

**GPIB**

# **Getting Started with Your PCI-GPIB and the NI-488.2M™ Software for Solaris 2**

January 1997 Edition  
Part Number 321381A-01

© Copyright 1997 National Instruments Corporation.  
All Rights Reserved.

---



### **Internet Support**

support@natinst.com

E-mail: info@natinst.com

FTP Site: ftp.natinst.com

Web Address: <http://www.natinst.com>



### **Bulletin Board Support**

BBS United States: (512) 794-5422

BBS United Kingdom: 01635 551422

BBS France: 01 48 65 15 59



### **Fax-on-Demand Support**

(512) 418-1111



### **Telephone Support (U.S.)**

Tel: (512) 795-8248

Fax: (512) 794-5678



### **International Offices**

Australia 03 9879 5166, Austria 0662 45 79 90 0, Belgium 02 757 00 20,  
Canada (Ontario) 905 785 0085, Canada (Québec) 514 694 8521, Denmark 45 76 26 00,  
Finland 09 527 2321, France 01 48 14 24 24, Germany 089 741 31 30,  
Hong Kong 2645 3186, Israel 03 5734815, Italy 02 413091, Japan 03 5472 2970,  
Korea 02 596 7456, Mexico 5 520 2635, Netherlands 0348 433466,  
Norway 32 84 84 00, Singapore 2265886, Spain 91 640 0085, Sweden 08 730 49 70,  
Switzerland 056 200 51 51, Taiwan 02 377 1200, U.K. 01635 523545

### **National Instruments Corporate Headquarters**

6504 Bridge Point Parkway Austin, TX 78730-5039 Tel: (512) 794-0100

# Important Information

---

## Warranty

The PCI-GPIB hardware is warranted against defects in materials and workmanship for a period of two years from the date of shipment, as evidenced by receipts or other documentation. National Instruments will, at its option, repair or replace equipment that proves to be defective during the warranty period. This warranty includes parts and labor.

The media on which you receive National Instruments software are warranted not to fail to execute programming instructions, due to defects in materials and workmanship, for a period of 90 days from date of shipment, as evidenced by receipts or other documentation. National Instruments will, at its option, repair or replace software media that do not execute programming instructions if National Instruments receives notice of such defects during the warranty period. National Instruments does not warrant that the operation of the software shall be uninterrupted or error free.

A Return Material Authorization (RMA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. National Instruments will pay the shipping costs of returning to the owner parts which are covered by warranty.

National Instruments believes that the information in this manual is accurate. The document has been carefully reviewed for technical accuracy. In the event that technical or typographical errors exist, National Instruments reserves the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult National Instruments if errors are suspected. In no event shall National Instruments be liable for any damages arising out of or related to this document or the information contained in it.

EXCEPT AS SPECIFIED HEREIN, NATIONAL INSTRUMENTS MAKES NO WARRANTIES, EXPRESS OR IMPLIED, AND SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CUSTOMER'S RIGHT TO RECOVER DAMAGES CAUSED BY FAULT OR NEGLIGENCE ON THE PART OF NATIONAL INSTRUMENTS SHALL BE LIMITED TO THE AMOUNT THEREOF PAID BY THE CUSTOMER. NATIONAL INSTRUMENTS WILL NOT BE LIABLE FOR DAMAGES RESULTING FROM LOSS OF DATA, PROFITS, USE OF PRODUCTS, OR INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF ADVISED OF THE POSSIBILITY THEREOF. This limitation of the liability of National Instruments will apply regardless of the form of action, whether in contract or tort, including negligence. Any action against National Instruments must be brought within one year after the cause of action accrues. National Instruments shall not be liable for any delay in performance due to causes beyond its reasonable control. The warranty provided herein does not cover damages, defects, malfunctions, or service failures caused by owner's failure to follow the National Instruments installation, operation, or maintenance instructions; owner's modification of the product; owner's abuse, misuse, or negligent acts; and power failure or surges, fire, flood, accident, actions of third parties, or other events outside reasonable control.

## Copyright

Under the copyright laws, this publication may not be reproduced or transmitted in any form, electronic or mechanical, including photocopying, recording, storing in an information retrieval system, or translating, in whole or in part, without the prior written consent of National Instruments Corporation.

## Trademarks

NI-488®, HS488™, and NI-488.2™ are trademarks of National Instruments Corporation.

Product and company names listed are trademarks or trade names of their respective companies.

## WARNING REGARDING MEDICAL AND CLINICAL USE OF NATIONAL INSTRUMENTS PRODUCTS

National Instruments products are not designed with components and testing intended to ensure a level of reliability suitable for use in treatment and diagnosis of humans. Applications of National Instruments products involving medical or clinical treatment can create a potential for accidental injury caused by product failure, or by errors on the part of the user or application designer. Any use or application of National Instruments products for or involving medical or clinical treatment must be performed by properly trained and qualified medical personnel, and all traditional medical safeguards, equipment, and procedures that are appropriate in the particular situation to prevent serious injury or death should always continue to be used when National Instruments products are being used. National Instruments products are NOT intended to be a substitute for any form of established process, procedure, or equipment used to monitor or safeguard human health and safety in medical or clinical treatment.

# FCC/DOC Radio Frequency Interference Class A Compliance

---

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.*

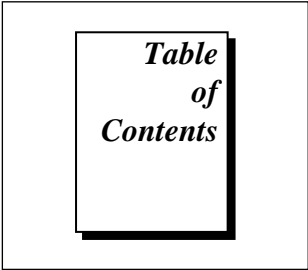
*This device complies with the FCC rules only if used with shielded interface cables of suitable quality and construction. National Instruments used such cables to test this device and provides them for sale to the user. The use of inferior or nonshielded interface cables could void the user's authority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

## 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.



---

## About This Manual

How to Use the Manual Set.....	vii
Organization of This Manual.....	vii
Conventions Used in This Manual .....	viii
Related Documentation .....	ix
Customer Communication .....	ix

## Chapter 1

### Introduction

How to Use This Manual.....	1-1
What You Need to Get Started .....	1-2
GPIB Hardware Overview.....	1-2
NI-488.2M Software Overview .....	1-2
Optional Programming Tools .....	1-3

## Chapter 2

### Hardware Installation

## Chapter 3

### Software Installation

NI-488.2M Software Components .....	3-1
Install the Software.....	3-1
Configure the Software with ibconf (Optional) .....	3-2
Removing the NI-488.2M Software (Optional).....	3-3

## Chapter 4

### Verify the Installation

Verify the System Boot Messages .....	4-1
Run the Software Installation Test.....	4-1
Troubleshooting Error Messages .....	4-2

## Chapter 5

### Begin to Use the NI-488.2M Software

Introduction to ibic.....	5-1
Programming Considerations.....	5-1

## Appendix A Specifications

## Appendix B Common Questions

## Appendix C Customer Communication

## Glossary

## Figure

Figure 2-1. Installing the PCI-GPIB.....	2-2
--	-----

## Tables

Table A-1. PCI-GPIB Hardware Characteristics .....	A-1
Table A-2. NI-488.2M Software Transfer Rates for the PCI-GPIB .....	A-1



**About  
This  
Manual**

---

This manual contains instructions to help you install and configure the National Instruments PCI-GPIB interface board and the NI-488.2M software for Solaris 2.

This manual assumes that you are already familiar with Solaris 2.

## How to Use the Manual Set

---

Use this getting started manual to install and configure your PCI-GPIB and the NI-488.2M software for Solaris 2.

Use the *NI-488.2M Software Reference Manual* to learn the basics of GPIB and how to develop an application program. The manual also contains 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-488.2M software.
- Chapter 2, *Hardware Installation*, contains instructions for installing your PCI-GPIB.
- Chapter 3, *Software Installation*, contains instructions to help you install and configure your NI-488.2M software.
- Chapter 4, *Verify the Installation*, describes how to verify the software installation and how to troubleshoot problems.
- Chapter 5, *Begin to Use the NI-488.2M Software*, helps you get started with the NI-488.2M software for Solaris 2.

- Appendix A, *Specifications*, describes the physical characteristics of the PCI-GPIB and the transfer rates of the NI-488.2M software, along with the recommended operating conditions.
- Appendix B, *Common Questions*, contains answers to common questions about using the NI-488.2M software.
- 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 a description of terms used in this manual, including abbreviations, acronyms, metric prefixes, mnemonics, and symbols.

## Conventions Used in This Manual

---

The following conventions appear in this manual.

<b><i>bold italic</i></b>	Bold italic text denotes a note, caution, or warning.
<b>bold</b> <b>monospace</b>	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 unique 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 the ANSI/IEEE Standard 488.2-1992, respectively, which define the GPIB.
<i>italic</i>	Italic text denotes emphasis, a cross reference, or an introduction to a key concept.
<i>italic</i> <i>monospace</i>	Italic text in this font denotes that you must supply the appropriate words or values in place of these items.
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 can also denote 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.

The Glossary lists abbreviations, acronyms, metric prefixes, mnemonics, symbols, and terms.



## 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*

## Customer Communication

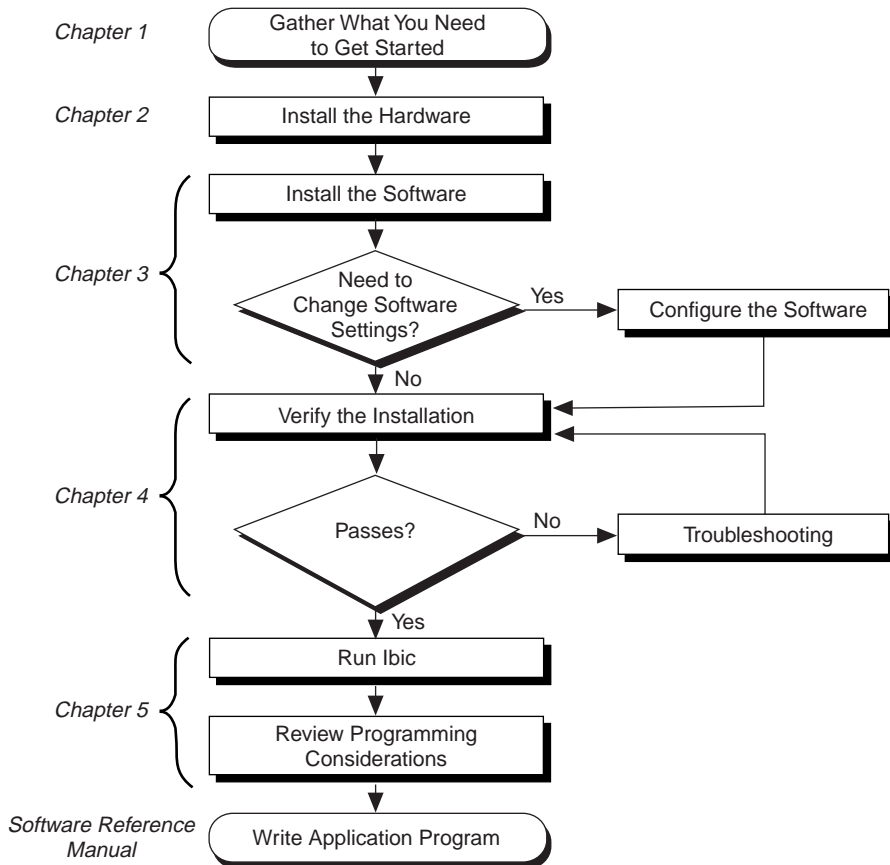
---

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

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

## How to Use This Manual



## What You Need to Get Started

---

- PCI-GPIB board
- 3.5 in. NI-488.2M Distribution Disk for PCI-GPIB and Solaris 2
- Solaris version 2.5.1 or higher installed on your SPARCstation
- Super-user privilege

## GPIB Hardware Overview

---

The PCI-GPIB is an IEEE 488 interface for computers with PCI expansion slots. It 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 up to 1.3 Mbytes/s, or 7.2 Mbytes/s using the high-speed GPIB protocol (HS488), 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, *Specifications*, for more information about the PCI-GPIB specifications and recommended operating conditions.

## NI-488.2M Software Overview

---

The NI-488.2M software consists of a loadable driver and utilities that transform a Sun SPARCstation running Solaris 2 into an IEEE 488.2 Controller with complete communications and bus management capabilities. The NI-488.2M software also includes a C language interface, two software diagnostic utilities, an interactive control program, and an interactive configuration program. The NI-488.2M driver supports up to four PCI-GPIB boards and is completely compatible with both IEEE 488 and IEEE 488.2 instruments.

Refer to Appendix A, *Specifications*, for information about the NI-488.2M software transfer rates.

# Optional Programming Tools

---

Your kit includes the NI-488.2M software for Solaris 2. 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 GPIB 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 more than 300 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.

# Hardware Installation

---

This chapter contains instructions for installing your PCI-GPIB.

**Warning:**

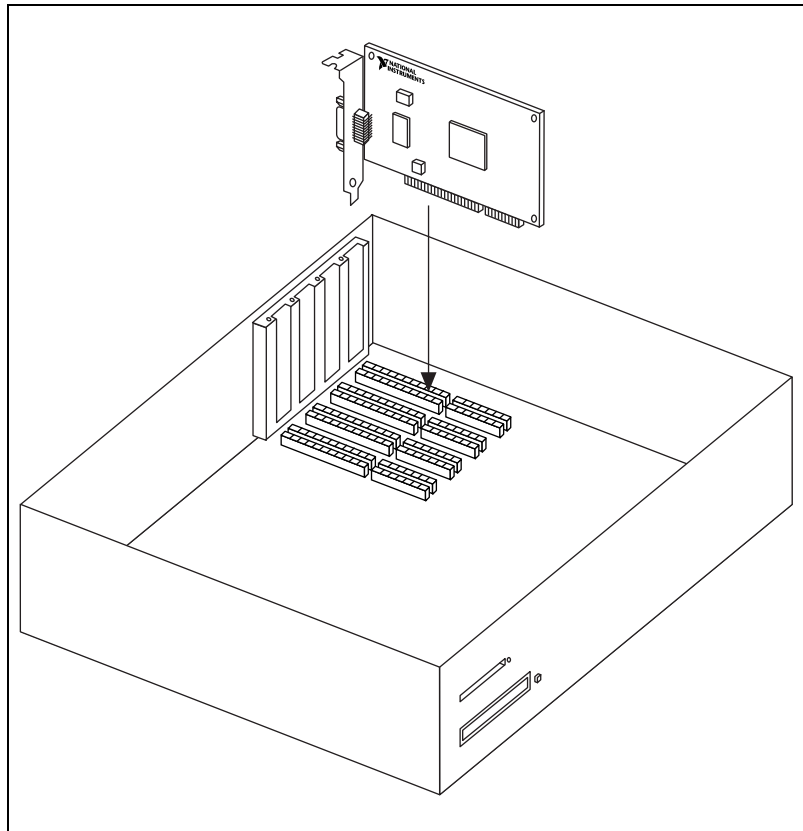
*Electrostatic discharge can damage several components on your GPIB board. To avoid electrostatic damage when you handle the module, touch the antistatic plastic package to a metal part of your computer chassis before you remove the board from the package.*

Before you install the PCI-GPIB, consult the manual that came with your workstation for specific instructions and warnings. You must have super-user privileges to install the hardware and software.

Perform the following steps to install the PCI-GPIB:

1. Log on as super-user (`root`).
2. Shut down your system by entering the following commands at the command line prompt:  

```
sync;sync;shutdown -y -g0 -i0
```
3. Turn off your computer after it has been shut down. Keep the computer plugged in so that it remains grounded while you install the GPIB hardware.
4. Remove the top cover (or other access panels) to give yourself access to the computer expansion slots.
5. Find an unused PCI expansion slot in your computer.
6. Remove the corresponding slot cover on the back panel of the computer.
7. Insert the PCI-GPIB into the slot with the GPIB connector sticking out of the opening on the back panel, as shown in Figure 2-1. It might be a tight fit, but do not force the board into place.



**Figure 2-1.** Installing the PCI-GPIB

8. Replace the top cover (or the access panel to the expansion slot).
9. Turn on your computer. The PCI-GPIB interface board is now installed.

# Software Installation

---

This chapter contains instructions to help you install and configure your NI-488.2M software.

## NI-488.2M Software Components

---

The NI-488.2M software package includes the following files:

- NI-488.2M driver (`ib`).
- Include file for user programs (`ugplib.h`).
- C language interface libraries (`libgpib.a` and `libgpib.so`).
- Source of the C language interface libraries (`cib.c` and `cib.h`).
- Interactive software configuration utility (`ibconf`).
- Interactive GPIB control program (`ibic`).
- Software diagnostic utilities (`ibtsta` and `ibtstb`).

## Install the Software

---

After you install the hardware, follow these steps to install the NI-488.2M software:

1. Log on as super-user (`root`).
2. Insert the NI-488.2M distribution diskette.
3. Add the NI-488.2M software to the operating system by entering one of the following commands.



**Caution:** *If you are running volume management, you must run `volcheck` to detect the floppy diskette. `volcheck` may warn you that the disk is unformatted, but do NOT choose to format the disk. Instead, select cancel.*

- If you are running volume management, enter the following commands. Do *not* choose to format the disk.

```
/usr/bin/volcheck
/usr/sbin/pkgadd -d /vol/dev/rdiskette0/unlabeled
```

- If you are not running volume management, enter the following command:

```
/usr/sbin/pkgadd -d /dev/rdiskette
```

4. Wait for the NI-488.2M software package to be successfully added, then eject the distribution diskette by entering the following command:

```
eject
```

## Configure the Software with `ibconf` (Optional)

---

`ibconf` is an interactive utility you can use to examine or modify the configuration of the driver. You might want to run `ibconf` to change the settings of the software parameters. You must have super-user privilege to run `ibconf`.

`ibconf` is largely self-explanatory and contains help screens that explain all commands and options. For more information on using `ibconf`, refer to the *NI-488.2M Software Reference Manual*.

Follow these steps to change the default parameters of your NI-488.2M software. The driver should not be in use while you are running `ibconf`.

1. Log on as super-user (`root`).
2. Start `ibconf` by entering the following command:

```
/usr/bin/ibconf filename
```

where *filename* is optional and refers to the name of the driver to be configured. The default is `/usr/kernel/drv/ib`.

After you have installed and configured the software, you should verify the installation. Refer to Chapter 4, *Verify the Installation*.



## Removing the NI-488.2M Software (Optional)

---

If you ever decide to stop using your PCI-GPIB board, you can remove the board and the NI-488.2M software. To remove the NI-488.2M software from the kernel configuration, you must have super-user privilege and the driver must *not* be in use. Enter the following command to unload the software:

```
pkgrm NIpcigpib
```

# Verify the Installation

---

This chapter describes how to verify the software installation and how to troubleshoot problems.

## Verify the System Boot Messages

---

If the following messages are printed out on the console or in the command tool window during the installation of the NI-488.2M software, the driver has established communication with the hardware device and recognized it.

```
*****  
* NI-488.2M GPIB Device Driver, Version 1.x *  
* Copyright (c) 1997 National Instruments Corp. *  
* All Rights Reserved. *  
*****
```

```
National Instruments PCI-GPIB (gpibx S/N nnn) XXXXXXXX
```

where nnn is the serial number of the board, and XXXXXXXX could either be blank, indicating the driver is capable of DMA I/O transfers, or \*\*\* NON-DMA \*\*\*, indicating the driver is not capable of DMA I/O transfers.

## Run the Software Installation Test

---

The software installation test has two parts: `ibtsta` and `ibtstb`.

- `ibtsta` checks for correct nodes `/dev/gpib` and `/dev/gpib0` and correct access to the device driver.
- `ibtstb` checks for correct DMA and interrupt operation. `ibtstb` requires a GPIB analyzer, such as the National Instruments GPIB analyzer, and can be omitted if an analyzer is not available.

Complete the following steps to verify the software installation:

1. Run `ibtsta` by entering the following command:  
`ibtsta`
2. If `ibtsta` completes with no errors and a bus analyzer is available, connect the bus analyzer to the GPIB board, then run `ibtstb` by entering the following command:  
`ibtstb`

If no error occurs, the NI-488.2M driver is installed correctly. If an error occurs, refer to the next section for troubleshooting information.

## Troubleshooting Error Messages

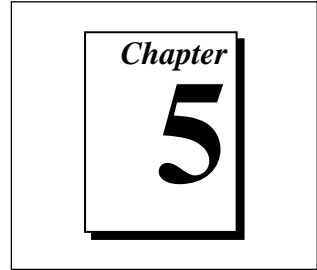
---

If `ibtsta` fails, the program generates common error messages that appear on your screen. These error messages explain what went wrong when you ran `ibtsta` and describe how you can correct the errors. For example, the following message might appear on your screen if you forgot to disconnect all your GPIB cables:

```
The fact that the ENOL error was not received when expected
indicates the possible presence of other devices on the bus.
Please disconnect ALL GPIB cables from the GPIB board, then
run this test again.
```

If you are still unable to run `ibtsta` and/or `ibtstb` successfully after you have followed the suggestions provided by the error messages, fill out the forms in Appendix C, *Customer Communication*, and contact National Instruments for assistance. For answers to other common questions, refer to Appendix B, *Common Questions*.

# Begin to Use the NI-488.2M Software



This chapter helps you get started with the NI-488.2M software for Solaris 2.

## Introduction to `ibic`

---

You can use `ibic`, the Interface Bus Interactive Control utility, 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` 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 routines before integrating them into your application
- Troubleshoot problems with your application

For more information about `ibic`, refer to the *NI-488.2M Software Reference Manual*.

## Programming Considerations

---

As you begin developing your GPIB application, remember the following points:

- The application program must include the `ugpib.h` header file as follows:

```
#include <sys/ugpib.h>
```

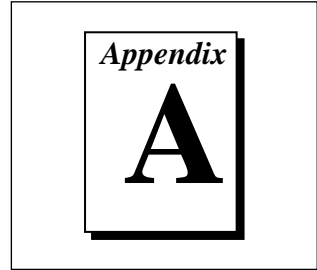
- When you compile your application, you must link it to the GPIB C language interface library using one of the following commands, where `example.c` is your application name:

```
cc example.c -lgpib
or
cc example.c -dy -lgpib
or
cc example.c -dn -lgpib
```

`-dy` specifies dynamic linking, which is the default method. It links the application to `libgpib.so`. `-dn` specifies static linking in the link editor. It links the application to `libgpib.a`. For more information about compiling and linking, see the man pages for `cc` and `ld`.

For information about choosing a programming method, developing your application, or compiling and linking, refer to the *NI-488.2M Software Reference Manual*. The reference manual also contains detailed information about each NI-488 function and NI-488.2 routine.

# Specifications



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

**Table A-1.** PCI-GPIB Hardware Characteristics

<b>Characteristic</b>	<b>Specification</b>
Dimensions	13.3 by 10.7 cm (5.25 by 4.20 in.)
Power Requirement	+5 VDC, 600 mA Maximum
I/O Connector	IEEE 488 Standard 24-Pin
Operating Environment Component Temperature Relative Humidity	0° to 55° C 5% to 90%, Noncondensing
Storage Environment Temperature Relative Humidity	-20° to 70° C 5% to 90%, Noncondensing
EMI	FCC Class A Verified

**Table A-2.** NI-488.2M Software Transfer Rates for the PCI-GPIB

<b>Transfer Method</b>	<b>Maximum GPIB Transfer Rate</b>
3-Wire (IEEE 488)	1.3 Mbytes/s*
HS488	7.2 Mbytes/s*
* Actual speed may vary considerably from speed shown because of system and instrumentation capabilities.	

# Common Questions

---

This appendix contains answers to common questions about using the NI-488.2M software.

## **What do I do if `ibtsta` or `ibtstb` fails with an error?**

If you cannot correct the problem by following the on-screen instructions, fill out the forms in Appendix C, *Customer Communication*, and contact National Instruments.

## **What is wrong if `ibfind` returns a -1?**

The driver may not be installed correctly, or the nodes may not have been created when the driver was loaded. Try installing the NI-488.2M software again. Refer to Chapter 3, *Software Installation*, for more information.

Also, the file may require read/write privileges you do not have, or you may have renamed a device. Make sure that the device names in your application program match the device names in `ibconf`.

## **What could be causing a problem with accessing the NI-488.2M distribution diskette?**

Check that the special file `/dev/rdiskette` is the correct file for the diskette driver. The codes should give you read/write access for `root`. Another possibility is that the data on the distribution diskette is corrupted.

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

For information about using the NI-488.2M language interface refer to Chapter 5, *Begin to Use the NI-488.2M Software*.

### **When would I use `ibic`?**

You can use `ibic` to test and verify instrument communication, troubleshoot problems, and develop your application program. For more information about `ibic`, refer to the *NI-488.2M Software Reference Manual*.

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

When you call National Instruments, you should have the results of the diagnostic test `ibtsta`. You should also have run `ibic` to try to find the source of your problem. Also, make sure you have filled out the *Hardware and Software Configuration Form* in Appendix C, *Customer Communication*.



# Customer Communication

---

For your convenience, this appendix contains forms to help you gather the information necessary to help us solve 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 application 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	09 527 2321	09 502 2930
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
U.K.	01635 523545	01635 523154

# 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 \_\_\_\_\_

Title \_\_\_\_\_

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 will reproduce the problem \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# 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 Board Revision \_\_\_\_\_

GPIB Software Version Number on Disk \_\_\_\_\_

Software Installation Test Results \_\_\_\_\_

## Other Products

Programming Language and Version \_\_\_\_\_

Operating System Version \_\_\_\_\_

Other Devices in System \_\_\_\_\_

Hardware Settings for Other Boards Installed \_\_\_\_\_

# 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 Hardware and the NI-488.2M Software for Solaris 2*

**Edition Date:** January 1997

**Part Number:** 321381A-01

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

---

---

---

---

---

---

---

---

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

---

---

---

---

---

---

---

---

Thank you for your help.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

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

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

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

A rectangular box containing a smaller, bold-bordered rectangle with the word "Glossary" written in a serif font inside it.

## *Glossary*

---

<b>Prefix</b>	<b>Meaning</b>	<b>Value</b>
m-	milli-	$10^{-3}$
c-	centi-	$10^{-2}$
k-	kilo-	$10^3$
M-	mega-	106

°	degrees
%	percent
A	amperes
ANSI	American National Standards Institute
ASIC	application-specific integrated circuit
C	Celsius
CPU	central processing unit
DMA	direct memory access
FCC	Federal Communications Commission
GPIB	General Purpose Interface Bus
hex	hexadecimal
Hz	hertz

*Glossary*

IEEE	Institute of Electrical and Electronic Engineers
in.	inches
I/O	input/output
IRQ	interrupt request
m	meters
MB	megabytes of memory
PC	personal computer
RAM	random-access memory
s	seconds
VDC	volts direct current