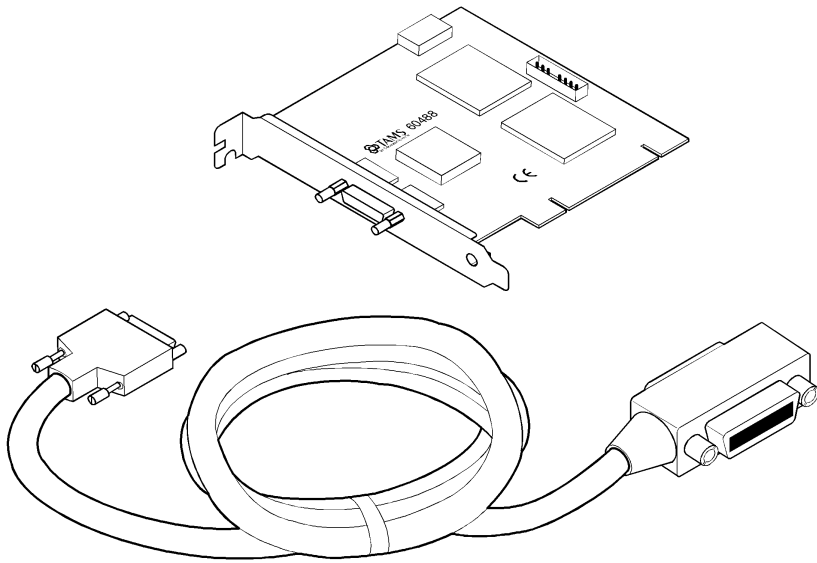




## TAMS 80488 HP-IB Card for Linux



### Installation & Operation

# TAMS 80488 HP-IB Card for Linux Installation & Operation

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## Introduction

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The following manual provides you with information on installing your TAMS HP-IB card and driver software on Linux. It also explains configuring your card for use with the I/O Libraries for Linux.

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**Note** The name of the product you have purchased is the TAMS 80488 (HP-IB Card for Linux). It includes the TAMS 60488 HP-IB card and the t60488 card driver for Linux.

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## Installing the HP-IB Interface

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This section explains how to install the TAMS 60488 HP-IB interface in the computer. To complete the installation:

1. Make sure the computer power switch is off.
2. Refer to the Owner's Guide of your computer for instructions on opening your computer and installing PCI boards.
3. Install the HP-IB interface in the workstation or PC by plugging the card into the PCI slot.

Follow the instructions being careful to handle the TAMS 60488 board only by its metal bracket. Avoid contact with the edges. After the board has been plugged in and the retaining screw installed the computer should be reassembled.

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**Note** Depending upon the space constraints in or around your computer, it may ease the installation process to connect the HP-IB cable to the card before installing the card.

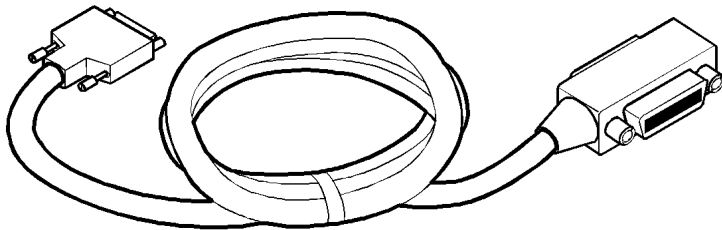
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4. Install the HP-IB interface cable. Be certain that the thumbscrews on the small connect are tight to ensure a good connection.

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**Note** The TAMS 60488 is a PCI device. Unlike most EISA and ISA devices a PCI device does not require an I/O address or IRQ setting. These settings are handled automatically.

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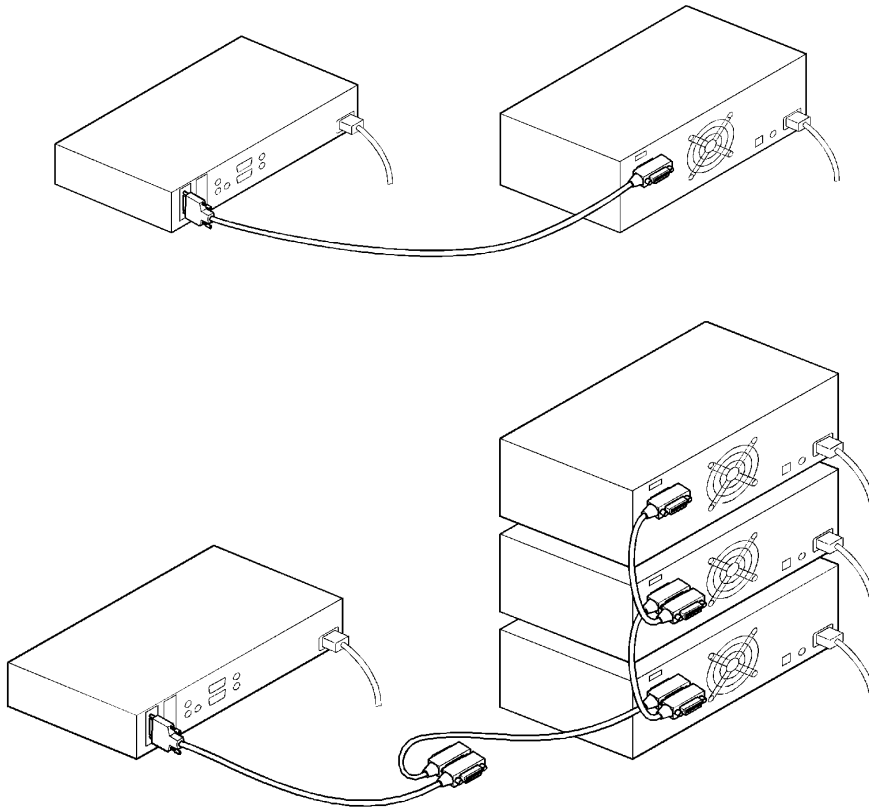
HP-IB cable required with TAMS interface.

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## Connecting the HP-IB Cable

The IEEE 488 specification is for a daisy chain configuration. 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 that came with the HP-IB card.

## Installing the Software

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**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 A.

---

1. Make sure that the I/O Libraries (82091) for Linux is installed.

```
rpm -q T82091
```

2. Insert the installation media into the drive and wait for the busy light to remain off.
3. If your system does not automount the CD-ROM, mount the CD-ROM, for example:

```
/bin/mount /dev/cdrom /mnt/cdrom
```

`/dev/cdrom` is the device file for your CD-ROM drive and  
`/mnt/cdrom` is a directory used as a mount point.

4. Change to the directory where the driver is.

```
cd /mnt/cdrom/t80488
```

5. Use RPM to install the driver. Architecture-specific versions of the software have been provided for systems running the i386, i686, and Athlon kernels; the `whichrpm.sh` program returns the name of the correct RPM for your system. (Note the use of backquotes ( ``` ) rather than single quotes ( `'` ).)

```
/bin/rpm -i `./whichrpm.sh`
```

6. The T80488 RPM will automatically load the t60488 kernel module and create the necessary device files. Each time you start up your

computer after this, the t60488 kernel module will be loaded and related device files will be created.

7. Once the installation is complete, unmount the CD.

```
cd /  
/bin/umount /mnt/cdrom
```

8. Once the CD is unmounted, 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 A is a reference for the Linux systems administrator, who might wish to know where these files are placed.

You will still need to configure the new TAMS HP-IB card as a SICL instrument card, as covered in the next section.



## Configuring the Card

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After installation of the driver software and loading of the t60488 kernel module (handled automatically by the RPM package), you will need to run `iosetup` (or manually edit the SICL configuration file `/etc/opt/sicl/hwconfig.cf`) to reflect the new interface card.

After configuration, the system does NOT need to be rebooted nor does the kernel module need to be reloaded. 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).

Whether you choose to use `iosetup` or manually edit `/etc/opt/sicl/hwconfig.cf`, you will need to provide the following information. It is recommended that you refer to this guide when creating or changing the configuration.

In `/etc/opt/sicl/hwconfig.cf`, the configuration lines have the form

```
<lu> <name> t60488 <slot> <hpib_addr> <syscon> <dmattrm>
```

The fields are defined as:

1. Logical Unit (lu): 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. A good choice for this, if your system only has one HP-IB card, is 7.
2. Symbolic Name (name): the user must supply a symbolic name for the TAMS card that is distinct from all other symbolic names currently configured under SICL. A good choice for this, if your system only has one HP-IB card, is “hpib” (without the quotes).
3. PCI Slot (slot): the user must specify the PCI device number of the TAMS card. This value has a one-to-one mapping with the slots in your computer, but may not be the same as the number on the back of

your computer case. The PCI device number can be determined by running the included program `/opt/sicl/bin/lst60488`, which returns a list of the device numbers where TAMS 60488 cards reside. (The largest device value that the t60488 driver can accept is 64.)

4. **HPIB 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.

5. **System Controller:** the user must specify either "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.
6. **DMATRM:** the user must specify either "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 function. See the man page on `itermchr` (3). 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: Systems Administration Reference**

The installation procedure places files in the following directories:

<b>File</b>	<b>Location</b>	<b>Description</b>
t60488.so	/opt/sicl/lib	t60488 shared library for SICL
t60488.o	/lib/modules/2.4/kernel/drivers/char	kernel driver module
t60488	/etc/init.d	stop/start script for (un)loading the kernel module and (un)creating the device files.
S95t60488 K05t60488	/etc/rc.d/rc[345].d	Links to /etc/init.d/t60488
t60488.0	/dev	special device file for PCI “slot” 1
t60488lx.read me	/usr/share/doc/T80488-2.1	Readme for the driver package
t60488.n	/dev	special device file for PCI “slot” n + 1

## **APPENDIX B**

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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.

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**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.

## 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 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 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.)



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