Technical Sales

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Requirements and Compatibility | Ordering Information | Detailed Specifications
For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

Last Revised: 2014-11-06 07:13:56.0

Serial Interfaces for PXI, PCI, PCMCIA, Ethernet, and USB

- Flexible baud rates from 57 bit/s to 2 Mbit/s (NI 843x)
- Up to 128 B transmit/receive FIFOs (NI 843x, USB, ENET)
- Full multiprocessor and hyperthreading compatibility (NI 843x)
- Memory-mapped to prevent I/O resource conflicts (NI 843x)
- 3.3 V and 5 V PCI slot-compatible (NI 843x)
- NI-Serial device driver works with NI-VISA for easy development
- LabVIEW Real-Time compatibility for deterministic control (standard plug-in, ENET)
- Optical isolation up to 2,000 V (standard plug-in)

Overview

National Instruments offers serial interfaces for PCI, PXI, PCMCIA, USB, and Ethernet. They are asynchronous interfaces for communicating with instruments via serial ports. Depending on the platform, interfaces are available with up to 16 ports and full Windows 2000/NT/XP/Me/9x plug-and-play compatibility, which gives you the benefit of automatic configuration for easier installation and maintenance. You can install and use these devices as standard serial ports from your existing applications or with applications written with NI-VISA. Development environments such as Visual Basic, Visual C++, and Excel, as well as NI LabVIEW, LabWindows™/CVI, Measurement Studio, and Lookout application software products, can access the add-in serial ports using standard serial I/O functions. All interface devices include an enhanced serial driver for improved performance, easy configuration, and access to the advanced transceiver control modes of the RS485 interfaces.

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Requirements and Compatibility

OS Information

- Windows 2000/XP
- Windows 7
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Driver Information

- NI-Serial
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Software Compatibility

- LabVIEW
- LabWindows/CVI
- Measurement Studio
- Visual Basic
- Visual C#
- Visual C++

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Application and Technology

Isolation

Ground loops—current flowing through the ground line when ground voltage levels differ between connected devices—are a common problem in many industrial applications. On RS485, this problem results in a common-mode voltage produced by the difference in ground levels or by noise induced on both lines. Isolating serial ports eliminates this problem and protects the computer system in harsh industrial environments. The National Instruments PCI, PXI, and serial interfaces are available with 2,000 V port-to-port isolation for such applications.

Cabling

NI 2-port serial interfaces have DB-9 male connectors with standard pin assignments for RS485 and RS232 connectors (see Figure 1). The 4-port interfaces use 10-position modular phone jacks, so a single back panel can contain all four connectors (see Figure 2). When purchasing a 4-port serial interface, you can order cables that convert the phone jacks to either DB-9 or DB-25 male connectors with standard pin assignments. In general, you should order four converter cables per 4-port serial device. Note that a converter cable is not designed to go the full distance from a 4-port serial interface directly to your instruments. The most popular NI converter cables convert the 10-pin phone

jack on a 4-port device to the same DB-9 male connector found on a typical PC serial port. The connection from this converter to your serial device uses the standard cables used with the PC serial port.

National Instruments ships cables with all isolated PCI 4-channel serial boards to ensure isolation. NI 4-channel PXI serial modules, which do not require special isolated cables to ensure isolation, come without cables.

All 8-port serial interfaces include an adapter cable that connects to the SCSI 68-pin connector on the device and terminates in eight standard DB-9 male connectors (see Figure 3).

All 16-port RS232 serial interfaces include a breakout box that connects to the SCSI 100-pin connector on the device and terminates in 16 standard DB-9 male connectors (see Figure 4).

NI ships PCMCIA serial cards with interface cables that provide one, two, or four DB-9 male connectors. These DB-9 male connectors provide standard pin assignments for RS485 and RS232 connections. Note that these cables are not designed to go the full distance from a PCMCIA serial card to your instrument. The cables provide the same DB-9 male connectors on a typical PC serial port.

High-Performance Interfaces

NI 843x high-performance serial interfaces deliver advanced features, such as flexible baud rates up to 2 Mbit/s and universal PCI, and hyperthreading and multiprocessor compatibility. With the flexible baud rate capabilities of the NI 843x interfaces, you can communicate with devices that operate with nonstandard baud rates ranging from 57 bit/s up to 2 Mbit/s within 1 percent and standard baud rates within 0.01 percent. With multiprocessor and hyperthreading
compatibility, you also can take advantage of the latest PC technology for higher speeds and improved efficiency. The new driver software included with the devices offers better resource allocation as well as DMA access for higher throughput with minimal CPU usage. In addition, NI 843x interfaces include new memory-mapping features that you can use to connect to more serial devices without resource conflicts. PCI-843x interfaces are universal PCI boards, fully compatible with both 5 V and 3.3 V signaling environments so the board can work in a wide range of PCs.

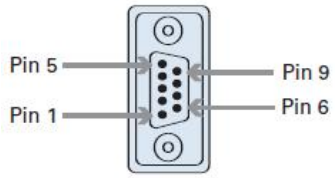

Figure 1. DB-9 Connector Pin Locations

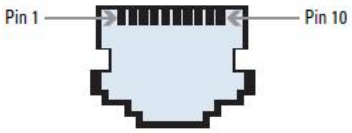

Figure 2. 10-Position Modular Jack Pin Locations

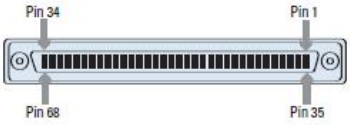

Figure 3. SCSI 68-Pin Connector Locations

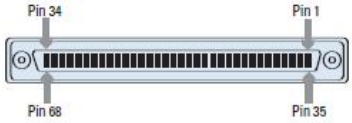

Figure 4. SCSI 100-Pin Connector Locations

USB Interfaces

The NI USB-232 and USB-485 transform your USB port into asynchronous serial ports for communication with serial devices. They are available in either 1-, 2-, or 4-port versions, using standard RS232, RS422, or RS485 communications. You can install and use the USB-232 and USB-485 as standard serial ports from your existing applications or with applications written with NI-VISA.

Additionally, 2- and 4-port versions of the USB-232 feature software-selectable DTE or DCE transceiver modes, as well as an automatic transceiver detection mode, or Auto232. The USB-485 features software-selectable biasing, with which you can turn biasing on and off for each port.

Ethernet Interfaces

The NI ENET-232 and ENET-485 serial device servers connect either 100BaseTX (100 Mbit/s) or 10BaseT (10 bit/s) Ethernet networks to asynchronous serial ports for communication with serial devices. They come with either 2- or 4-port options and use standard RS232, RS422, or RS485 communications. All products are shipped with driver software for Windows 2000/NT/XP. You can install and use these serial device servers as standard serial ports from your existing applications or with applications written with NI-VISA. The TCP/IP communication protocol, which handles all communication between the serial device server and the host PC, runs on embedded firmware in the serial device server. A configuration utility configures the IP address of the serial device server and exposes all additional serial ports to the OS for immediate use by any application software package using a standard Microsoft Windows Serial (COM) port interface.

Comparison Table

	Model	Power Requirements (from PCI, PXI, or PCMCIA) +5 VDC Typical Current (mA)	+5 VDC Maximum Current (mA)	+12 VDC Typical Current (mA)	+12 VDC Maximum Current (mA)	Signal Compatibility I/O Connectors	2000 V Isolation O=Optical D=Digital	LabVIEW Real-Time Support	All Signals	RXD, TXD, GND, RTS, and CTS Only	Data Line ESD Protection (HBM) (kV)	Max Transfer Rate (kb/s)	FIFO Size (B)	DB-9 Adapter(s) Included
High-Performance Plug-In	**PCI**													
	PCI-8430/2 (RS232)	325	500	–	–	DB-9 male	–		✓	–	15	1000	128	✓
	PCI-8430/4 (RS232)	400	600	–	–	10-position jack	–		✓	–	15	1000	128	✓
	PCI-8430/8 (RS232)	600	900	–	–	SCSI 68-pin interface	–		✓	–	15	1000	128	✓
	PCI-8431/2 (RS485)	500	750	–	–	DB-9 male	–		✓	–	15	2000	128	✓
	PCI-8431/4 (RS485)	725	1100	–	–	10-position jack	–		✓	–	15	2000	128	–
	PCI-8431/8 (RS485)	1300	1900	–	–	SCSI 68-pin interface	–		✓	–	15	2000	128	✓
	PCI-8432/2 (RS232)	380	570	–	–	DB-9 male	D		✓	–	15	1000	128	✓
	PCI-8432/4 (RS232)	550	815	–	–	10-position jack	D		✓	–	15	1000	128	✓
	PCI-8433/2 (RS485)	380	570	–	–	DB-9 male	D		✓	–	15	2000	128	✓
	PCI-8433/4 (RS485)	785	1200	–	–	10-position jack	D		✓	–	15	2000	128	✓
	PXI													
	PXI-8430/2 (RS232)	325	500	–	–	DB-9 male	–		✓	–	15	1000	128	✓
	PXI-8430/4 (RS232)	400	600	–	–	10-position jack	–		✓	–	15	1000	128	–
	PXI-8431/2 (RS485)	500	750	–	–	DB-9 male	–		✓	–	15	2000	128	✓
	PXI-8431/4 (RS485)	725	1100	–	–	10-position jack	–		✓	–	15	2000	128	–
Standard Plug-In	**PCI**													
	PCI-232/16 (RS232)	500	1000	–	–	SCSI 100-pin female	–	✓	Ports 1-8	Ports 9-16	15	115.2	64	✓
	PXI													
	PXI-8420/2 (RS232)	100	150	20	200	DB-9 male	–	✓	✓	–	15	115.2	64	✓
	PXI-8420/4 (RS232)	125	200	40	400	10-position jack	–	✓	✓	–	15	115.2	64	
	PXI-8420/8 (RS232)	150	250	80	800	SCSI 68-pin interface	–	✓	✓	–	15	115.2	64	✓
	PXI-8420/16 (RS232)	500	1000	–	–	SCSI 100-pin female	–	✓	Ports 1-8	Ports 9-16	15	115.2	64	✓
	PXI-8421/2 (RS485)	350	750	–	–	DB-9 male	–	✓	✓	–	2	460.8	64	✓
	PXI-8421/4 (RS485)	700	1300	–	–	10-position jack	–	✓	✓	–	2	460.8	64	
	PXI-8421/8 (RS485)	1100	2000	–	–	SCSI 68-pin interface	–	✓	✓	–	2	460.8	64	✓
	PXI-8422/2 (RS232)	400	650	–	–	DB-9 male	O	✓	✓	–	15	115.2	64	✓
	PXI-8422/4 (RS232)	500	750	–	–	10-position jack	O	✓	✓	–	15	115.2	64	
	PXI-8423/2 (RS485)	800	1300	–	–	DB-9 male	O	✓	✓	–	15	460.8	64	✓
	PXI-8423/4 (RS485)	1000	1500	–	–	10-position jack	O	✓	✓	–	15	460.8	64	
	PCMCIA													
	PCMCIA-232 (RS232)	40	150	–	–	DB-9 male	–		✓	–	2	921.6	16	✓
	PCMCIA-232/2 (RS232)	60	250	–	–	DB-9 male	–		✓	–	2	921.6	16	✓
	PCMCIA-232/4 (RS232)	60	200	–	–	DB-9 male	–		✓	–	15	115.2	64	✓
	PCMCIA-485 (RS485)	110	225	–	–	DB-9 male	–		✓	–	2	921.6	16	✓
	PCMCIA-485/2 (RS485)	150	400	–	–	DB-9 male	–		✓	–	2	921.6	16	✓

	Model	Power Requirements (from PCI, PXI, or PCMCIA) +5 VDC Typical Current (mA)	+5 VDC Maximum Current (mA)	+9 to +30 VDC Typical Current (mA)	+9 to +30 VDC Maximum Current (mA)	Signal Compatibility I/O Connectors	Optical Isolation	All Signals	Only RXD, TXD, GND, RTS, and CTS	Data Line ESD Protection[1] (HBM) (kV)	Max Transfer Rate (kb/s)	FIFO Size (B)	DB-9 Adapter(s) Included
External	**USB**												
	USB-232	100	500	–	–	DB-9 male	✓	–	–	15	230.4	128	–
	USB-232/2	200	500	–	–	DB-9 male	✓	–	–	15	230.4	128	–
	USB-232/4	300	500	–	–	DB-9 male	✓	–	–	15	230.4	128	–
	USB-485	175	500	–	–	DB-9 male	✓	–	–	15	460.8	128	–
	USB-485/2	300	500	–	–	DB-9 male	✓	–	–	15	460.8	128	–
	USB-485/4	–	–	225	500	DB-9 male	✓	–	–	15	460.8	128	–
	Ethernet												
	ENET-232/2	–	–	600	1000	DB-9 male	✓	–	–	15	230.4	128	–
	ENET-232/4	–	–	600	1000	DB-9 male	✓	–	–	15	230.4	128	–
	ENET-485/2	–	–	600	1000	DB-9 male	✓	–	–	15	460.8	128	–
	ENET-485/4	–	–	600	1000	DB-9 male	✓	–	–	15	460.8	128	–

[1]ESD Protection rating determined by transceiver component design.

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Ordering Information

For a complete list of accessories, visit the product page on ni.com.

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Software Recommendations

NI LabVIEW Full Development System for Windows

- Fully integrated graphical system design software
- Support for a wide range of measurement hardware, I/O, and buses
- Custom, event-driven user interfaces for measurement and control
- Extensive signal processing, analysis, and math functionality
- Advanced compiler to ensure high-performance execution and code optimization
- Includes SSP for professional technical support, online training, and software upgrades

NI LabWindows™/CVI for Windows

- Real-time advanced 2D graphs and charts
- Complete hardware compatibility with IVI, VISA, DAQ, GPIB, and serial
- Analysis tools for array manipulation, signal processing statistics, and curve fitting
- Simplified cross-platform communication with network variables
- Measurement Studio .NET tools (included in LabWindows/CVI Full only)
- The mark LabWindows is used under a license from Microsoft Corporation.

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Support and Services

System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at ni.com/advisor to find a system assurance program to meet your needs.

Technical Support

Get answers to your technical questions using the following National Instruments resources.

- **Support** - Visit ni.com/support to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
- **Discussion Forums** - Visit forums.ni.com for a diverse set of discussion boards on topics you care about.
- **Online Community** - Visit community.ni.com to find, contribute, or collaborate on customer-contributed technical content with users like you.

Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit ni.com/repair.

Training and Certifications

The NI training and certification program delivers the fastest, most certain route to increased proficiency and productivity using NI software and hardware. Training builds the skills to more efficiently develop robust, maintainable applications, while certification validates your knowledge and ability.

- **Classroom training in cities worldwide** - the most comprehensive hands-on training taught by engineers.
- **On-site training at your facility** - an excellent option to train multiple employees at the same time.
- **Online instructor-led training** - lower-cost, remote training if classroom or on-site courses are not possible.
- **Course kits** - lowest-cost, self-paced training that you can use as reference guides.
- **Training memberships** and training credits - to buy now and schedule training later.

Visit ni.com/training for more information.

Extended Warranty

NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit ni.com/warranty.

OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

Alliance

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 700 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.

Detailed Specifications

NI 9870 RS-232 C-Series Module

C-Series modules are for use with the NI CompactRIO platform. For complete module and system specifications, refer to the *NI 9870 Operating Instructions and Specifications*.

Specifications

The following specifications are typical for the range –40 to 70 °C unless otherwise noted.

Maximum baud rate	921.6 kbps

The NI 9870 supports arbitrary baud rates according to the following equation:

*BaudRate = 3.6864 Mbps / (Prescaler * Divider)*

Prescaler can be (4..65535).

Divider can be 1 or 4.

As long as the actual baud rate is within 2% of the desired baud rate, communication errors should not happen.

Maximum cable length	250 pF equivalent

Note Cable capacitance greater than 250 pF may adversely affect the maximum baud rate and thermal dissipation.

Maximum RS232 Receive signal (RXD, CTS, DSR, DCD, RI)

Continuous Voltage	±8 V

Note Continuous RS232 input voltages in excess of ±8 V may cause excessive thermal dissipation.

Data line ESD protection (human body model)	±15 kV
MTBF	448,008 hours at 25 °C; Bellcore Issue 6, Method 1, Case 3, Limited Part Stress Method

Note Contact NI for Bellcore MTBF specifications at other temperatures or for MIL-HDBK-217F specifications.

Power Requirements

Power consumption from chassis

Active mode	0.5 W max
Sleep mode	50 µW max

Thermal dissipation (at 70 °C)

Active mode	1.5 W max
Sleep mode	0.5 W max
Required external supply voltage range (V_{SUP})	+8 to +28 VDC

Power supply consumption from external supply V_{SUP}

Typical	0.5 W
Maximum	2 W

Physical Characteristics

If you need to clean the module, wipe it with a dry towel.

Weight	Approx. 154 g (5.4 oz)

Safety

Maximum Voltage [1]	

Connect only voltages that are within these limits.

RS232 Receive Signal-to-COM (RXD, CTS, DSR, DCD, RI)	±25 V max, Measurement Category I

RS232 Transmit Signal-to-COM (TX, RTS, DTR)	±13.2 V max, Measurement Category I
V_{SUP}-to-COM	±28 V max, Measurement Category I

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as *MAINS* voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

Caution Do *not* connect to signals or use for measurements within Measurement Categories II, III, or IV.

Isolation Voltages	
Port-to-earth ground	
Withstand	1000 V_{rms}, verified by a 5 s dielectric withstand test
Continuous	60 VDC, Measurement Category I
Shock and Vibration	
To meet these specifications, you must panel mount the CompactRIO system.	
Operating vibration, random (IEC 60068-2-64)	5 g_{rms}, 10 to 500 Hz
Operating shock (IEC 60068-2-27)	30 g, 11 ms half sine, 50 g, 3 ms half sine, 18 shocks at 6 orientations
Operating vibration, sinusoidal (IEC 60068-2-6)	5 g, 10 to 500 Hz

Environmental

CompactRIO modules are intended for indoor use only. For outdoor use, mount the CompactRIO system in a suitably rated enclosure. Refer to the installation instructions for the chassis you are using for more information about meeting these specifications.

Operating temperature	–40 to 70 °C
Storage temperature	–40 to 85 °C
Ingress protection	IP 40
Operating humidity	10 to 90% RH, noncondensing
Storage humidity	5 to 95% RH, noncondensing
Maximum altitude	2,000 m
Pollution Degree (IEC 60664)	2

NI 9871 RS-485 C-Series Module

C-Series modules are for use with the NI CompactRIO platform. For complete module and system specifications, refer to the *NI 9871 Operating Instructions and Specifications*.

Specifications	
The following specifications are typical for the range –40 to 70 °C unless otherwise noted.	
Maximum baud rate	3.6864 Mbps

The NI 9871 supports arbitrary baud rates according to the following equation:

*BaudRate = 3.6864 Mbps / (Prescaler * Divider)*

Prescaler can be (4..65535).

Divider can be 1 or 4.

As long as the actual baud rate is within 2% of the desired baud rate, communication errors should not happen.

Maximum cable length	1.2 km (4,000 ft.)
Data line ESD protection (human body model)	±15 kV
MTBF	514,016 hours at 25 °C; Bellcore Issue 6, Method 1, Case 3, Limited Part Stress Method

Note Contact NI for Bellcore MTBF specifications at other temperatures or for MIL-HDBK-217F specifications.

Power Requirements	
Power consumption from chassis	
Active mode	0.5 W max
Sleep mode	50 µW max
Thermal dissipation (at 70 °C)	

Active mode	1.5 W max
Sleep mode	55 mW max
Required external supply voltage range (V_{SUP})	+8 to +28 VDC
Power supply consumption from external supply V_{SUP}	
Typical	1 W
Maximum	3.5 W
Physical Characteristics	
If you need to clean the module, wipe it with a dry towel.	
Weight	Approx. 153 g (5.4 oz)
Safety	

Maximum Voltage [2]	
Connect only voltages that are within these limits.	
RS485/RS422 Port-to-COM	–8 to +13 VDC max, Measurement Category I
V_{SUP}-to-COM	±28 V max, Measurement Category I

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as *MAINS* voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

Caution Do *not* connect to signals or use for measurements within Measurement Categories II, III, or IV.

Isolation Voltages	
Port-to-earth ground	
Withstand	1000 V_{rms}, verified by a 5 s dielectric withstand test
Continuous	60 VDC, Measurement Category I
Shock and Vibration	
To meet these specifications, you must panel mount the CompactRIO system.	
Operating vibration, random (IEC 60068-2-64)	5 g_{rms}, 10 to 500 Hz
Operating shock (IEC 60068-2-27)	30 g, 11 ms half sine, 50 g, 3 ms half sine, 18 shocks at 6 orientations
Operating vibration, sinusoidal (IEC 60068-2-6)	5 g, 10 to 500 Hz
Environmental	
CompactRIO modules are intended for indoor use only. For outdoor use, mount the CompactRIO system in a suitably rated enclosure. Refer to the installation instructions for the chassis you are using for more information about meeting these specifications.	
Operating temperature	–40 to 70 °C
Storage temperature	–40 to 85 °C
Ingress protection	IP 40
Operating humidity	10 to 90% RH, noncondensing
Storage humidity	5 to 95% RH, noncondensing
Maximum altitude	2,000 m
Pollution Degree (IEC 60664)	2

PCI Serial Hardware

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

PCI-843*x* Series Hardware	
PCI-8430/2 (RS-232) and PCI-8431/2 (RS-485/422)	
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
Maximum baud rate	
PCI-8430/2	1 Mbps
PCI-8431/2	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PCI-8430/4 (RS-232) and PCI-8431/4 (RS-485/422)	
Dimensions	10.67 × 14.22 cm (4.2 × 5.6 in.)
I/O connector [3]	10-position modular jack (10P10C)
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
Maximum baud rate	
PCI-8430/4	1 Mbps
PCI-8431/4	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PCI-8430/8 (RS-232) and PCI-8431/8 (RS-485/422)	
Dimensions	10.67 × 14.48 cm (4.2 × 5.7 in.)
I/O connector [4]	68-pin, 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
Maximum baud rate	
PCI-8430/8	1 Mbps
PCI-8431/8	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PCI-8430/16 (RS-232)	

Dimensions	10.67 × 17.52 cm (4.2 × 6.9 in.)
I/O connector [5]	68-pin, VHDCI × 2
Power requirement (from PCI channel)	
PCI-8430/16	
+5 VDC	935 mA typical, 1.4 A maximum
Weight	99 g
Maximum baud rate	1 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PCI-8432/2 (RS-232) and PCI-8433/2 (RS-485/422)	
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
Weight	
PCI-8432/2	102 g
PCI-8433/2	104 g
Maximum baud rate	
PCI-8432/2	1 Mbps
PCI-8433/2	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PCI-8432/4 (RS-232) and PCI-8433/4 (RS-485/422)	
Dimensions	10.67 × 17.44 cm (4.2 × 6.9 in.)
I/O connector [3]	10-position modular jack (10P10C)
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
Maximum baud rate	
PCI-8432/4	1 Mbps
PCI-8433/4	3 Mbps

Boards support any baud rate from 2 baud up to the maximum.

Environmental Characteristics (for All PCI Interfaces)

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
Pollution Degree	2

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 [6]	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

Note This equipment is intended for indoor use only.

Safety Standards

This product is designed to meet 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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

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

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

Online Product Certification

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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Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit ni.com/environment/weee.htm.

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 Express Serial Hardware

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

NI PCIe-843*x* Series Hardware

NI PCIe-8430/8 (RS-232) and NI PCIe-8431/8 (RS-485/422)

Dimensions (without bracket)	11.12 × 17.53 cm (4.38 × 6.9 in.)
I/O connectors	
NI PCIe-8430/8	
RS-232 [7]	68-pin VHDCI
PCI Express	x1
NI PCIe-8431/8	
RS-485 [7]	68-pin VHDCI
PCI Express	x1
Power requirement (from PCI Express channel)	
NI PCIe-8430/8	
+3.3 VDC	200 mA typical, 750 mA maximum
+12 VDC	190 mA typical, 220 mA maximum
NI PCIe-8431/8	
+3.3 VDC [8]	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
Maximum baud rate	

NI PCIe-8430/8	1 Mbps
NI PCIe-8431/8	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
NI PCIe-8430/16 (RS-232) and NI PCIe-8431/16 (RS-485/422)	
Dimensions (without bracket)	11.12 × 17.53 cm (4.38 × 6.9 in.)
I/O connectors	
NI PCIe-8430/16	
RS-232 [9]	68-pin VHDCI × 2
PCI Express	x1
NI PCIe-8431/16	
RS-485 [9]	68-pin 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 [8]	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
Maximum baud rate	
NI PCIe-8430/16	1 Mbps
NI PCIe-8431/16	3 Mbps
Boards support any baud from 2 baud up to the maximum.	
Environmental Characteristics (for All PCI Express Interfaces)	
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 [6]	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

Note This equipment is intended for indoor use only.

Safety Standards

This product is designed to meet 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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

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

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

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

PXI Serial Hardware

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

PXI-843*x* Serial Hardware

PXI-8430/2 (RS-232) and PXI-8431/2 (RS-485/422)	
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

Maximum baud rate	
PXI-8430/2	1 Mbps
PXI-8431/2	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PXI-8430/4 (RS-232) and PXI-8431/4 (RS-485/422)	
Dimensions	100 × 160 mm (3.94 × 6.37 in.)
I/O connector [10]	10-position modular jack (10P10C)
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
Maximum baud rate	
PXI-8430/4	1 Mbps
PXI-8431/4	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PXI-8430/8 (RS-232) and PXI-8431/8 (RS-485/422)	
Dimensions	100 × 160 mm (3.94 × 6.37 in.), 3U
I/O connector [11]	68-pin 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
Weight	
PXI-8430/8	135 g
PXI-8431/8	137 g
Shock and vibration	
Operational shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC-60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)
Maximum baud rate	
PXI-8430/8	1 Mbps
PXI-8431/8	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PXI-8430/16 (RS-232)	
Dimensions	100 × 160 mm (3.94 × 6.37 in.), 3U
I/O connector [12]	68-pin VHDCI × 2
Power requirement (from PXI channel)	
PXI-8430/16	
	935 mA typical, 1.4 A maximum

+5 VDC	
Weight	157 g
Maximum baud rate	1 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PXI-8432/2 (RS-232) and PXI-8433/2 (RS-485/422)	
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
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
Shock and vibration	
Operational shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC-60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)
Random vibration	
Operating	5 to 500 Hz, 0.3 g_{rms}
Nonoperating	5 to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC-60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)
Maximum baud rate	
PXI-8432/2	1 Mbps
PXI-8433/2	3 Mbps
Boards support any baud rate from 2 baud up to the maximum.	
PXI-8432/4 (RS-232) and PXI-8433/4 (RS-485/422)	
Dimensions	100 × 160 mm (3.94 × 6.37 in.), 3U
I/O connector [10]	10-position modular jack (10P10C)
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
Weight	
PXI-8432/4	147 g
PXI-8433/4	147 g
Maximum baud rate	
PXI-8432/4	1 Mbps
PXI-8433/4	3 Mbps

Boards support any baud rate from 2 baud up to the maximum.

Environmental Characteristics (for All PXI Interfaces)

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
Pollution Degree	2

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 [6]	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

Note This equipment is intended for indoor use only.

Safety Standards

This product is designed to meet 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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

This product meets the essential requirements of applicable European Directives, as amended for CE marking, 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 Express Serial Hardware

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

PXIe-843*x* Serial Hardware

PXIe-8430/8 (RS-232) and PXIe-8431/8 (RS-485/422)	
Dimensions	100 × 160 mm (3.94 × 6.37 in.), 3U
I/O connector [13]	68-pin VHDCI
Power requirement (from PXI Express channel)	
PXIe-8430/8	
+12 VDC	220 mA typical, 250 mA maximum
+3.3 VDC	200 mA typical, 750 mA maximum
PXIe-8431/8	
+12 VDC	220 mA typical, 240 mA maximum
+3.3 VDC [14]	0.7 A typical, 1.5 A maximum
Weight	
PXIe-8430/8	143 g
PXIe-8431/8	143 g
Maximum baud rate	
PXIe-8430/8	1 Mbps
PXIe-8431/8	3 Mbps [15]
Boards support any baud rate from 2 baud up to the maximum.	
Baud rate accuracy	

PXIe-8430/8	Within 0.015% for standard baud rate Within 0.5% for nonstandard baud rate
PXIe-8431/8	Within 0.015% for standard baud rate Within 0.5% for nonstandard baud rate below 1 M, Within 1.3% for nonstandard baud rate between 1 M and 3 M
PXIe-8430/16 (RS-232) and PXIe-8431/16 (RS-485/422)	
Dimensions	100 × 160 mm (3.94 × 6.37 in.), 3U
I/O connector [16]	68-pin VHDCI × 2
Power requirement (from PXI Express channel)	
PXIe-8430/16	
+12 VDC	250 mA typical, 270 mA maximum
+3.3 VDC	400 mA typical, 1.5 A maximum
PXIe-8431/16	
+12 VDC	250 mA typical, 280 mA maximum
+3.3 VDC [14]	1.4 A typical, 3 A maximum
Weight	
PXIe-8430/16	152 g
PXIe-8431/16	155 g
Maximum baud rate	
PXIe-8430/16	1 Mbps
PXIe-8431/16	3 Mbps [15]
Boards support any baud rate from 2 baud up to the maximum.	
Baud rate accuracy	
PXIe-8430/16	Within 0.015% for standard baud rate, Within 0.5% for nonstandard baud rate
PXIe-8431/16	Within 0.015% for standard baud rate, Within 0.5% for nonstandard baud rate below 1 M, Within 1.3% for nonstandard baud rate between 1 M and 3 M
Environmental Characteristics (for All PXI Express Interfaces)	
Operating Environment	
Ambient temperature	0 to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)
Relative humidity	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Altitude (maximum)	2,000 m
Polution degree	2
Indoor use only.	
Storage Environment	
Ambient temperature	–40 to 71 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 limits.)
Relative humidity	5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Other Specifications	
Maximum cable length	
RS-485 [6]	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

Shock and vibration	
Operational shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC-60068-2-27. Meets MIL-PRF-28800F Class 2 limits.)
Random vibration	
Operating	5 to 500 Hz, 0.3 g_{rms}
Nonoperating	5 to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC-60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Note This equipment is intended for indoor use only.

Safety Standards

This product is designed to meet 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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

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

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

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USB Serial Hardware

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

USB-232 (RS-232) and USB-485 (RS-485/422)

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
Maximum baud rate	
USB-232	230.4 kbps
USB-485	460.8 kbps
Boards support standard baud rates below the maximum.	
USB-232/2, USB-232/4 (USB-232), USB-485/2, and USB-485/4 (RS-485/422)	
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
Maximum baud rate	
USB-232/2 and USB-232/4	230.4 kbps
USB-485/2 and USB-485/4	460.8 kbps
Boards support standard baud rates below the maximum.	
Environmental Characteristics (for All USB Interfaces)	
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
Pollution Degree	2
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 [6]	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

Note This equipment is intended for indoor use only.

Safety Standards

This product is designed to meet 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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

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

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

Online Product Certification

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Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit ni.com/environment/weee.htm.

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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.)

ENET Serial Hardware

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

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 (ENET-232/2, ENET-232/4 (RS-232), ENET-485/2, and ENET-485/4 (RS-485/422)	
Maximum cable length	
RS-485 [6]	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
Maximum baud rate	
ENET-232/2 and ENET-232/4	230.4 kbps
ENET-485/2 and ENET-485/4	460.8 kbps

Boards support standard baud rates below the maximum.

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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

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

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

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Environmental Management

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ExpressCard Serial Hardware

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

Hardware Specifications (NI ExpressCard-8420/2 (RS-232) and NI ExpressCard-8421/2 (RS-485/422))	
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)	
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
Voltage	+3.3 VDC ± 10%
Shock and Vibration	
Nonoperating shock	50 g, 11 ms (Tested in accordance with IEC-60068-2-27.)
Nonoperating vibration, sinusoidal	15 g, 100 to 2000 Hz (Tested in accordance with IEC-60068-2-6.)
Nonoperating drop test	2 drops in 3 mutually exclusive axes from 75 cm onto no-cushioning vinyl tile surface
Environmental Characteristics	
Altitude (maximum)	2,000 m (at 25 °C ambient temperature)
Pollution Degree	2
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.)
Be careful when removing ExpressCards. Recently used ExpressCards may exceed safe handling temperatures.	
Storage Environment	
	–20 to 65 °C (Tested in accordance with IEC-60068-2-1 and

Ambient temperature	IEC-60068-2-2.)
Nonoperating thermal shock	–20 to 65 °C, 5 shocks
Other Specifications	
Maximum cable length	
RS-485 [6]	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
Maximum baud rate	
NI ExpressCard-8420/2	230.4 kbps
NI ExpressCard-8421/2	460.8 kbps

Boards support standard baud rates below the maximum.

Note This equipment is intended for indoor use only.

Safety Standards

This product is designed to meet 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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

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

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

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PCMCIA Serial Hardware

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

Hardware Specifications (PCMCIA-232, PCMCIA-232/2, PCMCIA-232/4 (RS-232), PCMCIA-485, and PCMCIA-485/2 (RS-485/422))	
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 [6]	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
Maximum baud rate	
PCMCIA-232 and PCMCIA-232/2	230.4 kbps
PCMCIA-232/4	115.2 kbps
PCMCIA-485 and PCMCIA-485/2	921.6 kbps

Boards support standard baud rates below the maximum.

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 61326-1 (IEC 61326-1): 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 EMC declarations and certifications, refer to the *Online Product Certification* section.

Note When operating this product, use shielded cables and accessories.

CE Compliance CE

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[1] The maximum voltage that can be applied or output without creating a safety hazard.
[2] The maximum voltage that can be applied or output without creating a safety hazard.
[3] The four-port PCI serial boards require cables, included in your kit, to convert the 10-position modular jacks (10P10C) to DB-9 male connectors.
[4] The eight-port PCI serial boards require a cable, included in your kit, to convert the 68-pin connector to eight DB-9 connectors.
[5] The 16-port PCI serial boards require two cables, included in your kit, to convert the two 68-pin connectors to the 16 (2 × 8) DB-9 male connectors.
[6] RS-485 is capable of 1.2 km (4,000 ft) without surge limitation.
[7] The 8-port PCI Express serial boards require a cable, included in your kit, to convert the 68-pin connector to eight DB-9 male connectors.
[8] These values are based on the assumption that all 16 ports (for the NI PCIe-8431/16) or 8 ports (for the NI PCIe-8431/8) are using a 620 Ω bias resistor and NI-offered terminators installed on both ends of the cable.
[9] The 16-port PCI Express serial boards require two cables, included in your kit, to convert the two 68-pin connectors to the 16 (2 × 8) DB-9 male connectors.
[10] The four-port PXI serial boards require cables, included in your kit, to convert the 10-position modular jacks (10P10C) to DB-9 male connectors.
[11] The eight-port PXI serial boards require a cable, included in your kit, to convert the 68-pin connector to eight DB-9 connectors.
[12] The 16-port PXI serial boards require two cables, included in your kit, to convert the two 68-pin connectors to the 16 (2 × 8) DB-9 male connectors.
[13] The eight-port PXI Express serial boards require a cable, included in your kit, to convert the 68-pin connector to eight DB-9 connectors.
[14] These values are based on the assumption that all 16 ports (for the NI PXIe-8431/16) or 8 ports (for the NI PXIe-8431/8) are using a 620 Ω bias resistor and NI-offered terminators installed on both ends of the cable.
[15] For possible use with higher baud rates, refer to ni.com/kb and search for KnowledgeBase KB58KEI82F.
[16] The 16-port PXI Express serial boards require two cables, included in your kit, to convert the two 68-pin connectors to the 16 (2 × 8) DB-9 male connectors.

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