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GPIB

Getting Started with Your NB-GPIB/TNT and the NI-488.2™ Software for MacOS

July 1997 Edition
Part Number 320728C-01

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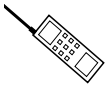
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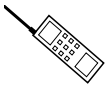
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Class A

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.

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.

Class B

Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canadian Department of Communications

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

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

FCC 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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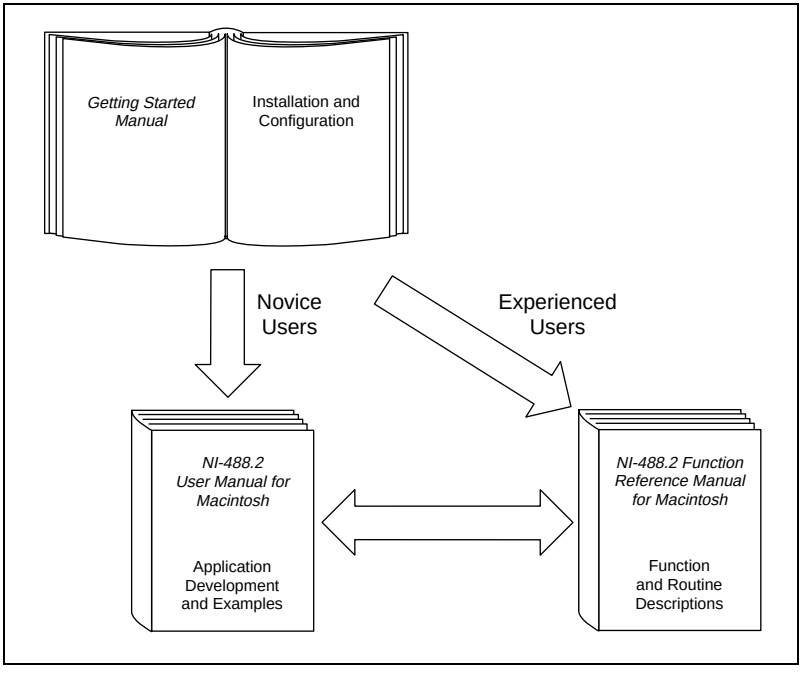
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This manual contains instructions for installing and configuring the National Instruments NB-GPIB/TNT, NB-GPIB, NB-GPIB-P/TNT, or NB-GPIB-P interface board and the NI-488.2 software for Macintosh. This manual is meant to be used with the *NI-488.2 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.

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 GPIB board and the NI-488.2 software.
- Chapter 2, *Hardware Installation and Configuration*, contains instructions for installing and configuring your GPIB board and describes how to verify the installation.
- Chapter 3, *Software Installation and Configuration*, contains instructions for installing and configuring your NI-488.2 software and describes how to verify the installation.
- Chapter 4, *Verifying the Installation*, describes how to verify the installation of your GPIB hardware and software.
- Chapter 5, *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 GPIB board 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.

	This icon to the left of bold italicized text denotes a warning, which advises you of precautions to take to avoid being electrically shocked.
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.
GPIB board	GPIB board refers to the NB-GPIB/TNT board, the NB-GPIB board, the NB-GPIB-P/TNT board, or the NB-GPIB-P board, in cases where the material applies to all of the boards. When the material applies to a specific board, the name of that board is used.
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.
NI-488.2	NI-488.2 refers to the NI-488.2 software for Macintosh unless otherwise noted.

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 488.2-1987, *IEEE Standard Codes, Formats, Protocols, and Common Commands*

Customer Communication

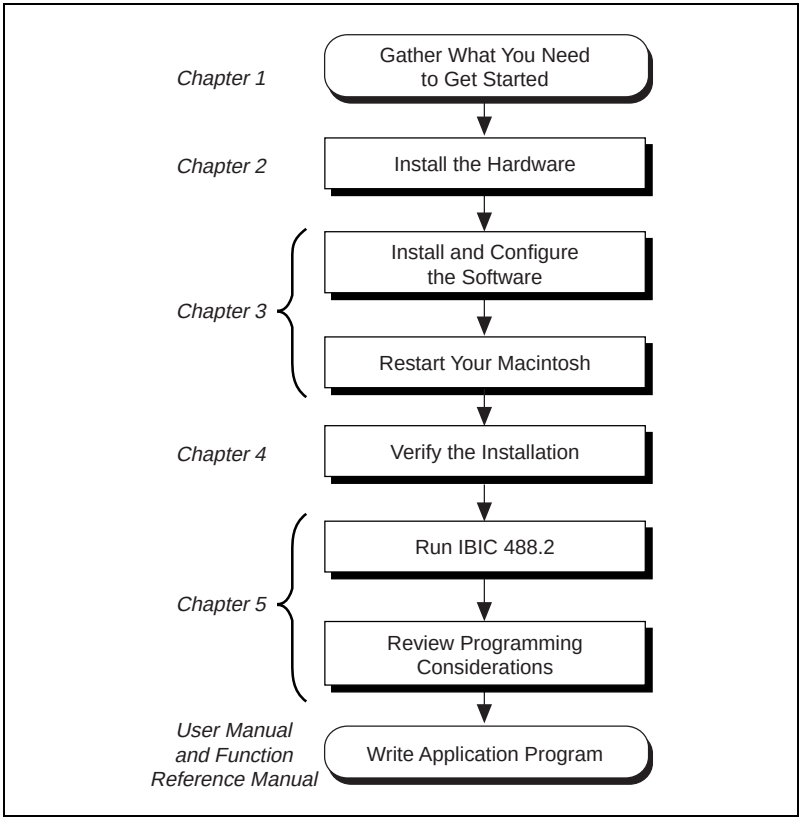
National Instruments wants to receive your comments on our products and manuals. We are interested in the applications you develop with our products, and we want to help if you have problems with them. To make it easy for you to contact us, this manual contains comment and configuration forms for you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

Chapter 1

Introduction

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

How to Use This Manual



What You Need to Get Started

- ❑ One of the following boards:
  - – NB-GPIB/TNT interface board with GPIB extension connector
  - – NB-GPIB-P/TNT interface board with GPIB extension connector
  - – NB-GPIB interface board with GPIB extension connector
  - – NB-GPIB-P interface board with GPIB extension connector
- ❑ 3.5 in. *NI-488.2 Distribution Disk for MacOS*

Hardware Description

The NB-GPIB/TNT and NB-GPIB-P/TNT are IEEE 488 interfaces for Macintosh NuBus computers. The TNT4882C chip on these boards performs the basic IEEE 488 Talker, Listener, and Controller functions, including those required by the most recent GPIB standard, IEEE 488.2. These boards 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 up to 2.3 MB/s. The NB-GPIB/TNT and NB-GPIB-P/TNT boards are fully software-compatible with all versions of NB-GPIB hardware.

The NB-GPIB and NB-GPIB-P boards, equipped with NAT4882 and Turbo488 ASICs, are also IEEE 488 interfaces for Macintosh NuBus computers. The NAT4882 controller chip performs the basic IEEE 488 Talker, Listener, and Controller functions, including those required by IEEE 488.2. The Turbo488 performance-enhancing chip boosts GPIB read and write transfers to rates of up to 850 KB/s.

The NB-GPIB/TNT and NB-GPIB are full-size NuBus boards. They have the capability of DMA transfers through the RTSI connector. The NB-GPIB-P/TNT and NB-GPIB-P are reduced-size boards that can fit into the 7 in. (17.78 cm) NuBus slot found in some Macintosh computers, such as the Centris 610. The NB-GPIB-P/TNT and NB-GPIB-P boards do not have DMA capability.

You can use standard GPIB cables to connect the NB-GPIB/TNT, NB-GPIB-P/TNT, or NB-GPIB-P with up to 14 instruments. You can connect the NB-GPIB with up to 13 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 cables are also available.

Table 1-1 compares the features of all four boards.

Table 1-1. GPIB Board Feature Comparison

	NB-GPIB/TNT	NB-GPIB-P/TNT	NB-GPIB	NB-GPIB-P
Chip(s)	TNT4882C	TNT4882C	NAT4882 and Turbo488 ASICs	NAT4882 and Turbo488 ASICs
DMA	Yes	No	Yes	No
Maximum number of instruments	14	14	13	14
Slot Size	27.305 cm by 10.16 cm (10.75 in. by 4.0 in.)	17.78 cm by 10.16 cm (7.0 in. by 4.0 in.)	27.305 cm by 10.16 cm (10.75 in. by 4.0 in.)	17.78 cm by 10.16 cm (7.0 in. by 4.0 in.)
Compatible with Power Macintosh?	Yes	Yes	No	No
Maximum Transfer Rates	1.3 MB/s with 3-wire handshake, or 2.3 MB/s with HS488	1.3 MB/s with 3-wire handshake, or 2.3 MB/s with HS488	850 KB/s	850 KB/s

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

Software Description

NI-488.2 software for MacOS is part of your GPIB board 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 for the PowerPC platform.

The shared library is only installed on computers equipped with a PowerPC processor.

Hardware Installation and Configuration

Chapter 2

This chapter contains instructions for installing and configuring your GPIB board and describes how to verify the installation.

Caution: ***Several components on your GPIB board 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.***

Set the Shield Ground Configuration

The GPIB board is set at the factory with the jumper in place to connect the logic ground of the GPIB board to its shield ground. This configuration minimizes EMI emissions.

Caution: ***The GPIB board was tested for compliance with FCC standards with shield ground connected to logic ground. Removing the jumper might cause EMI emissions to exceed any or all of the applicable standards.***

If your application requires that logic ground be disconnected from shield ground, follow these steps.

1. Locate the shield ground jumper (W1) on the GPIB board.
2. Remove the jumper and place it across only one of the jumper pins, as shown in Figure 2-1.

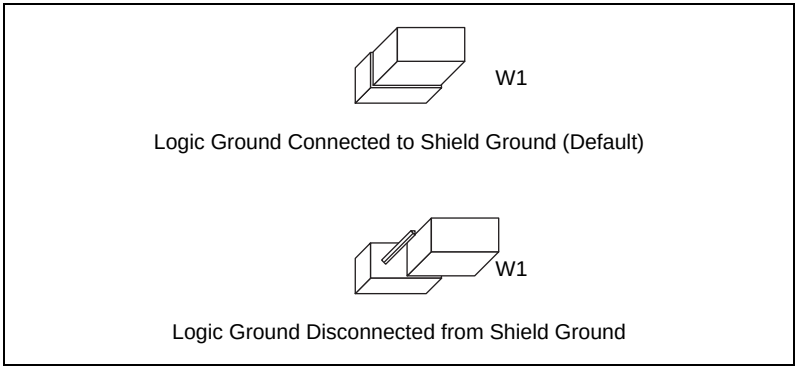


Figure 2-1. Ground Configuration Jumper Settings

3. Record the jumper setting on the *GPIB Board Hardware and Software Configuration Form* in Appendix C, *Customer Communication*.

Install the Hardware

Follow these steps to install your GPIB board.

1. Turn off your computer. Keep the computer plugged in so that it remains grounded while you install the GPIB board.
2. Remove the GPIB extension connector from the GPIB board by unscrewing the thumb screws located on each side of the connector, as shown in Figure 2-2.

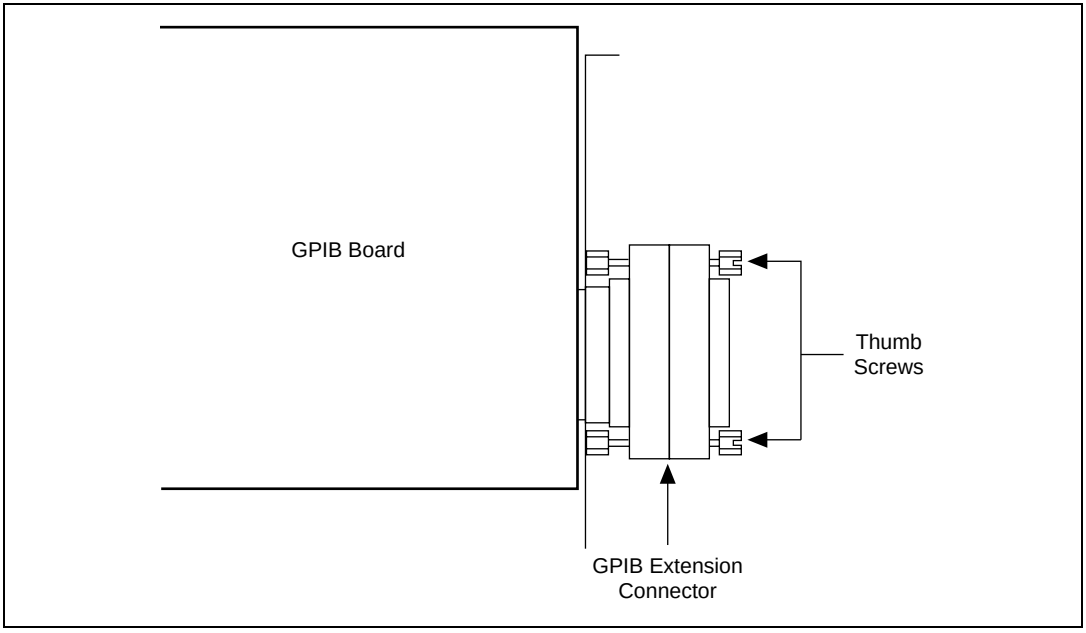


Figure 2-2. The GPIB Extension Connector

3. Install the GPIB board 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.
4. Connect the GPIB extension connector, removed in Step 2, to the GPIB board through the slot in the Macintosh back panel. Push the connector in until it is secure.

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

5. Tighten the thumb screws on each side of the GPIB extension connector.
6. Turn on your computer.

After you have installed your board, follow the instructions in Chapter 4, *Verifying the Installation*, to verify the hardware installation.

Software Installation and Configuration

Chapter 3

This chapter contains instructions for installing and configuring your NI-488.2 software and describes how to verify the installation.

NI-488.2 Software Components

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 you use to configure your GPIB.
- `NI-DMA/DSP` is a system extension that provides DMA functionality through an RTSI connection to a DMA-2800 or DMA-8.
- The `C LI` and `BASIC LI` folders contain language interfaces for Macintosh Programmer's Workshop (MPW) C, THINK C, FutureBASIC.
- `MacGPIB.shlb` is a shared library for C programmers developing applications for PowerPC.
- `IBIC 488.2` is an interactive GPIB control utility.
- `NI-488.2 Test` is a software diagnostic utility.
- 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 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.

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

Step 1. Install the NI-488.2 Files and Folders

Caution: ***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 3-1, and drag it to any available disk on the right side of the window.

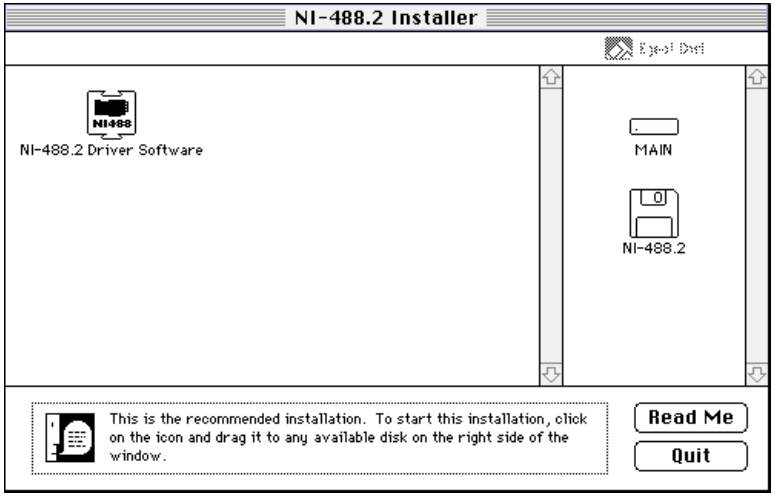


Figure 3-1. Installer Window

3. Click on the **Install** button to install the NI-488.2 software. If you want to install only some of the files, click on the **Custom Install** button and select the items to install.

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

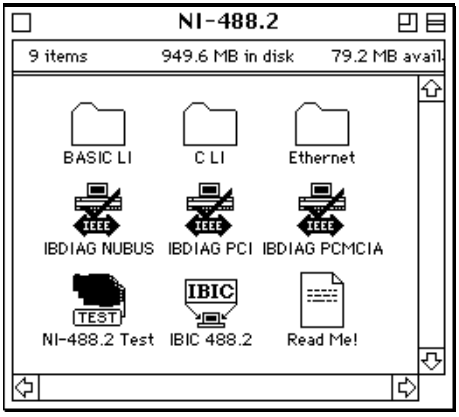


Figure 3-2. File and Folder Organization after Installation

Step 2. Examine or Change the Software Settings

You might want to configure the NI-488.2 Software settings 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 that one GPIB interface or external box is installed, you might want to associate a device with a particular interface.

NI-488 Config is a configuration utility that you can use to examine and change the software settings for your board. You can activate the configuration utility by selecting **Control Panels** from the **Apple Icon** menu and selecting **NI-488 Config**.

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

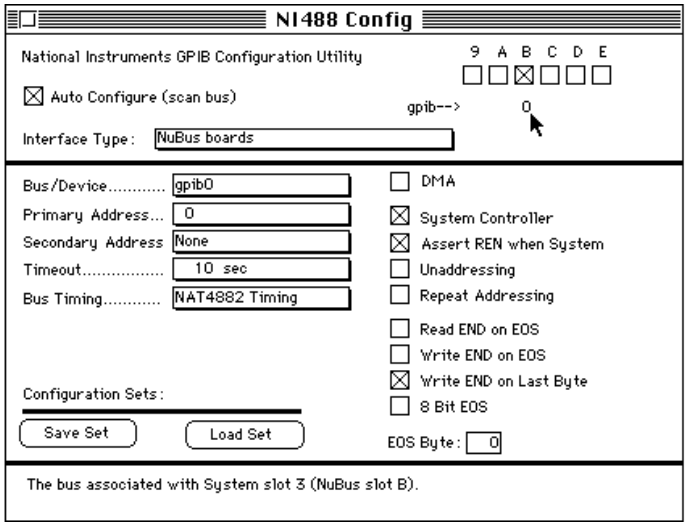


Figure 3-3. Sample Configuration for the GPIB Board

Step 3. Restart Your Macintosh

The NI-488.2 driver is loaded every time the Macintosh is started or restarted. Restart the Macintosh by selecting **Restart** from the **Special** menu. The NI-488.2 driver displays the **National Instruments** icon momentarily in the lower left corner of the screen to indicate that the interface software is being installed. If the **National Instruments** icon does not appear on your screen, repeat the installation procedure before continuing to Chapter 4, *Verifying the Installation.*

Chapter 4

Verifying the Installation

This chapter describes how to verify the installation of your GPIB hardware and software.

Verify the Hardware Installation

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

⚠ **Caution:** ***Disconnect all GPIB cables from your computer before running the hardware verification program.***

1. Turn on your computer.
2. Open the `NI-488.2` folder and double-click on the `IBDIAG NUBUS` icon, shown in Figure B-2.



Figure 4-1. IBDIAG NUBUS Icon

A test window appears on the screen, as shown in Figure 4-2.

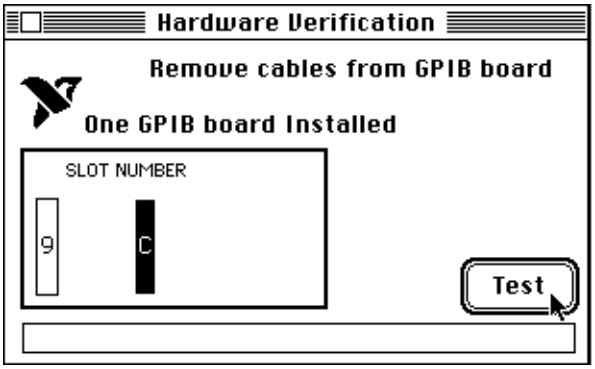


Figure 4-2. Test Window

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

3. Click on the **Test** button to run a series of tests that verify the GPIB board 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.
4. View the test results. Figure 4-3 shows the test window that appears if no error is detected. You can exit the `IBDIAG NUBUS` program if your hardware verification was successful by choosing **Quit** from the **File** menu.

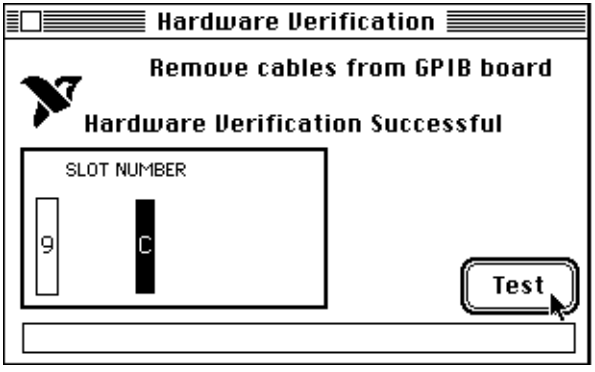


Figure 4-3. Hardware Verification Window after Successful Completion of Tests

If `IBDIAG NUBUS` completes successfully, you are ready to install the NI-488.2 software. Refer to Chapter 3, *Software Installation and Configuration.*

Figure 4-4 is an example of the alert box screen that appears if an error was detected. The alert box screen has error information and the option to continue or stop.

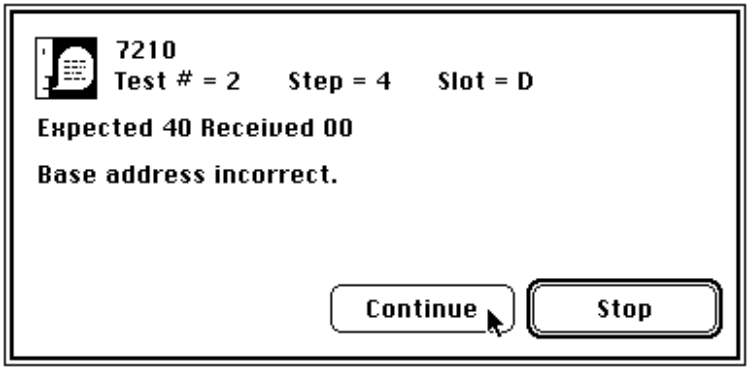


Figure 4-4. Alert Box with Error Information

5. Record the error information. Whenever an alert box screen 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 displays as shown in Figure 4-5.

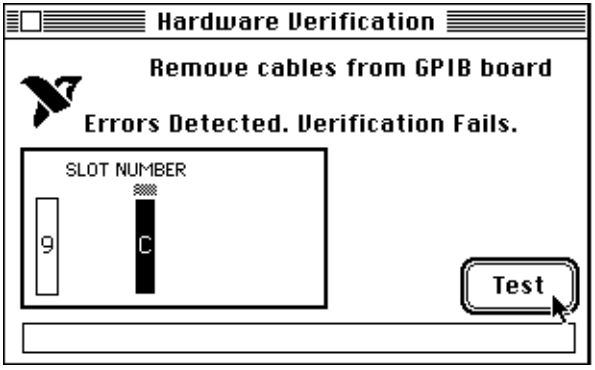


Figure 4-5. Hardware Verification Window after Unsuccessful Completion of Tests

6. If `IBDIAG NUBUS` fails, make sure that the GPIB board is positioned securely in its slot and that no GPIB cables are connected. Run the `IBDIAG NUBUS` program again. If the program still detects errors, refer to Appendix B, *Troubleshooting*, for possible solutions.
7. Exit the `IBDIAG NUBUS` program by selecting **Quit** from the **File** menu.

Verify the Software Installation

This step verifies that the software is installed and functioning with the GPIB board. First disconnect all GPIB cables from the GPIB board, 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 any one of the software installation steps fails, review the material in Chapter 4, *Troubleshooting*, which describes how to troubleshoot problems and lists some common questions. If you need to change a software setting, refer to Chapter 2, *Configuring the NI-488.2 Software*, 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 write your own application program. Refer to the *NI-488.2 User Manual for MacOS* for sample programs.

Using Your NI-488.2 Software

Chapter 5

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-488.2 functions 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 NI-488.2 functions before integrating them into your application.
- Troubleshoot problems with your application.

For more information about `IBIC 488.2`, refer to Chapter 2, *Developing Your Application*, in 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 3, *Understanding the NI-488.2 Software*, in the *NI-488.2 Software Reference 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 GPIB board and the recommended operating conditions.

Table A-1. Electrical Characteristics of the NB-GPIB/TNT and NB-GPIB-P/TNT

Characteristic	Specification
Number of GPIB Loads	1
Maximum Transfer Rate (programmed I/O)	1.3 MB/s using three-wire handshake* 2.3 MB/s using HS488*
Power Requirement	+5 VDC, 350 mA maximum
* Actual rates are dependent on instrument capabilities and system configuration.	

Table A-2. Electrical Characteristics of the NB-GPIB

Characteristic	Specification
Number of GPIB Loads	2
Maximum Transfer Rate (programmed I/O)	850 KB/s*
Power Requirement	+5 VDC, 1.25 A maximum
* Actual rates are dependent on instrument capabilities and system configuration.	

Table A-3. Electrical Characteristics of the NB-GPIB-P

Characteristic	Specification
Number of GPIB Loads	1
Maximum Transfer Rate (programmed I/O)	850 KB/s
Power Requirement	+5 VDC, 1.25 A maximum
* Actual rates are dependent on instrument capabilities and system configuration.	

Table A-4. Environmental Characteristics of the NB-GPIB/TNT and NB-GPIB-P/TNT

Characteristic	Specification
Operating Temperature	0° to 40° C
Storage Temperature	–20° to 70° C
Relative Humidity	5% to 90%, noncondensing
EMI	FCC Class A Verified

Table A-5. Environmental Characteristics of the NB-GPIB and NB-GPIB-P

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

Table A-6. Physical Characteristics of the NB-GPIB/TNT and NB-GPIB

Characteristic	Specification
Dimensions	27.305 cm by 10.16 cm (10.75 in. by 4.0 in.)
I/O Connector	IEEE 488 Standard 24-pin

Table A-7. Physical Characteristics of the NB-GPIB-P/TNT and NB-GPIB-P

Characteristic	Specification
Dimensions	17.78 cm by 10.16 cm (7.0 in. by 4.0 in.)
I/O Connector	IEEE 488 Standard 24-pin

Appendix B

Troubleshooting

This chapter 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 GPIB board is positioned securely in its slot.
- Make sure that any RTSI cables being used are inserted properly.
- If the hardware verification test fails, make sure that no GPIB cables are connected to the GPIB board.

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 INIT` control panel (GPIB configuration utility) should show the following software configuration:
  - The **Interface** menu selection should be set to **System Slots**.
  - An **X** should appear in the **System Slots** box that corresponds to the location of your GPIB board.

  You can use the `NI-488 INIT` control panel 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 GPIB board.

Common Questions

What can I do if the software doesn't recognize my NB-GPIB/TNT board after I installed it?

Upgrade the software to use the new `NI-488 INIT` as described in Chapter 3, *Software Installation and Configuration.*

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

In `NI-488 INIT`, an **X** should appear in the **System Slots** box that corresponds to the location of your GPIB board. If an **X** does not appear in that 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 INIT` and now my Macintosh crashes upon startup?

Try changing the name of the `NI-488 INIT` to `ZNI-488 INIT`. Because INITs load in alphabetical order, the `ZNI-488 INIT` will load last, preventing possible corruption from INITs 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.

My system has been crashing since I switched to a Quadra computer. What should I do?

This problem was associated with some versions of the `NB Handler INIT`. Upgrade to the `NI-488 INIT` to resolve this situation.

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

Try checking the **Unaddressing** option in the `NI-488 INIT`.

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*, 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 configuration form 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.



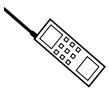
E-Mail Support (currently U.S. only)

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:_____

_____

_____

_____

_____

_____

GPIB Board 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 baord and revision number (for one of the following boards) _____

– NB-GPIB/TNT board revision _____

– NB-GPIB-P/TNT board revision _____

– NB-GPIB board revision _____

– NB-GPIB-P board revision _____

NI-488.2 software version number on disk _____

Shield ground jumper connected (yes or no) _____

NI-488 INIT 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 NB-GPIB/TNT and the NI-488.2™ Software for MacOS*

Edition Date: July 1997

Part Number: 320728C-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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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
DMA	direct memory access
EMI	electromagnetic interference
EOS	End-of-String
FCC	Federal Communications Commission
GPIB	General Purpose Interface Bus
Hz	hertz
IEEE	Institute of Electrical and Electronic Engineers
in.	inches
I/O	input/output
KB	kilobytes
m	meters
MB	megabytes of memory
RAM	random-access memory
REN	Remote Enable
RTSI	Real-Time System Integration
s	seconds
SC	System Controller
VDC	volts direct current

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