

**GPIB**

# **Getting Started with Your GPIB-ENET and the GPIB Software for Windows NT**

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This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual, may cause interference to radio and television reception. Classification requirements are the same for the Federal Communications Commission (FCC) and the Canadian Department of Communications (DOC). This equipment has been tested and found to comply with the following two regulatory agencies:

## Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Notices to User:** *Changes or modifications not expressly approved by National Instruments could void the user's authority to operate the equipment under the FCC Rules.*

*This device complies with the FCC rules only if used with shielded interface cables of suitable quality and construction. National Instruments used such cables to test this device and provides them for sale to the user. The use of inferior or nonshielded interface cables could void the user's authority to operate the equipment under the FCC rules.*

If necessary, consult National Instruments or an experienced radio/television technician for additional suggestions. The following booklet prepared by the FCC may also be helpful: *Interference to Home Electronic Entertainment Equipment Handbook*. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.

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This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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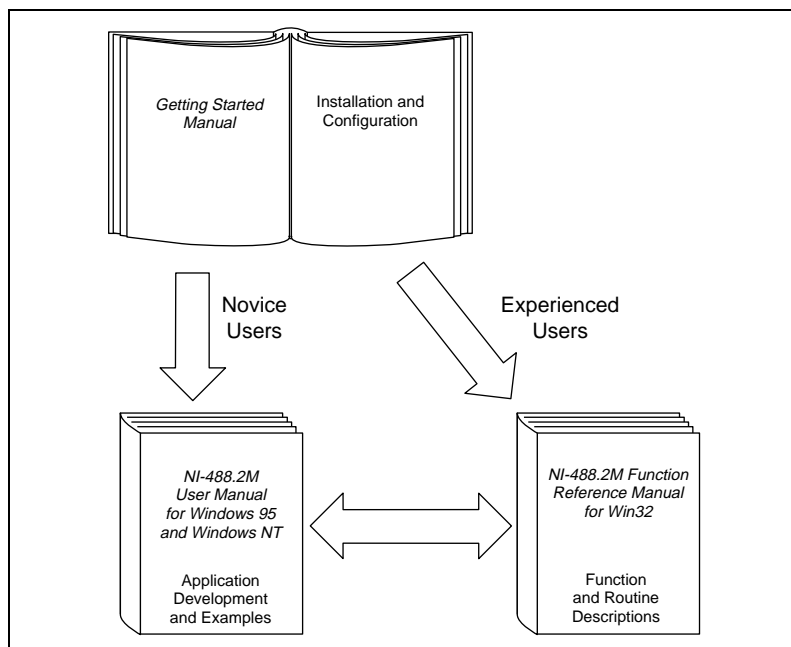


## About This Manual

This manual contains instructions to help you install and configure the National Instruments GPIB-ENET hardware and the GPIB software for Windows NT. The NI-488.2M software is intended for use with Microsoft Windows NT version 3.51 or higher.

This manual assumes that you are already familiar with Windows NT and with TCP/IP networks, and that your computer is connected to an Ethernet network. Before you can use the driver software for the GPIB-ENET, you must already have a Windows Sockets (WinSock) Interface, version 1.1 or higher, installed. Microsoft provides a WinSock Interface with Windows NT. Additionally, you can use a WinSock Interface purchased from another network vendor.

## How to Use the Manual Set



Use this getting started manual to install and configure your GPIB-ENET and the GPIB software for Windows NT.

Use the *NI-488.2M User Manual for Windows 95 and Windows NT* to learn the basics of GPIB and how to develop an application program. You can also use the user manual as a reference for debugging information and detailed examples.

Use the *NI-488.2M Function Reference Manual for Win32* for specific NI-488 function and NI-488.2 routine information, such as format, parameters, and possible errors.

## Organization of This Manual

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This manual is organized as follows:




- Chapter 1, *Introduction*, explains how to use this manual, lists what you need to get started and optional equipment you can order, and briefly describes the GPIB-ENET hardware and the GPIB software for Windows NT.
- Chapter 2, *Installation and Configuration*, describes how to install and configure the GPIB-ENET hardware and the GPIB software for Windows NT.
- Chapter 3, *Verify the Installation*, describes how to verify that the hardware and software are functioning correctly.
- Chapter 4, *Begin to Use the GPIB Software*, helps you get started with the NI-488.2M software for Windows NT.
- Appendix A, *Uninstall the Software*, describes how to uninstall the GPIB software from Windows NT.
- Appendix B, *GPIB-ENET 8-Bit DIP Switch*, describes how the 8-bit DIP switch on the back panel affects the operation of the GPIB-ENET.
- Appendix C, *READY LED Signaling*, describes how to interpret the **READY** LED error codes.
- Appendix D, *Troubleshooting and Common Questions*, describes how to troubleshoot problems and answers some common questions.
- Appendix E, *Specifications*, describes the characteristics of the GPIB-ENET and the transfer rates of the NI-488.2M software, along with the recommended operating conditions.
- Appendix F, *Customer Communication*, contains forms you can use to request help from National Instruments or to comment on our products and manuals.

- The *Glossary* contains an alphabetical list and description of terms used in this manual, including abbreviations, acronyms, metric prefixes, mnemonics, and symbols.

## Conventions Used in This Manual

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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 <b>File»Page Setup»Options»Substitute Fonts</b> directs you to pull down the <b>File</b> menu, select the <b>Page Setup</b> item, select <b>Options</b> , and finally select the <b>Substitute Fonts</b> options from the last dialog box.
	This icon to the left of bold italicized text denotes a note, which alerts you to important information.
	This icon to the left of bold italicized text denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.
	This icon to the left of bold italicized text denotes a warning, which advises you of precautions to take to avoid being electrically shocked.
<b>bold</b>	Bold text denotes the names of menus, menu items, parameters, dialog boxes, dialog box buttons or options, icons, windows, Windows 95 tabs, or LEDs.
<b><i>bold italic</i></b>	Bold italic text denotes a note, caution, or warning.
IEEE 488 and IEEE 488.2	<i>IEEE 488</i> and <i>IEEE 488.2</i> refer to the ANSI/IEEE Standard 488.1-1987 and the ANSI/IEEE Standard 488.2-1992, respectively, which define the GPIB.
<i>italic</i>	Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept.
monospace	Text in this font denotes text or characters that you should literally 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, and for statements and comments taken from programs.

## Related Documentation

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The following documents contain information that you may find helpful as you read this manual.

- ANSI/IEEE Standard 488.1-1987, *IEEE Standard Digital Interface for Programmable Instrumentation*
- ANSI/IEEE Standard 488.2-1992, *IEEE Standard Codes, Formats, Protocols, and Common Commands*
- ANSI/IEEE Standard 802.3-1988, *Information Processing Systems, Local Area Networks, Part 3*
- *Microsoft Windows NT System Guide*, Microsoft Corporation

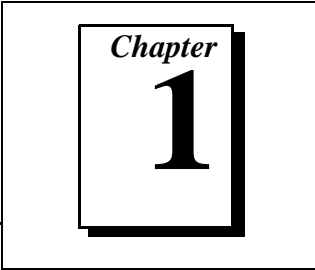
Additionally, you might need to refer to the documentation provided by your WinSock vendor.

## Customer Communication

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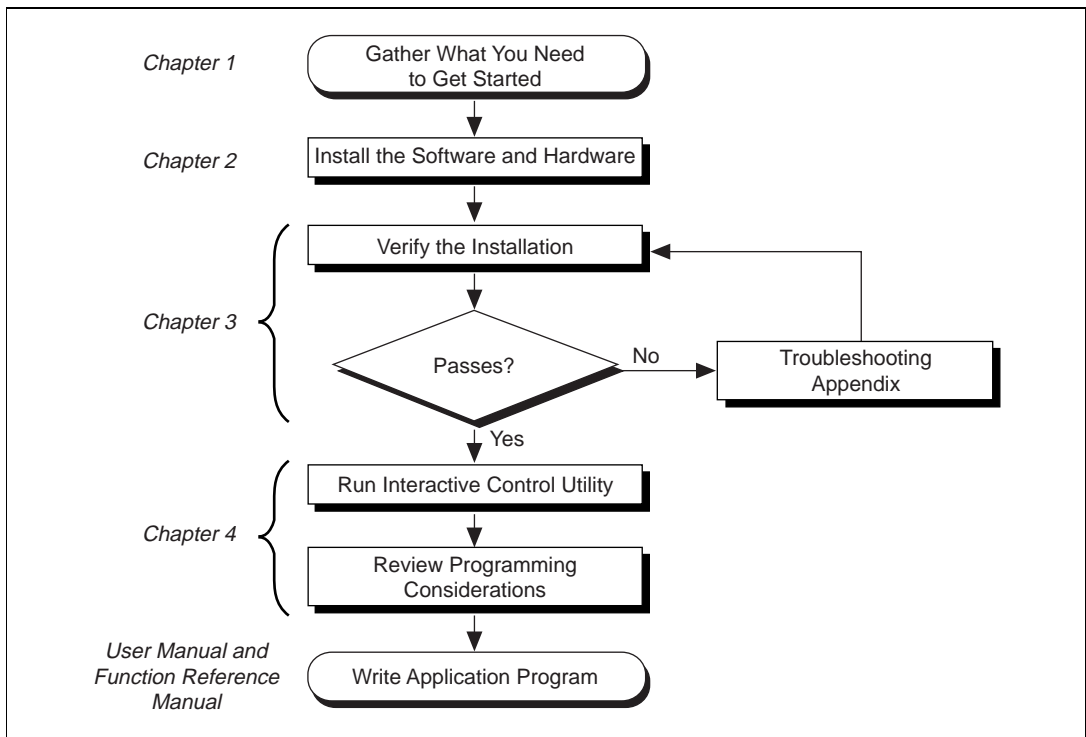
National Instruments wants to receive your comments on our products and manuals. We are interested in the applications you develop with our products, and we want to help if you have problems with them. To make it easy for you to contact us, this manual contains comment and configuration forms for you to complete. These forms are in Appendix F, [Customer Communication](#), at the end of this manual.

# Introduction



This chapter explains how to use this manual, lists what you need to get started and optional equipment you can order, and briefly describes the GPIB-ENET hardware and the GPIB software for Windows NT.

## How to Use This Manual



## What You Need to Get Started

---

Make sure you have all of the following items before you attempt to install the hardware and software:

- Windows NT version 3.51 or higher installed on your computer
- One of the following boxes, which is included in your kit:
  - GPIB-ENET—10Base-T Version (100-120 VAC)
  - GPIB-ENET—10Base-T Version (220-240 VAC)
  - GPIB-ENET—Coax Version (100-120 VAC)
  - GPIB-ENET—Coax Version (220-240 VAC)
- One of the following power cords, which is included in your kit:
  - U.S.A. standard power cord
  - Switzerland power cord
  - Australian power cord
  - Universal European power cord
  - North American power cord
  - U.K. power cord
- Ethernet cables, which you can purchase from National Instruments:
  - Twisted Pair (10Base-T) Cables (1, 5, or 10 m)
  - Coax (10Base-2) Cables (1, 5, or 10 m)
  - AUI (10Base-5) Cables (1, 5, or 10 m)
- The following 3.5 in., high density (1.44 MB) disks, which are included in your kit:
  - GPIB Software for Windows NT and the GPIB-ENET (Setup Disk)*
  - GPIB Software for Windows NT and the GPIB-ENET (NI-488.2M Software)*
- Shielded GPIB Cables<sup>1</sup>, which you can purchase from National Instruments:
  - Type X1 single-shielded cables (1, 2, or 4 m)
  - Type X2 double-shielded cables (1, 2, or 4 m)

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<sup>1</sup> To meet FCC emission limits for this device, you must use a shielded (Type X1 or X2) GPIB cable. Operating this equipment with a non-shielded cable may cause interference to radio and television reception.

# Optional Equipment

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## Multiple-Computer Software License

A multiple-computer software license is available so that one or more hosts on a single physical network can access one or more GPIB-ENET boxes. Contact National Instruments for more information regarding the license.

## Optional Hardware

Call National Instruments for more information about the following optional equipment:

- Serial or parallel bus extender and cables
- Bus expander/isolator
- GPIB mechanical switch

## GPIB-ENET Hardware Overview

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The GPIB-ENET transparently handles data transfers between an Ethernet-based TCP/IP host and the GPIB. With the GPIB-ENET, multiple hosts can share a set of GPIB instruments or a single host can control several GPIB systems.

The GPIB-ENET converts a computer equipped with an NI-488.2 driver and an Ethernet port into a GPIB Talker/Listener/Controller. It is powered by an internal 100-120 VAC or 220-240 VAC supply.

The GPIB-ENET comes with all the software and logic required to implement the physical and electrical characteristics of all versions of the ANSI/IEEE 488 standard, including ANSI/IEEE Standard 488.2-1992, and ANSI/IEEE Standard 802.3. The GPIB-ENET interprets and executes commands that you send to it over an Ethernet link and performs all necessary Ethernet-to-GPIB protocol conversions. For detailed hardware specifications, refer to Appendix E, *Specifications*.

Figure 1-1 shows the seven light-emitting diodes (LEDs) on the GPIB-ENET top panel. The LEDs show the current status of the GPIB-ENET. Table 1-1 describes each LED.

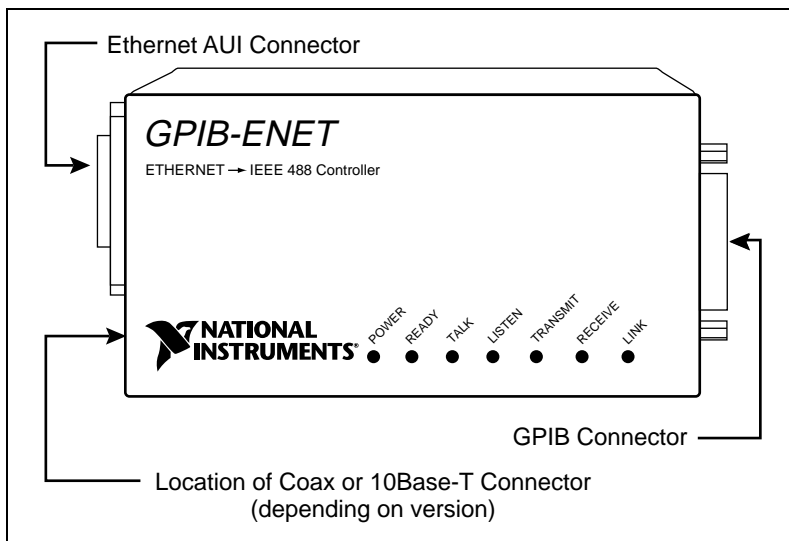


Figure 1-1. GPIB-ENET Top Panel and LEDs

Table 1-1. LED Descriptions

LED	Indication
<b>POWER</b>	Indicates that power has been supplied to the unit and the ON/OFF switch is in the ON position.
<b>READY</b>	Indicates the functional state of the GPIB-ENET. When the GPIB-ENET is powered on, this LED flashes and then becomes steady when the box is ready for operation. Continuous flashing indicates that an error has occurred.
<b>TALK</b>	Indicates that the GPIB-ENET is configured as a GPIB Talker.
<b>LISTEN</b>	Indicates that the GPIB-ENET is configured as a GPIB Listener.
<b>TRANSMIT</b>	Indicates that the GPIB-ENET is transmitting onto the Ethernet network.



**Table 1-1.** LED Descriptions (Continued)

LED	Indication
<b>RECEIVE</b>	Indicates that the GPIB-ENET is receiving Ethernet network traffic.
<b>LINK</b>	Indicates that the GPIB-ENET has detected a twisted pair (10Base-T) link. For GPIB-ENET coax and AUI options, this LED is not used and remains OFF.

## NI-488.2M Software Overview

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The NI-488.2M software includes a native, 32-bit multitasking Windows NT driver and supporting utilities.

The NI-488.2M software for Windows NT supports only the GPIB-ENET interface. If you need to access other National Instruments GPIB interfaces, you must remove the software for the GPIB-ENET and install the software for the other type of interface.

The NI-488.2M software, along with the GPIB-ENET hardware, transforms a general-purpose PC into a GPIB Talker/Listener/Controller with complete communications and bus management capability. The NI-488.2M software includes the following components:

- Device driver
- Diagnostic utility
- Configuration utilities
- Interactive control program
- Utilities for software development
- Language interface libraries for Microsoft Visual C/C++ 2.0 or higher, Borland C/C++ 4.0 or higher, and Microsoft Visual Basic 4.0 or higher
- Virtual device driver and special DOS and Windows 3 drivers for running existing NI-488.2 for DOS and Windows 3 applications under Windows NT
- Example programs that use NI-488 functions and NI-488.2 routines

Refer to Appendix E, *Specifications*, for information about the NI-488.2M software transfer rate for the GPIB-ENET.

## Optional Programming Tools

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Your kit includes the NI-488.2M software for Windows NT. In addition, you can order the LabWindows/CVI or LabVIEW software from National Instruments. LabWindows/CVI and LabVIEW include instrument driver libraries that make it easier to communicate with your instruments.

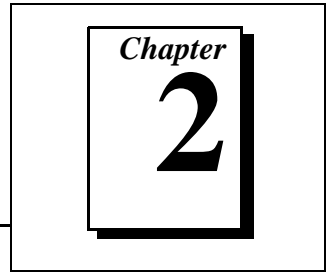
LabWindows/CVI is an interactive ANSI C development environment for building test and measurement and instrument control systems. It includes interactive code-generation tools and a graphical editor for building custom user interfaces. It also includes built-in libraries for IEEE 488.2, VXI, RS-232 control, and plug-in data acquisition. When you order LabWindows/CVI, you also get hundreds of complete instrument drivers, which are modular, source-code programs that handle the communication with your instrument so that you do not have to learn the programming details.

LabVIEW is a complete programming environment that departs from the sequential nature of traditional programming languages and features a graphical programming environment. It includes all the tools needed for instrument control, data acquisition, analysis, and presentation. LabVIEW also includes an extensive instrument driver library.

For more information about LabWindows/CVI and LabVIEW, contact National Instruments.

# Installation and Configuration

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This chapter describes how to install and configure the GPIB-ENET hardware and the GPIB software for Windows NT.

## Install the GPIB Software

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Complete the following steps to run the software installation program.

1. Log onto your Windows NT system using the Administrator account. The NI-488.2M installation program must have Administrator privileges because the program modifies the configuration registry of your computer.
2. Insert the *GPIB Software for Windows NT and the GPIB-ENET (Setup Disk)* into an unused drive.
3. Windows NT 3.51:

Select **Run...** from the **File** menu in the **Program Manager**.

Windows NT 4.0 or higher:

Select **Run...** from the **Start** menu.

Type the following command into the dialog box:

`x:\setup`

where *x* is the letter of the drive containing the distribution disk (usually a or b). To begin your software installation, click on the **OK** button.

4. The software installation wizard begins with the screen shown in Figure 2-1.

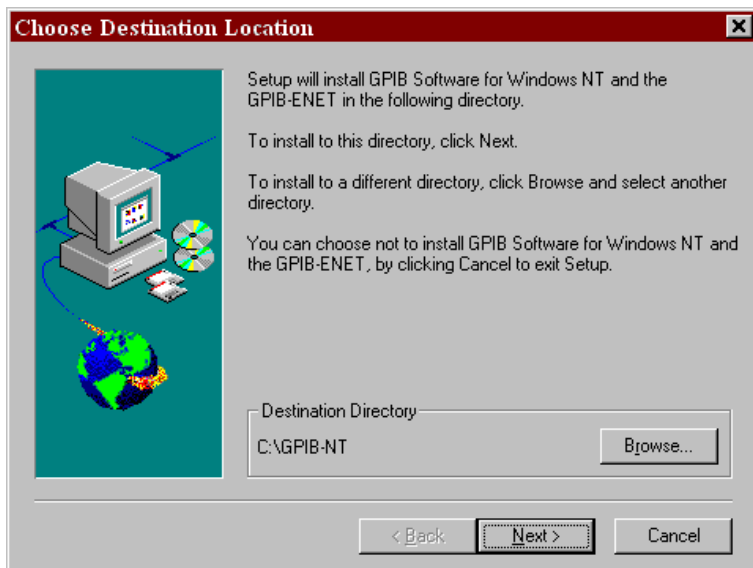


Figure 2-1. GPIB Software Setup Screen

The setup wizard guides you through the necessary steps to install the NI-488.2M software. You may go back and change values where appropriate by clicking on the **Back** button. You can exit the setup where appropriate by clicking on the **Cancel** button.

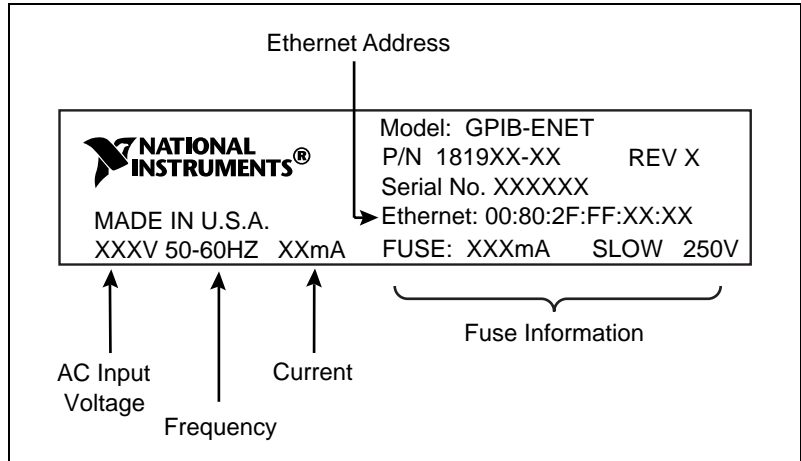
## Install the GPIB-ENET Hardware

### Step 1. Determine IP and Ethernet Addresses

The Internet Protocol (IP) address is the address that TCP/IP-based networks use to route information to the appropriate network and host. When you first install a GPIB-ENET in a network, or if the IP address for the GPIB-ENET changes, the GPIB-ENET IP address must be configured.

1. Note the Ethernet address from the bottom panel label of the GPIB-ENET.

The Ethernet address is not the same thing as the IP address. All devices on an Ethernet network are assigned a physical address, the Ethernet address, so that they can communicate with each other. The identification label on the bottom panel of the GPIB-ENET contains various information, including the Ethernet address. Figure 2-2 shows the GPIB-ENET identification label.



**Figure 2-2.** GPIB-ENET Bottom Panel Identification Label

2. Contact your network administrator to use the GPIB-ENET on your network. Your network administrator assigns a unique, valid IP address to your GPIB-ENET. Your network administrator can also tell you whether the GPIB-ENET should have its IP address configured by a RARP (Reverse Address Resolution Protocol) server, or manually using the Assign IP Address utility. The configuration of the IP address within the GPIB-ENET will occur in a later step.

## Step 2. Configure the NI-488.2M Software Characteristics

The GPIB Configuration utility is an interactive utility you can use to examine or modify the configuration of the driver. You must run the GPIB Configuration utility before you can use the NI-488.2M software for Windows NT. Follow these steps to run the utility:

1. Double-click on the **GPIB** icon in the **Control Panel**.

Windows NT 3.51:

Double-click on the **Control Panel** icon in the **Main** group of the **Program Manager**.

Windows NT 4.0 or higher:

Select **Start»Settings»Control Panel**.

The GPIB Configuration utility displays a list of all the GPIB interfaces and device names. Figure 2-3 shows the GPIB Configuration utility screen.

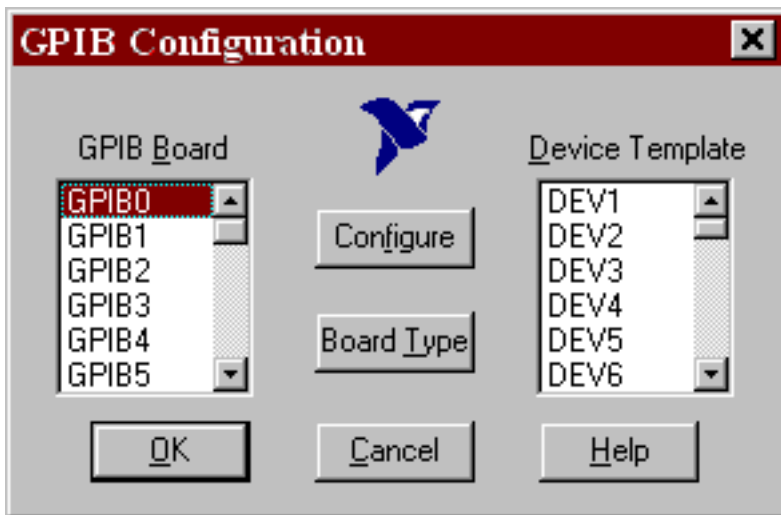
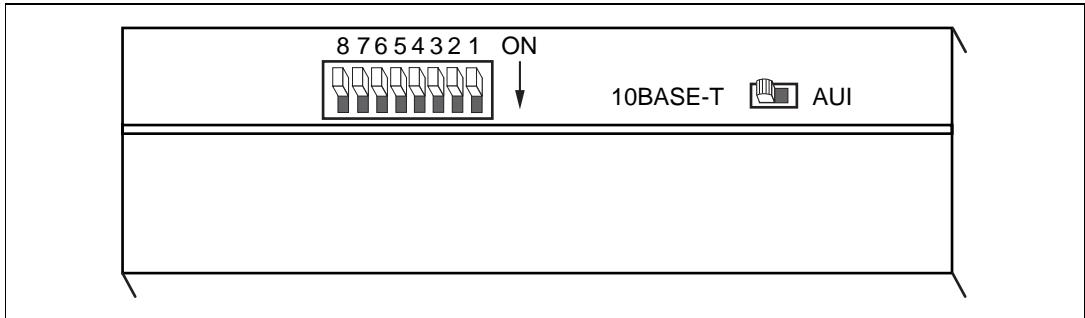


Figure 2-3. GPIB Configuration Utility

2. Select the **GPIB Board** name, typically GPIB0, for your GPIB-ENET.
3. Click on the **Board Type** button.
4. Change the board type from **None** to **GPIB-ENET**.
5. Click on the **OK** button to exit the **Board Type** dialog box.
6. Click on the **Configure** button.
7. Enter a **Host Name** (IP address) for the GPIB-ENET. The previous section, [Step 1. Determine IP and Ethernet Addresses](#), describes how to obtain an IP Address, or host name, for your GPIB-ENET.  
You can make any further changes that you need to in this dialog box. Use the online help if you have any questions.
8. Click on the **OK** button to save your changes.
9. Click on the **OK** button to exit the **GPIB Configuration** dialog box and save your changes.

### Step 3. Configure the GPIB-ENET Operating Characteristics

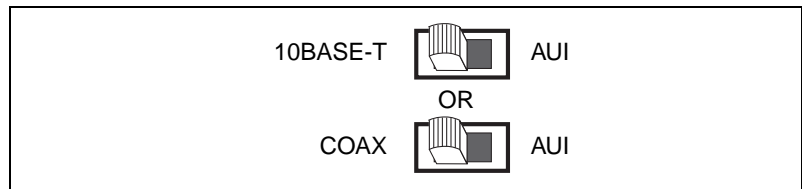
The GPIB-ENET has a two-position slide switch that you use to configure the network interface connector of the box. The GPIB-ENET also has an 8-bit DIP switch used to configure the operating characteristics. The switches are located on the back panel of the GPIB-ENET, as shown in Figure 2-4.



**Figure 2-4.** GPIB-ENET Back Panel Switches

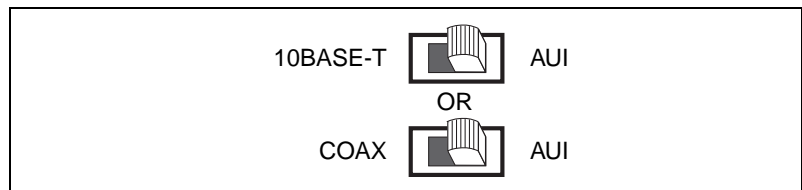
## Configure the Slide Switch

Your GPIB-ENET has two network interface connectors: a 15-pin AUI connector and either a 10Base-T Ethernet connector or a coax Ethernet connector. Use the slide switch to select which of the two connectors the GPIB-ENET uses. The default switch setting is either 10Base-T or coax. Figure 2-5 depicts the default setting for the different types of GPIB-ENET boxes.



**Figure 2-5.** Default Switch Setting for Ethernet Port Configuration

If you want to use the AUI connector, change the switch setting to match the appropriate setting in Figure 2-6.



**Figure 2-6.** Switch Setting for AUI Ethernet Port Configuration

## Configure the 8-Bit DIP Switch

The 8-bit DIP switch selects the operating mode of the GPIB-ENET. The GPIB-ENET is shipped to you with the DIP switches set for normal operation. In normal operating mode, all the switches are in the OFF position. Most customers use the GPIB-ENET in this mode. Do not change the DIP switch settings unless you run a GPIB-ENET utility that prompts you to change them. For information about the 8-bit DIP switch, refer to Appendix B, *GPIB-ENET 8-Bit DIP Switch*.

### Step 4. Connect the Cables

If you do not have both a GPIB cable and an Ethernet cable, as listed in the *What You Need to Get Started* section of Chapter 1, *Introduction*, you can purchase them from National Instruments.

1. Connect one end of the Ethernet cable to the GPIB-ENET and securely fasten it. Connect the other end of the Ethernet cable to your Ethernet network. Be sure to follow all IEEE 802.3 cabling restrictions.
2. Connect one end of the GPIB cable to the GPIB-ENET and tighten the thumb screws on the connector. Connect the other end of the GPIB cable to your GPIB system. Be sure to follow all IEEE 488.1 cabling restrictions and use only shielded GPIB cables.
3. Plug the power cord into an AC outlet of the correct voltage.

### Step 5. Switch on Your GPIB-ENET



**Caution** *Operating the GPIB-ENET at any voltage other than the one specified could damage the unit.*

The GPIB-ENET is shipped from the factory with either a 100-120 VAC or 220-240 VAC power supply. Before using your GPIB-ENET, verify that the voltage rating listed on the bottom of the box matches the voltage that is supplied in your area.

### IP Address Assignment by a RARP Server

Power on the GPIB-ENET. The **POWER** LED comes on immediately. The **READY** LED flashes while the GPIB-ENET completes its power-on self tests and the IP address is assigned. When the **READY** LED remains steady, the unit is ready to operate and you can configure the software.



The power-on self tests take about 10 seconds to complete, then the box obtains its IP address. The time required for the IP address assignment is highly dependent on your network and the configuration of your GPIB-ENET. If the **READY** LED does not become steady after one minute, refer to the *Troubleshooting Hardware Problems* section in Appendix D, *Troubleshooting and Common Questions*.

## IP Address Assignment Using Assign IP Address

To assign the IP address manually, run the Assign IP Address utility. This utility has built-in, context-sensitive online help, available by clicking on the **Help** button.

Follow these instructions to configure and assign an IP address with Assign IP Address.

1. To configure the IPAssign Protocol, first log in as an Administrator and close all applications. Then follow the steps for your version of Windows NT.

Windows NT 3.51:

- a. Open the **Network** control panel and click on the **Add Software...** button.
- b. In the **Add Network Software** dialog that appears, choose **<Other> Requires disk from manufacturer** from the drop-down list box.
- c. Click the **Continue** button.
- d. In the edit control of the **Insert Disk** dialog box that appears, enter the full path of your GPIB installation (such as `c:\gpib-nt`), and click the **OK** button.
- e. After the software is installed, click the **Close** button of the **Network** control panel applet.
- f. After the software configures the network bindings, you are prompted to restart your computer for the changes to take effect. Restart your computer at this time.

Windows NT 4.0 or higher:

- a. Open the **Network** control panel and click on the **Protocols** tab.
- b. Click the **Add...** button.
- c. In the **Select Network Protocol** dialog box that appears, click the **Have Disk...** button.

- d. In the edit control of the **Insert Disk** dialog box that appears, enter the full path of your GPIB software installation (such as `c:\gpib-nt`).
  - e. Click on the **OK** button in the **Select OEM Option** dialog box.
  - f. After the software is installed, click the **Close** button of the **Network** control panel applet.
  - g. After the software configures the network bindings, you are prompted to restart your computer for the changes to take effect. Restart your computer at this time.
2. To run Assign IP Address, follow the instructions for your version of Windows NT:

Windows NT 3.51:

Double-click on the **Assign IP Address** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.

Windows NT 4.0 or higher:

Select the **Assign IP Address** item under **Start»Programs»NI-488.2M Software for Windows NT**.

## Step 6. Configure Subnet Information

Before the GPIB-ENET is fully functional, you should configure it with proper subnet information using the Assign Subnet Information utility. Your GPIB-ENET may work properly even if you skip this step, but National Instruments recommends that you configure information about the subnet. This information includes the broadcast IP address and netmask to use on the subnet and up to four router IP addresses. The Assign Subnet Information utility has built-in, context-sensitive online help, available by clicking on the **Help** button.

Follow these instructions to run Assign Subnet Information:

Windows NT 3.51:

Double-click on the **Assign Subnet Information** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.

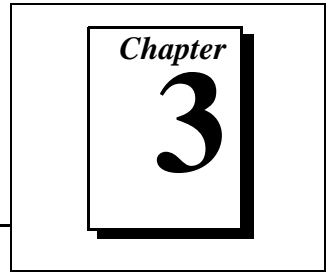
Windows NT 4.0 or higher:

Select the **Assign Subnet Information** item under **Start»Programs»NI-488.2M Software for Windows NT**.

When you have finished configuring the software and hardware, proceed to Chapter 3, *Verify the Installation*.

# Verify the Installation

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This chapter describes how to verify that the hardware and software are functioning correctly.

## Power-On Self Tests

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When you power on your GPIB-ENET, the **POWER** LED comes on immediately. The **READY** LED flashes while it completes its power-on self-tests and is assigned an IP address. When the tests complete successfully and the IP address is assigned, the **READY** LED remains steady, indicating that the unit is ready to operate.

The power-on self tests take about 10 seconds to complete. The time required for the IP address assignment is highly dependent on your network and the configuration of your GPIB-ENET. If the **POWER** LED does not come on immediately or the **READY** LED continues to flash for more than one minute, refer to Appendix D, *Troubleshooting and Common Questions*.

## Diagnostic Utility

---

The Diagnostic utility, installed with your GPIB software, verifies that your hardware and software are functioning properly.

Follow these instructions to run the Diagnostic utility:

Windows NT 3.51:

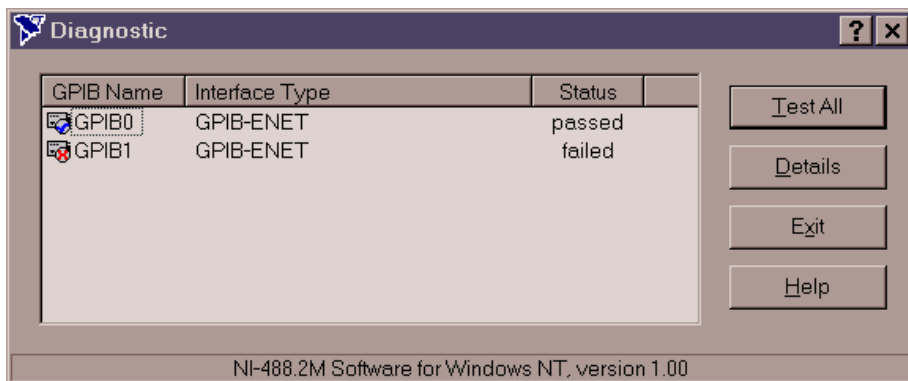
Double-click on the **Diagnostic** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.

Windows NT 4.0 or higher:

Select the **Diagnostic** item under **Start»Programs»NI-488.2M Software for Windows NT**.

When you have started the Diagnostic utility, test your GPIB interfaces by clicking on the **Test All** button. If the Diagnostic is successful, it puts a

checkmark next to the interface and changes its status from **untested** to **passed**. If the Diagnostic fails, it puts an X next to the interface, and changes its status from **untested** to **failed**. Figure 3-1 shows the Diagnostic utility after it has tested some GPIB interfaces.

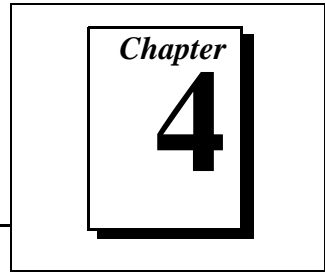


**Figure 3-1.** Diagnostic Utility after Testing

You can get details on any tested GPIB interface by selecting the interface and clicking on the **Details** button. For each failed GPIB interface, select it and click on the **Details** button to get a description of the failure. Use that information and the information in Appendix D, *Troubleshooting and Common Questions*, to troubleshoot the problem. Troubleshooting information is also available in the online help for the Diagnostic utility, which you can access by clicking on the **Help** button.

# Begin to Use the GPIB Software

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This chapter helps you get started with the NI-488.2M software for Windows NT.

## Introduction to the Win32 Interactive Control Utility

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You can use the interactive control utility to enter NI-488 functions and NI-488.2 routines interactively and see the values returned by the function calls. You can use the utility to do the following:

- Verify GPIB communication with your device quickly and easily.
- Learn the NI-488 functions and NI-488.2 routines before you write your application.
- Become familiar with the commands of your device.
- Receive data from your GPIB device.
- Troubleshoot problems with your application.

Follow these instructions to run the Win32 Interactive Control Utility.

Windows NT 3.51:

Double-click on the **Win32 Interactive Control** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.

Windows NT 4.0 or later:

Select the **Win32 Interactive Control** item under **Start>Programs>NI-488.2M Software for Windows NT**.

This utility includes extensive online help. For more information about the Win32 Interactive Control utility, refer to the *NI-488.2M User Manual for Windows 95 and Windows NT*.

## Introduction to the GPIB Spy Utility

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Included with the NI-488.2M software is GPIB Spy, a Win32 utility that can be used to monitor NI-488.2M calls made by Win32, Win16, and DOS GPIB applications. You can use GPIB Spy to do the following:

- Capture information about NI-488 functions and NI-488.2M routines as they are invoked by your GPIB applications.
- Display captured information, including, but not limited to, input and output parameter values, I/O buffer contents, and return values.
- Save, restore, and print captured information.

Follow these instructions to run GPIB Spy:

Windows NT 3.51:

Double-click on the **GPIB Spy** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.

Windows NT 4.0 or higher:

Select the **GPIB Spy** item under **Start»Programs»NI-488.2M Software for Windows NT**.

For more information about the GPIB Spy utility, refer to Chapter 5, *GPIB Spy Utility*, in the *NI-488.2M User Manual for Windows 95 and Windows NT*, or use the GPIB Spy context-sensitive online help.

## General Programming Considerations

---

As you begin developing your Win32 NI-488.2M application, remember the following points:

- For your C/C++ application, you must include the NI-488.2M header file in your source code.
- The NI-488.2M software is accessed through the 32-bit DLL, `gpiib-32.dll`, either by linking with one of the language interfaces provided with the NI-488.2M software, or by using direct DLL entry from other programming environments.
- Several sample GPIB applications are included with the NI-488.2M software. Use these as a guide for your own application development.

For information about choosing a programming method, developing your application, or compiling and linking, refer to the *NI-488.2M User Manual*

for Windows 95 and Windows NT. For detailed information about each NI-488 function and NI-488.2 routine, refer to the *NI-488.2M Function Reference Manual for Win32*.

## Running Existing DOS and Windows GPIB Applications

---

You can run existing DOS and Windows GPIB applications under Windows NT by using the GPIB Virtual Device Driver, `gpib-vdd.dll`, which is included with your NI-488.2M software.

To run DOS GPIB applications, load the special GPIB device driver `gpib-nt.com` instead of `gpib.com`, which you normally use with DOS. When you install the NI-488.2M software, the installation program copies `gpib-nt.com` into a subdirectory of the GPIB installation directory called `doswin16`. To use `gpib-nt.com`, you must modify your `config.nt` file to load `gpib-nt.com` whenever a DOS application runs. The `config.nt` file is located in your `winnt\system32` directory, where `winnt` is your Windows NT directory, for example, `c:\windows`. To load `gpib-nt.com`, add the following line to your `config.nt` file:

```
device=path\doswin16\gpib-nt.com
```

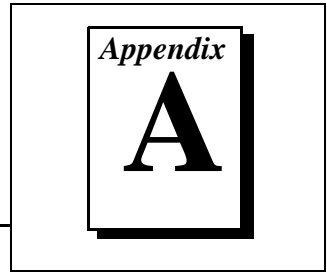
where `path` is the directory where you installed the GPIB software (the default installation directory is `c:\gpib-nt`).

To run 16-bit Windows GPIB applications, the system uses the special GPIB dynamic link library, `gpib.dll`. When you install the NI-488.2M software, the installation program copies `gpib.dll` into the `winnt\system32` directory, where `winnt` is your Windows NT directory, for example `c:\windows`. As long as `gpib.dll` is in your Windows NT directory, your system automatically accesses `gpib.dll` whenever you launch a 16-bit Windows GPIB application.



# Uninstall the Software

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This appendix describes how to uninstall the GPIB software from Windows NT.

## Removing the IPassign Protocol

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If you enabled the National Instruments IPassign Protocol for use with the Assign IP Address utility, you need to disable it with the Network Control Panel before removing your software. Complete the following steps to remove the IPassign Protocol:

Windows NT 3.51:

1. Double-click on the **Control Panel** icon in the **Main** group of the Program Manager.
2. Double-click on the **Network** icon.
3. Select **IPassign Protocol** in the **Installed Network Software** list, and click on the **Remove** button.

Windows NT 4.0 or later:

1. Select **Start»Settings»Control Panel**.
2. Double-click on the **Network** icon in the Control Panel to launch the Network applet.
3. Select the **Services** tab to display a list of components available for removal.
4. Select **National Instruments IPassign Protocol** in the **Network Services** list box, and click on the **Remove** button.

## Uninstalling the GPIB Software

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Complete the following steps if you want to remove the NI-488.2M software:

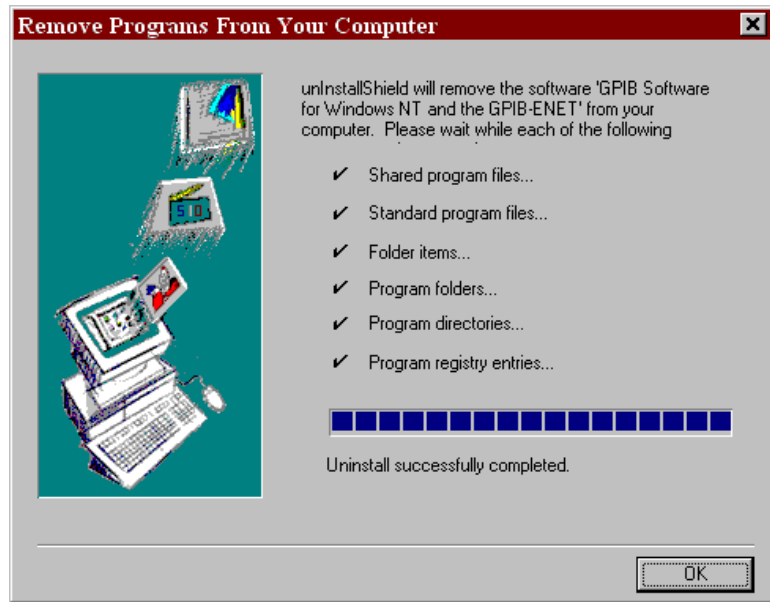
Windows NT 3.51:

1. Double-click on the **Uninstall GPIB Software for Windows** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.
2. Reboot your system.

Windows NT 4.0 or later:

1. Select **Start»Settings»Control Panel**.
2. Double-click on the **Add/Remove Programs** icon in the Control Panel to launch the Add/Remove Programs applet. A dialog box appears, listing the software available for removal.
3. Select the NI-488.2M software you want to remove, and click on the **Add/Remove...** button. An uninstall program runs and removes all folders, programs, and DLLs associated with the NI-488.2M software.
4. Reboot your system.

Figure A-1 shows the results of a successful uninstallation.



**Figure A-1.** Uninstallation Results

If you want to reinstall the hardware and software, refer to Chapter 2, *Installation and Configuration*.

# GPIB-ENET 8-Bit DIP Switch

This appendix describes how the 8-bit DIP switch on the back panel affects the operation of the GPIB-ENET.

The 8-bit DIP switch is located on the back panel of the GPIB-ENET, as shown in Figure B-1. The DIP switches set the operation mode of the GPIB-ENET. The GPIB-ENET is shipped to you with the DIP switches set for normal operation mode; all the switches are in the OFF position.

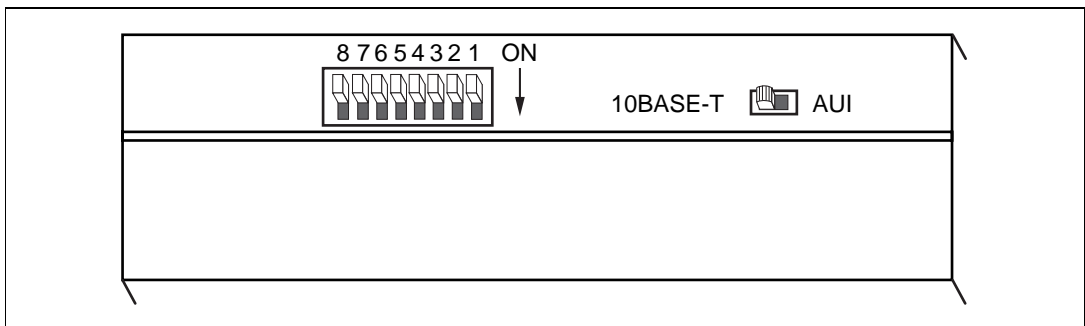


Figure B-1. GPIB-ENET Back Panel Switches

## 8-Bit DIP Switch Descriptions

Table B-1 shows the possible configurations of the GPIB-ENET DIP switches and what each configuration indicates. The entries in *bold italic* text represent the default settings.

Table B-1. DIP Switch Settings for Modes of Operation

Switch	Position	Indication
8	ON	Extended Factory Test
	<i>OFF</i>	<i>Normal Operation</i>
7	ON	Modify Mode
	<i>OFF</i>	<i>Normal Operation</i>

**Table B-1.** DIP Switch Settings for Modes of Operation (Continued)

Switch	Position	Indication
6	ON	Use Stored IP Address
	<i>OFF</i>	<i>Obtain IP Address</i>
5	ON	Manual IP Assignment
	<i>OFF</i>	<i>Automatic IP Assignment</i>
1-4	<i>OFF</i>	<i>These switches are reserved and should remain OFF.</i>

Switch 8 selects the Extended Factory Test mode and should remain OFF for normal operating mode. When this switch is ON, the GPIB-ENET performs extended tests which require special connections to the GPIB and Ethernet ports. Without these connections, the GPIB-ENET cannot pass the extended factory tests.

Switch 7 selects the Modify Mode and should remain OFF for normal operating mode. The firmware controlling the GPIB-ENET is stored in an electrically erasable memory. When this switch is ON, you can reprogram the firmware memory from the Ethernet network using the Firmware Update utility, or you can modify the subnet information using the Assign Subnet Information utility. Follow these instructions to run one of the utilities:

Windows NT 3.51:

Double-click on the icon for the utility in the **NI-488.2M Software for Windows NT** group of the Program Manager.

Windows NT 4.0 or higher:

Select the name of the utility under **Start>Programs>NI-488.2M Software for Windows NT**.

Both utilities have built-in, context-sensitive online help, available by clicking on the **Help** button within each utility.

Switch 6 indicates how the GPIB-ENET IP address is determined when it is powered on. If switch 6 is OFF, the GPIB-ENET expects to receive its IP address from the network, and then the GPIB-ENET stores the address in nonvolatile memory each time it is powered on. Each time the IP address is received from the network, the GPIB-ENET stores it in nonvolatile

memory. If switch 6 is ON, the GPIB-ENET retrieves the IP address that is stored in nonvolatile memory.

Switch 5 selects the method by which IP addresses are configured in the GPIB-ENET. When switch 5 is OFF, the GPIB-ENET issues RARP (Reverse Address Resolution Protocol) requests each time it is powered on. The GPIB-ENET continues to issue RARP requests until a valid RARP reply is received. If switch 5 is ON, the GPIB-ENET does not issue RARP requests. Note that if switch 6 is ON, the setting of Switch 5 is ignored.

In most networks, the GPIB-ENET can use RARP to have its address automatically configured; however, there are some networks which, for security or other reasons, do not use RARP. In this case, you must manually configure the IP address of the GPIB-ENET by running the Assign IP Address utility. This utility has built-in, context-sensitive online help, available by clicking the **Help** button.

Switches 1-4 are reserved for future expansion and should remain OFF.

# READY LED Signaling

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Appendix

C

This appendix describes how to interpret the **READY** LED error codes.

## READY LED Overview

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The **READY** LED has several purposes on the GPIB-ENET. When you first power on the GPIB-ENET, the **READY** LED flashes quickly while it completes its power-on self-tests. When the tests complete successfully and the IP address is assigned from either nonvolatile memory or the network, the **READY** LED remains steady, indicating that the unit is ready to operate.

During operation, the **READY** LED might begin to blink slowly. This occurs after running the Firmware Update utility, when the GPIB-ENET reports status on the operation. At other times, the **READY** LED blinks slowly to alert you of internal GPIB-ENET errors. For assistance in correcting this problem, use this appendix 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 GPIB Product Support Department can answer your questions more accurately and efficiently. Do not switch off power to your GPIB-ENET before recording the flashing **READY LED** pattern.*

**READY** LED signaling can report up to 100 different errors. The errors are numbered from 0 to 99 and are reported through sequences of **READY** LED flashes.

## Step 1. Count the Long Flashes

---

A 3-second interval, during which the **READY** LED is OFF, separates each repetition of the sequence. The sequence begins with a series of long 1-second flashes—that is, one second ON, one second OFF. These long flashes represent the digit in the tens column. There can be 1 to 10 long flashes, which represent digits 0 through 9. For example, one long flash represents the digit 0 in the tens column, two long flashes represent the digit 1 in the tens column, and 10 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. These short flashes represent the digit in the ones column. Again, there can be 1 to 10 flashes, which represent the digits 0 through 9. For example, one short flash represents the digit 0 in the ones column, two short flashes represent the digit 1 in the ones column, and 10 short flashes represent a 9 in the ones column.

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

<three seconds OFF> <two long flashes> <two short flashes> <three seconds OFF>. . .

The **READY** LED flashes the following sequence to represent status message 30:

<three seconds OFF> <four long flashes> <one short flash> <three seconds OFF>. . .

## Step 3. Record Your Status Code Number

---

When you have computed your status code number, record it on the [GPIB-ENET Hardware and Software Configuration Form](#) in Appendix F, *Customer Communication*, before calling National Instruments.



Table C-1 lists some examples of the long and short flashes and the status codes they report.

**Table C-1.** Sample READY LED Signals and the Corresponding Status Code Numbers

<b>Number of Long Flashes</b>	<b>Number of Short Flashes</b>	<b>Corresponding Status Code Number</b>
1	1	00
2	1	10
5	3	42
1	8	07
3	4	23
10	10	99

# Troubleshooting and Common Questions

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A graphic consisting of a large, bold, black letter 'D' centered within a white square. The square is framed by a thick black border. Above the 'D', the word 'Appendix' is written in a smaller, black, serif font.

This appendix describes how to troubleshoot problems and answers some common questions.

## Troubleshooting Hardware Problems

---



**Warning** *The GPIB-ENET contains circuitry that operates with hazardous voltages. Do not attempt to open and service the box. Refer servicing to qualified personnel.*

- Verify that all cables are securely connected to the GPIB-ENET.
- Verify that the GPIB-ENET is powered on. If the unit is powered on and plugged into an outlet of the proper voltage, yet you see no LED activity, check the condition of the fuse.



**Warning** *For continued protection against fire, replace the fuse with only the same type and rating of fuse. See Appendix E, Specifications, for fuse specifications.*

- Verify that the Ethernet port configuration slide switch is set to the correct Ethernet port. Refer to the [Configure the Slide Switch](#) section of Chapter 2, [Installation and Configuration](#), for more information.
- Verify that the DIP switch settings are configured properly for your setup. Refer to Appendix B, [GPIB-ENET 8-Bit DIP Switch](#), for more information.
- Verify with the system administrator that your IP address is valid and that the network is set up to recognize the IP address properly.
- If you configured the IP address manually using the Assign IP Address utility, verify that you have correctly followed the steps in the online help for that utility.
- If the **READY** LED continues to flash for more than one minute, you have a problem with your setup. If the **READY** LED is flashing quickly, the GPIB-ENET is unable to obtain its IP address from the network. In this case, check with your network administrator to verify your IP address and make sure that you recorded the Ethernet address correctly. If the **READY** LED is blinking slowly, the GPIB-ENET has an internal error. In this case, refer to Appendix C, [READY LED](#)

*Signaling*, to determine which error is being reported and contact National Instruments.

## Troubleshooting EDVR Error Conditions

---

In some cases, calls to NI-488 functions or NI-488.2 routines may return with the ERR bit set in `ibsta` and the value EDVR in `iberr`. The value stored in `ibcntl` is useful in troubleshooting the error condition.

### EDVR Error Condition with `ibcntl` Set to 0xE028002C (-534249428)

If a call is made with a board number that is within the range of allowed board numbers (typically 0 to 31), but which has not been assigned to a GPIB interface, an EDVR error condition occurs with `ibcntl` set to 0xE028002C. You can assign a board number to a GPIB interface by configuring the NI-488.2M software and selecting an interface name. Refer to [Step 2. Configure the NI-488.2M Software Characteristics](#) in Chapter 2, [Installation and Configuration](#), for information about how to configure the NI-488.2M software.

### EDVR Error Condition with `ibcntl` Set to 0xE0140025 (-535560155)

If a call is made with a board number that is not within the range of allowed board numbers (typically 0 to 31), an EDVR error condition occurs with `ibcntl` set to 0xE0140025.

### EDVR Error Condition with `ibcntl` Set to 0xE0140035 (-535560139)

If a call is made with a device name that is not listed in the logical device templates that are part of the GPIB Configuration utility, an EDVR error condition occurs with `ibcntl` set to 0xE0140035.

### EDVR Error Conditions with `ibcntl` in the Range from 0xE1002710 (-520083696) to 0xE1002EE0 (-520081696)

These errors are returned from the WinSock Interface. The lower 16 bits of `ibcntl` specify the actual WinSock Interface error. Refer to your WinSock Interface documentation for more information about the specific error.

### EDVR Error Condition with `ibcntl` Set to 0xE1000054 (-520093612)

You are attempting to communicate with a GPIB-ENET that does not have a host name (IP address) specified in the GPIB Configuration utility. Refer to [Step 2. Configure the NI-488.2M Software Characteristics](#), in Chapter 2,

*Installation and Configuration*, for information about how to configure the NI-488.2M software.

## EDVR Error Condition with `ibcntl` Set to `0xE100004E (-520093618)`

You are attempting to communicate with a GPIB-ENET that has a firmware revision that is incompatible with the current driver. Use the Firmware Update utility to upgrade the firmware to a compatible version. Follow these steps to run the utility:

Windows NT 3.51:

Double-click on the **Firmware Update** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.

Windows NT 4.0 or higher:

Select **Firmware Update** under **Start»Programs»NI-488.2M Software for Windows NT**.

This utility has built-in, context-sensitive online help, available by clicking on the **Help** button within the utility.

## Troubleshooting Diagnostic Utility Failures

---

The following sections explain common error messages generated by the Diagnostic utility.

### Missing Software Components

This error occurs if the software components that are necessary for the NI-488.2M software for Windows NT to function correctly are not present in the system. If you encounter this problem, reinstall the NI-488.2M software for Windows NT and run the Diagnostic utility again.

### No GPIB Interfaces Present

This error occurs if there are no GPIB interfaces physically present in the system or there is a resource conflict with the interfaces that are installed. If you encounter this problem, use the GPIB Configuration utility to examine the installed GPIB interfaces and the resources assigned to each. Then, run the Diagnostic utility again.

To access this information in the GPIB Configuration utility, complete the following steps:

1. Double-click on the **GPIB** icon in the **Control Panel**.

Windows NT 3.51:

Double-click on the **Control Panel** icon in the **Main** group of the **Program Manager**.

Windows NT 4.0 or higher:

Select **Start»Settings»Control Panel**.

2. Click on the **Interface Type** button and verify that the type of GPIB interface listed for each logical board name is correct. Click on the **OK** button to return to the main dialog box.
3. Double-click on each board name and verify that the hardware settings displayed in the dialog box match your actual hardware settings.

## GPIB-ENET Problem Encountered

This error occurs if an unknown problem is encountered while attempting to access the GPIB-ENET. There are several possible reasons that you might encounter this problem:

- The GPIB-ENET might not be properly configured. Refer to the [Install the GPIB-ENET Hardware](#) section in Chapter 2, [Installation and Configuration](#), for detailed instructions.
- The **Host Name** field in the GPIB Configuration utility might be incorrect for the GPIB-ENET. Run the GPIB Configuration utility, as described under [Step 2. Configure the NI-488.2M Software Characteristics](#) in Chapter 2, [Installation and Configuration](#), to verify that the IP address value has been correctly specified.
- The GPIB-ENET might not be correctly configured for your network. Try to ping your GPIB-ENET to make sure it is recognizable on the network. The ping utility is a network utility that sends a packet to a device/host on the network, then waits for it to be echoed back, which indicates an active device/host. Your WinSock provider probably came with a ping utility. Find the directory where `ping.exe` is installed and type in the following command:

```
ping IPaddress
```

where *IPaddress* is the IP address assigned to your GPIB-ENET. If your network administrator assigned you a hostname also, you can type in `ping hostname` instead. If ping is unable to communicate with your GPIB-ENET and your network administrator tells you that your IP address is valid, contact National Instruments.

## Missing WinSock Support

WinSock support is enabled and configured in the Network Control Panel applet. To configure WinSock support, perform the following steps.

Windows NT 3.51:

1. Double-click on the **Control Panel** icon in the **Main** group of the Program Manager.
2. Double-click on the **Network** icon.
3. In the **Network Settings** dialog box that appears, click on the **Add Software...** button.
4. In the **Add Network Software** dialog box that appears, select **TCP/IP Protocol and related components** item from the **Network Software** drop-down list.

Windows NT 4.0 or higher:

1. Double-click on the **Network** icon under **Start»Settings»Control Panel**.
2. In the **Network** dialog box that appears, select the **Protocols** tab.
3. On the **Protocols** tab, click on the **Add...** button.
4. In the **Select Network Protocol** dialog box that appears, select **TCP/IP Protocol**.

After you have properly installed and configured WinSock support, run the Diagnostic utility again.

## GPIB Cables Need To Be Disconnected

This error occurs if you have any GPIB cables connected to the GPIB interface. Disconnect all GPIB cables and run the Diagnostic utility again.

## GPIB Software Problem Encountered

This error occurs if the Diagnostic utility detects that it is unable to communicate correctly with the GPIB hardware using the installed GPIB software. If you get this error, shut down your computer, restart it, and run the Diagnostic utility again. If the problem persists, try reinstalling the GPIB software for Windows NT.

## Unknown Problem Encountered

This error occurs if an unknown problem is encountered while trying to execute the Diagnostic utility. If you encounter this problem, shut down your computer, restart it, and run the Diagnostic utility again. If the problem persists, try reinstalling the GPIB software for Windows NT.

## Common Questions

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### **I do not currently have a WinSock provider installed. What do I need to do to install a WinSock provider?**

Before you can use the driver software for the GPIB-ENET, you must have a WinSock interface, version 1.1 or higher, installed. You can install a WinSock interface from Microsoft or another network vendor. Refer to the [Missing WinSock Support](#) section of this appendix for information about how to install and configure WinSock support.

### **My driver is not communicating with the GPIB-ENET. What should I do?**

Make sure that the GPIB-ENET is configured properly. Refer to Chapter 2, [Installation and Configuration](#).

### **My I/O worked with a board interface, but it times out when I use the GPIB-ENET interface. What should I do?**

Network communication is slower than straight cable communication. You might need to raise the default **Timeout** value using the GPIB Configuration utility. Refer to [Step 2. Configure the NI-488.2M Software Characteristics](#) in Chapter 2, [Installation and Configuration](#), for information about the GPIB Configuration utility.

### **I powered off my GPIB-ENET before recording the flashing READY LED pattern. What should I do?**

Try to duplicate the error before calling National Instruments for assistance. Recording the **READY** LED pattern is not critical to the operation of your GPIB-ENET, but it saves you time and helps National Instruments to diagnose the problem quickly and accurately.

### **How can I determine which version of the GPIB software I have installed?**

Run the Diagnostic utility, as follows:

Windows NT version 3.51:

Start the Diagnostic utility by double-clicking on the **Diagnostic** icon in the **NI-488.2M Software for Windows NT** group of the Program Manager.

Windows NT version 4.0 or later:

Start the Diagnostic utility by choosing the **Diagnostic** item under **Start>Programs>NI-488.2M Software for Windows NT**.

A banner at the bottom of the Diagnostic utility window displays the version of the GPIB software that is installed.

### **Which GPIB interfaces does version 1.0 of the GPIB software for Windows NT and the GPIB-ENET support?**

This version of the GPIB software supports only the GPIB-ENET.

### **What do I do if the Diagnostic utility fails with an error?**

Refer to the troubleshooting sections of this appendix for specific information about what might cause the Diagnostic utility to fail. If you have already completed the troubleshooting steps, fill out the forms in Appendix F, *Customer Communication*, and contact National Instruments.

### **How many GPIB interfaces can I configure for use with my GPIB software for Windows NT?**

The GPIB software for Windows NT can be configured to communicate with up to 32 GPIB interfaces.

### **How many devices can I configure for use with my GPIB software for Windows NT?**

The GPIB software for Windows NT provides a total of 1,024 logical devices for applications to use. The default number of devices is 96. The maximum number of physical devices you should connect to a single GPIB interface is 14, or fewer, depending on your system configuration.



### **When should I use the Win32 Interactive Control utility?**

You can use the Win32 Interactive Control utility to test and verify instrument communication, troubleshoot problems, and develop your application program. For more information, refer to Chapter 4, *Begin to Use the GPIB Software*.

### **How do I use an NI-488.2M language interface?**

For information about using NI-488.2M language interfaces, refer to Chapter 3, *Developing Your Application*, in the *NI-488.2M User Manual for Windows 95 and Windows NT*.

### **How do I communicate with my instrument over the GPIB?**

Refer to the documentation that came from the instrument manufacturer. The command sequences you use are totally dependent on the specific instrument. The documentation for each instrument should include the GPIB commands you need to communicate with it. In most cases, NI-488 device-level calls are sufficient for communicating with instruments. Refer to Chapter 3, *Developing Your Application*, in the *NI-488.2M User Manual for Windows 95 and Windows NT*, for more information.

### **Can I use the NI-488 and NI-488.2 calls together in the same application?**

Yes, you can mix NI-488 functions and NI-488.2 routines.

### **What can I do to check for errors in my GPIB application?**

Examine the value of `ibsta` after each NI-488 or NI-488.2 call. If a call fails, the ERR bit of `ibsta` is set and an error code is stored in `iberr`. For more information about global status variables, refer to Chapter 3, *Developing Your Application*, in the *NI-488.2M User Manual for Windows 95 and Windows NT*.

### **Why does the uninstall program leave some components installed?**

The uninstall program removes only items that the installation program installed. If you add anything to a directory that the installation program created, the uninstall program does not delete that directory, because the directory is not empty after the uninstallation. You will need to remove any remaining components yourself.

**What information should I have before I call National Instruments?**

When you call National Instruments, you should have all of the information filled out on the *GPIB-ENET Hardware and Software Configuration Form* in Appendix F, *Customer Communication*.

# Specifications

Appendix

**E**

This appendix describes the characteristics of the GPIB-ENET and the transfer rates of the NI-488.2M software, along with the recommended operating conditions.

## Hardware Characteristics

**Table E-1.** Electrical Characteristics

<b>Characteristic</b>	<b>Specification</b>
Power Supply Unit	100-120 VAC $\pm$ 10%, 50-60 Hz or 220-240 VAC $\pm$ 10%, 50-60 Hz
Maximum Current Requirement	100-120 VAC 110 mA or 220-240 VAC 55 mA
Fuse Rating and Type	100-120 VAC 300 mA, UL/CSA approved or 220-240 VAC 500 mA, IEC approved

**Table E-2.** Environmental Characteristics

<b>Characteristic</b>	<b>Specification</b>
Operating Temperature	0° to 40° C
Storage Temperature	-20° to 70° C
Relative Humidity	10% to 90% noncondensing conditions
EMI	FCC Class A Verified

**Table E-3.** Physical Characteristics

<b>Characteristic</b>	<b>Specification</b>
Overall Case Size (Dimensions)	8.89 by 14.35 by 4.11 cm (3.5 by 5.65 by 1.62 in.)
Case Material	All metal enclosure
Weight	0.41 kg (0.9 lb)

## Software Transfer Rate

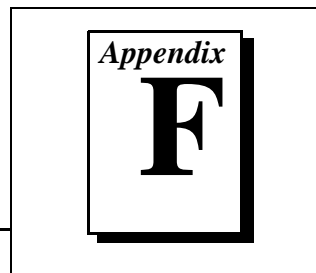
---

**Table E-4.** NI-488.2M Software Transfer Rate for the GPIB-ENET

<b>Transfer Method</b>	<b>Maximum GPIB Transfer Rate</b>
3-wire (IEEE 488)	74 kbytes/s*
* Actual speed may vary considerably from speed shown because of system and instrumentation capabilities.	

# Customer Communication

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For your convenience, this appendix contains forms to help you gather the information necessary to help us solve your technical problems and a form you can use to comment on the product documentation. When you contact us, we need the information on the Technical Support Form and the configuration form, if your manual contains one, about your system configuration to answer your questions as quickly as possible.

National Instruments has technical assistance through electronic, fax, and telephone systems to quickly provide the information you need. Our electronic services include a bulletin board service, an FTP site, a fax-on-demand system, and e-mail support. If you have a hardware or software problem, first try the electronic support systems. If the information available on these systems does not answer your questions, we offer fax and telephone support through our technical support centers, which are staffed by applications engineers.

## Electronic Services

### Bulletin Board Support

National Instruments has BBS and FTP sites dedicated for 24-hour support with a collection of files and documents to answer most common customer questions. From these sites, you can also download the latest instrument drivers, updates, and example programs. For recorded instructions on how to use the bulletin board and FTP services and for BBS automated information, call 512 795 6990. You can access these services at:

United States: 512 794 5422

Up to 14,400 baud, 8 data bits, 1 stop bit, no parity

United Kingdom: 01635 551422

Up to 9,600 baud, 8 data bits, 1 stop bit, no parity

France: 01 48 65 15 59

Up to 9,600 baud, 8 data bits, 1 stop bit, no parity

### FTP Support

To access our FTP site, log on to our Internet host, `ftp.natinst.com`, as anonymous and use your Internet address, such as `joesmith@anywhere.com`, as your password. The support files and documents are located in the `/support` directories.

## Fax-on-Demand Support

Fax-on-Demand is a 24-hour information retrieval system containing a library of documents on a wide range of technical information. You can access Fax-on-Demand from a touch-tone telephone at 512 418 1111.

## E-Mail Support (Currently USA Only)

You can submit technical support questions to the applications engineering team through e-mail at the Internet address listed below. Remember to include your name, address, and phone number so we can contact you with solutions and suggestions.

support@natinst.com

## Telephone and Fax Support

National Instruments has branch offices all over the world. Use the list below to find the technical support number for your country. If there is no National Instruments office in your country, contact the source from which you purchased your software to obtain support.

<b>Country</b>	<b>Telephone</b>	<b>Fax</b>
Australia	03 9879 5166	03 9879 6277
Austria	0662 45 79 90 0	0662 45 79 90 19
Belgium	02 757 00 20	02 757 03 11
Brazil	011 288 3336	011 288 8528
Canada (Ontario)	905 785 0085	905 785 0086
Canada (Québec)	514 694 8521	514 694 4399
Denmark	45 76 26 00	45 76 26 02
Finland	09 725 725 11	09 725 725 55
France	01 48 14 24 24	01 48 14 24 14
Germany	089 741 31 30	089 714 60 35
Hong Kong	2645 3186	2686 8505
Israel	03 6120092	03 6120095
Italy	02 413091	02 41309215
Japan	03 5472 2970	03 5472 2977
Korea	02 596 7456	02 596 7455
Mexico	5 520 2635	5 520 3282
Netherlands	0348 433466	0348 430673
Norway	32 84 84 00	32 84 86 00
Singapore	2265886	2265887
Spain	91 640 0085	91 640 0533
Sweden	08 730 49 70	08 730 43 70
Switzerland	056 200 51 51	056 200 51 55
Taiwan	02 377 1200	02 737 4644
United Kingdom	01635 523545	01635 523154
United States	512 795 8248	512 794 5678

# Technical Support Form

Photocopy this form and update it each time you make changes to your software or hardware, and use the completed copy of this form as a reference for your current configuration. Completing this form accurately before contacting National Instruments for technical support helps our applications engineers answer your questions more efficiently.

If you are using any National Instruments hardware or software products related to this problem, include the configuration forms from their user manuals. Include additional pages if necessary.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Fax ( \_\_\_\_ ) \_\_\_\_\_ Phone ( \_\_\_\_ ) \_\_\_\_\_

Computer brand \_\_\_\_\_ Model \_\_\_\_\_ Processor \_\_\_\_\_

Operating system (include version number) \_\_\_\_\_

Clock speed \_\_\_\_\_ MHz RAM \_\_\_\_\_ MB Display adapter \_\_\_\_\_

Mouse \_\_\_yes \_\_\_no Other adapters installed \_\_\_\_\_

Hard disk capacity \_\_\_\_\_ MB Brand \_\_\_\_\_

Instruments used \_\_\_\_\_

\_\_\_\_\_

National Instruments hardware product model \_\_\_\_\_ Revision \_\_\_\_\_

Configuration \_\_\_\_\_

National Instruments software product \_\_\_\_\_ Version \_\_\_\_\_

Configuration \_\_\_\_\_

The problem is: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

List any error messages: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The following steps reproduce the problem: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# GPIB-ENET Hardware and Software Configuration Form

Record the settings and revisions of your hardware and software on the line to the right of each item. Complete a new copy of this form each time you revise your software or hardware configuration, and use this form as a reference for your current configuration. Completing this form accurately before contacting National Instruments for technical support helps our applications engineers answer your questions more efficiently.

## National Instruments Products

GPIB-ENET hardware revision \_\_\_\_\_

10Base-T or Coax version \_\_\_\_\_

AC input voltage (100-120 V or 220-240 V) \_\_\_\_\_

DIP switch settings \_\_\_\_\_

Ethernet port configuration slide switch setting \_\_\_\_\_

IP address \_\_\_\_\_

READY LED signaling status code \_\_\_\_\_

GPIB software for GPIB-ENET and Windows NT version number on disks \_\_\_\_\_

Programming language interface version \_\_\_\_\_

Diagnostic utility results \_\_\_\_\_

## Other Products

### Programming Environment Information

Programming language \_\_\_\_\_

Compiler vendor \_\_\_\_\_

Compiler version \_\_\_\_\_

### Application Information

DOS application \_\_\_\_\_

Win16 application \_\_\_\_\_

Win32 application \_\_\_\_\_

If Win16 or Win32, method of accessing DLL (link with language interface or direct entry:)

\_\_\_\_\_



# Documentation Comment Form

National Instruments encourages you to comment on the documentation supplied with our products. This information helps us provide quality products to meet your needs.

**Title:** *Getting Started with Your GPIB-ENET and the GPIB Software for Windows NT*

**Edition Date:** April 1998

**Part Number:** 321368B-01

Please comment on the completeness, clarity, and organization of the manual.

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If you find errors in the manual, please record the page numbers and describe the errors.

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Thank you for your help.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

---

E-Mail Address \_\_\_\_\_

Phone ( \_\_\_\_ ) \_\_\_\_\_ Fax ( \_\_\_\_ ) \_\_\_\_\_

**Mail to:** Technical Publications  
National Instruments Corporation  
6504 Bridge Point Parkway  
Austin, Texas 78730-5039

**Fax to:** Technical Publications  
National Instruments Corporation  
512 794 5678

<b>Prefix</b>	<b>Meanings</b>	<b>Value</b>
n-	nano-	$10^{-9}$
$\mu$ -	micro-	$10^{-6}$
m-	milli-	$10^{-3}$

°	degrees
%	percent
A	amperes
AC	alternating current
ANSI	American National Standards Institute
AUI	attachment unit interface
C	Celsius
CSA	Canadian Standards Association
DIP	dual inline package
EEPROM	Electrically Erasable Programmable Read Only Memory
EMI	electromagnetic interference
FCC	Federal Communications Commission
g	grams
GPIB	General Purpose Interface Bus
Hz	hertz
IBIC	Interactive Bus Interactive Control
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers

*Glossary*

in.	inches
IP	Internet Protocol
lb	pounds
LED	light-emitting diode
m	meters
MB	megabytes of memory
RAM	random-access memory
RARP	Reverse Address Resolution Protocol
s	seconds
TCP	Transmission Control Protocol
UL	Underwriters Laboratories
V	volts
VAC	volts alternating current