

# **Manual**

## **Serial PCI Cards**



|                |   |
|----------------|---|
| <b>Models</b>  | <b>13011, 13410</b><br><b>13411, 13610</b><br><b>13611, 13812</b> |
| <b>Version</b> | <b>1.6</b>  |

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Since we can make mistakes, none of our statements should be used without checking. Please let us know of any mistakes or misunderstandings you are aware of, so that we can recognize and eliminate them quickly.

Perform work on and with W&T products only as described here and only if you have read and understood the manual fully. Unauthorized use can result in hazards. We are not liable for the consequences of unauthorized use. When in doubt, check with us or consult your dealer!

The gradual decline in ISA slots in modern PCs has made it necessary to make the functionality of ISA cards available for the PCI bus as well.

W&T has responded by creating an entire family of serial PCI interface cards which meet the needs of industrial automation through integrated galvanic isolation of the PC ports and the ability to equip the serial ports of the card with a variety of physical interfaces.

This PCI card family is described on the following pages along with their technical specifications and wiring examples.

The inherent benefits of PCI with respect to easy installation and automatic assigning of PC resources stand in contrast to the fact that these cards are no longer supported by the operating system itself, but rather require driver software.

One exception is Linux, which in kernel version 2.4. and higher supports the serial W&T PCI cards directly, without additional driver software.

Current information on the new developments as well as the newest driver releases can be found in the Internet at <http://www.wut.de> or in the e-mail updates provided to members of the W&T Interface Club. Subscriptions to the Interface Club can requested from the W&T homepage.

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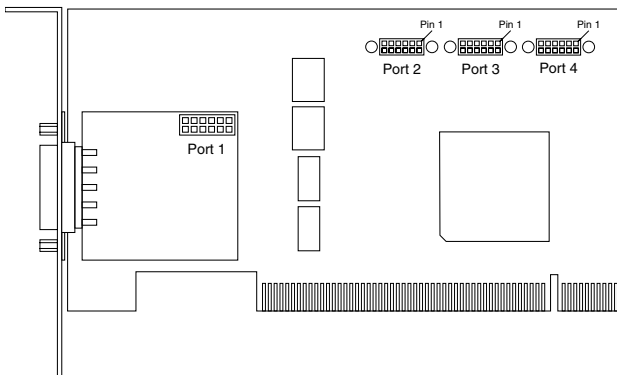
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**Serial Standard PCI Cards**

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**Low Profile PCI cards: General characteristics****Function**

All serial Low Profile PCI cards add the functionality of maximum four additional serial ports to your PC. One of these ports (Port 1) is integrated on the interface card, whereas three additional, optional ports (ports 2 through 4) are connected to the circuit board through ribbon cable. These optional ports are configured on the PCI card as serial TTL interfaces which can be converted into any serial standard interface (RS232, RS422, RS485 or 20mA) using W&T Interface Modules.

**Adapting to the physical housing requirements**

The serial interface cards are supplied with a short slot bracket which enables installation in Low Profile PCI systems. A longer slot bracket is provided for attaching the cards in standard PCI systems; this is attached to the circuit board in place of the short slot bracket.

To make the switch, remove the two threaded pins on the SUB-D plug, remove the slot bracket and attach the new bracket to the SUB-D plug using the threaded pins.

## **Galvanic isolation and ESD protection**

Port 1 on all W&T Low Profile PCI interface cards is galvanically isolated from the PC with an isolation voltage of at least 1kV DC, whereas the optional ports 2 through 4 have no galvanic isolation from the PC.

Galvanic isolation of the signals is implemented using fast opto-couplers; driver and receiver chips are powered by a galvanically isolated DC/DC converter. Please note that the shielding for the port connectors has a direct connection to the chassis ground of the PC using the metallic slot bracket.

The signal lines for the serial ports are protected against static discharge for a voltage of up to 15kV per IEC 801-2, Level 4.

## **Driver and software installation**

All the serial PCI interface cards are accessible under the various operating systems only using special drivers. These drivers are subject to continuous improvement both with respect to their technical features and the number and type of supported operating systems.

For this reason W&T makes the current drivers and software installation manuals available on the data sheet pages for the PCI cards in the Internet under <http://www.wut.de>.

## **Implementing optional ports 2 through 4**

As an option all serial Low Profile interface cards are able to also provide three additional serial ports in addition to the port integrated on the card. These ports are configured on the card as serial TTL interfaces which can be converted into the desired interface type by using interface modules.

It must be noted however that the optional ports 2 through 4 are not galvanically isolated from each other or from the PC, so that these ports may be used only for connecting peripherals

where no ground potential differences can be expected. This would include any peripherals which are located in the direct vicinity of the PC and thus are powered from the same subdivision as well as peripherals which are inherently potential-free. This generally applies to all devices which are powered from the interface or by a plug-in power supply. In all other cases external galvanic isolation must be provided.



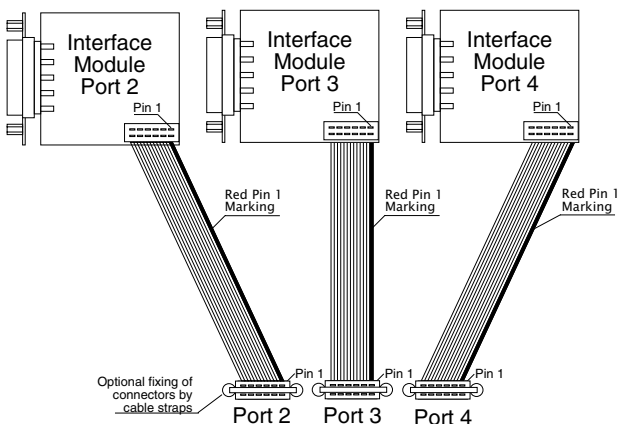
The additional interface modules are connected to the interface card using 2mm ribbon cable and attached by means of a slot bracket in the PC housing. Both components can be obtained as a special accessory from W&T under article number 13014. The ribbon cable connectors can be affixed to the interface card as needed using standard cable ties.

## Important notes

The serial W&T PCI cards may be equipped only with the 18x1x series interface modules (e.g. 18811, 18813, 18611, 18411, etc.) which have a supply voltage of 5V DC.

The use of 3.3V modules in the 18x3x series (e.g. 18831, 18833, 18631, etc.) will result in destruction of the interface modules and/or the PCI card.

When installing you must ensure that the arrangement of the ribbon cable and the interface modules corresponds to the drawing below. Otherwise the modules and/or the interface card may be destroyed.





**Low Profile PCI card 1x 20mA, #13410****Function**

The W&T PC card model 13410 provides a serial 20mA interface with galvanic isolation of 1kV DC on port 1. Ports 2 through 4 may also be used for any three, non-galvanically isolated serial ports.

**Wiring configuration**

The 20mA connection for the PC card is implemented as a DB9 plug. The connector pin assignments are shown in the following table:

| pin# | function           |
|------|--------------------|
| 1    | Data Out 20 mA     |
| 2    | Data Out +         |
| 3    | Data Out -         |
| 4    | Data Out GND       |
| 5    | Halfduplex control |
| 6    | Data In 20 mA      |
| 7    | Data In +          |
| 8    | Data In -          |
| 9    | Data In GND        |

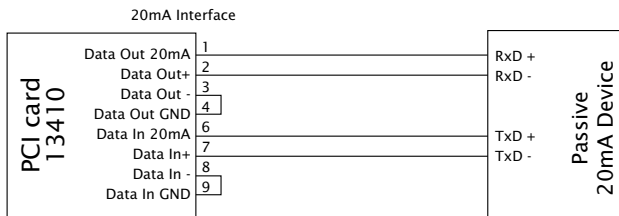
**Applications**

A ground level signal on Pin 5 of the SUB-D connector can be used to bring the 20mA interface into half-duplex mode, in which there is echo suppression of the sent signals.

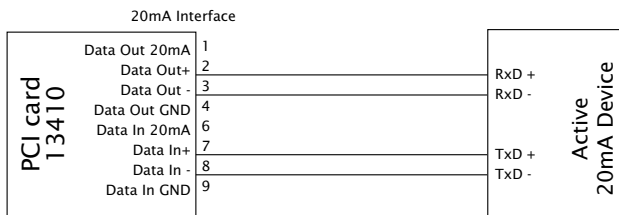
The PC card can be used as either an active or passive 20mA component. In active mode the card provides the loop current for the respective 20mA loop, whereas in passive mode the connected device itself must provide the loop current.

The operating mode can be set separately for both loops using the external wiring of the card. Examples for wiring the PC card in active/passive mode can be seen in the following drawings:

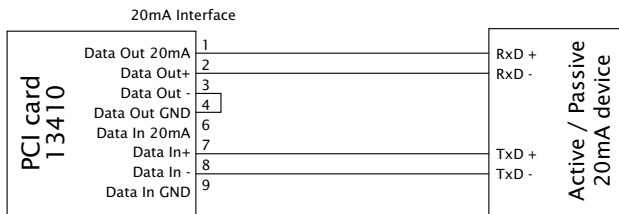
### Active Tx and Active Rx Current Loop Application



### Passive Tx and Passive Rx Current Loop Application



### Active Tx and Passive Rx Current Loop Application



**Technical Data**

|                     |   |
|---------------------|---|
| System bus:         | 32-bit bus / 33MHz  |
| PCI standard:       | PCI2.2 / signal voltage: 5V   |
| Serial ports:       | One galvanically isolated 20mA-port<br>Three non-isolated TTL-ports |
| Galvanic isolation: | port 1: min. 1kV DC<br>port 2..4: No isolation                      |
| Modes:              | Active and passive mode<br>Full- and half-duplex mode               |
| UART:               | 16950 with 128 bytes FIFO   |
| Base addresses:     | automatic configuration   |
| Interrupts:         | automatic configuration   |
| Baud rate:          | 50..57.600 baud   |
| Data format:        | any   |
| Signals:            | RxD+, RxD-, TxD+, TxD-  |
| Serial connections: | 1x 9-pin. SUB-D plug<br>3x 12-pin. 2mm PCB plug                     |
| Supply voltage:     | +5V, typ. 180mA   |
| Dimensions:         | 119.9 x 63.5 mm   |
| Weight:             | approx. 110 g   |
| Scope of delivery:  | Low Profile PCI card 1x 20mA<br>Standard slot bracket<br>Driver CD  |



## Low Profile PCI card 1x RS232/RS422/RS485, #13610

### Function

The W&T PC card model 13610 provides on port 1 a switchable serial RS232/RS422/RS485 interface with 1kV DC galvanic isolation. Ports 2 through 4 can also be used for any three non-galvanically isolated serial interfaces.

### Wiring configuration

The serial connection of the Low Profile PCI card is configured as a DB9 plug. The connector pin assignments are shown in the following table:

#### RS232 mode

| pin# | signal | function |
|------|--------|----------|
| 1    | DCD    | input    |
| 2    | RxD    | input    |
| 3    | TxD    | output   |
| 4    | DTR    | output   |
| 5    | GND    | GND      |
| 6    | DSR    | input    |
| 7    | RTS    | output   |
| 8    | CTS    | input    |
| 9    | RI     | input    |

#### RS422/RS485 mode

| pin# | signal | function |
|------|--------|----------|
| 1    | TXD A  | output   |
| 2    | RxD A  | input    |
| 3    | DTR A  | output   |
| 4    | CTS A  | input    |
| 5    | GND    | GND      |
| 6    | TXD B  | output   |
| 7    | RxD B  | input    |
| 8    | DTR B  | output   |
| 9    | CTS B  | input    |

### Modes

The combined RS232/RS422/485 interface of the PCI card can be set to various operating modes using the DIL switches located near the serial connector as described briefly below:

#### RS232 mode

This mode provides one data channel each (RxD and TxD) in each direction as well as six handshake channels (RTS, CTS, DSR, DCD, DTR and RI).

### **RS422 mode**

The PCI card supports one data and one handshake channel each (selectable DTR or RTS handshake output) in each direction. The RS422 sender and receiver chips are always active.

### **RS485 mode**

In all RS485 modes there is one data channel available in each direction. The operating modes differ only in how the RS485 driver and receiver chips are controlled.

#### **RS485 4-wire bus master**

In this mode the Master uses a wire pair to send requests to the Slaves, which send their replies to the Master on an additional common wire pair. The RS485 drivers and receivers are always active, whereby the Master can always send and is continuously listening for the Slaves.

#### **RS485 4-wire mode / RS485 2-wire mode with echo, handshake control**

One data channel in each direction is available. The RS485 driver chip is turned „ON“ with RTS or DTR, whereas RTS or DTR = „OFF“ switches the driver to tristate. The receive channel is always active in this mode.

#### **RS485 2-wire mode without echo, with handshake control**

One data channel in each direction is available. The RS485 driver chip is turned „ON“ with RTS or DTR, whereas RTS or DTR = „OFF“ turns the driver into tristate. The receive channel is deactivated when the driver is turned on, and the channel is on when the driver is in tristate.

### RS485 4-wire mode / RS485 2-wire mode with echo, automatic control

One data channel in each direction is available. The RS485 driver chip is automatically activated for each data transmission and reset to tristate after data output is finished. The receive channel is always active in this mode.

### RS485 2-wire mode without echo, automatic control

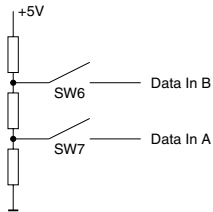
One data channel in each direction is available. The RS485 driver chip is automatically activated for each data transmission and reset to tristate after data output is finished. The receive channel is deactivated when the driver is turned on, and the channel is on when the driver is in tristate.

The DIL switch mode settings are shown in the following table:

| Operating mode  | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|
| RS232   | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON  |
| RS422, RS485, 4-wire bus master<br>DTR handshake      | OFF | OFF | OFF | ON  | OFF | *   | *   | OFF |
| RS422, RS485, 4-wire bus master<br>RTS handshake      | OFF | OFF | OFF | OFF | ON  | *   | *   | OFF |
| RS485, 4-wire / 2-wire with echo<br>DTR control       | OFF | OFF | ON  | ON  | OFF | *   | *   | OFF |
| RS485, 2-wire without echo<br>DTR control             | ON  | OFF | ON  | ON  | OFF | *   | *   | OFF |
| RS485, 4-wire / 2-wire with echo<br>RTS control       | OFF | OFF | ON  | OFF | ON  | *   | *   | OFF |
| RS485, 2-Draht without echo<br>RTS control            | ON  | OFF | ON  | OFF | ON  | *   | *   | OFF |
| RS485, 4-wire / 2-wire with echo<br>automatic control | OFF | ON  | OFF | ON  | OFF | *   | *   | OFF |
| RS485, 2-wire without echo<br>automatic control       | ON  | ON  | OFF | ON  | OFF | *   | *   | OFF |

## Terminating

All RS485 modes require terminating the bus system with a termination network which ensures a defined rest state in the tristate phases of bus operation. The bus system can be connected to a termination network on the PC card by closing DIL switches 6 and 7:





**Applications**

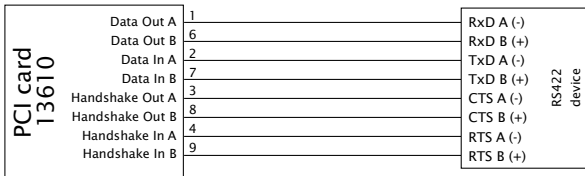
**RS232 application with hardware handshake**

RS232 interface



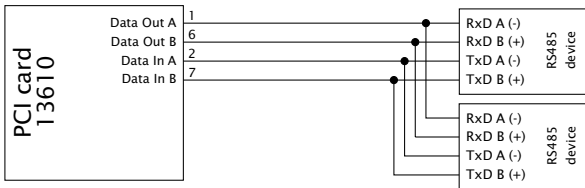
**RS422 application with hardware handshake**

RS422 interface



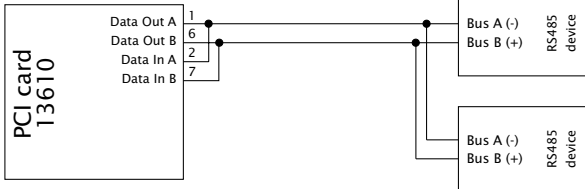
**RS485 4-wire bus master application**

RS485 interface



**RS485 2-wire application**

RS485 interface



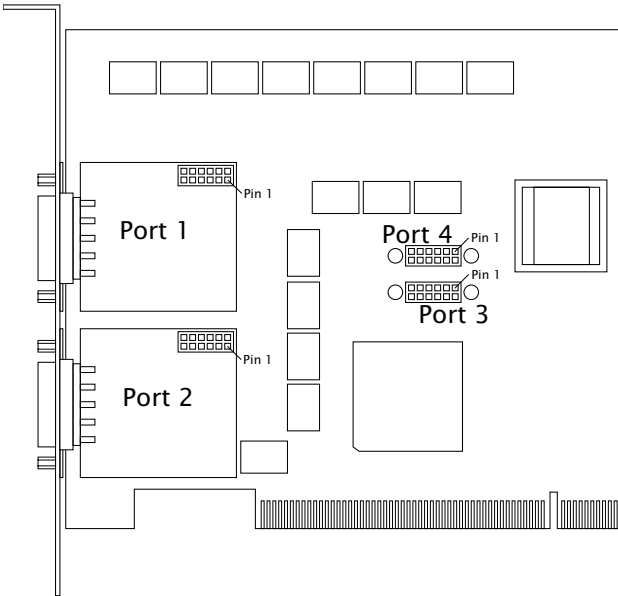
**Technical Data**

|                     |   |
|---------------------|---|
| System bus:         | 32-bit bus / 33MHz  |
| PCI standard:       | PCI2.2 / signal voltage: 5V   |
| Serial ports:       | One galvanically isolated, selectable<br>RS232-/RS422-/RS485-port<br>Three non-isolated TTL-ports                   |
| Galvanic isolation: | port 1: min. 1kV DC<br>port 2..4: No isolation  |
| Operating modes:    | RS232<br>RS422<br>RS485 2/4 wire mode with<br>automatic control<br>RS485 2/4 wire mode with<br>handshake control    |
| Switchover delay:   | approx. 10µs from send to receive for<br>RS485 automatic control (can be<br>factory changed on request)             |
| UART:               | 16950 with 128 bytes FIFO   |
| Base addresses:     | automatic configuration   |
| Interrupts:         | automatic configuration   |
| Baud rate:          | RS232: 50..230.400 baud<br>RS422/RS485: 50..460.800 baud  |
| Data format:        | any   |
| Signals:            | RS232 mode:<br>Rx/D, Tx/D, RTS, CTS, DSR, DTR, DCD, RI<br>RS422/RS485 mode:<br>Rx/D A/B, Tx/D A/B, CTS A/B, DTR A/B |
| Serial connections: | 1 x 9-pin. SUB-D plug<br>3 x 12-pin. 2mm PCB plug   |
| Supply voltage:     | +5V, typ. 150mA   |
| Dimensions:         | 119.9 x 63.5 mm   |
| Weight:             | approx. 110 g   |
| Scope of delivery:  | Low Profile PCI card<br>1 x RS232/RS422/RS485<br>Standard slot bracket, Driver CD                                   |

**Standard PCI cards: Common characteristics**

**Function**

All W&T serial interface cards for PCI bus systems add the functionality of maximum four additional serial ports to your PC. Two of these ports (port 1 and port 2) are integrated on the interface card, whereas two additional, optional ports (ports 3 and 4) are connected to the circuit board through ribbon cable. These 2 optional ports are configured on the PCI card as serial TTL interfaces which can be converted into any serial standard interface (RS232, RS422, RS485 or 20mA) using W&T Interface Modules.



## **Galvanic isolation and ESD protection**

Ports 1 and 2 on all W&T PCI interface cards are galvanically isolated from each other and from the PC with an isolation voltage of at least 1kV DC, whereas the optional ports 3 and 4 have no galvanic isolation from the PC.

Galvanic isolation of the signals is implemented using fast opto-couplers; driver and receiver chips are powered by a galvanically isolated DC/DC converter. Please note that the shielding for the port connectors has a direct connection to the chassis ground of the PC using the metallic slot bracket.

The signal lines for the serial ports are protected against static discharge for a voltage of up to 15kV per IEC 801-2, Level 4.

## **Driver and software installation**

All the serial PCI interface cards are accessible under the various operating systems only using special drivers. These drivers are subject to continuous improvement both with respect to their technical features and the number and type of supported operating systems.

For this reason W&T makes the current drivers and software installation manuals available on the data sheet pages for the PCI cards in the Internet under <http://www.wut.de>.

## **Implementing optional ports 3 and 4**

As an option all serial interface cards are able to also provide two additional serial ports (ports 3 and 4) in addition to the two ports integrated on the card. These ports are configured on the card as serial TTL interfaces which can be converted into the desired interface type by using interface modules.

It must be noted however that the optional ports 3 and 4 are not galvanically isolated from each other or from the PC, so that these ports may be used only for connecting peripherals where no ground potential differences can be expected. This would include any peripherals which are located in the direct vicinity of the PC and thus are powered from the same sub-division as well as peripherals which are inherently potential-free. This generally applies to all devices which are powered from the interface or by a plug-in power supply. In all other cases external galvanic isolation must be provided.



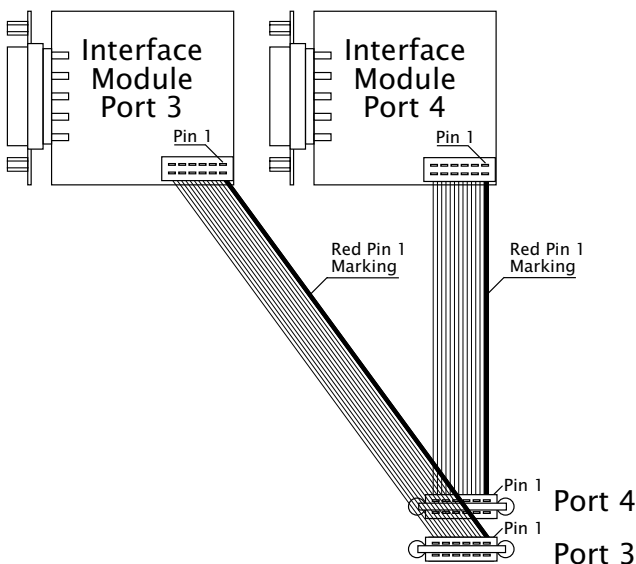
The additional interface modules are connected to the interface card using 2mm ribbon cable and attached by means of a slot bracket in the PC housing. Both components can be obtained as a special accessory from W&T under article number 13013. The ribbon cable connectors can be affixed to the interface card as needed using standard cable ties.

### Important notes

The serial W&T PCI cards may be equipped only with the 18x1x series interface modules (e.g. 18811, 18813, 18611, 18411, etc.) which have a supply voltage of 5V DC.

The use of 3.3V modules in the 18x3x series (e.g. 18831, 18833, 18631, etc. ) will result in destruction of the interface modules and/or the PCI card.

When installing you must ensure that the arrangement of the ribbon cable and the interface modules corresponds to the drawing below. Otherwise the modules and/or the interface card may be destroyed.



## PCI card base board for Interface-Modules, #13011

### Function

The serial W&T module base board 13011 together with W&T interface modules provides two independent serial interfaces with galvanic isolation of 1kV DC as well as two serial interfaces without galvanic isolation. Integration of the interface-specific components on the cards in the form of interchangeable interface modules provides for an optional mixed configuration of the cards with different interface types. This means for example you can easily implement an RS232 interface for connecting a mouse and a 20mA interface for connecting a controller on a single card.

### Wiring configuration

The serial TTL interface on the base board is implemented as a 12-pin PCB connector. The connector pin assignments are shown in the following table:

| pin# | signal | function      |
|------|--------|---------------|
| 1    | 5V     | power supply  |
| 2    | RI     | input         |
| 3    | RxD    | input         |
| 4    | TxD    | output        |
| 5    | n.c.   | n.c.          |
| 6    | CTS    | input         |
| 7    | DTR    | output        |
| 8    | DSR    | input         |
| 9    | RTS    | output        |
| 10   | DCD    | input         |
| 11   | 12V    | power supply  |
| 12   | GND    | signal ground |

Pin 1 of the connector is indicated by a rectangular soldering pad.

**Technical Data**

|                     |  |
|---------------------|--|
| System bus:         | 32-bit bus / 33MHz   |
| PCI standard:       | PCI2.2 / signal voltage: 5V  |
| Serial ports:       | Two galvanically isolated TTL ports<br>Two non-isolated TTL ports  |
| Note:               | The card can be configured with modules of various interface types |
| Galvanic isolation: | port 1,2: min. 1kV DC<br>port 3,4: No isolation                    |
| UART:               | 16950 with 128 bytes FIFO  |
| Base addresses:     | automatic configuration  |
| Interrupts:         | automatic configuration  |
| Baud rate:          | 50..460.800 baud   |
| Data format:        | any  |
| Signals:            | RxD, TxD, RTS, CTS, DSR, DCD, DTR, RI                              |
| Serial connections: | 4x 12-pin. 2mm PCB plug  |
| Supply voltage:     | +5V, +12V, depending on current draw of the modules used           |
| Dimensions:         | 120 x 106 mm   |
| Weight:             | approx. 110 g  |
| Scope of delivery:  | PCI card base board<br>Driver CD                                   |



**PCI card 2x 20mA, #13411****Function**

The W&T PC card model 13411 provides on port 1 and port 2 two independent serial 20mA interfaces with galvanic isolation of 1kV DC. Ports 3 and 4 can be used also for any two non-galvanically isolated serial interfaces.

**Wiring configuration**

The 20mA connections on the PC card are implemented as DB9 plugs. The connector pin assignments are shown in the following table:

| pin# | function           |
|------|--------------------|
| 1    | Data Out 20 mA     |
| 2    | Data Out +         |
| 3    | Data Out -         |
| 4    | Data Out GND       |
| 5    | Halfduplex control |
| 6    | Data In 20 mA      |
| 7    | Data In +          |
| 8    | Data In -          |
| 9    | Data In GND        |

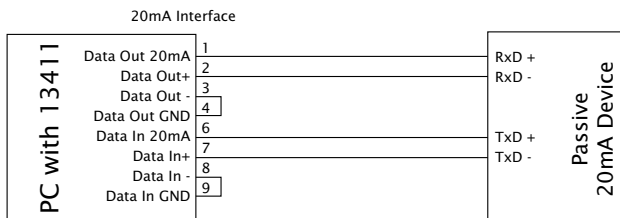
**Applications**

A ground level on Pin 5 of the SUB-D connector places the 20mA interface in half-duplex mode in which there is echo suppression of the sent signals.

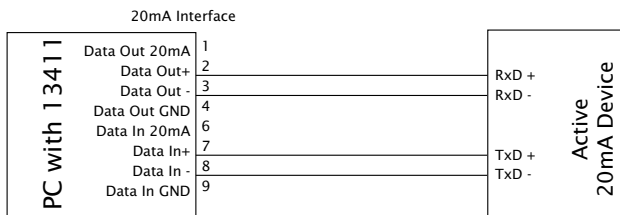
The PC card can be used as either an active or passive 20mA component. In active mode the card provides the loop current for the respective 20mA loop, whereas in passive mode the connected device itself must provide the loop current.

The mode can be set independently for both loops using the external wiring of the card. Examples for wiring the PC card in active/passive mode are shown in the following drawings:

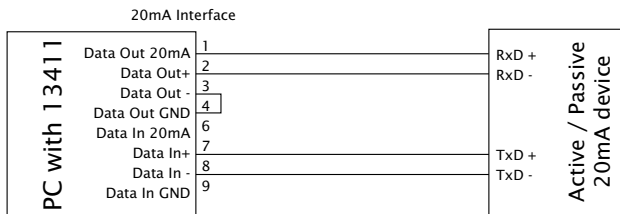
### Active Tx and Active Rx Current Loop Application



### Passive Tx and Passive Rx Current Loop Application



### Active Tx and Passive Rx Current Loop Application



**Technical Data**

|                     |  |
|---------------------|--|
| System bus:         | 32-bit bus / 33MHz   |
| PCI standard:       | PCI2.2 / signal voltage: 5V  |
| Serial ports:       | Two galvanically isolated 20mA ports<br>Two non-isolated TTL ports |
| Galvanic isolation: | port 1,2: min. 1kV DC<br>port 3,4: No isolation                    |
| Modes:              | Active and passive mode<br>Full- and half-duplex mode              |
| UART:               | 16950 with 128 bytes FIFO  |
| Base addresses:     | automatic configuration  |
| Interrupts:         | automatic configuration  |
| Baud rate:          | 50..57.600 baud  |
| Data format:        | any  |
| Signals:            | RxD+, RxD-, TxD+, TxD-   |
| Serial connections: | 2x 9-pin. SUB-D plug<br>2x 12-pin 2mm PCB plug                     |
| Supply voltage:     | +5V, typ. 200mA, +12V, typ. 100mA                                  |
| Dimensions:         | 120 x 106 mm   |
| Weight:             | approx. 110 g  |
| Scope of delivery:  | PCI card 2x 20mA<br>Driver CD                                      |



**PCI card 2x RS422/RS485, #13611****Function**

The W&T PC card model 13611 provides on port 1 and port 2 two independent serial RS422/RS485 interfaces with galvanic isolation of 1kV DC. Ports 3 and 4 can be used also for any two non-galvanically isolated serial interfaces.

**Wiring configuration**

The RS422/RS485 connections on the PC card are implemented as DB9 connectors. The connector pin assignments are shown in the following table:

| pin# | function            |
|------|---------------------|
| 1    | Data Out A (-)      |
| 2    | Data in A (-)       |
| 3    | Handshake Out A (-) |
| 4    | Handshake In A (-)  |
| 5    | Signal GND          |
| 6    | Data Out B (+)      |
| 7    | Data In B (+)       |
| 8    | Handshake Out B (+) |
| 9    | Handshake In B (+)  |

**Modes**

The RS422/485 interface of the PCI card can be set to various operating modes using the DIL switches located near the serial connector as described briefly below:

**RS422, RS485 4-wire-Bus-Master**

One data and one handshake channel each in each direction is available. The RS422/RS485 driver and receiver chips are always active in this mode.

**RS485 4-wire mode / RS485 2-wire mode with echo,  
handshake control**

One data channel in each direction is available. The RS485 driver chip is turned „ON“ with RTS or DTR, whereas RTS or DTR = „OFF“ turns the driver into tristate. The receive channel is always active in this mode.

**RS485 2-wire mode without echo, handshake control**

One data channel in each direction is available. The RS485 driver chip is turned „ON“ with RTS or DTR, whereas RTS or DTR = „OFF“ turns the driver into tristate. The receive channel is deactivated when the driver is turned on and the channel is on when the driver is in tristate.

**RS485 4-wire mode / RS485 2-wire mode with echo,  
automatic control**

One data channel in each direction is available. The RS485 driver chip is automatically activated for each data transmission and reset to tristate after data output is finished. The receive channel is always active in this mode.

**RS485 2-wire mode without echo, automatic control**

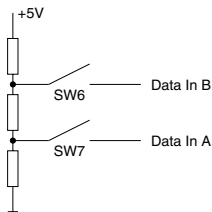
One data channel in each direction is available. The RS485 driver chip is automatically activated for each data transmission and reset to tristate after data output is finished. The receive channel is deactivated when the driver is turned on, and the channel is turned on when the driver is in tristate.

The DIL switch mode settings are shown in the following table:

| operating mode                                      | SW1 | SW2 | SW3 | SW4 | SW5 |
|---|-----|-----|-----|-----|-----|
| RS422, RS485, 4 wire bus master, DTR handshake      | OFF | OFF | OFF | ON  | OFF |
| RS422, RS485, 4 wire bus master, RTS handshake      | OFF | OFF | OFF | OFF | ON  |
| RS485, 4 wire / 2-wire with echo, DTR control       | OFF | OFF | ON  | ON  | OFF |
| RS485, 2-wire without echo, DTR control             | ON  | OFF | ON  | ON  | OFF |
| RS485, 4 wire / 2-wire with echo, RTS control       | OFF | OFF | ON  | OFF | ON  |
| RS485, 2-wire without echo, RTS control             | ON  | OFF | ON  | OFF | ON  |
| RS485, 4 wire / 2-wire with echo, automatic control | OFF | ON  | OFF | ON  | OFF |
| RS485, 2-wire without echo, automatic control       | ON  | ON  | OFF | ON  | OFF |

## Terminating

All RS485 modes require terminating the bus system with a termination network which ensures a defined rest state in the tristate phases of bus operation. The bus system can be connected to a termination network on the PC card by closing DIL switches 6 and 7:



## Applications

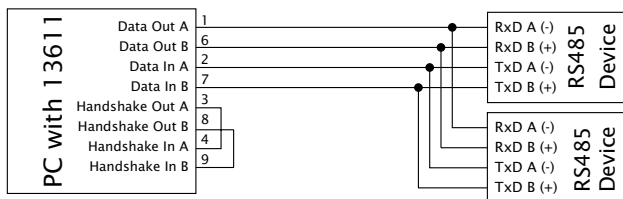
## RS422 Hardware Handshake Application

RS422/485 Interface



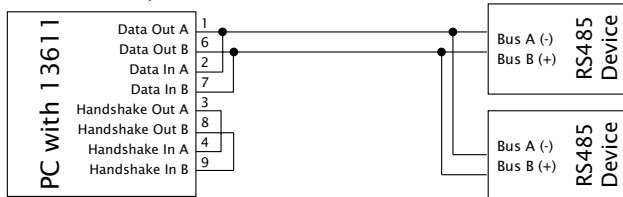
## RS485 4 Wire Bus Master Application

RS422/485 Interface



## RS485 2 Wire Application

RS422/485 Interface





**Technical Data**

|                     |   |
|---------------------|---|
| System bus:         | 32-bit bus / 33MHz  |
| PCI standard:       | PCI2.2 / signal voltage: 5V   |
| Serial ports:       | Two galvanically isolated<br>RS422-/RS485 ports<br>Two non-isolated TTL ports                                 |
| Galvanic isolation: | port 1,2: min. 1kV DC<br>port 3,4: no isolation   |
| Operating modes:    | RS422<br>RS485 2/4 wire mode with<br>automatic control<br>RS485 2/4 wire mode with<br>handshake control       |
| Switchover delay:   | approx. 10 $\mu$ s from send to receive for<br>RS485 automatic control (can be<br>factory changed on request) |
| UART:               | 1 6950 with 128 bytes FIFO  |
| Base addresses:     | automatic configuration   |
| Interrupts:         | automatic configuration   |
| Baud rate:          | 50..460.800 baud  |
| Data format:        | any   |
| Signals:            | RxD A/B, TxD A/B, CTS A/B, DTR A/B  |
| Serial connections: | 2x 9-pin. SUB-D plug<br>2x 12-pin. 2mm PCB plug   |
| Supply voltage:     | +5V, typ. 200mA, +12V, typ. 100mA   |
| Dimensions:         | 120 x 106 mm  |
| Weight:             | approx. 110 g   |
| Scope of delivery:  | PCI card 2x RS422/RS485<br>Driver CD  |



**PCI card 2x RS232, #13812****Function**

The W&T PC card model 13812 provides on port 1 and port 2 two independent serial RS232 interfaces with galvanic isolation of 1kV DC. ports 3 and 4 can be used also for any two non-galvanically isolated serial interfaces.

**Wiring configuration**

The RS232 connections on the PC card are implemented as DB9 plugs with standard PC pin assignments. The connector pin assignments are shown in the following table:

| pin# | function |
|------|----------|
| 1    | DCD      |
| 2    | RxD      |
| 3    | TxD      |
| 4    | DTR      |
| 5    | GND      |
| 6    | DSR      |
| 7    | RTS      |
| 8    | CTS      |
| 9    | RI       |

**Technical Data**

|                     |   |
|---------------------|---|
| System bus:         | 32-bit bus / 33MHz  |
| PCI standard:       | PCI2.2 / signal voltage: 5V   |
| Serial ports:       | Two galvanically isolated RS232-ports<br>Two non-isolated TTL ports |
| Galvanic isolation: | port 1,2: min. 1kV DC<br>port 3,4: No isolation                     |
| UART:               | 16950 with 128 bytes FIFO   |
| Base addresses:     | automatic configuration   |
| Interrupts:         | automatic configuration   |
| Baud rate:          | 50..230.400 baud  |
| Data format:        | any   |
| Signals:            | RxD, TxD, RTS, CTS, DSR, DCD, DTR, RI                               |
| Serial connections: | 2x 9-pin. SUB-D plug<br>2x 12-pin. 2mm PCB plug                     |
| Supply voltage:     | +5V, typ. 200mA, +12V, typ. 100mA                                   |
| Dimensions:         | 120 x 106 mm  |
| Weight:             | approx. 110 g   |
| Scope of delivery:  | PCI card 2x RS232, 1kV isolated<br>Driver CD                        |