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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 Radio-Frequency Interference

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.

NATIONAL INSTRUMENTS™

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.

FCC/Canada Radio Frequency Interference Compliance

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` 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[1], 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.

[1] The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

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.

Compliance with EU Directives

Users in the European Union (EU) should refer to the Declaration of Conformity (DoC) for information[1] 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`, 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

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
- CAN/CSA-C22.2 No. 60950-1

Note For UL and other safety certifications, refer to the product label, or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

[1] The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

Electromagnetic Compatibility

Emissions ..... EN 55011 Class A at 10 m
FCC Part 15A above 1 GHz

Immunity ..... EN 61326:1997 + A2:2001, Table 1

EMC/EMI ..... CE, C-Tick, and FCC Part 15 (Class A) Compliant

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:

Low-Voltage Directive (safety) 73/23/EEC

Electromagnetic Compatibility Directive (EMC) 89/336/EEC

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`, search by model number or product line, and click the appropriate link in the Certification column.

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

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[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

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[2] .....68-position, SCSI type connector

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

[2] 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.

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

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[1] ..... 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

Isolation voltage

From port to port..... 2,000 V_{rms}/60 s

From any port to host computer..... 2,000 V_{rms}/60 s

[1] The 16-port 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

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.)

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

Isolation voltage

From port to port .....2,000 V_{rms}/60 s

From any port to host computer .....2,000 V_{rms}/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

PCI-8432/4

+5 VDC .....550 mA typical
815 mA maximum

PCI-8433/4

+5 VDC .....785 mA typical
1.2 A maximum

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

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

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.

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

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
- CAN/CSA-C22.2 No. 60950-1

Note For UL and other safety certifications, refer to the product label, or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

Emissions.....EN 55011 Class A at 10 m
FCC Part 15A above 1 GHz

Immunity .....EN 61326:1997 + A2:2001, Table 1

EMC/EMI .....CE, C-Tick, and FCC Part 15 (Class A) Compliant

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:

Low-Voltage Directive (safety).....73/23/EEC

Electromagnetic Compatibility Directive (EMC) 89/336/EEC

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`, search by model number or product line, and click the appropriate link in the Certification column.

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

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[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

PXI-8430/4

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

PXI-8431/4

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

[1] The four-port 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[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

Power requirement (from PXI channel)

PXI-8422/2

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

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[1] The eight-port PXI serial boards require cables, which are included in your kit, to convert the 68-position connector to eight DB-9 connectors.

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

PXI-8423/2

+5 VDC..... 800 mA typical
1.3 A maximum

Isolation voltage

From port to port..... 2,000 V_{rms}/60 s

From any port to host computer..... 2,000 V_{rms}/60 s

Isolated 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-8422/4

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

PXI-8423/4

+5 VDC..... 1.0 A typical
1.5 A maximum

Isolation voltage

From port to port..... 2,000 V_{rms}/60 s

From any port to host computer..... 2,000 V_{rms}/60 s

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

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

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

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 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
- CAN/CSA-C22.2 No. 60950-1

Note For UL and other safety certifications, refer to the product label, or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

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

Electromagnetic Compatibility

Emissions ..... EN 55011 Class A at 10 m
FCC Part 15A above 1 GHz

Immunity ..... EN 61326:1997 + A2:2001, Table 1

EMC/EMI ..... CE, C-Tick, and FCC Part 15 (Class A) Compliant

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:

Low-Voltage Directive (safety) 73/23/EEC

Electromagnetic Compatibility Directive (EMC) 89/336/EEC

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`, search by model number or product line, and click the appropriate link in the Certification column.

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 × 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

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[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 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
- CAN/CSA-C22.2 No. 60950-1

Note For UL and other safety certifications, refer to the product label, or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	EN 61326:1997 + A2:2001, Table 1
EMC/EMI	CE, C-Tick, and FCC Part 15 (Class A) Compliant

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:

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

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`, search by model number or product line, and click the appropriate link in the Certification column.

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[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 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
- CAN/CSA-C22.2 No. 60950-1

Note For UL and other safety certifications, refer to the product label, or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

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

Electromagnetic Compatibility

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	EN 61326:1997 + A2:2001, Table 1
EMC/EMI	CE, C-Tick, and FCC Part 15 (Class A) Compliant



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:

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



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`, search by model number or product line, and click the appropriate link in the Certification column.

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[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.

AT Serial Hardware

This section describes the characteristics of the AT (ISA) 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
- CAN/CSA-C22.2 No. 60950-1

Note For UL and other safety certifications, refer to the product label, or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	EN 61326:1997 + A2:2001, Table 1
EMC/EMI	CE, C-Tick, and FCC Part 15 (Class A) Compliant

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:

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

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`, search by model number or product line, and click the appropriate link in the Certification column.

Nonisolated ISA Two-Port Boards

Dimensions .....10.67 × 16.51 cm (4.2 × 6.5 in.)

I/O connector DB-9

Power requirement (from PC AT I/O channel)

AT-485/2

+5 VDC .....390 mA typical, 510 mA maximum

AT-232/2

+5 VDC .....260 mA typical, 340 mA maximum

AT-485/2 (Shared IRQ)

+5 VDC .....140 mA typical, 180 mA maximum

AT-232/2 (Shared IRQ)

+5 VDC ..... 70 mA typical, 100 mA maximum

Nonisolated ISA Four-Port Boards

Dimensions .....10.67 × 16.51 cm (4.2 × 6.5 in.)

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

Power requirement (from PC AT I/O channel)

AT-485/4

+5 VDC .....160 mA typical, 200 mA maximum

AT-232/4

+5 VDC .....110 mA typical, 150 mA maximum

[1] The four-port AT serial board requires a cable to convert the 10-position modular jack to either DB-9 or DB-25 connectors.

AT-485/4 (Shared IRQ)

+5 VDC..... 160 mA typical
200 mA maximum

AT-232/4 (Shared IRQ)

+5 VDC..... 110 mA typical
150 mA maximum

Isolated ISA Two-Port Boards

Dimensions..... 10.67 × 18.70 cm
(4.2 × 6.9 in.)

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

Isolation voltage

From Port to Port ..... 2,000 V_{rms}/60 s

From Any Port to Host
Computer ..... 330 V_{rms}/60 s

Power requirement
(from PC AT I/O channel)

AT-485/2 Isolated

+5 VDC..... 220 mA typical
260 mA maximum

AT-232/2 Isolated

+5 VDC..... 160 mA typical
200 mA maximum

Isolated Four-Port Boards

Dimensions..... 10.67 × 25.40 cm
(4.2 × 10.0 in.)

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

Isolation voltage

From Port to Port ..... 2,000 V_{rms}/60 s

From Any Port to Host
Computer ..... 2,000 V_{rms}/60 s

[1] The four-port isolated AT serial board requires cables, which are included in your kit, to convert the 10-position modular jack to a DB-9 connector. Use only the type of cables provided in your kit.

Power requirement
(from PC AT I/O channel)

AT-485/4 Isolated

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

AT-232/4 Isolated

+5 VDC .....280 mA typical
320 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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