9 ms
Mechanical life:	5 x 10 ⁶ operations
Electrical life at 24 V:	10 ⁵ operations

Digital input

Nominal input current at 24 V:	6 mA
Nominal input voltage:	24 V
Switching threshold:	>16 V for logical "1".

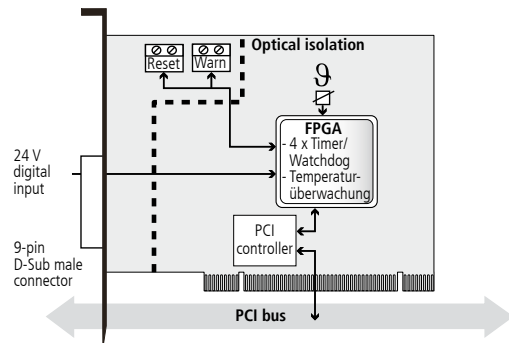
EMC – Electromagnetic compatibility

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

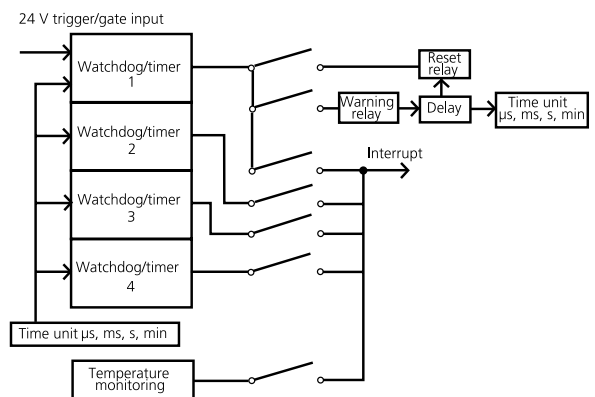
Dimensions:	120 x 85 mm
System bus:	PCI 32-bit 3.3/5 V acc. to spec. 2.2 (PCISiG)
Space required:	1 PCI slot
Operating voltage:	+5 V, ± 5 % from the PC
Current consumption:	240 mA ± 10 % typ.
Front connector:	9-pin D-Sub male connector
Temperature range:	0 to 60 °C (with forced cooling)

Simplified block diagram



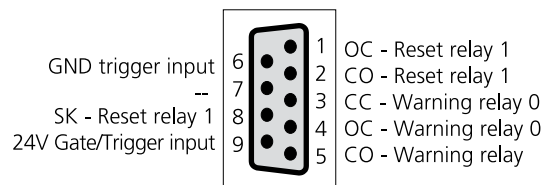
Possible alarm system settings

Function settings through software



Level 1: Interrupt / warning relay
Level 2: Reset relay / reset generated through reset switch of the PC system

Pin assignment – 9-pin D-Sub male connector



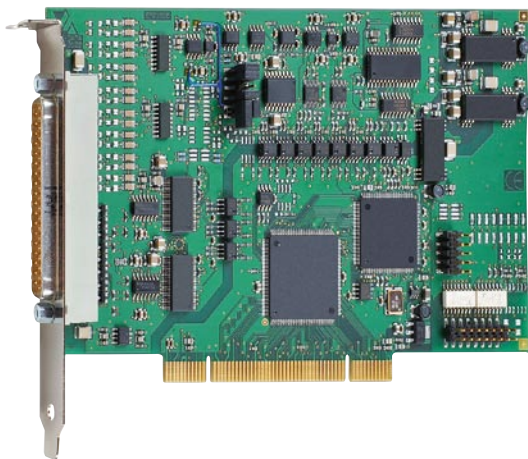
CO: Change-over contact
CC: Closer contact
OC: Opening contact

Ordering information

APCI-035

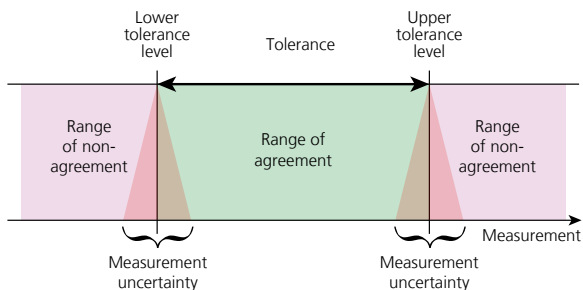
Watchdog board, optically isolated, 4 watchdogs/timers. Incl. technical description and software drivers.

PCI BOARDS: ANALOG I/O



High-precision measurement in the field

There are numerous measurement systems that provide precise data under laboratory conditions. This is different in the production or in outdoor areas, where the conditions are considerably more demanding. There the measurement results play a central role. Rework and defective goods can only be effectively reduced if the tolerance testing during the production process is precise enough to sort products reliably as being within or without the tolerance range. The importance of accuracy appears even clearer in cases where the measurement is used for regulation.



Precise even in case of temperature drift

Temperature drift can be caused by the surrounding temperature as well as by the board itself. To ensure the accuracy of the measurement, on the one hand we are careful to use only high-quality components with little drift. On the other hand we pay a lot of attention to the board layout. For example, components that generate heat are placed where they will not heat up the other components unnecessarily.

Precision through interference resistance

Not only the quality of the A/D converter is important but the interference resistance of the whole chain of acquisition has to be analysed, from the sensors to the acquisition board. Therefore in addition to our PC boards we offer robust cables and screw terminal boards that are intended for the use in a harsh industrial environment.

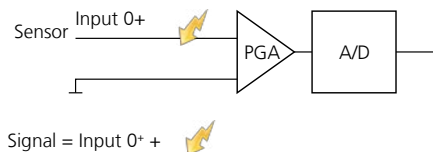
High-precision measurement

Measurement technology is the basis of every automation process. Therefore the accuracy of the sensor acquisition is highly important. The environment of a production line with a lot of interference requires peak performance from the measurement technology. For more than 25 years, ADDI-DATA has been developing analog boards for data acquisition intended for an industrial environment: they are robust, precise and fast.

Single-ended or differential inputs

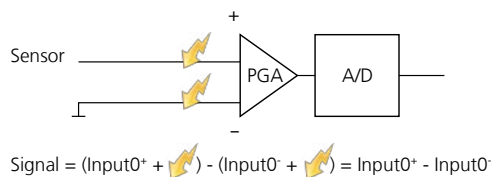
When measuring input voltage you can choose between 2 modes with important differences:

Single-ended mode – One-wire inputs connected to the system ground.



When acquiring analog signals in the single-ended mode, interfering signals are acquired with the signal. Therefore this mode is only advisable in case of high voltage levels and short lines.

Differential mode – Two-wire inputs



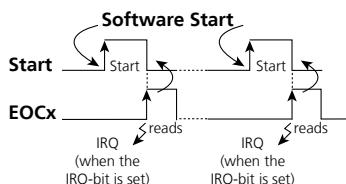
Interference signals affecting both lines are not included in the measurement because of the difference on the input. This is the optimal mode for measurement lines with a lot of interferences and long lines.

Acquisition modes of the analog inputs

There are four modes available for analog inputs. The following is a short overview of the settings available for data acquisition:

A. Simple mode

The software initiates and starts the A/D conversion and reads out the digital values of one or more channels after the end of conversion.



B. Sequence modes

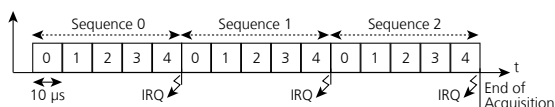
With the DMA function (Direct Memory Access) for a direct data exchange with the PC memory

There are 2 available sequence modes:

1. Simple sequence mode

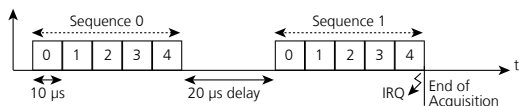
In this example the interrupt is generated at the end of each sequence after 5 acquisitions.

The complete acquisition process ends after 3 sequences.



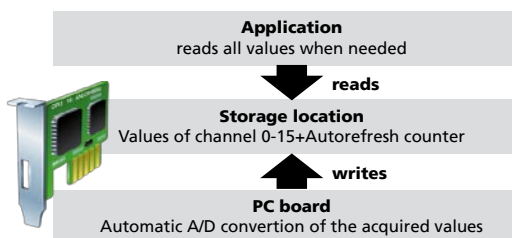
2. Sequence mode with delay

In this example the delay time between the end of one sequence and the start of the next sequence is 20 µs.



C. Auto refresh mode

The analog acquisition is initialised and the values of the channels are written in a buffer on an analog board. The PC reads the data asynchronously to the acquisition.

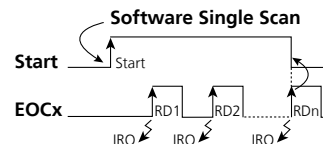


D. Scan mode

There are 6 different scan modes:

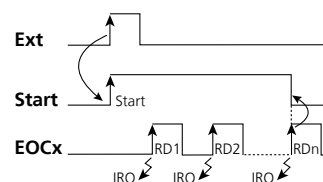
1. Software single scan

The interrupt routine of the user is called up after the last IRQ.

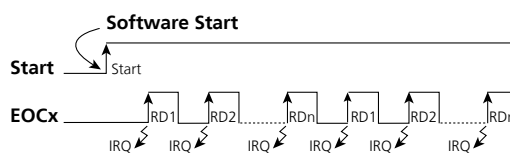


2. Hardware triggered single scan

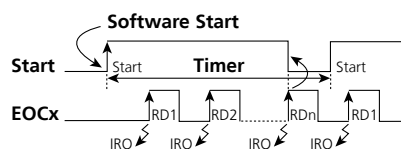
This scan can be triggered with increasing or decreasing edge. The hardware trigger allows to start the acquisition independently from the software or to start the acquisition of more than one board at the same time.



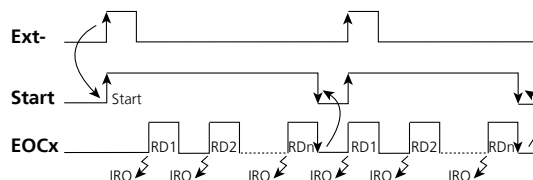
3. Continuous scan (software)



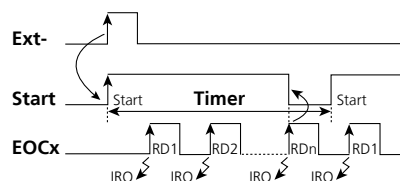
4. Continuous scan with timer delay (software)



5. Continuous scan (hardware)

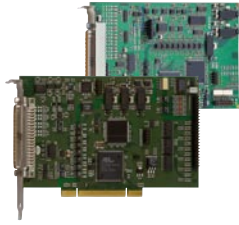


6. Continuous scan with timer delay (hardware)



PCI BOARDS: ANALOG I/O

Multifunction, analog input and analog output boards for 3.3 V or 5 V PCI








	Multifunction boards			Analog input boards					Analog output boards		
	APCI-3120	APCI-3110	APCI-3116	APCI-3010	APCI-3016	APCI-3002	APCI-3003	APCI-3001	APCI-3504	APCI-3504C	APCI-3501
32-bit PCI bus	3.3/5 V	3.3/5 V	3.3/5 V	3.3/5 V	3.3/5 V	3.3/5 V	3.3/5 V	3.3/5 V	5 V	5 V	3.3/5 V
FPGA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Simultaneous acquisition							✓				
Analog inputs											
Single Ended	16/8	16/8	16/8	16/8/4	16/8/4			16/8/4			
Differential	8/4	8/4	8/4	8/4/2	8/4/2	16		8/4			
Diff. separated from each other							4				
Resolution (-bit)	16	12	16	12	16	16	16	12			
Optical isolation	500 V	✓	✓	✓	✓	✓	✓	✓			
Throughput (kHz)	100	200	200	200	200	200	400/ channel	100			
Voltage range											
0-10 V; ± 10 V / 0-5 V; ± 5 V 0-2 V; ± 2 V / 0-1 V; ± 1 V	✓	✓	✓	✓	✓	✓	✓	✓			
Other ranges (optional)	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA	0-20 mA			
Gain 1, 2, 5, 10	✓	✓	✓	✓	✓	✓	✓	✓			
FIFO (value)	256	512	512	512	512	512	1024	256			
Functions of the analog inputs											
DMA (scatter gather, single, continuous, Sequence)		✓	✓	✓	✓	✓	✓	✓			
DMA (single, continuous, Sequence)	✓							✓			
Auto Refresh		✓	✓	✓	✓	✓	✓	✓			
Interrupt	✓	✓	✓	✓	✓	✓	✓	✓			
Programmed I/O	✓	✓	✓	✓	✓	✓	✓	✓			
Trigger:											
Software	✓	✓	✓	✓	✓	✓	✓	✓			
TTL input	-	-	-	-	-	-	-	-			
24 V input	✓	✓	✓	✓	✓	✓	✓	✓			
Sequence RAM	✓	✓	✓	✓	✓	✓	✓	✓			
Analog outputs	4 or 8	4	4						4	4	4 or 8
Resolution (-bit)	14	12	12						12	12	14
Optical isolation	✓	✓	✓						✓	✓	✓
0-10 V ± 10 V	✓	✓	✓						✓	✓	✓
Current outputs										0-20 mA	
Setup time	30 µs	15 µs	15 µs						15 µs	70 µs	30 µs
Digital I/O											
24 V inputs, optically isolated	4	4	4	4	4	4	4	4			
24 V outputs, optically isolated	4(OpenC)	4(50mA)	4(50mA)	4(50mA)	4(50mA)	4(50mA)	4(50mA)	4(OpenC)			2 2(OpenC)
TTL I/O		24	24	24	24						
Timer/Counter/Watchdog (depth) and/or	1 / - / 1 24-bit	3 / 3 / 2 16-bit	3 / 3 / 2 16-bit	3 / 3 / 1 16-bit	3 / 3 / 1 16-bit	1 / - / - 16-bit	1 / - / - 16-bit	1 / - / - 16-bit	1 / - / - 12-bit	1 / - / - 12-bit	1 / - / - 12-bit
Page	138	140	140	142	142	144	146	148	150	150	152
Software	Current driver list on the web: www.addi-data.com										



Temperature, pressure, noise, vibration and length measurement

New!

	Temperature measurement	Pressure measurement	Noise and vibration measurement	Length measurement	
					
	APCI-3200	APCI-3300	APCI-3600	APCI-3702	APCI-3701
64-bit or 32-bit PCI-Bus	3.3 V / 5 V	3.3 V / 5 V	3,3 V / 5 V	3.3 V / 5 V	3.3 V / 5 V
FPGA			✓		
Noise and vibration			✓		
Thermocouples J,K,T,E,R,S,B,N Pt100, Pt1000	✓				
Strain gauges		✓			
Inductive transducers				Half Bridge, LVDT	Half Bridge, LVDT
Signal conditioning			8 current sources for connecting ICP™ sensors		
Analog inputs	4 groups 4 channels	4 groups 4 channels			
Single Ended (SE)/ differential (diff.)	16 thermo/8 RTDs 8 thermo/4 RTDs 4 thermo/2 RTDs	8/4 inputs for strain gauges	8/8	5 channels <i>simultaneous</i> acquisition for induct. displacement transducers	16/8/1 channels for inductive displacement transducers
Resolution (-bit)	18	18	24	16	16
Optical isolation	✓	✓			
Throughput	20-160 Hz	20-160 Hz	2-200 kHz (through software)	depends on transducer type	depends on transducer type 2-20 kHz (50 kHz opt.)
Voltage ranges	+ 1.25 V	+ 1.25 V	± 10 V		
Gain	1, 2, 4, 8, 16, 32, 64, 128	1, 2, 4, 8, 16, 32, 64, 128		depends on transducer type	depends on transducer type
FIFO (Values)			128 DWORD		
Functions of the analog inputs					
DMA (scatter gather; single; continuous; Sequence)			scatter gather free run, ring buffer	✓	✓
Auto Refresh				✓	✓
Interrupt	✓	✓	✓	✓	✓
Programmed I/O	✓	✓	✓	✓	✓
Trigger: Software 24 V input	✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓
Sequence RAM				✓	✓
Analog outputs					
Resolution (-bit)			2		
Optical isolation			16		
0-10 V ± 10 V			± 10 V		
Chronometer inputs Gate inputs			4 2		
Timer/Watchdog (depth) in combination, and/or	- / -	- / -	- / -	1 / - 16-bit	1 / - 16-bit
Digital I/O Inputs 24 V, optically isolated Outputs 24 V, optically isolated	4 3 (Open Collector)	4 3 (Open Collector)	8 8 (50 mA)	8 8 (125 mA)	8 8 (125 mA)
Page	154	158	160	164	166
Software	Current driver list on the web: www.addi-data.com				