Getting Started with Your SB-GPIB and the NI-488.2M™ Software for Solaris 1

November 1993 Edition

Part Number 320299-01

National Instruments Corporate Headquarters
6504 Bridge Point Parkway
Austin, TX 78730-5039
(512) 794-0100
Technical support fax: (800) 328-2203
(512) 794-5678

Branch Offices:
Australia (03) 879 9422, Austria (0662) 435986, Belgium 02/757.00.20,
Canada (Ontario) (519) 622-9310, Canada (Québec) (514) 694-8521,
Denmark 45 76 26 00, Finland (90) 527 2321, France (1) 48 14 24 24,
Germany 089/741 31 30, Italy 02/48301892, Japan (03) 3788-1921,
Netherlands 03480-33466, Norway 32-848400, Spain (91) 640 0085,
Sweden 08-730 49 70, Switzerland 056/20 51 51, U.K. 0635 523545

Limited Warranty

The SB-GPIB 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 THERETOFORE 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 Instrument 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

Trademarks

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 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. This equipment has been tested and found to comply with the following two regulatory agencies:

Federal Communications Commission

This device complies with Part 15 of the Federal Communications Commission (FCC) Rules for a Class A digital device. Operation is subject to the following two conditions:

1. This device may not cause harmful interference in commercial environments.

2. This device must accept any interference received, including interference that may cause undesired operation.

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 A 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 harmful interference from the equipment to radio reception in commercial areas. 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.

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.

Contents

Tables

About This Manual

This manual contains instructions for installing and configuring the National Instruments SB-GPIB interface board and NI-488.2M multitasking software for use with a Sun SPARCstation running SunOS version 4.1 or higher (Solaris 1.x). This manual is meant to be used with the *NI-488.2M Software Reference Manual* (Part Number 320351-01).

The material in this manual assumes that the reader has a general knowledge of the Sun SPARCstation running SunOS and the General Purpose Interface bus (GPIB).

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Introduction*, lists the contents of your kit and optional equipment and briefly describes the NI-488.2M software and the SB-GPIB hardware.
- Chapter 2, *Hardware Installation*, contains instructions for installing the SB-GPIB board into your Sun SPARCstation.
- Chapter 3, *Software Installation and Configuration*, lists all the files contained on the distribution disk, and contains step-by-step instructions for installing and configuring the NI-488.2M software, verifying the installation of the NI-488.2M software, and using the NI-488.2M software with your GPIB application program.
- Appendix A, *Specifications*, describes the physical and electrical characteristics of the SB-GPIB board and the conditions under which it should be used.
- Appendix B, *Customer Communication*, contains forms you can use when requesting help from National Instruments or to comment on our products and manuals.
- The *Glossary* contains an alphabetical list and description of terms used in this manual, including abbreviations, acronyms, metric prefixes, mnemonics, and symbols.

Conventions Used in This Manual

The following conventions are used in this manual:

italic	Italic text denotes emphasis, a cross reference, or an introduction to a key concept.
`monospace`	Lowercase 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, paths, directories, programs, device names, functions, variables, and filenames, and for statements and comments taken from program code.
<>	Angle brackets enclose the name of a key on the keyboard–for example, <Delete>.
-	A hyphen between two or more key names enclosed in angle brackets denotes that you should simultaneously press the named keys. For example, <Ctrl-C>.
<Enter>	Key names are capitalized.
IEEE 488 and IEEE 488.2	IEEE 488 and IEEE 488.2 are used throughout this manual to refer to the ANSI/IEEE Standard 488.1-1987 and the ANSI/IEEE Standard 488.2-1987, respectively, which define the GPIB.
NI-488.2M	NI-488.2M is used throughout this manual to refer to the NI-488.2M software for SunOS (Solaris 1) unless otherwise noted.

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

Related Documentation

The following documents contain information that you might 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*
- *Sun SPARCstation Installation Guide*, Sun Microsystems, Inc., Mountain View, California 94043
- *SunOS 4.1 Release Notes*, Sun Microsystems, Inc., Mountain View, California 94043
- *Writing SBus Device Drivers*, Sun Microsystems, Inc., Mountain View, California 94043

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 lists the contents of your kit and optional equipment and briefly describes the NI-488.2M software and the SB-GPIB hardware.

What Your Kit Should Contain

Your SB-GPIB and NI-488.2M software kit should contain the following components.

Components	Part Number
SB-GPIB Interface Board	181115-01
3.5 in. NI-488.2M Distribution Disk for SB-GPIB and Sun SPARCstation SunOS software and C Interface or NI-488.2M Distribution Streaming Tape for SB-GPIB and Sun SPARCstation SunOS software and C Interface	422750-62 460750-62
Getting Started with Your SB-GPIB and the NI-488.2M Software for Solaris 1	320299-01
NI-488.2M Software Reference Manual	320351-01

Make sure each of these items is in your kit. If any item is missing, contact National Instruments.

Optional Equipment

You can order the following optional equipment from National Instruments:

Equipment	Part Number
Single-Shielded GPIB Cables*:	
Type X1 Cable – 1 m	763001-01
Type X1 Cable – 2 m	763001-02
Type X1 Cable – 4 m	763001-03
Double-Shielded GPIB Cables*:	
Type X2 Cable – 1 m	763061-01
Type X2 Cable – 2 m	763061-02
Type X2 Cable – 4 m	763061-03
* To meet FCC emission limits for a Class A device, you must use a shielded (Type X1 or X2) GPIB cable. Operating this equipment with an unshielded cable may cause interference to radio and television reception in commercial areas.	

Unpacking Your SB-GPIB

Follow these steps when unpacking your SB-GPIB board:

1. Verify that the pieces contained in the package you received match the kit parts list given earlier in this chapter.

Caution: Do not remove the board from its plastic package at this point.

2. Notice that your SB-GPIB board is shipped packaged in an antistatic plastic package to prevent electrostatic damage to the board. Several components on the board can be damaged by electrostatic discharge. To avoid such damage in handling the board, touch the plastic package to a metal part of your computer chassis before removing the board from the package.

3. Remove the board from the package and inspect the board for loose components or any other sign of damage. Notify National Instruments if the board appears damaged in any way. *Do not* install a damaged board into your computer.

Software Description

The NI-488.2M software consists of a loadable multitasking driver and programs that transform a Sun SPARCstation running SunOS 4.1 or higher (Solaris 1.x) into a GPIB Controller with complete communications and bus management capabilities. For a complete list of all the files included in the software package, refer to *Step 1. Prepare for Installation* in Chapter 3.

Hardware Description

The SB-GPIB board is compatible with all revisions of the IEEE 488 standard, including ANSI/IEEE Standard 488.2-1987. The NAT4882 chip performs the basic IEEE 488 Talker, Listener, and Controller functions. The Turbo488 chip enhances the performance of the SB-GPIB board. With the Turbo488 chip and the SBus Direct Virtual Memory Access (DVMA) transfers, data transfer rates for both read and write operations can exceed 1 Mbytes/sec.

You can install the SB-GPIB in any single-width master SBus slot. Standard IEEE 488 cables can connect the SB-GPIB with up to 14 devices. If you need to use more than 14 devices, you can add to your system using the National Instruments IEEE 488 extender or expander.

Chapter 2
Hardware Installation

This chapter contains instructions for installing the SB-GPIB board into your Sun SPARCstation.

Perform the following steps to install the SB-GPIB board.

1. Shut down your system by entering the following command at the command line prompt. (Your command line prompt might be *hostname#*.)

   ```
   shutdown -h now
   ```

   Wait for the > prompt to appear on your screen.

2. When you see the > prompt on your screen, turn off your computer.

3. Unplug the power cord.

4. Remove the cover of the system unit.

5. Insert the SB-GPIB board into slot 1 or 2 (the slots closest to the power supply) with the IEEE 488 receptacle sticking out of the opening on the back panel. Do not use slot 3. Slot 3 is a slave-only physical slot, and it does not support the SB-GPIB board, which uses DVMA (direct virtual memory access).

   If you are installing the SB-GPIB board into a SPARCstation 10 or similar computer, you might have to remove the two metal tabs on the mounting bracket.

6. Screw the mounting bracket of the SB-GPIB to the back panel rail of the computer.

7. Replace the system unit cover.

8. Plug in the power cord.

9. Turn on your computer.

The SB-GPIB board is now installed.

Chapter 3
Software Installation and Configuration

This chapter lists all the files contained on the distribution disk, and contains step-by-step instructions for installing and configuring the NI-488.2M software, verifying the installation of the NI-488.2M software, and using the NI-488.2M software with your GPIB application program.

Step 1. Prepare for Installation

Before you install the NI-488.2M software, consider the following:

- You must have super-user privilege to install the NI-488.2M software.
- The NI-488.2M distribution disk is in BAR format. The NI-488.2M distribution streaming tape is in TAR format.

  Note: The disk and streaming tape are referred to as the *NI-488.2M distribution media* throughout the remainder of this manual.

The files contained on the NI-488.2M distribution media are as follows:

`gpib.o`	NI-488.2M driver for SB-GPIB
`cib.c`	C language library
`ugpib.h`	Include file for user programs
`ibtsta`	Installation test
`ibic`	Interactive control utility
`ibconf`	Software configuration utility
`ib.INSTALL`	Install shell script
`openprom_xxx.o`	Patch file for SunOS 4.1.1 bug

If you have a SPARCstation 2 running under SunOS Version 4.1.1, you must rebuild the kernel using the `openprom_xxx.o` patch file from Sun Microsystems (Patch ID #100216-01, Bug ID #1046449).

If you are running SunOS version 4.1.1, use these steps to rebuild the kernel:

1. Complete one of the following steps:

   - If you have the file `sys/sun4c/openprom_xxx.c`, edit line 155 within the routine `sbus_decode_regprop` so that it reads as follows:

     ```
     for (i = 0, regp = dip->devi_reg; i
          <dip->devi_nreg; ++i, ++regp) {
     ```

   - If you do not have the file `sys/sun4c/openprom_xxx.c`, rebuild your kernel using the `openprom_xxx.o` file that came with our driver.

2. Rebuild your kernel (refer to the Sun *System and Network Administration Manual* in the sub-section *Creating and Installing a Custom Kernel*).

Step 2. Install the NI-488.2M Software

Perform the following steps to install the NI-488.2M software.

1. Log on as super-user (`root`).

2. Create a working directory (for example, `/usr/gpib`) by entering the following command:

   ```
   mkdir /usr/gpib
   ```

3. Change to this working directory by entering the following command:

   ```
   cd /usr/gpib
   ```

4. Copy the files from the NI-488.2M distribution media to this directory by entering one of the following commands:

   - For the diskette, enter the BAR command as follows:

     ```
     bar xvf /dev/rfd0c
     ```

- For the QIC-24 streaming tape, enter the `TAR` command as follows:

```
tar xvf /dev/rst8
```

5. Copy the `ibic`, `ibconf`, and `ibtsta` files to a directory in the command search path (for example, `/usr/bin`) by entering the following commands:

```
cp ibic /usr/bin
cp ibconf /usr/bin
cp ibtsta /usr/bin
```

6. Install the C library by compiling and converting the file `cib.c`. This procedure is necessary because the *NI-488.2M Software Reference Manual* assumes that a library has already been created for the C language interface. To compile the file `cib.c` and create a C language library, enter the following commands:

```
cc -c cib.c
ar rv /lib/libgpib.a cib.o
ranlib /lib/libgpib.a
```

   You can also add `cib.o` to an existing library or include `cib.o` during the link phase of each compile operation.

Step 3. Load the NI-488.2M Driver

The NI-488.2M software includes a loadable driver. You do *not* need to link the driver with the object files in the kernel, rebuild the kernel, or restart the system. Loadable drivers are loaded into the system by `ib.INSTALL` and the `/dev/vd` pseudo device driver. Loadable drivers are unloaded from the system by `ib.UNLOAD`.

Note: You cannot change or examine any of the default parameters of the driver if the driver is loaded. If you want to change or examine the default parameters, you must do so before loading or after unloading the driver. For instructions on changing the default parameters, see *Step 4. Configure the Software with ibconf* later in this chapter.

1. Run `ib.INSTALL` in your working directory and follow the instructions in the shell script. Enter the following command:

   ```
   ./ib.INSTALL
   ```

2. The following question appears on the screen:

   ```
   Do you want the driver to be automatically
   loaded during each reboot? [y/n] (y):
   ```

   The default is `y` for yes. If you do not want the driver to be automatically loaded during a restart, type `n` and then press <Enter>.

3. The following question appears on the screen:

   ```
   How many gpib interfaces are installed? (1)
   ```

   The default is 1. You might have as many as four.

4. If the driver is installed correctly, the following message appears:

   ```
   ib: module loaded; id=#
   ```

   where # is an identification number that is returned by the operating system. When you see this message, press <Enter>.

5. The following message appears:

   ```
   SB-GPIB device driver (Ver 2.x) is loaded.
   Copyright (c) 1992 National Instruments Corp.
   All Rights Reserved.
   ```

6. If the driver is already loaded or if the board is not properly seated, the following message appears:

   ```
   Can't load this module:  No such
   device or address.
   ```

Step 4. Configure the Software with ibconf

You might want to view or change some of the default software parameters. The software configuration utility `ibconf` allows you to change these software parameters. Even if the default parameters are acceptable, you must run `ibconf` to create the device nodes in the `/dev` directory. 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 Chapter 2, *Installation and Configuration of NI-488.2M Software* in the *NI-488.2M Software Reference Manual*.

Use these general steps if you want to change the default parameters of the driver:

1. Unload the driver before running `ibconf`.
2. Run `ibconf` and save the new configuration.
3. Exit `ibconf`.
4. Load the driver again.
5. Run `ibconf` again to create the device nodes. Enter `y` before exiting `ibconf` to save the new configuration.

After you run `ibconf` to create the device nodes in the `/dev` directory, only the super user can access the nodes. You can use the following UNIX commands to make the device nodes accessible to all users:

```
chmod 666 /dev/dev*
chmod 666 /dev/gpib*
```

Step 5. Verify the Software Installation

The software installation test `ibtsta` verifies that the driver is installed correctly. It checks for a correct node `/dev/gpib0` and correct access to the device driver.

Run `ibtsta` by entering the following command:

```
ibtsta
```

If the name of the UNIX kernel booted is not `/vmunix`, enter the full pathname when prompted.

If an error occurs in `ibtsta`, make sure that you have followed the instructions in Chapters 2 and 3 correctly. If you still have problems, complete the *SB-GPIB Hardware and Software Configuration Form* in Appendix B and then call National Instruments for technical support.

If no error occurs, the NI-488.2M software is installed correctly.

Using the NI-488.2M Software with Your Application Program

After the driver software is installed and verified successfully, follow these guidelines to proceed with development of your NI-488.2M application software.

- The file `cib.c` is the interface between your C language application program and the operating system entry points to the NI-488.2M driver. The functions available in `cib.c` are described in detail in the *NI-488.2M Software Reference Manual*. To use these functions, you must either compile `cib.c` and include the resulting object file during the link phase of each application compile operation, or link the GPIB library `libgpib` as shown in the following examples:

  ```
  cc test.c cib.o      or      cc test.c -lgpib
  ```

- The application program must include the following header file:

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

- The NI-488.2M functions are compatible with any other NI-488.2 functions used with other National Instruments products.

- The best way to learn the NI-488.2M functions and the device-specific commands of your instruments is to use the interactive control program `ibic`. By using `ibic`, you can control instruments from the keyboard one step at a time. For information on using `ibic`, refer to the *NI-488.2M Software Reference Manual.*

Unloading the Driver (Optional)

To unload the driver, you must have super-user privilege and the driver must *not* be in use. Unload the driver by entering the following command:

```
/dev/ib.UNLOAD
```

When the driver is successfully unloaded, the following message appears:

```
SB-GPIB Driver has been unloaded.
```

If the driver is in use and you try to unload it, the following message appears:

```
Can not unload the module:  Device busy.
```

Appendix A
Specifications

This appendix describes the electrical, physical, and environmental characteristics of the SB-GPIB board and the conditions under which it should be used.

Table A-1. Electrical Characteristics

Characteristic	Specification
Turbo488 Clock NAT4882 Clock	20 MHz 20 MHz
Transfer Rates GPIB Reads GPIB Writes GPIB Commands	 Over 1 Mbytes/sec* Over 1 Mbytes/sec* Over 350 kbytes/sec*
Power Requirement (from SBus)	+5 VDC 500 mA typical, 780 mA maximum
*Actual rates depend upon instrumentation capabilities.	

Table A-2. Physical Characteristics

Characteristic	Specification
Dimensions	3.3 in. x 5.8 in.
I/O Connector	IEEE 488 Standard 24-pin

Table A-3. Environmental Characteristics

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

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.

National Instruments provides comprehensive technical assistance around the world. In the U.S. and Canada, applications engineers are available Monday through Friday from 8:00 a.m. to 6:00 p.m. (central time). In other countries, contact the nearest branch office. You may fax questions to us at any time.

Corporate Headquarters
(512) 795-8248
Technical support fax: (800) 328-2203
(512) 794-5678

Branch Offices	**Phone Number**	**Fax Number**
Australia	(03) 879 9422	(03) 879 9179
Austria	(0662) 435986	(0662) 437010-19
Belgium	02/757.00.20	02/757.03.11
Denmark	45 76 26 00	45 76 71 11
Finland	(90) 527 2321	(90) 502 2930
France	(1) 48 14 24 00	(1) 48 14 24 14
Germany	089/741 31 30	089/714 60 35
Italy	02/48301892	02/48301915
Japan	(03) 3788-1921	(03) 3788-1923
Netherlands	03480-33466	03480-30673
Norway	32-848400	32-848600
Spain	(91) 640 0085	(91) 640 0533
Sweden	08-730 49 70	08-730 43 70
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.

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 _____

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 _____

(continues)

National Instruments software product _____

Version _____

Configuration _____

The problem is _____

_____

_____

_____

_____

_____

_____

_____

List any error messages _____

_____

_____

_____

_____

_____

_____

_____

The following steps will reproduce the problem _____

_____

_____

_____

_____

_____

_____

SB-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. Update this form each time you revise your software or hardware configuration, and use this form as a reference for your current configuration.

National Instruments Products

- SB-GPIB Hardware Revision _____
- NI-488.2M Software Revision Number on Distribution medium _____

Other Products

- Programming Language and Version _____
- Operating System Version _____
- Computer Make and Model _____
- Microprocessor _____
- Clock Frequency _
- Type of other boards installed and their respective hardware settings _____ _____
- Other devices in system _____

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 SB-GPIB and the NI-488.2M™ Software for Solaris 1**

Edition Date: **November 1993**

Part Number: **320299-01**

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

(continues)

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, MS 53-02
Austin, TX 78730-5039

Fax to: Technical Publications
National Instruments Corporation
MS 53-02
(512) 794-5678

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
C	Celsius
DVMA	direct virtual memory access
EMI	electromagnetic interference
EOI	end or identify
EOS	end of string
FCC	Federal Communications Commission
GPIB	General Purpose Interface (IEEE 488) Bus
hex	hexadecimal
Hz	hertz
IEEE	Institute of Electrical and Electronic Engineers
in.	inches
MB	Megabytes of memory
m	meters
sec	seconds
VDC	volts direct current