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.

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 all four connectors can exist on a single back panel (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.
Serial Interfaces for PXI, PCI, PCMCIA, Ethernet, and USB

High-Performance Interfaces

NI 843x high-performance serial interfaces deliver advanced features such as flexible baud rates up to 2 Mb/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 b/s up to 2 Mb/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 and 3.3 V signaling environments so the board can work in a wide range of PCs.

USB Interfaces

The National Instruments USB-232 and USB-485 transform your USB port into asynchronous serial ports for communication with serial devices. The NI USB-232 and USB-485 are available in either 1, 2, or 4-port versions, using standard RS232, RS422, or RS485 communications. You can install and use these serial device servers 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 National Instruments ENET-232 and ENET-485 serial device servers connect either 100BaseTX (100 Mb/s) or 10BaseT (10 Mb/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 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.

Specifications

### Interface Hardware Dimensions

<table>
<thead>
<tr>
<th>High-Performance PCI</th>
<th>2-port boards (isolated and unisolated)</th>
<th>4-port boards (isolated and unisolated)</th>
<th>8-port boards</th>
<th>16-port boards</th>
<th>PXI (excluding connectors)</th>
<th>USB-232</th>
<th>USB-232/4</th>
<th>USB-232/2, USB-232/4, USB-232/16</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10.7 by 14.2 cm (4.2 by 5.6 in)</td>
<td>10.7 by 14.2 cm (4.2 by 5.6 in)</td>
<td>10.7 by 17.3 cm (4.2 by 6.8 in)</td>
<td>10.7 by 14.9 cm (4.2 by 5.7 in)</td>
<td>10.7 by 17.5 cm (4.2 by 6.9 in)</td>
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<td>21.0 by 12.4 by 3.7 cm (8.3 by 4.9 by 1.4 in)</td>
<td>21.0 by 12.4 by 3.7 cm (8.3 by 4.9 by 1.4 in)</td>
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</table>

### Environmental Specifications

#### Safety

<table>
<thead>
<tr>
<th>Operating Environment</th>
<th>Storage Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>Relative Humidity</td>
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<tr>
<td>PCI</td>
<td>0 to 55</td>
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<tr>
<td>PXI</td>
<td>0 to 55</td>
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<tr>
<td>PCMCIA</td>
<td>0 to 55</td>
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<td>USB</td>
<td>0 to 70</td>
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<tr>
<td>Ethernet</td>
<td>0 to 70</td>
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</tbody>
</table>

These products are 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

#### Electromagnetic Compatibility

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

Immunity: EN 61006-1: A2/2001, Table 1

CE, C-Tick, and FCC Part 15 (Class A) Compliant

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

#### CE Compliance

These products meet 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: For more information on certifications, marks, and DoCs, visit ni.com/certification.
## Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Requirements (from PCI, PCI, or PCMCIA)</th>
<th>2000 V Isolation (v)</th>
<th>RXD, TXD, GND, RTS, and CTS</th>
<th>Data Line ESD Protection (V)</th>
<th>Max Transfer Rate (kb/s)</th>
<th>FIFO Size (B)</th>
<th>DB-9 Adapter(s) Included</th>
<th>Part Number</th>
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<tbody>
<tr>
<td><strong>Typical</strong></td>
<td><strong>Maximum Current (mA)</strong></td>
<td><strong>Typical Current (mA)</strong></td>
<td><strong>Maximum Current (mA)</strong></td>
<td><strong>Signal Compatibility I/O Connectors</strong></td>
<td><strong>Optical Isolation</strong></td>
<td><strong>All Signals</strong></td>
<td><strong>Only</strong></td>
<td><strong>Max Transfer Rate (kb/s)</strong></td>
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### Power Requirements
- **Typical** Current: The current required for typical operating conditions.
- **Maximum Current**: The maximum current that the device can handle without damage.
- **Signal Compatibility I/O Connectors**: Compatibility of the signals in I/O connectors.
- **Optical Isolation**: Optical isolation of the signals.
- **All Signals** and **Only**: Options indicate which signals are supported.
- **Data Line ESD Protection**: Electrostatic discharge protection for data lines.
- **Max Transfer Rate**: Maximum transfer rate in kilobits per second (kb/s).
- **FIFO Size**: Size of the FIFO buffer in bytes (B).
- **DB-9 Adapter(s) Included**: Whether a DB-9 adapter is included.

### Compatibility
- **SCSI 68-pin interface**: Compatibility with the SCSI 68-pin interface.
- **SCSI 100-pin female**: Compatibility with the SCSI 100-pin female interface.
- **DB-9 male**: Compatibility with the DB-9 male connector.
- **10-position jack**: Compatibility with the 10-position jack.
- **100-pin female**: Compatibility with the 100-pin female connector.

### External Pinouts
- **Pinouts from PCI, PCI, or PCMCIA**
- **Pinouts from PCI, PCI, or PCMCIA**

### Part Numbers
- **ENET-232/4**
- **ENET-232/2**
- **ENET-232/8**
- **ENET-485/4**
- **ENET-485/2**
- **ENET-485/8**
- **ENET-485/16**
- **USB-232**
- **USB-232/2**
- **USB-232/4**
- **USB-485**
- **USB-485/2**
- **USB-485/4**
- **Ethernet**
- **ENET-232/2**
- **ENET-232/4**
- **ENET-485/2**
- **ENET-485/4**
- **USB-232**
- **USB-232/2**
- **USB-232/4**
- **USB-485**
- **USB-485/2**
- **USB-485/4**
- **Ethernet**

### Notes
- **2000 V Isolation**: Electrical isolation of up to 2000 volts.
- **RXD, TXD, GND, RTS, and CTS**: Compatibility with RXD, TXD, GND, RTS, and CTS signals.
- **Data Line ESD Protection**: Protection against electrostatic discharge for data lines.
- **Max Transfer Rate**: Maximum data transfer rate.
- **FIFO Size**: Size of the FIFO buffer.
- **DB-9 Adapter(s) Included**: Whether a DB-9 adapter is included.

*Updated: 2021-01-01*
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