

Tech Source

Raptor OpenWindows for Solaris Installation and Reference Manual

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PREFACE

This publication documents the Tech Source, Inc. Raptor OpenWindows for Solaris Installation for use with the Tech Source, Inc. Raptor cards. This manual is intended for users who incorporate the Tech Source, Inc. Raptor Cards into Sun PCI systems.

This is a guide to the installation of the Raptor OpenWindows for Solaris software. All systems vary to a degree. Knowledge of the features of your system is helpful during the installation process.

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Chapter 1

INTRODUCTION

1.1 Overview

Thank you for purchasing a Tech Source, Inc. Raptor graphics card for use with your Sun desktop/server. This manual describes the installation and configuration of the Raptor graphics card and the accompanying software. This software runs on Sun PCI desktops/servers and supports two classes of Raptor graphics cards.

The I-Class graphics cards are based on the I-128 graphics processor and include the following products:

Raptor 2000	Supports 2048x2048 resolution (analog). Designed to support Sony DDM monitor
Raptor 1000	Supports multiple resolutions up to 1920x1200x60 (analog)
Raptor 2500	Supports 2560x2048 resolution and drives the Tech Source 2500FPS Digital Flat Panel using a digital interface

The T-Class graphics cards are based on the Tech Source proprietary TROZ graphics processor and include the following products:

Raptor 2100T	Supports 2048x2048 resolution (analog). Radar scan converter interface available (optional)
Raptor 1100T	Supports multiple resolutions up to 1920x1200x60 (analog). Radar scan converter interface available (optional)

Raptor 2500T	Supports either 2560x2048 (digital) or 2048x2048 resolution (digital), depending upon the hardware configuration.
Raptor 2500T-DL	Supports either 2560x2048 (digital) or 2048x2048 resolution (digital), depending upon the hardware configuration. The appropriate configuration supports the Tech-Source 2500FPS or 2100FPS respectively. This card replaces the Raptor 2500T.

This manual contains two different software installation chapters corresponding to the two different classes of graphics cards. Please be sure to read the chapter corresponding to the graphics card that you are installing. Read the label on the back of your Raptor graphics card to determine the model of card that you have. Alternatively, you can also look at Appendix C and identify your card based on the drawings and descriptions.

All systems vary somewhat, therefore some knowledge of the features of your system and a basic understanding of UNIX shell commands are helpful during the software installation process.

From this point forward, Tech Source, Inc. will be referred to as Tech Source or TSI.

The Raptor OpenWindows for Solaris software is provided on a CD-ROM. It consists of:

- Raptor device-drivers for Solaris
- Raptor loadable module (DDX) for OpenWindows
- MOX extension loadable module and libraries for OpenWindows

NOTE: OpenWindows is Sun Microsystems' version of the X Window System.

The software supports Solaris versions 2.5.1, 2.6, 7, 8 and 9.

1.2 Conventions

This manual will follow certain conventions throughout.

Whenever a variable name, command name, directory, or filename is used in a paragraph it will appear in a `mono-spaced` font.

At times the reader will be instructed to enter commands at a prompt. In this case a transcript of a sample session will be provided where a prompt will be followed by the commands the reader is to enter. The entire transcript will be in a `mono-spaced` font with the prompt in a normal weight and the user's entries in **bold**.

The prompt used in a transcript varies depending on the circumstances. The following are some common prompts and when they are used:

<code>prompt#</code>	used when the user is required to have root privileges
<code>prompt%</code>	used when the user is not required to have root privileges
<code>ok</code>	prompt displayed when the user is in Boot PROM mode

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Chapter 2

HARDWARE INSTALLATION

2.1 Hardware Configurations Supported

The Raptor cards have been tested on and currently support the following PCI based systems.

- Sun Blade 100
- Sun Blade 150
- Sun Blade 1000
- Sun Blade 2000
- Sun Blade 2500
- Ultra 5
- Ultra 10
- Ultra 80
- Enterprise 250
- Enterprise 450

NOTE: If your Sun PCI system is not listed here, please contact Tech Source.

2.2 Installation Instructions

Installing a Raptor card is simple and consists of a few easy steps.

NOTE: Remember which cables go to which connectors. You may want to label the cables and connectors before disconnecting them.

Step 1: Shut down the system and turn the power OFF. Remove the system's cover along with any cables that prevent you from doing so. Find an available PCI slot, and remove the bracket and screw. Ground yourself by touching the metal part of the case.

Step 2: Install the Raptor card firmly into the PCI slot. Take care to press it evenly and snugly into the slot. Once you are certain the card is installed properly in the slot, secure it with the bracket screw.

Step 3: Secure the system's cover and reattach any previously removed cables, and connect the video cable to the monitor.

NOTE: Installation of Raptor 2100/2500 FPS is discussed in Section 2.3

NOTE: If the system is currently using a secondary TSI graphics device, read section 3.5 or 4.6 on configuring one of the cards as the console. The console device is the screen on which the boot up messages will appear. The monitor must be connected to the console device before you proceed to one of the following software installation chapters.

The Raptor card is now installed and the system is ready for software installation. Refer to Chapters 3 and 4 for instructions on installing the Raptor OpenWindows for Solaris software.

2.3 Raptor 2100/2500 FPS Installation

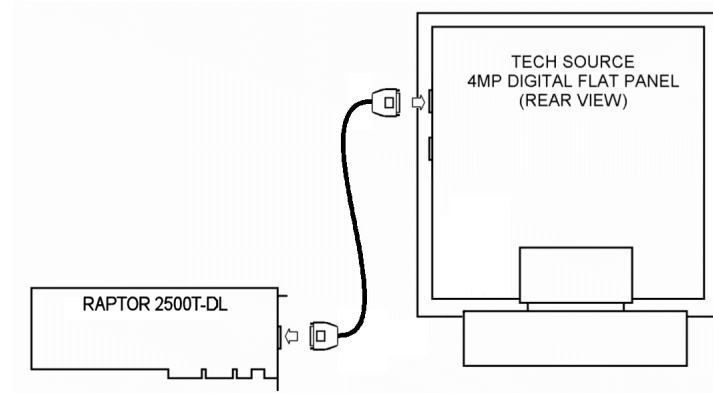


Figure 2-1 – Raptor 2100 Digital Flat Panel Subsystem

Tech Source offers two flat panel subsystems: the Raptor 2100FPS with a resolution of 2048x2048 (4MP), and the Raptor 2500FPS with a resolution of 2560x2048 (5MP). Each subsystem is comprised of one LCD flat panel (4MP or 5MP), one Raptor 2500T-DL graphics card, and a standard Dual-Link DVI cable to connect them together.

On the back of the Raptor LCD panel are two DVI inputs, labeled A and B. Plug the Dual-Link DVI cable into either port. Optionally, connect a second Raptor 2500T-DL card to the remaining port. Select which signal to display by accessing the OSD (on-screen display) or by sending the appropriate signals to the panel's RS232 interface. For more information on the RS232 interface, please refer to the Raptor LCD manual.

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Chapter 3

SOFTWARE INSTALLATION FOR I-CLASS CARDS

3.1 Overview

This chapter describes how to install and configure I-Class Raptor cards. Installation of T-Class Raptor cards is covered in Chapter 4. The following is a list of I-Class cards:

- Raptor 1000
- Raptor 2000
- Raptor 2500

NOTE: This software must be installed on your system prior to running OpenWindows on these cards.

The software for the I-Class cards is provided on CD-ROM or by FTP and is composed of the following packages:

- TS`Irapw` OpenWindows software
- TS`Ircfg` Raptor configuration program
- TS`Irap` 32-bit device driver for Raptor 1000 & 2000 cards
- TS`Irapx` 64-bit device driver for Raptor 1000 & 2000 cards
- TS`Irapqfpx` 64-bit device driver for Raptor 2500
- TS`Irapqfp` 32-bit device driver for Raptor 2500

3.2 Requirements

The following are prerequisites for installing the Raptor OpenWindows for Solaris Software:

- The system is running Solaris 2.5.1 or higher.

- OpenWindows Version 3.5 or higher has already been installed on the system. This is typically bundled with the OS.
- At least 2MB of disk space is available in `/usr` and `/`.
- One or more of the cards listed in Section 3.1 are presently installed in the workstation.

3.3 Installing I-Class Card Driver Software

The following are step-by-step instructions for installing the Raptor OpenWindows for Solaris Software from a CD-ROM.

1. Install a Raptor card in the computer as described in Chapter 2.
2. Boot the computer with the `-r` (reconfiguration) option. To do this on an UltraSPARC workstation, perform the following steps:
 - Power ON the computer.
 - Wait until you see boot messages displaying on the screen, then press and hold the `STOP (L1)` key, and then press the `A` key.
 - At the `ok` prompt, type `boot -r`.
3. After the system comes up, log in as `root`.
4. Insert the CD-ROM labeled "Raptor OpenWindows for Solaris Software" into the drive.
5. If `/cdrom/cdrom0` exists, the CD-ROM was automatically mounted. Change directories to the CD-ROM by typing the following:

```
prompt# cd /cdrom/cdrom0/I-Class
```

If `/cdrom/cdrom0` does not exist, mount the CD-ROM by typing the following:

```
prompt# mount -F hsfs -O -o ro \  
/dev/dsk/c0t6d0s0 /cdrom
```

```
prompt# cd /cdrom/I-Class
```

6. To install the software, type:

```
prompt# ./install_all
```

This script will ask you a number of yes-or-no questions (generated by Sun's `pkgadd` installation program). Answer these questions appropriately.

7. To install the MOX module and libraries, type:

```
prompt# cd /cdrom/cdrom0/mox
```

or

```
prompt# cd /cdrom/mox
```

[if the CD-ROM was mounted as outlined in Step 5 above]

```
prompt# pkgadd -d . TSImox
```

Note: You must install the MOX package in order to use the MOX extension.

8. Reboot the system to complete the installation.

One new device name is created in the `/dev/fbs` directory for each Raptor card. It is denoted by `rapqfp#` for Raptor 2500, and `raptor#` for other cards (where # represents an instance number assigned by the operating system).

Note: Device nodes will be created only for cards presently in the system.

3.4 Changing Resolution and Bit-Depth

After installation you will need to configure the OpenWindows screen resolution, bit-depth, and refresh rate for your monitor. (This resolution is different from the console resolution. Appendix A discusses changing the console resolution.) At any time after installation you can change these parameters by using the `raptorconfig` utility.

NOTE: You must be logged in as `root` to execute this program.

3.4.1 Resolution on Raptor 2000 and Raptor 2500

The resolution for the Raptor 2000 card is fixed at 2048x2048 for the Sony DDM 2800 monitor. The resolution of the Raptor 2500 card is fixed at 2560x2048.

3.4.2 Resolution on Raptor 1000

The Raptor 1000 supports multiple resolutions. The resolution can be selected through the `raptorconfig` utility.

3.4.3 Raptorconfig Utility

The `raptorconfig` utility has an interactive menu-style interface (See **Figure 3.1**). It can be used to set resolution, bit-depth and refresh rate. To use this program to configure your Raptor card, type:

```
prompt# raptorconfig
```

NOTE: If X Windows is running on the Raptor card(s) to be configured, please exit out of it before running `raptorconfig`. Failure to do so could result in a corrupted screen for the remainder of the X Window session.

The Raptor device(s) will be listed in the left column of the configuration screen displayed by `raptorconfig`. (See **Figure 3.1**).

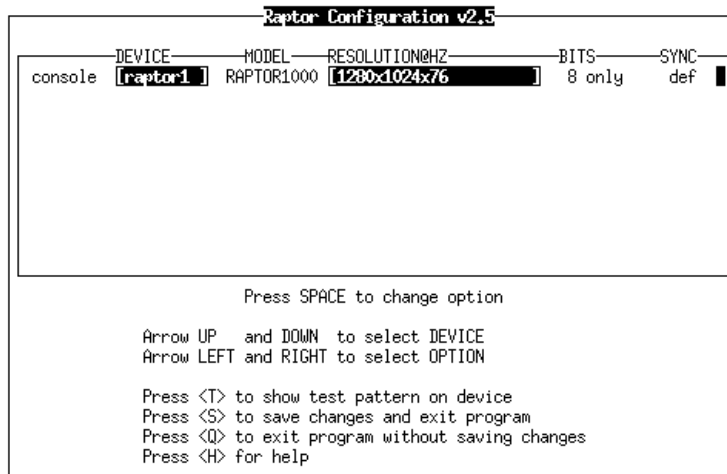


Figure 3.1 Raptorconfig

A description of the commands is as follows:

- | | |
|------------------|--|
| Up/Down Arrow | selects the desired graphics device to modify |
| Left/Right Arrow | selects the parameter to modify (e.g. resolution, bit-depth, or sync) |
| Space Bar | modifies the parameter for the selected graphics device (will bring up a menu when applicable) |

't'	puts a test pattern on the entire display (hit any key to return to the main screen)
's'	saves current settings and exits
'h'	help
'q'	exits the program without saving any changes

3.5 Setting Raptor as the Console (Optional)

This section describes how to configure the Raptor as the console device in your system. For information on setting the resolution in console mode, please refer to Appendix A.

3.5.1 Raptor as the Only Framebuffer

NOTE: If the procedure for your system is not described below, please contact Tech Source.

3.5.1.1 Sun Blade 100 and Sun Blade 150

To use the Raptor as the system console on a Sun Blade 100 or Sun Blade 150 use the following procedure:

1. At the `ok` prompt, type: `show-displays`. This will list the installed graphics devices and a prompt to enter a selection.

2. Type the letter that corresponds to the Raptor card that you want to use as the console device. Raptor cards can be identified by looking for the string `TSI` or `raptor` in the list of device names.
3. Type `setenv output-device <Control-Y>`. When you type `<Control-Y>`, the display that was selected in the previous step will be inserted in the command line.
4. Power off the system
5. Connect your monitor cable to the onboard VGA connector on your system back panel
6. Power on the system.

3.5.1.2 Ultra 5 and Ultra 10

To use the Raptor as the system console on an Ultra 5 or Ultra 10 as the only framebuffer, first disable the graphics device which comes built-in to the Ultra 5 and Ultra 10.

At the `ok` prompt, type:

```
ok setenv pcib-probe-list 1,3
ok reset-all
```

Once the system is reset, all console messages will be directed to the Raptor card.

NOTE: To restore the motherboard's graphics device as the console for any reason, simply add it back to the `pcib-probe-list` as below:

```
ok setenv pcib-probe-list 1,2,3
ok reset-all
```

3.5.1.3 Sun Blade 1000, Sun Blade 2000, Ultra 80, E250, and E450

If no other framebuffers are present in a Sun Blade 1000, Sun Blade 2000, Ultra 80, E250, or E450 then the Raptor will be the console by default, provided the board is in a valid probed PCI slot.

3.5.2 Raptor with a Secondary Framebuffer

NOTE: This section does not apply to Sun Blade machines. The information in Section 3.5.1.1 applies to all Sun Blades with multiple framebuffers.

The Raptor can be made the console device when other secondary framebuffers are present in the system.

To configure the Raptor card as the console when UPA framebuffers are in the system, the `output-device` variable in NVRAM must be changed to the actual path of the desired Raptor cards. This path can best be determined by searching for the string `TSI` in the `/` tree at the `ok` prompt.

To find the PCI devices, at the `ok` prompt, type the following:

```
ok show-devs
```

You should see at least one entry containing the string `TSI`. For example, `TSI,raptor@#`, where `#` will be a digit representing your Raptor's PCI number.

Use this entry as the console device for your desired Raptor. For example, if the path is `/pci@1f,4000` to the device `TSI,raptor@#`, then type the following command:

NOTE: Replace `#` with the digit representing your Raptor's PCI slot number.


```
ok setenv output-device /pci@1f,4000/TSI,raptor@#
ok reset-all
```

Once the system is reset, all console messages will be directed to the selected Raptor card.

NOTE: To restore the default graphics device as the console for any reason, simply set the output-device variable back to its default value of `screen` as below:

```
ok setenv output-device screen
ok reset-all
```

3.5.2.1 Other PCI Framebuffers

To make the Raptor card the console device when other PCI framebuffers are present in the system, it may be necessary to change the `pcia-probe-list` to probe the Raptor's slot before that of the other framebuffers (in addition to making the changes in 3.5.1, if applicable).

Determine the slot numbers that correspond to these framebuffers, and then ensure that the Raptor slot number precedes them in the `pcia-probe-list`.

For example, if the Raptor is located in slot 3, and a secondary framebuffer is located in slot 1, then update the `pcia-probe-list` so that slot 3 is probed BEFORE slot 1. A possible configuration may resemble the following:

```
ok setenv pcia-probe-list 3,2,1,4
ok reset-all
```

Once the system is reset, all console messages will be directed to the Raptor card.

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Chapter 4

SOFTWARE INSTALLATION FOR T-CLASS CARDS

4.1 Overview

This Chapter describes how to install and configure TClass Raptor cards. Installation of TClass Raptor cards is covered in Chapter 3. The following is a list of T-Class cards:

- Raptor 2100T
- Raptor 1100T
- Raptor 2500T
- Raptor 2500T-DL

NOTE: This software must be installed on your system prior to running OpenWindows on these cards.

The software for the T-Class cards is provided on CD-ROM or by FTP and is composed of the following packages:

- `TSItrz.u` Device drivers for the Raptor T-Class cards.
- `TSItrzw` OpenWindows DDX for the Raptor TClass cards.

4.2 Requirements

The following are prerequisites for installing the Raptor OpenWindows for Solaris Software:

- The system is running Solaris 2.5.1 or higher.
- OpenWindows Version 3.5 or higher has already been installed on the system. This is typically bundled with the OS.

- At least 2MB of disk space is available in `/usr` and `/`.
- One or more of the cards listed in Section 4.1 are presently installed in the system.

4.3 Installing T-Class Card Driver Software

The following are step-by-step instructions for installing the Raptor OpenWindows for Solaris Software from a CD-ROM.

1. Install a Raptor card in the computer as described in Chapter 2.
2. Boot the computer with the `-r` (reconfiguration) option by performing the following steps:
 - Power ON the computer.
 - Wait until you see boot messages displaying on the screen, then press and hold the `Stop (L1)` key, and then press the `A` key.
 - At the `ok` prompt, type `boot -r`.
3. After the system comes up, log in as `root`.
4. Insert the CD-ROM labeled "Raptor OpenWindows for Solaris" into the drive.
5. If `/cdrom/cdrom0` exists, the CD-ROM was automatically mounted. Change directories to the CD-ROM by typing the following:

```
prompt# cd /cdrom/cdrom0/T-Class
```

If /cdrom/cdrom0 does not exist, mount the CD-ROM by typing the following:

```
prompt# mount -F hsfs -O -o ro \  
/dev/dsk/c0t6d0s0 /cdrom
```

```
prompt# cd /cdrom/T-Class
```

6. To install the software, type:

```
prompt# ./install_all
```

This script will ask you a number of yes-or-no questions (generated by Sun's pkgadd installation program). Answer these questions appropriately.

7. If you did not install the MOX module and libraries in Chapter 3, you can install them now by typing:

```
prompt# cd /cdrom/cdrom0/mox
```

or

```
prompt# cd /cdrom/mox
```

[if the CD-ROM was mounted as outlined in Step 5 above]

```
prompt# pkgadd -d . TSImox
```

<p>Note: You must install the MOX package in order to use the MOX extension.</p>

8. Reboot the system to complete the installation.

One new device name is created in the /dev/fbs directory for each Raptor card. It is denoted by rap1kt# for the Raptor 1100T, rap2kt# for the Raptor 2100T, and raptfp# for the Raptor 2500T and Raptor 2500T-DL (where # represents an instance number assigned by the operating system).

4.4 Changing Resolution and Bit-Depths

4.4.1 Raptor 1100T

The default resolution of the Raptor 1100T is set to 1280x1024. The resolution of this card can be changed through the `trzconfig` utility. This utility can also be used to change the bit-depths. Refer to Section 4.5 for details on using `trzconfig`.

4.4.2 Raptor 2100T

The resolution of the Raptor 2100T is fixed at 2048x2048. However, the bit-depth can be changed. To change the bit-depth, use the `trzconfig` utility. Refer to Section 4.5 for details.

4.4.3 Raptor 2500T and Raptor 2500T-DL

The Raptor 2500T and Raptor 2500T-DL are configured in hardware to support either 2048x2048 or 2560x2048 resolutions. Therefore, depending on your flat panel subsystem, it will support the appropriate resolution. For example, Raptor 2500 FPS supports 2560x2048 and Raptor 2100 FPS supports 2048x2048.

4.5 Trzconfig Utility

After installation you can configure the X Window screen resolution, bit-depth, and refresh rate for your monitor to be different from the default settings. The `trzconfig` utility can be used any time after installation to change these settings. Please see the man page on `trzconfig` for a detailed description.

Raptor cards support the following bit-depths:

8	8-bit PsuedoColor
8+24	Simultaneous 8-bit PsuedoColor and 24-bit True Color
24	24-bit True Color
8+8	Two 8-bit PseudoColor visuals
mox16	MOX, 8-bit Normal, 13-bit Group, 5-bit Absolute
mox24	MOX, 8-bit Normal, 21-bit Group, 13-bit Absolute
mox32	MOX, 8-bit Normal, 24-bit Group, 21-bit Absolute

The next section describes how to use `trzconfig` to configure the Raptor card.

4.5.1 Interactive Configuration

The `trzconfig` utility has an interactive menu-style interface (See **Figure 4.1**). To use this program to configure your Raptor card, type:

```
prompt# trzconfig
```

NOTE: If X Windows is running on the Raptor card(s) to be configured, please exit out of it before running `trzconfig`. Failure to do so could result in a corrupted screen for the remainder of the X Window session.

The Raptor device(s) will be listed in the left column of the configuration screen displayed by `trzconfig`. (See **Figure 4.1**).

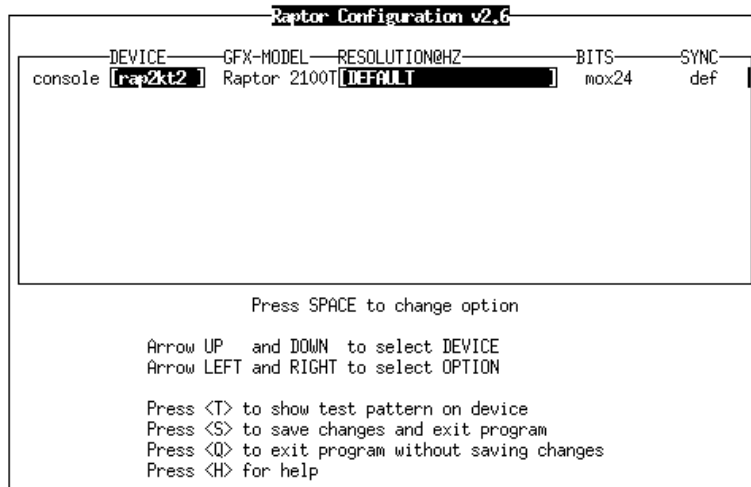


Figure 4.1 – Trzconfig

A description of the commands is as follows:

Up/Down Arrow	selects the desired graphics device to modify
Left/Right Arrow	selects the parameter to modify (e.g. resolution, bit-depth, or sync)
Space Bar	modifies the parameter for the selected graphics device (will bring up a menu when applicable)
't'	puts a test pattern on the entire display (hit any key to return to the main screen)
's'	saves current settings and exits

'h'	help
'q'	exits the program without saving any changes

4.6 Setting Raptor as the Console (Optional)

This section describes how to configure the Raptor as the console device in your system.

NOTE: If the procedure for your system is not described below, please contact Tech Source.

4.6.1 Raptor as the Only Framebuffer

4.6.1.1 Sun Blade 100 and Sun Blade 150

To use the Raptor as the system console on a Sun Blade 100 or Sun Blade 150 use the following procedure:

1. At the `ok` prompt, type: `show-displays`. This will list the installed graphics devices and a prompt to enter a selection.
2. Type the letter that corresponds to the Raptor card that you want to use as the console device. Raptor cards can be identified by looking for the string `TSI` in the list of device names.
3. Type `setenv output-device <Control-Y>`. When you type `<Control-Y>`, the display that was selected in the previous step will be inserted in the command line.

4. Power off the system
5. Connect your monitor cable to the onboard VGA connector on your system back panel
6. Power on the system.

4.6.1.2 Ultra 5 and Ultra 10

To use the Raptor as the system console on an Ultra 5 or Ultra 10 as the only framebuffer, first disable the graphics device which comes built-in to the Ultra 5 and Ultra 10.

At the `ok` prompt, type:

```
ok setenv pcib-probe-list 1,3  
ok reset-all
```

Once the system is reset, all console messages will be directed to the Raptor card.

NOTE: To restore the motherboard's graphics device as the console for any reason, simply add it back to the `pcib-probe-list` as below:

```
ok setenv pcib-probe-list 1,2,3  
ok reset-all
```

4.6.1.3 Sun Blade 1000, Sun Blade 2000, Ultra 80, E250 and E450

If no other framebuffers are present in a Sun Blade 1000, Sun Blade 2000, Ultra 30, E250, or E450 then the Raptor will be the console by default, provided the board is in a valid probed PCI slot.

4.6.2 Raptor with a Secondary Framebuffer

NOTE: This section does not apply to Sun Blade machines. The information in section 4.6.1 applies to all Sun Blades with multiple framebuffers.

The Raptor can be made the console device when other secondary framebuffers are present in the system.

To configure the Raptor card as the console when UPA framebuffers are in the system, the `output-device` variable in NVRAM must be changed to the actual path of the desired Raptor cards. This path can best be determined by searching for the string `TSI` in the `/ tree` at the `ok` prompt.

To find the PCI devices, at the `ok` prompt, type the following:

```
ok show-devs
```

You should see at least one entry containing the string `TSI`. For example, `TSI,rapifp#`, where `#` will be a digit representing your Raptor's PCI slot number.

Use this entry as the console device for your desired Raptor card. For example, if the path is `/pci@1f,4000` to the Raptor 3840T device `TSI,rapifp#`, type the following command:

NOTE: Replace `#` with the digit representing your Raptor's PCI slot number.

```
ok setenv output-device /pci@1f,4000/TSI,rapifp#  
ok reset-all
```

Once the system is reset, all console messages will be directed to the selected Raptor card.

NOTE: To restore the default graphics device as the console for any reason, simply set the `output-device` variable back to its default value of `screen` as below:

```
ok setenv output-device screen  
ok reset-all
```

4.6.2.1 Other PCI Framebuffers

To make the Raptor card the console device when other PCI framebuffers are present in the system, it may be necessary to change the `pcia-probe-list` to probe the Raptor's slot before that of the other framebuffers (in addition to making the changes in 4.6.1, if applicable).

Determine the slot numbers that correspond to these framebuffers, then ensure that the Raptor slot number precedes them in the `pcia-probe-list`.

For example, if the Raptor is located in slot 3, and a secondary framebuffer is located in slot 1, then update the `pcia-probe-list` so that slot 3 is probed BEFORE slot 1. A possible configuration may resemble the following:

```
ok setenv pcia-probe-list 3,2,1,4  
ok reset-all
```

Once the system is reset, all console messages will be directed to the Raptor card.

Chapter 5

OPENWINDOWS

5.1 Overview

This section describes how to start up OpenWindows on the Raptor cards. The examples in this chapter use `raptor0` as the device name but the device name of your card may be different. The following table lists the different Raptor cards and their corresponding device names. The device name will have the card's instance number appended to it. For example, the first instance of a Raptor 2000 will have a device name of `raptor0`.

<u>Raptor Card</u>	<u>Device Name</u>
1000	<code>raptor</code>
2000	<code>raptor</code>
2500	<code>rapqfp</code>
1100T	<code>rap1kt</code>
2100T	<code>rap2kt</code>
2500T	<code>raptfp</code>
2500T-DL	<code>raptfp</code>

5.1.1 Raptor as the Console

If the Raptor is the console, type:

```
prompt# openwin
```

5.1.2 Raptor as the Secondary Framebuffer

If the PGX (Sun Microsystem's on board video card) card is the console and the Raptor is the second card, to start OpenWindows on both cards, in multi-screen mode, type:

```
prompt# openwin -dev /dev/fbs/m640 \  
          -dev /dev/fbs/raptor0
```

The assigned OpenWindows screen numbers correspond to the order of the devices on the command line.

NOTE: In the above example, the `raptor` device instance number is 0. This may be different in your configuration. Please check in `/dev/fbs/` or `dmesg` for the correct device instance numbers on your system.

5.2 Common Desktop Environment (CDE)

Common Desktop Environment (CDE) is available with Solaris 2.5 and higher versions and it is independent of the Raptor software.

If you have installed CDE and would like the CDE login screen to appear on the Raptor display, you will need to change your `/etc/dt/config/Xservers` file to include the following line:

```
:0 Local local-uid@console root \  
/usr/openwin/bin/Xsun :0 -dev /dev/fbs/raptor0
```

You may add any other command line arguments to the end of the line. In addition, since the graphics devices are dynamically allocated during each reconfiguration boot, you should check your `/dev/fbs` directory for the name of your Raptor device (e.g. `raptor0` or `raptor1`, etc.) and modify the `Xservers` file accordingly.

When `dtlogin` is started, a login screen will appear on the Raptor display. A user may log in on this display using the console keyboard and mouse.

5.3 Setting Bit-Depth on I-Class Cards

I-Class cards support 8-bit `mox16` and `mox24` modes. By default X windows comes up in 8-bit mode on these cards. The bit-depth can be selected by using the `raptorconfig` utility (see Section 3.4.3.)

For an explanation of the various MOX modes, please see Section 5.5.

5.4 Setting Bit-Depth on T-Class Cards

Raptor 1100T, 2100T, 2500T and Raptor 2500T-DL cards support 8-bit, 24-bit, 8+8-bit, 8+24-bit, `mox16`, `mox24` and `mox32` modes. By default X Windows comes up in 8-bit mode on these cards. The bit-depth can be selected by using the `trzconfig` utility (see Section 4.5.)

For an explanation of the various MOX modes, please see Section 5.5.

5.5 MOX Modes

The following MOX modes apply to all Raptor cards:

<code>mox16</code>	MOX, 8-bit Normal, 13-bit Group, 5-bit Absolute
<code>mox24</code>	MOX, 8-bit Normal, 21-bit Group, 13-bit Absolute

The following MOX mode applies to the Raptor 1100T, 2100T and 2500T cards:

<code>mox32</code>	MOX, 8-BIT Normal, 32-bit Group, 24-bit Absolute
--------------------	--

<p>NOTE: Details of the MOX extension to X Server are in a separate technical white paper.. This may be obtained from Tech Source.</p>

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Chapter 6

UNINSTALLING RAPTOR SOFTWARE

6.1 Uninstalling Raptor Software

To uninstall the packages comprising the Raptor software, first determine which packages were installed by typing:

```
prompt# pkginfo | grep TSI
```

This will list the packages from Tech Source that are installed on your system. Please take note of these packages, and then type one of the following commands to remove the I-Class or T-Class software in the proper order.

WARNING: This uninstall procedure is **not** for use with older versions of the Raptor software. It is important to use the procedure, which was provided with the previous release to uninstall a previous release.

For I-Class cards, type:

```
prompt# pkgrm TSirapw TSirapx TSirap \
        TSircfg TSirapqfpx TSirapqfp
```

```
prompt# pkgrm TSImox
```

For T-Class cards, type:

```
prompt# pkgrm TSitrzw TSitrz
```

```
prompt# pkgrm TSImox
```

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Chapter 7

TECHNICAL ASSISTANCE

7.1 Who to Call for Help

If you need help, please call our Technical Support Team at (800) 330-8301, or directly at (407) 262-7100 between the hours of **9:30am - 5:30pm EST** Monday through Friday.

Please have the software part number, version, and serial number for your Raptor card(s) available when contacting Tech Source in order to expedite support. Please make a note of this information in the area below:

DETAILS OF YOUR CARD(S):

P/N: _____

Model Name: _____

Serial Number(s): _____

NOTE: Technical Assistance will be available only for products under standard or extended warranty.

7.2 Email Address

Our email address is hotline@techsource.com.

International customers should use email or our fax line at (407) 339-2554.

7.3 Website

Detailed product information and Frequently Asked Questions (FAQs), are available on our website located at:

<http://www.techsource.com>

Appendix A

CHANGING THE CONSOLE RESOLUTION

A.1 Overview

Normally the default console resolution is sufficient for most users but if the monitor does not “sync-up” you may need to change the console resolution.

NOTE: It is recommended that you use `raptorconfig` to test a resolution before configuring the console to that resolution.

The Raptor card can be configured to be the console in the UltraSPARC workstation. Every Raptor card type has its own default console resolution and default depth as shown in the following table:

Board	Resolution	Refresh	Bits/Pixels	Sync
Raptor 1000	1280x1024	67Hz	8	Separate
Raptor 1100T	1280x1024	67Hz	8	Separate
Raptor 2000	2048x2048	60Hz	8	Separate
Raptor 2100T	2048x2048	60Hz	8	Separate
Raptor 2500	2560x2048	60Hz	8	Separate
Raptor 2500T	2560x2048 or 2048x2048	60Hz	8	Separate
Raptor 2500T-DL	2560x2048 or 2048x2048	60Hz	8	Separate

The display resolution of the Raptor 2000, Raptor 2500, Raptor 2100T, Raptor 2500T and Raptor 2500T-DL cards cannot be changed. It is possible to change the console resolution on the Raptor 1000 and Raptor 1100T cards. The procedures described in this appendix are:

- Output-Device Method
- Video-Mode Method
- Video-Timing Method

This appendix includes a troubleshooting section describing possible problems and solutions associated with changing the console resolution.

A.2 Output-Device Method

To specify the console resolution of a Raptor card via the `output-device` environment variable, use the format `screen:rAxBxC` where:

A is the desired horizontal resolution,
B is the desired vertical resolution,
C is the desired refresh rate.

The system will check these values against an internal list of resolutions (see section A.3 for valid list) and use the corresponding entry as the console resolution.

For example, to use VESA 1024x768@75Hz as the console resolution, type the following at the ok prompt:

```
ok setenv output-device screen:r1024x768x75
ok reset-all
```

NOTE: The new console resolution will take effect following the reset, and will hold the resolution information until the `output-device` variable is changed manually.

A.3 Video-Mode Method

At the `ok` prompt in Boot PROM mode, the console resolution can easily be set on the Raptor 1000 and Raptor 1100T cards by using one of the preinstalled resolution modes. These resolution settings are identified by the following video modes:

Raptor 1000/1100T Video Modes:

1	640x480x72
2	640x480x75
3	640x480x85
4	800x600x60
5	800x600x72
6	800x600x75
7	800x600x85
8	1024x768x60
9	1024x768x70
10	1024x768x75
11	1024x768x77 *
12	1024x768x85
13	1024x800x85 *
14	1152x900x60
15	1152x900x66 *
16	1152x900x70
17	1152x900x75
18	1152x900x76 *
19	1152x900x85
20	1280x800x76 *
21	1280x1024x60
22	1280x1024x66
23	1280x1024x67 *
24	1280x1024x75
25	1280x1024x76 *
26	1280x1024x85
27	1600x1000x66 *
28	1600x1000x76 *
29	1600x1200x60

30	1600x1200x65
31	1600x1200x70
32	1600x1200x75
33	1600x1200x85 +
34	1600x1280x76 *

NOTE: The resolutions followed by an * use composite sync. The resolutions followed by a + are not supported on the Raptor 1100T.

Use `nvedit` to set the `video-mode` variable in NVRAM to the number that corresponds to the desired video mode in the preceding table. For example, to set `video-mode` to 8 on the Raptor 1000 (1024x768x60), type the following:

NOTE: Please refer to Appendix B for a description of `nvedit` commands.

```
ok nvedit
  0: 8 value video-mode
  1: <ctrl-c>
ok nvstore
ok setenv use-nvramrc? true
ok reset
```

NOTE: The last three commands enable the NVRAM. Without these lines, the changes you make with `nvedit` will be ignored.

A.4 Video-Timing Method

If the previously described method fails for your configuration, it is possible to specify the exact timing numbers for a particular resolution. This method for setting the console resolution also uses `nvedit`. This method is more involved and requires knowledge of all timing parameters for the desired resolution, and is only meant for monitors whose resolutions are not available in the Video-Mode Method.

NOTE: Please refer to Appendix B for a description of `nvedit` commands.

For example, to set the console resolution to 1280x1024x76, type the following:

```
ok nvedit
  0: : video-timing " 1280, 384, 32, 64,
      1024, 43, 3, 8, 135000000, 0" ;
  1: <ctrl-c>
ok nvstore
ok setenv use-nvramrc? true
ok reset
```

NOTE: The syntax is very important. The spaces must be present exactly as they appear in the example.

NOTE: The last three commands enable the NVRAM. Without these lines, the changes you make with `nvedit` will be ignored.

The following is a brief description of the 10 parameters used in this method.

- horizontal resolution (in pixels)
- horizontal blanking total
- horizontal front porch
- horizontal sync width
- vertical resolution (in lines)
- vertical blanking total
- vertical front porch
- vertical sync width
- dot clock in Hz
- sync value:
 - 0 separate sync
 - 256 sync on green
 - 512 positive vertical sync pulse
 - 1024 positive horizontal sync pulse
 - 2048 composite sync

The sync values can be added together to select more than one of the above.

NOTE: To obtain the timing parameters required to use the video-timing method, please contact Tech Source with your monitor's requirements.

A.5 Troubleshooting

Problem:

The Video-Mode method described in Appendix A was used to change the console resolution but the card does not come up in the desired resolution.

Possible Cause:

The `output-device` environment variable may have been set at the `ok` prompt, or the `video-timing` variable may be set in NVRAM. The resolution specified by the `output-device` variable and the `video-timing` variable takes precedence over the resolution specified by the `video-mode` variable. If a resolution has not been specified by any of these variables, then the card's default resolution is used. The order of precedence from highest to lowest is as follows:

1. `output-device` resolution (Section A.2)
2. `video-timing` resolution (Section A.4)
3. `video-mode` resolution (Section A.3)
4. card's default resolution (Section A.1)

Solution:

Clear the resolution specification from the `output-device` environment variable by typing the following:

```
ok setenv output-device screen  
ok reset-all
```

Use `nvedit` to remove the `video-timing` variable from NVRAM using the following procedure:

1. Type `nvedit` at the `ok` prompt in Boot PROM mode.
2. Use `<Ctrl-n>` to move to the next line until the cursor is on the line where `video-timing` is defined.
3. Type `<Ctrl-u><Ctrl-k>` to delete the line.
4. Type `<Ctrl-c>` to exit the `nvedit` editor.
5. Type `nvstore` to save the changes.
6. Type `setenv use-nvramrc? true` to enable the NVRAM.
7. Type `reset-all` to restart the system.

This procedure can also be used to remove the `video-mode` variable if necessary.

See Appendix B for more information on `nvedit` commands.

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Appendix B

USING NVEDIT TO MODIFY NVRAM

B.1 NVRAM Edit Commands

This section discusses the use of NVRAM. The NVRAM is used for setting resolution in the Video-Mode and Video-Timing methods. To edit the NVRAM, type `nvedit` at the `ok` prompt. There are several commands that you must use to edit the variables in NVRAM:

<Backspace>	deletes the character preceding the cursor
<Ctrl-l>	lists NVRAM current values
<Ctrl-p>	moves to the previous line
<Ctrl-n>	moves to the next line
<Ctrl-b>	moves to the previous character
<Ctrl-f>	moves to the next character
<Ctrl-u>	deletes to the beginning of the line
<Ctrl-k>	joins the current and next line
<Ctrl-u><Ctrl-k>	deletes the current line
<Ctrl-c>	exits the NVRAM editor (back to the <code>ok</code> prompt)

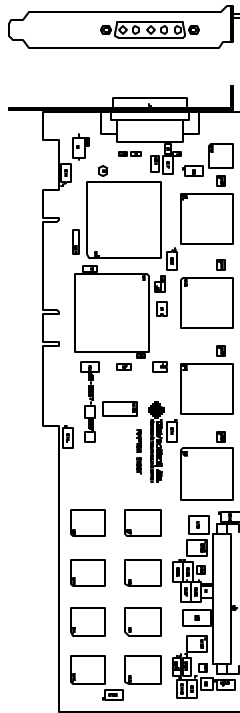
The changes will only take effect if they are stored using the `nvstore` command entered at the `ok` prompt. Once the changes are stored, the NVRAM must be enabled before the system will execute it. This is done by setting the environment variable `use-nvramrc?` to `true`. Type `reset` to reboot the system and make the changes effective.

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Appendix C

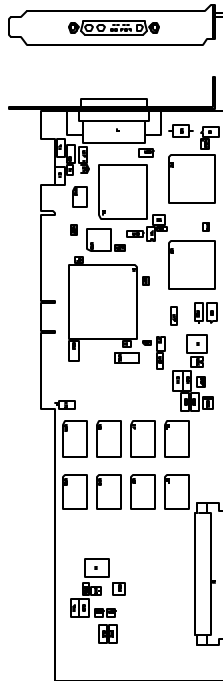
CARD SPECIFICATIONS

C.1 Raptor 2100T Specifications



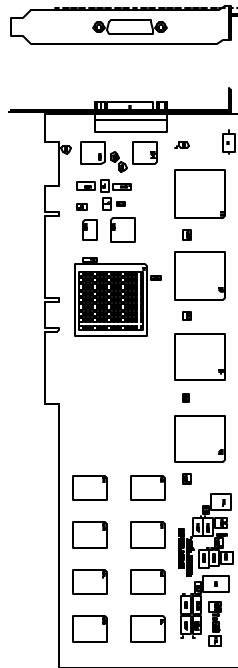
Frame Buffer:	64MB SGRAM
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling
Video Interface:	Red, Green, Blue, at RS-343 (50 ohm)
Video Sync:	Separate sync at TTL levels, (75 ohm)
Video Connector:	DB-5W5
Temperature Rating:	10 ⁰ to 50 ⁰ C operating -10 ⁰ to 70 ⁰ C non-operating
Humidity Rating:	5 to 90% (non-condensing)
Power Rating:	+5 @ 5 Amps
Dimensions:	312mm x 107mm (12.28" x 4.2")

C.2 Raptor 1100T Specifications



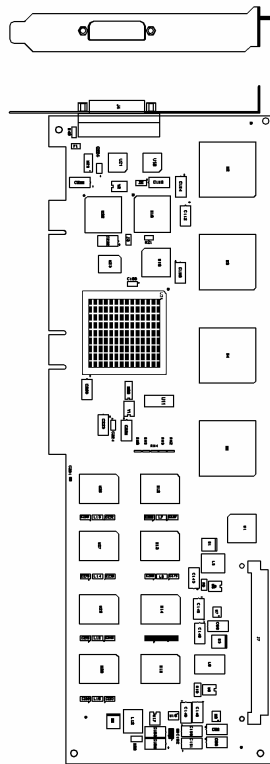
Frame Buffer:	32MB SGRAM
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors.
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling
Video Interface:	Red, Green, Blue, at RS-343A (75 ohm)
Video Sync:	Separate or composite syncs at TTL levels, (75 ohm)
Video Connector:	DB-13W3
Temperature Rating:	10 ⁰ to 50 ⁰ C operating -10 ⁰ to 70 ⁰ C non-operating
Humidity Rating:	5 to 90% (non-condensing)
Power Rating:	+5V @ 5 Amps
Dimensions:	312mm x 107mm (12.28" x 4.2")

C.3 Raptor 2500T Specifications



- Frame Buffer:** 64MB SGRAM
- MOX Hardware:** Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
- Hardware Cursor:** Up to 3 cursors
- Color Lookup Tables:** Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
- PCI Interface:** 33/66 MHz, 32/64-bit Universal Signaling
- Video Connector:** One Low Force Helix 60-pin (LFH60) connector [all digital interface]
- Temperature Rating:** 10⁰ to 50⁰C operating
-10⁰ to 70⁰C non-operating
- Humidity Rating:** 5 to 90% (non-condensing)
- Power Rating:** +5V @ 5 Amps
- Dimensions:** 312mm x 107mm (12.28" x 4.2")

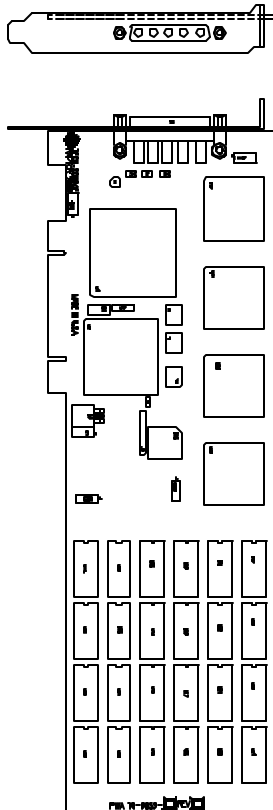
C.4 Raptor 2500T-DL Specifications



Frame Buffer:	64MB SGRAM
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling
Video Connector:	DVI Dual-Link
Temperature Rating:	10 ⁰ to 50 ⁰ C operating -10 ⁰ to 70 ⁰ C non-operating
Humidity Rating:	5 to 90% (non-condensing)
Power Rating:	+5V @ 5 Amps
Dimensions:	312mm x 107mm (12.28" x 4.2")

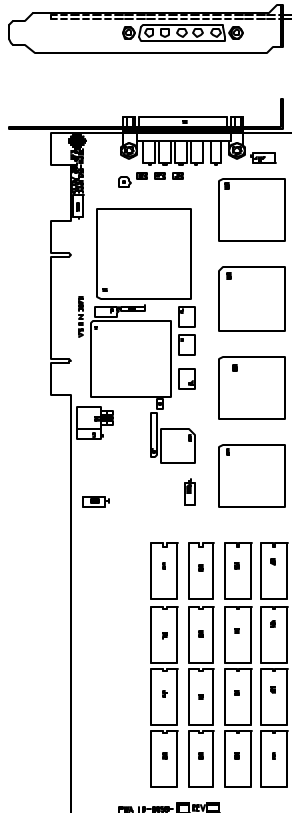
C.5 Raptor 2000 Specifications

C.5.1 Raptor 2000-24M



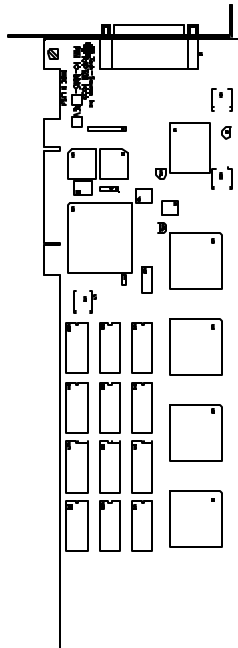
Frame Buffer:	8-bit single or double buffered; 24 Megabytes VRAM
MOX Hardware:	Tech Source MOX ASIC; 24 layer Priority Management
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Table(s):	1024 entries
PCI Interface:	33 MHz, 32-bit
Video Interface:	Red, Green, Blue, at RS-343 (50 ohms)
Video Sync:	Separate sync at TTL levels (75 ohms)
Video Connector:	DB-5W5
Temperature Rating:	10 ⁰ to 50 ⁰ C operating -10 ⁰ to 70 ⁰ C non-operating
Humidity Rating:	5 to 90% (non-condensi ng)
Power Rating:	+5V @ 4 Amps; +12V @ 100mA
Dimensions:	312mm x 107mm (12.28" x 4.2")

C.5.2 Raptor 2000-12M



- Frame Buffer:** 8-bit single or double buffered;
12 Megabytes VRAM
- MOX Hardware:** Tech Source MOX ASIC; 24 layer
Priority Management
- Hardware Cursor:** 3 color, 64 x 64 bitmap
- Color Lookup
Table(s):** 1024 entries
- PCI Interface:** 33 MHz, 32-bit
- Video Interface:** Red, Green, Blue, at RS-343
(50 ohms)
- Video Sync:** Separate sync at TTL levels
(75 ohms)
- Video Connector:** DB-5W5
- Temperature
Rating:** 10⁰ to 50⁰C operating
-10⁰ to 70⁰C non-operating
- Humidity Rating:** 5 to 90% (non-condensing)
- Power Rating:** +5V @ 4 Amps; +12V @ 100mA
- Dimensions:** 312mm x 107mm (12.28" x 4.2")

C.6 Raptor 1000 Specifications



Frame Buffer: 8-bit single or double buffered;
12 Megabytes VRAM

MOX Hardware: Tech Source MOX ASIC; 24 layer
Priority Management

Hardware Cursor: 3 color, 64 x 64 bitmap

**Color Lookup
Table(s):** 1024 entries

PCI Interface: 33 MHz, 32-bit

Video Interface: Red, Green, Blue, at RS-343
(75 ohm)

Video Sync: Composite or Separate

Video Connector: DB-13W3

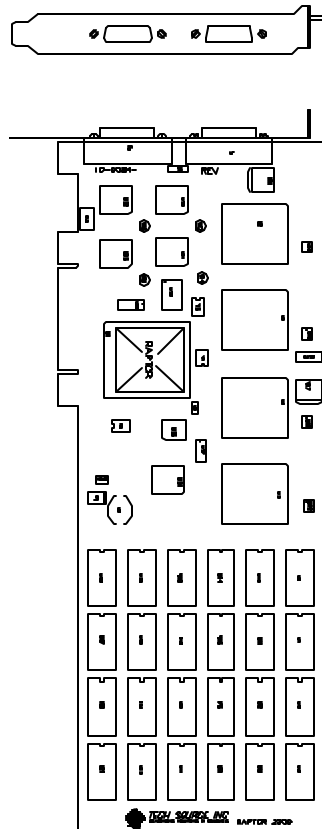
Temperature 10⁰ to 50⁰C operating
Rating: -10⁰ to 70⁰C non-operating

Humidity Rating: 5 to 90% (non-condensing)

Power Rating: +5V @ 2.5 Amps

Dimensions: 312mm x 107mm (12.28" x 4.2")

C.7 Raptor 2500 Specifications



Frame Buffer:	24 MB VRAM
MOX Hardware:	Tech Source MOX 32 ASIC; 24 layer Priority Management
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33 MHz, 32-bit (Universal)
Video Connector:	Dual MDR 26 (2)
Temperature Rating:	10 ⁰ to 50 ⁰ C operating -10 ⁰ to 70 ⁰ C non-operating
Humidity Rating:	5 to 90% (non-condensing)
Power Rating:	+5V @ 5 Amps
Dimensions:	312mm x 107mm (12.28" x 4.2")

Appendix D

X Windows System Screen Dump Utility

D.1 Overview

D.1.1 TSI Screen Capture Utility

tsiwd is a utility that dumps the contents of portions of the X Window screen to a file. It stores the data in a graphics file format that uses 24-bit lossless compression. This utility differs from *xwd* in that *tsiwd* captures the data/contents from up to 32-bit planes, including the contents of layers created through the Multiple Overlay eXtension (MOX).

D.2 Usage

Usage: `/usr/openwin/bin/tsiwd`
`[-geometry x,y,width,height] [-dev path] [-ppm | -bmp]`
filename

The *tsiwd* utility saves the contents of an X window (or other region) to "filename".

The utility has two basic modes of operation: window capture and region capture. To capture the contents of a particular window, run *tsiwd* without the geometry argument. The cursor will change shape to resemble a cross, at which point the user can left-click on the window he/she desires to capture. Selecting the root window in this manner will capture the entire screen's contents.

Alternately, an exact region of the screen can be captured by specifying the region's geometry using the geometry option.

The "x" and "y" specify the upper left-hand corner of the region, which, along with "width" and "height", describe the rectangular area to be captured.

However chosen, the captured image is saved as a PNG file by default. PNGs provide lossless compression, 24-bit color, and may be viewed with a variety of common imaging applications. If PNG is not preferred, then either BMP or PPM can be selected instead by including either of the switches "-bmp" or "-ppm". The "-dev" option specifies the graphics device, but is not needed with most versions of the software. If it is needed, simply provide the path to the graphics device with this option.

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