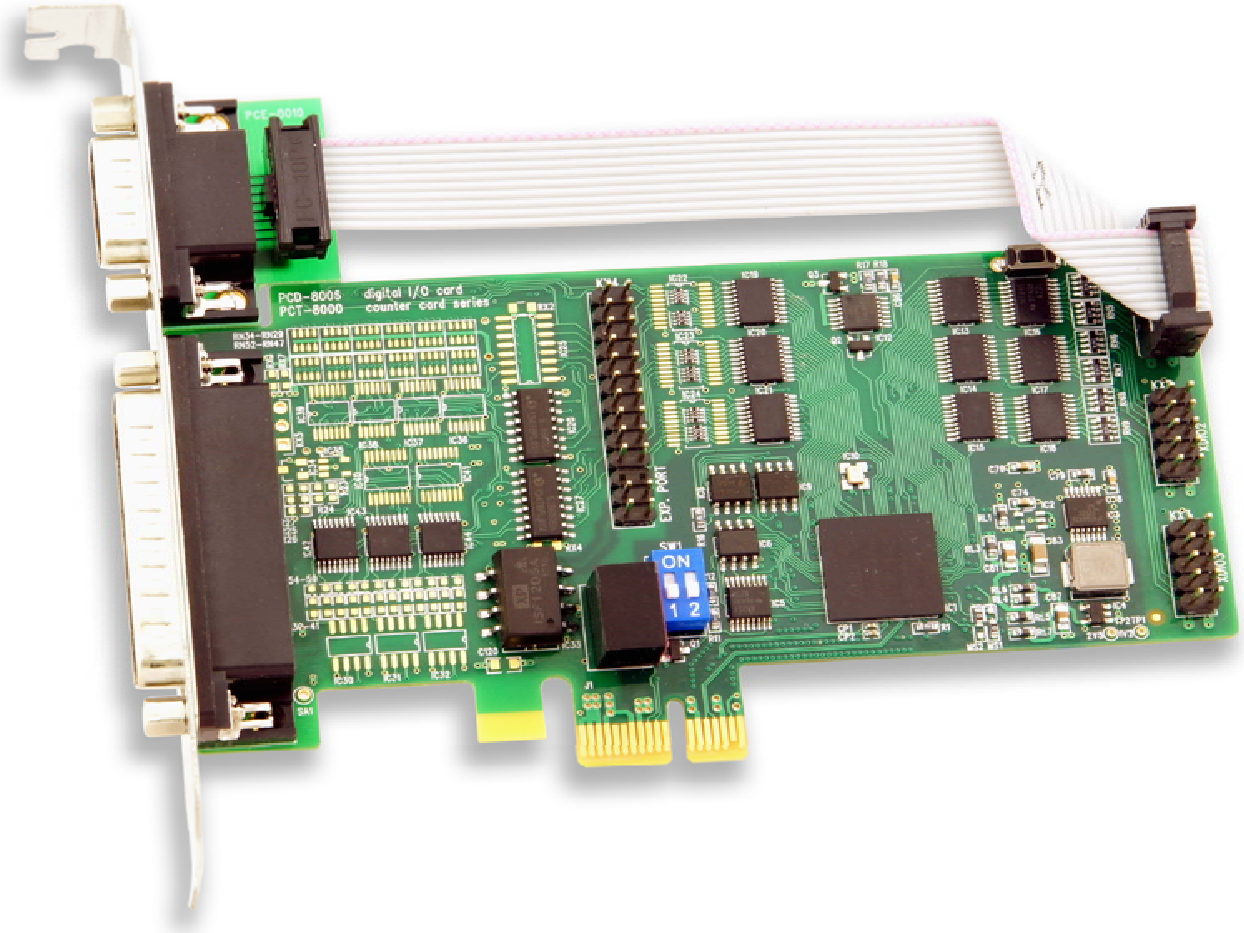



# IRC Counter & SSI PCIe card PCT-8303/8306/8360/8363 User Guide

**My DAQ Card Details:**

type of card: . . . . . (e.g. PCT-8303)

serial number: . . . . . (e.g. 81010108)

purchase date: . . . . . .

card owner: . . . . . .


Manufacturing, sales office, service center, technical support and headquarters:

address: TEDIA® spol. s r. o.
Zábělská 12
31211 Plzeň
Czech Republic

website: http://www.tedia.eu

phone/e-mail: https://www.tedia.eu/contacts

tech. support: https://www.tedia.eu/support

# Table of Contents

CE Declaration of Conformity, WEEE

1. Introduction
- 1.1 Description . . . . . I - 1
- 1.2 General instructions for use . . . . . I - 1
- 1.3 Note on the contents of the manual . . . . . I - 1
- 1.4 New firmware versions and customer´s firmware . . . . . I - 1

2. Specifications
- 2.1 Counters, encoders and inputs . . . . . I - 2
- 2.2 SSI interface . . . . . I - 2
- 2.3 Digital ports . . . . . I - 3
- 2.4 Interrupt logic . . . . . I - 3
- 2.5 General data . . . . . I - 3

3. Installation
- 3.1 Introduction . . . . . I - 4
- 3.2 Hardware configuration . . . . . I - 4
- 3.3 Installation . . . . . I - 4
- 3.4 Location of switches and connectors . . . . . I - 4
- 3.5 Connector pin assignment . . . . . I - 4

4. IRC encoders and Counters
- 4.1 Introduction . . . . . I - 5
- 4.2 Description of inputs . . . . . I - 5
- 4.3 Programmable encoders . . . . . I - 5
- 4.4 Counters . . . . . I - 5
- 4.5 Other functions . . . . . I - 5

5. SSI interface
- 5.1 Introduction . . . . . I - 6
- 5.2 Description of SSI interfaces . . . . . I - 6
- 5.3 SSI interface specifications . . . . . I - 6

6. Digital Ports
- 6.1 Introduction . . . . . I - 7
- 6.2 Description of digital ports . . . . . I - 7
- 6.3 Interrupt logic . . . . . I - 7

Appendix - Tables and Figures

Notes

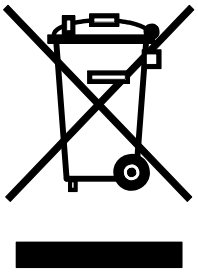
## CE Declaration of Conformity

All TEDIA® products described in this user guide comply with the essential requirements of the following applicable European Directives:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

The CE Declaration of Conformity original document is stored at the manufacturer and its copy may be provided on request.

## Waste Electrical and Electronic Equipment (WEEE)



This symbol indicates that waste products should be disposed of separately from municipal household waste according to WEEE Directive 2012/19/EU of the European Parliament and the Council on waste electrical and electronic equipment (WEEE). All products at the end of their life cycle must be sent to a WEEE collection and recycling center. Proper WEEE disposal reduces environmental impact and the risk to human health due to potentially hazardous substances used in such equipment. Your cooperation in proper WEEE disposal will contribute to the effective usage of natural resources.

# 1. Introduction

## 1.1 Description

The PCT-8303/8306/8360/8363 are add-on PCI Express cards intended especially for laboratory and industrial automation and measuring systems.

**The PCT-8303/8306/8360/8363 cards provide especially these features:**

- isolated RS-422 inputs equipped with encoders (including for IRC sensors) and counters
- isolated SSI interfaces
- three 8-bit bidirectional digital ports, software configurable as input or output
- IRQ logic with interrupt sources derived from rising or falling edge of each digital port signal (i.e. 48 individually programmable interrupt sources) and internal timer

**Available types and versions of cards:**

| | |
|---|---|
| PCT-8303 | standard format card, three IRC counters |
| PCT-8306 | standard format card (*), six IRC counters |
| PCT-8360 | standard format card, six SSI interfaces |
| PCT-8363 | standard format card (*), three IRC counters and six SSI interfaces |
| PCT-83xx/LP | low-profile format card of PCT-8303, PCT-8306, PCT-8360 and PCT-8363 |
| (*) | the PCT-8306/8363 cards require two positions |

In the following text, unless otherwise stated, the designation **PCT-83xx applies to all types and versions of card.**

## 1.2 General instructions for use

The PCT-83xx card is suitable for installation in either office or industrial computers that are fitted with the PCI Express bus (Gen 1 compatible).

Cable types and their maximum length are described in paragraph 2.5 General data.

*Caution:*
*The cards are designed for DAQ&C applications and may be used only according to the manufacturer's recommendations and precautions given in this manual and other general standards and terms and may be used only such a way, that its failure caused by any reason will not be dangerous to any person or property.*

## 1.3 Note on the contents of the manual

This manual contains all information related to card features, I/O connectors etc., but does not include a description of installing and using drivers.

For information about drivers and programming check the dedicated documentation.

## 1.4 New firmware versions and customer´s firmware

The PCT-83xx card is based on a FPGA unified core providing implementation of PCI Express bus and all peripheral circuitry, e.g. solution that gives maximum control and supervision over full functionality. High concentration of control algorithms within FPGA allows to add or modify functions without redesign the board (e.g. firmware with added special custom features or a build completely new custom firmware).

A simple software utility for user-friendly firmware upgrade is available.

# 2. Specifications

## 2.1 Counters, encoders and inputs

| | | |
|---|---|---|
| Number of counters: | 3 | PCT-8303, PCT-8363 |
| | 6 | PCT-8306 |
| | 0 | PCT-8360 |
| Counting mode: | bidirectional with programmable input encoder | |
| Counting depth: | 32 bits (configurable in range of 2÷4294967295) | |
| Counting modes: | IRC quadrature modes X1, X2, X4<br>"up/down", "count/dir", "count/gate" | |
| Counting frequency: | 8 MHz max. | (IRC modes, w/o filter) |
| | 16 MHz max. | (other modes, w/o filter) |
| | 800 kHz max. | (IRC modes, with filter) |
| | 1.6 MHz max. | (other modes, with filter) |

*Note: The highest frequency of quadrature IRC modes is given as a single phase signal (the highest frequency of quadrant changes is therefore doubled).*
*For modes without a filter, the highest signal asymmetry is defined as 40/60%; it means phase duration, resp. duration of L and H levels of at least 25 ns.*
*For modes with a low-pass filter, a phase duration, resp. duration of L and H levels of at least 310 ns.*
*For details check Figure 4 through Figure 7 (all in Appendix of this manual).*

| | | |
|---|---|---|
| Type of counter inputs: | RS-422/TTL | (isolated from PC) |
| ESD protection: | TVS diode 6.4 V | (20 A @ 8/20 μs) |
| Input impedance / capacity: | 8 kOhm / 200 pF approx. | |
| Isolation voltage: | 1000 $V_{DC}$ | (standard version of the card) |
| | 600 $V_{DC}$ | (card with ESD-X1 option) |

*Note: ESD-X1 option includes Surge Arrester (protection of the isolation barrier).*

## 2.2 SSI interface

| | | |
|---|---|---|
| Interface type: | "SSI master" | |
| Number of SSI interfaces: | 6 | PCT-8360 a PCT-8363 |
| | 0 | PCT-8303 a PCT-8306 |
| Interface signals: | 6x RS-422 transmitter | (isolated from PC) |
| | 6x optocoupler | (isolated from all other parts) |
| Interface CLK frequency: | configurable in the range 100 kHz ÷ 1 MHz | |
| Data length: | 1÷32 bits | |
| Data coding: | binary or Gray code | |
| Isolation voltage (SSI to PC): | 1000 $V_{DC}$ | (standard version of the card) |
| | 600 $V_{DC}$ | (card with ESD-X1 option) |
| Isolation voltage (SSI): | 100 $V_{DC}$ | (among all SSI signals) |

*Note: ESD-X1 option includes Surge Arrester (protection of the isolation barrier).*

## 2.3 Digital ports

| | |
|---|---|
| Number of ports: | three 8-bit bidirectional ports |
| Operating levels: | HC/HCT/TTL |
| Load impedance of outputs: | 500 Ohm min. |

*Note: Digital bidirectional ports are not protected against overvoltage, stresses outside the range 0÷5 V will may cause permanent damage.*
*The digital ports in the output mode are durable to permanent short-circuit against GND while maintaining the maximum current of the 5V power source (see paragraph 2.5 General data).*

## 2.4 Interrupt logic

| | |
|---|---|
| Interrupt sources: | timestamp IRQ generator (1÷255 ms),<br>all digital ports |
| Interrupt trigger event: | timestamp generator overflow,<br>any combination of rising or falling edges on all digital ports |

## 2.5 General data

| | | |
|---|---|---|
| Bus type: | PCI Express (x1, Gen 1) | |
| PCI ID: | VID=$1760_H$, DID=$0810_H$ | (PCT-8303, PCT-8303/LP) |
| | VID=$1760_H$, DID=$0811_H$ | (PCT-8306, PCT-8306/LP) |
| | VID=$1760_H$, DID=$0812_H$ | (PCT-8363, PCT-8363/LP) |
| | VID=$1760_H$, DID=$0820_H$ | (PCT-8360, PCT-8360/LP) |
| Bus power consumption: | 300 mA typ. @ 3.3 V | (500 mA max.) |
| | 150 mA typ. @ 12 V | (500 mA max.) |
| Internal power supply: | 700 mA max. @ 5 V | (see note below) |
| Board dimensions:: | 56 x 128 mm approx. | (PCE-8019 not included) |
| Connectors: | D-Sub 25 - male | (IRC inputs, SSI interface) |
| | 10 pin header type | (DIO ports 0, 1 a 2) |
| Operating temperature: | 0÷60 °C | |
| Storage temperature: | -20÷70 °C | |
| Operating humidity: | 10÷90 %, noncondensing | |
| Recommended cable length: | shielded cables, 2 m max. | |

*Note: The internal 5V power supply voltage is generated by the on-board circuits from the 12V PCI Express bus power source and is used to supply the DIO ports and also to supply PCE-16xx series external boards (see description of KX1÷KX3 connectors). The total current of all 24 DIO signals when output mode is selected, including the current consumption of PCE-16xx boards, must not exceed the permitted value.*

*Note: The PCT-8306/8363 (both standard and low-profile versions) cards require two positions; the first for a real PCIe card, the second for an adapter board PCE-83xx.*

# 3. Installation

## 3.1 Introduction

Attention has been focused on achieving a high quality and reliability during the manufacturing process and attention was also paid to an inspection of the card before being shipped to you. Detailed reading of this guide and following the instructions precisely are highly recommended for achieving full quality and to prevent any damage during installation. For further information see manufacturer's website http://www.tedia.eu.

## 3.2 Hardware configuration

The PCT-83xx card contains a single configuration element - a two-segment DIP switch (the status of this switch can be read by the program to identify multiple cards as CardID value). Check Figure 1 in Appendix of this manual for more information.

## 3.3 Installation

*Important Warning:*
*While installing the card, please follow the principles for handling the circuits, which are sensitive to the electrostatic discharge damage. Touch the card carefully only by the edges, and do not touch the components or metal contacts on the bottom of the card.*
*The computer must be switched off before the card is installed. Always disconnect the power supply cord and other cables connected to the PC!*
*The cards may be stored only in an antistatic wrapper outside of the computer. Failure to comply with the rules listed above may lead to damage of the sensitive circuits of the card, or even of the whole computer.*

After removing the slot cover plate, plug the configured card into a free slot for expansion PC cards and fix it in place. In case of the PCT-8306/8363 types, install the PCE-8303/8363 adapter board (included in the delivery package of the card) into the next position and connect the flat cables.

If you plan to use the digital ports DIO1 and DIO2 of standard format card, install the PCE-16xx series board (not included in the delivery package of the card) into the next position and connect the flat cables. Similarly, if you plan to use the digital ports DIO0, DIO1 and DIO2 of low-profile card, install the PCE-8025/LP adaptor board (not included in the delivery package) into the next position and connect the flat cables.

*Note:* *In the event of any queries, please contact the manufacturer's technical support. See http://www.tedia.eu for more contact information.*

## 3.4 Location of switches and connectors

See the Appendix, Figure 1a/1b for location of configuration switches and connectors.

## 3.5 Connector pin assignment

The connector pin layouts are shown in Table 1 through Table 7, the connector pin assignment is shown in Figure 2 (all in Appendix of this manual).

# 4. IRC encoders and Counters

## 4.1 Introduction

The PCT-8303, PCT-8363 and PCT-8306 cards contain three or six independent bidirectional counters equipped with programmable input encoders supporting a wide range of operating modes.

In addition, each counter is equipped with minimum/maximum detectors ensuring the capture of extremes between two position readings.

All the mentioned functions are implemented in a powerful FPGA gate array.

## 4.2 Description of inputs

The input circuits are compatible with RS-422 signal standard (preferred sensor connection method) or unbalanced 5 V signal (HC/HCT/TTL standard).

See the Appendix, Figure 3 for details.

## 4.3 Programmable encoders

The programmable encoder allows configuration to most of the used operating modes, see the Appendix, Figure 4 through Figure 7 for details.

Modes that allow the detection of incorrect combinations or sequences of input signals, the encoder generates error information.

In case of input signal "ringing" a low-pass filter can be activated (available for all modes).

## 4.4 Counters

The card contains 32-bit bidirectional counters with the possibility of cycle shortening in the range of 2÷4294967295; the counter therefore works in the range...

| counting range | incrementation | decrementation |
|---|---|---|
| 1 | 0 - 1 - 0 - 1 - ... | 1 - 0 - 1 - 0 - ... |
| 2 | 0 - 1 - 2 - 0 - 1 - ... | 1 - 0 - 2 - 1 - 0 ... |
| 4294967295 | 4294967295 - 0 - 1- ... | 1 - 0 - 4294967295 - 4294967294 - ... |

The card allows to preset any 32-bit value for each counter individually or for selected set of counters simultaneously. Similarly, the counter values can be read individually or simultaneously for any set of counters. In addition, the PCT-8363 card allows to synchronized reading of counter values and SSI interface data.

## 4.5 Other functions

Each counter is equipped with minimum/maximum detectors ensuring the capture of extremes between two position readings.

# 5. SSI interface

## 5.1 Introduction

The PCT-8360 and PCT-8363 cards contain six programmable "SSI master" interfaces with controllers implemented in a powerful FPGA gate array.

## 5.2 Description of SSI interfaces

The "SSI master" interface consists of two signals...

- the CLK signal (generated by the master controller) is intended for timing transmissions
- the DATA signal (generated by the slave controller) is intended for data transfer from the slave controller to the master controller

Both CLK and DATA signals are transmitted by two wires due to the use of differential RS-422 signal standard.

All CLKx transmitters are isolated from the computer, but they are not isolated from each other. All DATAx signal receivers are isolated separately from all other circuits.

See the Appendix, Figure 8 for details.

## 5.3 SSI interface specifications

The SSI master controller supports configuration of data length in the range of 1 to 32 bits and data format (direct binary code or Gray code) independent for each interface.

All controllers operate with a CLK signal frequency configurable in the range of 100 kHz to 1 MHz (one common option for all interfaces).

The period of reading data from SSI slave controllers is configurable in the range of 10 to 256 periods of the CLK signal (one common option for all interfaces).

Thanks to the common CLK signal frequency and the common period of reading data, all SSI interfaces work completely synchronously.

# 6. Digital Ports

## 6.1 Introduction

The PCT-83xx card provides three 8-bit bidirectional digital ports.

All digital ports (identified as DIO0, DIO1 and DIO2) use header type connectors located at the back edge of the card.

In case of the standard format card (ie. PCT-83xx), the DIO0 port is accessed on the card bracket via adapter cable PCE-8019 terminated with D-Sub 9 connector. Remaining two ports (ie. DIO1 and DIO2) can be accessed via adapter cable PCE-1620 (card bracket with D-Sub 9 connector), or other types from the PCE-16xx series adapter boards.

*Note: Unlike the adapter cable PCE-8019, the PCE-16xx boards are not included in the delivery package of the card.*

In case of the low-profile format card (ie. PCT-83xx/LP) all three ports DIO0, DIO1 and DIO2 can be accessed via adapter cable PCE-8025/LP (low-profile card bracket with D-Sub 25 connector); there are currently no other option available.

*Note: The PCE-8025/LP adaptor board is not included in the delivery package of the card.*

The signal direction of DIO port (ie. input or output option) can be selected independ for each 8-bit port (it is not possible to select direction individually for each of the eight signals of one DIO port) from the user software.

The port direction and output data after computer is turned on or restarted are stored in the on-board EEPROM memory and can modify by the software utility (by default, all ports are set as input).

## 6.2 Description of digital ports

Drivers and receivers based on HCTMOS technology were used for digital ports.

In the output mode (ie. driver mode), the HCTMOS circuits provide true 5 V signal levels with a high output current with low voltage drop and can therefore be used for direct control of LEDs, optocouplers, or miniature relays (coil parameters 5 V, 500 Ohm).

In the input mode (ie. receiver mode), the HCTMOS circuits provide not only TTL signal compatibility, but moreover high input impedance, very low leakage current and protection diodes. The unconnected state of inputs represents the H logic level generated by pull-up resistors 10 kOhm against a voltage of 5 V, and the inputs can be therefore also used to direct connecting of floating contacts.

Check the Appendix, Figure 9 for detail information.

*Note: Unfortunately, the concept of bidirectional ports does not provide the overvoltage protection available to other ports of PCI/PCIe TEDIA cards.*

## 6.3 Interrupt logic

The PCT-83xx card allows to trigger an interrupt (simultaneously with the timestamp IRQ generator) by any combination of rising or falling edges of the signals of all digital ports.

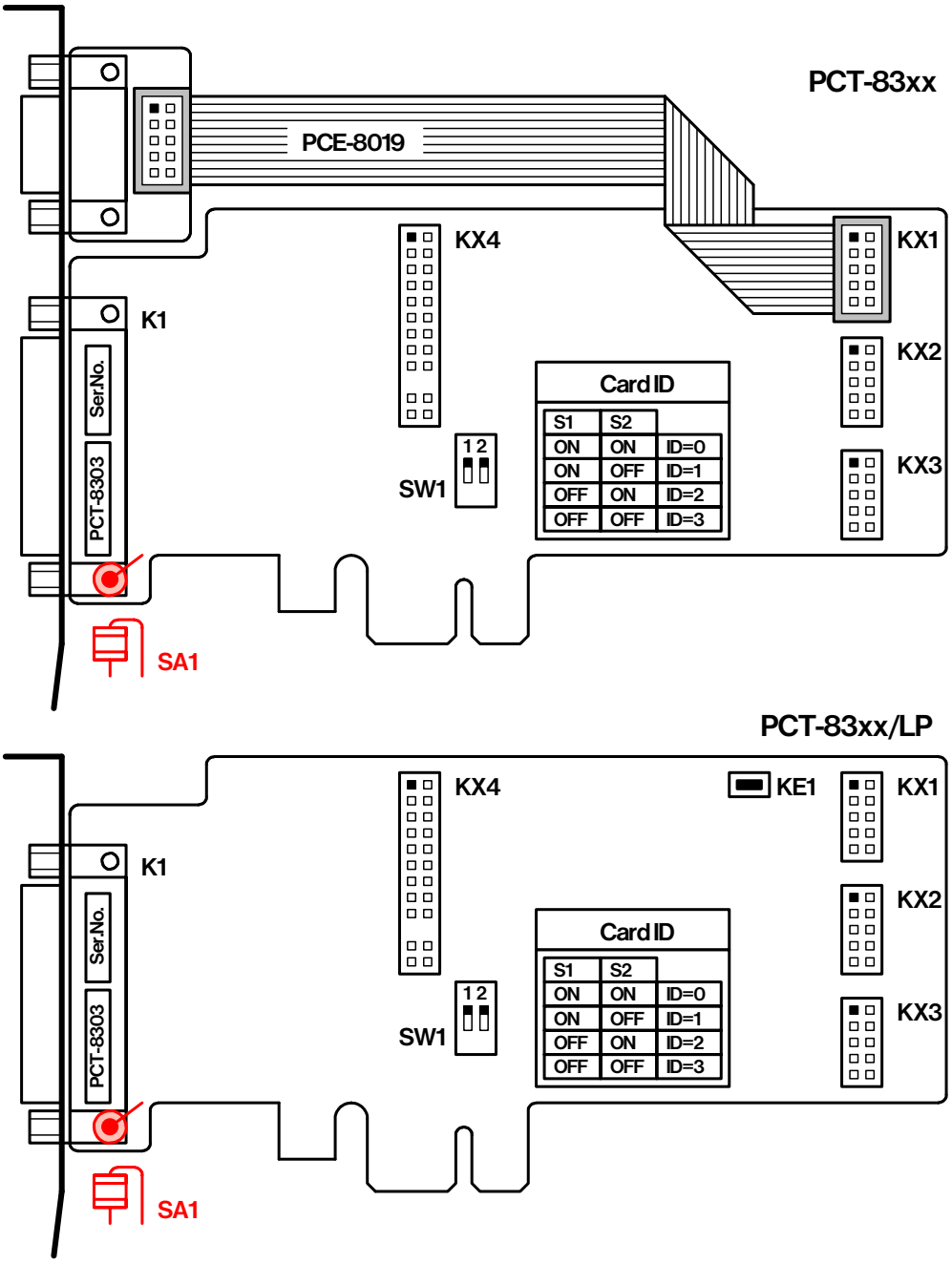



Figure 1a. Location of switches and connectors on both version of cards.

| | |
|---|---|
| K1 | connector of IRC inputs or SSI interface signals (D-Sub 25 - male) |
| KX1 | connector of digital port DIO0, ie. DIO00÷07 signals (2x5 pin header type) |
| KX2 | connector of digital port DIO1, ie. DIO08÷15 signals (2x5 pin header type) |
| KX3 | connector of digital port DIO2, ie. DIO16÷23 signals (2x5 pin header type) |
| KX4 | connector dedicated for adapter board PCE-8306 or PCE-8363 |
| SW1 | DIP switch for identifying multiple cards (CardID value) |
| PCE-8019 | adapter cable PCE-8019 terminated with D-Sub 9 male connector (included in the delivery package of the standard format card) |
| KE1 | button for activating backup firmware (intended for service purposes) |
| SA1 | Surge Arrester (cards with ESD-X1 option) |

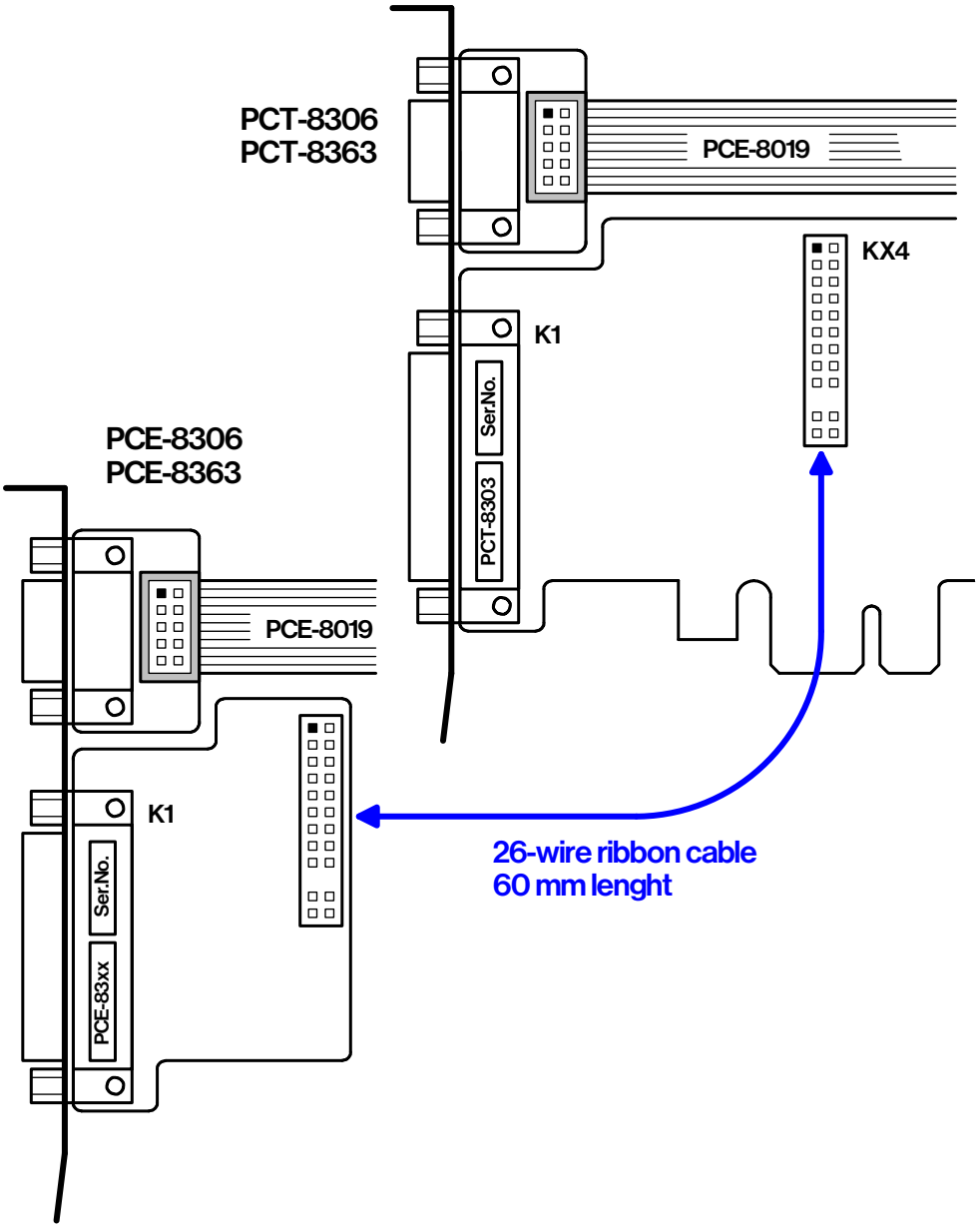



Figure 1b. PCT-8306/8363, interconnection adapter board with PCIe card.

The PCT-8303/8360 types are single slot PCIe card and do not require any adapter board.

The PCT-8306/8363 (both standard and low-profile versions) cards require two positions; the first for a real PCIe card PCT-83xx, the second for an adapter board PCE-83xx.

| Type of the complete set | PCIe card | | Adapter board | |
|---|---|---|---|---|
| | Type label | Signal K1 | Type label | Signal K1 |
| **PCT-8306** | PCT-8306 | IRC0 ÷ IRC2 | PCE-8306 | IRC3 ÷ IRC5 |
| **PCT-8363** | PCT-8363 | IRC0 ÷ IRC2 | PCE-8363 | SSI0 ÷ SSI5 |

*Note:* *The PCE-83xx board in the standard (ie. not low-profile) version also contains an additional PCE-8019 cable to access DIO port on bracket.*

| K1 signal | pin | pin | K1 signal |
|---|---|---|---|
| - - - (see note below) | C1 | | |
| - - - (see note below) | C2 | C14 | - - - (see note below) |
| VREF (1,25 V) | C3 | C15 | - - - (see note below) |
| IRCCNT2_R- | C4 | C16 | VREF (2,5 V) |
| IRCCNT2_B- | C5 | C17 | IRCCNT2_R+ |
| IRCCNT2_A- | C6 | C18 | IRCCNT2_B+ |
| IRCCNT1_R- | C7 | C19 | IRCCNT2_A+ |
| IRCCNT1_B- | C8 | C20 | IRCCNT1_R+ |
| IRCCNT1_A- | C9 | C21 | IRCCNT1_B+ |
| IRCCNT0_R- | C10 | C22 | IRCCNT1_A+ |
| IRCCNT0_B- | C11 | C23 | IRCCNT0_R+ |
| IRCCNT0_A- | C12 | C24 | IRCCNT0_B+ |
| GND_IRCCNT | C13 | C25 | IRCCNT0_A+ |

Table 1. PCT-8303/8306/8363, D-Sub 25 (male) connector pin assignment.

*Note:* *Unconnected pins 1, 2, 14 and 15 can be alternatively used for 5V and 12V voltages from a PC power supply (special customization of cards).*

| K1 signal | pin | pin | K1 signal |
|---|---|---|---|
| CLK5- | C1 | | |
| DATA5- | C2 | C14 | CLK5+ |
| CLK4- | C3 | C15 | DATA5+ |
| DATA4- | C4 | C16 | CLK4+ |
| CLK3- | C5 | C17 | DATA4+ |
| DATA3- | C6 | C18 | CLK3+ |
| CLK2- | C7 | C19 | DATA3+ |
| DATA2- | C8 | C20 | CLK2+ |
| CLK1- | C9 | C21 | DATA2+ |
| DATA1- | C10 | C22 | CLK1+ |
| CLK0- | C11 | C23 | DATA1+ |
| DATA0- | C12 | C24 | CLK0+ |
| GND_CLK | C13 | C25 | DATA0+ |

Table 2. PCT-8360, D-Sub 25 (male) connector pin assignment.

| KX1/KX2/KX3 signal | pin | pin | KX1/KX2/KX3 signal |
|---|---|---|---|
| DIO00/08/16 | D1 | D2 | DIO01/09/17 |
| DIO02/10/18 | D3 | D4 | DIO03/11/19 |
| DIO04/12/20 | D5 | D6 | DIO05/13/21 |
| DIO06/14/22 | D7 | D8 | DIO07/15/23 |
| GND | D9 | D10 | 5V (see specification chapter) |

Table 3. PCT-8303/8306/8360/8363, header type connector pin assignment.

*Note: In case of the standard format card, the DIO0 port is accessible on the card bracket via adapter cable PCE-8019 terminated with D-Sub 9 connector (see Table 6). Remaining two ports (ie. DIO1 and DIO2) can be accessed via adapter cable PCE-1620 (card bracket with D-Sub 9 connector, see Table 6), or other types from the PCE-16xx series adapter boards.*
*In case of the low-profile format card all three ports DIO0, DIO1 and DIO2 can be accessed via adapter cable PCE-8025/LP (see Table 7).*

| K1 signal | pin | pin | K1 signal |
|---|---|---|---|
| - - - (see note below) | C1 | | |
| - - - (see note below) | C2 | C14 | - - - (see note below) |
| VREF (1,25 V) | C3 | C15 | - - - (see note below) |
| IRCCNT5_R- | C4 | C16 | VREF (2,5 V) |
| IRCCNT5_B- | C5 | C17 | IRCCNT5_R+ |
| IRCCNT5_A- | C6 | C18 | IRCCNT5_B+ |
| IRCCNT4_R- | C7 | C19 | IRCCNT5_A+ |
| IRCCNT4_B- | C8 | C20 | IRCCNT4_R+ |
| IRCCNT4_A- | C9 | C21 | IRCCNT4_B+ |
| IRCCNT3_R- | C10 | C22 | IRCCNT4_A+ |
| IRCCNT3_B- | C11 | C23 | IRCCNT3_R+ |
| IRCCNT3_A- | C12 | C24 | IRCCNT3_B+ |
| GND_IRCCNT | C13 | C25 | IRCCNT3_A+ |

Table 4. PCE-8306 adapter board, D-Sub 25 (male) connector pin assignment.

*Note: Unconnected pins 1, 2, 14 and 15 can be alternatively used for 5V and 12V voltages from a PC power supply (special customization of cards).*

| K1 signal | pin | pin | K1 signal |
|---|---|---|---|
| The connector pin assigment is identical to the PCT-8360 (see table Tab. 2.) | | | |

Table 5. PCE-8363 adapter board, D-Sub 25 (male) connector pin assignment.

| signal | pin | pin | signal |
|---|---|---|---|
| DIO00 / DIO08 / DIO16 | C1 | | |
| DIO02 / DIO10 / DIO18 | C2 | C6 | DIO01 / DIO09 / DIO17 |
| DIO04 / DIO12 / DIO20 | C3 | C7 | DIO03 / DIO11 / DIO19 |
| DIO06 / DIO14 / DIO22 | C4 | C8 | DIO05 / DIO13 / DIO21 |
| GND | C5 | C9 | DIO07 / DIO15 / DIO23 |
| | | | |

Table 6. D-Sub 9 (male) connector pin assignment located on PCE-8019 (single DIO port adapter cable) and PCE-1620 (dual DIO port adapter cable).

| signal | pin | pin | signal |
|---|---|---|---|
| DIO00 | C1 | | |
| DIO02 | C2 | C14 | DIO01 |
| DIO04 | C3 | C15 | DIO03 |
| DIO06 | C4 | C16 | DIO05 |
| DIO08 | C5 | C17 | DIO07 |
| DIO10 | C6 | C18 | DIO09 |
| DIO12 | C7 | C19 | DIO11 |
| DIO14 | C8 | C20 | DIO13 |
| DIO16 | C9 | C21 | DIO15 |
| DIO18 | C10 | C22 | DIO17 |
| DIO20 | C11 | C23 | DIO19 |
| DIO22 | C12 | C24 | DIO21 |
| GND | C13 | C25 | DIO23 |
| | | | |

Table 7. PCE-8025/LP adapter board, D-Sub 25 (male) connector pin assignment.

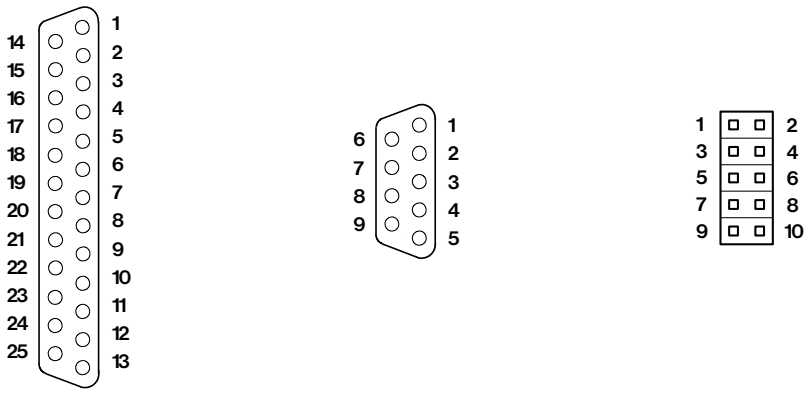



Figure 2. Pin layout on D-Sub 25 (male), D-Sub 9 (male) and header type connectors (2x 5 pins, 2.54 mm pitch).

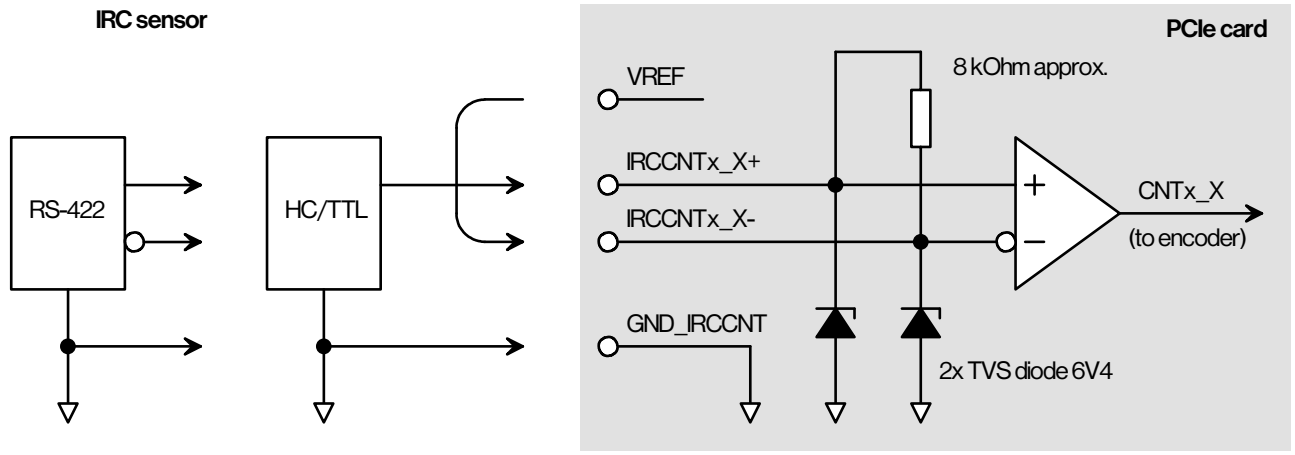



Figure 3. Simplified schematic of IRC encoder/counter input.

One RS-422 input is drawn in the schematic (each encoder uses three inputs) and the recommended connection to the sensor equipped with differential signal driver (RS-422; connected directly to both inputs IRCCNTx_X+/IRCCNTx_X-), resp. unbalanced 5 V signal driver (HC/TTL; connected to the IRCCNTx_X+ input, while the second input IRCCNTx_X- is connected to the appropriate reference voltage) .

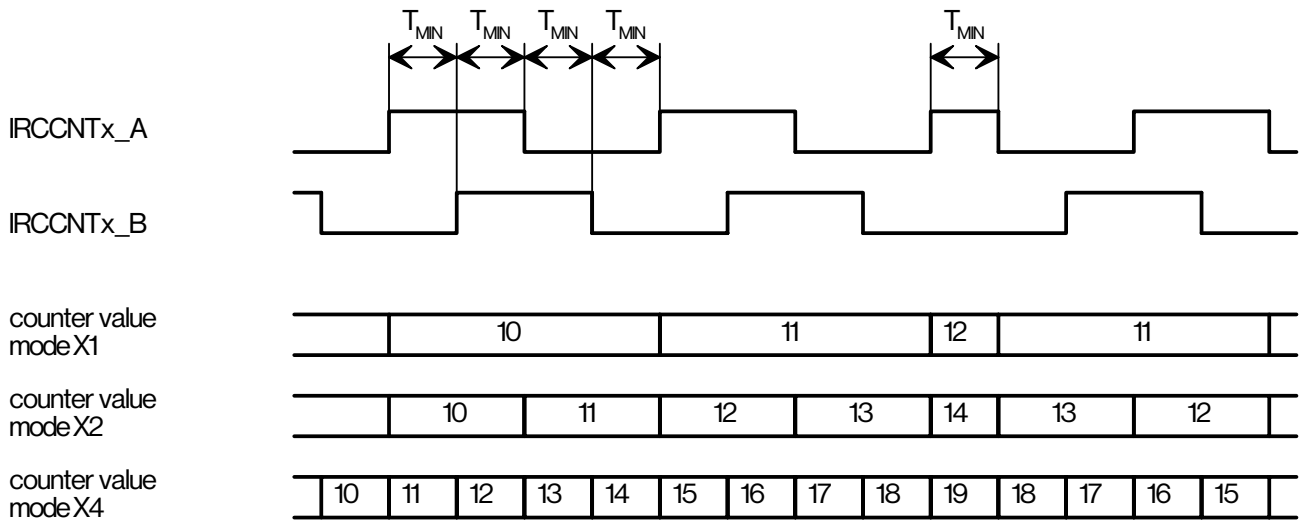



Figure 4. "Quadrature X1, X2 and X4" counting mode.
($T_{MIN}$ at least 25 ns long when filter is disabled, resp. 310 ns when enabled)
(the encoder detects discontinuous quadrants changes and signals as an error)

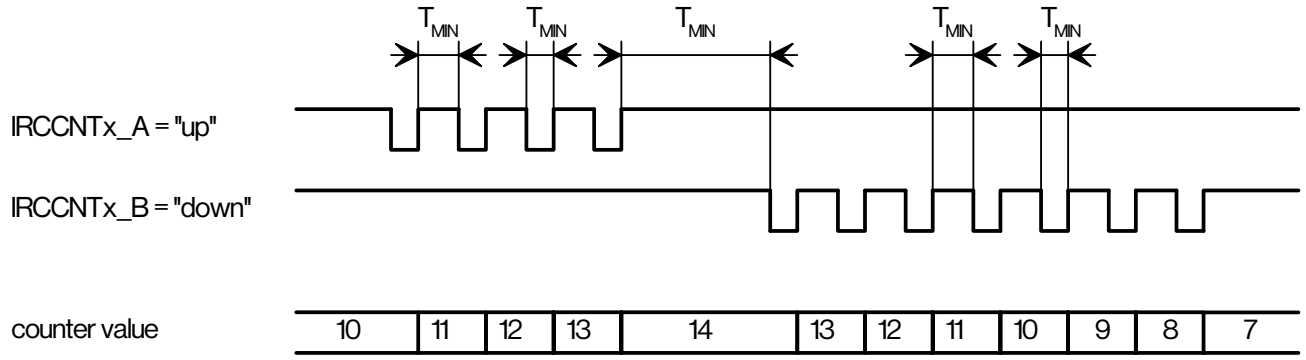



Figure 5. "Up/Down" counting mode.
($T_{MIN}$ at least 25 ns long when filter is disabled, resp. 310 ns when enabled)
(the encoder detects both "up/down" signals at level L and signals as an error)

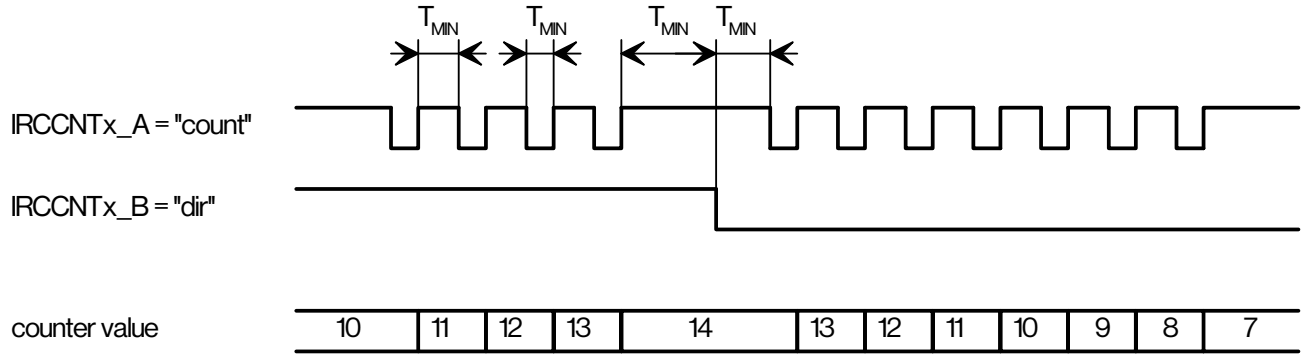



Figure 6. "Count/Dir" counting mode.
($T_{MIN}$ at least 25 ns long when filter is disabled, resp. 310 ns when enabled)

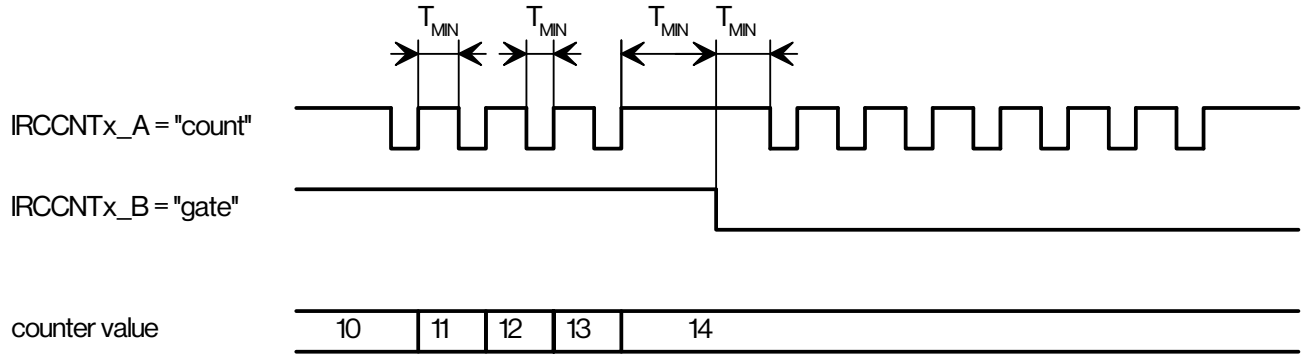



Figure 7. "Count/Gate" counting mode.
($T_{MIN}$ at least 25 ns long when filter is disabled, resp. 310 ns when enabled)

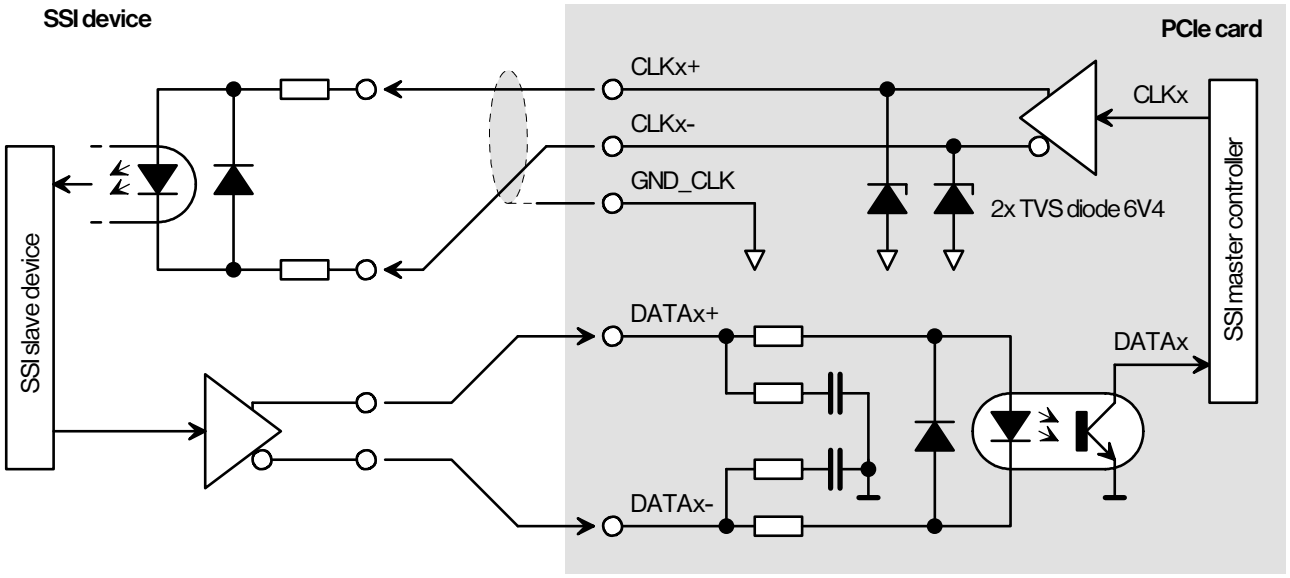



Figure 8. Simplified schematic of SSI interface.

One SSI channel is drawn in the schematic.
All CLKx transmitters are isolated from the computer, but they are not isolated from each other (ie. they use a common GND_CLK; it can be used as a shield for CLK signals).
All DATAx signal receivers are isolated separately from all other circuits.

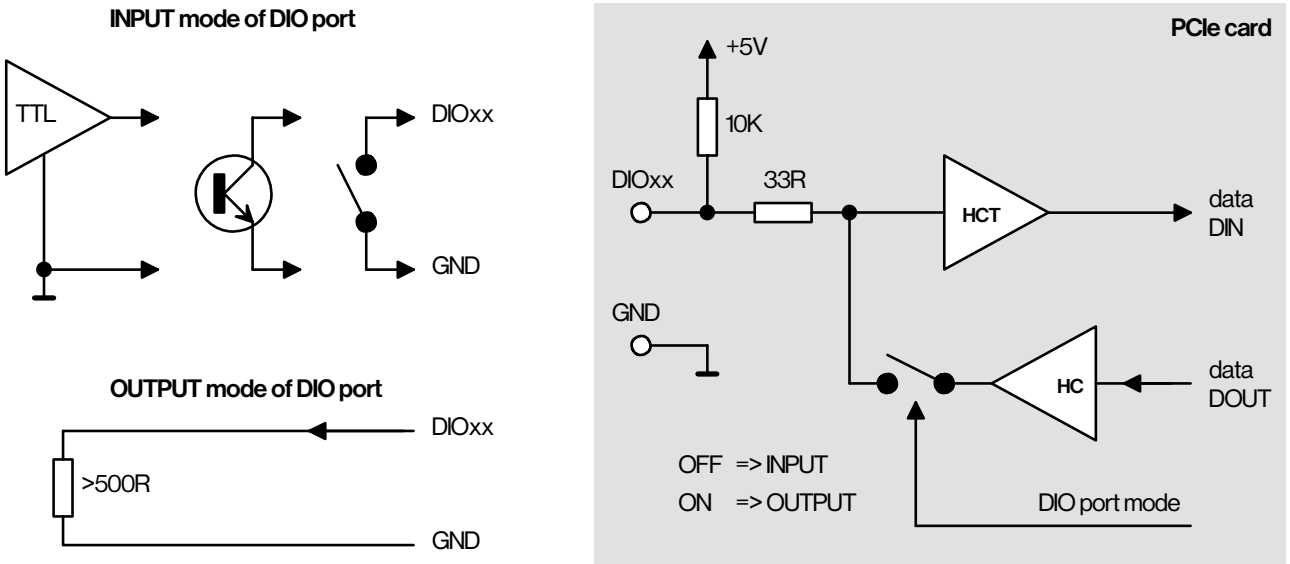
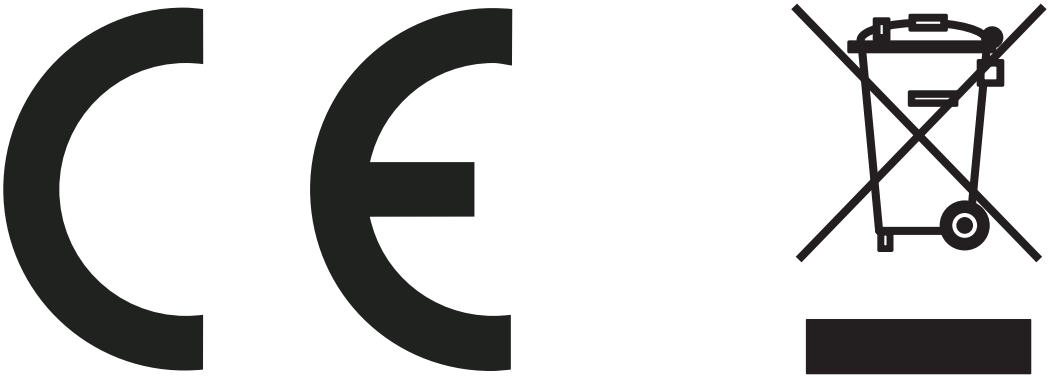



Figure 9. Simplified schematic of DIO ports.

The diagram shows one bidirectional I/O channel.
The signal direction of DIO port (ie. input or output option) can be selected independ for each 8-bit port, but it is not possible to select direction individually for each of the eight signals of one DIO port.



Member of PCI Special Interest Group

**Developement, manufacturing, sales office, service center, technical support and headquarters:**


| | |
|---|---|
| address: | TEDIA® spol. s r. o.<br>Zábělská 12<br>31211 Plzeň<br>Czech Republic |
| website: | https://www.tedia.eu |
| phone/e-mail: | https://www.tedia.eu/contacts |
| tech. support: | https://www.tedia.eu/support |