ADDI-DATA®
PARTNER FÜR PRÄZISION

Technical Description

APCIe-2200

Relay board, optically isolated

DIN EN ISO 9001:2015 certified

Edition: 02.07-04/2022

Product information

This manual contains the technical installation and important instructions for correct commissioning and usage, as well as production information according to the current state before printing.
The content of this manual and the technical product data may be changed without prior notice.
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Warning!

The following risks result from the improper implementation of the board and from use contrary to the regulations:

Personal injury

Damage to the board, the PC and peripherals

Pollution of the environment.

- Protect yourself, others and the environment!
- Read the safety precautions (yellow leaflet) carefully!

  If this leaflet is not enclosed with the documentation, please contact us and ask for it.
- Observe the instructions of this manual!

  Make sure that you do not forget or skip any step!
  We are not liable for damages resulting from the wrong use of the board.
- Pay attention to the following symbols:

NOTICE!
Designates hints and other useful information.

NOTICE!
Designates a possibly dangerous situation.
If the instructions are ignored, the board, the PC and/or peripherals may be **destroyed**.

WARNING!
Designates a possibly dangerous situation.
If the instructions are ignored, the board, the PC and/or peripherals may be **destroyed** and persons may be **endangered**.

Contents

Figures

Tables

Chapter overview

In this manual, you will find the following information:

Chapter	Content
1	Important information on the application, the user and on handling the board
2	Brief description of the board (features, block diagram)
3	Detailed information on the insertion of the board, connection of the accessories (including pin assignment) and driver installation **Tip:** Print out this chapter to have help at hand for inserting and installing the board.
4	Description of the individual functions of the board
5	Standard software: Information on the API software functions
6	Procedure for returning (repairing, etc.) or disposing of the board
7	List of technical data and limit values of the board
8	Appendix with glossary and index
9	Contact and support address

1 Definition of application, user, handling

1.1 Definition of application

1.1.1 Intended use

The board **APCIe-2200** must be inserted in a personal computer (PC) with PCI Express slots which is used as electrical equipment for measurement, control and laboratory pursuant to the standard DIN EN IEC 61010-1.

The used personal computer (PC) must fulfil the requirements of DIN EN IEC 62368-1 and DIN EN 55032 or IEC/CISPR 32 and DIN EN 55024 or IEC/CISPR 24.

The use of the board **APCIe-2200** in combination with external screw terminal panels requires correct installation according to the standard DIN EN IEC 61439-1 (Low-voltage switchgear and controlgear assemblies).

1.1.2 Usage restrictions

The **APCIe-2200** board must not be used as a safety-related part (SRP).

The **APCIe-2200** board must not be used for safety-related functions, such as emergency stop functions.

The **APCIe-2200** board must not be used in potentially explosive atmospheres.

1.1.3 Limits of use

All safety information and the instructions in the manual must be followed to ensure proper intended use.

Uses of the board beyond these specifications are considered as improper use. The manufacturer is not liable for damages resulting from improper use.

The board must remain in its anti-static packaging until it is installed.

Please do not delete the identification numbers of the board or the warranty claim will be invalid.

1.2 User

1.2.1 Qualification

Only persons trained in electronics are entitled to perform the following works:

- Installation
- Commissioning
- Use
- Maintenance.

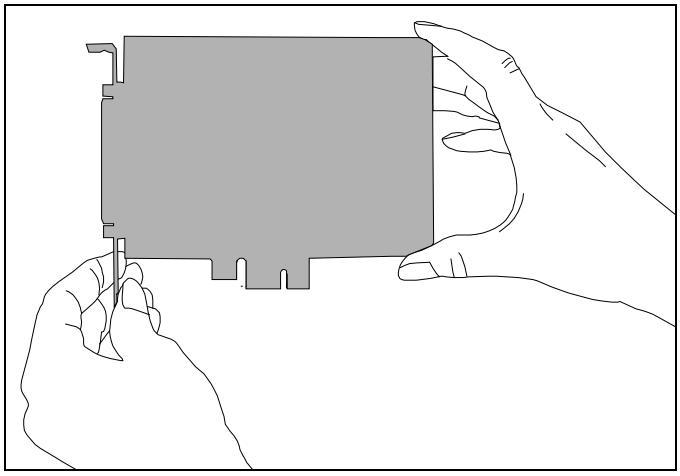
1.2.2 Country-specific regulations

Do observe the country-specific regulations regarding

- the prevention of accidents
- electrical and mechanical installations
- Electromagnetic compatibility (EMC).

1.3 Handling of the board

Fig. 1-1: Correct handling



Hold the board cautiously at the outer end and at the slot bracket.
Do not touch the surface of the board!

1.4 Questions and updates

If you have any questions, do not hesitate to call us or to send us an e-mail:

Phone: +49 7229 1847-0
E-mail: info@addi-data.com

Manual and software download from the Internet

The latest versions of the technical manual and the standard software for the board **APCIe-2200** can be downloaded for free at: https://drivers.addi-data.com.

NOTICE!
Before using the board and in case of malfunction during operation, check if there is an update (manual, driver) available. Current data can be found on our website or contact us directly.

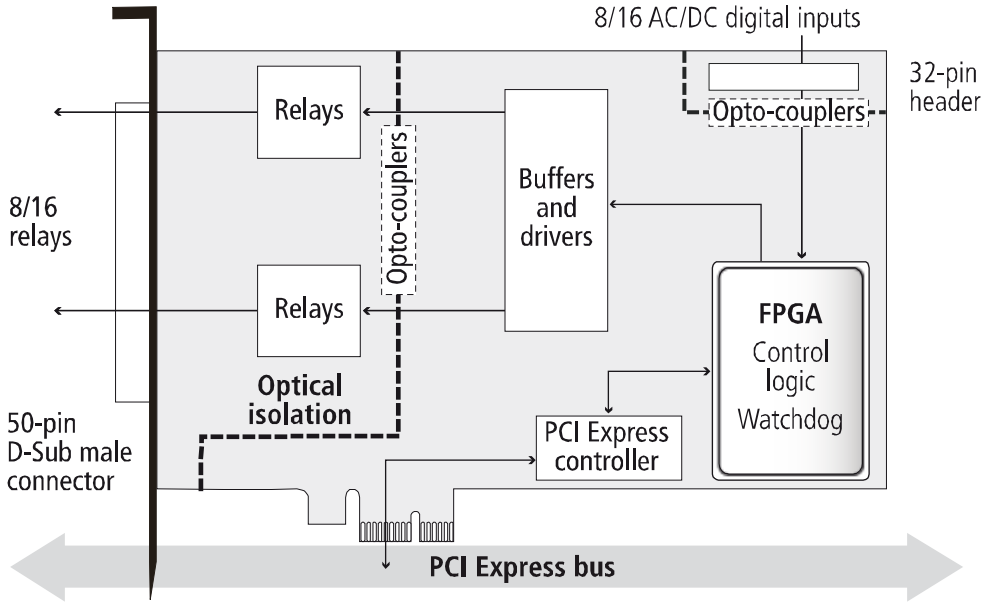
2 Brief description

2.1 Technical features

- 8 or 16 electromechanical relays with change-over contacts (each relay can be optionally wired as an opening, closing or change-over contact)
- Maximum switching voltage: 200 VDC, 200 VAC
- Maximum switching current: 2 A, with a maximum switching capacity of 60 W
- 8 or 16 digital inputs (24 V), including 7 or 15 interruptible inputs
- Optical isolation: 1000 V
- 1 timer (16-bit)
- 1 timer/watchdog (12-bit); watchdog for resetting the outputs to “0” (these are set to “0” at power-on)
- Protection against fast transients (burst), electrostatic discharge and high-frequency EMI

2.2 Block diagram

Fig. 2-1: Block diagram: APCIe-2200



3 Insertion and installation of the board

3.1 Insertion of the APCIe board

Risk of injury!
Be sure to follow the safety precautions!
Improper use of the board may lead to property damage and personal injury.

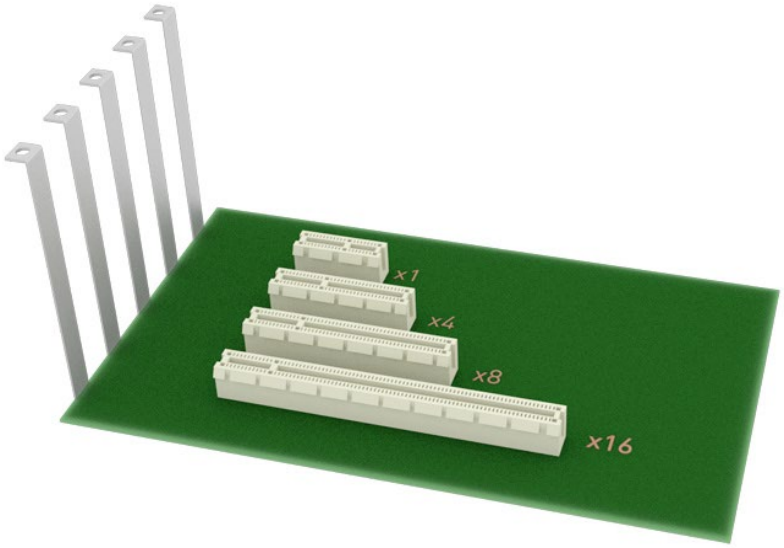
3.1.1 Opening the PC

- Switch off the PC and all the units connected to it.
- Pull the PC mains plug from the socket.
- Open the PC as described in the manual of the PC manufacturer.

3.1.2 Selecting a slot

- Select a free 1-lane (x1), 4-lane (x4), 8-lane (x8) or 16-lane (x16) PCI-Express slot for the board.

Fig. 3-1: PCI Express slot types

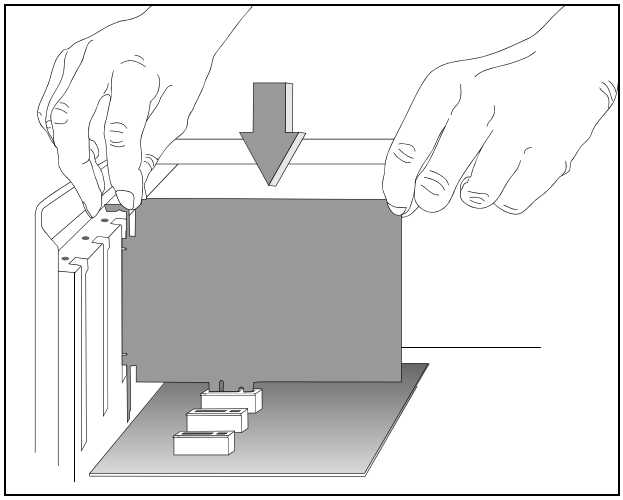


- Unscrew the back cover from the selected slot. For this, follow the operating instructions provided by the PC manufacturer!
  Keep the back cover in a safe place. You will need it if you remove the board.
- Provide for potential equalisation.
- Take the board out of its protective packaging.

3.1.3 Inserting the board

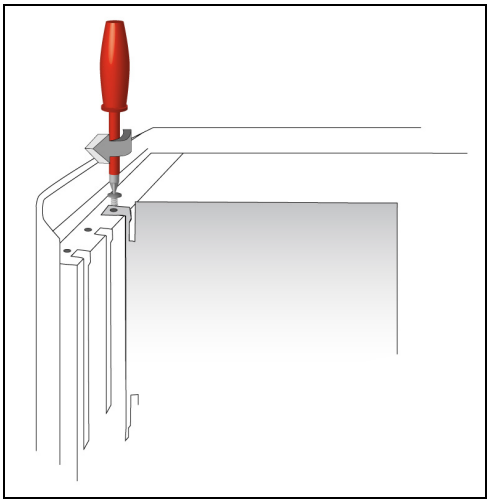
- Insert the board vertically from above into the selected slot.

Fig. 3-2: Slot: Insert the board



- Fasten the board to the rear of the PC housing using the screw which held the back cover in place.

Fig. 3-3: PC housing: Fasten the board



- Tighten all loose screws.

3.1.4 Closing the PC

- Close the PC as described in the manual of the PC manufacturer.

3.2 Connecting the accessories

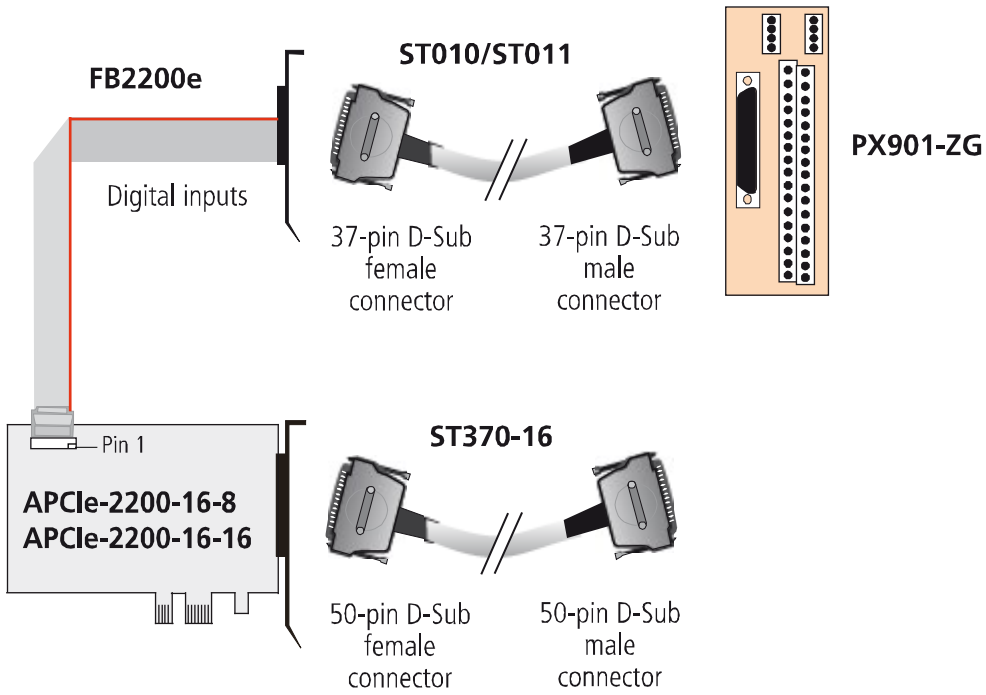
3.2.1 Connection of cables and screw terminal panel

The peripherals are connected to the relay contacts of the **APCIe-2200** board via the cable **ST370-16**, which needs to be connected to the 50-pin D-Sub male connector of the board. In terms of electro-magnetic compatibility (EMC), this cable has the following properties:

- Metallised connector housing
- Shielded cable
- Cable shield folded back over insulation and firmly screwed on both sides to the connector housing.

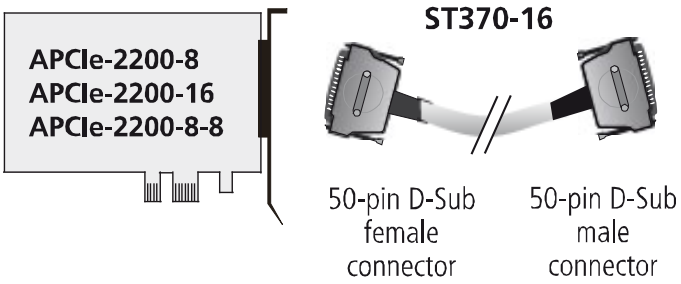
With the **APCIe-2200-8-8** version, also the eight digital inputs are led out via the 50-pin D-Sub male connector of the board.
For all other versions with digital inputs, the supplied ribbon cable **FB2200e** is connected to the 32-pin header of the board. This ribbon cable also has a 37-pin D-Sub male connector for the connection of the cable **ST010** or **ST011**, i.e. a second slot is required.

Fig. 3-4: APCIe-2200-16-x: Connection of cables and screw terminal panel



NOTICE!
Plug the **FB2200e** cable into the connector by inserting the red (or blue or black) cable line into pin 1.

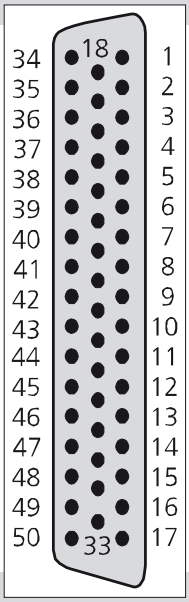
Fig. 3-5: APCIe-2200-x and APCIe-2200-8-8: Connection of the ST370-16 cable



3.2.2 Pin assignment

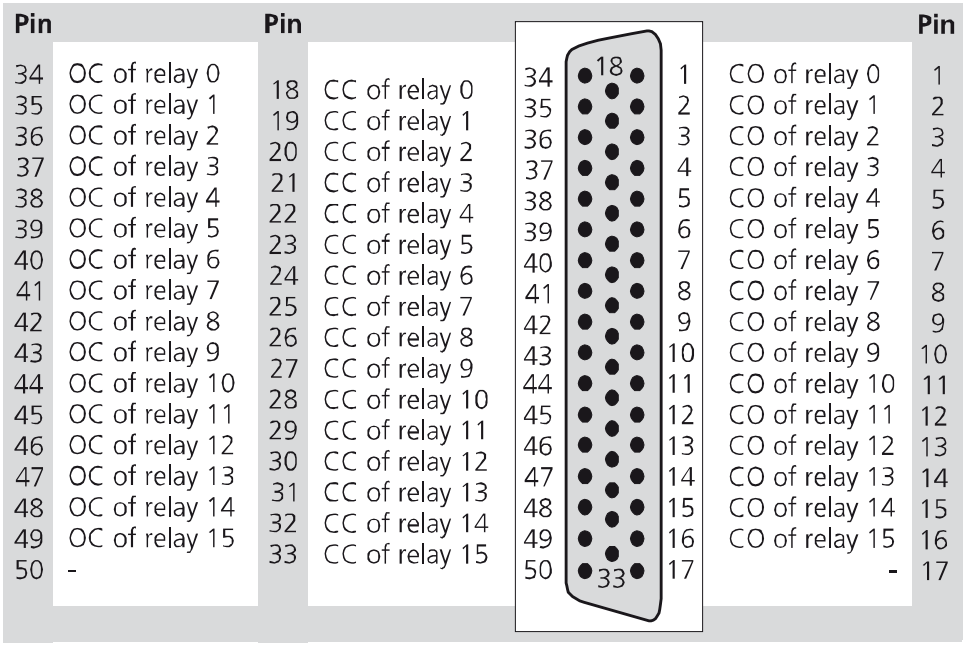
Fig. 3-6: 50-pin D-Sub male connector (APCIe-2200-8)

Pin		Pin			Pin
34	OC of relay 0	18	CC of relay 0	CO of relay 0	1
35	OC of relay 1	19	CC of relay 1	CO of relay 1	2
36	OC of relay 2	20	CC of relay 2	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	CO of relay 7	8
42	-	26	-	-	9
43	-	27	-	-	10
44	-	28	-	-	11
45	-	29	-	-	12
46	-	30	-	-	13
47	-	31	-	-	14
48	-	32	-	-	15
49	-	33	-	-	16
50	-			-	17



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

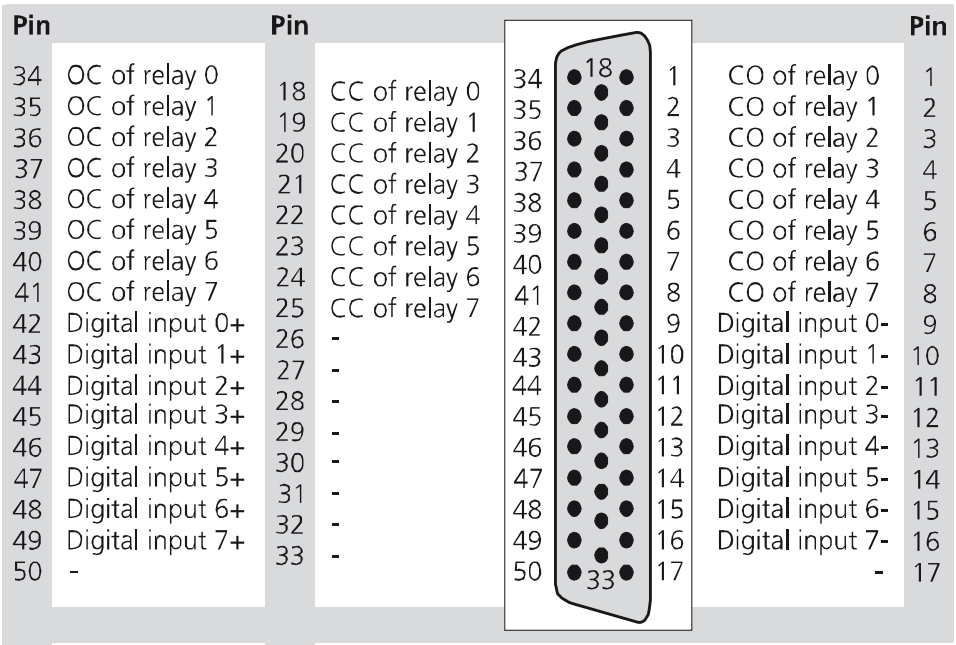
Fig. 3-7: 50-pin D-Sub male connector (APCIe-2200-16 / APCIe-2200-16-x)



Pin		Pin			Pin	
34	OC of relay 0	18	CC of relay 0	34 ● 18 ● 1	CO of relay 0	1
35	OC of relay 1	19	CC of relay 1	35 ● ● 2	CO of relay 1	2
36	OC of relay 2	20	CC of relay 2	36 ● ● 3	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	37 ● ● 4	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	38 ● ● 5	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	39 ● ● 6	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	40 ● ● 7	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	41 ● ● 8	CO of relay 7	8
42	OC of relay 8	26	CC of relay 8	42 ● ● 9	CO of relay 8	9
43	OC of relay 9	27	CC of relay 9	43 ● ● 10	CO of relay 9	10
44	OC of relay 10	28	CC of relay 10	44 ● ● 11	CO of relay 10	11
45	OC of relay 11	29	CC of relay 11	45 ● ● 12	CO of relay 11	12
46	OC of relay 12	30	CC of relay 12	46 ● ● 13	CO of relay 12	13
47	OC of relay 13	31	CC of relay 13	47 ● ● 14	CO of relay 13	14
48	OC of relay 14	32	CC of relay 14	48 ● ● 15	CO of relay 14	15
49	OC of relay 15	33	CC of relay 15	49 ● ● 16	CO of relay 15	16
50	-			50 ● 33 ● 17	-	17

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

Fig. 3-8: 50-pin D-Sub male connector (APCIe-2200-8-8)

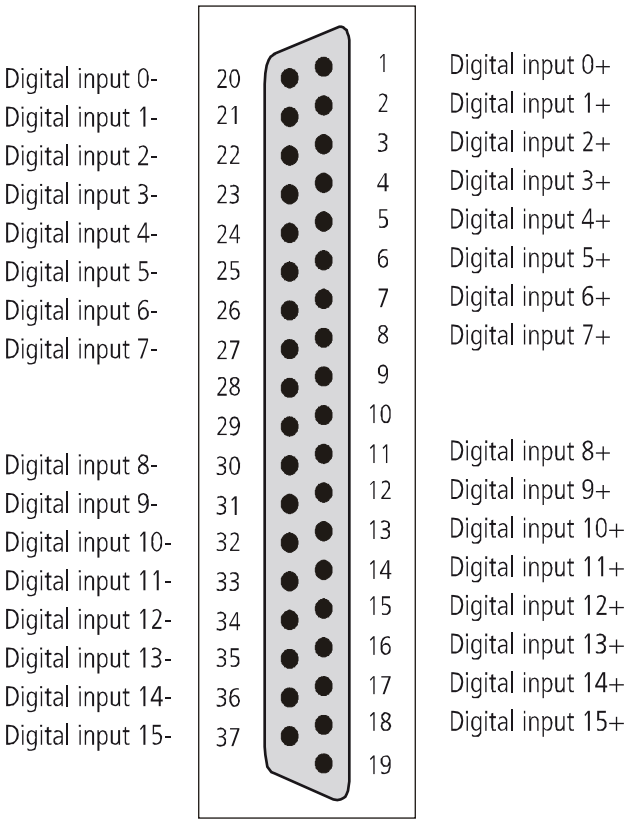


Pin		Pin			Pin	
34	OC of relay 0	18	CC of relay 0	34 ● 18 ● 1	CO of relay 0	1
35	OC of relay 1	19	CC of relay 1	35 ● ● 2	CO of relay 1	2
36	OC of relay 2	20	CC of relay 2	36 ● ● 3	CO of relay 2	3
37	OC of relay 3	21	CC of relay 3	37 ● ● 4	CO of relay 3	4
38	OC of relay 4	22	CC of relay 4	38 ● ● 5	CO of relay 4	5
39	OC of relay 5	23	CC of relay 5	39 ● ● 6	CO of relay 5	6
40	OC of relay 6	24	CC of relay 6	40 ● ● 7	CO of relay 6	7
41	OC of relay 7	25	CC of relay 7	41 ● ● 8	CO of relay 7	8
42	Digital input 0+	26	-	42 ● ● 9	Digital input 0-	9
43	Digital input 1+	27	-	43 ● ● 10	Digital input 1-	10
44	Digital input 2+	28	-	44 ● ● 11	Digital input 2-	11
45	Digital input 3+	29	-	45 ● ● 12	Digital input 3-	12
46	Digital input 4+	30	-	46 ● ● 13	Digital input 4-	13
47	Digital input 5+	31	-	47 ● ● 14	Digital input 5-	14
48	Digital input 6+	32	-	48 ● ● 15	Digital input 6-	15
49	Digital input 7+	33	-	49 ● ● 16	Digital input 7-	16
50	-			50 ● 33 ● 17	-	17

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

NOTICE!
With the **APCIe-2200-8-8** version, the digital inputs are led out via the 50-pin D-Sub male connector. The **FB2200e** cable is not required for this.

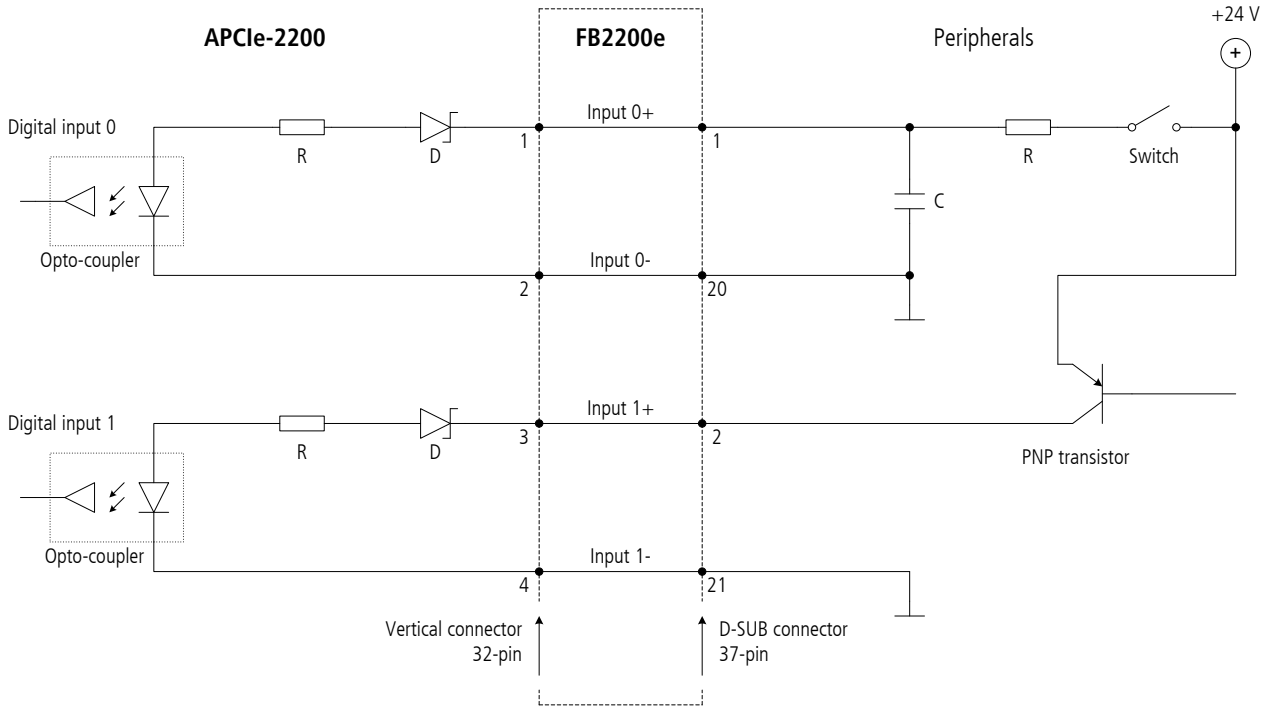
Fig. 3-9: 37-pin D-Sub male connector (digital inputs)



3.3 Connection examples

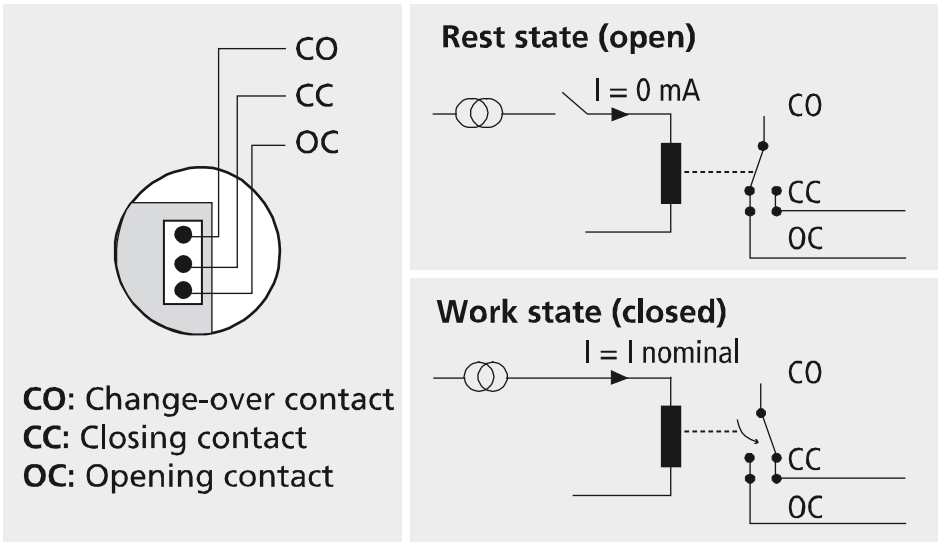
3.3.1 Digital inputs (24 V)

Fig. 3-10: Connection example: Digital inputs (24 V)



3.3.2 Digital outputs (relays)

Fig. 3-11: Switching principle of the relays



3.4 Driver installation

Information on how to select and download the appropriate driver can be found in the document “Quick installation PC boards” (see PDF link).

The installation of drivers of the type “ADDI-DATA Multiarchitecture Device Drivers 32-/64-Bit for x86/AMD64” as well as the installation of the corresponding samples is described in the installation instructions (see PDF link).

4 Function description

4.1 Digital inputs

The digital inputs acquire external signal states. The input information is loaded as a numeric value in a memory cell of the system via the driver function. This numeric value represents the status of the input signals.

The inputs correspond to the 24 V industry standard (DIN EN IEC 61131-2):

- Logic “1” corresponds to an input voltage ≥ 19 V.
- Logic “0” corresponds to an input voltage ≤ 14 V.

The current demand for each input is 8 mA at nominal voltage (see Chapter 7.4.1). The maximum input voltage is 30 V.

NOTICE!
The mains supply for the external power supply of the board must deliver at least the power that is required for your application.

The input signals are filtered by TVS diodes, Z-diodes, RC filters and opto-couplers. In this way, the effect of inductive and capacitive noise is reduced.

4.2 Digital outputs (relays)

The **APCIe-2200** has 8 or 16 relays with change-over contacts. For this, positive logic is used:

- Logic “1” = Set output (connection: change-over contact with closing contact)
- Logic “0” = Reset output (connection: change-over contact with opening contact)

Each output can switch a maximum current of 2 A.

4.3 Interrupt

The board has an interrupt line, which is assigned by the BIOS. Interrupt sources are the following:

- Interruptible inputs: channels 1 to 15
- Timer 1
- Watchdog: The outputs are reset.

The interrupt source information is provided to the user program via an interrupt routine.

4.3.1 Interruptible inputs: Event logic

It is possible to mask an OR event with a rising or falling edge. To control the event logic, the following functions (set through software) are available:

- Activate/deactivate the interrupt function
- The interrupt source can be read back.
- The IRQ status register can be read back.
- The interrupt function is programmed via two registers which the events are masked with (hexadecimal).

4.3.2 Interrupt control

The interrupt logic is disabled after an interrupt has been released. At the end of the interrupt routine, the interrupt logic is enabled again. During the interrupt routine, the board does not react to changes to the input channels.
Another interrupt is released only after the original interrupt service routine has been processed and if an interruptible edge or status change takes place.

4.3.3 OR logic

Table 4-1: OR logic

	Inactive	Rising	Falling	Rising/Falling
Mode_1	0	1	0	1
Mode_2	0	0	1	1

The OR logic reacts to rising or falling edges.

An interrupt is released if there is a change of edges at an interruptible input which fulfils the interrupt condition set by Mode_1 and Mode_2.

Example: Edge change interrupt

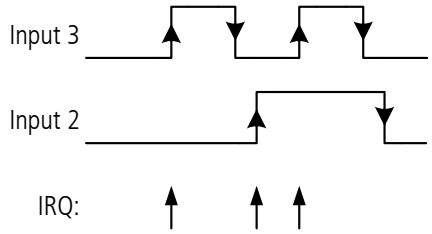
In the figures below, the following parameters are set:

1st condition:

Channels 2 and 3 react to rising edges (Mode_1 = 0xC and Mode_2 = 0x0).

Fig. 4-1: OR logic: Edge change interrupt: 1st condition

Mode_1 = 1100 (binary) or 0xC (hex)
Mode_2 = 0000 (binary) or 0x0 (hex)



2nd condition:

Channels 2 and 3 react to falling edges (Mode_1 = 0x0 and Mode_2 = 0xC).

Fig. 4-2: OR logic: Edge change interrupt: 2nd condition

Mode_1 = 0000 (binary) or 0x0 (hex)
Mode_2 = 1100 (binary) or 0xC (hex)

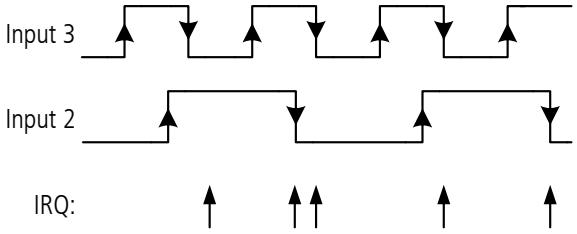


Table 4-2: OR logic principle for two channels (example)

Input 3 Mode_2, Mode_1	Input 2 Mode_2, Mode_1	Input 2 / Input 3
0,0	0,0	No interrupt
1,0	0,0	10* 10
0,1	0,0	10 10
1,1	0,0	10 10 10 10
0,0	1,0	01** 01
1,0	1,0	01 10 01 10
0,1	1,0	10 01 10 01
1,1	1,0	10 01 10 10 01 10
0,0	0,1	01 01
1,0	0,1	01 10 01 10
0,1	0,1	01 10 10 01
1,1	0,1	01 10 10 10 01 10
0,0	1,1	01 01 01 01
1,0	1,1	01 01 10 01 01 10
0,1	1,1	01 10 01 10 01 01
1,1	1,1	01 10 01 10 10 01 01 10

* 10: **Interrupt source:** The second input (channel 3) has released an interrupt.

** 01: **Interrupt source:** The first input (channel 2) has released an interrupt.

4.4 Timer and watchdog

The board **APCIe-2200** has two timers (0 and 1). One of them (timer 0) can also be programmed as a watchdog.

4.4.1 Timer

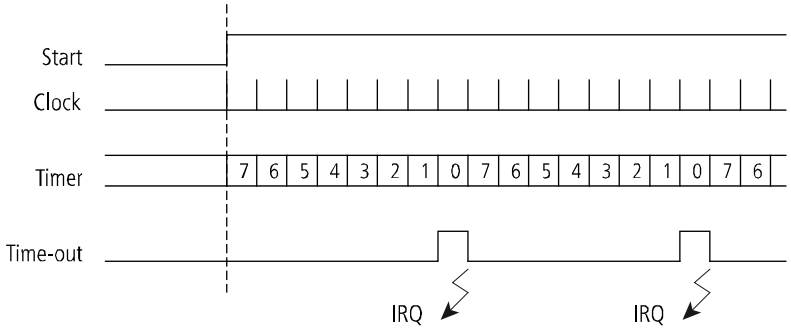
Independently from the PC clock, the timer provides a time base to synchronise operations, for example. The 16-bit timer is a downward counter which can release an interrupt after the programmed cycle time has elapsed (time-out).
The current timer value and the start value (reload value) as well as status and interrupt registers can be read back through software. The cycle time can be programmed in the range from 1 µs to 65535 s.

Example

Reload value = 7
Initialisation with a rising edge
Interrupt enabled

When the timer value is "0", the reload value "7" will be reloaded with the next valid edge and an interrupt will be released.

Fig. 4-3: Timer (example)



4.4.2 Watchdog

The watchdog is a downward counter. It is used to monitor the digital outputs of the board.

After the start of the watchdog, the start value (reload value) is reloaded every time the digital outputs are set (triggering). Triggering can also occur directly through a software command without setting the digital outputs again. The watchdog resets the digital outputs after the complete cycle time has elapsed (time-out), i.e. if the watchdog has not been triggered anew.
The operating states of the watchdog can be read back. The cycle time can be programmed in the range from 1 µs to 4095 s.

5 Standard software

The API software functions supported by the board are listed in an HTML document. A description of how to access the respective file can be found in the document “Quick installation PC boards” (see PDF link), in the chapter “Standard software”.

6 Return or disposal

6.1 Return

If you need to return your board, you should read the following checklist before.

Checklist for returning the board:

- Specify the reason for returning your board (e.g. exchange, modification, repair), the serial number of the board, the contact person in your company including his/her telephone extension and e-mail address, as well as the mailing address for a potential new delivery. You do not have to indicate the RMA number.

Fig. 6-1: Serial number

- Note down the serial number of the board.
- Place the board in an ESD protective cover. Then pack it in a cardboard box so that it is well-protected for shipping. Send the packed board together with your details to:

  ADDI-DATA GmbH
  Airpark Business Center
  Airport Boulevard B210
  77836 Rheinmünster
  Germany
- If you have any questions, do not hesitate to contact us:

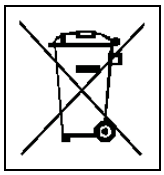
  Phone: +49 7229 1847-0
  E-mail: info@addi-data.com

6.2 Disposal of ADDI-DATA waste equipment

ADDI-DATA organises the disposal of ADDI-DATA products that were put on the German market after 13 August 2005.
If you want to return waste equipment, please e-mail your request to: info@addi-data.com.

Boards that were delivered after 13 August 2005 can be recognised by the following label:

Fig. 6-2: Disposal: Label



This symbol indicates the disposal of waste electrical and electronic equipment. It is valid in the European Union and in other European countries that have a separate collection system. Products carrying this symbol must not be treated as household waste.
For more detailed information on the recycling of these products, please contact your local citizens' office, your household waste collection service, the shop where you bought this product or the distributor you purchased this product from.

If you dispose of this product correctly, you will help to prevent damage that could be caused to the environment and to human health by inappropriate disposal. The recycling of materials will help to conserve our natural resources.

Disposal in other countries than Germany
Please dispose of the product according to the country-specific regulations.

7 Technical data and limit values

7.1 Electromagnetic compatibility (EMC)

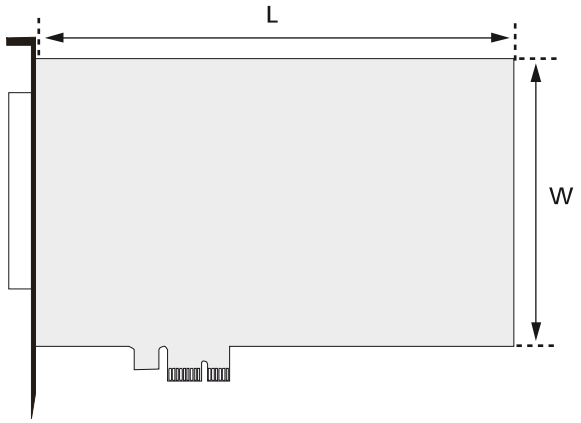
The **APCIe-2200** board is suited for installation in personal computers (PCs) which comply with the European EMC directive.

The board **APCIe-2200** complies with the European EMC directive. The tests were carried out by a certified EMC laboratory in accordance with the standard DIN EN IEC 61326-1. 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.

7.2 Mechanical structure

Fig. 7-1: APCIe-2200: Dimensions



Dimensions (L x W):	149 x 99 mm	
Weight:	135 g	
Insertion into:	PCI Express slot	
Connection to peripherals:		
Front connector:	50-pin D-Sub male connector (digital outputs)	
Additional connector:	**APCIe-2200-16-16, APCIe-2200-16-8:** 32-pin header (digital inputs)	
Accessories: [1]	see Chapter 3.2	
Digital outputs:	Cable:	**ST370-16**
Digital inputs:	Cable: Screw terminal panel:	**ST010 / ST011** **PX901-ZG**

NOTICE!
The connection lines must be installed in such a way that they are protected against mechanical loads.

[1] not included in standard delivery

7.3 Versions

The board **APCIe-2200** is available in the following versions:

Table 7-1: Versions

Version	Features
APCIe-2200-8	8 relays
APCIe-2200-16	16 relays
APCIe-2200-8-8	8 relays, 8 digital inputs (24 V)
APCIe-2200-16-8	16 relays, 8 digital inputs (24 V), with ribbon cable for the connection of the digital inputs
APCIe-2200-16-16	16 relays, 16 digital inputs (24 V), with ribbon cable for the connection of the digital inputs

The specific version name can be found on the type label at the slot bracket of your board.

7.4 Limit values

Height:	2000 m over NN
Operating temperature:	0-60 °C (with forced ventilation)
Storage temperature:	-25 °C to +70 °C
Relative air humidity at indoor installation:	50 % at +40 °C 80 % at +31 °C
Minimum PC requirements:	
System bus:	1-/4-/8-/16-lane PCI Express according to PCI Express Base Specification, Revision 1.0a (PCI Express 1.0a)
Link speed:	2.5 Gbit/s
Required space: - Digital outputs: - Digital inputs:	 1 PCI Express slot 1 PCI Express slot (for **FB2200e** cable)
Operating system:	Windows 10, Windows 7, Linux
Safety:	
Optical isolation:	1000 V
Energy demand:	
Operating voltage from the PC:	3.3 V ± 9 %
Current consumption (typ., without load)	see Table 7-2

Table 7-2: Typical current consumption (boards)

	APCIe-2200-8	APCIe-2200-16	APCIe-2200-8-8	APCIe-2200-16-8	APCIe-2200-16-16
Without load	0.31 A	0.31 A	0.31 A	0.31 A	0.31 A
Full load	0.64 A	0.98 A	0.67 A	1.01 A	1.03 A

7.4.1 Digital inputs

Number of inputs:	8 or 16 (common GND according to DIN EN IEC 61131-2)
Interruptible inputs:	7 or 15
Nominal voltage:	24 V
Filter/Protective circuit:	Low pass/TVS diodes
Optical isolation:	1000 V
Input voltage:	0-30 V
Input current (at nominal voltage):	5-8 mA typ.
Max. input frequency (at nominal voltage):	10 kHz
Logic input levels:	UH_{max}: 30 V UH_{min}: 19 V UL_{max}: 14 V UL_{min}: 0 V

7.4.2 Digital outputs (relays)

Number of outputs:	8 or 16
Output type:	Relay with change-over contact
Optical isolation:	1000 V
Max. switching voltage:	200 VDC, 200 VAC
Max. switching current:	2 A
Max. switching capacity:	60 W
Contact resistance:	< 100 mΩ
Contact material:	Ag- and Au-plated
Mechanical life:	10^8 operations
Electrical life (at rated load):	10^5 operations

Risk of death!
With a switching voltage greater than 60 VDC or 25 VAC, the corresponding measures (e.g. covers) must be taken to protect the sections that are dangerous to touch when connecting peripherals to the **APCIe-2200.**

7.4.3 Timer and watchdog

Timer (interruptible)

Number:	2 (timers 0 and 1)
Resolution:	16-bit
Time base:	µs, ms, s (programmable)
Time value range:	1 to 65535
Tolerance:	≤ 1 µs, ms, s

Watchdog

Number:	1 (timer 0)
Resolution:	12-bit
Time base:	µs, ms, s (programmable)
Time value range:	1 to 4095
Tolerance:	≤ 1 µs, ms, s

8 Appendix

8.1 Glossary

Change-over contact
A change-over contact is a contact arrangement, with which a contact point closes, when it is operated, as another contact point opens. The change-over contact is connected to the closing contact when the relay is accessed and with the opening contact in the rest position.

Closing contact
With a make or closing contact, a contact is made after activation of the relay. When the relay is no longer accessed, the contact is opened again.

Data bus
The data bus basically consists of several lines (or pins) through which the processor sends and receives data. The volume of data that can be transmitted simultaneously depends on the number of data lines. In other words: The more pins the bus has, the more efficient it is.

Direct current voltage
DC voltage means that the voltage remains constant over time. In practice, it will always exhibit small fluctuations. Particularly when switching a device on or off, the transitional behaviour may be of significance. Transient oscillations may occur, determined by the actual connection.

Driver
A driver is a series of software instructions written specifically to manage particular devices.

Edge
Edges can either be rising or falling.
Logic levels are defined for processing and displaying information. In binary circuits, voltages are used for digital values. Here, the two voltage ranges “H” (high) und “L” (low) represent the information.

The “H” range is closer to plus infinity; the “H” level corresponds to digital 1. “L” denotes the range closer to minus infinity; the “L” level corresponds to digital 0. The rising edge is the transition from the status “0” to “1”; the falling edge is the opposite transition.

EMC
= Electromagnetic Compatibility

According to the European EMC Directive, electromagnetic compatibility is “the ability of equipment to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to other equipment in that environment.”

ESD
= Electrostatic Discharge

On non-conductive surfaces, an electric charge is conducted away very slowly. If the dielectric strength is overcome, there is a fast potential equalisation between the surfaces involved. The often very sudden equalisation process is referred to as electrostatic discharge (ESD). Currents of up to 20 A may occur in this process.

Ground line
Ground lines should not be seen as potential-free return lines. Different ground points may have small potential differences. This is always true with large currents and may cause inaccuracy in high-resolution circuits.

Interrupt
Processing of a current program is stopped or interrupted and the CPU is prompted to process another defined routine. It springs back to the interrupted program after the routine is complete.

Level
Logic levels are defined for processing and displaying information.
In binary circuits, voltages are used for digital values. Here, the two voltage ranges “H” (high) und “L” (low) represent the information. The “H” range is closer to plus infinity; the “H” level corresponds to digital 1. “L” denotes the range closer to minus infinity; the “L” level corresponds to digital 0.

Limit value
Exceeding the limit values, even for a short time, can easily result in the destruction of the component or the (temporary) loss of functionality.

Opening contact
The relay contact closed in the rest position is the break or opening contact.

Operating voltage
The operating voltage is the voltage to the device in sustained operation. It must not exceed the maximum sustained voltage, and all unfavourable operating conditions, such as possible mains power surges for over a minute when the device is switched on, must be taken into account.

Optical isolation
Optical isolation means that there is no flow of electrical current between the circuit to be measured and the measuring system.

PCI Express
This is a parallelisable serial process for switched point-to-point connections. Unlike PCI bus, PCIe is not a parallel bus but a serial point-to-point connection. Data transfer is via so-called lanes comprising a line pair for transmission and a second pair for receiving. Individual components are connected via switches. PCIe is also hot-plug compatible, which allows (defective) expansion boards to be replaced in operation – a feature much in demand in the server area.

Protective diode
A protective diode is a diode used at the entrance of integrated MOS (metal oxide semi-conductor) circuits which operates in the reverse range with allowed input voltages. In the event of overvoltage, it works in the transition range and thus protects the input transistors of the circuits from damage.

Relay
A relay is an electromagnetically operated switch for switching circuits on, off or over. It consists of a coil with an iron core. If electricity flows through the coil, a magnetic field is created, which causes the contacts to open or close.

Resolution
The resolution indicates how precisely a signal or value is held within the computer.

Synchronous
Two time-dependent events, time slots, or signals are synchronous if their respective significant dates correspond with each other and are divided by requested time intervals that are nominally the same.

Timer
A timer is used for adjusting time-dependent program processes between the processor and peripheral devices. It mostly contains counters that are independent of each other, and it can be programmed like a programmable I/O module via a control word register for different operating types.

TVS
= Transient Voltage Suppression

8.2 Index

9 Contact and support

Do you have any questions? Write or call us:

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Airport Boulevard B210
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E-mail: info@addi-data.com

Manual and software download from the Internet:

https://drivers.addi-data.com