



**TAMS 61488/64487/64488/  
65488 GPIB Cards for  
Windows XP/Vista**



**Installation & Operation**

# TAMS 61488/64487/64488/65488 GPIB Interface Installation & Operation

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# Introduction

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The TAMS 61488/64487/64488/65488 GPIB Interfaces are intended to add IEEE-488 capabilities to any computer with PCI or PCI-Express sockets. The 64487 and 64488 cards provide a single GPIB bus, and differ only in their mounting bracket (low-profile or standard). The 65488 is similar to the 64488, but provides two independent GPIB busses. It is available with a standard height bracket only. The TAMS 61488 provides a single GPIB bus, with a 32 bit, 33 MHz PCI 3.0 implementation. The other TAMS Interfaces are one-lane PCI-Express implementations that can be used in sockets from 1X to 16X that support PCI-Express standards 1.0a, 1.1, or 2.0.

The TAMS cards take full advantage of the PCI and PCI-Express bus performance and deliver the highest possible level of throughput.

Whether you are using HP-VEE, BASIC for Windows, or programming in C with the SICL library, your code will now run at full performance without modification.

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# Hardware Warranty

All TAMS products use the highest quality components and are assembled to the highest specifications. Should a defect exist, or a failure occur, we apologize. Any defective unit will be repaired or replaced immediately.

Please follow the instructions below for service response.

- In the US please return it to TAMS. Please call or Fax for return instructions.
- Internationally, please contact the local distributor for return instructions.

Any customer may contact TAMS, or return products directly to TAMS, but for customers outside the US, this may cause a delay, which could be avoided by working with the local distributor.

The complete hardware warranty information is found in Appendix B located in the back of this manual.

For software warranty information see the Software License in Appendix A.

# Installing the 61488/64487/64488/65488 GPIB Interface

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This section describes the installation process for the 64487/64488/65488 PCI-Express/GPIB Interfaces, as well as the 61488 PCI/GPIB Interface.

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## Software Installation

These interfaces use same driver, referred to here as the 6x488 software. Minimum software rev is 1.2, for Windows XP/Vista. The TAMS 6x488 software depends upon the Agilent IO Libraries. You need to have installed the Agilent IO Suite 14.2 or later before you can install the TAMS 6x488 software or hardware. For more information and to download the IO Libraries, please refer to Agilent Technologies IO Libraries web page at:

<http://www.agilent.com/find/iolib>

Software installation requires you to have Administrator privileges. Next, install the TAMS 6x488 driver software. Installing the 6x488 software before the hardware ensures that Windows will be able to find the correct driver that is associated with the TAMS PCI/PCI-Express/GPIB interface. If the IO Libraries are reinstalled or updated, then the 6x488 driver software must then be reinstalled.

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## Hardware Installation

Once the TAMS 6x488 software is installed, the TAMS GPIB card can be physically installed in the computer.

You should note the following guidelines to avoid equipment damage when handling any interface cards.

- Make sure the computer's power is turned OFF and the power cord is removed from the AC power outlet, before removing or installing interfaces.
- 

**Caution** Plugging or unplugging an interface with the power on can damage the interface and the computer.

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- Most interfaces contain components that are sensitive to damage from electrostatic discharge. Use protective measures including anti-static workstation and personal grounding devices, if possible. When installing an interface, do not leave the interface exposed longer than necessary.
- 

**Caution** Whenever you remove, install, or handle an interface, hold it by its support bracket only. Do not touch its electrical components or traces.

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## Configuring the Equivalent Loads (Resistor Packs)

As shipped, there are two resistor packs installed in sockets RN1-RN2 for the 64487/64488 cards. With the 65488, there are four packs installed in RN1-RN4. The 61488 card has sockets labeled J2 and J3 for the resistor packs. These provide 10 additional equivalent loads, as defined in the IEEE 488.1-1987 standard. For systems with few devices and long cable lengths, the additional loads are required to provide increased signal integrity and better transfer rates on the cable. In most situations, they can be left installed, which gives a total of 11 loads for the card.

However, there is a maximum of 20 equivalent loads per bus system. Most devices have one equivalent load, so a maximum of nine additional devices can be used while the resistors are installed. If your bus system will have more than nine additional devices, carefully remove both of the resistor packs and store them.

If the resistors need to be reinstalled later on, be sure that the visual key aligns with pin 1 on the sockets. Pin 1 is denoted with either the number “1”, or a circle. The resistor packs are equivalent, and can be interchanged.



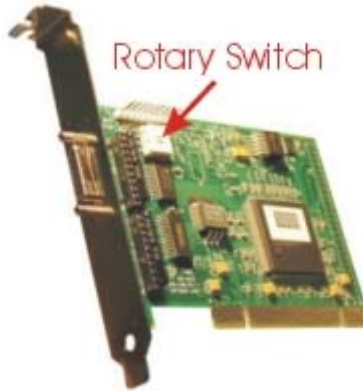
J2 and J3 are a pair, RN1 and RN2 are a pair, and RN3 and RN4 are a pair, and pairs must be installed together.

For full details on the constraints in configuring a bus system, refer to section 5.2.3 in the IEEE 488.1-1987 specification. The TAMS cards are capable of operation at 1 Mbyte per second, and therefore the constraints in that section apply. This requires 48 mA tri-state drivers be used in all devices, all devices must be powered on, and cabling must be a maximum of 15 meters total length with at least one equivalent load per meter of cabling. The 65488 provides two separate GPIB busses, so 15 meters of cabling can be attached to each bus.

# Installing the GPIB Interface

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Before installing the GPIB card note the settings of the rotary switches on the card. Each channel of every 61488, 64487, 64488, and 65488 card installed in the computer must have a unique switch setting. The 65488 has two channels, so the two switches must have unique settings. By default, the 65488 ships with the rotary switches set to zero and one for SW1 and SW2. If you have multiple cards, you need to manually change the rotary switch settings to ensure that each channel has a unique value. For installations with multiple cards, it is a good idea to write the switch setting on the metal support bracket with a felt tipped pen.



Refer to the Owner's Guide of your computer for instructions on opening your computer and installing interface boards. Follow the instructions being careful to handle the interface board only by its edges. After the board has been plugged in and the retaining screw installed the computer should be reassembled.

Depending on the computer, it may be advisable to connect the small Cannon connector of the required GPIB cable to the interface card prior to fully seating the PCI board. Reassemble the computer. Ensure that the thumbscrews and the small connector are tight for a good connection.



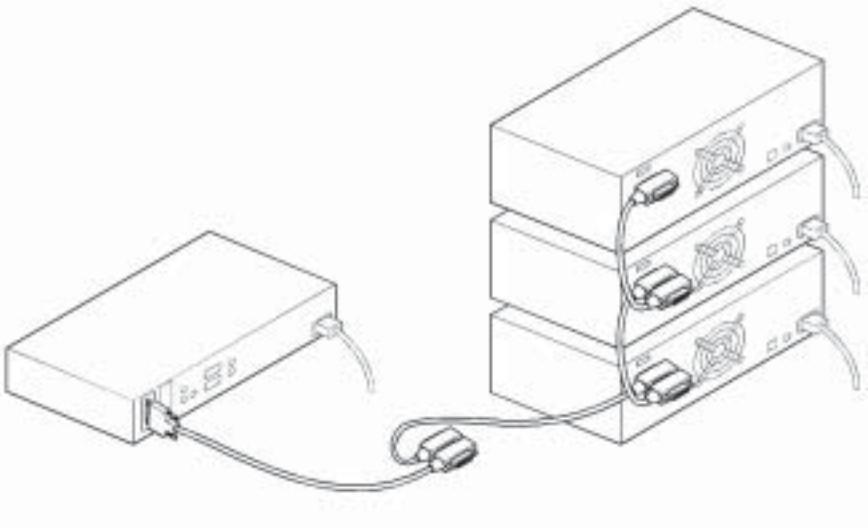
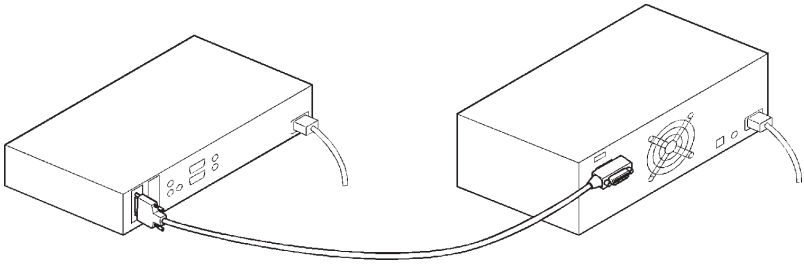
GPIB cable required by the TAMS GPIB cards

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## Connecting the GPIB Cable

The IEEE 488 specification is for a daisy chain configuration, and so the standard connector on the cable supplied can be attached directly to any GPIB device or to any device in a chain of GPIB devices.

The following illustrations show possible connections.



The lower illustration shows two connectors daisy-chained without being attached to an instrument. This is discouraged, since the jackscrews do not securely hold the connectors together in that configuration.

# New Hardware Wizard

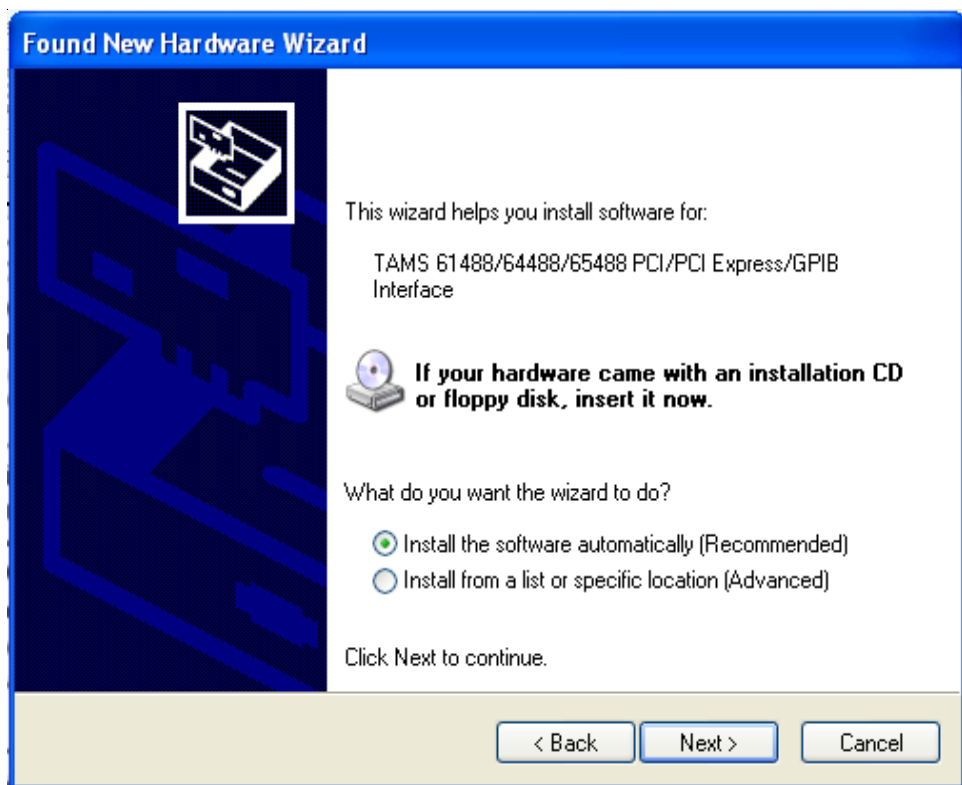
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After the PCI or PCI-Express card is installed in the computer, New Hardware Wizard will detect the card and associate the appropriate driver at the next bootup.



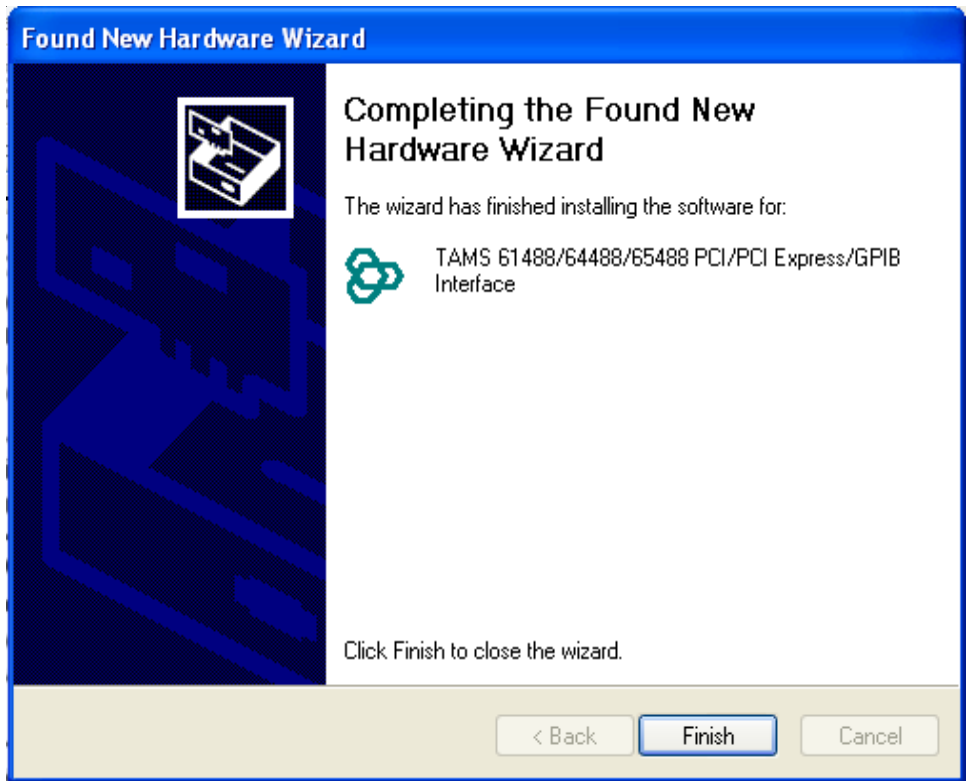
Click on Next.

You will get a screen that looks like this:



Click on Next

This will bring up this screen:



Click on Finish.

This completes the driver installation process for a 61448, 64487, or 64488. For a 65488, the process is repeated for the other GPIB channel.

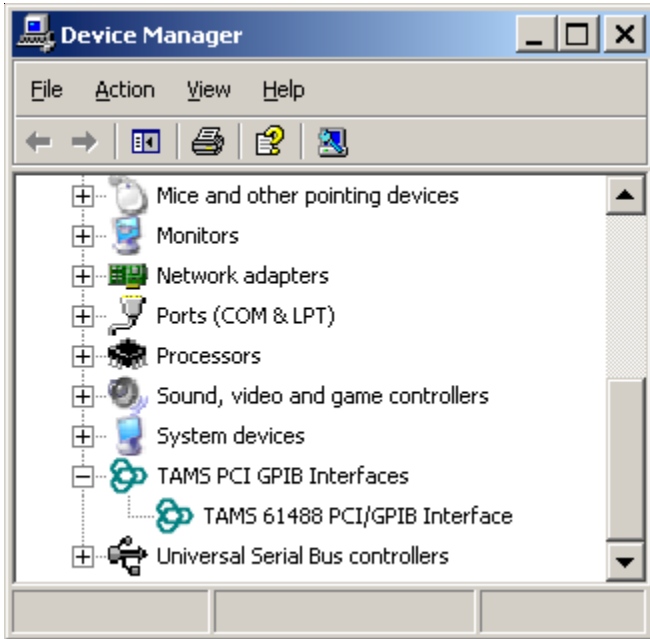
In order to use the TAMS GPIB Interface, the Agilent IO Libraries needs to be configured to recognize the added interfaces. This process is explained in the next section.

# Using the Device Manager

The Windows Device Manager can be used to determine the status of the PCI/PCI-Express/GPIB card. To Start the Device Manager, click on the Windows ‘Start’ Button and select ‘Run’. This will bring up a ‘Run Dialog’, enter:

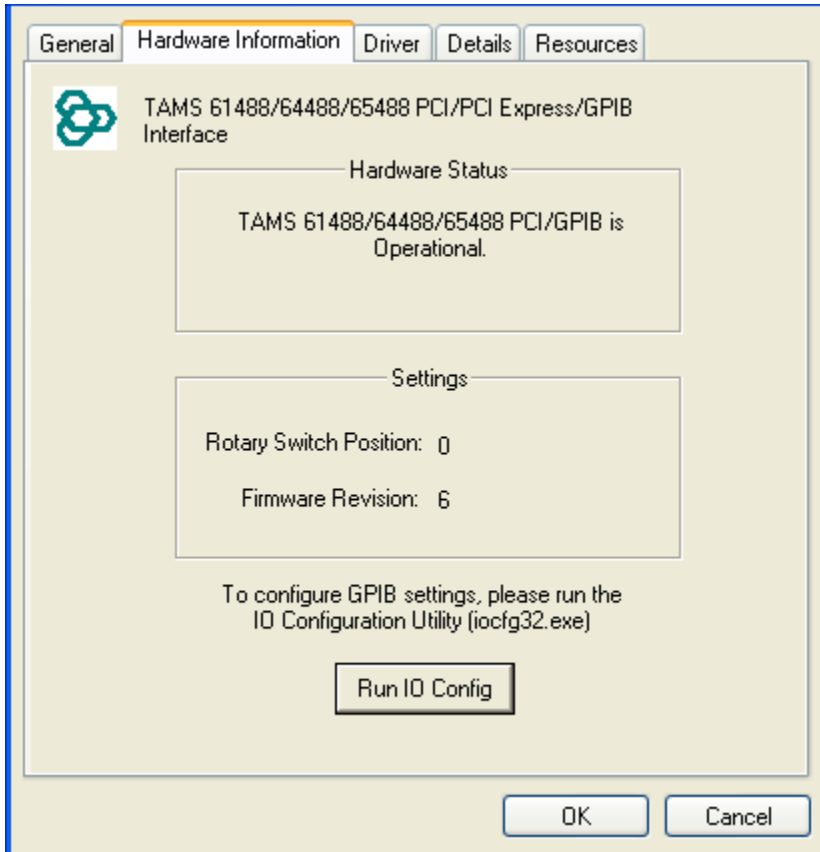
```
devmgmt.msc
```

Then press the ‘OK’ button. This will start the Windows Device Manager. It will bring up a new dialog that shows all the devices that are in the system.



All of the TAMS 61488, 64487, 64488, and 65488 cards will be listed under “TAMS PCI/PCI-Express/GPIB Interfaces”. Click on the ‘+’ icon next to “TAMS PCI/PCI-Express/GPIB Interfaces”, to see all of the interfaces that are installed. The 65488 will show up as two interfaces. Right click on the specific interface that you want more information on. This will bring up a menu. Select ‘Properties’. This will bring up a tabbed Dialog Box.

Select the “Hardware Information” tab:



The hardware status indicates the condition of the hardware. It should indicate that the TAMS GPIB is operational. The Setting indicates the position of the Rotary Switch as well as the Firmware Revision. Firmware revision will be 6 or greater for a 61488 card, and 17 or greater for one of the PCI-Express cards.

You set other GPIB configuration settings, using the Agilent IO Configuration Utility. You can Run IO Config by pressing the “Run IO Config” button. The configuration process is described in the next section.

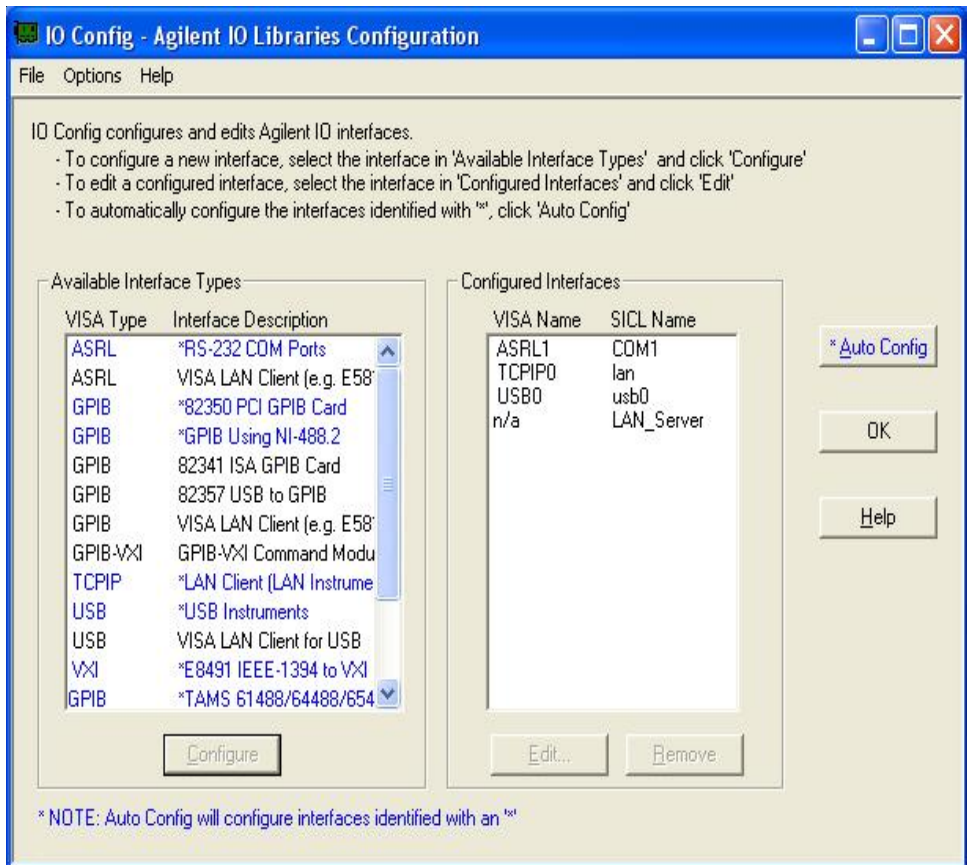
# Configuring the Card for Windows XP/Vista

Configure the interface by executing the IO Config program (iocfg32.exe), which will be located in the IO Libraries bin subdirectory. If you are running I/O Libraries Suite 14 or 15, then you need to manually run iocfg32.exe from the IO Libraries Suite bin directory.

**Note** If the Agilent IO Libraries were installed using the default values the IO Libraries bin subdirectory will be found here:

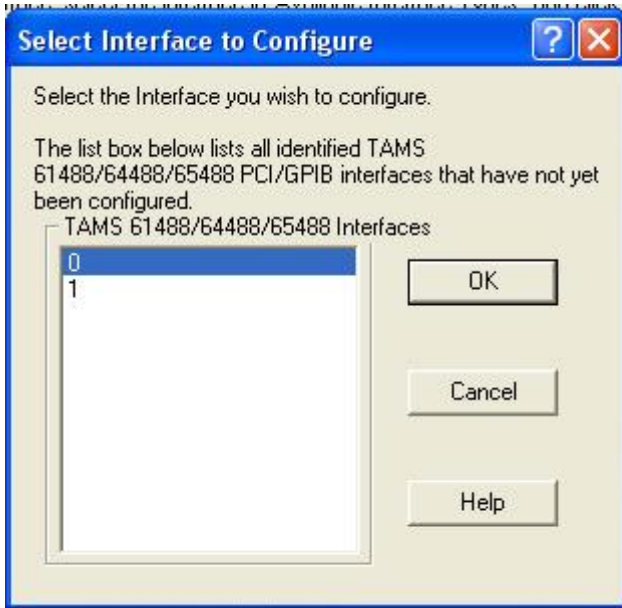
C:\Program Files\Agilent\IO Libraries Suite\bin\

Upon execution, the IO Config program will present a window like this:



To configure your PCI-Express interface, please highlight the TAMS 61488/64488/65488 GPIB entry under Available Interface Types and double click on it or click on Configure.

The following window will appear if you have multiple interfaces to configure, such as with a 65488 card:



Select the interface you wish to configure. Each number corresponds to the unique rotary switch position that is set on each 6x488 interface. Click on OK.

Now the following dialog will appear:

The screenshot shows a configuration dialog box titled "TAMS 61488/64488/65488 PCI / GPIB -- Configur...". The dialog contains the following fields and controls:

- SICL Interface Name:** Text box containing "gpib0".
- VISA Interface Name:** Text box containing "GPIB0" with up/down arrows.
- Logical Unit:** Text box containing "7" with up/down arrows.
- Bus Address:** Text box containing "21" with up/down arrows.
- Minimum T1 Delay (ns):** Text box containing "500".
- Rotary Switch:** Text box containing "0".
- System Controller**

Buttons on the right side of the dialog include: OK, Cancel, Help, Defaults, and Edit VISA Config... At the top right is a close button (X). At the top left is the TAMS logo and the text "TAMS Test & Measurement Systems Inc.". Below the logo is the text: "Questions? Press the Help button below. Recommended default values are shown."

In this window you will select all of the configurable parameters for the card. If you have existing applications that specify a different SICL or VISA name, then you may need to change these parameters to match the configuration name that the program is expecting.

Typically, the logical unit does not have to be changed. Traditionally, the first GPIB interface has been assigned the logical unit of 7.

The Bus Address, which by default is 21, is the GPIB Primary address of the GPIB Interface. Please make sure that this GPIB address does NOT conflict with any other GPIB device on the same bus. The 65488 card, with two separate busses, can use the same address for both busses.

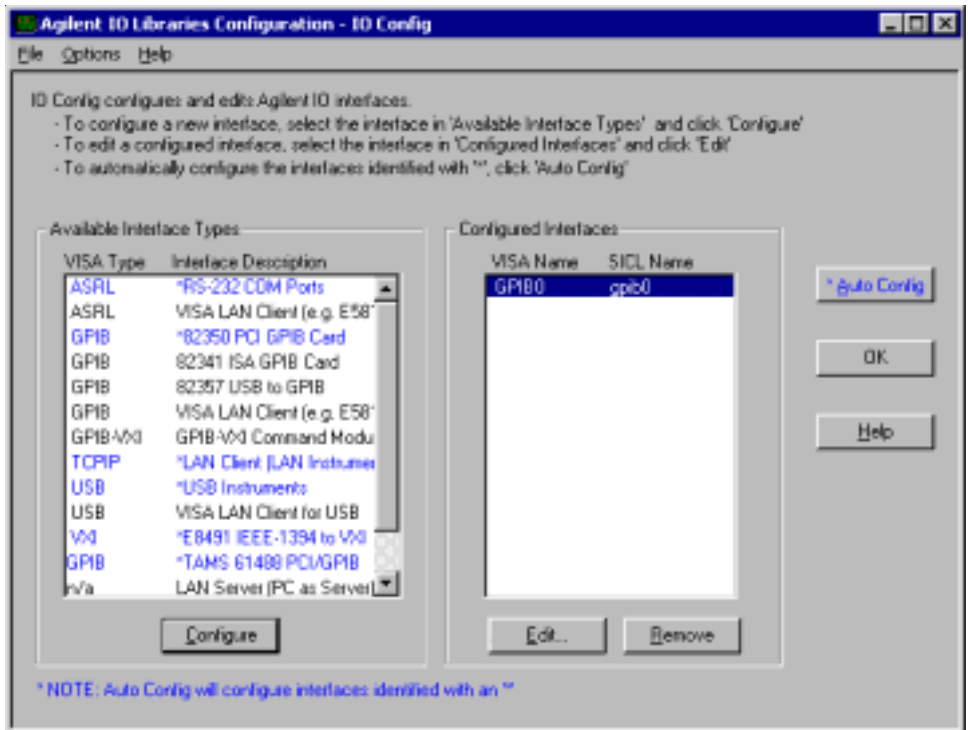
The Minimum T1 Delay affects the transfer rate when the card is talking. T1 Delay for the interfaces is from 360 ns to 2000ns. This does not alter the speed at which data handshakes into the interface card on a read. If all of the devices on your bus are capable of high speed (1 MB/sec) transfers, then you can set the Min T1 Delay to 360 ns. Otherwise, use the default of 500 ns. Since most instruments have a fixed T1 delay time of 350 ns, the constraints of section 5.2.3 in IEEE 488.1-1987 generally apply, regardless of the Min T1 Delay setting on the TAMS card.

The Rotary Switch indicates what position the switch associated with this channel is set to on the PCI card. This field can only be changed by physically changing the Rotary Switch Setting on the PCI card. Only change the Rotary Switch setting when the computer is turned off and power is disconnected. The two switches on a 65488 card must be set to unique numbers, and must not conflict with switch settings on other 61488/64488/65448 cards in the system.

The System Controller checkbox indicates if this interface is the GPIB System Controller. Typically, this checkbox is checked.

Additional information on these functions is provided through the HELP button.

When you are finished setting the configurable parameters, click OK. You will then see your interface listed on the screen.



Now, repeat this procedure to configure the other channel if using a 65488 GPIB interface, and click OK to exit IO Config.

## Using the Interface with TransEra HTBASIC

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Load the SICL version of the GPIB/HPIB driver with your desired options, e.g.:

```
LOAD BIN "HPIBS;DEV gpib0 ISC 7 TIMEOUT 5"
```

Note: By default, the TAMS GPIB interface uses a SICL Name of 'gpib0'. Historically 'hpib7' is the SICL name of the first GPIB Controller. If you change the SICL Name in IO Config, then you need to change the example above to match your selected SICL name.

For multiple gpib interfaces, such as you have with the 65488 product, it is necessary to make a copy of the HPIBS.dW6 driver file (such as HPIBS1.dW6), and load that file also:

```
LOAD BIN "HPIBS1;DEV gpib1 ISC 8 TIMEOUT 5"
```

Typically these lines are installed in the AUTOST file by editing with HTBASIC.

## Using the Interface with HP VEE

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Configure at least one instrument per interface, using the Logical Unit number assigned to the TAMS GPIB interface as the prefix, and then perform I/O as usual. The refresh button will not report that the card is present: this is normal and does not indicate malfunction.

# Appendix A - Software License Agreement

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## Software License Agreement

Please carefully read this License Agreement before installing the software. Rights in the software are offered only on the condition that the Customer agrees to all terms and conditions of the License Agreement. If you do not agree to the terms of the License Agreement, you may return the unopened software package and the hardware for a full refund.

In return for the payment of fee TAMS grants the Customer a license to use the software, until terminated subject to the following

Customer may use the software on any one computer.

Customer may not reverse assemble or decompile the software.

Customer may make copies for archival purposes.

Customer has no other rights to copy.

All copies of the software must bear the copyright notice(s) contained on the original.

**OWNERSHIP:** Customer agrees that they do not have any title or ownership of the software, other than ownership of the physical media. Customer acknowledges and agrees that the software is copyrighted and protected under the copyright laws.

Customer Acknowledges and agrees that the software may have been developed by a third party software supplier named in the copyright notice(s) included with the software, who shall be authorized to hold Customer responsible for any copyright infringement or violation of this License Agreement.

**TRANSFER OF RIGHTS IN SOFTWARE:** Customer may transfer rights in the software to a third party only as part of the transfer of all their rights and only if Customer obtains the prior agreement of the third party to be bound by the terms of this License Agreement.

Upon such transfer, Customer agrees that their rights in the software are terminated and that they will either destroy their copies and adaptations or they will deliver them to the third party.

Transfer to a US government department or agency or to a prime or lower tier contractor in connection with a US government contract shall be made only upon their prior written agreement to terms required by TAMS.

**SUBLICENSING AND DISTRIBUTION:** Customer may not sublicense the software or distribute copies or adaptations of the software to the public in physical media or by telecommunications without the prior written consent of TAMS

**TERMINATION:** TAMS May terminate this software license for failure to comply with any of these terms provided TAMS has requested Customer to cure the failure and Customer has failed to do so within thirty (30) days of such notice.

**UPDATES AND UPGRADES:** Customer agrees that the software does not include updates and upgrades which may be available from TAMS under a separate support agreement.

**EXPORT CLAUSE:** Customer agrees not to export or re-export the software or any copy or adaptation in violation of the US Export Administration regulations or other applicable regulations.

## LIMITED WARRANTY

TAMS warrants for a period of 90 days from the date of purchase that the software product will execute its programming instructions when properly installed on the computer or workstation with a supported version of the Operating System. TAMS does not warrant that the operation of the software will be uninterrupted or error free. In the event that this software product fails to execute its programming instructions during this warranty period, Customer's remedy shall be to return the CD media to TAMS for replacement. Should TAMS be unable to replace the media within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the entire product and all copies.

TAMS warrants the media upon which the product is recorded to be free from defects in materials and workmanship under normal use for a period of 90 days from the date of purchase. In the event any media prove to be defective during the warranty period, Customer's remedy shall be to return the media to TAMS for replacement. Should TAMS be unable to replace the media within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the entire product and all copies.

**NOTICE OF WARRANTY CLAIMS** Customer must notify TAMS in writing of any warranty claim within the warranty period.

**LIMITATION OF WARRANTY:** TAMS makes no other express warranty, whether written or oral, with respect to this product. Any implied warranty of merchantability or fitness is limited to the 90-day duration of this written warranty. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you.

This warranty gives specific legal rights, and you may also have other rights which vary from state to state, province to province or country to country.

**EXCLUSIVE REMEDIES :** The remedies provided above are Customer's sole and exclusive remedies. In no event shall TAMS be liable for any direct, indirect special, incidental, or consequential damages (including lost profit) whether based on warranty, contract, tort or any other legal theory. Some states provinces or countries do not allow the exclusion or limitation of incidental or consequential damages, so the limitation or exclusion may not apply to you.

**WARRANTY SERVICE:** Warranty service may be obtained directly from TAMS or from any of its Distributors.

# **Appendix B - Hardware Warranty Information**

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## **ONE YEAR LIMITED WARRANTY**

Test & Measurement Systems, Inc. warrants to the purchaser that the Interface card will be free of all defects in material and/or workmanship for one year from the date of shipment to the customer.

In the event of malfunction or failure attributable directly to faulty material and/or workmanship, TAMS will at its option, repair or replace the defective product or components, to whatever extent it shall deem necessary to restore the product or component, to proper operating condition. TAMS may at its option repair or replace, a defective unit with a new or refurbished unit.

The customer shall be solely responsible for the failure of any TAMS product, resulting from accident abuse, or misapplication of the product, and TAMS and its suppliers assume no liability as a consequence of such events under the terms of this warranty.

While TAMS has made every effort to provide clear and accurate technical information about the application of this product, TAMS and its suppliers assume no liability for any events arising out of the use of this technical information.

This Warranty gives you specific legal rights and you may also have other rights which vary from state to state, and from country to country.

This Warranty is in Lieu of all other express warranties which now or hereafter might otherwise arise with respect to this product. ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR USE, SHALL HAVE NO GREATER DURATION THAN THE PERIOD FOR THE EXPRESS WRITTEN WARRANTY APPLICABLE TO THIS PRODUCT AS SHOWN ABOVE, AND SHALL TERMINATE AUTOMATICALLY AT THE EXPIRATION OF SUCH PERIOD.

(Some states and countries do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you) No action shall be brought for breach of any implied or express warranty after one year subsequent to the expiration of the period of the express written warranty.

Incidental and consequential damages caused by malfunction, defect, or otherwise and with respect to breach of any express or implied warranty, are not the responsibility of TAMS, and to the extent permitted by law, are hereby excluded both for property and to the extent not unconscionable, for personal injury damage. (Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.)

# Appendix C: Specifications

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## General Characteristics

Weight	62.4 grams (61488/64488) 56.7 grams (64487) 79.4 grams (65488)
Size (excluding bracket)	11.9 cm x 7.6 cm (61488) 13.3 cm x 7 cm (64487/64488) 13.3 cm x 9.4 cm (65488)
Form Factor	PCI Std. Height Short Card (61488) PCI-Express Low Profile Short Card (64487) PCI-Express Std. Height Short Card (64488/65488)
Interfaces	1 IEEE 488 (61488/64487/64488) 2 IEEE 488 (65488) 1 PCI (61488) 1 PCI-Express x1 (64487/64488/65488)
Power Required	3.3V @ 0.65 amps (64487/64488/65488) 12V @ 0.25 amps (64487/64488) 12V @ 0.40 amps (65488) 5v @ .30 amps (61488)
Standards	IEEE 488.1-1987 IEEE 488.2 PCI 3.0 (61488) PCI-Express 1.0a (64487/64477/65488) RoHS (64487/64488/65488)

## Environmental Specifications

Operating Temperature	0 degrees C to 40 degrees C
Storage Environment	-20 degrees C to 55 degrees C
Operating Humidity	10-90%, non-condensing

## Ordering Information

URL	<a href="http://www.tamsinc.com/hpib">http://www.tamsinc.com/hpib</a>
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TAMS GPIB Cards for Windows XP/Vista  
Printed in USA E09.01.08  
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