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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 Electromagnetic Compatibility

This section contains safety instructions and electromagnetic compatibility (EMC) information for the hardware it accompanies. Read this section before installing and using the new hardware.

Safety Information

The following section contains important safety information that you must follow when installing and using the hardware.

Do not operate the hardware in a manner not specified in this document and in the user documentation. Misuse of the hardware can result in a hazard. You can compromise the safety protection if the hardware is damaged in any way. If the hardware is damaged, return it to National Instruments for repair.

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Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

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

Do not operate the hardware in an explosive atmosphere or where there may be flammable gases or fumes unless the hardware is UL (U.S.) or Ex (EU) Certified and marked for hazardous locations. The hardware must be in a suitably rated IP 54 minimum enclosure for hazardous locations. Refer to the hardware's user documentation for more information.

You must insulate signal connections for the maximum voltage for which the hardware is rated. Do not exceed the maximum ratings for the hardware. Do not install wiring while the hardware 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 hardware. Remove power from signal lines before connecting them to or disconnecting them from the hardware.

Operate the hardware 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. Typical level for sealed components or coated PCBs.
- Pollution Degree 2 means that only nonconductive pollution occurs in most cases. Occasionally, however, a temporary conductivity caused by condensation must be expected. Typical level for most products.
- Pollution Degree 3 means that conductive pollution occurs, or dry, nonconductive pollution occurs that becomes conductive due to condensation.

Operate the hardware at or below the measurement category[1] marked on the hardware label. Measurement circuits are subjected to working voltages[2] and transient stresses (overvoltage) from the circuit to which they are connected during measurement or test. Measurement categories establish standard impulse withstand voltage levels that commonly occur in electrical distribution systems. The following is a description of measurement categories:

- Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS[3] voltage. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special hardware, limited-energy parts of hardware, circuits powered by regulated low-voltage sources, and electronics.
- Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system (MAINS[3]). This category refers to local-level electrical distribution, such as that provided by a standard wall outlet (for example, 115 AC voltage for U.S. or 230 AC voltage for Europe). Examples of Measurement Category II are measurements performed on household appliances, portable tools, and similar hardware.
- Measurement Category III is for measurements performed in the building installation at the distribution level. This category refers to measurements on hard-wired hardware such as hardware in fixed installations, distribution boards, and circuit breakers. Other examples are wiring, including cables, bus bars, junction boxes, switches, socket outlets in the fixed installation, and stationary motors with permanent connections to fixed installations.
- Measurement Category IV is for measurements performed at the primary electrical supply installation typically outside buildings. Examples include electricity meters and measurements on primary overcurrent protection devices and on ripple control units.

To obtain the safety certification(s) for this product, visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

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[1] Measurement categories, also referred to as overvoltage or installation categories, are defined in electrical safety standard IEC 61010-1 and IEC 60664-1.

[2] Working voltage is the highest rms value of an AC or DC voltage that can occur across any particular insulation.

[3] MAINS is defined as a hazardous live electrical supply system that powers hardware. Suitably rated measuring circuits may be connected to the MAINS for measuring purposes.

Electromagnetic Compatibility Information

This hardware has been tested and found to comply with the applicable regulatory requirements and limits for electromagnetic compatibility (EMC) as indicated in the hardware's Declaration of Conformity (DoC)[1]. These requirements and limits are designed to provide reasonable protection against harmful interference when the hardware is operated in the intended electromagnetic environment. In special cases, for example when either highly sensitive or noisy hardware is being used in close proximity, additional mitigation measures may have to be employed to minimize the potential for electromagnetic interference.

While this hardware is compliant with the applicable regulatory EMC requirements, there is no guarantee that interference will not occur in a particular installation. To minimize the potential for the hardware to cause interference to radio and television reception or to experience unacceptable performance degradation, install and use this hardware in strict accordance with the instructions in the hardware documentation and the DoC[1].

If this hardware does cause interference with licensed radio communications services or other nearby electronics, which can be determined by turning the hardware off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the antenna of the receiver (the device suffering interference).
- Relocate the transmitter (the device generating interference) with respect to the receiver.
- Plug the transmitter into a different outlet so that the transmitter and the receiver are on different branch circuits.

Some hardware may require the use of a metal, shielded enclosure (windowless version) to meet the EMC requirements for special EMC environments such as, for marine use or in heavy industrial areas. Refer to the hardware's user documentation and the DoC[1] for product installation requirements.

When the hardware is connected to a test object or to test leads, the system may become more sensitive to disturbances or may cause interference in the local electromagnetic environment.

Operation of this hardware in a residential area is likely to cause harmful interference. Users are required to correct the interference at their own expense or cease operation of the hardware.

Changes or modifications not expressly approved by National Instruments could void the user's right to operate the hardware under the local regulatory rules.

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[1] The Declaration of Conformity (DoC) contains important EMC compliance information and instructions for the user or installer. To obtain the DoC for this product, visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

PCI Serial Hardware

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 meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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

Environmental Management

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电子信息产品污染控制管理办法 （中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

PCI-843*x* Series Hardware

Nonisolated PCI Two-Port Boards

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

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

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

Weight

PCI-8430/2 ..... 88 g

PCI-8431/2 ..... 92 g

Nonisolated PCI Four-Port Boards

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

I/O connector[1] ..... 10-position modular jack

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

Weight

PCI-8430/4 ..... 99 g

PCI-8431/4 ..... 102 g

Nonisolated PCI Eight-Port Boards

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

I/O connector[2] ..... 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

Weight

PCI-8430/8 ..... 84 g

PCI-8431/8 ..... 85 g

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[1] The four-port PCI serial boards require cables, included in your kit, to convert the 10-position modular jacks to DB-9 male connectors.

[2] The eight-port PCI serial boards require a cable, included in your kit, to convert the 68-position connector to eight DB-9 connectors.

Nonisolated PCI 16-Port Boards

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

I/O connector[1] .....68-position, VHDCI × 2

Power requirement (from PCI channel)

PCI-8430/16

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

Weight .....99 g

Isolated PCI Two-Port Boards

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

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

Operating rated voltage (continuous)

RS-232 .....–25 V to +25 V

RS-485 .....–7 V to + 12 V

Isolation voltages

Port-to-port

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

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

[1] The 16-port PCI serial boards require two cables, included in your kit, to convert the two 68-position connectors to the 16 (2 × 8) DB-9 male connectors.

Weight

PCI-8432/2 ..... 102 g

PCI-8433/2 ..... 104 g

Isolated PCI Four-Port Boards

Dimensions ..... 10.67 × 17.44 cm (4.2 × 6.9 in.)

I/O connector[1] ..... 10-position modular jack

Operating rated voltage (continuous)

RS-232 ..... –25 V to +25 V

RS-485 ..... –7 V to + 12 V

Isolation voltages

Port-to-port

Continuous ..... 60 VDC (CAT I)

Withstand ..... 2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous ..... 60 VDC (CAT I)

Withstand ..... 2000 V_{rms}, verified by a 5 s dielectric withstand test

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

Weight

PCI-8432/4 ..... 105 g

PCI-8433/4 ..... 106 g

[1] The four-port PCI serial boards require cables, included in your kit, to convert the 10-position modular jacks to DB-9 male 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 male connector

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[1].....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

[1] The four-port legacy PCI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 male connectors.

Nonisolated PCI Eight-Port Boards

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

I/O connector[1] ..... 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[2] ..... 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 male connector

Operating rated voltage (continuous)

RS-232 ..... –25 V to +25 V

RS-485 ..... –7 V to + 12 V

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[1] The eight-port legacy PCI serial boards require a cable, included in your kit, to convert the 68-position connector to eight DB-9 male connectors.

[2] The 16-port legacy PCI serial boards require a breakout box, included in your kit, to separate the 100-position connector to 16 DB-9 male connectors.

Isolation voltages

Port-to-port

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

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[1].....10-position modular jack

Operating rated voltage (continuous)

RS-232.....–25 V to +25 V

RS-485.....–7 V to + 12 V

Isolation voltages

Port-to-port

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

[1] The four-port legacy PCI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 male connectors.

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.)

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

Indoor use only.

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[1]..... 30 m (limited by EMC/surge)

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

[1] 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

PCI Express Serial Hardware

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

Note This equipment is intended for indoor use only.

Safety

This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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

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NI PCIe-843*x* Series Hardware

Nonisolated PCI Express 16-Port Boards

Dimensions (without bracket)..... 11.12 × 17.53 cm (4.38 × 6.9 in.)

I/O connectors

NI PCIe-8430/16

RS-232[1]..... 68-position VHDCI × 2

PCI Express x1

[1] The 16-port PCI Express serial boards require two cables, included in your kit, to convert the two 68-position connectors to the 16 (2 × 8) DB-9 male connectors.

NI PCIe-8431/16

RS-485[1] .....68-position VHDCI × 2

PCI Express x1

Power requirement (from PCI Express channel)

NI PCIe-8430/16

+3.3 VDC .....400 mA typical
1.5 A maximum

+12 VDC .....210 mA typical
250 mA maximum

NI PCIe-8431/16

+3.3 VDC[2].....1.4 A typical, 3 A maximum

+12 VDC .....210 mA typical
250 mA maximum

Weight

NI PCIe-8430/16 .....99 g

NI PCIe-8431/16 .....101 g

Nonisolated PCI Express 8-Port Boards

Dimensions (without bracket) .....11.12 × 17.53 cm (4.38 × 6.9 in.)

I/O connectors

NI PCIe-8430/8

RS-232[3] .....68-position VHDCI

PCI Express x1

NI PCIe-8431/8

RS-485[3] .....68-position VHDCI

PCI Express x1

Power requirement (from PCI Express channel)

NI PCIe-8430/8

+3.3 VDC[4].....200 mA typical
750 mA maximum

+12 VDC .....190 mA typical
220 mA maximum

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[1] The 16-port PCI Express serial boards require two cables, included in your kit, to convert the two 68-position connectors to the 16 (2 × 8) DB-9 male connectors.

[2] These values are based on the assumption that all 16 ports (for the PCIe-8431/16) or 8 ports (for the PCIe-8431/8) are using a 620 Ω bias resistor and NI-offered terminators installed on both ends of the cable.

[3] The 8-port PCI Express serial boards require a cable, included in your kit, to convert the 68-position connector to eight DB-9 male connectors.

[4] These values are based on the assumption that all 16 ports (for the PCIe-8431/16) or 8 ports (for the PCIe-8431/8) are using a 620 Ω bias resistor and NI-offered terminators installed on both ends of the cable.

NI PCIe-8431/8

+3.3 VDC..... 700 mA typical
1.5 A maximum

+12 VDC..... 190 mA typical
220 mA maximum

Weight

NI PCIe-8430/8..... 88 g

NI PCIe-8431/8..... 90 g

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[1]..... 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

[1] RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

PXI Serial Hardware

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 meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

PXI-843*x* Serial Hardware

Nonisolated PXI Two-Port Boards

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

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

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

Weight

PXI-8430/2 .....134 g

PXI-8431/2 .....134 g

Nonisolated PXI Four-Port Boards

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

I/O connector[1] .....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

Weight

PXI-8430/4 .....137 g

PXI-8431/4 .....140 g

Nonisolated PXI Eight-Port Boards

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

I/O connector[2] .....68-position SCSI (68-pin SCSI to eight DB-9 male connector 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

---

[1] The four-port PXI serial boards require cables, included in your kit, to convert the 10-position modular jacks to DB-9 male connectors.

[2] The eight-port PXI serial boards require a cable, included in your kit, to convert the 68-position connector to eight DB-9 connectors.

Weight

PXI-8430/8 ..... 135 g

PXI-8431/8 ..... 137 g

Nonisolated PXI 16-Port Boards

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

I/O connector[1] ..... 68-position VHDCI × 2

Power requirement (from PXI channel)

PXI-8430/16

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

Weight ..... 157 g

Isolated PXI Two-Port Boards

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

I/O connector ..... DB-9 male connector × 2

Operating rated voltage (continuous)

RS-232 ..... –25 V to +25 V

RS-485 ..... –7 V to + 12 V

Isolation voltages

Port-to-port

Continuous ..... 60 VDC (CAT I)

Withstand ..... 2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous ..... 60 VDC (CAT I)

Withstand ..... 2000 V_{rms}, verified by a 5 s dielectric withstand test

[1] The 16-port PXI serial boards require two cables, included in your kit, to convert the two 68-position connectors to the 16 (2 × 8) DB-9 male connectors.

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

Weight

PXI-8432/2 .....125 g

PXI-8433/2 .....125 g

Isolated PXI Four-Port Boards

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

I/O connector[1] .....10-position modular jack
(RJ-50) × 4

Operating rated voltage (continuous)

RS-232 .....–25 V to +25 V

RS-485 .....–7 V to + 12 V

Isolation voltages

Port-to-port

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

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

[1] The four-port PXI serial boards require cables, included in your kit, to convert the 10-position modular jacks to DB-9 male connectors.

Weight

PXI-8432/4..... 147 g

PXI-8433/4..... 147 g

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

Indoor use only.

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[1]..... 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

[1] RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

Legacy PXI Serial Hardware

Nonisolated PXI Two-Port Boards

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

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

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[1] .....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

[1] The four-port legacy PXI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 male connectors.

Nonisolated PXI Eight-Port Boards

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

I/O connector[1] ..... 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[2] 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 male connector

Operating rated voltage (continuous)

RS-232 ..... –25 V to +25 V

RS-485 ..... –7 V to + 12 V

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[1] The eight-port legacy PXI serial boards require a cable, included in your kit, to convert the 68-position connector to eight DB-9 male connectors.

[2] The 16-port legacy PXI serial boards require a breakout box, included in your kit, to separate the 100-position connector to 16 DB-9 male connectors.

Isolation voltages

Port-to-port

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

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[1].....10-position modular jack

Operating rated voltage (continuous)

RS-232.....–25 V to +25 V

RS-485.....–7 V to + 12 V

Isolation voltages

Port-to-port

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

Port-to-host

Continuous .....60 VDC (CAT I)

Withstand .....2000 V_{rms}, verified by a 5 s dielectric withstand test

[1] The four-port legacy PXI serial boards require a cable to convert the 10-position modular jack to either DB-9 or DB-25 male connectors.

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.)

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

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

Indoor use only.

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[1]..... 30 m (limited by EMC/surge)

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

[1] 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

USB Serial Hardware

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 meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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

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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 male connector

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 × 12.45 × 3.56 cm
(8.3 × 4.9 × 1.4 in.)

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

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

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

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

Indoor use only.

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[1] ..... 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

[1] RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

ENET Serial Hardware

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 meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- 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 the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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

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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 male connector

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[1] .....30 m (limited by EMC/surge)

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

[1] 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

ExpressCard Serial Hardware

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 meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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Hardware Specifications

Dimensions .....34 × 75 × 5 mm (1.34 × 2.95 × 0.2 in.)

Weight

- NI ExpressCard-8420/2 .....16 g (0.5 oz)
- NI 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 male connectors
- ExpressCard.....ExpressCard/34 standard connector interface

Power requirements
(from ExpressCard USB interface)

Voltage ..... +3.3 VDC ± 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)

Pollution 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[1] .....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

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 meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- 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 the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

[1] RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

Hardware Specifications

Dimensions..... Type II PC card

I/O connector..... Adapter cable with DB-9 male 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[1] ..... 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

[1] RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At 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.

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