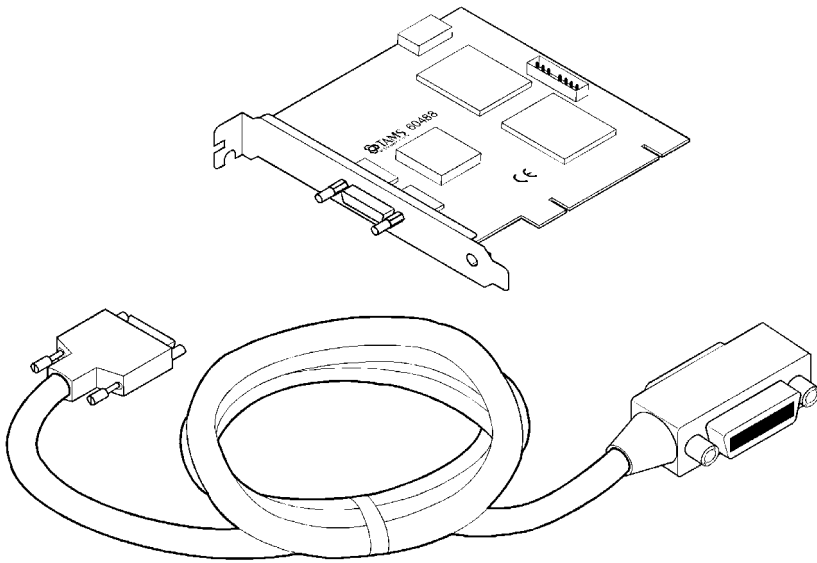# TAMS 70488
HP-IB Card for Workstations

Installation & Operation

TAMS 70488 HP-IB Interface
Installation & Operation

Test & Measurement Systems Inc.
750 14th Street SW
Loveland, Colorado 80537
USA

Telephone (970) 669 6553
Fax   (970) 669 3090
Web Site   www.tamsinc.com

Contents

Introduction

The TAMS HP-IB Interface is intended to add IEEE-488 capabilities to any computer with a PCI bus.

The TAMS card takes full advantage of the PCI bus performance and delivers the highest possible level of throughput.

The TAMS Interface supports both the 3.3v and 5v PCI specifications as a universal card.

Thanks to HP's software architecture and the design of the TAMS driver, once the driver is loaded (which is done once at installation) the TAMS card can be used in any application without requiring more computer overhead or any changes to code developed for HP's HP-IB cards.

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

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 on the inside of the back cover.

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

Handling Interfaces- Some Words of Caution

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.

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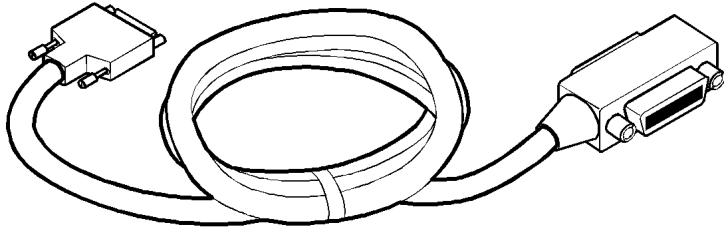
Caution   Whenever you remove, install, or handle an interface, hold it by its support bracket and side edges only. Do not touch its electrical components or traces.

Installing the HP-IB Interface

Refer to the Owner's Guide of your computer for instructions on opening your computer and installing PCI boards.

Follow the instructions being careful to handle the TAMS 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, is may be advisable to connect the small Cannon connector of the required HP-IB cable to the TAMS 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.

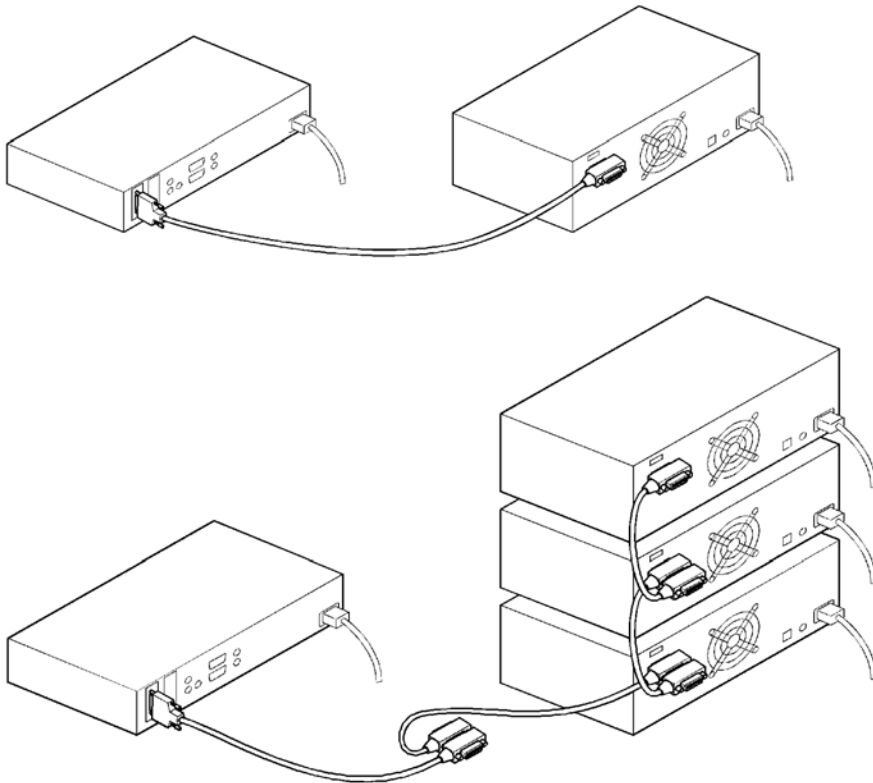HP-IB cable required with TAMS interface.

Connecting the HP-IB 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 HP-IB device or to any device in a chain of HP-IB devices.

The following illustrations show correct connections.

You are now ready to install the software which came with the HP-IB card.

Installing the software with HP-UX 10.X

Note You must have root permission to install the software. In addition, you must have permission to write to the directories in Table 3 in Appendix B. Installation of the TAMS HP-IB driver (t60488) will require rebooting the system.

1. Insert the installation media into the drive and wait for the busy light to remain off.

2. Mount the cdrom, for example:

   ```
   /etc/mount   /dev/dsk/c0t2d0 /cdrom
   ```

   `/dev/dsk/c0t2d0` is the device file for your cdrom drive and `/cdrom` is a directory used as a mount point.

3. Run the interactive HP-UX swinstall utility.

   ```
   /usr/sbin/swinstall
   ```

4. Verify that the Source Host Name and Source Depot Path are correct (usually the Specify Source window will open automatically, it can be accessed by selecting 'Change Source' from the Actions menu). The Source Depot Path is normally `/var/spool/sw`, unless you have copied the package from the installation media to a Source Depot. If this is the case you will need to change the Source Depot Path to point to the installation media. For example: `/cdrom`. Once Source Host Name and Source Depot Path are set correctly select 'OK'.

5. The SD Install - Software Selection window should contain an entry named 'T60488'. Highlight this entry by clicking on it once. Choose 'Mark For Install; from the Actions menu, and 'Yes' should appear in the Marked column.

6. Select 'Install' from the Actions menu.

7. The HP-UX swinstall utility will analyze the host system configuration and the software package requirements. Once the analysis phase is complete select OK to start the installation.

8. As the final stage of the configuration, the HP-UX swinstall utility will automatically rebuild the kernel and reboot the system.

9. Once the system has rebooted you may remove the media from the drive and store it in a safe place.

In general, the installation procedure places the files in the necessary directories by default. Appendix B is a reference for the Unix systems administrator, who might wish to know where these files are placed.

After the system reboots, you will need to use iosetup to configure the new TAMS HP-IB card as a SICL instrument card, as covered in the next section.

Configuring the Card

After installation of the driver software and reboot of the HP-UX system (handled automatically by swinstall), the SICL iosetup command must be executed to configure the TAMS card as a SICL instrument card. See the man page on iosetup (1M).

The t60488 driver is implemented as a custom Tulip driver. Therefore, the system does NOT need to be rebooted after changing the configuration using iosetup. However, the SICL iclear function should be used after making changes to ensure that the configuration changes have taken effect. See the man page on iclear (1).

The following information must be supplied by the user during the iosetup process:

1. Logical Unit: the user must supply a logical unit number for the TAMS card that is distinct from all other logical unit numbers currently configured under SICL.

2. Symbolic Name: the user must supply a symbolic name for the TAMS card that is distinct from all other symbolic names currently configured under SICL.

3. Driver Name: the name "t60488" must be used.

4. Location: the user must specify the slot number on the PCI bus slot used for the TAMS card. The first slot is numbered "1".

5. Address: the user must specify the HPIB bus address that the TAMS card is to use on the HPIB bus. This value must not be the same as any other device connected to the HPIB cable. It may be the same as other HPIB interface cards in the computer, so long as those other cards are not attached to the card via the HPIB cables.

If the TAMS card is set up as a system controller, it is traditional to give it HPIB bus address 21. This is not required, but does serve to reduce confusion.

6. Arg 1: the user must specify either "SYSCON" or "1" if the TAMS card is to be used as the system controller. Any other value will cause the card to function as a non system controller.

7. Arg 2: the user must specify either "DMATRM" or "1" if the TAMS card is to be capable of using DMA with HPIB data read operations in which a terminating character is used to end the transfer. Any other value will cause the card to always use polled transfers in this case, regardless of the value specified by the user using the ihint SICL library function.

    DMA transfers are significantly faster than polled transfers, especially for larger transfers. However, when DMA is used, the EOI condition cannot be distinguished from the termination character condition: EOI will always be reported on any transfer that ends with a termination character, even if the EOI was not physically present.

    This option only affects inbound transfers in which a terminating character is specified using the itermchr SICL library funtion. See the man page on itermchr (3).

8. Arg 3 - Arg 16: ignored.

By default, the t60488 will use DMA on all transfers whenever possible. This can be overridden by using the ihint SICL library function to specify I_HINT_USEPOLL. See the man page on ihint (3).

Appendix A: Tables

Table 1

I/O Setup for HP-UX

File   View   Help

Main Menu

To configure a new interface, select it in the Available Interface Types list and click on Configure. To edit a previously configured interface, select it in the Configured Interfaces list and click on Edit.

Available Interface Types   Configured Interfaces

Available Interface Types	Configured Interfaces
E1489 MXI/VXI Interface	**hpib (TULIP)**
E2070 HP-IB Interface	
E2071 High Speed HP-IB	
E2074 GPIO Interface	
LAN Client Interface	
Interpreted SCPI (I-SCPI)	
745i or 747i Built-in HP-IB	
RS232 built-in serial port	
Custom TULIP Driver	

Done...

Cancel

Help

Configure	Edit...	Remove...

Detailed Information for Configured Interfaces

hpib (TULIP)
Custom TULIP Driver:
    Logical Unit #: 7
    Symbolic Name: hpib
    Driver Name: t60488
    Location: 0
    Card Address: 21
    Arg. 1: SYSCON
    Arg. 2: DMATRM

Table 2

Custom TULIP Driver Configuration

TULIP Driver

Default settings for this interface are shown. Make changes if desired, and click on OK to accept.

Identifiers

Logical Unit #: `7`   ▲
                       ▼

Symbolic Name   `HPIB`

Interface Specific

Driver Name: `t60488`

Location (Integer):   `0`

Address (Integer):   `21`

Arguments (Optional)

Arg 1:   `SYSCON`   ▲

Arg 2:   `DMATRM`

Arg 3:   ` `

Arg 4:   ` `

Arg 5:   ` `   ▼

OK

Cancel

Defaults

Help

Appendix B: Systems Administration Reference

The installation procedure places files in the following directories:

Table 3

File	Location	Description
t60488.sl	/opt/sicl/lib	SICL shared Tulip library
libt60488.a	/usr/conf/lib	kernel driver library
t60488	/usr/conf/master.d	master file for kernel rebuild
t60488.0	/dev	special device file for PCI slot 1
t60488.n	/dev	special device file for PCI slot n + 1

In addition, the file /etc/opt/sicl/hwconfig.cf is modified by having comments added describing how to set up the TAMS board. If iosetup is used to configure the card as a SICL instrument card, these comments can be ignored.

The current version identifier of the t60488 driver can be obtained by using the "what" HP-UX command on either the t60488.sl or libt60488.a library files.

APPENDIX C

Software License Agreement

Please carefully read this License Agreement before opening the media.
Rights in the software are offered only on the condition that the Customer
agrees to all terms and conditions of the License Agreement. **Opening the
Media indicates your acceptance of these terms and conditions.** If
you do not agree to 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 buy 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 subliscence 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 it's 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 it's 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 top 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 sates 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 it's Distributors.

Warranty Information

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 it's 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 assumes 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 assumes 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 MERCHANT ABILITY 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.)

TAMS 70488 HP-IB Card for Workstations