

# **Manual**

## **PC Cards for ISA Bus Systems**



Type	13001, 13401 13601, 13801 13802
Release	1.2

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Carry out your work on or with W&T products only to the extent that they are described here and after you have completely read and understood the manual or guide. We are not liable for unauthorized repairs or tampering. When in doubt, check first with us or with your dealer.

W&T has made available an entire family of serial PC interface cards which, thanks to the integrated galvanic isolation of the ports from the PC and the ability to equip the serial ports on the card with various physical interfaces, now meet the needs of industrial automation.

This PC card family is described in the following pages together with the corresponding technical data and connection examples.

For up-to-date information on new developments, go to our homepage at <http://www.wut.de> or use the email short-infos available from the W&T Interface Club, which you can also sign up for at the W&T homepage.

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**Mainboard for Serial Interface Modules, #13001****Function**

The W&T serial module mainboard equip your PC with two independent serial interfaces with an insulation of up to 1000 Volts. The integration of interface specific components in the form of exchangeable interface modules offer the possibility of an optional card equipment with various types of interfaces. This makes it possible to concentrate the connections of a RS232-COM1: for a mouse and a 20mA-COM2: for a control device on one card.

Both serial ports are equipped with type 16C550 FIFO UARTs; this makes them functionally compatible with standard RS232 interfaces, so that the cards can easily be used with your available software. Following a reset, the type 16550 elements are in standard UART operating mode, so that there is no need to worry about existing software. The FIFO mode has to be activated explicitly by the software.

DMA operation of the 16550 UARTs is not supported by the hardware of the W&T port cards.

**Galvanic isolation**

The two ports of the W&T serial module mainboard are galvanically isolated from each other and with respect to the PC for an isolation voltage of 1kV. The signals are insulated by means of high-speed opto-couplers; energy is supplied to the driver and receiver elements by means of an isolated DC/DC converter. Please note that the shielding of the port connectors is directly connected to the case of the PC by the metallic back panel.

### **Configuring the card**

The base address and the required interrupt line can be set by DIP switches at the lower edge of the card.

### **Base addresses**

The I/O base addresses of the two ports can be set independently by DIP switches to 03F8H, 02F8H, 03E8H or 02E8H. Serial ports at these base addresses are recognized by almost all modern BIOS versions upon startup of the PC, and are written to the BIOS RAM of the computer. Some older BIOS versions recognize only two serial ports at the base addresses for COM1 and COM2. In these rare cases, a separate program is needed to search the computer for installed serial ports and write the COM3 and COM4 ports to BIOS RAM. The necessary software can be obtained from W&T on request. Setting both ports to the same base address should be strictly avoided.

Please see the following tables for an explanation of the address DIP switch settings:

Port 1	SW 1.9	SW 1.10	SW 1.11
Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 1.12 has no function

Port 2	SW 2.9	SW 2.10	SW 2.11
Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 2.12 has no function

Since the address is decoded by means of GALs, customizing of the I/O address is no problem. This option makes it possible to employ more than 4 serial ports on a computer, if the software permits the use of additional I/O addresses.

**Interrupt settings**

The W&T serial PC Cards permit use of the standard interrupts IRQ3 and IRQ4 for the serial ports COM1 and COM2, and interrupts IRQ5 and IRQ7 for the parallel ports LPT1 and LPT2 if the system has no parallel ports or if the built-in parallel ports do not operate in interrupt mode. Since it is a long card, the PC Card also supports interrupts IRQ9..IRQ12 of the second interrupt controller.

Please see the following tables for an explanation of the IRQ DIP switch setting:

IRQ	SW 1.1	SW 1.2	SW 1.3	SW 1.4	SW 1.5	SW 1.6	SW 1.7	SW 1.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 1

IRQ	SW 2.1	SW 2.2	SW 2.3	SW 2.4	SW 2.5	SW 2.6	SW 2.7	SW 2.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 2

**Connectors and pin assignment**

The serial TTL interfaces of the W&T serial module mainboard use pin header connectors with identical pin configuration. The connector pin assignments are shown in the table below:

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 pin head connector has a square pad while the other pins have round pads.

**Technical data**

Base addresses: 03F8H, 02F8H, 03E8H, 02E8H

Interrupts: IRQ3, IRQ4, IRQ5, IRQ7  
IRQ9, IRQ10, IRQ11, IRQ12

Baudrate: 50..115200 Baud

Data format: any data format

Isolation: min. 1000 volts

TTL interface: 2mm pin header connector

Dimensions: 165 x 106 mm

Weight: approx. 200 g

Packing list: PC card, type 13001



**PC card 2x 20mA, #13401****Function**

The W&T PC card 13401 equip your PC with two independent 20mA serial interfaces with an insulation of up to 1000 Volts.

Both serial ports are equipped with type 16C550 FIFO UARTs; this makes them functionally compatible with standard RS232 interfaces, so that the cards can easily be used with your available software. Following a reset, the type 16550 elements are in standard UART operating mode, so that there is no need to worry about existing software. The FIFO mode has to be activated explicitly by the software.

DMA operation of the 16550 UARTs is not supported by the hardware of the W&T port cards.

**Galvanic isolation and protection against static discharge**

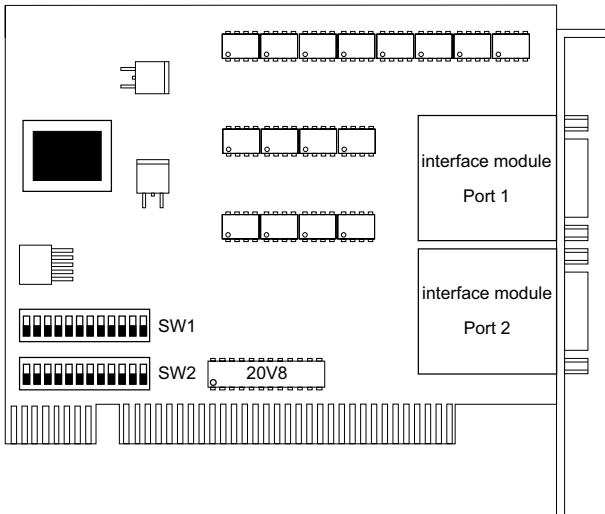
The two serial ports of the PC card are galvanically isolated from each other and with respect to the PC for an isolation voltage of 1kV.

The signals are insulated by means of high-speed optocouplers; energy is supplied to the driver and receiver elements by means of an isolated DC/DC converter. Please note that the shielding of the port connectors is directly connected to the case of the PC by the metallic back panel.

All interface signal lines of the PC card are protected against electrostatic discharge of up to 15kV according to IEC 801-2, level 4.

## Configuring the card

The base address and the required interrupt line can be set by DIP switches at the lower edge of the card.



## Base addresses

The I/O base addresses of the two ports can be set independently by DIP switches to 03F8H, 02F8H, 03E8H or 02E8H. Serial ports at these base addresses are recognized by almost all modern BIOS versions upon startup of the PC, and are written to the BIOS RAM of the computer. Some older BIOS versions recognize only two serial ports at the base addresses for COM1 and COM2. In these rare cases, a separate program is needed to search the computer for installed serial ports and write the COM3 and COM4 ports to BIOS RAM. The necessary software can be obtained from W&T on request. Setting both ports to the same base address should be strictly avoided.

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COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 1.12 has no function

Port 2	SW 2.9	SW 2.10	SW 2.11
Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 2.12 has no function

Since the address is decoded by means of GALs, customizing of the I/O address is no problem. This option makes it possible to employ more than 4 serial ports on a computer, if the software permits the use of additional I/O addresses.

**Interrupt settings**

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3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 1

IRQ	SW 2.1	SW 2.2	SW 2.3	SW 2.4	SW 2.5	SW 2.6	SW 2.7	SW 2.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 2

**Connectors and pin assignment**

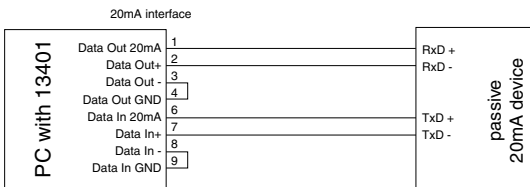
The two ports of the W&T 20 mA PC card 13401 use DB9 male connectors with identical pin configuration. The connector pin assignments are shown in the table below:

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

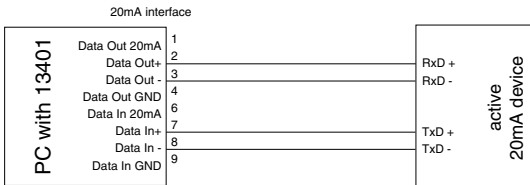
**Applications**

The PC card 13401 can be used as an active or passive 20mA component. In the active mode, the card supplies the current required by the respective 20mA loop, while in the passive mode the loop current must be supplied by the connected device. The operating mode can be selected for both loops separately. Examples of card-switching into active/passive mode are shown in the following drawings:

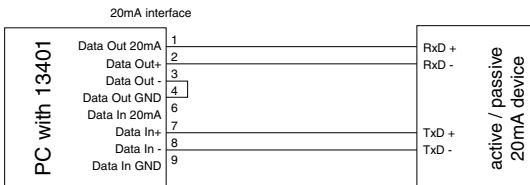
**Active Tx and active Rx current loop application**



**Passive Tx and passive Rx current loop application**



**Active Tx and passive Rx current loop application**



**Technical data**

Base addresses:	03F8H, 02F8H, 03E8H, 02E8H
Interrupts:	IRQ3, IRQ4, IRQ5, IRQ7 IRQ9, IRQ10, IRQ11, IRQ12
Baudrate:	50..57600 Baud
Data format:	any data format
Operation modes:	20mA active / passive mode independently selectable for Tx and Rx current loop
Isolation:	min. 1000 volts
ESD protection:	up to 15kV according to IEC 801-2, level 4
Supply current:	approx. 200mA @5V, 60mA @12V
20mA interface:	DB9 male connector
Dimensions:	165 x 106 mm
Weight:	approx. 200 g
Packing list:	20mA PC card, type 13401



**PC card 2x RS422/RS485, #13601****Function**

The W&T PC card 13601 equip your PC with two independent RS422/RS485 serial interfaces with an insulation of up to 1000 Volts.

Both serial ports are equipped with type 16C550 FIFO UARTs; this makes them functionally compatible with standard RS232 interfaces, so that the cards can easily be used with your available software. Following a reset, the type 16550 elements are in standard UART operating mode, so that there is no need to worry about existing software. The FIFO mode has to be activated explicitly by the software.

DMA operation of the 16550 UARTs is not supported by the hardware of the W&T port cards.

**Galvanic isolation and protection against static discharge**

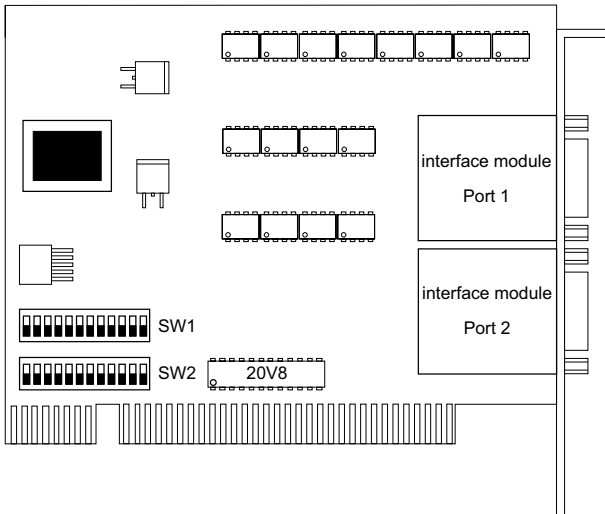
The two serial ports of the PC card are galvanically isolated from each other and with respect to the PC for an isolation voltage of 1kV.

The signals are insulated by means of high-speed optocouplers; energy is supplied to the driver and receiver elements by means of an isolated DC/DC converter. Please note that the shielding of the port connectors is directly connected to the case of the PC by the metallic back panel.

All interface signal lines of the PC card are protected against electrostatic discharge of up to 15kV according to IEC 801-2, level 4.

## Configuring the card

The base address and the required interrupt line can be set by DIP switches at the lower edge of the card.



## Base addresses

The I/O base addresses of the two ports can be set independently by DIP switches to 03F8H, 02F8H, 03E8H or 02E8H. Serial ports at these base addresses are recognized by almost all modern BIOS versions upon startup of the PC, and are written to the BIOS RAM of the computer. Some older BIOS versions recognize only two serial ports at the base addresses for COM1 and COM2. In these rare cases, a separate program is needed to search the computer for installed serial ports and write the COM3 and COM4 ports to BIOS RAM. The necessary software can be obtained from W&T on request. Setting both ports to the same base address should be strictly avoided.

Please see the following tables for an explanation of the address DIP switch settings:

Port 1	SW 1.9	SW 1.10	SW 1.11
Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 1.12 has no function

Port 2	SW 2.9	SW 2.10	SW 2.11
Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 2.12 has no function

Since the address is decoded by means of GALs, customizing of the I/O address is no problem. This option makes it possible to employ more than 4 serial ports on a computer, if the software permits the use of additional I/O addresses.

**Interrupt settings**

The W&T serial PC Cards permit use of the standard interrupts IRQ3 and IRQ4 for the serial ports COM1 and COM2, and interrupts IRQ5 and IRQ7 for the parallel ports LPT1 and LPT2 if the system has no parallel ports or if the built-in parallel ports do not operate in interrupt mode. Since it is a long card, the PC Card also supports interrupts IRQ9..IRQ12 of the second interrupt controller.

Please see the following tables for an explanation of the IRQ DIP switch setting:

IRQ	SW 1.1	SW 1.2	SW 1.3	SW 1.4	SW 1.5	SW 1.6	SW 1.7	SW 1.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 1

IRQ	SW 2.1	SW 2.2	SW 2.3	SW 2.4	SW 2.5	SW 2.6	SW 2.7	SW 2.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 2

### Connectors and pin assignment

The two ports of the W&T RS422/RS485 PC card 13601 use DB9 male connectors with identical pin configuration. The connector pin assignments are shown in the table below:

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 (+)

## **Operating mode**

The RS422/RS485 interface of the W&T PC card 13601 can be set for five different operating modes by DIP switch setting. The selectable operating modes are briefly described here:

### **RS422, RS485 4 wire bus master application**

One data channel and one handshake channel in each direction are available. The RS422/RS485 receivers and transmitters are always active in this operating mode.

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

One data channel in each direction is available. The RS485 output driver is switched on with DTR or RTS = "ON", while DTR or RTS = "OFF" forces the driver to high impedance state. The RS485 receiving channel is always active in this operating mode.

### **RS485, 2 wire application without echo, handshake control**

One data channel in each direction is available. The RS485 output driver is switched on with DTR or RTS = "ON", while DTR or RTS = "OFF" forces the driver to high impedance state. The RS485 receiving channel is deactivated when the driver is on, but is switched on when the driver is in the high impedance state.

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

One data channel in each direction is available. The RS485 output driver is activated automatically with each transmission of data, and goes to the high impedance state again after the

end of transmission. The RS485 receiving channel is always active in this operating mode.

**RS485, 2 wire application without echo, automatic control**

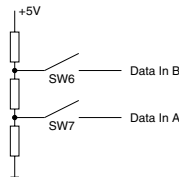
One data channel in each direction is available. The RS485 output driver is activated automatically with each transmission of data, and goes to the high impedance state again after the end of transmission. The RS485 receiving channel is deactivated when the driver is on, but is switched on when the driver is in the high impedance state

Please see the following table for an explanation of the operating mode DIP switch:

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

**Termination**

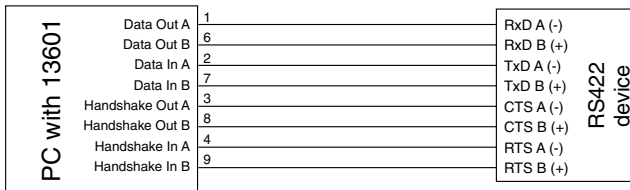
For all RS485 operating modes it is essential that the bus system be terminated with a termination network which assures a defined rest state in the high-impedance phases of bus operation. The bus system can be connected to a termination network by closing switches #6 and #7:



**Applications**

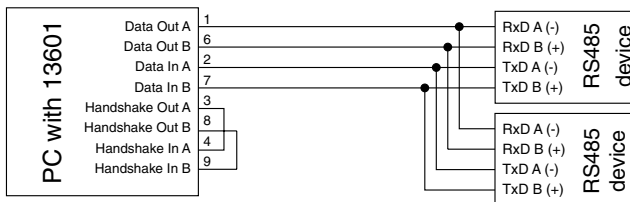
**RS422 hardware handshake application**

RS422/485 interface



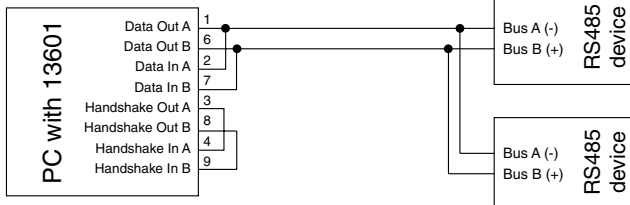
**RS485 4 wire bus master application**

RS422/485 interface



**RS485 2 wire application**

RS422/485 interface



**Technical data**

Operating modes:	RS422 RS485 2/4 wire mode with automatic control RS485 2/4 wire mode with handshake control
Switchover delay:	approx. 10µs from send to receive for RS485 automatic control (can be factory changed on request)
Base addresses:	03F8H, 02F8H, 03E8H, 02E8H
Interrupts:	IRQ3, IRQ4, IRQ5, IRQ7 IRQ9, IRQ10, IRQ11, IRQ12
Baudrate:	50..115200 Baud
Data format:	any data format
Isolation:	min. 1000 volts
ESD protection:	up to 15kV according to IEC 801-2, level 4
Termination:	switchable termination network for RS485 modes
Supply current:	approx. 200mA @5V, 150mA @12V
RS422/485 interface:	DB9 male connector
Dimensions:	165 x 106 mm
Weight:	approx. 200 g
Packing list:	RS422/RS485 PC card, type 13601



## PC card 2x RS232, non-isolated, #13801

### Function

The W&T PC card 13801 equip your PC with two independent RS232 serial interfaces. Both serial ports are equipped with type 16C550 FIFO UARTs; this makes them functionally compatible with standard RS232 interfaces, so that the cards can easily be used with your available software. Following a reset, the type 16550 elements are in standard UART operating mode, so that there is no need to worry about existing software. The FIFO mode has to be activated explicitly by the software.

DMA operation of the 16550 UARTs is not supported by the hardware of the W&T PC card 13801.

### ESD protection

All interface signal lines of the PC card 13801 are protected against electrostatic discharge of up to 15kV according to IEC 801-2, level 4.

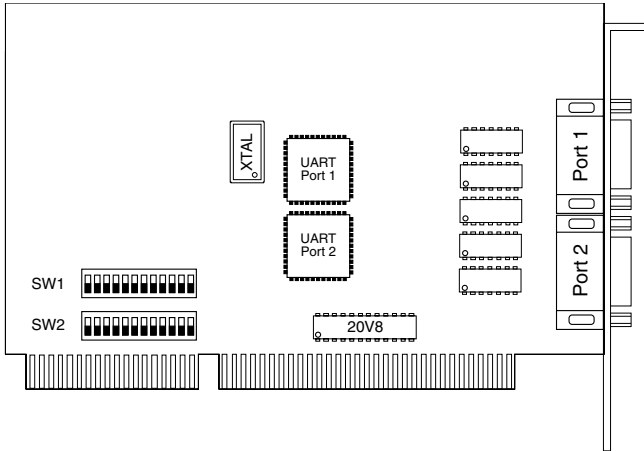
### Connectors and pin assignment

The two ports of the W&T RS232 PC card 13801 use DB9 male connectors with identical pin configuration. The connector pin assignments are shown in the table below:

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

## Configuring the card

The base address and the required interrupt line can be set by DIP switches at the lower edge of the card.



## Base addresses

The I/O base addresses of the two ports can be set independently by DIP switches to 03F8H, 02F8H, 03E8H or 02E8H. Serial ports at these base addresses are recognized by almost all modern BIOS versions upon startup of the PC, and are written to the BIOS RAM of the computer. Some older BIOS versions recognize only two serial ports at the base addresses for COM1 and COM2. In these rare cases, a separate program is needed to search the computer for installed serial ports and write the COM3 and COM4 ports to BIOS RAM. The necessary software can be obtained from W&T on request. Setting both ports to the same base address should be strictly avoided.

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COM4 (02E8H)	ON	ON	ON

SW 1.12 has no function

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Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

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The W&T serial PC Cards permit use of the standard interrupts IRQ3 and IRQ4 for the serial ports COM1 and COM2, and interrupts IRQ5 and IRQ7 for the parallel ports LPT1 and LPT2 if the system has no parallel ports or if the built-in parallel ports do not operate in interrupt mode. Since it is a long card, the PC Card also supports interrupts IRQ9..IRQ12 of the second interrupt controller.

Please see the following tables for an explanation of the IRQ DIP switch setting:

IRQ	SW 1.1	SW 1.2	SW 1.3	SW 1.4	SW 1.5	SW 1.6	SW 1.7	SW 1.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 1

IRQ	SW 2.1	SW 2.2	SW 2.3	SW 2.4	SW 2.5	SW 2.6	SW 2.7	SW 2.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 2

## Technical data

Base addresses: 03F8H, 02F8H, 03E8H, 02E8H

Interrupts: IRQ3, IRQ4, IRQ5, IRQ7  
IRQ9, IRQ10, IRQ11, IRQ12

Baudrate: 50..115200 Baud

Data format: any data format

Isolation: no isolation

ESD protection: up to 15kV according to IEC 801-2,  
level 4

Supply current: approx. 200mA @5V,  
30mA @12V, 30mA @-12V

RS232 interface: DB 9 male connector

Dimensions: 165 x 106 mm

Weight: approx. 150 g

Packing list: RS232 PC card, type 13801

**PC card 2x RS232, 1kV isolated, #13802****Function**

The W&T PC card 13802 equip your PC with two independent RS232 serial interfaces with an insulation of up to 1000 Volts.

Both serial ports are equipped with type 16C550 FIFO UARTs; this makes them functionally compatible with standard RS232 interfaces, so that the cards can easily be used with your available software. Following a reset, the type 16550 elements are in standard UART operating mode, so that there is no need to worry about existing software. The FIFO mode has to be activated explicitly by the software.

DMA operation of the 16550 UARTs is not supported by the hardware of the W&T port cards.

**Galvanic isolation and protection against static discharge**

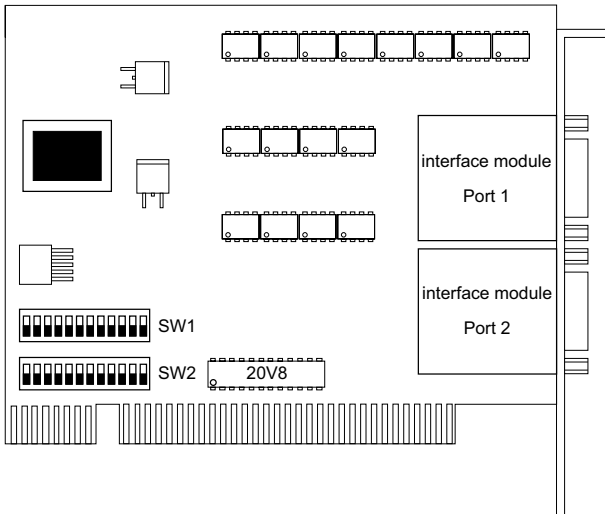
The two serial ports of the PC card are galvanically isolated from each other and with respect to the PC for an isolation voltage of 1kV.

The signals are insulated by means of high-speed optocouplers; energy is supplied to the driver and receiver elements by means of an isolated DC/DC converter. Please note that the shielding of the port connectors is directly connected to the case of the PC by the metallic back panel.

All interface signal lines of the PC card are protected against electrostatic discharge of up to 15kV according to IEC 801-2, level 4.

## Configuring the card

The base address and the required interrupt line can be set by DIP switches at the lower edge of the card.



## Base addresses

The I/O base addresses of the two ports can be set independently by DIP switches to 03F8H, 02F8H, 03E8H or 02E8H. Serial ports at these base addresses are recognized by almost all modern BIOS versions upon startup of the PC, and are written to the BIOS RAM of the computer. Some older BIOS versions recognize only two serial ports at the base addresses for COM1 and COM2. In these rare cases, a separate program is needed to search the computer for installed serial ports and write the COM3 and COM4 ports to BIOS RAM. The necessary software can be obtained from W&T on request. Setting both ports to the same base address should be strictly avoided.

Please see the following tables for an explanation of the address DIP switch settings:

Port 1	SW 1.9	SW 1.10	SW 1.11
Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 1.12 has no function

Port 2	SW 2.9	SW 2.10	SW 2.11
Disabled	X	X	OFF
COM1 (03F8H)	OFF	OFF	ON
COM2 (02F8H)	ON	OFF	ON
COM3 (03E8H)	OFF	ON	ON
COM4 (02E8H)	ON	ON	ON

SW 2.12 has no function

Since the address is decoded by means of GALs, customizing of the I/O address is no problem. This option makes it possible to employ more than 4 serial ports on a computer, if the software permits the use of additional I/O addresses.

**Interrupt settings**

The W&T serial PC Cards permit use of the standard interrupts IRQ3 and IRQ4 for the serial ports COM1 and COM2, and interrupts IRQ5 and IRQ7 for the parallel ports LPT1 and LPT2 if the system has no parallel ports or if the built-in parallel ports do not operate in interrupt mode. Since it is a long card, the PC Card also supports interrupts IRQ9..IRQ12 of the second interrupt controller.

Please see the following tables for an explanation of the IRQ DIP switch setting:

IRQ	SW 1.1	SW 1.2	SW 1.3	SW 1.4	SW 1.5	SW 1.6	SW 1.7	SW 1.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 1

IRQ	SW 2.1	SW 2.2	SW 2.3	SW 2.4	SW 2.5	SW 2.6	SW 2.7	SW 2.8
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
7	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
12	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Interrupt setting port 2

**Connectors and pin assignment**

The two ports of the W&T RS232 PC card 13802 use DB9 male connectors with identical pin configuration. The connector pin assignments are shown in the table below:

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



**Technical data**

Base addresses:	03F8H, 02F8H, 03E8H, 02E8H
Interrupts:	IRQ3, IRQ4, IRQ5, IRQ7 IRQ9, IRQ10, IRQ11, IRQ12
Baudrate:	50..115200 Baud
Data format:	any data format
Isolation:	min. 1000 volts
ESD protection:	up to 15kV according to IEC 801-2, level 4
Supply current:	approx. 200mA @5V, 80mA @12V
RS232 interface:	DB 9 male connector
Dimensions:	165 x 106 mm
Weight:	approx. 200 g
Packing list:	RS232 PC card, type 13802

