# Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V, for PCI Express

**PCI EXPRESS®**

## APCIe-1532

PCI Express interface

16 digital inputs, 24 V, including 15 interruptible inputs

16 digital outputs, 24 V, 500 mA/channel

Optical isolation 1000 V

Input and output filters

Connection through industry-standard D-Sub connector

**RoHS 2002/95/EC**
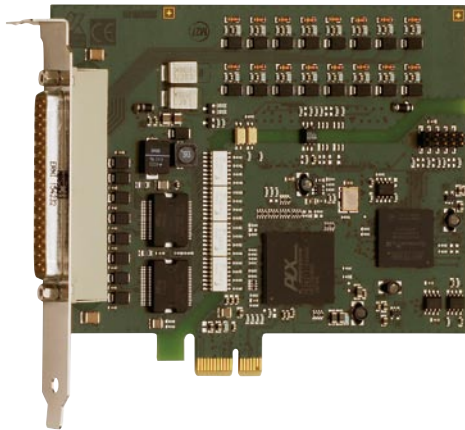
Signed 64-bit drivers for Windows 7/XP

**LabVIEW™**

**LabWindows/CVI™**

## Features

### Inputs
- 16 optically isolated inputs, 24 V, incl. 15 interruptible inputs
- Channel 0 can be used as a 16-bit counter input (up to 100 kHz)
- Reverse voltage protection
- All inputs are filtered

### Outputs
- 16 optically isolated outputs, 11 to 36 V
- Output current per channel 500 mA
- Total current: 3 A typ. (fused through PTC resistor)
- Watchdog for resetting the outputs to "0"
- At Power-On, reset of the outputs to "0"
- Current limit: ~1.5 A per 8 channels (through PTC)
- Short-circuit current per output ~1.5 A typ.
- Self-resetting fuse (electronic fuse)
- Overtemperature and overvoltage protection
- 24 V power outputs with protection diodes and filters
- Ext. 24 V voltage supply screened and filtered
- Shutdown logic, when the external supply voltage drops below 7 V

### Timer / Counter
- 2 timers (12-bit resolution)
- 1 timer can be used as watchdog
- 1 counter

### Safety features
- Optical isolation 1000 V
- Creeping distance IEC 61010-1
- Protection against fast transients (burst), overvoltage, electrostatic discharge and high-frequency EMI
- Separate ground line for inputs and outputs

## Applications

- Industrial I/O control
- PLC coupling
- Reading of encoder values for process control
- Signal switching
- Interface to electromechanical relays
- ON/OFF monitoring of motors, lights...
- Watchdog timer
- Interface to machines

## Software drivers

A CD-ROM with the following software and programming samples 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
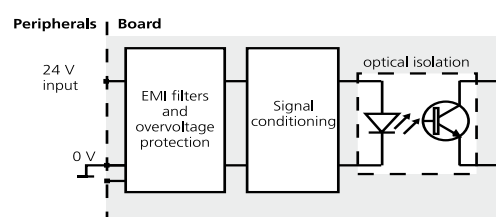- LabVIEW • LabWindows/CVI

### ADDIPACK functions:
- Digital input • Digital output • Watchdog
- Timer • Counter

### On request:
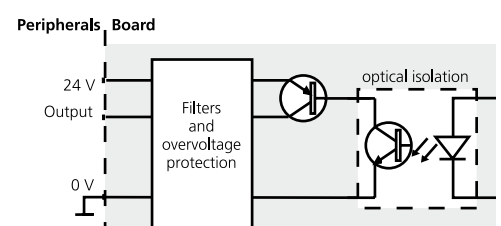Further operating systems, compilers and samples.

Driver download: www.addi-data.com/downloads

### Protective circuit for the input channels



### Protective circuit for the output channels



*Preliminary product information

**ADDI-DATA®**
SPIRIT OF EXCELLENCE

# Specifications*

## Digital inputs

| | |
|---|---|
| Number of inputs: | 16 digital inputs, |
| (common ground | channel 0 can be used as a 16-bit counter input |
| acc. to IEC 1131-2) | (up to 100 kHz) |
| Interruptible inputs: | 15 channels (channel 1 to 15) |
| Optical isolation: | 1000 V through opto-couplers, from PC to peripheral |
| Nominal voltage: | 24 V |
| Input current: | **at 24 V** |
| Channel 0 or 0-1: | 6.6 mA typ. |
| Channel 1-15 or 2-16: | 2 mA typ. |
| Input frequency (max.): | **at 24 V** |
| Channel 0 or 0-1: | 100 kHz |
| Channel 1-15 or 2-16: | 5 kHz |
| Logic input levels: | **at 24 V** |
| UH (max.): | 30 V |
| UH (min.): | 19 V |
| UL (max.): | 14 V |
| UL (min.): | 0 V |
| Filters/protective circuit: | Input filters, transil diode, RC filters, Z diode, opto-couplers |

## Digital outputs

| | |
|---|---|
| Number of outputs: | 16 digital outputs |
| Output type: | High-side (load to ground) acc. to IEC 1131-2 |
| Optical isolation: | 1000 V (through opto-couplers), from PC to peripheral |
| Nominal voltage: | 24 V |
| Supply voltage range: | 11 to 36 V |
| Current limit: | 1.5 A per 8 channels (through PTC) |
| Output current per output: | 500 mA (typical) |
| Short-circuit current per output: | 1.5 A (typ.) pulse current shutdown at 24 V, $R_{load}$<0.1 Ω |
| RDS ON resistance: | max. 0.2 Ω at 25 °C |
| Switch-on time: | $I_{out}$=0.5 A, load = resistance: 50 µs |
| Switch-off time: | $I_{out}$=0.5 A, load = resistance: 75 µs |
| Overtemperature (shutdown): | 135 °C (output driver) |
| Temperature hysteresis: | 15 °C (output driver) |

## Timer/watchdog

| | |
|---|---|
| Timer: | 2 x 12-bit timers, 1 up to 4095 µs, ms, s |
| | 1 timer can be used as watchdog. |

## Safety

| | |
|---|---|
| Shutdown logic ($V_{CC}$ diagnostic): | When the ext. 24 V voltage drops below 7 V: The outputs are switched off. |
| Watchdog: | For resetting the outputs to "0" |
| Common diagnostics: | For all 16 channels at overtemperature of one channel |

## 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: | 149 x 99 mm |
| System bus: | Acc. to PCI Express base specification, Revision 1.0a (PCI Express 1.0a) |
| Space required: | 1-/4-lane PCI Express slot |
| Operating voltage: | + 3.3 V from PC |
| Current consumption: | Inputs and outputs inactive   320 mA ± 10 %, typical |
| | 8 inputs and outputs active   400 mA ± 10 %, typical |
| | 16 inputs and outputs active 470 mA ± 10 %, typical |
| Front connector: | 37-pin D-Sub male connector |
| Temperature range: | 0 to 60 °C (with forced cooling) |

## Simplified block diagram



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

| Left (pin) | | | (pin) Right |
|---|---|---|---|
| Dig. input 1 | 20 | 1 | Dig. input 0 |
| Dig. input 3 | 21 | 2 | Dig. input 2 |
| Dig. input 5 | 22 | 3 | Dig. input 4 |
| Dig. input 7 | 23 | 4 | Dig. input 6 |
| Dig. input 9 | 24 | 5 | Dig. input 8 |
| Dig. input 11 | 25 | 6 | Dig. input 10 |
| Dig. input 13 | 26 | 7 | Dig. input 12 |
| Dig. input 15 | 27 | 8 | Dig. input 14 |
| 24 V ext. | 28 | 9 | 24 V ext. |
| (Outputs) 0 V ext. | 29 | 10 | (Inputs) 0 V ext. |
| Dig. output 1 | 30 | 11 | Dig. output 0 |
| Dig. output 3 | 31 | 12 | Dig. output 2 |
| Dig. output 5 | 32 | 13 | Dig. output 4 |
| Dig. output 7 | 33 | 14 | Dig. output 6 |
| Dig. output 9 | 34 | 15 | Dig. output 8 |
| Dig. output 11 | 35 | 16 | Dig. output 10 |
| Dig. output 13 | 36 | 17 | Dig. output 12 |
| Dig. output 15 | 37 | 18 | Dig. output 14 |
| | | 19 | Diagnostic output |

## ADDI-DATA connection

**Example 1**
Connection of the inputs and outputs through screw terminal panel



**Example 2**
Connection of the inputs through screw terminal panel PX901-DG

Connection of the outputs through relay output board PX8500-G



## Ordering information

### APCIe-1532

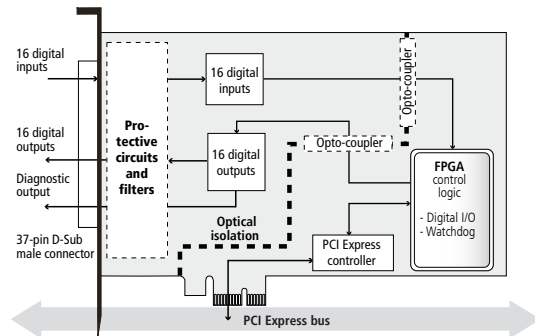Digital I/O board, optically isolated, 32 digital inputs and outputs, 24 V, for PCI Express. Incl. technical description and software drivers.

| | |
|---|---|
| **APCIe-1532:** | 16 inputs, 24 V, 16 outputs, 11-36 V, 1 counter |

### Accessories

| | |
|---|---|
| **PX901-D:** | Screw terminal panel, LED status display |
| **PX901-DG:** | Screw terminal panel, LED status display, for DIN rail |
| **PX9000:** | 3-row screw terminal panel for DIN rail, with LED status display |
| **PX8500-G:** | Relay output board for DIN rail, cascadable |

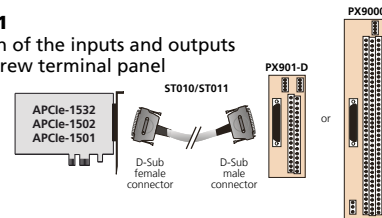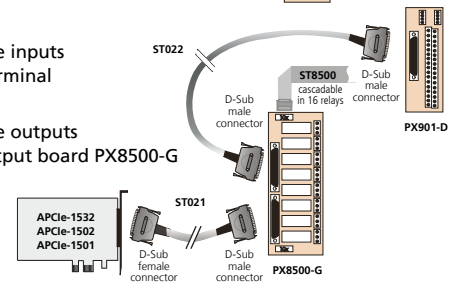| | |
|---|---|
| **ST010:** | Standard round cable, shielded, twisted pairs, 2 m |
| **ST011:** | Standard round cable, shielded, twisted pairs, 5 m |
| **ST010-S:** | Same as ST010, for high currents |
| **ST021:** | Round cable between APCIe-15x2 and PX8500-G, shielded, twisted pairs, 2 m |
| **ST022:** | Round cable between PX8500-G and PX901 or PX9000, shielded, 2 m |
| **ST8500:** | Ribbon cable for cascading two PX8500-G |

*Preliminary product information