

# NI Serial Hardware Specifications Guide

This document lists safety and compliance information for NI Serial hardware, as well as physical specifications, software characteristics, and recommended operating conditions.

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## Safety and Radio-Frequency Interference

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This section contains safety instructions and information about the radio-frequency interference characteristics of the hardware it accompanies. Read this section before installing and using the new hardware.

### Safety Information

This section contains important safety information that you *must* follow when installing and using the module.

Do *not* operate the module in a manner not specified in this document. Misuse of the module can result in a hazard. You can compromise the safety protection built into the module if the module is damaged in any way. If the module is damaged, return it to National Instruments (NI) for repair.

Do *not* substitute parts or modify the module except as described in this document. Use the module only with the chassis, modules, accessories, and cables specified in the installation instructions. You *must* have all covers and filler panels installed during operation of the module.

Do *not* operate the module in an explosive atmosphere or where there may be flammable gases or fumes. If you must operate the module in such an environment, it must be in a suitably rated enclosure.

If you need to clean the module, use a soft, nonmetallic brush. Make sure that the module is completely dry and free from contaminants before returning it to service.

Operate the module only at or below Pollution Degree 2. Pollution is foreign matter in a solid, liquid, or gaseous state that can reduce dielectric strength or surface resistivity. The following is a description of pollution degrees:

- Pollution Degree 1 means no pollution or only dry, nonconductive pollution occurs. The pollution has no influence.
- Pollution Degree 2 means that only nonconductive pollution occurs in most cases. Occasionally, however, a temporary conductivity caused by condensation must be expected.
- Pollution Degree 3 means that conductive pollution occurs, or dry, nonconductive pollution occurs that becomes conductive due to condensation.

You *must* insulate signal connections for the maximum voltage for which the module is rated. Do *not* exceed the maximum ratings for the module. Do not install wiring while the module is live with electrical signals. Do not remove or add connector blocks when power is connected to the system. Avoid contact between your body and the connector block signal when hot swapping modules. Remove power from signal lines before connecting them to or disconnecting them from the module.

## **Compliance with FCC/Canada Radio Frequency Interference Regulations**

### **Determining FCC Class**

The Federal Communications Commission (FCC) has rules to protect wireless communications from interference. The FCC places digital electronics into two classes. These classes are known as Class A (for use in industrial-commercial locations only) or Class B (for use in residential or commercial locations). All National Instruments (NI) products are FCC Class A products.

Depending on where it is operated, this Class A product could be subject to restrictions in the FCC rules. (In Canada, the Department of Communications (DOC), of Industry Canada, regulates wireless interference in much the same way.) Digital electronics emit weak signals during normal operation that can affect radio, television, or other wireless products.

All Class A products display a simple warning statement of one paragraph in length regarding interference and undesired operation. The FCC rules have restrictions regarding the locations where FCC Class A products can be operated.

Consult the FCC Web site at [www.fcc.gov](http://www.fcc.gov) for more information.

## **FCC/DOC Warnings**

This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual and the CE marking Declaration of Conformity<sup>1</sup>, may cause interference to radio and television reception. Classification requirements are the same for the Federal Communications Commission (FCC) and the Canadian Department of Communications (DOC).

Changes or modifications not expressly approved by NI could void the user's authority to operate the equipment under the FCC Rules.

## **Class A**

### **Federal Communications Commission**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at their own expense.

### **Canadian Department of Communications**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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<sup>1</sup> The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

## Compliance with EU Directives

Users in the European Union (EU) should refer to the Declaration of Conformity (DoC) for information<sup>1</sup> pertaining to the CE marking. Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.



**Caution** If the NI Serial hardware is used in a manner inconsistent with the instructions or specifications listed by National Instruments, the protective features of the chassis may be impaired.

## PCI Serial Hardware

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This section describes the characteristics of the PCI serial hardware and the recommended operating conditions.



**Note** This equipment is intended for indoor use only.

## Safety

This product is designed to meet the requirements of the following standards of safety for information technology equipment:

- IEC 60950-1, EN 60950-1
- UL 60950-1, CSA 60950-1



**Note** For UL and other safety certifications, refer to the product label or visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



**Note** For EMC compliance, operate this device with shielded cabling. In addition, all covers and filler panels must be installed.

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<sup>1</sup> The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)



**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee.htm](http://ni.com/environment/weee.htm).

## PCI-843x Series Hardware

### Nonisolated PCI Two-Port Boards

Dimensions..... 10.67 × 14.22 cm  
(4.2 × 5.6 in.)

I/O connector..... DB-9

Power requirement (from PCI channel)

PCI-8430/2

+5 VDC..... 325 mA typical  
500 mA maximum

PCI-8431/2

+5 VDC..... 500 mA typical  
700 mA maximum

### Nonisolated PCI Four-Port Boards

Dimensions..... 10.67 × 14.22 cm  
(4.2 × 5.6 in.)

I/O connector<sup>1</sup> ..... 10-position modular jack

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<sup>1</sup> The four-port PCI serial boards require cables, which are included in your kit, to convert the 68-position connector to eight DB-9 connectors.

Power requirement (from PCI channel)

PCI-8430/4

+5 VDC .....400 mA typical  
600 mA maximum

PCI-8431/4

+5 VDC .....725 mA typical  
1.1 A maximum

## Nonisolated PCI Eight-Port Boards

Dimensions .....10.67 × 14.48 cm  
(4.2 × 5.7 in.)

I/O connector<sup>1</sup> .....68-position, SCSI type connector

Power requirement (from PCI channel)

PCI-8430/8

+5 VDC .....600 mA typical  
900 mA maximum

PCI-8431/8

+5 VDC .....1.3 A typical  
1.9 A maximum

## Nonisolated PCI 16-Port Boards

Dimensions .....10.67 × 17.52 cm  
(4.2 × 6.9 in.)

I/O connector<sup>2</sup> .....68-position, VHDCI × 2

Power requirement (from PCI channel)

PCI-8430/16

+5 VDC .....935 mA typical  
1.4 A maximum

## Isolated PCI Two-Port Boards

Dimensions .....10.67 × 17.52 cm  
(4.2 × 6.9 in.)

I/O connector .....DB-9

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<sup>1</sup> The eight-port PCI serial boards require a cable, which is included in your kit, to convert the 68-position connector to eight DB-9 connectors.

<sup>2</sup> The 16-port PCI serial boards require two cables, which are included in your kit, to convert the two 68-position connectors to the 16 (2 × 8) DB-9 connectors.

Rated voltage, continuous

RS-485 .....	-7 to +12 V
RS-232 .....	-25 to +25 V

Isolation voltage, noncontinuous (withstand)

From port.....	2,000 V <sub>rms</sub> /60 s
From any port to host computer.....	2,000 V <sub>rms</sub> /60 s

Power requirement (from PCI channel)

PCI-8432/2	
+5 VDC.....	380 mA typical 570 mA maximum

PCI-8433/2	
+5 VDC.....	380 mA typical 570 mA maximum

## Isolated PCI Four-Port Boards

Dimensions.....	10.67 × 17.44 cm (4.2 × 6.9 in.)
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I/O connector<sup>1</sup> ..... 10-position modular jack

Rated voltage, continuous

RS-485 .....	-7 to +12 V
RS-232 .....	-25 to +25 V

Isolation voltage, noncontinuous (withstand)

From port.....	2,000 V <sub>rms</sub> /60 s
From any port to host computer.....	2,000 V <sub>rms</sub> /60 s

Power requirement (from PCI channel)

PCI-8432/4	
+5 VDC.....	550 mA typical 815 mA maximum

PCI-8433/4	
+5 VDC.....	785 mA typical 1.2 A maximum

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<sup>1</sup> The four-port PCI serial boards require cables, which are included in your kit, to convert the 10-position modular jacks to DB-9 connectors.

# Legacy PCI Hardware

## Nonisolated PCI Two-Port Boards

Dimensions .....	10.67 × 14.22 cm (4.2 × 5.6 in.)
I/O connector .....	DB-9
Power requirement (from PCI channel)	
PCI-485/2	
+5 VDC .....	350 mA typical 750 mA maximum
PCI-232/2	
+5 VDC .....	50 mA typical 100 mA maximum
±12 VDC .....	20 mA typical 200 mA maximum

## Nonisolated PCI Four-Port Boards

Dimensions .....	10.67 × 14.22 cm (4.2 × 5.6 in.)
I/O connector <sup>1</sup> .....	10-position modular jack
Power requirement (from PCI channel)	
PCI-485/4	
+5 VDC .....	700 mA typical 1.3 A maximum
PCI-232/4	
+5 VDC .....	70 mA typical 150 mA maximum
±12 VDC .....	40 mA typical 400 mA maximum

## Nonisolated PCI Eight-Port Boards

Dimensions .....	10.67 × 14.48 cm (4.2 × 5.7 in.)
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<sup>1</sup> The four-port legacy PCI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 connectors.

I/O connector<sup>1</sup> ..... 68-position, SCSI type connector

Power requirement (from PCI channel)

PCI-485/8

+5 VDC..... 1.1 A typical  
2.0 A maximum

PCI-232/8

+5 VDC..... 100 mA typical  
180 mA maximum

±12 VDC..... 80 mA typical  
800 mA maximum

## Nonisolated PCI 16-Port Boards

Dimensions..... 10.67 × 17.52 cm  
(4.2 × 6.9 in.)

I/O connector<sup>2</sup> ..... 100-position, SCSI type  
connector

Power requirement (from PCI channel)

PCI-232/16

+5 VDC..... 250 mA typical  
500 mA maximum

## Isolated PCI Two-Port Boards

Dimensions..... 10.67 × 17.52 cm  
(4.2 × 6.9 in.)

I/O connector..... DB-9

Rated voltage, continuous

RS-485 ..... -7 to +12 V

RS-232 ..... -25 to +25 V

Isolation voltage, noncontinuous (withstand)

From port to port..... 2,000 V<sub>rms</sub>/60 s

From any port to host computer..... 2,000 V<sub>rms</sub>/60 s

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<sup>1</sup> The eight-port legacy PCI serial boards require a cable, which is included in your kit, to convert the 68-position connector to eight DB-9 connectors.

<sup>2</sup> The 16-port legacy PCI serial boards require a breakout box, which is included in your kit, to separate the 100-position connector to 16 DB-9 connectors.

Power requirement (from PCI channel)

PCI-485/2	
+5 VDC .....	800 mA typical 1.3 A maximum
PCI-232/2	
+5 VDC .....	400 mA typical 650 mA maximum

## Isolated PCI Four-Port Boards

Dimensions .....	10.67 × 17.44 cm (4.2 × 6.9 in.)
I/O connector <sup>1</sup> .....	10-position modular jack
Rated voltage, continuous	
RS-485 .....	-7 to +12 V
RS-232 .....	-25 to +25 V
Isolation voltage, noncontinuous (withstand)	
From port to port .....	2,000 V <sub>rms</sub> /60 s
From any port to host computer .....	2,000 V <sub>rms</sub> /60 s

Power requirement (from PCI channel)

PCI-485/4	
+5 VDC .....	1.0 A typical 1.5 A maximum
PCI-232/4	
+5 VDC .....	500 mA typical 750 mA maximum

## Environmental Characteristics

### Operating Environment

Ambient temperature .....	0 to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)

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<sup>1</sup> The four-port legacy PCI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 connectors.

Altitude (maximum)..... 2,000 m

## Storage Environment

Ambient temperature..... -20 to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity ..... 5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

## Other Specifications

Maximum cable length

RS-485<sup>1</sup> ..... 30 m (limited by EMC/surge)

RS-232 ..... 2,500 pF equivalent (TIA-EIA-232-F 2.1.4)

Data line ESD protection (human body model)

RS-485 ..... ± 15 kV

RS-232 ..... ± 15 kV

## PXI Serial Hardware

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This section describes the characteristics of the PXI serial hardware and the recommended operating conditions.



**Note** This equipment is intended for indoor use only.

## Safety

This product is designed to meet the requirements of the following standards of safety for information technology equipment:

- IEC 60950-1, EN 60950-1
- UL 60950-1, CSA 60950-1



**Note** For UL and other safety certifications, refer to the product label or visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

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<sup>1</sup> RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

## Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



**Note** For EMC compliance, operate this device with shielded cabling. In addition, all covers and filler panels must be installed.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)



**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee.htm](http://ni.com/environment/weee.htm).

## PXI-843x Serial Hardware

### Nonisolated PXI Two-Port Boards

Dimensions ..... 100 × 160 mm  
(3.94 × 6.37 in.)

I/O connector ..... DB-9

Power requirement (from PXI channel)

PXI-8430/2

+5 VDC ..... 325 mA typical  
500 mA maximum

PXI-8431/2	
+5 VDC.....	500 mA typical 750 mA maximum

## Nonisolated PXI Four-Port Boards

Dimensions.....	100 × 160 mm (3.94 × 6.37 in.)
I/O connector <sup>1</sup> .....	10-position modular jack

### Power requirement (from PXI channel)

PXI-8430/4	
+5 VDC.....	400 mA typical 600 mA maximum
PXI-8431/4	
+5 VDC.....	725 mA typical 1.1 A maximum

## Nonisolated PXI Eight-Port Boards

Dimensions.....	100 × 160 mm (3.94 × 6.37 in.), 3U
I/O connector <sup>2</sup> .....	68-position SCSI (68-pin SCSI to eight DB-9 adapter cable included)

### Power requirement (from PXI channel)

PXI-8430/8	
+5 VDC.....	1 A typical 1.5 A maximum
PXI-8431/8	
+5 VDC.....	925 mA typical 1.4 A maximum

## Nonisolated PXI 16-Port Boards

Dimensions.....	100 × 160 mm (3.94 × 6.37 in.), 3U
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<sup>1</sup> The four-port PXI serial boards require cables, which are included in your kit, to convert the 10-position modular jacks to DB-9 connectors.

<sup>2</sup> The eight-port PXI serial boards require a cable, which is included in your kit, to convert the 68-position connector to eight DB-9 connectors.

I/O connector<sup>1</sup> .....68-position VHDCI × 2

Power requirement (from PXI channel)

PXI-8430/16

+5 VDC .....935 mA typical  
1.4 A maximum

## Isolated PXI Two-Port Boards

Dimensions .....100 × 160 mm  
(3.94 × 6.37 in.), 3U

I/O connector .....DB-9 × 2

Rated voltage, continuous

RS-485 .....-7 to +12 V

RS-232 .....-25 to +25 V

Isolation voltage, noncontinuous (withstand)

From port to port .....2,000 V<sub>rms</sub>/60 s

From any port to host computer .....2,000 V<sub>rms</sub>/60 s

Power requirement (from PXI channel)

PXI-8432/2

+5 VDC .....725 mA typical  
1 A maximum

PXI-8433/2

+5 VDC .....725 mA typical  
1 A maximum

## Isolated PXI Four-Port Boards

Dimensions .....100 × 160 mm  
(3.94 × 6.37 in.), 3U

I/O connector<sup>2</sup> .....10-position modular jack  
(RJ-50) × 4

Rated voltage, continuous

RS-485 .....-7 to +12 V

RS-232 .....-25 to +25 V

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<sup>1</sup> The 16-port PXI serial boards require two cables, which are included in your kit, to convert the two 68-position connectors to the 16 (2 × 8) DB-9 connectors.

<sup>2</sup> The four-port PXI serial boards require cables, which are included in your kit, to convert the 10-position modular jacks to DB-9 connectors.

Isolation voltage, noncontinuous (withstand)	
From port.....	2,000 V <sub>rms</sub> /60 s
From any port to host computer.....	2,000 V <sub>rms</sub> /60 s
Power requirement (from PXI channel)	
PXI-8432/4	
+5 VDC.....	925 mA typical 2 A maximum
PXI-8433/4	
+5 VDC.....	950 mA typical 2 A maximum

## Environmental Characteristics

### Operating Environment

Ambient temperature.....	0 to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Altitude (maximum).....	2,000 m

### Storage Environment

Ambient temperature.....	-20 to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

## Other Specifications

Maximum cable length	
RS-485 <sup>1</sup> .....	30 m (limited by EMC/surge)
RS-232 .....	2,500 pF equivalent (TIA-EIA-232-F 2.1.4)

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<sup>1</sup> RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

Data line ESD protection (human body model)	
RS-485 .....	± 15 kV
RS-232 .....	± 15 kV

## Legacy PXI Serial Hardware

### Nonisolated PXI Two-Port Boards

Dimensions .....	100 × 160 mm (3.94 × 6.37 in.)
I/O connector .....	DB-9
Power requirement (from PXI channel)	
PXI-8420/2	
+5 VDC .....	100 mA typical 150 mA maximum
±12 VDC .....	20 mA typical 200 mA maximum
PXI-8421/2	
+5 VDC .....	350 mA typical 750 mA maximum

### Nonisolated PXI Four-Port Boards

Dimensions .....	100 × 160 mm (3.94 × 6.37 in.)
I/O connector <sup>1</sup> .....	10-position modular jack
Power requirement (from PXI channel)	
PXI-8420/4	
+5 VDC .....	125 mA typical 200 mA maximum
±12 VDC .....	40 mA typical 400 mA maximum
PXI-8421/4	
+5 VDC .....	350 mA typical 750 mA maximum

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<sup>1</sup> The four-port legacy PXI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 connectors.

## Nonisolated PXI Eight-Port Boards

Dimensions.....	100 × 160 mm (3.94 × 6.37 in.)
I/O connector <sup>1</sup> .....	68-position, SCSI type connector
Power requirement (from PXI channel)	
PXI-8420/8	
+5 VDC.....	150 mA typical 250 mA maximum
±12 VDC.....	80 mA typical 800 mA maximum
PXI-8421/8	
+5 VDC.....	1.1 A typical 2.0 A maximum

## Nonisolated PXI 16-Port Boards

Dimensions.....	100 × 160 mm (3.94 × 6.37 in.)
I/O connector <sup>2</sup> .....	100-position, SCSI type connector
Power requirement (from PXI channel)	
PXI-8420/16	
+5 VDC.....	500 mA typical 750 mA maximum

## Isolated PXI Two-Port Boards

Dimensions.....	100 × 160 mm (3.94 × 6.37 in.)
I/O connector.....	DB-9
Rated voltage, continuous	
RS-485 .....	-7 to +12 V
RS-232 .....	-25 to +25 V

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<sup>1</sup> The eight-port legacy PXI serial boards require a cable, which is included in your kit, to convert the 68-position connector to eight DB-9 connectors.

<sup>2</sup> The 16-port legacy PXI serial boards require a breakout box, which is included in your kit, to separate the 100-position connector to 16 DB-9 connectors.

Isolation voltage, noncontinuous (withstand)

- From port to port .....2,000 V<sub>rms</sub>/60 s
- From any port to host computer .....2,000 V<sub>rms</sub>/60 s

Power requirement (from PXI channel)

- PXI-8422/2
  - +5 VDC .....400 mA typical  
650 mA maximum
- PXI-8423/2
  - +5 VDC .....800 mA typical  
1.3 A maximum

## Isolated PXI Four-Port Boards

Dimensions .....100 × 160 mm  
(3.94 × 6.37 in.)

I/O connector<sup>1</sup> .....10-position modular jack

Rated voltage, continuous

- RS-485 .....-7 to +12 V
- RS-232 .....-25 to +25 V

Isolation voltage, noncontinuous (withstand)

- From port to port .....2,000 V<sub>rms</sub>/60 s
- From any port to host computer .....2,000 V<sub>rms</sub>/60 s

Power requirement (from PXI channel)

- PXI-8422/4
  - +5 VDC .....500 mA typical  
750 mA maximum
- PXI-8423/4
  - +5 VDC .....1.0 A typical  
1.5 A maximum

## Environmental Characteristics

### Operating Environment

Ambient temperature .....0 to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

<sup>1</sup> The four-port legacy PXI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 connectors.

Relative humidity .....	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Altitude (maximum).....	2,000 m

## Storage Environment

Ambient temperature.....	-20 to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

## Other Specifications

Maximum cable length	
RS-485 <sup>1</sup> .....	30 m (limited by EMC/surge)
RS-232 .....	2,500 pF equivalent (TIA-EIA-232-F 2.1.4)
Data line ESD protection (human body model)	
RS-485 .....	± 15 kV
RS-232 .....	± 15 kV

# USB Serial Hardware

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This section describes the characteristics of the USB serial hardware and the recommended operating conditions.



**Note** This equipment is intended for indoor use only.

## Safety

This product is designed to meet the requirements of the following standards of safety for information technology equipment:

- IEC 60950-1, EN 60950-1
- UL 60950-1, CSA 60950-1



**Note** For UL and other safety certifications, refer to the product label or visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

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<sup>1</sup> RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

## Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



**Note** For EMC compliance, operate this device with shielded cabling. In addition, all covers and filler panels must be installed.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
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**EU Customers** At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee.htm](http://ni.com/environment/weee.htm).

## One-Port USB Hardware

Dimensions .....3.81 × 3.56 × 1.52 cm  
(1.5 × 1.4 × 0.6 in.)

Case material .....PVC

Weight

USB-232 .....121 g (0.27 lb)

USB-485 .....118 g (0.26 lb)

I/O connector .....DB-9

USB connector.....Captive cable with USB  
series A plug

Power requirement (from USB channel)

USB-485

+5 VDC..... 175 mA typical  
500 mA maximum

USB-232

+5 VDC..... 80 mA typical  
100 mA maximum

## Two and Four-Port USB Hardware

Dimensions.....  $21.08 \times 12.45 \times 3.56$  cm  
( $8.3 \times 4.9 \times 1.4$  in.)

Case material..... Hard plastic with metal baseplate

Weight..... 375 g (0.83 lb)

I/O connector..... DB-9

USB connector ..... USB series B

Power requirement (from USB channel)

USB-485/2

+5 VDC..... 300 mA typical  
500 mA maximum

USB-232/2

+5 VDC..... 200 mA typical  
500 mA maximum

USB-232/4

+5 VDC..... 300 mA typical  
500 mA maximum

Power requirement (from external supply)

USB-485/4 (9 V–30 V)

+12 VDC (typical)..... 225 mA typical  
500 mA maximum

# Environmental Characteristics

## Operating Environment

Ambient temperature .....	0 to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Altitude (maximum) .....	2,000 m

## Storage Environment

Ambient temperature	
One port.....	-40 to 80 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Two and four port.....	-40 to 85 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

## Other Specifications

Maximum cable length	
RS-485 <sup>1</sup> .....	30 m (limited by EMC/surge)
RS-232.....	2,500 pF equivalent (TIA-EIA-232-F 2.1.4)
Data line ESD protection (human body model)	
RS-485.....	± 15 kV
RS-232.....	± 15 kV

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<sup>1</sup> RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

# ENET Serial Hardware

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This section describes the characteristics of the ENET serial hardware, along with the recommended operating conditions.



**Note** This equipment is intended for indoor use only.

## Safety

This product is designed to meet the requirements of the following standards of safety for information technology equipment:

- IEC 60950-1, EN 60950-1
- UL 60950-1, CSA 60950-1



**Note** For UL and other safety certifications, refer to the product label or visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



**Note** For EMC compliance, operate this device with shielded cabling. In addition, all covers and filler panels must be installed.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)



**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

# Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee.htm](http://ni.com/environment/weee.htm).

## Electrical Characteristics

Power requirement (from external supply)

External supply (9 V–30 V)

+12 VDC (typical).....500 mA typical  
750 mA maximum

## Environmental Characteristics

### Operating Environment

Ambient temperature .....0 to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity .....10 to 90%, noncondensing  
(Tested in accordance with IEC-60068-2-56.)

Altitude (maximum) .....2,000 m

### Storage Environment

Ambient temperature .....–40 to 85 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity .....5 to 95%, noncondensing  
(Tested in accordance with IEC-60068-2-56.)

## Physical Characteristics

Overall case size (dimensions) .....21.0 × 12.4 × 3.7 cm  
(8.25 × 4.89 × 1.44 in.)

Case material .....Hard plastic with metal baseplate

Weight .....394 g (0.87 lb)

Serial connectors.....DB-9

## Network Specifications

Ethernet connector .....	RJ-45
Connection type .....	IEEE 802.3 compliant 100Base-TX (100 Mbits/s) 10Base-T (10 Mbits/s)
Duplex mode .....	Half duplex

## Other Specifications

Maximum cable length	
RS-485 <sup>1</sup> .....	30 m (limited by EMC/surge)
RS-232 .....	2,500 pF equivalent (TIA-EIA-232-F 2.1.4)
Data line ESD protection (human body model)	
RS-485 .....	± 15 kV
RS-232 .....	± 15 kV

## ExpressCard Serial Hardware

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This section describes the characteristics of the ExpressCard serial hardware, along with the recommended operating conditions.



**Note** This equipment is intended for indoor use only.

## Safety

This product is designed to meet the requirements of the following standards of safety for information technology equipment:

- IEC 60950-1, EN 60950-1
- UL 60950-1, CSA 60950-1



**Note** For UL and other safety certifications, refer to the product label or visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

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<sup>1</sup> RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

## Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



**Note** For EMC compliance, operate this device with shielded cabling. In addition, all covers and filler panels must be installed.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)



**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee.htm](http://ni.com/environment/weee.htm).

## Hardware Specifications

Dimensions .....	34 × 75 × 5 mm (1.34 × 2.95 × 0.2 in.)
Weight	
ExpressCard-8420/2 .....	16 g (0.5 oz)
ExpressCard-8421/2 .....	17 g (0.6 oz)
Connectors	
I/O connector .....	26-position latching connector with 20 cm breakout cable to two DB-9 connectors (male)
ExpressCard.....	ExpressCard/34 standard connector interface

Power requirements  
(from ExpressCard USB interface)

Voltage ..... +3.3 VDC  $\pm$  10%

NI ExpressCard-8420/2

+3.3 VDC ..... 100 mA typical  
250 mA maximum

NI ExpressCard-8421/2

+3.3 VDC ..... 160 mA typical  
260 mA maximum

## Environmental Characteristics

Altitude (maximum)..... 2,000 m (at 25 °C ambient temperature)

Polution Degree..... 2

Indoor use only

## Operating Environment

Ambient temperature..... 0 to 65 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity ..... 5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)



**Hot Surface** Be careful when removing ExpressCards. Recently used ExpressCards may exceed safe handling temperatures.

## Storage Environment

Ambient temperature..... –20 to 65 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Nonoperating thermal shock ..... –20 to 65 °C, 5 shocks

## Other Specifications

Maximum cable length

RS-485<sup>1</sup> .....30 m (limited by EMC/surge)

RS-232.....2,500 pF equivalent  
(TIA-EIA-232-F 2.1.4)

Data line ESD protection (human body model)

RS-485.....± 15 kV

RS-232.....± 15 kV

## PCMCIA Serial Hardware

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This section describes the characteristics of the PCMCIA serial hardware, along with the recommended operating conditions.



**Note** This equipment is intended for indoor use only.

## Safety

This product is designed to meet the requirements of the following standards of safety for information technology equipment:

- IEC 60950-1, EN 60950-1
- UL 60950-1, CSA 60950-1



**Note** For UL and other safety certifications, refer to the product label or visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



**Note** For EMC compliance, operate this device with shielded cabling. In addition, all covers and filler panels must be installed.

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<sup>1</sup> RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)



**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit [ni.com/environment/weee.htm](http://ni.com/environment/weee.htm).

## Hardware Specifications

Dimensions.....	Type II PC card
I/O connector.....	Adapter cable with DB-9 Dsub connector and converter for PC card
Power requirement (from PCMCIA expansion slot)	
PCMCIA-232	
+5 VDC.....	40 mA typical, 150 mA maximum
PCMCIA-485	
+5 VDC.....	110 mA typical, 225 mA maximum
PCMCIA-232/2	
+5 VDC .....	60 mA typical, 250 mA maximum
PCMCIA-485/2	
+5 VDC.....	150 mA typical, 400 mA maximum
PCMCIA-232/4	
+5 VDC.....	60 mA typical, 200 mA maximum

# Environmental Characteristics

## Operating Environment

Ambient temperature .....	0 to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Altitude (maximum) .....	2,000 m

## Storage Environment

Ambient temperature .....	-40 to 120 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity .....	5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

## Other Specifications

Maximum cable length	
RS-485 <sup>1</sup> .....	30 m (limited by EMC/surge)
RS-232 .....	2,500 pF equivalent (TIA-EIA-232-F 2.1.4)
Data line ESD protection (human body model)	
RS-485 .....	± 15 kV
RS-232 .....	± 15 kV

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<sup>1</sup> RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

# Where to Go for Support

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The National Instruments Web site is your complete resource for technical support. At [ni.com/support](http://ni.com/support) you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electronic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting [ni.com/certification](http://ni.com/certification). If your product supports calibration, you can obtain the calibration certificate for your product at [ni.com/calibration](http://ni.com/calibration).

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