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GPIB

Getting Started with Your PCI-GPIB and the NI-488.2™ Software for MacOS

July 1997 Edition
Part Number 320966B-01

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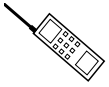
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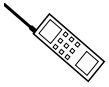
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Federal Communications Commission

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.

Canadian Department of Communications

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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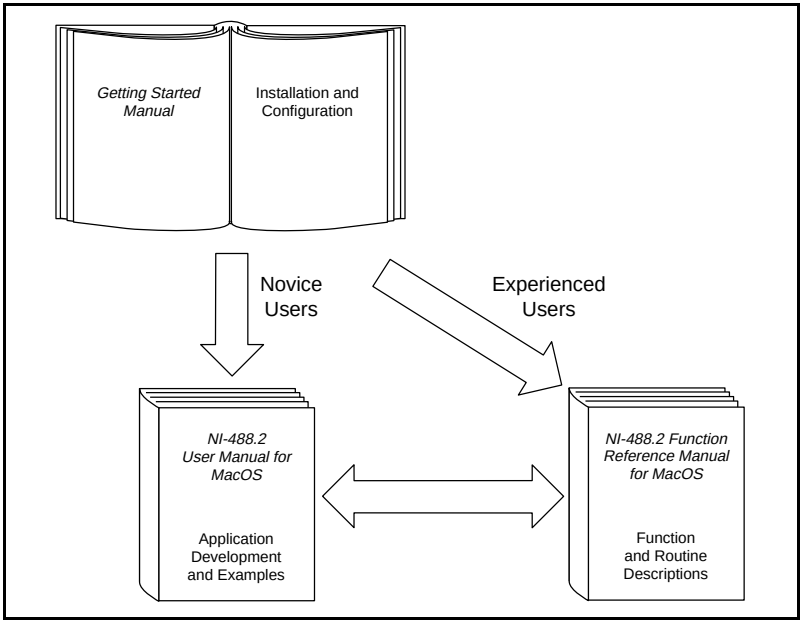
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About This Manual

This manual contains instructions for installing and configuring the National Instruments PCI-GPIB interface board and the NI-488.2 software for MacOS. This manual is meant to be used with the *NI-488.2 User Manual for MacOS* and the *NI-488.2 Function Reference Manual for MacOS.*

This manual assumes that you are already familiar with the Macintosh operating system.

How to Use This Manual Set



Use this getting started manual to install and configure your GPIB hardware and NI-488.2 software.

Use the *NI-488.2 User Manual for MacOS* to learn the basics of GPIB and how to develop an application program. The user manual also contains debugging information and detailed examples.

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

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Introduction*, explains how to use this manual, lists what you need to get started, and briefly describes the PCI-GPIB and the NI-488.2 software.
- Chapter 2, *Installation and Configuration*, contains instructions for installing and configuring your PCI-GPIB and the NI-488.2 software.
- Chapter 3, *Verify the Installation*, contains instructions for verifying the installation of your PCI-GPIB and the NI-488.2 software.
- Chapter 4, *Using Your NI-488.2 Software*, describes the `IBIC 488.2` utility and lists some general programming considerations.
- Appendix A, *Hardware Specifications*, specifies the electrical, environmental, and physical characteristics of the PCI-GPIB and the recommended operating conditions.
- Appendix B, *Troubleshooting*, describes how to troubleshoot hardware and software problems and lists some common questions.
- Appendix C, *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, and mnemonics.

Conventions Used in This Manual

The following conventions are used in this manual:



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.

bold — Bold text denotes the names of menus, menu items, parameters, dialog box, dialog box buttons or options, icons, windows, or LEDs.

bold italic — Bold italic text denotes a note, caution, or warning.

`bold monospace` — Bold text in this font denotes the messages and responses that the computer automatically prints to the screen. This font also emphasizes lines of code that are different from the other examples.

IEEE 488 and IEEE 488.2 — IEEE 488 and IEEE 488.2 refer to the ANSI/IEEE Standard 488.1-1987 and ANSI/IEEE Standard 488.2-1987, respectively, which define the GPIB.

italic — Italic text denotes emphasis, a cross reference, or an introduction to a key concept.

Macintosh — Macintosh refers to any computer using MacOS.

`monospace` — Text in this font denotes text or characters that 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

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*
- *PCI Local Bus Specification*, Revision 2.0

Customer Communication

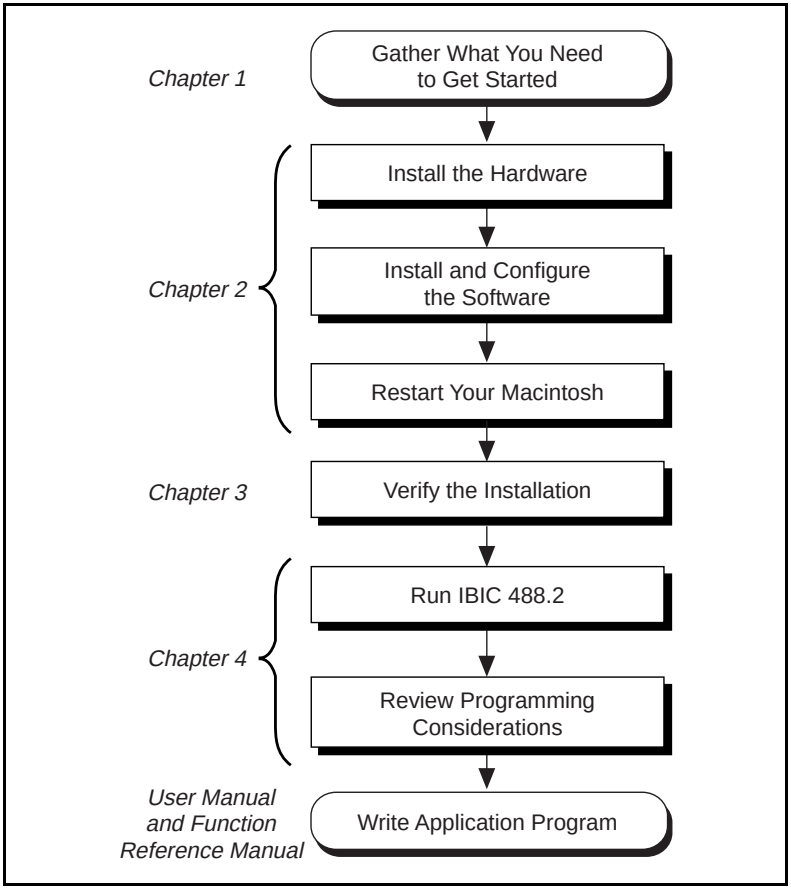
National Instruments wants to receive your comments on our products and manuals. We are interested in the applications you develop with our products, and we want to help if you have problems with them. To make it easy for you to contact us, this manual contains comment and configuration forms for you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

Introduction

Chapter 1

This chapter explains how to use this manual, lists what you need to get started, and briefly describes the PCI-GPIB and the NI-488.2 software.

How to Use This Manual



What You Need to Get Started

- ❑ PCI-GPIB interface board with GPIB extension connector
- ❑ 3.5 in. *NI-488.2 Software for MacOS Distribution Disk*
- ❑ Macintosh operating system version 7.5.2 or later

Hardware Description

The PCI-GPIB is an IEEE 488 interface for computers with PCI expansion slots. The TNT4882C ASIC performs the basic IEEE 488 Talker, Listener, and Controller functions, including those required by the most recent GPIB standard, IEEE 488.2. The PCI-GPIB can sustain data transfer rates of 1.3 MB/s, and can also implement a high-speed GPIB protocol (HS488), so that you can have data transfers greater than 1.7 MB/s, depending on the speed of your system.

You can use standard GPIB cables to connect the PCI-GPIB with up to 14 instruments. If you need to use more than the maximum number of instruments, you can use the National Instruments GPIB extenders or the GPIB expander/isolator to add additional instruments to the system. Double-shielded GPIB cables are also available.

Refer to Appendix A, *Hardware Specifications*, for more information about the PCI-GPIB specifications and recommended operating conditions.

Software Description

The NI-488.2 software for MacOS is part of your PCI-GPIB kit. It is a comprehensive package of software for transforming the Macintosh into a GPIB Controller with complete communications and bus management capability. The NI-488.2 software also comes with an interactive GPIB control utility; FutureBASIC, Macintosh Programmer's Workshop (MPW) C, THINK C, and Metrowerks CodeWarrior C language interfaces; and a shared library for C programmers developing applications on the PowerPC platform.

Optional Programming Tools

Your kit includes the NI-488.2 software for MacOS. In addition, you can order the LabVIEW software from National Instruments. LabVIEW includes instrument driver libraries that make it easier to communicate with your GPIB instruments.

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. When you order LabVIEW, 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.

For more information about LabVIEW, contact National Instruments.

Installation and Configuration

Chapter 2

This chapter contains instructions for installing and configuring your PCI-GPIB and the NI-488.2 software.

Caution: ***Several components on your PCI-GPIB can be damaged by electrostatic discharge. To avoid such damage in handling the board, touch the antistatic plastic package to a metal part of your computer chassis before removing the board from the package.***

Install the Hardware

Follow these steps to install your PCI-GPIB.

1. Turn off your computer. Keep the computer plugged in so that it remains grounded while you install the PCI-GPIB.
2. Install the PCI-GPIB according to the instructions in the manual that came with your computer. You can install the board into any slot. If you are installing multiple boards in your computer, space them evenly to maximize airflow. For example, if you are installing three boards in a computer with six slots, position them in slots two, four, and six.
3. Connect the GPIB extension connector to the PCI-GPIB through the slot in the Macintosh back panel, as shown in Figure 2-1. Push the connector in until it is secure.

Note: ***In some Macintosh computers, the GPIB extension connector may not fit. With these computers, you must use a narrower single-ended cable such as the Type X5 cable, available from National Instruments.***

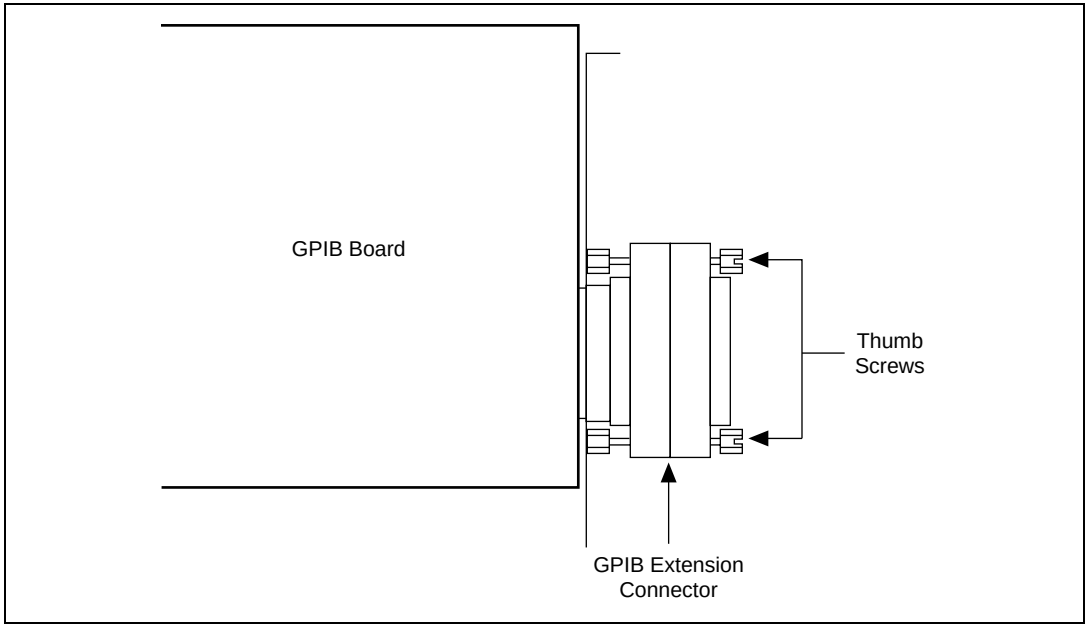


Figure 2-1. The GPIB Extension Connector

4. Tighten the thumb screws on each side of the GPIB extension connector.

☞ **Note:** ***If you are going to verify the hardware installation with the*** `IBDIAG PCI` ***program, do not connect the GPIB cable.***

5. Turn on your computer.

After you have installed your board, follow the instructions in the next section to install the NI-488.2 software. You must install the software before you verify the hardware installation using `IBDIAG PCI`.

Install the Software

The NI-488.2 software is in compressed form on one disk. Installing all of the software requires about 1.5 MB of space on your hard disk and takes about five minutes.

The NI-488.2 software includes the following components:

- `NI-488.2 Installer` is the software installation program.
- `NI-488 INIT` is an INIT that loads the device drivers for installed National Instruments GPIB interfaces when you power on or restart your Macintosh.
- `NI-488 Config` is a control panel configuration utility that you can use to examine or change the software settings.
- `PCI_GPIB` is a native PowerMac device driver which supports the PCI-GPIB interface.
- The `C LI` and `BASIC LI` folders contain language interfaces for Macintosh Programmer's Workshop (MPW) C, THINK C, Metrowerks CodeWarrior C, FutureBASIC, and a shared library for C programmers.
- `IBIC 488.2` is an interactive GPIB control utility.
- `NI-488.2 Test` is a software diagnostic utility.
- `IBDIAG NUBUS`, `IBDIAG PCI`, and `IBDIAG PCMCIA` are hardware diagnostic utilities.
- The `Ethernet` folder contains utilities that are applicable only if you have a National Instruments GPIB-ENET.
- The `Read Me` file contains the latest updates and corrections to the manual when appropriate.

Install the NI-488.2 software by completing the following steps.

Step 1. Install the NI-488.2 Files and Folders

☞ **Note:** ***Virus detection software might prevent the installer from copying important files to the*** `System Folder`***. You must disable or bypass any virus prevention software before attempting the installation procedure.***

To install the NI-488.2 files and folders, complete the following steps.

1. Insert the NI-488.2 software distribution disk and double-click on the **NI-488.2 Installer** icon.

2. To install the NI-488.2 software, click on the icon on the left side of the **Installer** window, shown in Figure 2-2, and drag it to any available disk on the right side of the window.

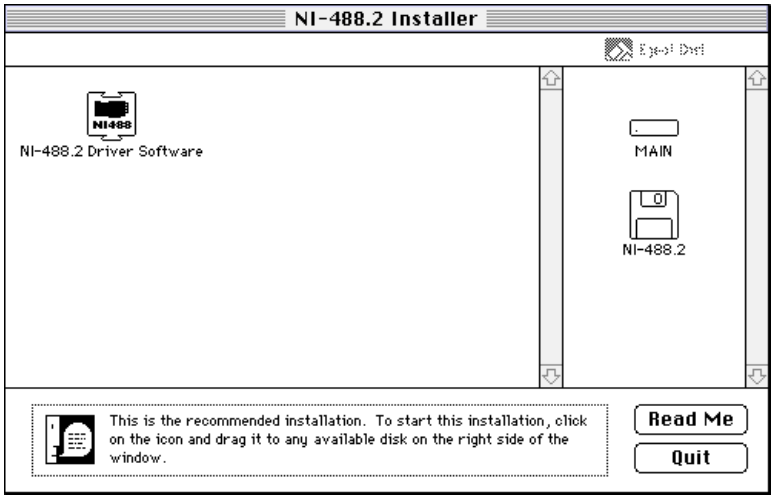


Figure 2-2. Installer Window

After installation of all of the software, the `NI-488.2` folder should contain the items shown in Figure 2-3. The installer places the `NI-488 Config` file in the `Control Panels` folder and the `NI-488 INIT` and `PCI_GPIB` files in the `Extensions` folder.

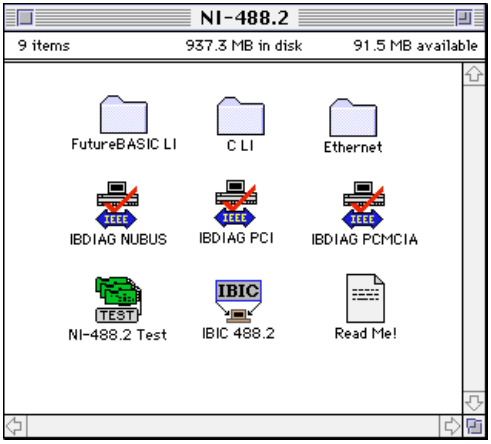


Figure 2-3. File and Folder Organization after Installation

Step 2. Examine or Change the Software Settings

You might want to configure the NI-488.2 software using the configuration utility. The default settings for the software work for most applications and devices. However, you might want to change a device name or primary address. Also, if more than one GPIB interface or external box is installed, you might want to associate a device with a particular interface.

You can activate the configuration utility by selecting **Control Panels** from the **Apple Icon** menu and selecting **NI-488 Config**.

Figure 2-4 shows a possible configuration for the PCI-GPIB. The **Auto Configure** box is selected by default and assigns `gpib0` (bus number 0) to the appropriate slot. If an `X` does not appear in a system slot box, follow the instructions in the *Verify the Hardware Installation* section in Chapter 3, *Verify the Installation*, to verify that the board is operating correctly.

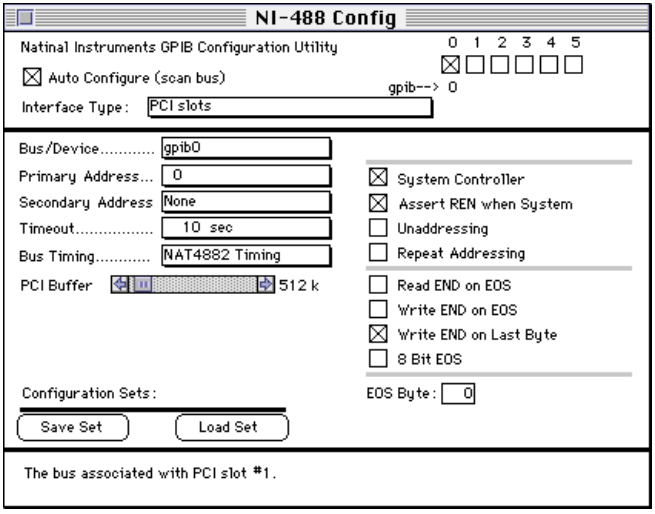


Figure 2-4. Sample Configuration for the PCI-GPIB

Refer to Chapter 6, *GPIB Configuration Utility*, in the *NI-488.2 User Manual for MacOS* for more information on running the `NI-488 Config` utility and for information about the configurable software parameters.

Step 3. Restart Your Macintosh

The NI-488.2 software is installed every time you start or restart your Macintosh. The NI-488.2 software displays the National Instruments icon momentarily in the lower left corner of the screen to indicate that the software is being installed. If the National Instruments icon does not appear on your screen, repeat the software installation procedure.

After you have installed the NI-488.2 software, proceed to the next chapter, *Verify the Installation*.

Chapter 3

Verify the Installation

This chapter contains instructions for verifying the installation of your PCI-GPIB and the NI-488.2 software.

Verify the Hardware Installation

To verify and test the hardware installation, run the `IBDIAG PCI` hardware diagnostic program that came with your NI-488.2 software. `IBDIAG PCI` verifies that your hardware is functioning properly and that the configuration of your board does not conflict with anything else in the system.

1. Disconnect all GPIB cables from the PCI-GPIB and the GPIB extension connector before running the hardware verification program.
2. Turn on your computer.
3. Open the NI-488.2 folder and click on the `IBDIAG PCI` icon.

   A test window appears on the screen, as shown in Figure 3-1.

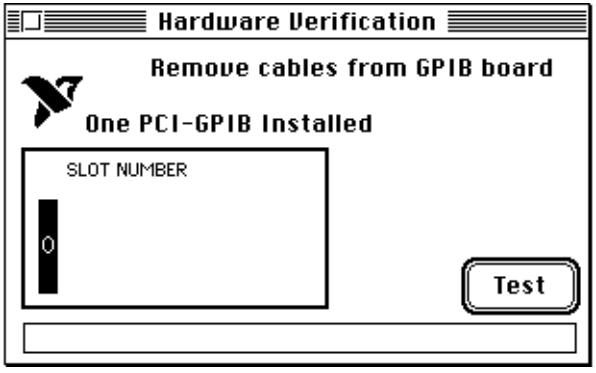


Figure 3-1. Test Window

The slot indicators show the Macintosh slots that have boards installed. An indicator highlighted in black shows the slot number of a PCI-GPIB that you can test. You can exit the `IBDIAG PCI` program without running it by choosing **Quit** from the **File** menu.

4. Click on the **Test** button to run a series of tests that verify the PCI-GPIB hardware installation. A bar graph indicates the progress of the tests, and a message appears above the slot indicators at the completion of all tests.
5. View the test results. Figure 3-2 shows the test window that appears if no error was detected. You can exit the `IBDIAG PCI` program if your hardware verification was successful by choosing **Quit** from the **File** menu.

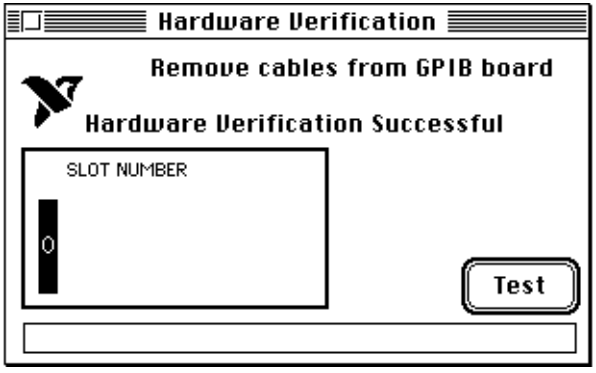


Figure 3-2. Hardware Verification Window after Successful Completion of Tests

Figure 3-3 is an example of the dialog box that appears if an error is detected. The dialog box has error information and the option to continue or stop.

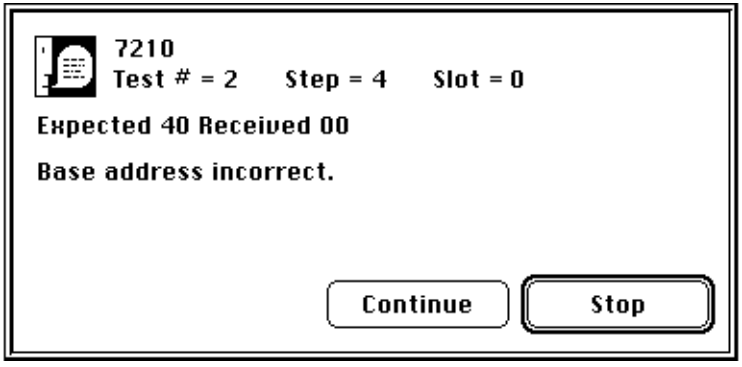


Figure 3-3. Dialog Box with Error Information

6. Record the error information. Whenever a dialog box appears, record the information before clicking on either **Continue** or **Stop**. At the end of the program, if the hardware verification did not complete successfully, a screen appears as shown in Figure 3-4.

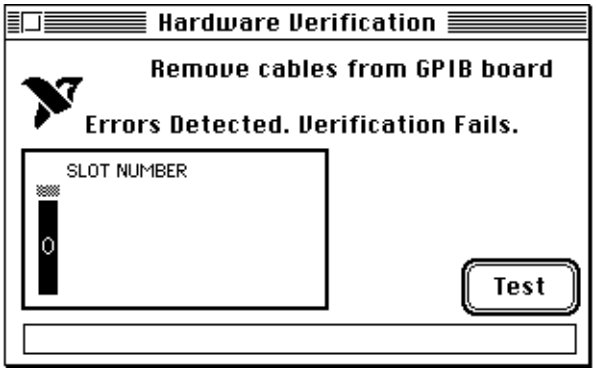


Figure 3-4. Hardware Verification Window after Unsuccessful Completion of Tests

7. If `IBDIAG PCI` fails, make sure that the PCI-GPIB is positioned securely in its slot and that no GPIB cables are connected to the PCI-GPIB or the GPIB extension connector. Run the `IBDIAG PCI` program again. If the program still detects errors, refer to Chapter 4, *Using Your NI-488.2 Software*, for possible solutions.
8. Exit the `IBDIAG PCI` program by selecting **Quit** from the **File** menu**.**

Verify the Software Installation

This step verifies that the software is installed and functioning with the PCI-GPIB. First disconnect all GPIB cables from the PCI-GPIB and the GPIB extension connector, then double-click on the `NI-488.2 Test` icon in the `NI-488.2` folder.

If no error messages appear on the screen, the installation is complete. If error messages do appear on the screen, select **Restart** from the **Special** menu, and double-click on the `NI-488.2 Test` icon. If the test fails again, reinstall the NI-488.2 software from the distribution disk, restart your Macintosh, and double-click on the `NI-488.2 Test` icon.

If the `NI-488.2 Test` still fails, review the material in Chapter 4, *Using Your NI-488.2 Software*, which describes how to troubleshoot problems and lists some common questions. If you need to change a

software setting, refer to Chapter 6, *GPIB Configuration Utility*, in the *NI-488.2 User Manual for MacOS*. If the software settings are correct and the verification still fails, carefully note all error information on the forms in Appendix C, *Customer Communication*, and contact National Instruments.

If the verification test is successful, you are ready to connect the GPIB cable to the GPIB extension connector and start writing your own application program. Refer to the *NI-488.2 Function Reference Manual for MacOS* for sample programs.

Using Your NI-488.2 Software

Chapter 4

This chapter describes the `IBIC 488.2` utility and lists some general programming considerations.

Introduction to IBIC 488.2

The NI-488.2 software includes the Interface Bus Interactive Control utility, `IBIC 488.2`. You can use `IBIC 488.2` to enter NI-488 functions and NI-488.2 routines interactively and display the results of the function calls automatically. Without writing an application, you can use `IBIC 488.2` to do the following:

- Verify GPIB communication with your device quickly and easily.
- Become familiar with the commands of your device.
- Receive data from your GPIB device.
- Learn new functions and routines before integrating them into your application.
- Troubleshoot problems with your application.

For more information about `IBIC 488.2`, refer to the *NI-488.2 User Manual for MacOS*.

General Programming Considerations

Depending on the programming language you use to develop your application, you must include certain files, statements, or global variables at the beginning of your application. For specific instructions, refer to Chapter 2, *Developing Your Application*, in the *NI-488.2 User Manual for MacOS*.

For information about choosing a programming method, developing your application, or compiling and linking, refer to the *NI-488.2 User Manual for MacOS*. For detailed information about each NI-488 function and NI-488.2 routine, refer to the *NI-488.2 Function Reference Manual for MacOS*.

Hardware Specifications

Appendix
A

This appendix specifies the electrical, environmental, and physical characteristics of the PCI-GPIB and the recommended operating conditions.

Table A-1. Electrical Characteristics of the PCI-GPIB

Characteristic	Specification
Number of GPIB Loads	1
Maximum Transfer Rate (programmed I/O)	1.3 MB/s using three-wire handshake* 1.7 MB/s using HS488*
Power Requirement	+5 VDC, 600 mA maximum
* Actual rates are dependent on instrument capabilities and system configuration.	

Table A-2. Environmental Characteristics of the PCI-GPIB

Characteristic	Specification
Operating Temperature	0° to 55° C
Storage Temperature	–20° to 70° C
Relative Humidity	5% to 90%, noncondensing
EMI	FCC Class A Verified

Table A-3. Physical Characteristics of the PCI-GPIB

Characteristic	Specification
Dimensions	13.34 cm by 10.67 cm (5.25 in. by 4.20 in.)
I/O Connector	IEEE 488 Standard 24-pin

Troubleshooting

Appendix B

This appendix describes how to troubleshoot hardware and software problems and lists some common questions.

If hardware or software problems persist after you try the solutions recommended in this chapter, note all error information on the forms in Appendix C, *Customer Communication,* and contact National Instruments.

Troubleshooting Hardware Problems

Check the following if you encounter hardware problems:

- Make sure that the PCI-GPIB is positioned securely in its slot.
- If the hardware verification test fails, make sure that no GPIB cables are connected to the PCI-GPIB or the GPIB extension connector.
- Make sure that you install the NI-488.2 software and restart your Macintosh before running `IBDIAG PCI`.

Troubleshooting Software Problems

Check the following if you encounter software problems:

- Make sure that all GPIB cables are connected properly, unless you are running the hardware verification test.
- The `NI-488 Config` control panel (GPIB configuration utility) should show the following software configuration:
  - The **Interface Type** menu selection should be set to **PCI Slots**.
  - An **X** should appear in a system slot box for each PCI-GPIB board. If it does not, try moving the board to a different slot. If other boards are already installed, swap the arrangement of the boards.

  You can use the `NI-488 Config` control panel utility to examine and adjust the configuration of the software. Refer to Chapter 6,

GPIB Configuration Utility, in the *NI-488.2 User Manual for MacOS* for more information on running the utility and for information about the configurable software parameters.

- If the software verification test fails, make sure that no GPIB cables are connected to the PCI-GPIB or the GPIB extension connector.
- Make sure to restart your Macintosh after you install the NI-488.2 software.

Common Questions

What can I do if the software doesn't recognize my PCI-GPIB after I install it?

Run the `IBDIAG PCI` hardware diagnostic program as described in Chapter 3, *Verify the Installation*.

What do I do if my board does not show up in the `NI-488 Config` utility?

In `NI-488 Config`, an **X** should appear in a system slot box for each PCI-GPIB. If an X does not appear in any box, try moving the board to a different slot. If other boards are already installed, swap the arrangement of the boards.

What do I do if my GPIB extension connector does not fit?

You may need to order a Type X5 single-ended GPIB cable, available from National Instruments.

What do I do if the hardware or software verification test fails with an error?

Refer to the troubleshooting sections of this chapter for information about what might cause these tests to fail.

What do I do if I have installed the NI-488.2 software and now my Macintosh crashes upon startup?

Try changing the name of the `NI-488 INIT` to `ZNI-488 INIT`. Because INIT files load in alphabetical order, the `ZNI-488 INIT` will load last, preventing possible corruption from INIT files that load after it. If changing the name of the `NI-488 INIT` does not solve the problem, another INIT file might have a conflict with the `NI-488 INIT`. Try removing some of your other INIT files. You can store them in a

temporary folder, in case you need to reload them later. You can use the `Extensions Manager` control panel to disable certain extensions and control panels.

What do I do if my board does not work correctly with a scanner?

Try checking the **Unaddressing** option in the `NI-488 Config` control panel.

What do I do if my board does not work correctly with a film recorder?

Try checking the **Repeat Addressing** option in the `NI-488 Config` control panel.

When should I use `IBIC 488.2`?

You can use `IBIC 488.2` to test and verify instrument communication, troubleshoot problems, and develop your application program. For more information about `IBIC 488.2`, refer to Chapter 4, *Interface Bus Interactive Control Utility*, in the *NI-488.2 User Manual for MacOS*.

How do I use an NI-488.2 language interface?

For information about using NI-488.2 language interfaces, refer to the *NI-488.2 User Manual for MacOS*.

How can I use the files located in the `Ethernet` folder?

You do not need to use the files in the `Ethernet` folder unless you have a National Instruments GPIB-ENET.

What information should I have before I call National Instruments?

When you call National Instruments, you should have the results of the hardware and software verification tests. In addition, make sure you have filled out the forms in Appendix C, *Customer Communication*.

Customer Communication

Appendix C

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.



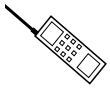
E-Mail Support (currently U.S. only)

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.





	Telephone	Fax
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
Canada (Ontario)	905 785 0085	905 785 0086
Canada (Quebec)	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 5734815	03 5734816
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:_____

_____

_____

_____

_____

_____

PCI-GPIB 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

PCI-GPIB revision number _____

NI-488.2 software version number of disk _____

NI-488 config control panel settings _____

Other Products

Programming language and version number _____

Computer make and model _____

Memory capacity on computer _____

Clock frequency or speed _____

Operating system version _____

Number of GPIB devices on bus _____

Other hardware devices in system _____

Type of monitor _____

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 PCI-GPIB and the NI-488.2™ Software for MacOS*

Edition Date: July 1997

Part Number: 320966B-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 _____

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Phone (___)_____ Fax (___) _____

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National Instruments Corporation
6504 Bridge Point Parkway
Austin, TX 78730-5039

Fax to: Technical Publications
National Instruments Corporation
(512) 794-5678

Glossary

Prefix	Meanings	Value
m-	milli-	10^{-3}
c-	centi-	10^{-2}
M-	mega-	10^{6}

°	degrees
%	percent
A	amperes
AC	alternating current
ANSI	American National Standards Institute
ASIC	application-specific integrated circuit
C	Celsius
EMI	electromagnetic interference
FCC	Federal Communications Commission
GPIB	General Purpose Interface Bus
Hz	hertz
IEEE	Institute of Electrical and Electronic Engineers
in.	inches
I/O	input/output
m	meters
MB	megabytes of memory
RAM	random-access memory
s	seconds
VDC	volts direct current

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