GPIB Hardware Guide

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

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

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

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

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

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

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

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

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

Conventions

The following conventions are used in this manual:

»   The **»** symbol leads you through nested menu items and dialog box options
             to a final action. The sequence **Options»Settings»General** directs you to
             pull down the **Options** menu, select the **Settings** item, and select **General**
             from the last dialog box.

             This icon denotes a note, which alerts you to important information.

             This icon denotes a caution, which advises you of precautions to take to
             avoid injury, data loss, or a system crash. When this symbol is marked on a
             product, refer to the *Safety* section of Appendix A, *Specifications*, for
             information about precautions to take.

             When this symbol is marked on a product, it denotes a warning advising
             you to take precautions to avoid electrical shock.

             When this symbol is marked on a product, it denotes a component that may
             be hot. Touching this component may result in bodily injury.

bold   Bold text denotes items that you must select or click in the software, such
             as menu items and dialog box options. Bold text also denotes parameter
             names.

italic   Italic text denotes variables, emphasis, a cross-reference, or an introduction
             to a key concept. Italic text also denotes text that is a placeholder for a word
             or value that you must supply.

monospace   Text in this font denotes text or characters that you should enter from the
             keyboard, sections of code, programming examples, and syntax examples.
             This font is also used for the proper names of disk drives, paths, directories,
             programs, subprograms, subroutines, device names, functions, operations,
             variables, filenames, and extensions.

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1

GPIB Hardware

AT-GPIB/TNT (PnP)

⚠ **Caution**   Electrostatic discharge can damage several components on your GPIB board. To avoid such damage in handling your board, touch the antistatic plastic package to a metal part of your computer chassis before removing the board from the package.

Follow these steps to install your interface:

1. Make sure that your computer is powered off. Keep the computer plugged in so that it remains grounded while you install the GPIB hardware.

2. Remove the top cover (or other access panels) to gain access to the computer expansion slots.

3. Find an unused expansion slot in your computer. The AT-GPIB/TNT (PnP) board requires a 16-bit ISA expansion slot.

4. Remove the corresponding slot cover on the back panel of the computer.

5. Insert the GPIB board into the slot with the GPIB connector sticking out of the opening on the back panel, as shown in Figure 1-1. It might be a tight fit, but do not force the board into place.
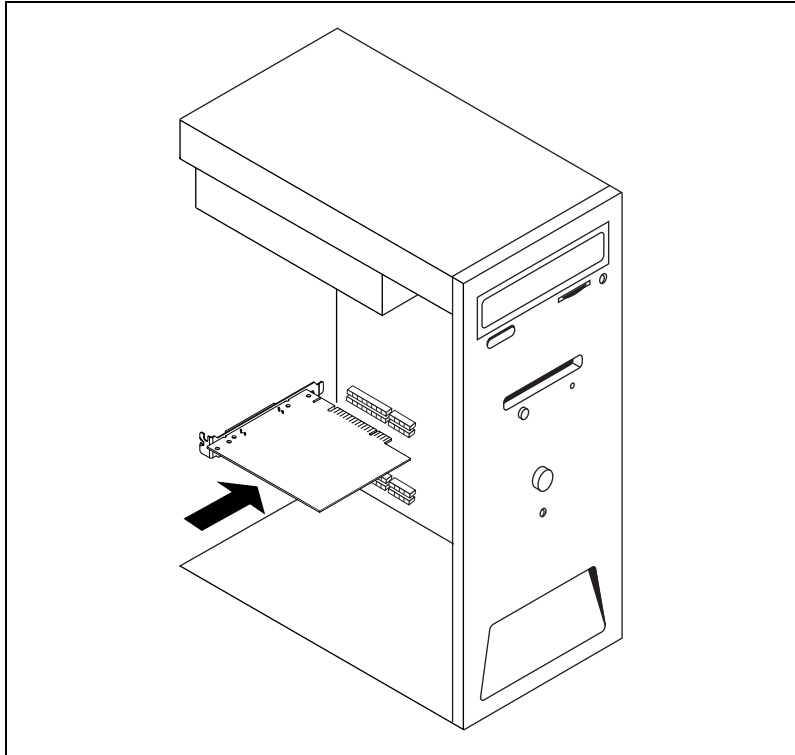

Figure 1-1. Installing the AT-GPIB/TNT (PnP)

6. Screw the mounting bracket of the GPIB board to the back panel rail of the computer.

7. Replace the top cover (or the access panel to the expansion slot) and power on your computer.

The GPIB hardware installation is now complete.

GPIB-USB Interfaces

⚠ **Caution**   The GPIB-USB hardware does not have isolation built into it. If you have a system where there are different ground potentials involved, the voltage difference could surge through the GPIB hardware and cause damage. This situation most often occurs when the PC is a laptop running on a battery and the GPIB device is powered by an AC wall connection.

To prevent damage to the GPIB-USB hardware or other components in your system when different ground potentials are involved, do any of the following:

- Buy a GPIB-120A, which can provide up to 1600 V electrical isolation between GPIB systems. These are available at `ni.com`.

- Buy a pair of GPIB-140A units, which extend a GPIB system using fiber optics. Because the GPIB signals at each end are transformed into fiber optic signals, each unit can reside at a different ground potential. These are also available at `ni.com`.

- Use a USB isolated hub. National Instruments does not sell these, but there are many available for sale elsewhere on the Web or in stores.

- Change the system setup so that all components in the system share the same earth ground to eliminate the possibilities of voltage differential running through the system.

Follow these steps to install your interface:

1. Connect the USB connector from the GPIB-USB interface to an available USB port on your computer.

2. Before connecting the GPIB-USB interface to GPIB devices, ensure that the computer and the GPIB devices are at the same ground potential. The GPIB-USB interface connects directly to most GPIB devices without requiring a GPIB cable.

3. If your computer is already running, the operating system automatically detects the GPIB interface. Otherwise, the GPIB interface is detected when you start your computer.

| 1 | PC | 2 | USB Connector | 3 | GPIB-USB Interface | 4 | To GPIB Devices |
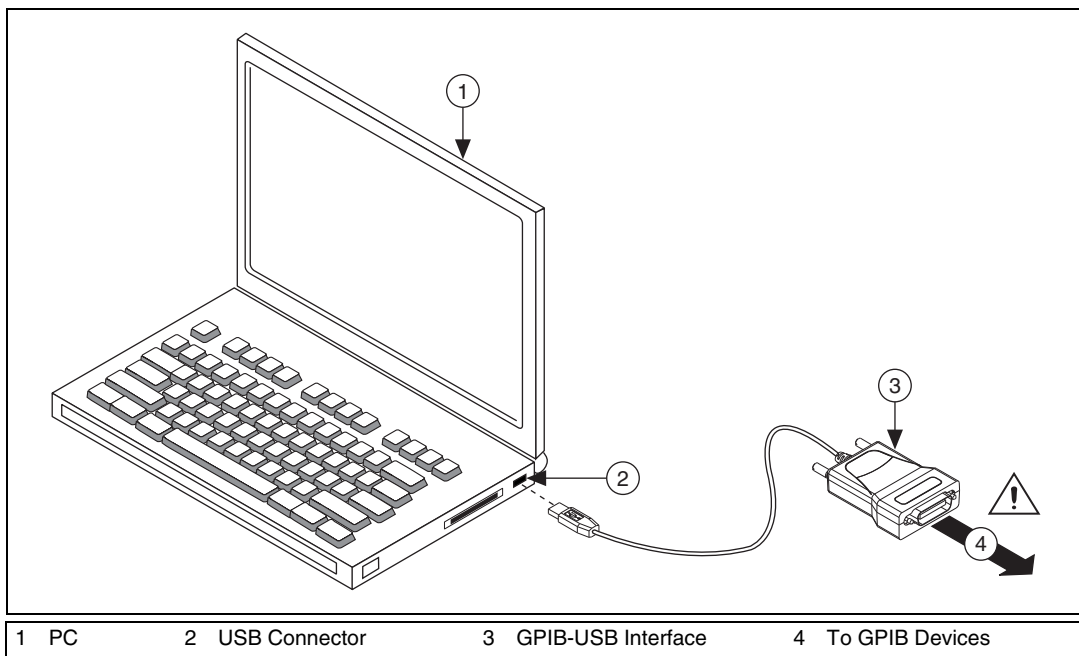
Figure 1-2. Installing the GPIB-USB Interface

The GPIB hardware installation is now complete.

NI PCIe-GPIB, NI PCIe-GPIB+, PCI-GPIB, PCI-GPIB+, PCI-GPIB/LP, and PCI-8232

⚠ **Caution** Electrostatic discharge can damage several components on your GPIB board. To avoid such damage in handling your board, touch the antistatic plastic package to a metal part of your computer chassis before removing the board from the package.

Follow these steps to install your interface:

1. Make sure that your computer is powered off. Keep the computer plugged in so that it remains grounded while you install the GPIB hardware.

2. Remove the top cover (or other access panels) to gain access to the computer expansion slots.

3. Find an unused expansion slot in your computer. Your PCI card can be plugged into either a 3.3 V or 5 V, 32- or 64-bit PCI slot. Your PCI Express card can be plugged into a x1, x4, x8, or x16 PCI Express slot.

4. Remove the corresponding slot cover on the back panel of the computer.

5. Insert the GPIB board into the slot with the GPIB connector sticking out of the opening on the back panel, as shown in Figure 1-3. It might be a tight fit, but do not force the board into place.

Note   Your PCI Express board may be larger than the one shown in the figure.

1	PCI Express Board	3	Computer
2	PCI Express Slot		

1	PCI Board	3	Computer
2	PCI Slot		
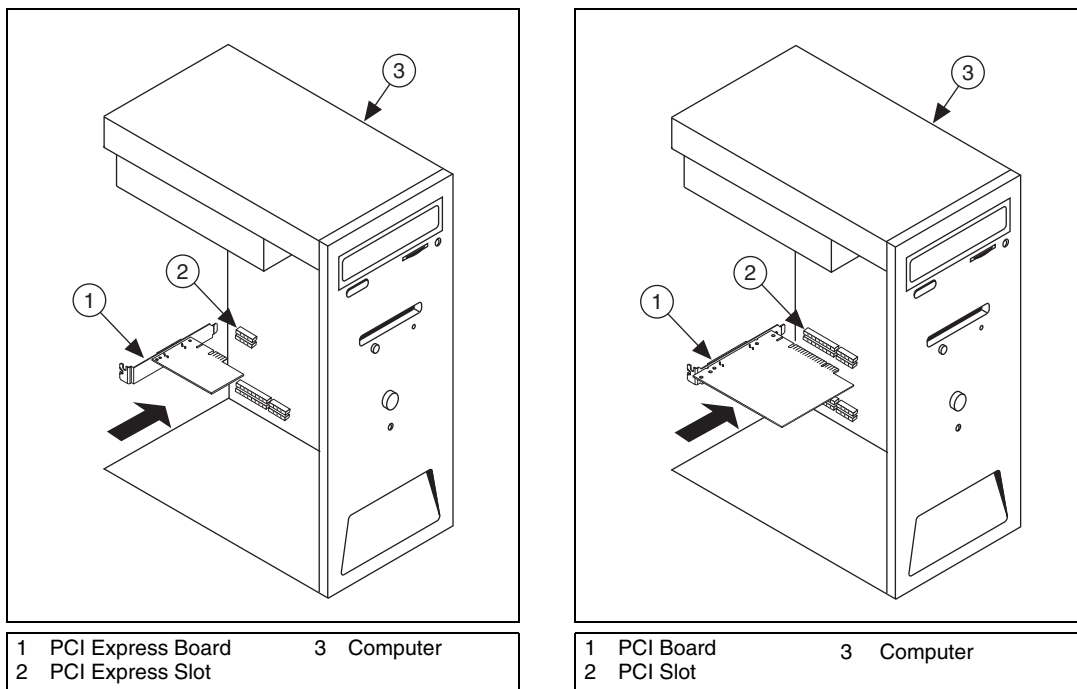
Figure 1-3. Installing Your PCI Card

6. Screw the mounting bracket of the GPIB board to the back panel rail of the computer.

7. Replace the top cover (or the access panel to the expansion slot).

8. Power on your computer.

The GPIB hardware installation is now complete.

PCMCIA-GPIB

⚠ **Caution**   The PCMCIA-GPIB hardware does not have isolation built into it. If you have a system where there are different ground potentials involved, the voltage difference could surge through the GPIB hardware and cause damage. This situation most often occurs when the PC is a laptop running on a battery and the GPIB device is powered by an AC wall connection.

To prevent damage to the PCMCIA-GPIB hardware or other components in your system when different ground potentials are involved, do any of the following:

•   Buy a GPIB-120A, which can provide up to 1600 V electrical isolation between GPIB systems. These are available at `ni.com`.

•   Buy a pair of GPIB-140A units, which extend a GPIB system using fiber optics. Because the GPIB signals at each end are transformed into fiber optic signals, each unit can reside at a different ground potential. These are also available at `ni.com`.

•   Change the system setup so that all components in the system share the same earth ground to eliminate the possibilities of voltage differential running through the system.

Follow these steps to install your interface:

1.   Reboot the computer.

2.   If the PCMCIA-GPIB is not already inserted, insert it into a free PC Card (PCMCIA) socket. The card has no jumpers or switches to set, and you do not need to power down the system when you insert it.

3.   Before connecting the PCMCIA-GPIB interface to GPIB devices, ensure that the computer and the GPIB devices are at the same ground potential.

Figure 1-4 shows how to insert the PCMCIA-GPIB and how to connect the cable.

| 1 | Portable Computer | 2 | PCMCIA Socket | 3 | PCMCIA-GPIB Cable |
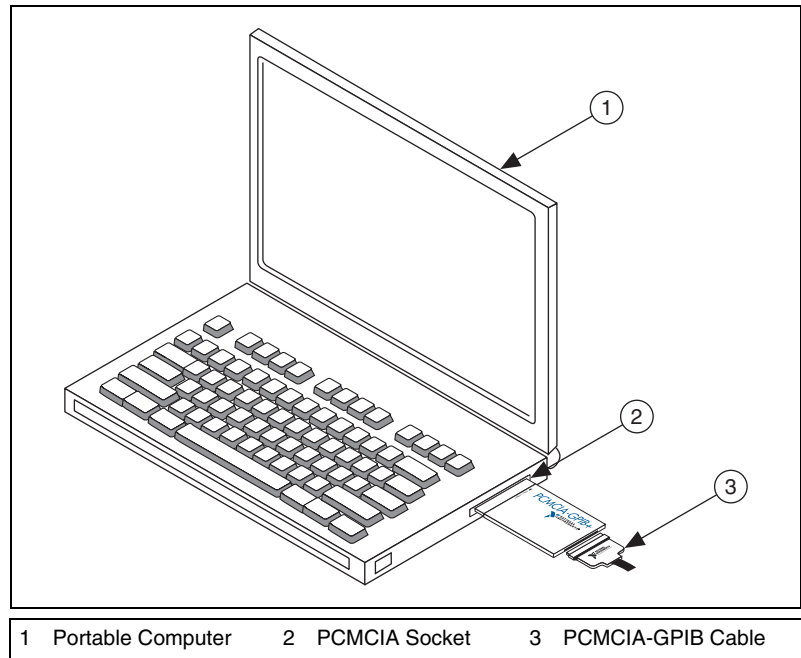
Figure 1-4. Inserting the PCMCIA-GPIB

The GPIB hardware installation is now complete.

NI ExpressCard-GPIB

⚠️ **Caution**   The NI ExpressCard-GPIB hardware does not have isolation built into it. If you have a system where there are different ground potentials involved, the voltage difference could surge through the GPIB hardware and cause damage. This situation most often occurs when the PC is a laptop running on a battery and the GPIB device is powered by an AC wall connection. To prevent damage to the NI ExpressCard-GPIB hardware or other components in your system when different ground potentials are involved, do any of the following:

• Buy a GPIB-120A, which can provide up to 1600 V electrical isolation between GPIB systems. These are available at ni.com.

• Buy a pair of GPIB-140A units, which extend a GPIB system using fiber optics. Because the GPIB signals at each end are transformed into fiber optic signals, each unit can reside at a different ground potential. These are also available at ni.com.

- Change the system setup so that all components in the system share the same earth ground to eliminate the possibilities of voltage differential running through the system.

Follow these steps to install the NI ExpressCard-GPIB interface:

1. Plug the card into an available ExpressCard™ slot on your computer.

2. Before connecting the NI ExpressCard-GPIB interface to GPIB devices, ensure that the computer and the GPIB devices are at the same ground potential. The NI ExpressCard-GPIB interface uses the same cable as the PCMCIA-GPIB.

3. If your computer is already running, the operating system automatically detects the GPIB interface. Otherwise, the GPIB interface is detected when you start your computer.

Figure 1-5 shows how to insert the NI ExpressCard-GPIB and connect the cable.

| 1 | Portable Computer | 2 | ExpressCard Slot | 3 | PCMCIA-GPIB Cable |
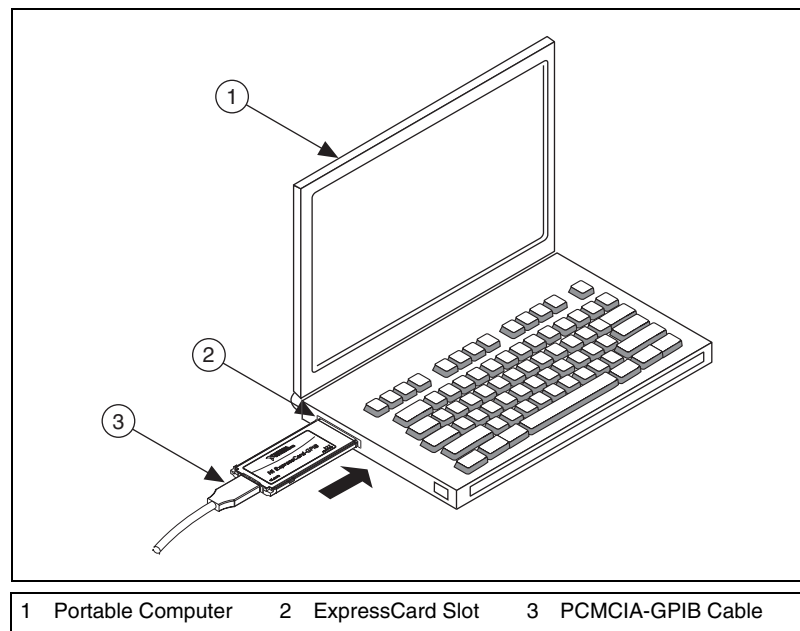
Figure 1-5. Inserting the NI ExpressCard-GPIB

The GPIB hardware installation is now complete.

PMC-GPIB

⚠ **Caution** Electrostatic discharge can damage several components on your GPIB board. To avoid electrostatic damage when you handle the board, touch the antistatic plastic package to a metal part of your system chassis before removing the board from the package.

Complete the following steps to install your PMC-GPIB:

1. Power off your system.

2. Find an unused PMC slot in your system. You may need to remove the host from the system to access the PMC slot.

3. Remove the corresponding slot filler panel from the host.

4. Insert the PMC-GPIB into the slot as shown in Figure 1-6. It might be a tight fit, but do not force the board into place.

1	Host Face Plate	3	5 V Keying Hole	5	Mounting Screws
2	3.3 V Keying Hole	4	PMC-GPIB Board		
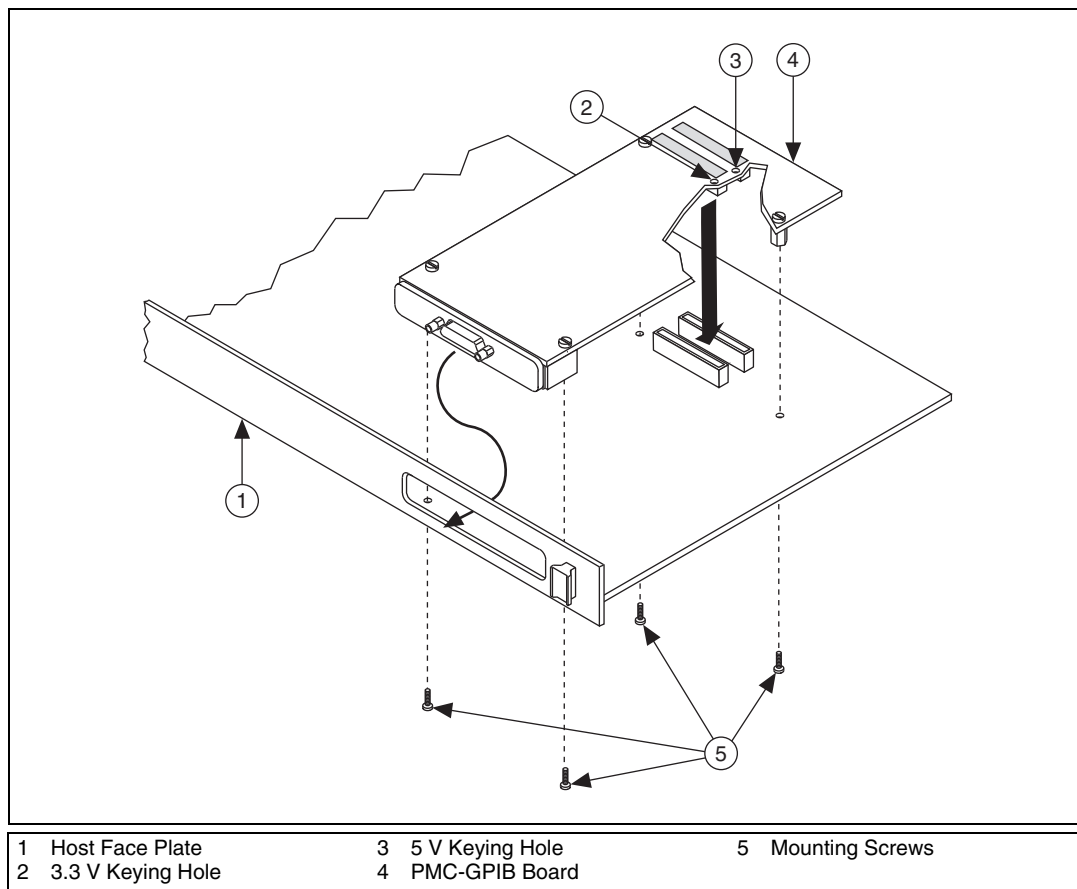
Figure 1-6. Installing the PMC-GPIB

5. Use the mounting hardware provided to fasten the PMC-GPIB to the host.

6. Reinstall the host, if you removed it to install the PMC-GPIB.

7. Power on your system.

The PMC-GPIB hardware installation is now complete.

PXI-GPIB and PXI-8232

⚠️ **Caution**   Electrostatic discharge can damage several components on your GPIB board. To avoid electrostatic damage when you handle the board, touch the antistatic plastic package to a metal part of your system chassis before removing the board from the package.

Complete the following steps to install your PXI card:

1. Make sure that your PXI or CompactPCI chassis is powered off. Keep the PXI or CompactPCI chassis plugged in so that it remains grounded while you install your PXI card.

2. Choose an unused PXI or CompactPCI 5 V peripheral slot. For maximum performance, your PXI card has an onboard DMA controller that can only be used if the board is installed in a slot that supports bus arbitration, or bus master cards. National Instruments recommends installing your PXI card in such a slot. If you install the board in a non-master slot, you must disable your PXI card's onboard DMA controller using the board-level call `ibdma`. Refer to the *NI-488.2 Help* for a complete description of `ibdma`.

3. Remove the filler panel for the peripheral slot you have chosen.

4. Touch a metal part on your chassis to discharge any static electricity that might be on your clothes or body.

5. Insert your PXI card into the selected 5 V slot. Use the injector/ejector handle to fully inject the device into place. Figure 1-7 shows how to install your PXI card into a PXI or CompactPCI chassis.

1	Injector/Ejector Handle (In Down Position)	3	PXI Chassis
2	Your PXI Card	4	Injector/Ejector Rail
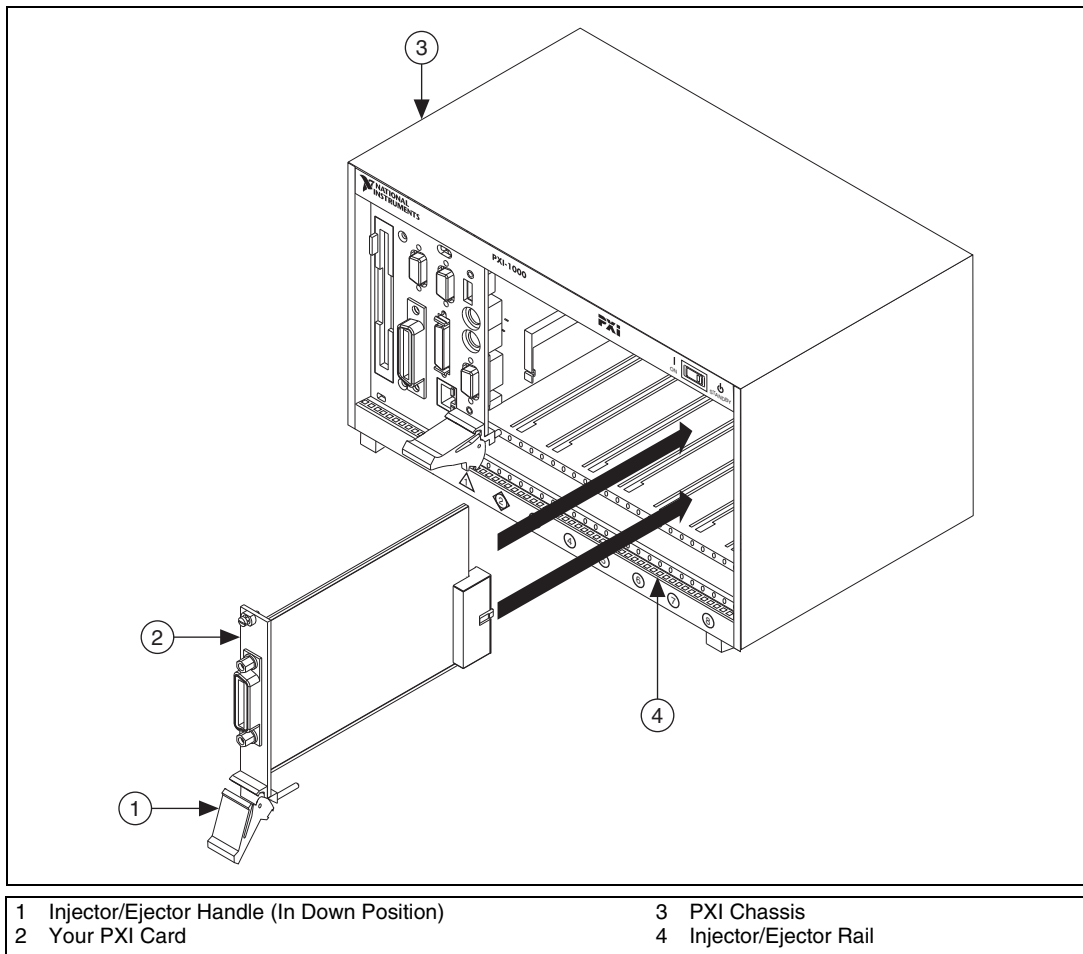
Figure 1-7. Installing Your PXI Card

6. Screw the front panel of the PXI card to the front panel mounting rail of the PXI or CompactPCI chassis.

7. Power on your PXI or CompactPCI chassis.

The PXI card installation is now complete.

GPIB-ENET/100

GPIB-ENET/100 Installation

Follow these steps and refer to Figure 1-8 to install the GPIB-ENET/100:

1. Connect one end of your Ethernet cable to your GPIB-ENET/100. Connect the other end of the Ethernet cable to your Ethernet network.

2. Connect one end of the power cord to the power supply. Screw the power connector on the other end of the power supply onto the power jack of the GPIB-ENET/100.

3. Plug the other end of the power cord into an AC outlet.

1	Front Panel LEDs	3	Power Cord	5	Ethernet Connector	7	Ethernet Cable
2	GPIB Cable	4	Power Supply	6	Power Connector	8	To Ethernet Network
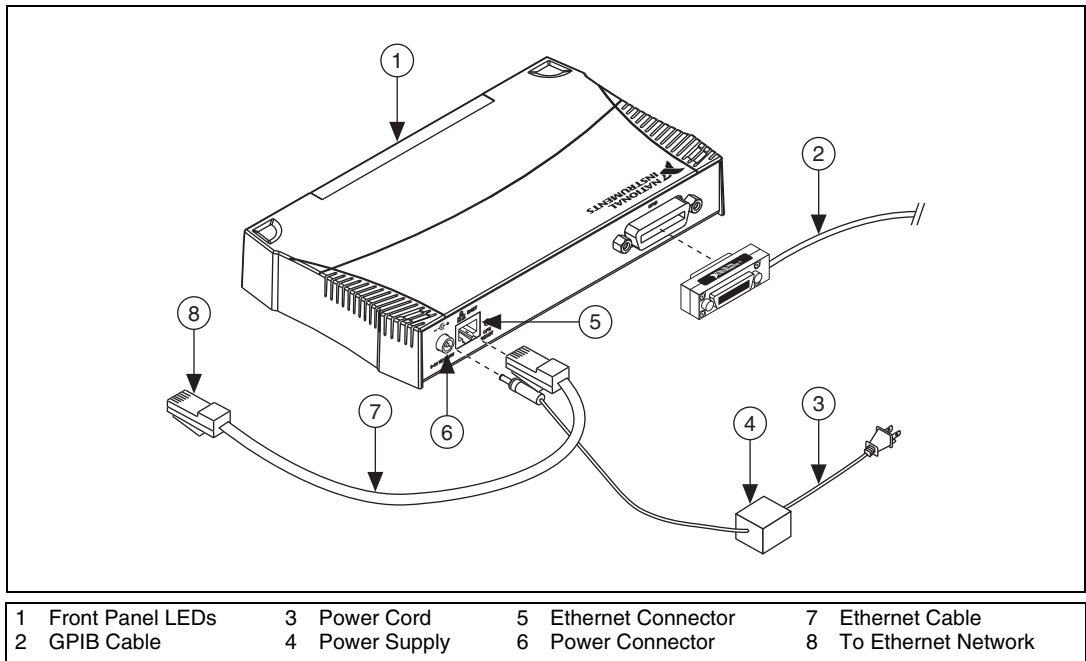
Figure 1-8. Installing the GPIB-ENET/100

4. Refer to the *Baseplate Identification Label* on the base of the GPIB-ENET/100 and make a note of the serial number, Ethernet address, and default hostname. You will need this information when you run some of the utilities.

5. Contact your network administrator to determine whether your network supports DHCP or if you need to manually perform the Ethernet configuration to set up the network parameters. If your

network uses DHCP, the network configuration is performed automatically at startup. A steady yellow **PWR/RDY** LED indicates the GPIB-ENET/100 passed its self-tests and acquired its IP address. The unit is now ready to operate. You may need to run software configuration and verification utilities at this time.

6. Connect the GPIB cable to the GPIB-ENET/100. Connect the other end to your GPIB instrument.

Baseplate Identification Label

When you configure the GPIB-ENET/100 for use on your network, you will need to differentiate it from other network devices. Every GPIB-ENET/100 has a unique serial number, Ethernet address, and default hostname. You can find this information on the baseplate identification label on the GPIB-ENET/100.

Note   The Ethernet address is not the IP address. All devices on an Ethernet network are assigned a unique physical address—the Ethernet address—so they can communicate with each other.

| 1 | Serial Number | 2 | Ethernet Address | 3 | Default Hostname |
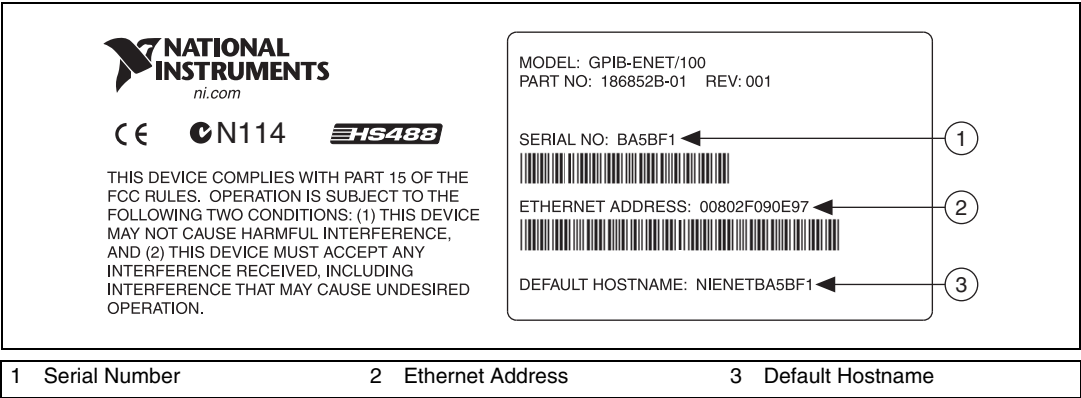
Figure 1-9. GPIB-ENET/100 Baseplate Identification Label

Startup

Turn on the front-panel power switch. The **PWR/RDY** LED flickers orange rapidly while the GPIB-ENET/100 completes its power-on self-tests and attempts to acquire its network parameters. Each Ethernet and GPIB LED lights up as its functionality is tested.

By default, the GPIB-ENET/100 attempts its network configuration automatically through DHCP. The time required for assigning the IP address depends on your network and the configuration of your GPIB-ENET/100. Allow up to 90 seconds and observe the state of the **PWR/RDY** LED to determine the outcome of the self tests. One of the following should occur:

- A steady yellow **PWR/RDY** LED indicates the GPIB-ENET/100 passed its self tests and acquired its IP address. The unit is now ready to operate. When using DHCP, the GPIB-ENET/100 typically is ready to operate about 15 seconds after you power it on.

- If the **PWR/RDY** LED continues to flicker orange rapidly, the unit was unable to use DHCP to configure its network parameters. It is now in network configuration mode. Refer to *Ethernet Configuration* for information on configuring the network parameters manually. If this utility is successful, the **PWR/RDY** LED should become steady yellow.

- If the **PWR/RDY** LED blinks a slow red/yellow pattern, the GPIB-ENET/100 did not pass its self tests. Refer to *PWR/RDY LED Signaling* to interpret the flash pattern before calling National Instruments Technical Support.

- If the **PWR/RDY** LED is steady red, the GPIB-ENET/100 has an unrecoverable error. Contact National Instruments Technical Support.

Table 1-1 summarizes the functionality of all the front-panel LEDs on the GPIB-ENET/100.

Table 1-1. GPIB-ENET/100 LED Descriptions

LED	Description
PWR/RDY	Flashes orange rapidly at startup while performing self tests and when acquiring network parameters. A steady yellow state indicates the box is ready for operation. A distinct red/yellow flashing pattern indicates an error occurred.
LINK 10/100	Indicates the GPIB-ENET/100 detected a twisted pair (10Base-T or 100Base-TX) link. The color indicates the connection speed. If yellow, the speed is 10 Mbits/s. If green, the speed is 100 Mbits/s.
TX	Indicates the GPIB-ENET/100 is transmitting to the Ethernet network.
RX	Indicates the GPIB-ENET/100 is receiving Ethernet network traffic.
TALK	Indicates the GPIB-ENET/100 is configured as a GPIB Talker.
LISTEN	Indicates the GPIB-ENET/100 is configured as a GPIB Listener.

Software Recognition

On Windows, use the GPIB Ethernet Wizard to add the GPIB-ENET/100
to your system. Launch the GPIB Ethernet Wizard from **Start»
Programs»National Instruments»NI-488.2**. **(Windows 8)** Click
NI Launcher and select GPIB Ethernet Wizard. Accept the
GPIB-ENET/100 default configuration settings or change them while
running the wizard.

On Mac and Linux, use the Add GPIB Hardware Wizard to add the
GPIB-ENET/100 to your system. Launch the Add GPIB Hardware Wizard
from the GPIB Explorer utility in the installed `NI-488.2` or `ni4882`
directory. Once the GPIB-ENET/100 is recognized, you can change the
configuration settings with the NI Ethernet Device Configuration Utility,
described in the Ethernet Configuration section.

Refer to the installation guide on your CD for more details about the GPIB
Ethernet Wizard, Add GPIB Hardware Wizard, and GPIB Explorer utility.

Ethernet Configuration

Use the NI Ethernet Device Configuration utility if you need to manually
configure the network parameters of the GPIB-ENET/100. If your network
uses DHCP, the network configuration is performed automatically at
startup, and you do not need to run this utility unless you want to change
the hostname. Consult your network administrator if you do not know
whether your network uses DHCP.

In addition to manually configuring the network parameters, you can use
the NI Ethernet Device Configuration utility for any of the following
purposes:

• Enable DHCP
• Verify or change the hostname
• Add or change a comment to help identify the device

On Windows, once the GPIB-ENET/100 is recognized in Measurement &
Automation Explorer, you may need to remove it and add it again after
using the NI Ethernet Device Configuration Utility to change the
configuration settings.

Using the NI Ethernet Device Configuration Utility

The GPIB-ENET/100 must be in network configuration mode—the **PWR/RDY** LED continuously flickers orange rapidly—before you can make changes to the network parameters. The GPIB-ENET/100 automatically enters network configuration mode if it is unable to obtain its network configuration through DHCP. During normal operation, you also can enter network configuration mode by pressing and holding the rear-panel **CFG RESET** switch for three seconds.

Run the NI Ethernet Device Configuration Utility. For Windows, launch Measurement & Automation Explorer. If you already have a GPIB-ENET/100 installed on your system, expand **Devices and Interfaces** and **Network Devices**, right-click your GPIB-ENET/100, and select **Device Configuration**. Alternately, select **Help»Help Topics»NI-488.2** to view the NI-488.2 online help. Search for the topic *How do I set network settings for the GPIB-ENET/100?* and click the link to launch the utility.

If you are using a Mac, Linux, or UNIX platform, launch the utility from the GPIB Explorer utility in the installed `NI-488.2` or `ni4882` directory.

The **NI Ethernet Device Configuration** window displays a list of National Instruments Ethernet devices found on your subnet, sorted by model. You can identify your device by the Ethernet address or the serial number found on the GPIB-ENET/100 baseplate label.

The listed devices can be in one of four possible states, as indicated in the **IP address/hostname** column:

- A hostname indicates the device has successfully been configured by DHCP.

- A numerical IP address indicates the device has successfully been configured with a static IP address.

- ***Unconfigured*** indicates the device is configured to use DHCP, but DHCP failed to attain network parameters.

- ***Busy*** indicates the device is configured to use DHCP and currently is attempting to acquire network parameters.

View the properties for any of the following reasons:

- You need to configure an unconfigured IP address.

- You need to change the current network parameters.

- You previously used DHCP, but it is no longer available.

- You are using DHCP and need to change the hostname of the GPIB-ENET/100.

- The **IP address/hostname** column displays an exclamation point (**!**) next to your GPIB-ENET/100, indicating a configuration problem. Refer to *Verifying the Hostname* for help resolving this problem.

- You want to add or change a comment to help identify the device.

Refresh the list of Ethernet devices if you do not see your GPIB-ENET/100 in the list, or to discover a device that you recently added to the subnet.

Exit if you are finished using the NI Ethernet Device Configuration utility or if you are using DHCP and you do not need to change the hostname of the GPIB-ENET/100.

Changing the Network Settings

Your GPIB-ENET/100 must be in network configuration mode before you can use the NI Ethernet Device Configuration utility to change its network settings. You also can refer to *Enter Network Configuration Mode during Normal Operation* if the **PWR/RDY** LED is not currently flickering orange rapidly.

1. View the properties for your GPIB-ENET/100.

   The current hostname is displayed. The hostname associates a name with a numerical IP address. **Hostname** is a required field.

   The GPIB-ENET/100 attempts to use the hostname when registering with DHCP. Many DHCP servers have the ability to register the hostname and the assigned IP address. You then can reliably use the hostname to communicate with your GPIB-ENET/100 even if the numerical IP address changes.

   However, some DHCP servers do not implement hostname registration. The GPIB-ENET/100 requires Domain Name Server (DNS) registration when using DHCP. If your DHCP server does not support DNS registration, you must use static network parameters.

2. Select either **Obtain an IP address automatically (DHCP)** or **Use the following IP settings**.

   a. If you select **Obtain an IP address automatically (DHCP)**, you do not need to enter any network parameters unless you want to change the hostname of the Ethernet device.

   b. If you select **Use the following IP settings**, enter the *Static IP Parameters* you have chosen for the host IP address, subnet mask, gateway IP, and DNS server IP.

3. You can enter an optional comment to help you identify each device.

4. Confirm your changes and exit the NI Ethernet Device Configuration utility.

The GPIB-ENET/100 automatically reboots with the new configuration in effect.

Static IP Parameters

If DHCP is not available, you must provide the GPIB-ENET/100 with several important network parameters.

*   **IP address**—The unique, computer-readable address of a device on your network. An IP address typically is represented as four decimal numbers separated by periods (for example, `130.164.54.215`). Refer to the *Choosing a Static IP Address* section.

*   **Subnet mask**—A code that helps the network device determine whether another device is on the same network or a different network.

*   **Gateway IP**—The IP address of a device that acts as a gateway, which is a connection between two networks. If your network does not have a gateway, set this parameter to `0.0.0.0`.

*   **DNS Server**—The IP address of a network device that stores hostnames and translates them into IP addresses. If your network does not have a DNS server, set this parameter to `0.0.0.0`.

Choosing a Static IP Address

For a Network Administered by a Network Administrator

If you are adding the GPIB-ENET/100 to an existing Ethernet network, you must choose IP addresses carefully. Contact your network administrator to obtain an appropriate static IP address for your GPIB-ENET/100. Also have the network administrator assign the proper subnet mask, gateway, and DNS server addresses.

For a Network without a Network Administrator

If you are assembling your own small Ethernet network, you can choose your own IP addresses. The format of the IP addresses is determined by the subnet mask. You should use the same subnet mask as the computer you are using with your GPIB-ENET/100. If your subnet mask is `255.255.255.0`, the first three numbers in every IP address on the network must be the same. If your subnet mask is `255.255.0.0`, only the first two numbers in the IP addresses on the network must match.

For either subnet mask, numbers between 1 and 254 are valid choices for the last number of the IP address. Numbers between 0 and 255 are valid for the third number of the IP address, but this number must be the same as other devices on your network if your subnet mask is 255.255.255.0.

If you are setting up your own network, you probably do not have a gateway or DNS server, so you should set these values to 0.0.0.0.

Verifying the Hostname

The NI Ethernet Device Configuration utility automatically verifies that the hostname for each DHCP-enabled device matches the DNS entry for the assigned IP address. This verification process automatically occurs when you either run the utility or refresh the list of devices. The utility alerts you if it detects a problem with the network settings.

To correct the problem with the hostname, complete the following steps:

1. Locate the device that has a problem. This is indicated by an exclamation point (**!**) on the device icon.

2. View the properties for the device. The utility displays four options for resolving the verification error. Select the one that best fits your situation.

   - **Change the device's hostname to match the DNS entry**—Use this option if you want to accept the hostname assigned by the DHCP server, or if you cannot contact the network administrator to change the DNS entry.

   - **Use static network parameters instead of DHCP**—Use this option if you cannot use the hostname assigned by the DHCP server. Contact your network administrator to obtain a valid IP address, subnet, and gateway. This option disables DHCP on the device.

   - **Edit the current hostname**—Use this option to change the hostname to a name other than either the configured hostname or the name assigned by the DHCP server. Contact your network administrator to obtain a valid name.

   - **Keep the existing hostname**—Use this option if you want to keep the previously assigned hostname. If you select this option, contact your network administrator to change the DNS entry.

3. Confirm the network parameter settings. The device reboots with the new settings in effect.

4. After the device reboots, refresh the list of devices to verify that the hostname is now valid.

5. Exit when you are finished using the NI Ethernet Device Configuration utility.

Firmware Update

The GPIB-ENET/100 software includes a firmware update utility you can use to access new features that may be added to the GPIB-ENET/100 in the future. You must update the firmware to take advantage of any new features.

The GPIB-ENET/100 always ships with the most recent firmware. You do not need to run the firmware update utility on a new product. You can obtain the latest upgrade at the following path:

`ftp://ftp.ni.com/support/gpib/firmware/GPIBENET100/`

You need to know either the IP address or hostname of your GPIB-ENET/100 before you run the NI Ethernet Device Firmware Update utility. If you do not remember this information, first run the NI Ethernet Device Configuration utility.

⚠ **Caution**   Do *not* power-off the GPIB-ENET/100 or disconnect the power supply while running the NI Ethernet Device Firmware Update utility. Doing so will damage the unit. The GPIB-ENET/100 reboots automatically when the update completes.

📝 **Note**   The NI Ethernet Device Firmware Update utility cannot update the firmware while any network connections are active. Close any open connections before you attempt a firmware update. Hosts cannot connect to the GPIB-ENET/100 while it is updating the firmware.

1. In Windows, run Measurement & Automation Explorer. Right-click on any GPIB-ENET/100 interface and select **Firmware Update** from the drop-down menu. If you are using a Mac, Linux, or UNIX platform, launch the utility from the GPIB Explorer utility in the installed `NI-488.2` or `ni4882` directory.

2. Specify the hostname or IP address of the GPIB-ENET/100 and enter the full path of the binary file where the firmware image is located.

3. The NI Ethernet Device Firmware Update utility communicates with the specified GPIB-ENET/100 to verify the box has no open network connections and determine the current version of the firmware in the unit.

4. When prompted, confirm the change you are about to perform. The update utility transfers the firmware image to your GPIB-ENET/100 and displays the status of the update, including whether the firmware update completed successfully or failed. The GPIB-ENET/100 automatically reboots with the new firmware in effect.

5. Exit the NI Ethernet Device Firmware Update utility.

PWR/RDY LED Signaling

The **PWR/RDY** LED blinks slowly in a distinct red/yellow pattern to alert you of internal errors. Use this section to interpret and record the pattern that the **PWR/RDY** LED flashes, and then contact National Instruments.

Note   By recording the **PWR/RDY** LED status messages before calling National Instruments, you can save yourself time, and the Product Support Department can answer your questions more accurately and efficiently. Do not switch off power to your GPIB-ENET/100 before recording the flashing **PWR/RDY** LED pattern.

PWR/RDY LED signaling can report up to 81 different errors. The errors are numbered from 11 to 99 and are reported through sequences of **PWR/RDY** LED flashes.

Note   There is no zero in any error message. This means that error message numbers 0–10, 20, 30, 40, 50, 60, 70, 80, and 90 are not possible.

Step 1. Count the Long Flashes

A three-second interval, during which the **PWR/RDY** LED is yellow, separates each repetition of the sequence. The sequence begins with a series of long one-second flashes—that is, one second red, one second yellow. These long flashes represent the digit in the tens column. There can be one to nine long flashes, which represent digits 1 through 9. For example, one long flash represents the digit 1 in the tens column, and nine long flashes represent the digit 9 in the tens column.

Step 2. Count the Short Flashes

The long flashes are followed by shorter flashes; each short flash lasts about one-fifth of a second—that is, one-fifth of a second red, one-fifth of a second yellow. These short flashes represent the digit in the ones column. Again, there can be one to nine flashes, which represent the digits 1 through 9. For example, one short flash represents the digit 1 in the ones column, and nine short flashes represent the digit 9 in the ones column.

Using this method, the **PWR/RDY** LED flashes the following sequence to represent status message 11:

<three seconds yellow> <one long red flash> <one short red flash> <three seconds yellow>…

The **PWR/RDY** LED flashes the following sequence to represent status message 31:

<three seconds yellow> <three long red flashes> <one short red flash> <three seconds yellow>…

Step 3. Record Your Status Code Number

When you have computed your error message number, write it down and also note the ON/OFF state of the **LINK**, **TX**, and **RX** LEDs. Have this information available when calling National Instruments.

CFG RESET Switch

The Configuration Reset (**CFG RESET**) switch is a recessed switch located beside the ENET connector on the rear panel.

You can use this switch to either reset the unit to its default network characteristics or place the GPIB-ENET/100 in network configuration mode.

Reset the Default Network Characteristics at Startup

If you want to reset the unit to its default network characteristics, you can use the **CFG RESET** switch at power-on. By pressing and holding the **CFG RESET** switch while you power on the GPIB-ENET/100, the network parameters revert to the default settings as defined on the baseplate label.

You must press and hold the switch for three seconds. If you release the switch prior to three seconds, no change occurs to the network configuration, and the GPIB-ENET/100 continues to boot normally.

Observe the **PWR/RDY** LED as it goes through the following changes during these three seconds.

1. The LED begins slowly alternating between red and yellow.

2. The alternating pattern increases in tempo.

3. At three seconds, the **PWR/RDY** LED becomes steady red. This indicates the network configuration will be set to the factory default settings.

4. When you release the **CFG RESET** switch, the box continues to boot as normal, and the **PWR/RDY** LED indicates the boot process as described in Table 1-1, *GPIB-ENET/100 LED Descriptions*.

Enter Network Configuration Mode during Normal Operation

While the GPIB-ENET/100 is operational, as indicated by a steady yellow **PWR/RDY** LED, you can use the **CFG RESET** switch to place the box into network configuration mode. You then can use the NI Ethernet Device Configuration utility.

Because you cannot change the network parameters unless you deliberately place the GPIB-ENET/100 into network configuration mode, the parameters are protected while in normal operation. Hosts cannot connect to the GPIB-ENET/100 while it is in network configuration mode.

Note Pressing the **CFG RESET** switch has no effect if hosts are currently connected.

Close all connections, then press and hold the **CFG RESET** switch for three seconds. If you release the switch prior to three seconds, the GPIB-ENET/100 continues to operate normally.

The **PWR/RDY** LED goes through the following changes during these three seconds.

1. The LED begins slowly alternating between red and yellow.

2. The alternating pattern increases in tempo.

3. At three seconds, the **PWR/RDY** LED becomes steady red. This indicates the GPIB-ENET/100 is ready to enter network configuration mode.

4. Now release the **CFG RESET** switch. The **PWR/RDY** LED alternates rapidly between red and yellow to indicate the GPIB-ENET/100 is now in network configuration mode.

This mode remains in effect until you switch off the GPIB-ENET/100 or you use the NI Ethernet Device Configuration utility to change its network characteristics. The GPIB-ENET/100 automatically reboots when you exit the utility.

GPIB-ENET/1000

GPIB-ENET/1000 Installation

Follow these steps and refer to Figure 1-10 to install the GPIB-ENET/1000:

1. Connect one end of your Ethernet cable to your GPIB-ENET/1000. Connect the other end of the Ethernet cable to your Ethernet network.

2. Connect one end of the power cord to the power supply. Screw the power connector on the other end of the power supply onto the power jack of the GPIB-ENET/1000.

3. Plug the other end of the power cord into an AC outlet.

1	Front Panel LEDs	4	Power Supply	7	Configuration Reset Switch
2	GPIB Cable	5	Ethernet Connector	8	Ethernet Cable
3	Power Cord	6	Power Connector	9	To Ethernet Network
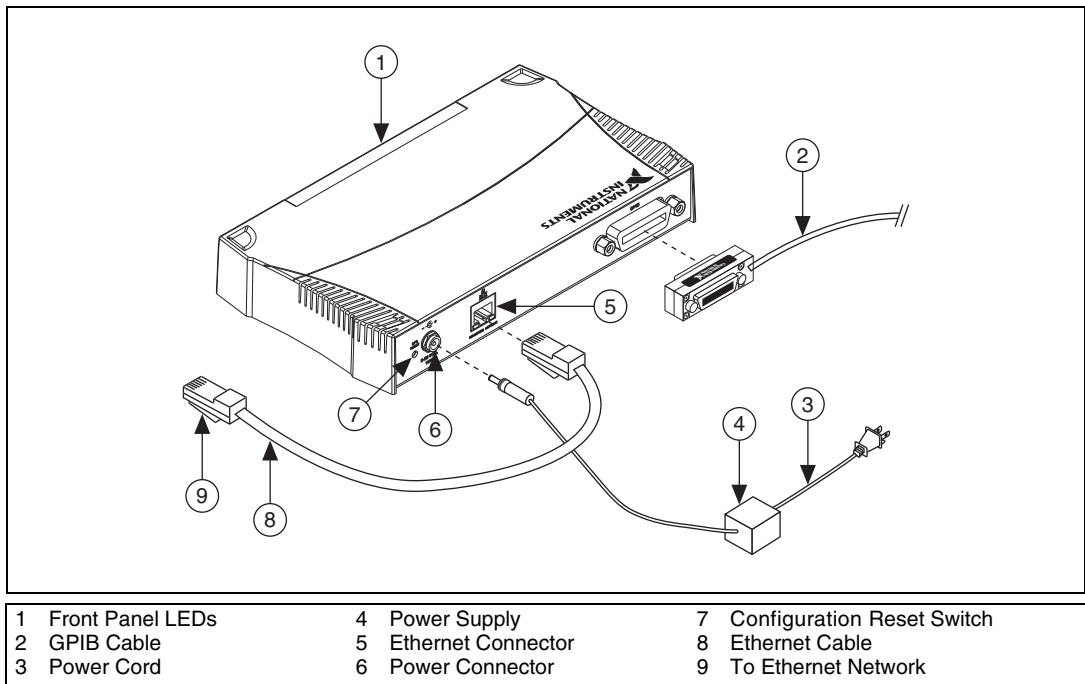
Figure 1-10. Installing the GPIB-ENET/1000

4. Refer to the *Baseplate Identification Label* on the base of the GPIB-ENET/1000 and make a note of the serial number, MAC address (Ethernet address), and default hostname. You will need this information when you run some of the utilities.

5. Contact your network administrator to determine whether your network supports DHCP or if you need to manually perform the Ethernet configuration to set up the network parameters. If your network uses DHCP, the network configuration is performed automatically at startup. If your network does not use DHCP, Auto IP (link-local) addressing is used to acquire an initial IP address. A steady green **READY** LED indicates the GPIB-ENET/1000 finished its boot process and acquired its IP address. The unit is now ready to operate. You may need to run software configuration and verification utilities at this time.

6. Connect the GPIB cable to the GPIB-ENET/1000. Connect the other end to your GPIB instrument.

Baseplate Identification Label

When you configure the GPIB-ENET/1000 for use on your network, you will need to differentiate it from other network devices. Every GPIB-ENET/1000 has a unique serial number, Ethernet address, and default hostname. You can find this information on the baseplate identification label on the GPIB-ENET/1000.

Note   The Ethernet address is not the IP address. All devices on an Ethernet network are assigned a unique physical address—the Ethernet address, also known as the MAC address—so they can communicate with each other.

| 1 | Serial Number | 2 | MAC Address (Ethernet Address) | 3 | Default Hostname |
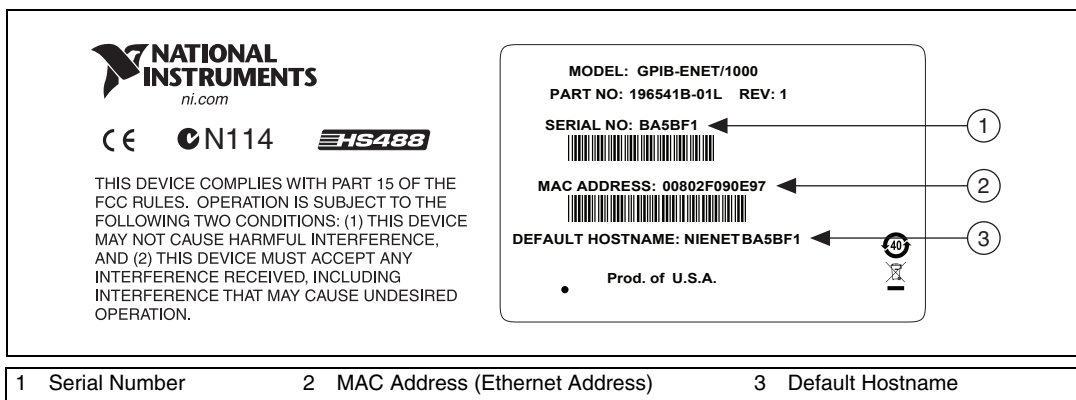
Figure 1-11. GPIB-ENET/1000 Baseplate Identification Label

Startup

Turn on the front-panel power switch. The **POWER** LED turns solid green. The **READY** LED flickers green rapidly while the GPIB-ENET/1000 completes its boot process and attempts to acquire its network parameters.

By default, the GPIB-ENET/1000 attempts its network configuration automatically through DHCP. If there is no DHCP response, the GPIB-ENET/1000 reverts to Auto IP addressing and assigns itself an IP address in the range of 169.254.*x*.*x*. Refer to *Auto IP Addressing* for more information. The time required for assigning the IP address depends on your network and the configuration of your GPIB-ENET/1000. Allow up to 30 seconds and observe the state of the **READY** LED to determine the outcome of the boot process. One of the following should occur:

- A steady green **READY** LED indicates the GPIB-ENET/1000 finished the boot process and acquired its IP address. The unit is now ready to operate. When using DHCP, the GPIB-ENET/1000 typically is ready to operate about 15 seconds after you power it on.

- If the **READY** LED blinks a slow red pattern, the GPIB-ENET/1000 boot process failed. Refer to *READY LED Signaling* to interpret the flash pattern before calling National Instruments Technical Support.

- A steady red **READY** LED indicates that the GPIB-ENET/1000 has corrupt firmware and has entered Safe Mode. The only operation allowed in Safe Mode is to update the firmware. Refer to the *Firmware Update* section for instructions on how to update the firmware.

Table 1-2 summarizes the functionality of all the front-panel LEDs on the GPIB-ENET/1000.

Table 1-2. GPIB-ENET/1000 LED Descriptions

LED	Description
POWER	Indicates the power cable is connected and the GPIB-ENET/1000 is switched on.
READY	Flashes green rapidly at startup while booting and acquiring network parameters. A steady green state indicates the box is ready for operation. A steady red or slow red flashing pattern indicates an error occurred.
TALK	Indicates the GPIB-ENET/1000 is configured as a GPIB Talker.
LISTEN	Indicates the GPIB-ENET/1000 is configured as a GPIB Listener.
ACT/LINK	Indicates the GPIB-ENET/1000 detected an Ethernet link and flickers to indicate network activity.

Ethernet Connector LEDs

The Ethernet connector LEDs on the back panel, shown in Figure 1-12, indicate your Ethernet connection status.
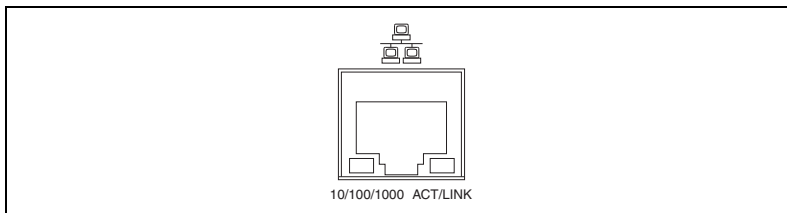
Figure 1-12. Ethernet Connector LEDs

The **10/100/1000** LED indicates your Ethernet connection speed.

- **Yellow**—Indicates your network connection is 1000 Mbit/s.

- **Green**—Indicates your network connection is 100 Mbit/s.

- **Off**—Indicates your network connection is 10 Mbit/s, or the Ethernet is not connected if the **ACT/LINK** LED also is off.

The **ACT/LINK** LED indicates network activity.

- **Steady green**—Indicates you have a network link, but no network activity is detected.

- **Flickering green**—Indicates you have a network link and network activity is detected.

- **Off**—Indicates you do not have a network link.

Software Recognition

Use the GPIB Ethernet Wizard to add the GPIB-ENET/1000 to your system. Launch the GPIB Ethernet Wizard from **Start»Programs» National Instruments»NI-488.2**. (**Windows 8**) Click **NI Launcher** and select GPIB Ethernet Wizard. Accept the GPIB-ENET/1000 default configuration settings or change them while running the wizard.

Ethernet Configuration

The GPIB-ENET/1000 uses a Web page for device configuration. If your network uses DHCP, the network configuration is performed automatically at startup, and you should not need the GPIB-ENET/1000 Configuration Web page unless you need to modify the hostname or update the firmware.

In addition to manually configuring the network parameters, you can use the GPIB-ENET/1000 Configuration Web page for any of the following purposes:

- Enable DHCP/Auto IP addressing

- Verify or change the hostname

- Add or change a comment to help identify the device

- Change the administrator password

- Update firmware

Once the GPIB-ENET/1000 is recognized in Measurement & Automation Explorer, you may need to remove it and add it again if you modify the configuration of a GPIB-ENET/1000.

Using the GPIB-ENET/1000 Configuration Web Page

You can access the GPIB-ENET/1000 Configuration Web page in most browsers. Enter the IP address or hostname into the browser's address bar. Anyone can view the current configuration at any time. However, changes to the configuration or firmware updates proceed only after you enter the proper password.

Changing the Network Settings

Follow these steps to change the network settings:

1. Navigate to the GPIB-ENET/1000 Configuration Web page using a browser.

   The current hostname is displayed. The hostname associates a name with a numerical IP address. **Hostname** is a required field.

   The GPIB-ENET/1000 attempts to use the hostname when registering with DHCP. Many DHCP servers have the ability to register the hostname and the assigned IP address. You then can reliably use the hostname to communicate with your GPIB-ENET/1000 even if the numerical IP address changes.

   Some DHCP servers do not implement hostname registration. The GPIB-ENET/1000 requires Domain Name Server (DNS) registration when using DHCP. If your DHCP server does not support DNS registration, you must use an Auto IP address or static network parameters.

2. Choose whether you need to use DHCP with Auto IP fallback or a
   static IP configuration.

   a. Leaving the checkbox unchecked enables DHCP with Auto IP
      fallback. You do not need to enter any network parameters unless
      you want to change the Ethernet device hostname.

   b. To use static IP configuration, check the **Static IP Configuration**
      checkbox. Enter the *Static IP Parameters* you have chosen for the
      host IP Address, Subnet Mask, Default Gateway, Primary DNS
      Server, and Secondary DNS Server.

3. You can enter an optional comment to help you identify each device.

4. When your configuration is complete, save the configuration to the
   GPIB-ENET/1000. You must supply the correct administrator
   password prior to the settings being saved.

The GPIB-ENET/1000 applies the setting changes immediately. There is
no need to reboot the interface.

Auto IP Addressing

Auto IP addressing, also referred to as link-local addressing, allows a
network device to obtain its network identity automatically and advertise
its presence without other network servers being required, such as DHCP
and DNS. An Auto IP address is in the form of `169.254.`*x*`.`*x*. This type
of addressing is useful for connecting the GPIB-ENET/1000 directly to a
Windows PC.

To determine the Auto IP address the GPIB-ENET/1000 is using, you need
to discover the interface using Measurement & Automation Explorer or the
GPIB Ethernet Wizard. In addition to an automatically assigned IP address,
Auto IP also consists of a "local name" responder. You should be able to
access the GPIB-ENET/1000 using the hostname followed by `.local`,
such as `nienetba5bf1.local`.

Static IP Parameters

If DHCP is not available and you do not want to use Auto IP, you must
provide the GPIB-ENET/1000 with several important network parameters.

• **IP address**—The unique, computer-readable address of a device on
  your network. An IP address typically is represented as four decimal
  numbers separated by periods (for example, `130.164.54.215`).
  Refer to the *Choosing a Static IP Address* section.

• **Subnet Mask**—A bit mask that helps the network device determine
  whether another device is on the same network or a different network.

- **Default Gateway**—The IP address of a device that acts as a gateway, which is a connection between two networks. If your network does not have a gateway, set this parameter to `0.0.0.0`.
- **Primary DNS Server/Secondary DNS Server**—The IP address of a network device that stores hostnames and translates them into IP addresses. If your network does not have a DNS server, set this parameter to `0.0.0.0`.

Choosing a Static IP Address

For a Network Administered by a Network Administrator

If you are adding the GPIB-ENET/1000 to an existing Ethernet network, you must choose IP addresses carefully. Contact your network administrator to obtain an appropriate static IP address for your GPIB-ENET/1000. Also have the network administrator assign the proper subnet mask, gateway, and DNS server addresses.

For a Network without a Network Administrator

If you are assembling your own small Ethernet network, you can choose your own IP addresses. The format of the IP addresses is determined by the subnet mask. You should use the same subnet mask as the computer you are using with your GPIB-ENET/1000. If your subnet mask is `255.255.255.0`, the first three numbers in every IP address on the network must be the same. If your subnet mask is `255.255.0.0`, only the first two numbers in the IP addresses on the network must match.

For either subnet mask, numbers between 1 and 254 are valid choices for the last number of the IP address. Numbers between 0 and 255 are valid for the third number of the IP address, but this number must be the same as other devices on your network if your subnet mask is `255.255.255.0`.

If you are setting up your own network, you probably do not have a gateway or DNS server, so you should set these values to `0.0.0.0`.

Firmware Update

The GPIB-ENET/1000 software includes a firmware update feature you can use to access new features that may be added to the GPIB-ENET/1000 in the future. You must update the firmware to take advantage of any new features. You can obtain the latest upgrade by navigating to `ni.com/info` in a Web browser and entering Info Code `GPIBENET1000FW`.

⚠ **Caution**   Do *not* power-off the GPIB-ENET/1000 or disconnect the power supply while updating the firmware. Doing so could damage the unit. The GPIB-ENET/1000 reboots automatically when the update completes.

1.   Launch Measurement & Automation Explorer.

2.   Expand **Devices and Interfaces** and **Network Devices**.

3.   Right-click the GPIB-ENET/1000 to be updated and select **Device Configuration**. The GPIB-ENET/1000 Configuration Web page should launch.

4.   On the Web page, click **Update** under **Firmware** in the **Details** section.

READY LED Signaling

The **READY** LED blinks red slowly in a distinct pattern to alert you of internal errors. Use this section to interpret and record the pattern that the **READY** LED flashes, and then contact National Instruments.

✎ **Note**   By recording the **READY** LED status messages before calling National Instruments, you can save yourself time, and the Product Support Department can answer your questions more accurately and efficiently. Do not switch off power to your GPIB-ENET/1000 before recording the flashing **READY** LED pattern.

READY LED signaling can report up to 81 different errors. The errors are numbered from 11 to 99 and are reported through sequences of **READY** LED flashes.

✎ **Note**   There is no zero in any error message. This means that error message numbers 0–10, 20, 30, 40, 50, 60, 70, 80, and 90 are not possible.

Step 1. Count the Long Flashes

A three-second interval, during which the **READY** LED is off, separates each repetition of the sequence. The sequence begins with a series of long one-second flashes—that is, one second red, one second off. These long flashes represent the digit in the tens column. There can be one to nine long flashes, which represent digits 1 through 9. For example, one long flash represents the digit 1 in the tens column, and nine long flashes represent the digit 9 in the tens column.

Step 2. Count the Short Flashes

The long flashes are followed by shorter flashes; each short flash lasts about one-fifth of a second—that is, one-fifth of a second red, one-fifth of a second off. These short flashes represent the digit in the ones column. Again, there can be one to nine flashes, which represent the digits 1 through 9. For example, one short flash represents the digit 1 in the ones column, and nine short flashes represent the digit 9 in the ones column.

Using this method, the **READY** LED flashes the following sequence to represent status message 11:

<three seconds off> <one long red flash> <one short red flash>
<three seconds off>…

The **READY** LED flashes the following sequence to represent status message 31:

<three seconds off> <three long red flashes> <one short red flash>
<three seconds off>…

Step 3. Record Your Status Code Number

When you have computed your error message number, write it down and also note the ON/OFF state of the **ACT/LINK** LED. Have this information available when calling National Instruments.

CFG RESET Switch

The Configuration Reset (**CFG RESET**) switch is a recessed switch located beside the power connector on the rear panel.

You can use this switch at power on to reset the unit to its factory settings. By pressing and holding the **CFG RESET** switch while you power on the GPIB-ENET/1000, all settings revert to the factory settings as follows:

- DHCP with Auto IP fallback.

- Default hostname as printed on the baseplate label.

- Administrator password is pass.

You must press and hold the switch until the **READY** LED flickers yellow. If you release the switch prior to the **READY** LED flickering yellow, no change occurs to the network configuration, and the GPIB-ENET/1000 continues to boot normally.

Once the **READY** LED flickers yellow, release the **CFG RESET** switch. The GPIB-ENET/1000 resets to its default network characteristics and resumes the boot process. The **READY** LED indicates the boot process progress, as described in Table 1-2.

A

Specifications

AT-GPIB/TNT (PnP), GPIB-USB Interfaces, PCI-8232, NI PCIe-GPIB (Part Number 198405*x*-0xL), NI PCIe-GPIB+, PCI-GPIB, PCI-GPIB+, PCMCIA-GPIB, PMC-GPIB

Environment

Operating ambient temperature.............. 0 to 55 °C

Operating relative humidity .... 10 to 90%, noncondensing

Storage environment

Storage ambient temperature .... -20 to 70 °C

Storage relative humidity .... 5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-1, IEC-60068-2-2, and IEC-60068-2-56.)

Power Requirements

AT-GPIB/TNT (PnP)............................ +5 VDC @ 120 mA typical, 240 mA max

GPIB-USB Interfaces............................ Bus Power @ 500 mA max

PCI-8232 .... +5 VDC @ 874 mA typical, 1160 mA max

NI PCIe-GPIB (part number 198405*x*-0*x*L) .... +3.3 VDC @ 320 mA typical, 500 mA max

NI PCIe-GPIB+.................................... +3.3 VDC @ 360 mA typical, 560 mA max

PCI-GPIB (with TNT4882C
controller) ....+3.3 VDC @ 121 mA typical,
182 mA max
+5 VDC @ 300 mA typical,
450 mA max

PCI-GPIB (with TNT5004
controller) ....+5 VDC @ 150 mA max
+VIO @ 5 mA max

PCI-GPIB+ ....+3.3 VDC @ 170 mA typical,
575 mA max

PCMCIA-GPIB ....+5 VDC @ 65 mA typical,
85 mA max

PMC-GPIB ....+5 VDC @ 50 mA typical,
100 mA max

Performance

AT-GPIB/TNT (PNP)

3-wire...Up to 1480 Kbytes/s

HS488..Up to 1580 Kbytes/s

GPIB-USB-B

3-wire...Up to 930 Kbytes/

HS488..Up to 930 Kbytes/s

GPIB-USB-HS

3-wire...Up to 1800 Kbytes/s

HS488..Up to 7820 Kbytes/s

NI PCIe-GPIB (198405*x*-0*x*L)

3-wire...Up to 1670 Kbytes/s

HS488..Up to 7980 Kbytes/s

PCI-GPIB

3-wire...Up to 1620 Kbytes/s

HS488..Up to 7980 Kbytes/s

PCMCIA-GPIB

  3-wire .... Up to 1350 Kbytes/s

  HS488 .... Up to 1350 Kbytes/s

PXI-8232, PXI-GPIB

Environment

  Operating ambient temperature.............. 0 to 55 °C

  Operating relative humidity .... 10 to 90%, noncondensing

  Storage ambient temperature .... -20 to 70 °C

  Storage relative humidity .... 5 to 95%, noncondensing
                 (Tested in accordance with
                 IEC-60068-2-1, IEC-60068-2-2,
                 and IEC-60068-2-56.)

Shock and Vibration

  Functional 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.)

Power Requirements

PXI-8232 ....+3.3 VDC @ 910 mA typical,
1,500 mA max

PXI-GPIB (with TNT4882C
controller) ....+3.3 VDC @ 122 mA typical,
182 mA max
+5 VDC @ 300 mA typical,
450 mA max

PXI-GPIB (with TNT5004
controller) ....+3.3 VDC @ 80 mA typical,
165 mA max
+VIO @ 3 mA typical,
10 mA max

Performance

GPIB

3-wire..Up to 1620 Kbytes/s
HS488...Up to 7980 Kbytes/s

NI PCIe-GPIB (Part Number 190243*x*-01)

Environment

Operating ambient temperature ....0 to 35 °C

Operating relative humidity...................10 to 90%, noncondensing

Storage ambient temperature ....-20 to 70 °C

Storage relative humidity.......................5 to 95%, noncondensing
(Tested in accordance with
IEC-60068-2-1, IEC-60068-2-2,
and IEC-60068-2-56.)

Power requirements ....+3.3 VDC @ 970 mA typical,
+12 VDC @ 124 mA typical

Performance

GPIB

    3-wire .... Up to 1610 Kbytes/s

    HS488 .... Up to 7960 Kbytes/s

GPIB-ENET/100

Environment

Operating ambient temperature.............. 0 to 65 °C

Operating relative humidity .... 10 to 90%, noncondensing

Storage ambient temperature .... -40 to 100 °C

Storage relative humidity .... 5 to 95%, noncondensing
(Tested in accordance with
IEC-60068-2-1, IEC-60068-2-2,
and IEC-60068-2-56.)

Power requirements................................ External source 9 to 30 VDC
+15 VDC @ 250 mA typical,
425 mA max

Performance

GPIB

    3-wire .... Up to 1000 Kbytes/s

GPIB-ENET/1000

Physical

Dimensions... 20.6 × 12.7 × 3.7 cm
(8.125 × 5 × 1.438 in.)

Weight .... 402 g (14.2 oz)

Operating Environment

Ambient temperature range.................... 0 to 55 °C
(Tested in accordance with
IEC-60068-2-1 and
IEC-60068-2-2.)

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

Power requirements ....External source 9 to 30 VDC
+12 VDC @ 250 mA typical,
500 mA max

Storage Environment

Ambient temperature range ....-40 to 70 °C
(Tested in accordance with
IEC-60068-2-1 and
IEC-60068-2-2.)

Relative humidity range.........................5 to 95%, noncondensing
(Tested in accordance with
IEC-60068-2-56.)

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 Hz to 500 Hz, 0.3 g_{rms}
Nonoperating ....5 Hz to 500 Hz, 2.4 g_{rms}

Random vibration is tested in accordance with IEC-60068-2-64. The
nonoperating test profile exceeds the requirements of MIL-PRF-28800F,
Class 3.

Performance

GPIB
3-wire...Up to 1480 Kbytes/s
HS488..Up to 5600 Kbytes/s

NI ExpressCard-GPIB

Environment

Operating ambient temperature.............. 0 to 65 °C

Operating relative humidity .... 5 to 95%, noncondensing

Storage ambient temperature .... -20 to 65 °C
(Tested in accordance with
IEC-60068-2-1, IEC-60068-2-2,
and IEC-60068-2-56.)

Nonoperating thermal shock .... -20 to 65 °C, 5 shocks

Shock and Vibration

Nonoperating shock .... 50 g, 11 ms
(Tested in accordance with
IEC-60068-2-27.)

Nonoperating vibration,
sinusoidal .... 15 g, 100 to 2,000 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

Power requirements............................... +3.3 VDC ± 10% @ 140 mA
typical, 500 mA max

Performance

GPIB

3-wire .... Up to 1830 Kbytes/s
HS488 .... Up to 7230 Kbytes/s

All Devices

Altitude ....2,000 m (at 25 °C ambient temperature)

Pollution Degree 2

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, CSA 60950-1

⚠ **Caution**   Overloading the circuits may damage supply wiring. Do not exceed the ratings on the equipment nameplate when connecting equipment to the supply circuit.

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

Electromagnetic Compatibility

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

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

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

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

CE Compliance $C\,\epsilon$

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

• 2006/95/EC; Low-Voltage Directive (safety)

• 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

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

Environmental Management

NI is committed to designing and manufacturing products in an
environmentally responsible manner. NI recognizes that eliminating
certain hazardous substances from our products is beneficial to the
environment and to NI customers.

For additional environmental information, refer to the *Minimize Our
Environmental Impact* web page at ni.com/environment. This page
contains the environmental regulations and directives with which NI
complies, as well as other environmental information not included in this
document.

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 and Electronic Equipment, visit ni.com/environment/weee.

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.)

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- **Support**—Technical support at `ni.com/support` includes the following resources:

  - **Self-Help Technical Resources**—For answers and solutions, visit `ni.com/support` for software drivers and updates, a searchable KnowledgeBase, product manuals, step-by-step troubleshooting wizards, thousands of example programs, tutorials, application notes, instrument drivers, and so on. Registered users also receive access to the NI Discussion Forums at `ni.com/forums`. NI Applications Engineers make sure every question submitted online receives an answer.

  - **Standard Service Program Membership**—This program entitles members to direct access to NI Applications Engineers via phone and email for one-to-one technical support, as well as exclusive access to self-paced online training modules at `ni.com/self-paced-training`. All customers automatically receive a one-year membership in the Standard Service Program (SSP) with the purchase of most software products and bundles including NI Developer Suite. NI also offers flexible extended contract options that guarantee your SSP benefits are available without interruption for as long as you need them. Visit `ni.com/ssp` for more information.

    For information about other technical support options in your area, visit `ni.com/services`, or contact your local office at `ni.com/contact`.

- **Training and Certification**—Visit `ni.com/training` for training and certification program information. You can also register for instructor-led, hands-on courses at locations around the world.

- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, National Instruments

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You also can visit the Worldwide Offices section of `ni.com/niglobal` to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.