PCI/PCI-X Communication Cards User Guide

My Communication Card Details:

type of card: . . . .   (e.g. PCI-1482U)

serial number: . . . .   (e.g. 114823777)

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
phone: +420 373730431 (sales office)
                +420 373730436 (technical support)
fax: +420 373730430
e-mail: sales@tedia.eu
                support@tedia.eu
internet: http://www.tedia.eu

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Table of Contents

CE Declaration of Conformity

1. Introduction

2. Specifications

3. Installation

4. Windows Drivers

Appendix II - Tables and Figures

Notes

CE Declaration of Conformity

Issued in terms of Directive 2004/108/EC of the European parliament and of the Council.

We, TEDIA® spol. s r. o., declare under our sole responsibility that the following products

PCI-1200U series (i.e. PCI-1222U, PCI-1224U, PCI-1232U, PCI-1234U and PCI-1254U),
PCI-1400U series (i.e. PCI-1414U, PCI-1434U, PCI-1472U, PCI-1474U, PCI-1482U and PCI-1484U), and
PCI-1800U series (i.e. PCI-1824U and PCI-1884U),

when installed in accordance with the manufacturers specifications, are in conformity with the following standards

> EN 55022, EN 61000-3-2, EN 61000-3-3,
> EN 55024, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4,
> EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11

and with directive   2004/108/EC including amendments.

Products are marked with the "CE" logo.

Test Certificate:	202199-01 issued by EZÚ Praha
Date of Issue CE Declaration:	6.5.2008
Manufacturer:	TEDIA® spol. s r. o.
	Zábělská 12
	31211 Plzeň
	Czech Republic
Manufacturer's Representative:	Ing. Martin Linda, Managing Director

Signature of the Representative:

1.   Introduction

1.1.   Description

The PCI bus communication series cards are products of a modern design intended especially for industrial automation systems. These cards provide optionally 2 or 4 communication ports of serial line standards RS-232, RS-422 or RS-485.

Due to their conception, these communication cards are intended especially for:

- Distributed process control applications
- Industrial automation
- Multipoint data acquisition
- POS (Point-of-Sale) Systems
- Remote serial device control
- Communication with measuring systems

1.2.   Available Versions

card type (connectors)	RS-232 non-isolated	RS-232 isolated	RS-422/485 non-isolated	RS-422/485 isolated	for details see page
Supported signals ==>	all	all	TXD, RXD	TXD, RXD	
PCI-1222U (2x D-Sub 9)	2				II - 1
PCI-1224U (4x D-Sub 9)	4				II - 1
PCI-1232U (2x D-Sub 9)		2			II - 2
PCI-1234U (4x D-Sub 9)		4			II - 2
PCI-1254U (4x D-Sub 9)		3		1	II - 2
PCI-1414U (4x D-Sub 9)		1		3	II - 3
PCI-1434U (4x D-Sub 9)		2		2	II - 3
PCI-1472U (2x D-Sub 9)			2		II - 4
PCI-1474U (4x D-Sub 9)			4		II - 5
PCI-1482U (2x D-Sub 9)				2	II - 3
PCI-1484U (4x D-Sub 9)				4	II - 3
PCI-1824U (4x RJ45)	4				II - 6
PCI-1884U (4x RJ45)				4	II - 7

1.3.   General Instructions for Use

The cards are suitable for installation in either office or industrial computers that are fitted with the PCI bus (5V or 3.3V version) or the PCI-X, operating at 32-bit, 33 MHz.

For the recommended cable specifications and maximal length see Chapter 3.7.

Caution:

The cards are designed for data transmission 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.

2.   Specifications

2.1.   Common Features

Number of ports:	2 or 4
Supported interfaces:	RS-232, RS-422, RS-485
Supported signals RS-232:	TXD, RXD, RTS, CTS, DTR, DSR, DCD
	RI (all versions except PCI-1824U)
Supported signals RS-422:	TXD+(B), TXD-(A), RXD+(B), RXD-(A)
Supported signals RS-485:	TXD/RXD+(B), TXD/RXD-(A)
Communication controller:	OXmPCI954
Oscillator:	1.8432 MHz (standard speed option)
	14.745 MHz (high speed option)
UART type:	16C950
Backward compatibility:	16C450, 16C550, 16C650, 16C750
Data bits:	5, 6, 7, 8
Parity:	odd, even, space, mark, none
Stop bits:	1, 1.5, 2
FIFO (TXD + RXD):	128 + 128 characters

2.2.   RS-232 Isolated Interface

Transceiver type:	HIN211E (Intersil or equivalent)	
Transfer rate:	230.4 kBd max.	
Compatibility:	ANSI/TIA/EIA-232-F	
Isolation voltage:	1000 V_{DC}	(default)
	600 V_{DC}	(with ESD-X2 or ESD-X4 option)
ESD protection:	15 kV	(IEC1000-4-2, air-gap)
Isolation protection (ESD-X2/X4):	surge arrester	(CG5-600L, 5 kA max. @ 1 kV/µs)

2.3.   RS-232 Non-isolated Interface

All data are identical to the isolated cards, except the port isolation data.

2.4.   RS-422/485 Isolated Interface

Transceiver type:	SN75176 (Texas Instruments or equivalent)	
Transfer rate:	921.6 kBd max.	
RS-485 Flow control:	ADFC, DTR	
Compatibility:	ANSI/TIA/EIA-422-B, or TIA/EIA-485-A	
Input impedance:	12 kOhm min.	
Termination impedance:	120 Ohm / 0.7 V typ.	
Isolation voltage:	1000 V_{DC}	(default)
	600 V_{DC}	(with ESD-X2 or ESD-X4 option)
ESD surge protection:	TVS diode 5.8 V	(600 W/1 ms, 300 A @ 8/20 µs)
Isolation protection (ESD-X2/X4):	surge arrester	(CG5-600L, 5 kA max. @ 1 kV/µs)

2.5. RS-422/485 Non-isolated Interface

All data are identical to the isolated cards, except the port isolation data.

2.6. Other Data

Bus type:	PCI/PCI-X, 3.3V or 5V, 32-bit, 33 MHz	
I/O and MEM addresses:	assigned by PCI BIOS	
IRQ channel:	assigned by PCI BIOS	
Power supply voltage:	5V only (the cards do not utilize either 3.3V nor ±12V)	
Power consumption:		
PCI-1222U:	100 mA typ. @ 5 V	(150 mA max.)
PCI-1224U:	130 mA typ. @ 5 V	(200 mA max.)
PCI-1232U:	400 mA typ. @ 5 V	(600 mA max.)
PCI-1234U:	600 mA typ. @ 5 V	(900 mA max.)
PCI-1254U:	600 mA typ. @ 5 V	(900 mA max.)
PCI-1414U:	600 mA typ. @ 5 V	(900 mA max.)
PCI-1434U:	600 mA typ. @ 5 V	(950 mA max.)
PCI-1472U:	180 mA typ. @ 5 V	(250 mA max.)
PCI-1474U:	300 mA typ. @ 5 V	(450 mA max.)
PCI-1482U:	400 mA typ. @ 5 V	(750 mA max.)
PCI-1484U:	600 mA typ. @ 5 V	(1050 mA max.)
PCI-1824U:	130 mA typ. @ 5 V	(200 mA max.)
PCI-1884U:	600 mA typ. @ 5 V	(1050 mA max.)
Physical dimensions:	approx. 90 x 125 mm	(PCI cards)
	approx. 90 x 60 mm	(extension PCI-102x)
Port connectors:	D-Sub 9 - male	
	RJ45	
Pin Assignment:	EIA/TIA-574	(RS-232, D-Sub 9)
	EIA/TIA-561	(RS-232, RJ45)
	specific	(RS-422, RS-485)
Operating temperature:	0° ˜ 65° C	
Storage temperature:	-20° ˜ 80° C	
Relative humidity:	10% ˜ 90%, non-condensing	
Recommended cable length:	15 m max.	(RS-232)
	1200 m max.	(RS-422, RS-485)

Caution:

> *The isolation protection (ESD-X2 or ESD-X4) is an optional feature, which has to be ordered together with the card. It cannot be additionally added by the user.*

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.   Line Mode Selection

The communication cards support standard interfaces RS-232, RS-422 (four-wire duplex line) and RS-485 (two-wire half-duplex line).

The RS-232 cards do not require any hardware configuration (except PCI-1824U).

When using RS-422, it is possible to choose the permanent active output driver mode, driven by the DTR signal mode or the automatic mode (the so-called multimaster RS-422 mode or four-wire RS-485).

In the case of RS-485 it is possible to choose either the DTR driven mode or automatic. Receiving of the transmitted data is automatically blocked. To use this "echo" function, the card should be configured into the RS-422 multimaster mode and the RXD and TXD signal pairs should be tied together (RXD- to TXD- and RXD+ to TXD+).

The DIP switches and jumpers are reserved for selecting the mode; see the pictures and tables in Appendix II of this manual for more details.

Note: When using the RS-485 interface, the Windows driver needs to be configured specifically. See the description in Chapter 4.4. for more details.

3.3.   Oscillator Selection

The communication cards let you choose one of the two frequencies by setting the jumper. The standard frequency of 1.8432 MHz ("standard speed" option) allows you to achieve 100% compatibility with common serial line drivers with transfer rates up to 115.2 kBd. The frequency of 14.7456 MHz ("high speed" option) allows you to achieve higher, non-standard transfer rates. Jumpers are reserved for oscillator selection; see the pictures and tables in Appendix II of this manual for more details.

3.4.   Card Installation

Important Warning:
While installing the card, please follow instructions below and the requirements for handling the circuits sensitive to electrostatic discharge (ESD). Touch the card carefully only by the edges, and do not touch the components or metal contacts on the card.
The card may be stored only in ESD protection bag, when not installed in 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.
The PC must be turned off and the power supply cord disconnected during the installation!
In the event of any queries, please contact the manufacturer's technical support.

Step-by-step installation instructions:

*Note: Before installing the card into the computer, we to recommend note down the card
         serial number for the event of contacting technical support (see figures in the
         Appendix II) . You can note the number in the table at the beginning of this manual.*

1)   Power off the PC and all peripheral devices.
2)   Disconnect the power supply cord and other lead-in cables connected to the
     peripheral devices; only devices without power supply can stay connected.
3)   Remove the PC´s cover and slot cover bracket if there is one.
4)   Check Appendix II and configure PCI COM card DIP switches as necessary.
5)   Insert the card firmly into a free PCI or PCI-X slot and secure it in place by a screw.
6)   In the case of a four-port COM card, fasten the expansion card into next position and
     connect the ribbon cable to the COM card.
7)   Replace the PC´s cover and connect all cables and power supply cord.

3.5.   Location of Switches, Jumpers and Connectors

The location of switches, jumpers and LEDs and connectors may be found in the Appendix
II of this manual; each of these elements is explained in the information listed above.

3.6.   Connector Pin Assignment

The connector pin assignments are shown in Table 6. and Table 7., and the RS-422/485
interface circuits are shown in Figure 12. and Figure 13. in Appendix II of this manual.

3.7.   Topology & Cable Recommendations

The RS-232 line uses a shielded cable, without any termination resistors.

The RS-422/RS-485 communication line is realized by a cable conforming the EIA-RS-485
standard (i.e. shielded pair, conductor cross-section at least 0.22 mm^2, impedance 100÷130
Ohm, line capacitance approx. 60 pF/m). Recommended type is Belden 9841.

The recommended arrangement for RS-422 and RS-485 is a connected series of
point-to-point (multidropped) nodes, a line or bus (stubs up to 1 m), up to 1200 m length
(for transmittion rates up to 1 MBd). See Figure 14. and Figure 15.

Ideally, the two ends of the cable will have a termination resistor connected across the two
wires. Typical value is 120 Ohms for twisted pairs. At least one of the terminators should
have active topology (the so-called terminator with failsafe bias resistors), when using
RS-485 or RS-422 multimaster (four-wire RS-485).

The maximal number of the devices at one RS-485 communication line is 32. If you need to
use more devices than 32, the repeaters can be used to divide the network into several
segments - see Figure 16. Each segment should meet the requirements listed above. The
repeater is considered as one of the 32 devices. Although the number of the repeaters in a
row is not limited, more than three are not generally recommended.

*Note: The TEDIA® product line provides a complex series of isolated converters, and
         repeaters for the RS-232, RS-422 and RS-485 lines.*

4.   Windows drivers

4.1.   Introduction

At the date of issuing of this manual the following operating systems have been supported: Windows 7, Windows Vista, Windows XP (both 32-bit and 64-bit versions, including the corresponding Windows Server installations), Windows 2000, Windows 95/98/Me and NT4.

Actual drivers can be downloaded at http://www.tedia.eu.

You can find the detailed installation instructions in the folder within the driver.

4.2.   Windows 2000/XP/Vista/7, Windows 95/98/Me

These drivers support the following features:
- 128 characters deep FIFO and alternative emulation of lower UART versions
- optimized interrupt control
- automatic oscillator frequency detection with possibility of manual change
- support of several serial port TEDIA® cards of different type
- RS-485 line driver automatic control
- support of special pre-divider and "quad speed" mode
  (it allows you to reach even remarkable transfer rates)

The configuration dialog box allows you to set most of the UART settings, including the RS-485 line driver automatic control, FIFO optimisation, etc.

The Windows 2000/XP/Vista/7 driver supports up to 256 COM ports and their manual relocation. The Windows 95/98/Me driver supports 128 COM ports and the allocation of ports in the range of COM5 - COM128 is automatic.

Windows 2000/XP/Vista/7 and Windows 95/98/Me are PnP operating systems, so the drivers are installed by standard system resources after the new hardware is detected.

Important Warning:
Before removing the card from the computer, it is necessary to uninstall the driver first by removing the corresponding ports in "Control Panel -> System -> Device Manager -> Ports (COM & LPT)" and then remove "Oxford Semiconductor ... UARTs" items and corresponding "PCI function" in "Multifunction adapters". See more information in the installation instructions in the folder within the driver.

4.3.   Windows NT4

The Windows NT4 driver (TEDIA® version) supports the following features:
- 128 characters deep FIFO (full range)
- optimized interrupt control
- automatic oscillator frequency detection
- enumeration of serial ports of several identical simultaneously installed cards
- RS-485 line automatic control (configured with a separate program)

Because Windows NT4 is not PnP operating system, the setup program for installing and uninstalling the driver is included with the driver. The configuration dialog box allows you to choose the basic communication parameters. A separate program for setting the RS-485 automatic control is supplied with the TEDIA® version of the Windows NT4 driver.

4.4. Specific Driver Settings for RS-485 Line

The PCI communication cards support the automatic RS-485 flow control, or the automatic driver activation in the RS-422 multimaster mode (four-wire RS-485) if desired. Setting of this mode is different in particular operating systems. Except Windows NT4, the settings are accessible via the Device Manager in the Properties tab of the corresponding COM port.

Windows 2000/XP/Vista/7:

In the "Settings" tab in the system dialog, set the "Hardware config" option to "RS422/485" and the"RS485 buffer enable" option to "Active low". For standard RS-422 leave it as "Normal".

Windows 95/98/Me:

In the "Settings" tab in the system dialog, set the "DTR function" option to "RS485 Buf_En Active low". For standard RS-422 leave it as "Normal".
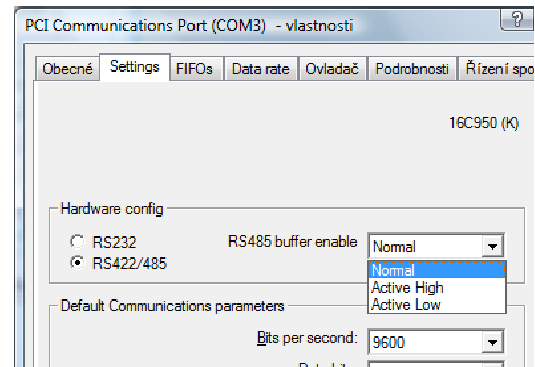
Windows NT4:

The configuration process of the ports is performed by a separate program SERCONF.EXE, supplied with the TEDIA® version of the Windows NT4 driver.

Important Warning:
For the correct function, it is necessary to configure the corresponding ports via the DIP switch. See the detailed description in the Appendix II of this manual.

4.5. Driver Installation Notes

The TEDIA® communication cards use the PCI IDs of the chipset manufacturer (i.e. Oxford Semiconductor) due to the compatibility with the cards of many other manufacturers.

That means the supplied drivers are compatible with the cards of other manufacturers (providing that the Oxford Semiconductor technical specifications are kept). The other manufacturers' cards using the same PCI ID set, i.e.

Vendor ID	1415_H	(VID Oxford Semiconductor)
Device ID	$950A_H$	(all TEDIA® 2 port cards)
	9501_H	(all TEDIA® 4 port cards)
Subsystem VID	1415_H	
Subsystem ID	0001_H , or higher	

may operate with the drivers delivered with the TEDIA® cards.

Note: If more than one communication card with the same chipset is installed in the system, while using different PCI IDs and modified Oxford Semiconductor drivers, the compatibility problems may appear just at any other hardware collision combination.
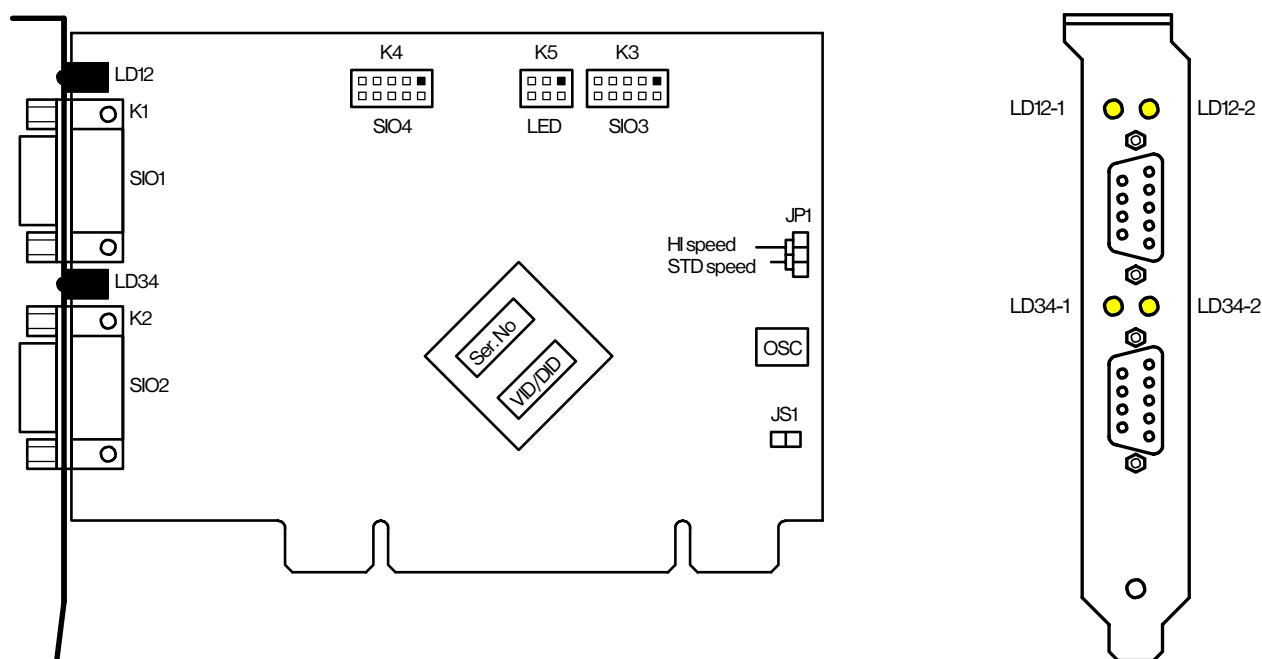
Figure 1.   Important Components at PCI-1222U and PCI-1224U.

PCI-1222U   DID=950A; connectors K3÷K5 are not present.

PCI-1224U   DID=9501; K3÷K5 are present for connecting of the expansion card.

Notes: *The DID label is located at the OXmPCI954, see the figure above.*

The PCI-1224U set includes the PCI card itself and the PCI-1029 expansion card (see description in page II-11) that provides COM3 and COM4.

K1, K2   SIO1 and SIO2 communication ports (RS-232)

K3, K4, K5   SIO3 and SIO4 communication ports (RS-232)
                (accessible through the PCI-1029 expansion card)

LD12-1   SIO1 port activity indicating LED (RXD)

LD12-2   SIO1 port activity indicating LED (TXD)

LD34-1   SIO2 port activity indicating LED (RXD)

LD34-2   SIO2 port activity indicating LED (TXD)

JP1   UART oscillator selection
                (STD speed = 1.8432 MHz, HI speed = 14.7456 MHz)

JS1   Connector for service purposes only

Figure 2.   Important Components at PCI-1232U, PCI-1234U and PCI-1254U.
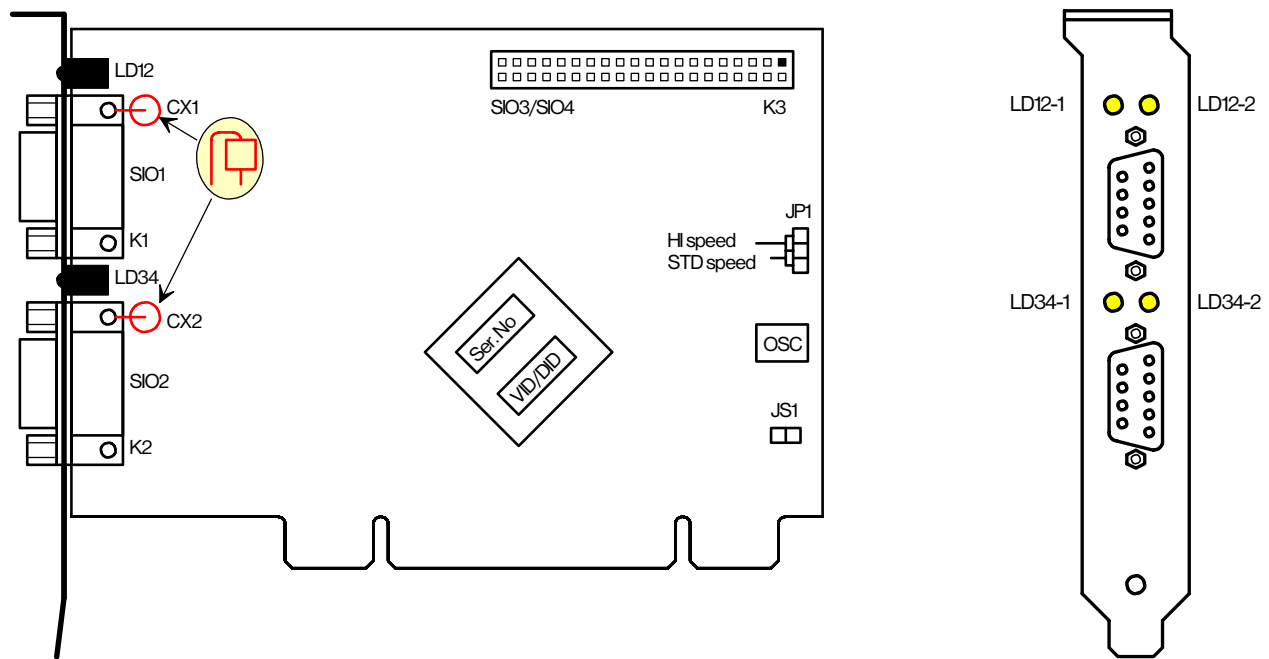
PCI-1232U   DID=950A; connector K3 is not present.

PCI-1234U   DID=9501; K3 are present for connecting of the expansion card.

PCI-1254U   Is 100% identical to PCI-1234U, but the set includes different expansion card.

Notes: *The DID label is located at the OXmPCI954, see the figure above.*

The PCI-1234U set includes the PCI card itself and the PCI-1023 expansion card (see description in page II-8) that provides COM3 and COM4.

The PCI-1254U set includes the PCI card itself and the PCI-1026 expansion card (see description in page II-10) that provides COM3 and COM4.

K1, K2   SIO1 and SIO2 communication ports (isolated RS-232)

K3   SIO3 and SIO4 communication ports
            (accessible through the PCI-1023/1026 expansion card)

LD12-1   SIO1 port activity indicating LED (RXD)

LD12-2   SIO1 port activity indicating LED (TXD)

LD34-1   SIO2 port activity indicating LED (RXD)

LD34-2   SIO2 port activity indicating LED (TXD)

JP1   UART oscillator selection
            (STD speed = 1.8432 MHz, HI speed = 14.7456 MHz)

JS1   Connector for service purposes only

CX1, CX2   Surge arrester (only at cards using the ESD-X2 or ESD-X4 optional extension)
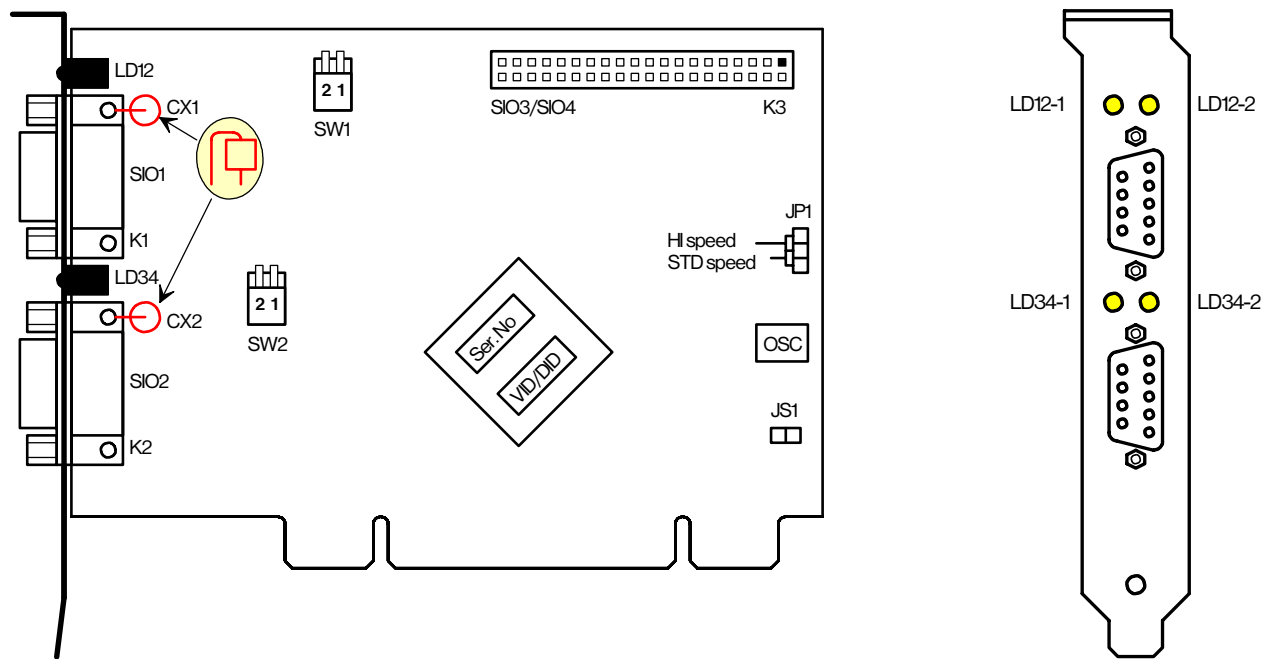
Figure 3.   Important Components at PCI-1414, PCI-1434U, PCI-1482U and PCI-1484U.

PCI-1414U   DID=9501; K3 is present for connecting of the expansion card.
PCI-1434U   Is 100% identical to PCI-1414U, but the set includes different expansion card.
PCI-1482U   DID=950A; K3 is not present.
PCI-1484U   Is 100% identical to PCI-1414U, but the set includes different expansion card.

Notes: *The DID label is located at the OXmPCI954, see the figure above.*

The PCI-1414U set includes the PCI card itself and the PCI-1026 expansion card (see description in page II-10) that provides COM3 and COM4.

The PCI-1434U set includes the PCI card itself and the PCI-1023 expansion card (see description in page II-8) that provides COM3 and COM4.

The PCI-1484U set includes the PCI card itself and the PCI-1024 expansion card (see description in page II-9) that provides COM3 and COM4.

K1, K2   SIO1 and SIO2 communication port connectors (isolated RS-422/485)
K3   SIO3 and SIO4 communication port connectors
            (accessible through the PCI-1026/1023/1024 expansion card)
LD12-1   SIO1 port activity indicating LED (RXD)
LD12-2   SIO1 port activity indicating LED (TXD)
LD34-1   SIO2 port activity indicating LED (RXD)
LD34-2   SIO2 port activity indicating LED (TXD)
JP1   UART oscillator selection
            (STD speed = 1.8432 MHz, HI speed = 14.7456 MHz)
JS1   Connector for service purposes only
SW1, SW2   DIP switch for hardware configuration (see Table 1., page II-4)
CX1, CX2   Surge arrester (only at cards using the ESD-X2 or ESD-X4 optional extension)
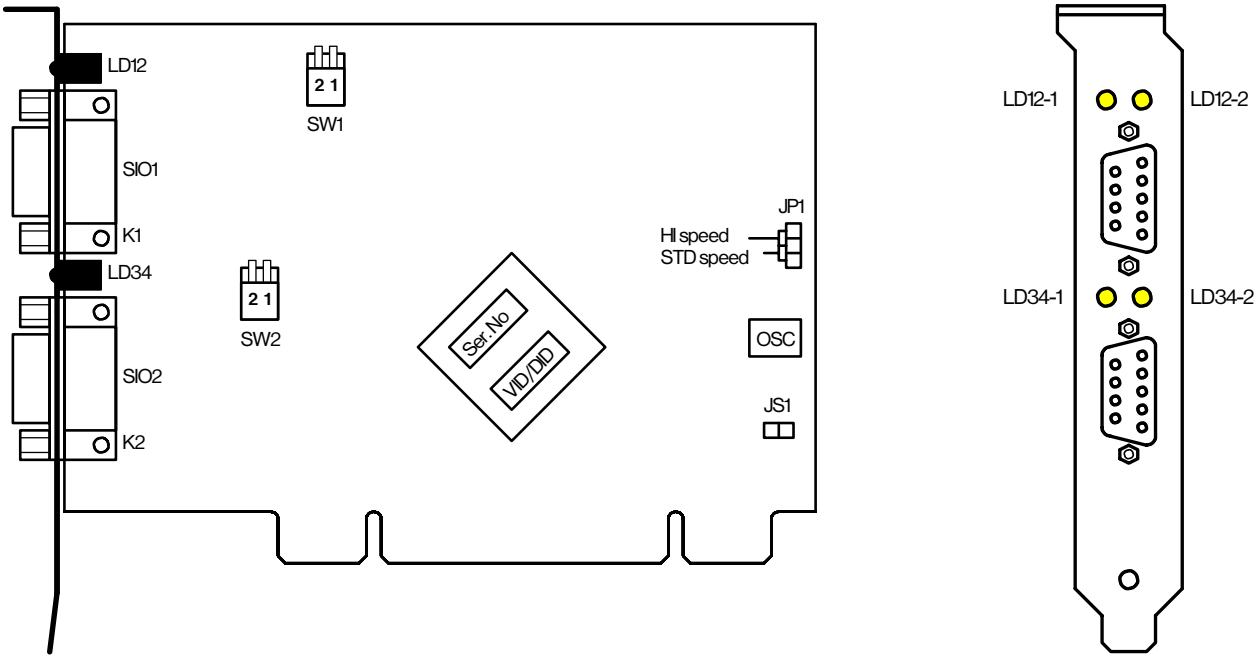
Figure 4.　　Important Components at PCI-1472U (DID=950A).

Note:　　　　*The DID label is located at the OXmPCI954, see the figure above.*

K1, K2　　　SIO1 a SIO2 communication port connectors (RS-422/485)
LD12-1　　　SIO1 port activity indicating LED (RXD)
LD12-2　　　SIO1 port activity indicating LED (TXD)
LD34-1　　　SIO2 port activity indicating LED (RXD)
LD34-2　　　SIO2 port activity indicating LED (TXD)
JP1　　　　　UART oscillator selection
　　　　　　　(STD speed = 1.8432 MHz, HI speed = 14.7456 MHz)
JS1　　　　　Connector for service purposes only
SW1, SW2　　DIP switch for hardware configuration (see table below)

| SW1, SW2 | | SW1 - SIO1 port settings |
segment 1	segment 2	SW2 - SIO2 port settings
ON	ON	RS-422 mode
ON	OFF	reserved
OFF	ON	RS-422 multimaster mode (four-wire RS-485)
OFF	OFF	RS-485 mode

Table 1.　　SW1 and SW2 switch configuration on PCI-1414U, PCI-1434U, PCI-1472U, PCI-1482U and PCI-1484U.
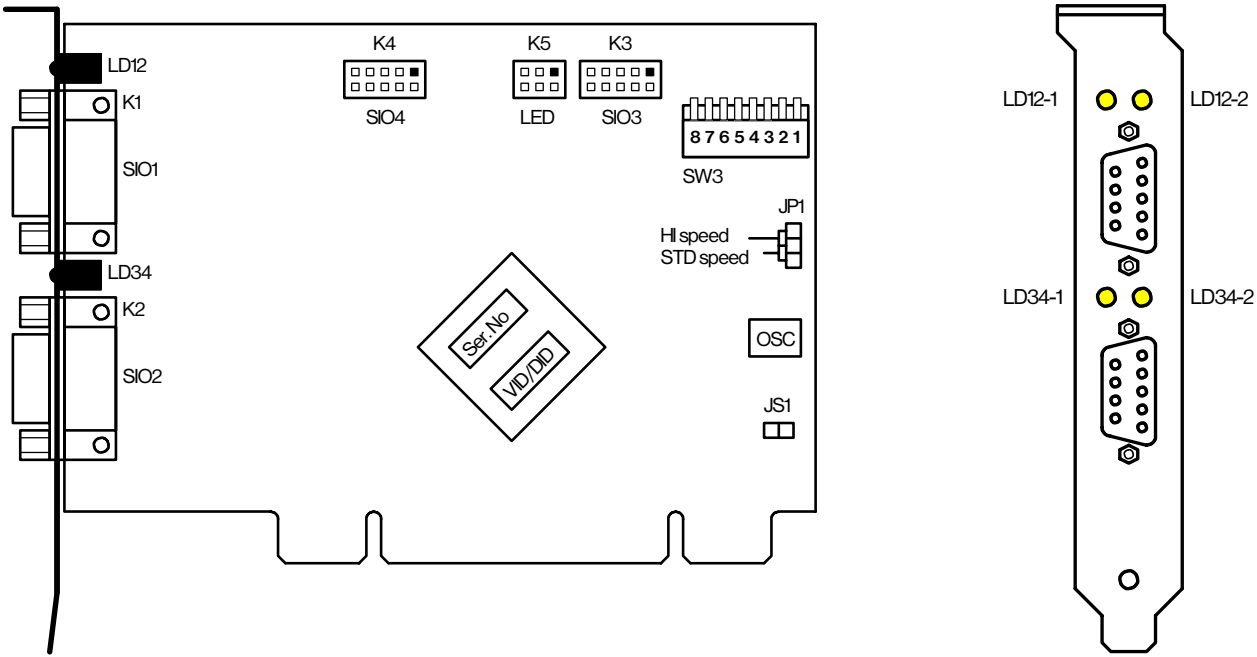
Figure 5.   Important Components at PCI-1474U (DID=9501).

Note: The PCI-1474U set includes the PCI card itself and the PCI-1029 expansion card (see description in page II-11) that provides COM3 and COM4.

K1, K2	SIO1 a SIO2 communication port connectors (RS-422/485)
K3, K4, K5	SIO3 a SIO4 communication port connectors (RS-422/485)
LD12-1	SIO1 port activity indicating LED (RXD)
LD12-2	SIO1 port activity indicating LED (TXD)
LD34-1	SIO2 port activity indicating LED (RXD)
LD34-2	SIO2 port activity indicating LED (TXD)
JP1	UART oscillator selection (STD speed = 1.8432 MHz, HI speed = 14.7456 MHz)
JS1	Connector for service purposes only
SW3	DIP switch for hardware configuration (see table below)

SW3		Description
segment 1	**segment 2**	**SIO1 port settings**
segment 3	**segment 4**	**SIO2 port settings**
segment 5	**segment 6**	**SIO3 port settings**
segment 7	**segment 8**	**SIO4 port settings**
ON	ON	RS-422 mode
ON	OFF	reserved
OFF	ON	RS-422 multimaster mode (four-wire RS-485)
OFF	OFF	RS-485 mode

Table 2.   SW3 switch configuration on PCI-1474U.
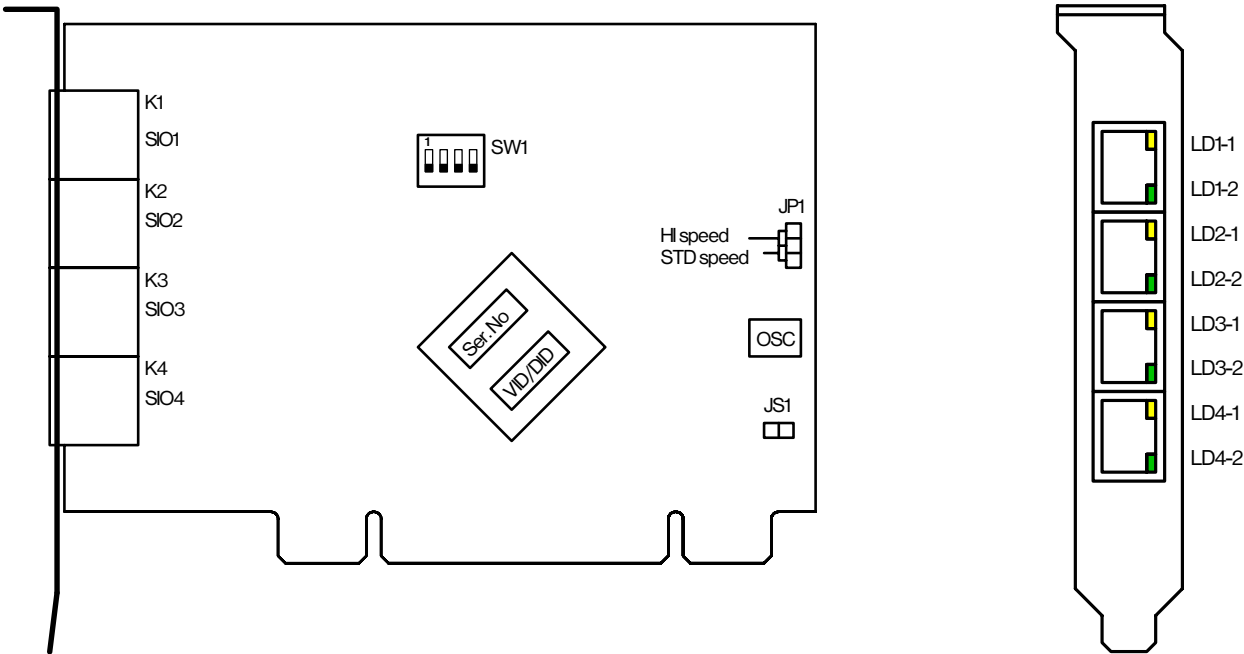
Figure 6.   Important Components at PCI-1824U (DID=9501).

K1÷K4	SIO1 - SIO4 communication port connectors
LD1-1	SIO1 port activity indicating LED (RXD)
LD1-2	SIO1 port activity indicating LED (TXD)
LD2-1	SIO2 port activity indicating LED (RXD)
LD2-2	SIO2 port activity indicating LED (TXD)
LD3-1	SIO3 port activity indicating LED (RXD)
LD3-2	SIO3 port activity indicating LED (TXD)
LD4-1	SIO4 port activity indicating LED (RXD)
LD4-2	SIO4 port activity indicating LED (TXD)
JP1	UART oscillator selection
	(STD speed = 1.8432 MHz, HI speed = 14.7456 MHz)
JS1	Connector for service purposes only
SW1	DIP switch for hardware configuration (see table below)

SW1				SIO1÷SIO4 port settings
1	**2**	**3**	**4**	
ON	- - -	- - -	- - -	SIO1, RI signal tied to DSR
OFF	- - -	- - -	- - -	SIO1, RI signal set to "low" permanently
- - -	ON	- - -	- - -	SIO2, RI signal tied to DSR
- - -	OFF	- - -	- - -	SIO2, RI signal set to "low" permanently
- - -	- - -	ON	- - -	SIO3, RI signal tied to DSR
- - -	- - -	OFF	- - -	SIO3, RI signal set to "low" permanently
- - -	- - -	- - -	ON	SIO4, RI signal tied to DSR
- - -	- - -	- - -	OFF	SIO4, RI signal set to "low" permanently

Table 3.   SW1 switch configuration on PCI-1824U.

Figure 7. Important Components at PCI-1884U (DID=9501).

K1÷K4	SIO1 - SIO4 communication port connectors
LD x-x	Port activity LEDs are identical to PCI-1824U (see previous page)
JP1	The UART clock frequency selection
	(STD speed = 1.8432 MHz, HI speed = 14.7456 MHz)
JS1	Connector for service purposes only
SW1÷SW4	DIP switch for hardware configuration (see table below); every port is configured by one switch (SW1÷SW4 for SIO1÷SIO4).
SW5	DIP switch for hardware configuration; every port is being configured by one DIP switch segment; segment 1 configures SIO1:

    ON   = RS-422/485 driver is driven by DTR, or automatically
                   (RS-485 or RS-422 multimaster mode)
    OFF = RS-422/485 driver is permanently on (default when using RS-422)
    segments 2.÷4. configure SIO2÷SIO4 analogically

SW1, SW2, SW3, SW4				SWx - SIOx port settings
1	**2**	**3**	**4**	
ON	- - -	- - -	- - -	RXD RS-422 termination resistor connected
OFF	- - -	- - -	- - -	RXD RS-422 termination resistor disconnected
- - -	ON	ON	- - -	TXD RS-422 (or RXD/TXD RS-485) "active" termination impedance connected
- - -	OFF	OFF	- - -	TXD RS-422 (or RXD/TXD RS-485) "active" termination impedance disconnected
- - -	- - -	- - -	ON	RS-422 mode (standard or multimaster)
- - -	- - -	- - -	OFF	RS-485 mode

Table 4. SW1÷SW4 switch configuration on PCI-1884U.
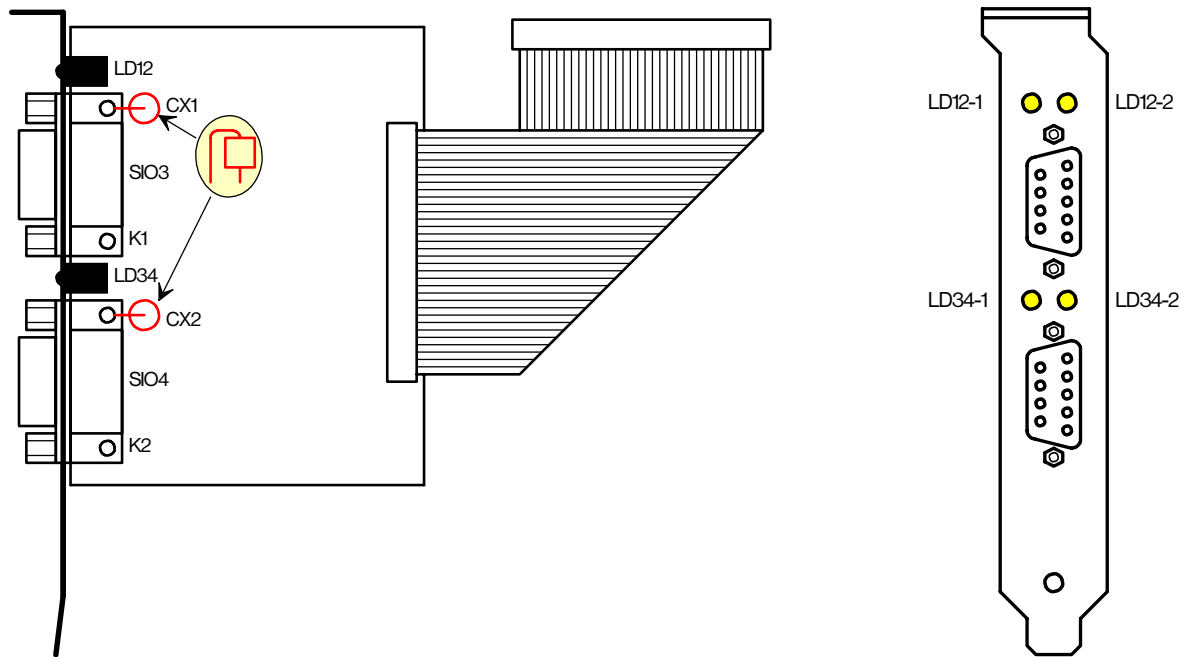
Figure 8.   Important Components at PCI-1023.

Note: The PCI-1023 expansion card is included in the PCI-1234U or PCI-1434U set (see page II-2 and II-3).

K1, K2   SIO3 and SIO4 communication port connectors
LD12-1   SIO1 port activity indicating LED (RXD)
LD12-2   SIO1 port activity indicating LED (TXD)
LD34-1   SIO2 port activity indicating LED (RXD)
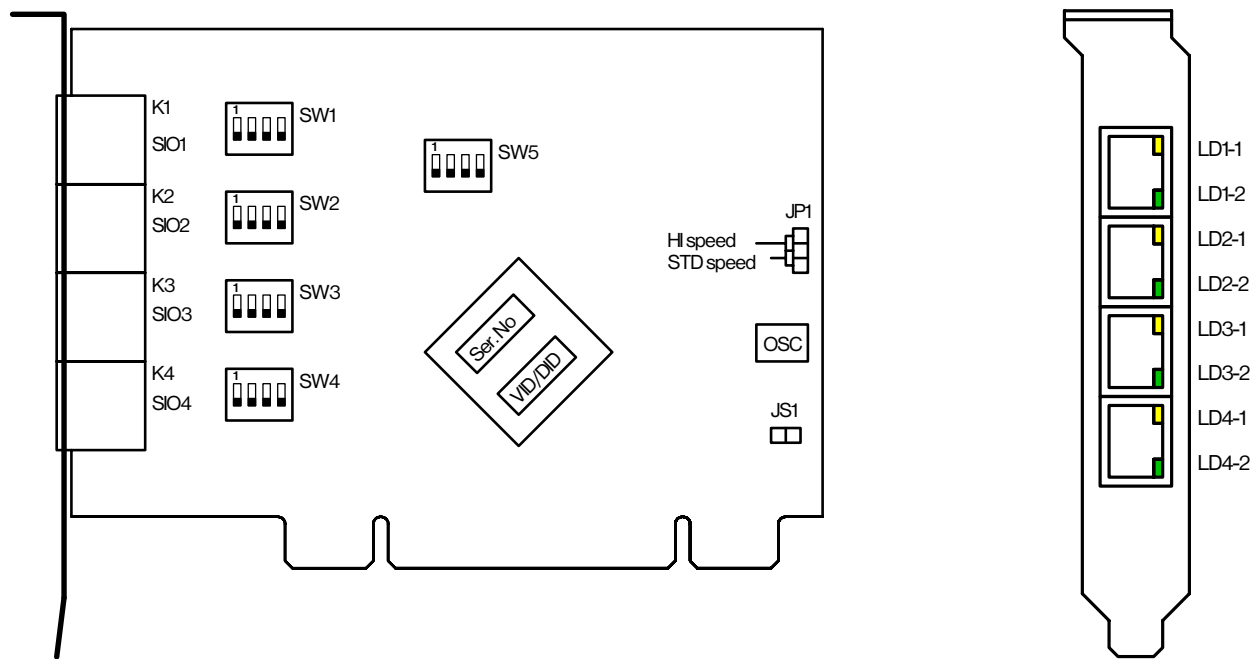LD34-2   SIO2 port activity indicating LED (TXD)
CX1, CX2   Surge arrester (only at cards using the ESD-X2 or ESD-X4 optional extension)

Figure 9.   Important Components at PCI-1024.

Note: *The PCI-1024 expansion card is included in the PCI-1484U set (see page II-3).*

K1, K2	SIO3 and SIO4 communication port connectors
LD12-1	SIO1 port activity indicating LED (RXD)
LD12-2	SIO1 port activity indicating LED (TXD)
LD34-1	SIO2 port activity indicating LED (RXD)
LD34-2	SIO2 port activity indicating LED (TXD)
CX1, CX2	Surge arrester (only at cards using the ESD-X2 or ESD-X4 optional extension)

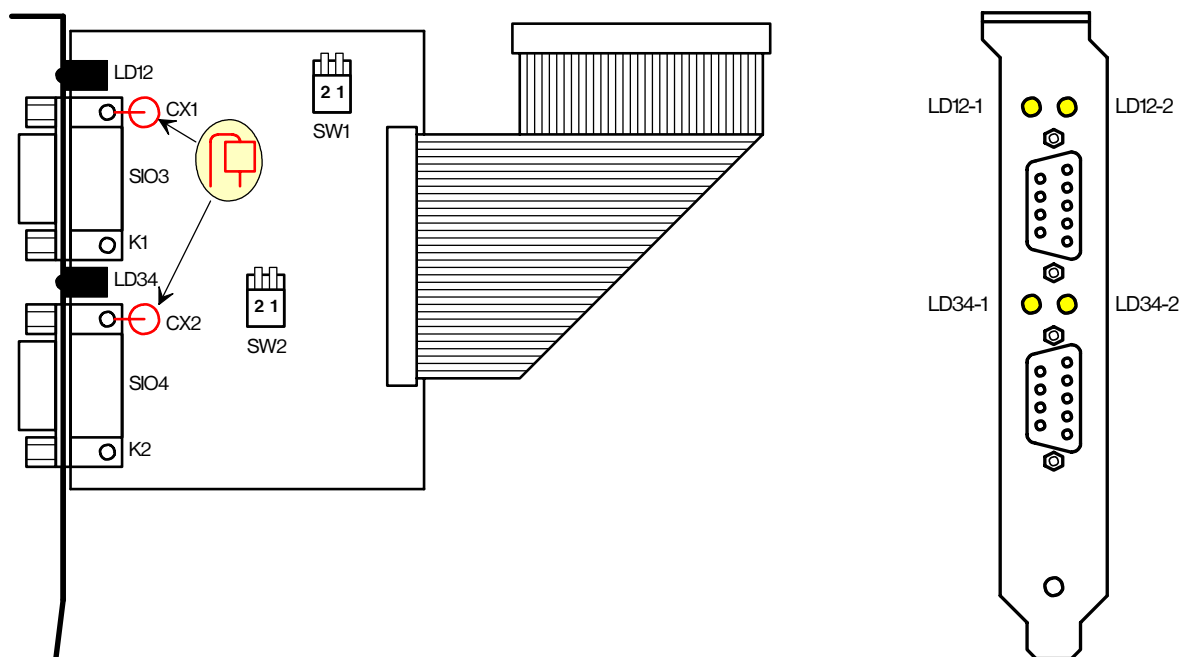| SW1, SW2		SW1 - SIO3 port settings
segment 1	**segment 2**	SW2 - SIO4 port settings
ON	ON	RS-422 mode
ON	OFF	reserved
OFF	ON	RS-422 multimaster mode (four-wire RS-485)
OFF	OFF	RS-485 mode

Table 5.   SW1 and SW2 switch configuration on PCI-1024 and PCI-1026.
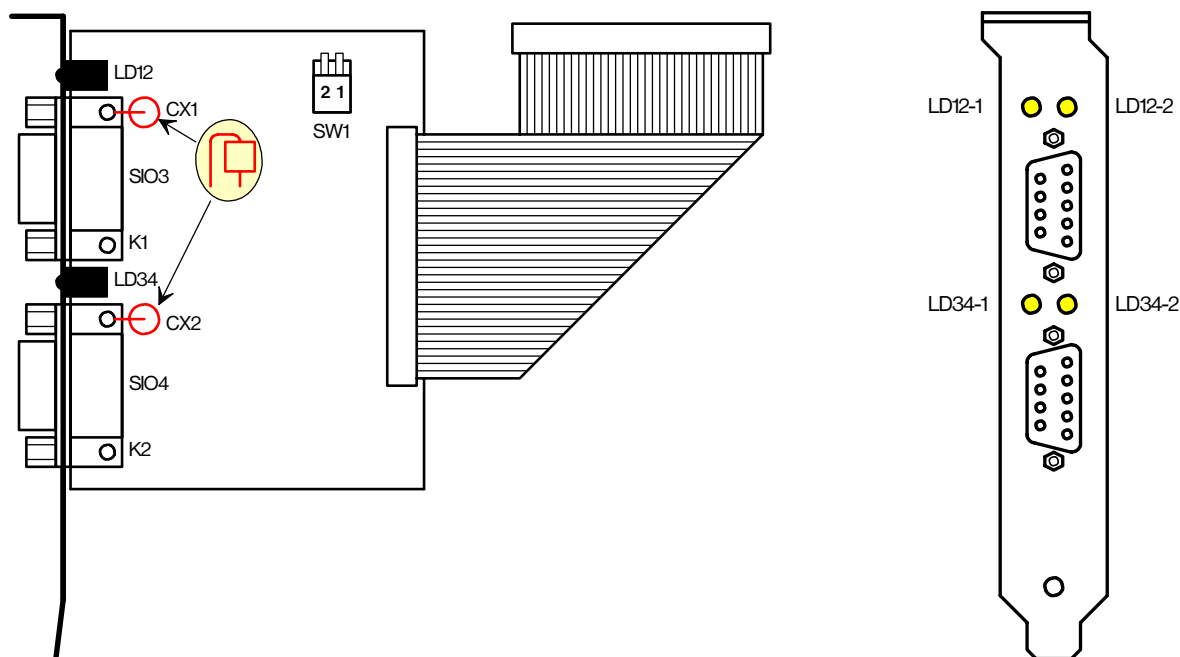
Figure 10.   Important Components at PCI-1026.

Note: The PCI-1026 expansion card is included in the PCI-1254U or PCI-1414U set (see page II-2 and II-3).

K1	SIO3 communication port connector (isolated RS-422/485)
K2	SIO4 communication port connector (isolated RS-232)
LD12-1	SIO3 port activity indicating LED (RXD)
LD12-2	SIO3 port activity indicating LED (TXD)
LD34-1	SIO4 port activity indicating LED (RXD)
LD34-2	SIO4 port activity indicating LED (TXD)
SW1, SW2	DIP switch for hardware configuration (see Table 5., page II-9)
CX1, CX2	Surge arrester (only at cards using the ESD-X2 or ESD-X4 optional extension)
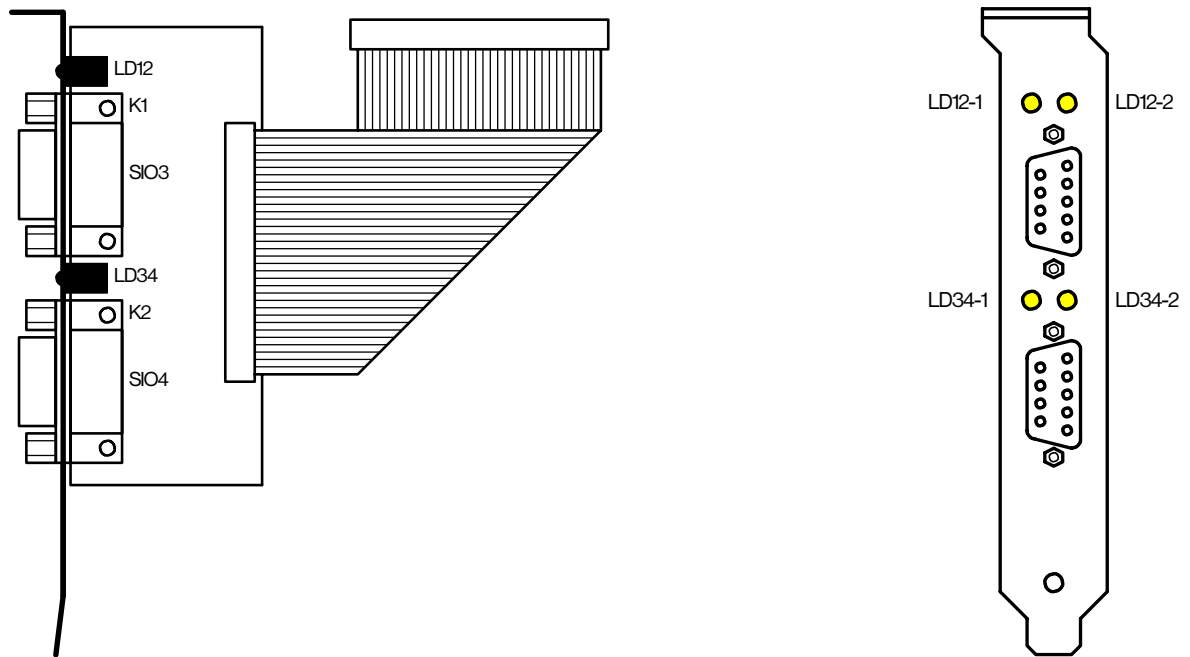
Figure 11. Important Components at PCI-1029.

Note: *The PCI-1029 expansion card is included in the PCI-1224U or PCI-1474U set (see page II-1 and II-5).*

K1, K2	SIO3 and SIO4 communication port connectors
LD12-1	SIO3 port activity indicating LED (RXD)
LD12-2	SIO3 port activity indicating LED (TXD)
LD34-1	SIO4 port activity indicating LED (RXD)
LD34-2	SIO4 port activity indicating LED (TXD)

RS-232 Pinout	D-Sub 9	RJ45
DCD	1	2
RXD	2	5
TXD	3	6
DTR	4	3
GND (common ground)	5	4
DSR	6	1
RTS	7	8
CTS	8	7
RI	9	- - -

Table 6.   RS-232 Connector Pinout.

Note: *The RI signal at the RJ45 connector cards may be alternatively tied to DSR or set permanently to "low" state. See description in page II-6.*

RS-422 Pinout	RS-485 Pinout	D-Sub 9	RJ45
GND (common ground)		1	3, 4, 5 a 6
termination impedance for RXD+		2	(DIP switch)
termination impedance for RXD-		3	(DIP switch)
termination impedance for TXD+ (or TXD/RXD+)		4	(DIP switch)
termination impedance for TXD- (or TXD/RXD-)		5	(DIP switch)
RXD+ (B)	- - -	6	7
RXD- (A)	- - -	7	8
TXD+ (B)	TXD/RXD+ (B)	8	1
TXD- (A)	TXD/RXD- (A)	9	2

Table 7.   RS-422/485 Connector Pinout.

Note: *The circuit schematics including the termination resistors topology is shown in Figure 12. and Figure 13.*
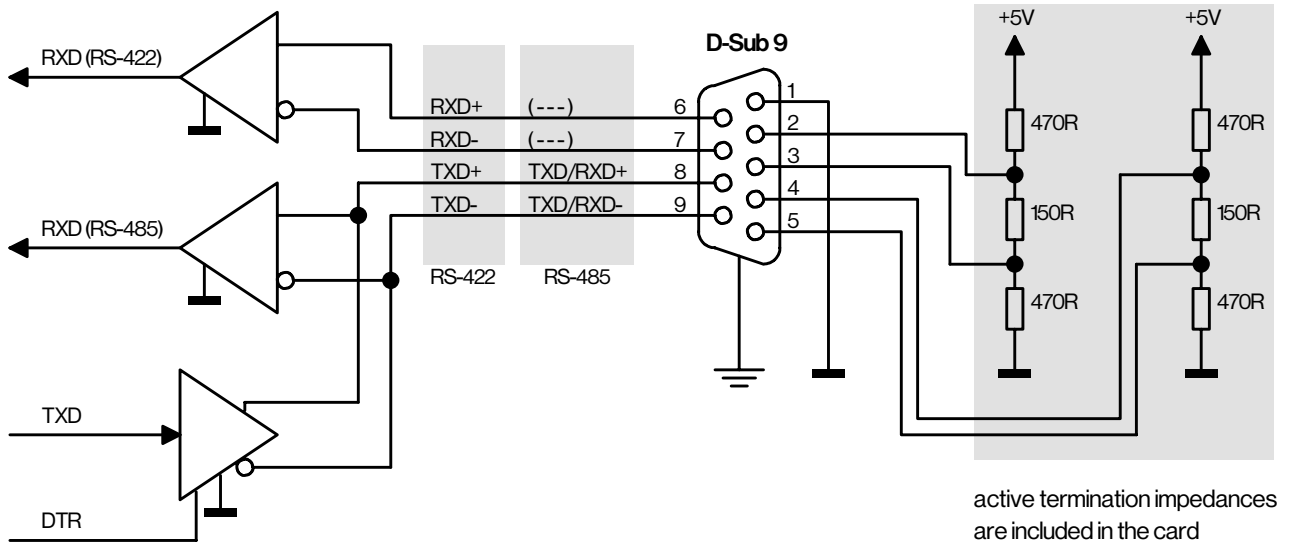
Figure 12.   Internal circuit schematics of the RS-422/485 interface using the D-Sub 9 connectors.
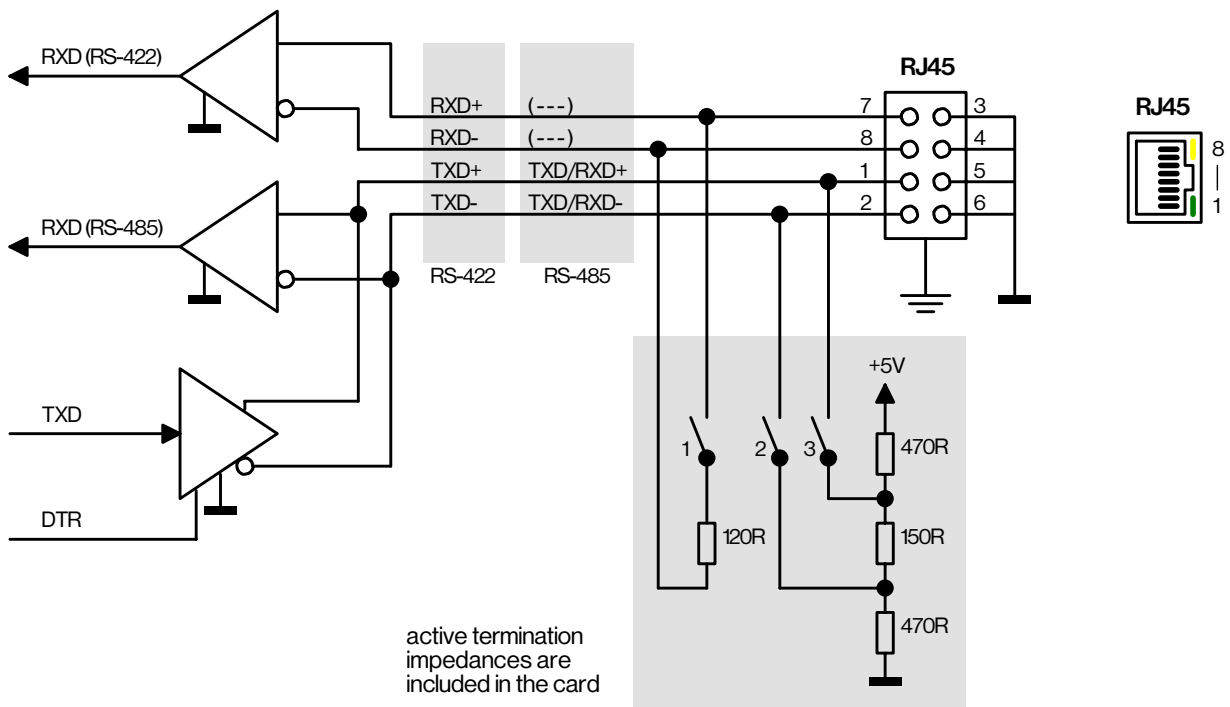
Figure 13.   Internal circuit schematics of the RS-422/485 interface using the RJ45 connectors.
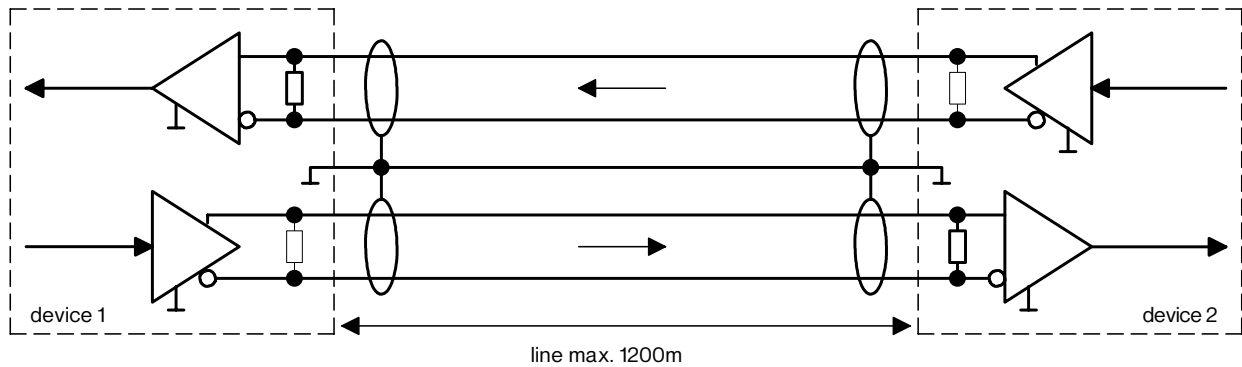
Figure 14.   Schematics of Typical RS-422 Line with the Point-To-Point Topology.

Note: *The line utilizes two shielded pairs (see Chapter 3.7.). The termination resistors on the driver side are not necessary when using the standard mode. When using the multimaster mode, the requirements are analogical to the RS-485 line.*
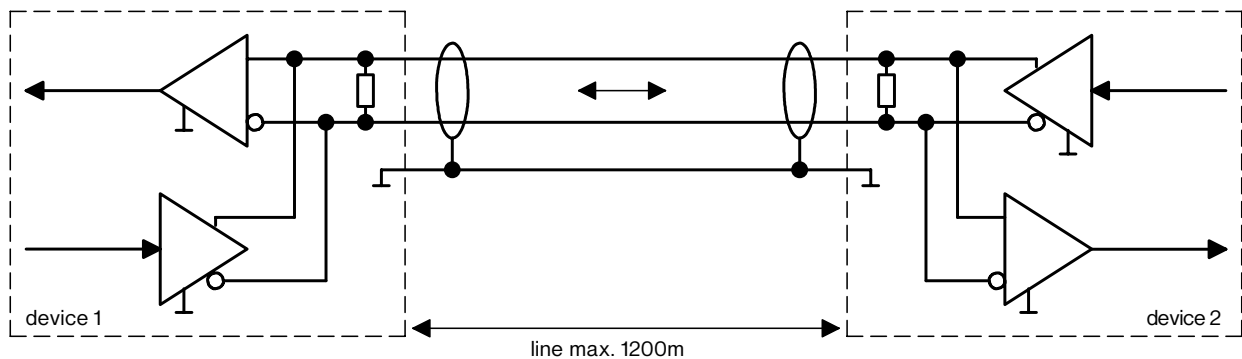
Figure 15.   Schematics of Typical RS-485 Line with the Point-To-Point Topology.

Note: *The line utilizes one shielded pair (see Chapter 3.7.). The termination resistors are shown as passive here, but at least one of them should have active topology (see Figure 12.).*

Figure 16.   Schematics of RS-485 Network with the Segment Topology.

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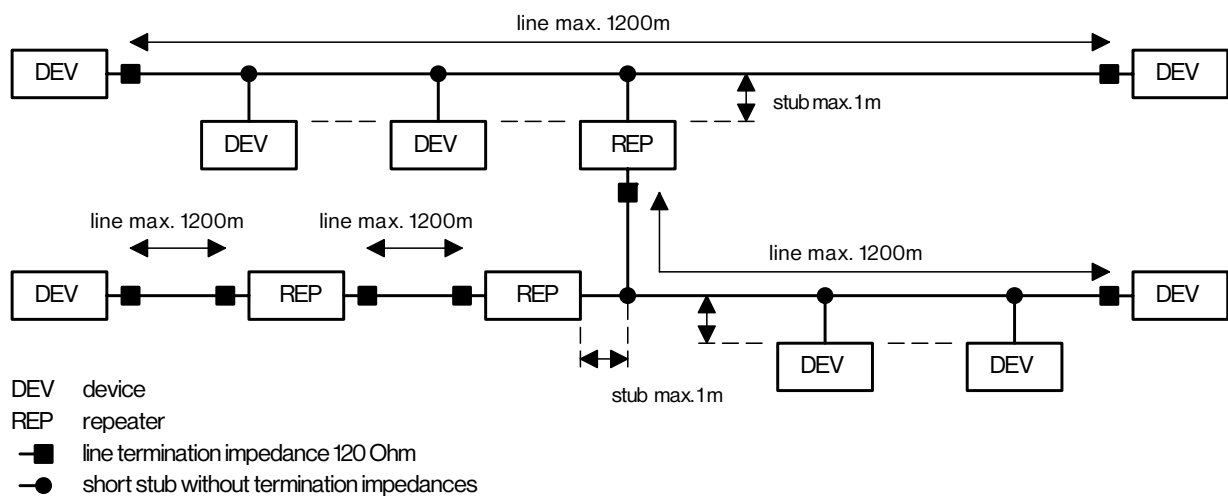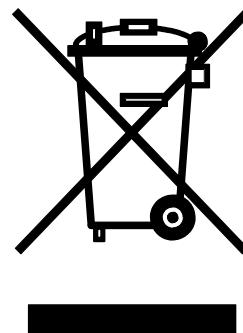
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Developement, manufacturing, sales office, service center,
technical support and headquarters:

address:	TEDIA® spol. s r. o.
	Zábělská 12
	31211 Plzeň
	Czech Republic
phone:	+420 373730431 (general number, sales office)
	+420 373730436 (technical support)
fax:	+420 373730430
e-mail:	sales@tedia.eu
	support@tedia.eu
internet:	http://www.tedia.eu