

Serial Interfaces for RS-232 and RS-485

NI Serial Interfaces for PCI, PXI, PCMCIA, and ISA

- Compatible with standard PC serial port
- Full Windows Plug and Play compatibility
- 2, 4, 8, and 16 ports
- Handle RTS/CTS hardware handshake lines
- 460 kb/s maximum transfer rate
- Transmit and receive FIFOs 64 B maximum
- Interrupt sharing between ports
- 2,000 V isolation

NI PCI-232, NI PXI-8420, NI PXI-8422, NI PCMCIA-232, NI AT-232

- RS-232 interfaces
- Cable lengths up to 15.6 m (50 ft)

Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio
- Lookout
- Any package that uses the Microsoft serial driver interface

NI PCI-485, NI PXI-8421, NI PXI-8423, NI PCMCIA-485, NI AT-485

- RS-485 or RS-422 interfaces
- Communicate with up to 31 devices
- 4 transceiver-control modes including automatic mode for 2-wire RS-485 devices
- Cable lengths up to 1.2 km (4,000 ft)

Driver Software (Included)

- NI-Serial for Windows 2000/XP/NT/Me/9x



Overview

National Instruments offers serial interface devices for PCI, PXI, PCMCIA, and ISA. They are asynchronous serial interfaces for communicating with instruments via serial ports. Depending on the platform, interfaces are available with up to 16 ports and full Windows 2000/XP/NT/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, reliable interrupt sharing between ports, and access to the advanced transceiver control modes of the RS-485 interface devices.

Isolation

A common problem in many industrial applications is ground loops – current flowing through the ground line when ground voltage levels differ between connected devices. On RS-485, this problem results in a common-mode voltage produced by the difference in ground levels or by noise induced on both lines. Isolation of serial ports eliminates this problem and protects the computer system in harsh industrial environments. The National Instruments PCI, PXI, and AT serial devices are available with optical isolation up to 2,000 V for such applications.

Cabling

Our 2 and 4-port serial devices are not shipped with serial interface cables. Two-port versions have DB-9 male connectors with standard pin assignments for RS-485 and RS-232 connectors (see Figure 1). Four-port devices use 10-position modular

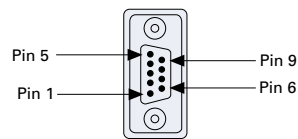


Figure 1. DB-9 Connector Pin Locations

phone jacks, so all four connectors can exist on a single back panel (see Figure 2). When purchasing a 4-port serial device, you must 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. Our most popular 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.

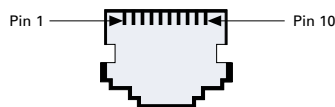


Figure 2. 10-Position Modular Jack Pin Locations

INFO CODES

For more information, or to order products online visit ni.com/info and enter:

- pxi8420
- at232
- at485
- pci232
- pci485
- pcmcia232
- pcmcia485

BUY ONLINE!

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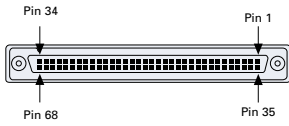


Figure 3. SCSI 68-Pin Connector Locations

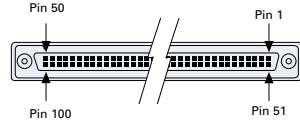


Figure 4. SCSI 100-Pin Connector Locations

As an exception to the previous description, National Instruments ships isolated ISA and PCI 4-channel serial boards with cables to ensure isolation. The 4-channel PXI serial modules, which do not require special isolated cables to ensure isolation, do not include 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 RS-232 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).

PCMCIA serial cards ship with interface cables that provide one, two, or four DB-9 male connectors. These DB-9 male connectors provide standard pin assignments for RS-485 and RS-232 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 found on a typical PC serial port.

Ordering Information

Model	Serial Port	Bus	Number of Ports	FIFO Size B	Max Transfer Rate kb/s	Isolation	Cables Included	Part Number
PCI								
NI PCI-232/2	RS-232	PCI	2	64	115.2	–	–	777642-02
NI PCI-232/4	RS-232	PCI	4	64	115.2	–	–	777642-04
NI PCI-232/8	RS-232	PCI	8	64	115.2	–	✓	777642-08
NI PCI-232/16	RS-232	PCI	16	64	115.2	–	✓	777642-16
NI PCI-232I/2	RS-232	PCI	2	64	115.2	✓	–	777854-02
NI PCI-232I/4	RS-232	PCI	4	64	115.2	✓	✓	777854-04
NI PCI-485/2	RS-485/422	PCI	2	64	460	–	–	777641-02
NI PCI-485/4	RS-485/422	PCI	4	64	460	–	–	777641-04
NI PCI-485/8	RS-485/422	PCI	8	64	460	–	✓	777641-08
NI PCI-485I/2	RS-485/422	PCI	2	64	460	✓	–	777853-02
NI PCI-485I/4	RS-485/422	PCI	4	64	460	✓	✓	777853-04
PXI								
NI PXI-8420/2	RS-232	PXI	2	64	115.2	–	–	777733-02
NI PXI-8420/4	RS-232	PXI	4	64	115.2	–	–	777733-04
NI PXI-8420/8	RS-232	PXI	8	64	115.2	–	✓	777733-08
NI PXI-8420/16	RS-232	PXI	16	64	115.2	–	✓	777733-16
NI PXI-8421/2	RS-485/422	PXI	2	64	460	–	–	777735-02
NI PXI-8421/4	RS-485/422	PXI	4	64	460	–	–	777735-04
NI PXI-8421/8	RS-485/422	PXI	8	64	460	–	✓	777735-08
NI PXI-8422/2	RS-232	PXI	2	64	115.2	✓	–	777736-02
NI PXI-8422/4	RS-232	PXI	4	64	115.2	✓	–	777736-04
NI PXI-8423/2	RS-485/422	PXI	2	64	460	✓	–	777737-02
NI PXI-8423/4	RS-485/422	PXI	4	64	460	✓	–	777737-04
PCMCIA								
PCMCIA-232	RS-232	PCMCIA	1	16	115.2	–	✓	777379-01
PCMCIA-232/2	RS-232	PCMCIA	2	16	115.2	–	✓	777379-02
PCMCIA-232/4	RS-232	PCMCIA	4	64	115.2	–	✓	777379-04
PCMCIA-485	RS-485/422	PCMCIA	1	16	115.2	–	✓	777378-01
PCMCIA-485/2	RS-485/422	PCMCIA	2	16	115.2	–	✓	777378-02
ISA								
AT-232/2	RS-232	ISA	2	16	115.2	–	–	777312-02
AT-232/4	RS-232	ISA	4	16	115.2	–	–	777312-04
AT-232I/2	RS-232	ISA	2	16	115.2	✓	–	777500-02
AT-232I/4	RS-232	ISA	4	16	115.2	✓	✓	777500-04
AT-485/2	RS-485/422	ISA	2	16	115.2	–	–	777311-02
AT-485/4	RS-485/422	ISA	4	16	115.2	–	–	777311-04
AT-485I/2	RS-485/422	ISA	2	16	115.2	✓	–	777501-02
AT-485I/4	RS-485/422	ISA	4	16	115.2	✓	✓	777501-04

Serial Interfaces for RS-232 and RS-485

PCI, PXI, PCMCIA, and ISA Interfaces

Serial Instrument Control/Connectivity

Specifications

Model	Power Requirement (from PCI, PXI, PCMCIA, or ISA channel)				Noise Emissions I/O Connectors	Optical (FCC Class Verified)	2,000 V Only RXD, TXD, Isolation	Signal Compatibility		Data Line ESD Protection (HBM)
	+5 VDC		+12 VDC					All Signals	GND, RTS, and CTS	
	Typical Current	Maximum Current	Typical Current	Maximum Current						
PCI										
PCI-232/2	50 mA	100 mA	20 mA	200 mA	DB-9 male	A	–	✓	–	15 kV
PCI-232/4	70 mA	150 mA	40 mA	400 mA	10-position jack	A	–	✓	–	15 kV
PCI-232/8	100 mA	180 mA	80 mA	800 mA	SCSI 68-pin female	A	–	✓	–	15 kV
PCI-232/16	500 mA	1.0 A	–	–	SCSI 100-pin female	A	–	–	Ports 1-8	15 kV
PCI-232/2	400 mA	650 mA	–	–	DB-9 male	A	✓	–	Ports 9-16	15 kV
PCI-232/4	500 mA	750 mA	–	–	10-position jack	A	✓	–	✓	15 kV
PCI-485/2	350 mA	750 mA	–	–	DB-9 male	A	–	–	✓	2 kV
PCI-485/4	700 mA	1.3 A	–	–	10-position jack	A	–	–	✓	2 kV
PCI-485/8	1.1 A	2.0 A	–	–	SCSI 68-pin interface	A	–	–	✓	2 kV
PCI-485/2	800 mA	1.3 A	–	–	DB-9 male	A	✓	–	✓	15 kV
PCI-485/4	1.0 A	1.5 A	–	–	10-position jack	A	✓	–	✓	15 kV
PXI										
PXI-8420/2	100 mA	150 mA	20 mA	200 mA	DB-9 male	A	–	✓	–	15 kV
PXI-8420/4	125 mA	200 mA	40 mA	400 mA	10-position jack	A	–	✓	–	15 kV
PXI-8420/8	150 mA	250 mA	80 mA	800 mA	SCSI 68-pin male	A	–	✓	–	15 kV
PXI-8420/16	500 mA	1.0 A	–	–	SCSI 100-pin female	A	–	–	Ports 1-8	15 kV
PXI-8421/2	350 mA	750 mA	–	–	DB-9 male	A	–	–	Ports 9-16	2 kV
PXI-8421/4	700 mA	1.3 A	–	–	10-position jack	A	–	–	✓	2 kV
PXI-8421/8	1.1 A	2.0 A	–	–	SCSI 68-pin female	A	–	–	✓	2 kV
PXI-8422/2	400 mA	650 mA	–	–	DB-9 male	A	✓	–	✓	15 kV
PXI-8422/4	500 mA	750 mA	–	–	10-position jack	A	✓	–	✓	15 kV
PXI-8423/2	800 mA	1.3 A	–	–	DB-9 male	A	✓	–	✓	15 kV
PXI-8423/4	1.0 A	1.5 A	–	–	10-position jack	A	✓	–	✓	15 kV
PCMCIA										
PCMCIA-232	40 mA	60 mA	–	–	DB-9 male	A	–	✓	–	2 kV
PCMCIA-232/2	60 mA	75 mA	–	–	DB-9 male	A	–	✓	–	2 kV
PCMCIA-232/4	60 mA	140 mA	–	–	DB-9 male	A	–	✓ ¹	–	15 kV
PCMCIA-485	90 mA	100 mA	–	–	DB-9 male	A	–	–	✓	2 kV
PCMCIA-485/2	95 mA	110 mA	–	–	DB-9 male	A	–	–	✓	2 kV
ISA										
AT-232/2	260 mA	340 mA	–	–	DB-9 male	B	–	✓	–	2 kV
AT-232/4	340 mA	450 mA	–	–	10-position jack	B	–	✓	–	2 kV
AT-232/2	160 mA	200 mA	–	–	DB-9 male	A	✓	–	✓	15 kV
AT-232/4	280 mA	320 mA	–	–	10-position jack	A	✓	–	✓	15 kV
AT-485/2	390 mA	510 mA	–	–	DB-9 male	B	–	–	✓	2 kV
AT-485/4	600 mA	780 mA	–	–	10-position jack	B	–	–	✓	2 kV
AT-485/2	220 mA	260 mA	–	–	DB-9 male	A	✓	–	✓	15 kV
AT-485/4	300 mA	360 mA	–	–	10-position jack	A	✓	–	✓	15 kV

¹Ports 3 and 4 include all signals except RI.

Dimensions

PCI	10.7 by 17.5 cm (4.2 by 6.9 in.)
PXI	16.0 by 10.0 cm (6.3 by 3.9 in.) (not including connectors)
PCMCIA	Type II PC Card
ISA	10.7 by 16.5 cm (4.2 by 6.5 in.)

Operating Environment

Ambient temperature ISA	0 to 70 °C
PCI, PXI, PCMCIA	0 to 55 °C
Relative humidity	10 to 90%, noncondensing

Storage Environment

Ambient temperature (PCI, PXI, ISA)	-40 to 85 °C
Ambient temperature (PCMCIA)	-40 to 125 °C
Relative humidity	5 to 90%, noncondensing

Electrostatic Discharge Protection

Case contact and air discharge	±4 kV
RS-232 and RS-435 data lines	see specification table