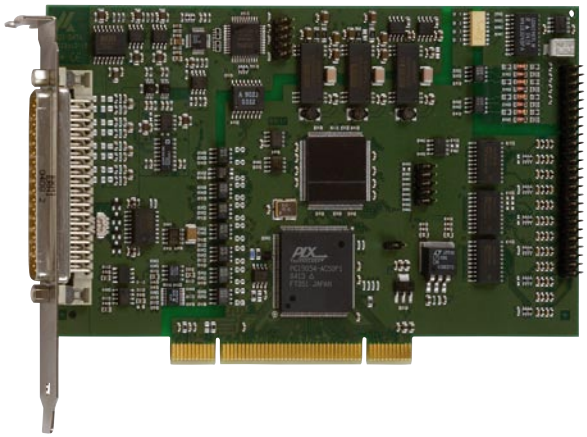
# Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4 analog outputs, 12-/16-bit



## APCI-3110 / APCI-3116

**PCI 3.3 V or 5 V**

**Optical isolation 1000 V**

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

**12-bit or 16-bit resolution, 200 kHz**

**PCI DMA, programmable gain**

**4 analog outputs, 12-bit**

**Timer/counter/watchdog**

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

RoHS 2002/95/EC

PCI 32-bit

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 SE or 8/4 diff. inputs, optically isolated
- Resolution: 12-bit (APCI-3110) or 16-bit (APCI-3116)
- Throughput: 200 kHz
- Input voltage: 0-10 V, ±10 V, 0-5 V, ±5 V, 0-2 V, ±2 V, 0-1 V, ±1 V, 0-20 mA (option), 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
- Onboard FIFO (for 512 analog values)
- PCI-DMA for analog data acquisition

### Analog outputs

- 4 analog outputs, optically isolated
- 12-bit resolution
- Setup time 15 µs typ
- Output voltage after reset: 0 V
- Each output has its own ground line (without optical isolation)
- Output voltage range: -10 V up to + 10 V
- Output current: ± 5 mA
- Short-circuit current: ± 20 mA

### 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
- Port0: outputs / Port1: inputs / Port2: 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

- 2, 16-bit

## Safety features

- 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
- Protection against high-frequency EMI
- Input filters
- Noise neutralisation of the PC supply
- Connection of the I/O signals through robust industry-standard 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.

### Software drivers for:

Linux Kernel version 2.4.22 to 2.6.30, real-time drivers for Windows 7(32-bit)/Vista(32-bit)/XP/2000.
The board is supplied with **ADDIPACK**.

### Drivers for the following software packages:

- LabVIEW up to 7.0 and from 7.0
- LabWindowsCVI

### Samples for the following compilers:

Microsoft VC++ 5.0 • Borland C++ 5.01
Visual Basic 5.0 • Delphi 4.0
LabVIEW from version 7.0 on request.

### Supported ADDIPACK functions:

- Analog input • Analog output • Digital input
- Digital output • Interrupt • Watchdog • Timer • Counter

Current driver list on the web: www.addi-data.com

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# Specifications

## Analog inputs

| | |
|---|---|
| Number of inputs: | 16/8 SE or 8/4 differential inputs |
| Resolution: | 12-bit (APCI-3110) or 16-bit (APCI-3116) |
| Optical isolation: | 1000 V through opto-couplers from PC to peripheral |
| Input ranges: | Software-programmable for each channel<br>0-10 V, ±10 V, 0-5 V, ± 5 V, 0-2 V, ± 2 V, 0-1 V, ± 1 V<br>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,<br>Interrupt at EOC (End Of Conversion),<br>DMA transfer at EOC |
| Interrupts: | End of conversion, at timer overrun, End of scan |

## Analog outputs

| | |
|---|---|
| Number of outputs: | 4 |
| Optical isolation: | 1000 V through opto-couplers |
| Resolution: | 12-bit |
| **Voltage outputs** | |
| Output range: | -10 V to +10 V (-1 LSB) |
| LSB: | 4.8828 mV |
| Accuracy: | 11-bit |
| Time to Ready: | typ. 4.5 µs |
| Setup time: | typ 15 µs (at 10 V step) |
| Max. output current: | ± 5 mA |
| Short-circuit current: | ± 20 mA |
| Output voltage after reset: | 0 V |

## Digital I/O

| | |
|---|---|
| Number of I/O channels: | 4 digital inputs, 24 V<br>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 |

## TTL I/O

| | |
|---|---|
| Number of TTL I/O channels: | 24 |
| I/O Address range: | 128 Byte, addressing : 32-bit |
| Programming: | Through write/read commands |

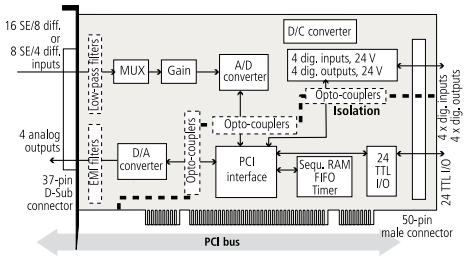
## EMC – Electromagnetic compatibility

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.

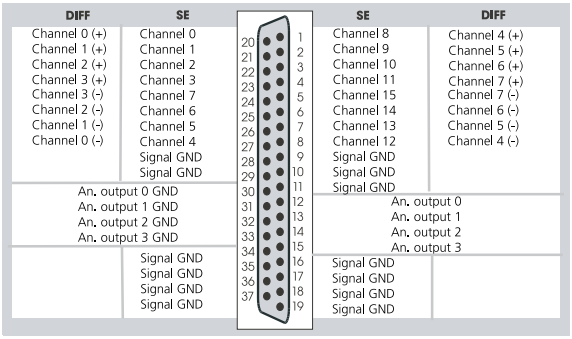
## Physical and environmental conditions

| | |
|---|---|
| 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 I/O,<br>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) |

## Simplified block diagram




## Pin assignment – 37-pin D-Sub male connector

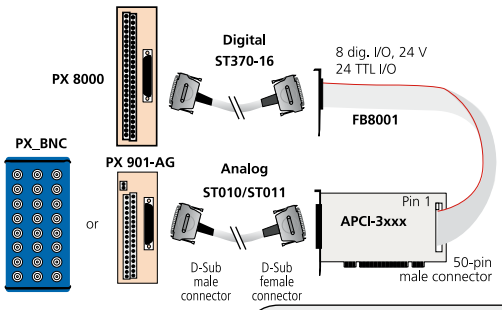



## Pin assignment – 50-pin male connector

| 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 bis 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-3110 / APCI-3116

Multifunction board, optically isolated, 16/8 SE or 8/4 diff. inputs, 4 analog outputs, 12-/16-bit.
Incl. technical description and software drivers.

### Versions

**APCI-3110-16:** 16 SE/8 diff. inputs, 4 analog outputs, 12-bit
**APCI-3110-8:** 8 SE/4 diff. inputs, 4 analog outputs, 12-bit
**APCI-3116-16:** 16 SE/8 diff. inputs, 4 analog outputs, 16-bit
**APCI-3116-8:** 8 SE/4 diff. inputs, 4 analog outputs, 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

**PX 901-A:** Screw terminal panel with transorb diodes for connecting the analog I/O
**PX 901-AG:** Same as PX 901-A with housing for DIN rail
**PX_BNC:** BNC connection box for connecting the analog I/O
**ST010:** Standard round cable, shielded, twisted pairs, 2 m
**ST011:** Standard round cable, shielded, twisted pairs, 5 m
**PX 8000:** 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

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