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Getting Started with Your MC-GPIB and the NI-488.2™ Software for Windows

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Federal Communications Commission

This device complies with Part 15 of the Federal Communications Commission (FCC) Rules for a Class B digital device. A Class B device is distinguishable from a Class A device by the appearance of an FCC ID number located on the Class B device.

Canadian Department of Communications

This device complies with the limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications (DOC).

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada.

Instructions to Users

These regulations are designed to provide reasonable protection against interference from the equipment to radio and television reception in residential areas.

There is no guarantee that interference will not occur in a particular installation. However, the chances of interference are much less if the equipment is installed and used according to this instruction manual.

If the equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, one or more of the following suggestions may reduce or eliminate the problem.

- Operate the equipment and the receiver on different branches of your AC electrical system.
- Move the equipment away from the receiver with which it is interfering.
- Reorient or relocate the receiver's antenna.
- Be sure that the equipment is plugged into a grounded outlet and that the grounding has not been defeated with a cheater plug.

Notice 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.

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: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock Number 004-000-00345-4.

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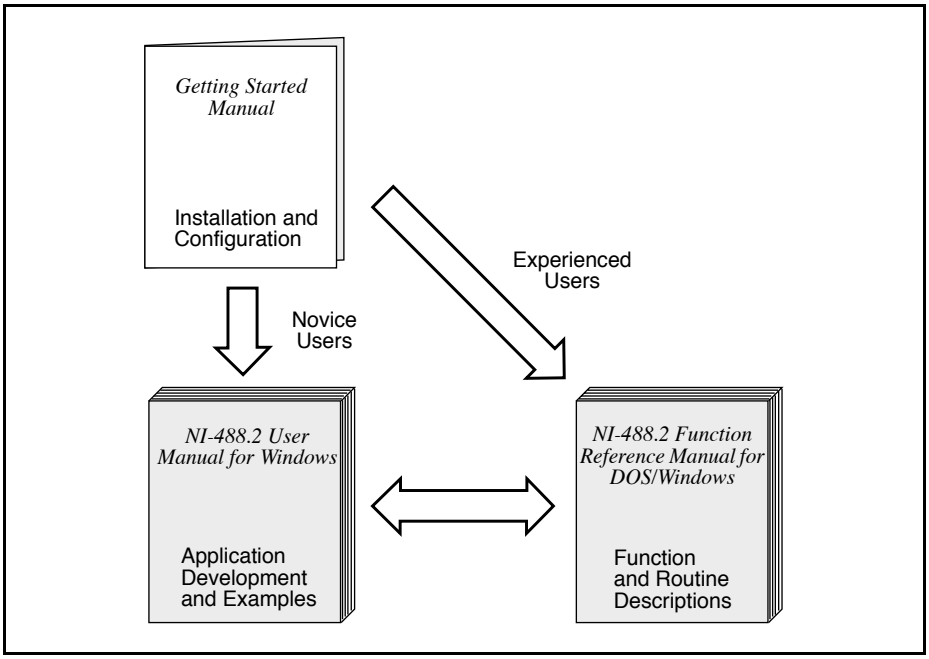
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About This Manual

This manual contains instructions for installing and configuring the National Instruments MC-GPIB interface board and the NI-488.2 software for Windows. The interface board is intended for use in personal computers equipped with 16-bit Micro Channel slots. The NI-488.2 software is intended for use with Microsoft Windows version 3.0 or higher. This manual assumes that you are already familiar with the Windows operating system.

How to Use the Manual Set



Use this getting started manual (part number 320739-01) to install and configure your GPIB board and NI-488.2 software for Windows.

Use the *NI-488.2 User Manual for Windows* (part number 320701-01) 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 DOS/Windows* (part number 320702-01) 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 includes a brief description of the GPIB board and the NI-488.2 software.
- Chapter 2, *Hardware Installation and Configuration*, contains instructions for configuring and installing your GPIB board.
- Chapter 3, *Software Installation and Configuration*, contains instructions for installing and configuring your NI-488.2 software.
- Chapter 4, *Installation Verification and Troubleshooting,* describes how to verify the hardware and software installation and how to troubleshoot problems.
- Chapter 5, *Using Your NI-488.2 Software,* describes the `wibic` utility and lists some programming considerations.
- Appendix A, *Hardware Specifications*, describes the characteristics of the GPIB board and the recommended operating conditions.
- Appendix B, *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 are used in this manual.

bold	Bold text denotes menus, menu items, dialog buttons, or options.
italic	Italic text denotes emphasis, a cross reference, or an introduction to a key concept.
bold italic	Bold italic text denotes a note, caution, or warning.
`monospace`	Text in this font denotes text or characters that are to be literally input from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, directories, programs, subprograms, subroutines, device names, functions, variables, field names and filenames.

`bold monospace`	Bold text in this font denotes the messages and responses that the computer automatically prints to the screen.
<>	Angle brackets enclose the name of a key on the keyboard–for example, <PageDown>.
-	A hyphen between two or more key names enclosed in angle brackets denotes that you should simultaneously press the named keys–for example, <Control-Alt-Delete>.
<Enter>	Key names are capitalized.
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 488.2-1987, respectively, which define the GPIB.

Abbreviations, acronyms, metric prefixes, mnemonics, symbols, and terms are listed in the *Glossary*.

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*
- *IBM Personal System/2 Quick Reference Manual*
- *Microsoft Windows User's Guide,* Microsoft Corporation

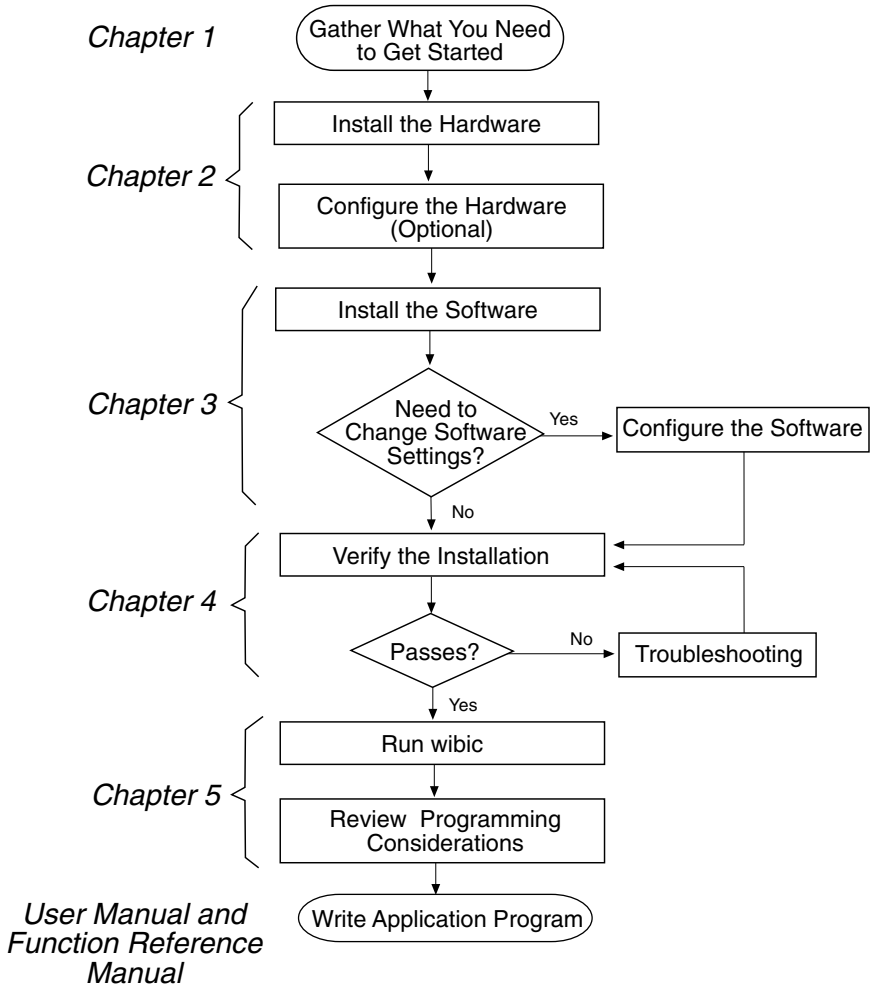
Customer Communication

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 B, *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 includes a brief description of the MC-GPIB board and the NI-488.2 software.

How to Use This Manual



What You Need to Get Started

- ❑ MC-GPIB board (part number 181165-01)

  or

  MC-GPIB board with key (part number 181165-02)

- ❑ 3.5 in. low density (720 KB) *NI-488.2 Software for Windows. Distribution Disks for the MC-GPIB* (part numbers 413048-99 and 413049-99)

- ❑ Windows version 3.0 or higher installed on your computer

- ❑ A blank diskette to use for a backup copy of the IBM PS/2 reference diskette (or your system reference diskette if you have a PS/2-compatible computer)

Hardware Description

The MC-GPIB board transforms any IBM Personal System/2 (PS/2) or compatible computer equipped with 16-bit Micro Channel slots into a full-functioning Talker/Listener/Controller. The NAT4882 controller chip is fully compatible with the IEEE 488.2 standard. The Turbo488 performance-enhancing ASIC boosts GPIB read and write transfers to rates exceeding 1 Mbytes/s.

You can use standard GPIB cables to connect the MC-GPIB with up to 14 instruments. If you want to use more instruments, you can order a bus extender or expander from National Instruments. Refer to Appendix A, *Hardware Specifications* for more information about the MC-GPIB hardware specifications and operating conditions.

Software Description

The NI-488.2 software for Windows includes a Windows dynamic link library, language interface libraries, and debugging and development utilities. The NI-488.2 software and GPIB hardware transform a general-purpose PC into a GPIB Talker/Listener/Controller that has complete communications and bus management capability.

Chapter 2
Hardware Installation and Configuration

This chapter contains instructions for configuring and installing your MC-GPIB board.

Warning: ***Several components on your MC-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.***

Setting the Shield Ground Configuration (Optional)

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

Caution: ***The MC-GPIB board was tested for compliance with FCC standards with the 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 jumper W1 on your MC-GPIB board.

2. Remove the jumper and place it across only one of the jumper pins as shown in Figure 2-1.

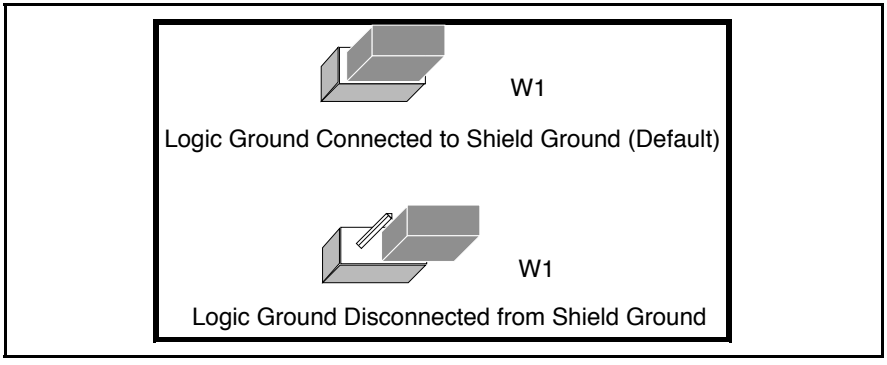


Figure 2-1. Ground Configuration Jumper Settings

3. Record the jumper setting on the *MC-GPIB Hardware and Software Configuration Form* in Appendix B, *Customer Communication*.

Install the Hardware

Before you install the MC-GPIB, make sure you have a backup copy of the PS/2 reference diskette. If you do not have one, you can make one by following the instructions in the *IBM Personal System/2 Quick Reference* manual that came with your PS/2 computer.

Follow these steps to install the MC-GPIB board:

1. Turn on your computer with the backup copy of the PS/2 reference diskette already inserted into the diskette driver.

2. Select **Copy an option diskette** to copy the configuration files from your NI-488.2 distribution disk.

3. Wait for the reference program to prompt you for the option diskette, then remove the PS/2 diskette and insert the NI-488.2 distribution disk into the diskette drive.

4. Remove the NI-488.2 distribution disk when all the files have been copied.

5. Turn off your computer. Keep the computer plugged in so that it remains grounded while you install the MC-GPIB board.

6. Remove the top or side cover of the system unit.

7. Remove the expansion slot cover on the back of the system unit.

8. Insert the MC-GPIB board into an unused slot with the GPIB connector sticking out of the opening on the back panel.

9. Screw the mounting bracket of the MC-GPIB to the back panel rail of the computer.

10. Replace the system cover.

Configure the Hardware

1. Restart your computer with the backup copy of the PS/2 reference diskette inserted into the diskette drive. The reference program asks if you want to automatically configure the computer. Respond by typing a `y` for yes.

   The reference program on the PS/2 diskette automatically configures the hardware by assigning values for the base I/O address, interrupt level, and DMA channel of the interface board.

2. To see what values were assigned by the reference program, select **Set Configuration** from the **Main Menu** and then **View Configuration** from the subsequent **Set Configuration Menu** of the PS/2 reference diskette.

   Make sure that the DMA channel the reference program chooses is between 0 and 7. If the program assigns one in the range of 8 to 14, select **Change Configuration** in the reference program and select an unused DMA channel between 0 and 7.

   You can use programmed I/O GPIB transfers if you do not want to use DMA for GPIB transfers. If this is the case, run `wibconf` and select `NONE` for the DMA channel. You do not need to update the configuration file on the reference diskette. However, you might want to update this file just to remind yourself that you disabled DMA.

   The MC-GPIB supports fairness, so the `Fairness Enable Field` defaults to ON. This setting means that even if the MC-GPIB is using the Micro Channel bus exclusively, it releases control of the bus when another Micro Channel bus master requests to use the bus.

3. Remove the PS/2 reference diskette.

4. Restart your computer.

   After you install the NI-488.2 software, it automatically configures itself to match the hardware settings. If you are installing one MC-GPIB board, the software assigns it as `gpib0`. If you are installing more than one board, the board in the lowest-numbered slot is `gpib0`, the board in the next lowest-numbered slot is `gpib1`, and so on.

Chapter 3
Software Installation and Configuration

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

NI-488.2 Software Components

The NI-488.2 software includes the following components:

- Device driver
- Hardware and software diagnostic tests
- Configuration utility
- Interactive control program
- Utilities for software development
- Language interface libraries for the following languages – Microsoft Visual Basic for Windows, Microsoft C, and Borland C++
- Example programs that use NI-488 functions and NI-488.2 routines

For a detailed list of files, refer to the *NI-488.2 User Manual for Windows*.

Install the Software

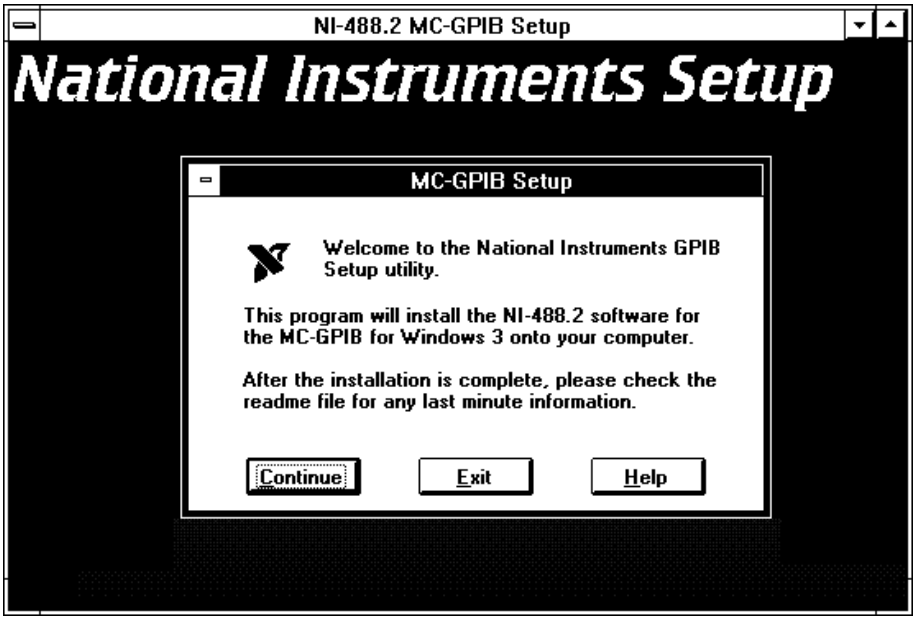
After you have installed and configured the hardware, you are ready to install the NI-488.2 software. Complete the following steps to run the software installation program.

1. Insert the NI-488.2 distribution disk into an unused drive.
2. Choose **Run...** from the **File** menu in the **Program Manager** window and type the following command into the dialog box:

   `x:\setup`

   where *x* is the letter of the drive containing the distribution disk (usually `a` or `b`).

The software installation begins with the following screen:



The interactive Windows setup program takes you through the necessary steps to install the NI-488.2 software. For help during the installation, click on the **Help** button. You can exit the setup at any time by clicking on the **Exit** button. When the installation is complete, restart Windows.

After you have installed your software, you might want to view or modify the driver configuration. Refer to the next section for instructions on running the configuration utility `wibconf`. If you do not want to run `wibconf`, refer to Chapter 4, *Installation Verification and Troubleshooting*, for instructions on verifying the hardware and software installation.

Configure the Software with wibconf (Optional)

`wibconf` is an interactive utility you can use to examine or modify the configuration of the driver. Follow these steps to run `wibconf`:

1. Double-click on the **wibconf** icon in the **GPIB** group of the **Program Manager**. A parameters dialog box appears.

2. Enter the drive, path, and name that describes the location of the Windows GPIB configuration file `gpib.ini` in the dialog box, and press <Enter> or click the **OK** button. For example, if you installed Windows on drive `c` in a directory named `windows`, then you would enter `c:\windows\gpib.ini` in the parameters dialog box. Changes made using `wibconf` are recorded in the `gpib.ini` file.

3. Use the cursor keys to select different fields and view corresponding help information.

4. Make any necessary changes.

5. Exit `wibconf` by pressing <Esc> or the function key <F9>, and save your changes.

6. Restart Windows.

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

After the software is installed and configured, you should verify the installation. Refer to Chapter 4, *Installation Verification and Troubleshooting*.

Chapter 4
Installation Verification and Troubleshooting

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

Run the Hardware Diagnostic Program ibdiag

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

Follow these steps to run `ibdiag`:

1. Disconnect any GPIB cables.

2. Go to the directory where the software is installed (for example, `c:\mc-gpibw`).

3. Enter the following command:

   ```
   ibdiag
   ```

If `ibdiag` completes with no errors, your hardware is functioning properly. If `ibdiag` returns an error message, refer to the next section for troubleshooting instructions.

Troubleshooting ibdiag Error Messages

Follow these steps to troubleshoot `ibdiag` error messages.

1. Make sure that there are no base I/O address or DMA channel conflicts in your system. The configuration program on the PS/2 reference diskette warns you if these types of conflicts exist. If conflicts exist, follow these steps:

   a. Restart your computer using your PS/2 reference diskette.

   b. Using the PS/2 configuration program, change the base I/O address or DMA channel until the program indicates that no conflicts exist. Then change the interrupt level setting so that interrupts are disabled.

   c. Save the changes and restart your computer.

   d. Run `ibdiag` again.

If `ibdiag` fails again, one of the following situations is occurring:

- A GPIB cable is connected to the board. Remove all GPIB cables before running `ibdiag` again.
- Another board or built-in device in your computer is using the same address space or DMA channel, without reporting its usage. Because of this problem, the PS/2 configuration program is not able to detect conflicts. Repeat this step using a new value for the base I/O address or DMA channel.
- The board is defective or cannot be used in your computer. Complete the *Technical Support Form* in Appendix B, *Customer Communication*, and contact National Instruments.

If `ibdiag` passes, your base I/O address and DMA channel settings are valid. Continue to Step 2 to verify your interrupt request setting.

2. Make sure you are using a valid interrupt request line. The configuration program on the PS/2 reference diskette does *not* warn you about interrupt conflicts. To make sure you are using a valid interrupt request line, follow these steps:
   a. Restart your computer using your PS/2 reference diskette.
   b. Using the PS/2 configuration program, change the interrupt level setting so that interrupts are enabled.
   c. Save the changes and restart your computer.
   d. Run `ibdiag` again.

   If `ibdiag` fails this time, one of the following situations is occurring:

   - Another board or built-in device in your computer is using the same interrupt request line. Repeat this step using a new value for the interrupt request line.
   - The board is defective or cannot be used in your computer. Complete the *Technical Support Form* in Appendix B, *Customer Communication*, and contact National Instruments.

Run the Software Diagnostic Program wibtest

To verify and test the hardware and software installation, run the `wibtest` software diagnostic program that came with your NI-488.2 software. The `wibtest` program is a Windows application that requires no user interaction.

Follow these steps to run `wibtest`:

1. Disconnect any GPIB cables.
2. Double-click on the **wibtest** icon in the **GPIB** group in the **Program Manager**.

If `wibtest` completes with no errors, you have installed the NI-488.2 software correctly. If `wibtest` returns an error message, refer to the next section for troubleshooting instructions.

Troubleshooting wibtest Error Messages

The following sections explain common error messages generated by `wibtest`.

The `wibtest` program locks up your computer if the GPIB board under test is configured to use an incorrect interrupt level. If `wibtest` locks up, you can either reconfigure the hardware to use a different interrupt level or use `wibconf` to disable the use of interrupts. For detailed instructions, refer to the section *Configure the Software with wibconf* in Chapter 3, *Software Installation and Configuration*.

Note: ***In the following paragraphs,*** `gpibx` ***refers to board*** `gpib0`, `gpib1`, `gpib2`, ***or*** `gpib3` ***as appropriate.***

Presence Test of Driver

The `wibtest` program tests for the presence of the NI-488.2 driver `gpib.dll` and the NI-488.2 configuration information file `gpib.ini`.

If `gpib.dll` is not in the Windows directory, a warning box pops up with the following text:

`File Error: Cannot find GPIB.DLL`

Press the **Close** button. `wibtest` displays the following error message when it fails:

`<<< No driver present for GPIBx. >>>`

To correct the problem, make sure that `gpib.dll` is located in the Windows directory (usually `c:\windows`).

If `gpib.ini` is not in the Windows directory, `wibtest` displays the same error message when it fails:

`<<< No driver present for GPIBx. >>>`

To correct this problem, make sure that `gpib.ini` is located in the Windows directory (usually `c:\windows`).

If you are unable to locate `gpib.dll` or `gpib.ini`, then you should reinstall the software.

Presence Test of Board

The following error message appears if the board `gpibx` is not installed or if the software is not configured properly:

```
<<<  No board present for GPIBx.  >>>
```

If this message appears, you could have one of the following situations:

- The `Use this GPIB Interface` field in `wibconf` might be set to `no` for board `gpibx`. If you want to use the board, you must set this field to `yes`.
- The board is not properly installed. Refer to the *Install the Hardware* section in Chapter 2, *Hardware Configuration and Installation*.

GPIB Cables Connected

The following error message appears if a GPIB cable is connected to the board when you run `wibtest`:

```
Call(25) 'ibcmd " "' failed, ibsta (0x134) not what was expected
(0x8130)

Call(25) 'ibcmd " "' failed, expected ibsta (0x100) to have the ERR
bit set.
```

Disconnect all GPIB cables before trying the test again.

Common Questions

Which NI-488.2 software (DOS or Windows) do I need to install?

If you want to run a GPIB application under DOS, install the NI-488.2 software for DOS. If you want to run a GPIB application in Windows, you must install the NI-488.2 software for Windows.

Can I have the NI-488.2 for DOS and Windows drivers installed at the same time?

Yes, there is nothing wrong with installing both. However, it is better not to use them at the same time.

How can I determine which type of GPIB board I have installed?

Run the `GPIBInfo` utility. If you run `GPIBInfo` without specifying any parameters, it returns information about the GPIB boards currently configured for use in your system. If you know the base I/O address of a GPIB interface board, you can enter it as a

parameter for specific information. For example, `GPIBInfo E00` returns information about the GPIB board at base I/O address E00. For more information about `GPIBInfo`, refer to the *NI-488.2 User Manual for Windows*.

How can I determine which version of the NI-488.2 software I have installed?

Run the `GPIBInfo` utility. If you run `GPIBInfo` without specifying any parameters, it returns information about the version of the NI-488.2 software currently installed. For more information about `GPIBInfo`, refer to the *NI-488.2 User Manual for Windows.*

What should I type into the pop-up window that appears when I start `wibconf`?

This pop-up window is prompting you for the drive and path where the `gpib.ini` file is located. If Windows is installed in the default directory (`c:\windows`), just press <Return>. If Windows is *not* installed in the default directory, enter the path and directory where Windows is installed so that `wibconf` can find the correct `gpib.ini` file to modify. For example, if Windows is installed in the directory `d:\win3`, type `d:\win3\gpib.ini` in the pop-up window.

What do I do if `ibdiag` or `wibtest` fails with an error?

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

When would I use `wibic`?

You can use `wibic` to test and verify instrument communication, troubleshoot problems, and develop your application program. For more information about `wibic`, refer to Chapter 5, *wibic–Windows Interface Bus Interactive Control*, in the *NI-488.2 User Manual for Windows*.

How do I use an NI-488.2 language interface?

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

What information should I have before I call National Instruments?

When you call National Instruments, you should have the results of the diagnostic tests `ibdiag` and `wibtest` and the output of `GPIBInfo`. Also, make sure you have filled out the configuration form in Appendix B, *Customer Communication*.

Chapter 5
Using Your NI-488.2 Software

This chapter describes the `wibic` utility and lists some programming considerations.

Introduction to wibic

You can use `wibic`, the Windows 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 `wibic` to do the following:

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

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

General Programming Considerations

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

- You must link the language interface library with your compiled source code.
- You must include the header file in your source code.

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

Appendix A
Hardware Specifications

This appendix describes the characteristics of the MC-GPIB board and the recommended operating conditions.

Table A-1. Electrical Characteristics

Characteristic	Specification
Maximum GPIB Transfer Rates (Windows)	
Reads	750 kbytes/s*
Writes	1 Mbytes/s*
Power Requirement	+5 VDC 1.0 A Typical 1.6 A Maximum
* Actual speed may vary considerably from speed shown because of instrumentation capabilities.	

Table A-2. Physical Characteristics

Characteristic	Specification
Dimensions	8.9 cm by 29.2 cm (3.5 in. by 11.5 in.)
I/O Connector	IEEE 488 Standard 24-pin

Table A-3. Environmental Characteristics

Characteristic	Specification
Operating Environment	
Component Temperature	0° to 40° C
Relative Humidity	5% to 90%, noncondensing
Storage Environment	
Temperature	-20° to 70° C
Relative Humidity	5% to 90%, noncondensing
EMI	FCC Class B Certified

Appendix B
Customer Communication

For your convenience, this appendix contains forms to help you gather the information necessary to help us solve technical problems you might have as well as a form you can use to comment on the product documentation. Filling out a copy of the *Technical Support Form* before contacting National Instruments helps us help you better and faster.

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Norway	32-848400	32-848600
Spain	(91) 640 0085	(91) 640 0533
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Switzerland	056/20 51 51	056/20 51 55
U.K.	0635 523545	0635 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.

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Name _____

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Computer brand _____

Model _____ Processor _____

Operating system _____

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 _____

(continues)

The problem is _____

List any error messages _____

The following steps will reproduce the problem _____

MC-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

- MC-GPIB Revision _____
- NI-488.2 Software Version Number on Distribution medium _____
- Programming Language Interface Version _____
- Shield Ground Connected to Logic Ground (yes or no) _____
- Board Settings:

	Base I/O Address	Interrupt Level	DMA Channel
`gpib0`	_____	_____	_____
`gpib1`	_____	_____	_____
`gpib2`	_____	_____	_____
`gpib3`	_____	_____	_____

Other Products

- Computer Make and Model _____
- Microprocessor _____
- Clock Frequency _____
- Type of Monitor Card Installed _____
- Windows Version _____
- Application Programming Language (BASIC, C, Pascal, and so on)_____

- Other Boards in System _____
- Base I/O Address of Other Boards _____
- Interrupt Level of Other Boards _____
- DMA Channels of Other Boards _____

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 MC-GPIB and the NI-488.2™ Software for Windows**

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Part Number: **370909A-01**

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

(continues)

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Glossary

Prefix	Meaning	Value
m-	milli-	10^{-3}
k-	kilo-	10^{3}
M-	mega-	10^{6}

°	degrees
%	percent
A	amperes
AC	alternating current
ANSI	American National Standards Institute
ASIC	application-specific integrated circuit
BIOS	Basic Input/Output System
C	Celsius
CPU	central processing unit
DLL	dynamic link library
DMA	direct memory access
EMI	electromagnetic interference
FCC	Federal Communications Commission
GPIB	General Purpose Interface Bus
hex	hexadecimal
Hz	hertz
IEEE	Institute of Electrical and Electronic Engineers
in.	inches
I/O	input/output
IRQ	interrupt request
KB	kilobytes of memory
MB	megabytes of memory
PC	personal computer
RAM	random-access memory
s	seconds
VDC	volts direct current

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