

Tech Source

Raptor X Servers for Tru64 UNIX Installation and Reference Manual

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April 29, 2005

Publication # 65-0207-01

Rev K

Addendum Information
Date Released

April 29, 2005

Changes made to:

REVISION NUMBER	CHANGES	DATE
A	Initial Release	12-06-96
B	Added CD-ROM Installation	02-13-97
C	Changed CD-ROM Mount Command	03-21-97
D	Changed prompt command on software installation	08-06-97
E	Added Raptor GFX-8M and Raptor 2000	03-29-98
F	Add 8-bit multiple resolution support	04-30-98
G	New Layout and major updates to content	01-23-01
H	Change in Software Installation	03-15-01
J	Raptor 2500, Raptor 1100T, Raptor 2100T & Raptor 2100D Support	08-19-03
K	Removed Raptor 2100D and Raptor 2500 and added support for Raptor 2500T-DL	04-29-05

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PREFACE

This publication documents the Tech Source, Inc. Raptor hardware/software installation and reference. This manual is intended for users who incorporate the Tech Source, Inc. Raptor graphics cards into their HP/Compaq PCI based Alpha Workstations. All systems vary to a degree. Knowledge of the features of your system and an understanding of UNIX shell scripts are helpful during the installation process.

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TABLE OF CONTENTS

INTRODUCTION	1-1
1.1 Overview	1-1
1.2 Conventions	1-3
HARDWARE INSTALLATION	2-1
2.1 Hardware Configurations Supported.....	2-1
2.2 Installation Instructions	2-1
2.3 Raptor 2100/2500 FPS Installation	2-3
SOFTWARE INSTALLATION	3-1
3.1 Installation	3-1
3.1.1 Installation from CD-ROM.....	3-2
3.1.1.1 Installation on Tru64 UNIX v4.0.....	3-2
3.1.1.2 Installation on Tru64 UNIX v5.0 and Higher	3-3
3.2 Changing the Resolution	3-5
INVOKING X WINDOWS	4-1
4.1 Overview	4-1
4.2 Invoking X from Command Line	4-1
4.3 Setting Depth and Resolutions.....	4-2
4.3.1 Resolution Options for Raptor 1000 & Raptor 1100T4-3	
4.3.2 Depth and Resolution Options -Raptor GFX-8PD...	4-3
4.3.3 Depth Options for T-Class Cards.....	4-5
4.3.4 Depth Options for I-Class Cards.....	4-7
4.3.5 Editing the <code>xServer.conf</code> File.....	4-7
4.4 MOX.....	4-8
4.5 Configuring with an Elsa Gloria Card.....	4-9
4.6 Configuring Raptor with Radeon Cards	4-10
4.7 Starting <code>xdm</code>	4-10
4.7.1 MOX Mode Using <code>xdm</code>	4-11
4.8 Common Desktop Environment (CDE).....	4-11
4.8.1 MOX Mode Using CDE	4-12
ADVANCED FEATURES	5-1
5.1 Overview	5-1
5.2 The 8+8 Mode.....	5-1
5.3 MOX (Multiple Overlay eXtension).....	5-1
5.4 Cached Pixmaps	5-2

TABLE OF CONTENTS CONT'D

5.5 Flash Erase.....	5-2
5.6 The 8+24 Simultaneous Visuals.....	5-3
UNINSTALLING RAPTOR SOFTWARE.....	6-1
6.1 Uninstalling Raptor X Servers for Tru64 UNIX.....	6-1
TECHNICAL ASSISTANCE.....	7-1
7.1 Who to Call for Help.....	7-1
7.2 Email Address	7-1
7.3 Website.....	7-2
APPENDIX A.....	A-1
LIST OF RESOLUTIONS.....	A-1
A.1 Raptor 1000 and Raptor 1100T.....	A-1
A.2 Raptor GFX-8PD.....	A-2
APPENDIX B.....	B-1
CARD SPECIFICATIONS	B-1
B.1 Raptor 2100T Specifications	B-1
B.2 Raptor 1100T Specifications	B-2
B.3 Raptor 2500T-DL Specifications	B-3
B.4 Raptor 2000 Specifications	B-4
B.4.1 Raptor 2000-24M Specifications	B-4
B.4.2 Raptor 2000-12M Specifications	B-5
B.5 Raptor 1000 Specifications	B-6
B.6 Raptor GFX-8PD Specifications	B-7
APPENDIX C.....	C-1
X WINDOWS SYSTEM SCREEN DUMP UTILITY.....	C-1
C.1 Overview	C-1
C.1.1 TSI Screen Capture Utility	C-1
C.2 Usage	C-1

Chapter 1

INTRODUCTION

1.1 Overview

Thank you for purchasing a Tech Source, Inc. Raptor graphics card for use with your HP/Compaq Alpha based workstations. This manual describes the installation and configuration of the Raptor graphics card and the accompanying software. This software runs on HP/Compaq Alpha based workstations 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)

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-DL Supports 2048x2048 resolutions (digital) and drives the Raptor 2100 and Raptor 2500 LCD Flat Panels.

For applications that require a graphics boot console at a low resolution, as an alternative to Powerstorm & Elsa-Gloria cards, Tech Source provides a low cost solution called the Raptor GFX-8PD

NOTE: This software supports Tru64 UNIX 4.0f and higher. Tru64 UNIX was formerly called Digital UNIX.

The software is a set of kernel device drivers and X Window System loadable device-dependent modules, which are installed and uninstalled using the standard utility `set1d`. You may refer to the man page for `set1d` before continuing.

The software consists of four packages:

- **RAPTOR503** Drivers for the Raptor 2000 (12M), Raptor 2000 (24M) and Raptor 1000 (I-Class Cards)
- **RAPFT503** Drivers for Raptor 2100T, Raptor 1100T and Raptor 2500T-DL (T-Class Cards)
- **RAPMOX503** MOX eXtension libraries and include files along with demos and examples
- **GFXP502** Drivers for the Raptor GFX-8PD card

Read the label on your Raptor graphics card to determine the model of card that you have. Alternatively, you can also look at Appendix B and identify your card based on the drawings and descriptions.

From this point forward, all Raptor products will be referred to as Raptor cards. The Raptor 2000 (12M) and the Raptor 2000 (24M) will be referred to as Raptor 2000. The company name, Tech Source, Inc., will be referred to as Tech Source or TSI.

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:

<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 software has been tested on and currently supports the following PCI based system:

- HP Alpha Workstation XP 1000
- HP Alpha Workstation DS10 & DS25
- HP Alpha Workstation 433au

Other similar PCI workstations are expected to work as well. Please email hotline@techsource.com if you run into any issues.

The following Tech Source cards are supported:

- Raptor 1000 [8-bit, MOX16, MOX24 modes]
- Raptor 2000 [8-bit, MOX16, MOX24 modes]
- Raptor GFX-8PD [8 and 8+24 and 24-bit modes]
- Raptor 1100T [8-bit, MOX16, MOX24, MOX32, 8+8, 8+24, 24-bit modes]
- Raptor 2100T [8-bit, MOX16, MOX24, MOX32, 8+8, 8+24, 24-bit modes]
- Raptor 2500T-DL [8-bit, MOX16, MOX24, MOX32, 8+8, 8+24, 24-bit modes]

The various modes are discussed in detail in Chapter 4.

2.2 Installation Instructions

The Raptor card installation is simple and consists of a few easy steps. These installation instructions presume that you are familiar with the HP Tru64 UNIX operating system.

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

Step 1: Shutdown the system and turn the power OFF, remove the system's cover, find an available PCI Local Bus slot, and remove the bracket and screw. Ground yourself by touching the metal part on the case.

Step 2: Install the Raptor card firmly into the PCI Local Bus 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, attach any previously removed cables, and connect the video cable to your monitor.

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

The Raptor card is now installed and the system is ready for software installation. Refer to Chapter 3 for installing the Raptor Software for Tru64 UNIX.

2.3 Raptor 2100/2500 FPS Installation

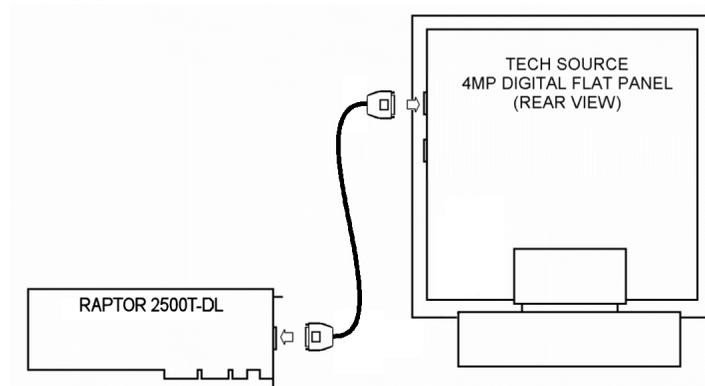


Figure 2-1 – Raptor 2100 Digital Flat Panel Subsystem

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 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

3.1 Installation

The software is installed using the standard Tru64 UNIX utility `setld`. You must be logged in as super-user or root when doing the installation.

NOTE: If you had already installed Raptor software earlier, trying to install the new software will give you the following message:
setld: All subsets on the kit are already installed.

You need to uninstall the previous Raptor software in order to install the new version. Refer to Chapter 6 for the uninstall procedure.

NOTE: Only the Raptor GFX-8PD card currently provides a graphics console function. If you are using any other Raptor card, you will also need to install a HP Alpha graphics adapter, (like a Power Storm graphics adapter) a Raptor GFX-8PD, or a dumb terminal serial console to monitor the system boot up messages.

The software consists of four packages:

- **RAPTOR503** Drivers for the Raptor 2000 (12M), Raptor 2000 (24M) and Raptor 1000
- **RAPFT503** Drivers for the Raptor 2100T, Raptor 1100T and Raptor 2500T-DL
- **RAPMOX503** MOX libraries and include files along with demos and examples
- **GFXP502** Drivers for the Raptor GFX-8PD card

It is only necessary to install the package for the card you wish to use.

3.1.1 Installation From CD-ROM

3.1.1.1 Installation on Tru64 UNIX v4.0

This driver software supports Tru64 UNIX v4.0f and higher. To install from a CD-ROM, follow the procedure below.

1. Insert the CD-ROM into the drive.
2. Create a mount point for the CD-ROM, such as `/cdrom`.

```
prompt# mkdir /cdrom
```

3. Mount the CD-ROM on `/cdrom`. For example, if the CD-ROM device is located on the `c` partition of `rz4`, type:

```
prompt# mount -t cdfs -o rrip /dev/rz4c \  
/cdrom
```

Follow instructions below to install individual patches.

4.
 - a. To install the software for Raptor 2000 and Raptor 1000, type:

```
prompt# cd /cdrom/RAPTOR
```

```
prompt# setld -l .
```

- b. To install the Raptor GFX-8PD software package, type:

```
prompt# cd /cdrom/GFX
```

```
prompt# setld -l .
```

- c. To install the software for Raptor 2100T, Raptor 1100T and Raptor 2500T-DL, type:

```
prompt# cd /cdrom/RAPFT
```

```
prompt# setld -l .
```

- d. To install the RAPMOX503 package, type:

```
prompt# cd /cdrom/RAPMOX
```

```
prompt# setld -l .
```

NOTE: You must install the RAPMOX package if you plan to use MOX (Multiple Overlay Extension) features

5. You will need to reboot the system for the installation to take effect.
6. To list the installed graphics cards, type:

```
prompt# sizer -gt
```

7. When setld is done, unmount the CD-ROM:

```
prompt# umount /cdrom
```

3.1.1.2 Installation on Tru64 UNIX v5.0 and higher

To install from a CD-ROM, follow the procedure below.

1. Insert the CD-ROM into the drive.
2. Create a mount point for the CD-ROM, such as /cdrom.

```
prompt# mkdir /cdrom
```

3. Mount the CD-ROM on /cdrom. For example, if the CD-ROM device is located at the /dev/disk/cdrom0c, type:

```
prompt# mount -t cdfs -o rrip \  
           /dev/disk/cdrom0c /cdrom
```

4.
 - a. To install the software for Raptor 2000 and Raptor 1000 type:

```
prompt# cd /cdrom/RAPTOR
```

```
prompt# setld -l .
```

- b. To install the Raptor GFX-8PD software package, type:

```
prompt# cd /cdrom/GFX
```

```
prompt# setld -l .
```

- c. To install the software for Raptor 2100T, Raptor 1100T and Raptor 2500T-DL, type:

```
prompt# cd /cdrom/RAPFT
```

```
prompt# setld -l .
```

- d. To install the RAPMOX503 package, type:

```
prompt# cd /cdrom/RAPMOX
```

```
prompt# setld -l .
```

NOTE: You must install RAPMOX package if you plan to use MOX (Multiple Overlay Extension) features
--

5. You will need to reboot the system for the installation to take effect.

6. To list the installed graphics cards, type:

```
prompt# sizer -gt
```

7. When `setld` is done, unmount the CD-ROM:

```
prompt# umount /cdrom
```

3.2 Changing the Resolution

Resolutions can be changed on some Raptor cards. The table below illustrates the configurability of various cards. The procedures to change resolutions are described in the sections listed in the last column of the table.

Card Type	Resolution Change	Section
Raptor 1000	Yes	4.3.1
Raptor 2000	Fixed (2048x2048)	--
Raptor 1100T	Yes	4.3.1
Raptor GFX-8PD	Yes	4.3.2
Raptor 2500T-DL	Fixed (2048x2048)	--
Raptor 2500T-DL	Fixed (2560x2048)	--

NOTE: Changing of the bit-depth is described in Section 4.3.

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Chapter 4

INVOKING X WINDOWS

4.1 Overview

There are several ways to start up X Windows on your HP Alpha system.

- Invoking X from Command Line
- xdm
- CDE

This chapter assumes the use of `cs` environment.

4.2 Invoking X from Command Line

To start up X Windows from the command line, simply type:

```
prompt# /usr/bin/X11/X
```

This will start windows on all the graphics cards in the system in multi-screen mode. The screen-order is determined by which graphics card is first identified by the system.

NOTE: If you start up X from the command line, it will come up with the default background but no X Clients. X Client programs must be started up remotely.

To change the screen-order, use the `-screenOrder` option.

For example,

```
prompt# X -screenOrder 1,0
```

This reverses the orders of screens 1 and 0. The default screen order is 0, 1, 2, and so on.

To disable X Windows on a selected card, use the `-disableScreen` option. For example,

```
prompt# X -disableScreen1
```

This will start up `x` on the cards associated with screen 0, screen 2, screen 3, etc.

NOTE: The `-screenOrder` option should list all the screens. Omitting any screen will cause the X Server to crash.

To bring up X Windows on a selected card only, use the `-onlyScreen` option and refer to the screen number of that card.

```
prompt# X -onlyScreen0
```

This will start up Windows on screen 0 only.

To determine the number of screens and the screen numbers, type:

```
prompt# /usr/sbin/sizer -gt
```

The first card listed is screen 0, the second card is screen 1, and so on.

4.3 Setting Depth and Resolutions

The resolutions are configurable on Raptor 1100T, Raptor 1000 and GFX-8PD. The bit-depths are configurable on all T-Class & GFX-8PD cards. MOX configuration is available on both I-Class and T-Class cards. This section discusses how to change the resolutions and bit depths of these cards.

4.3.1 Resolution Options for the Raptor 1000 and Raptor 1100T

The X Windows resolution of the Raptor 1000 and Raptor 1100T can be set through the `-screen` and `-vsync` command line options and by editing the `XServers.conf`. If no option is used, the resolution defaults to 1280x1024@60 for Raptor 1000 and 1280x1024@60 for Raptor 1100T. For a list of valid resolutions, please refer to Appendix A.

If the specified resolution does not match one from the list, the default resolution will be used.

To set the resolution to 1600x1200@60, type:

```
prompt# /usr/bin/X11/X -screen 1600x1200 \  
-vsync 60
```

NOTE: If no screen number is specified in the option, the setting will be applied to all the screens.

The screen number can be specified on most of the X Server options. For example the following command will set the screen 1 resolution to 1600x1200@60 and all other screens will use the default value.

```
prompt# /usr/bin/X11/X -screen1 1600x1200 \  
-vsync 60
```

4.3.2 Depth and Resolution Options for the Raptor GFX-8PD

The bit depth of the Raptor GFX-8PD can be set to 8-bit only, 8+24 bit or 24-bit only by passing command line parameters. By default, the card will start up in the 8-bit mode.

To start X Windows on the Raptor GFX-8PD in 24-bit only mode, on Tru64 5.0 and later type:

```
prompt# /usr/bin/X11/X -depth 24 -lbr
```

On Tru64 4.0f type:

```
prompt# /usr/bin/X11/X -depth 24
```

To start X Windows on the Raptor GFX-8PD in 8+24 bit mode, on Tru64 5.0a and later type:

```
prompt# /usr/bin/X11/X -depth 32 -lbr
```

On Tru64 4.0f type:

```
prompt# /usr/bin/X11/X -depth 32
```

When configured in the 8+24 mode, both PseudoColor (8-bit) visual and TrueColor (24-bit) visuals are supported simultaneously, with the PseudoColor visual being the default visual. The default visual can be changed to the TrueColor.

To start X Windows in the 24-bit only mode, type:

```
prompt# /usr/bin/X11/X -depth 24 -lbr
```

To change the default visual in the 8+24 mode to 24-bit TrueColor type:

```
prompt# /usr/bin/X11/X -depth 32 \  
-vclass TrueColor -lbr
```

<p>NOTE: The <code>-lbr</code> option must be specified in 24-bit only and 8+24 bit modes when using TRU64 UNIX version 5.0A and later.</p>
--

The X Windows resolution of the Raptor GFX-8PD can be set through the `-screen` and `-vsync` command line options. If no option is used, the resolution is set to 1280x1024@60. For a list of valid resolutions, please refer to Appendix A. If the specified resolution does not match one from the list, the default resolution will be used.

To set the resolution to 1600x1200@60, type:

```
prompt# /usr/bin/X11/X -screen 1600x1200 \  
-vsync 60
```

The screen number can be specified on most of the X Server options. For example, if the Raptor GFX-8PD is screen 1, the following command will set the screen 1 resolution to 1600x1200@60 and all other screens will use the default value.

```
prompt# /usr/bin/X11/X -screen1 \  
1600X1200 -vsync 60
```

NOTE: If no screen number is specified in the option, the setting will be applied to all the screens.

Editing the `Xserver.conf` file as described in the Section 4.3.5 can also set the resolution.

4.3.3 Depth Options for T-Class Cards

The bit-depth of Raptor T-Class Cards can be set to 8-bit only, 8+8-bit, 8+24-bit, 24-bit, MOX16, MOX24, MOX32. An explanation of different MOX modes can be found in Section 4.4.

To start X Windows with a specific depth the environment variable `STARSMODE` needs to be set. By default X Windows comes up in 8-bit mode on these cards.

To start X Windows in 8bit only mode, set the `STARSMODE` environment variable to `+8` before starting up the X Server.

```
prompt# setenv STARSMODE +8
```

To start X Windows in 8+8-bit mode, set the `STARSMODE` environment variable to `+8+8` before starting up the X Server.

```
prompt# setenv STARSMODE +8+8
```

To start X Windows in 8+24-bit mode, set the `STARSMODE` environment variable to `+8+24` before starting up the X Server.

```
prompt# setenv STARSMODE +8+24
```

To start X Windows in 24-bit mode, set the `STARSMODE` environment variable to `+24` before starting up the X Server.

```
prompt# setenv STARSMODE +24
```

To start X Windows in MOX16-bit mode, set the `STARSMODE` environment variable to `+mox16` before starting up the X Server.

```
prompt# setenv STARSMODE +mox16
```

To start X Windows in MOX24-bit mode, set the `STARSMODE` environment variable to `+mox24` before starting up the X Server.

```
prompt# setenv STARSMODE +mox24
```

To start X Windows in MOX32-bit mode, set the `STARSMODE` environment variable to `+mox32` before starting up the X Server.

```
prompt# setenv STARSMODE +mox32
```

If the server is started in multi-screen mode then all screens will be set to the specified bit-depth.

4.3.4 Depth Options for I-Class Cards

I-Class Cards can be started up in 8bit and MOX modes. On these cards X Windows starts up in 8-bit mode by default. An explanation of different MOX modes can be found in Section 4.4.

To start X Windows in MOX16 mode, set the `STARSMODE` environment variable to `+mox16` before starting up the X Server.

```
prompt# setenv STARSMODE +mox16
```

To start the X Windows in MOX24 mode, set the `STARSMODE` environment variable to `+mox24` before starting up the X Server.

```
prompt# setenv STARSMODE +mox24
```

4.3.5 Editing the Xserver.conf File

As an alternative to specifying the resolution on the command line, the X Windows configuration file `Xserver.conf` may be edited. For example, to set the resolution to `1600x1200@60`, modify the last line in `/var/X11/Xserver.conf` as follows:

```
args<  
  
-screen 1600x1200 -vsync 60 -pn  
>
```

NOTE: The <code>-pn</code> option allows the X Server to come up even if it cannot listen in on all ports. It is highly recommended.

The above changes will apply to all screens.

To specify a screen number you may modify the configuration file `/var/X11/Xserver.conf` as follows:

```
args<
-screen1 1600x1200 -vsync 60 -pn
>
```

For the GFX-8PD the bit depth can also be specified in `Xserver.conf`.

To start X Windows on the Raptor GFX-8PD in 24-bit only mode on the first screen (`screen 0`), modify the `Xserver.conf` file as follows:

```
args<
-depth0 24 -pn
>
```

To start X Windows using the resolution values in the configuration file, simply type:

```
prompt# x
```

Resolution values specified on the command line will override those specified in `/var/X11/Xserver.conf` file.

4.4 MOX

MOX (Multiple Overlay Extension) provides support for multiple drawing layers on graphics cards. MOX is available on all Raptor cards except for the GFX-8PD. Details about MOX can be obtained in a technical white paper available separately from Tech Source. The following MOX modes are supported on all MOX capable cards.

MOX16 MOX, 8-bit Normal, 13-bit Group, 5-bit Absolute
MOX24 MOX, 8-bit Normal, 21-bit Group, 13-bit Absolute

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

MOX32 MOX, 8-bit Normal, 32-bit group, 24-bit absolute

4.5 Configuring with an Elsa Gloria Card

All Raptor cards can be used with the Elsa Gloria card in multi-screen mode. For the cards to work together properly, an updated ddx module for the Elsa Gloria (`lib_dec_comet.so`) must be installed. This module can be obtained either from HP or from Tech Source. In addition, the `-I -css` options must be added to the end of the command line.

```
prompt# X -I -css
```

NOTE: `-I -css` must be the last options on the command line. The X Server will ignore all subsequent options.

A Raptor GFX-8PD card can be used with the Elsa Gloria card if the VGA BIOS is disabled on the Raptor GFX-8PD card. Contact Tech Source (see Chapter 7) for more information. As with the other Raptor cards, the `-I -css` options are necessary to fix the Elsa Gloria bugs.

4.6 Configuring Raptor with Radeon Cards

Raptor cards can be used with the Radeon cards in a multi-screen configuration. However, for the Radeon cards to work properly in the multi-screen mode, the latest Radeon kit labeled V1.3A (RAD543A) must be installed.

Some components, most notably the CDE desktop, do not handle multiple screens very well. It is advised that the user run all the screens at the same bit depth and with the same default visual class. The default depth for Raptor is 8-bit and the visual is PseudoColor. Radeon, on the other hand, comes up in 24-bit TrueColor. To set Radeon card at the 8-bit depth with Pseudo Color visual, the following options may be used on the command line or in the `args<>` section of the X server

configuration file `/var/X11/Xserver.conf`:

```
-depth 8  
-vclass Pseudo Color
```

4.7 Starting xdm

The X Display Manager (`xdm`) program is used for running multiple users on the same host machine. `xdm` provides services similar to those provided by `init`, `getty` and `login` on character terminals prompting for login name and password, authenticating the user, and running a **session**. It provides a login window for each user or selected users.

Several files that are required to start `xdm` are provided in the directory `/usr/lib/X11/xdm`. The configuration file `xdm-config` contains references to the other files and is used to specify the configuration parameters of `xdm`. The `Xservers` file specifies the users (displays) that must get a login window. The `Xservers` file will have individual lines to represent the X Server startup on each of the displays on which an `xdm` login

screen is desired. A typical `xservers` file is shown below:

```
:0 local /usr/bin/X11/X
```

This will start up X Windows on all graphics cards in the default mode. Command line arguments as described in Sections 4.2 and 4.3 can be appended to this line.

For more information on `xdm`, refer to the `xdm` man pages.

4.7.1 MOX Mode Using `xdm`

In order to run MOX under `xdm` you must make use of the `StartWin` script installed in `/usr/bin/X11`. The `Xservers` file should be modified as follows:

```
:0 local /usr/bin/X11/StartWin :0
```

Additional command line options can be appended at the end of this line. The following example `StartWin` script will start up the X Server in `MOX24` mode.

```
#!/bin/sh
STARSMODE=+mox24
export STARSMODE
pass="/usr/bin/X11/X "$*"
exec $pass
```

NOTE: By default, the `StartWin` script starts up the X Server in `MOX24` mode. It can be edited in order to support other MOX modes.

4.8 Common Desktop Environment (CDE)

Common Desktop Environment (CDE) can be configured by editing the `/usr/dt/config/Xservers` file. The default entry in this file is:

```
:0 Local local@console /usr/bin/X11/X :0
```

This will start up X Windows on all the graphics cards in the system. Command line options as described in Sections 4.2 and 4.3 can be appended to this line.

4.8.1 MOX Mode Using CDE

You must use the `StartWin` script (in `/usr/bin/X11`) in order to run MOX under CDE. The `/usr/dt/config/Xservers` file should be modified as follows:

```
:0 local local@console /usr/bin/X11/StartWin :0
```

Additional command line options can be appended at the end of this line. The following example `StartWin` script will start up the X Server in `MOX24` mode.

```
#!/bin/sh
STARSMODE=+mox24
export STARSMODE
pass="/usr/bin/X11/X "$*
exec $pass
```

NOTE: By default, the `StartWin` script starts up the X Server in `MOX24` mode. It can be edited in order to support other MOX modes.

Chapter 5

ADVANCED FEATURES

5.1 Overview

The Raptor cards have several advanced features available through the X Server. They are discussed in the subsections below.

5.2 The 8+8 Mode

This mode is available on Raptor 2100T, Raptor 2500T-DL and Raptor 1100T cards and offers two PseudoColor visuals on the same screen.

Each of these 8bit visuals offers their own set of planes and colormap and can be accessed using the standard X Window function calls such as `XGetVisualInfo` and `XMatchVisual`. This mode can be used for applications that require overlay/underlay configuration or when two 8-bit applications are required to have their own installed colormaps. Unlike MOX, which offers several n-bit layers (where n=1 through 9)), this mode allows only two 8-bit layers independently.

5.3 MOX (Multiple Overlay eXtension)

MOX (Multiple Overlay Extension) is available with all Raptor cards (except GFX-8PD) and facilitates multiple graphics layer support. Each layer can have up to 9 planes. The priority for each of these layers can be dynamically configured. This type of layering is particularly useful in Air Traffic Control and Command and Control applications where each aspect of the drawing is rendered in its own independent layer.

In normal X Servers, when planes are allocated, the available colors are significantly reduced. For example, in an 8-bit X Server, if we allocate two 4-bit layers, the total number of colors available are only $16+15=31$ in contrast to the original 256 colors. MOX allows efficient use of a colormap that has up to 2048 entries. The MOX hardware on the Raptor cards does efficient mapping of these LUT entries to the corresponding planes.

Section 4.4 describes how to start up the X Server in MOX mode and discusses the various options available. To request a white paper on MOX, please send an email inquiry to hotline@techsource.com.

5.4 Cached Pixmaps

All Raptor cards support offscreen pixmap caching. Cached pixmaps are those that are stored in Raptor's offscreen memory. These offscreen pixmaps allow faster transfer rates to and from screen windows. The default minimum size of pixmaps allocated in this manner is 4096 pixels (width x height).

The available off-screen memory depends on the amount of video memory and the current resolution and depth settings. For example, on a Raptor GFX-8PD card with 8MB of video memory and running at 1024x768 resolution with depth of 8 bits, 768K is used for onscreen memory. 7.2MB is available for pixmaps. In 24-bit configuration, the onscreen memory used is 4 times more than what is used in the 8-bit configuration.

The largest pixmaps are stored in off-screen memory. If a larger pixmap replaces a smaller pixmap in the off-screen memory, the smaller pixmap will move to system memory and remain there even after the larger pixmap is destroyed.

5.5 Flash Erase

The Flash Erase feature is available on all Raptor cards besides the Raptor GFX-8PD. When using Flash Erase, the entire screen can be cleared at the rate of approximately 6000 frames/second. It is

ideal for use with double buffering to clear the entire back buffer or to clear select planes from the back buffer.

Flash Erase is available transparently through the `XFillRectangle` function. It is available to use for any rectangle whose width spans the entire screen since the area to be cleared is defined by scan lines. It is also available through the Multi-buffer and Double-buffering Extensions when the back buffer is a cached pixmap and the rectangular area to be cleared has a width equal to the display width.

5.6 The 8+24 Simultaneous Visuals

The 8+24 mode supports 8-bit and 24-bit visuals simultaneously. This mode is available on the Raptor 2500T-DL, Raptor 2100T, Raptor 1100T and Raptor GFX-8PD cards. By supporting the TrueColor (24-bit) and PseudoColor (8-bit) visuals simultaneously, we can support just about any kind of X client application. Besides, with 16 million colors available, colormap flashing can be avoided. This mode also allows you to implement a pseudo overlay where the 8-bit visual overlays the 24-bit visual.

The default visual for this mode is PseudoColor. Please see Section 4.3.2 and 4.3.3 for a description on how to enable the 8+24 mode on the Raptor cards.

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Chapter 6

UNINSTALLING RAPTOR SOFTWARE

6.1 Uninstalling Raptor X Servers for Tru64 UNIX

The Tru64 UNIX utility, `setld`, must be used for uninstalling the software. To check if you have Raptor software installed on your machine, type:

```
prompt# setld -i | grep RAP
```

This will print out all Raptor patches like RAPFT, RAPTOR & RAPMOX. To look for GFX package, type:

```
prompt# setld -i | grep GFX
```

Therefore, to uninstall them, type one or more of these appropriately:

```
prompt# setld -d GFXP502
prompt# setld -d RAPFT503
prompt# setld -d RAPTOR503
prompt# setld -d RAPMOX503
```

Warning: This uninstall procedure is not for use with older versions of the Raptor software. The package name may be different for the older version. When uninstalling a previous release, it is important to use the procedure that was provided with that release. The packages can be uninstalled in any order.

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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 may use email or our fax line at (407) 339-2554.

7.3 Website

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

<http://www.techsource.com>

Appendix A

LIST OF RESOLUTIONS

A.1 Raptor 1000 and Raptor 1100T

The following is a list of resolutions supported by the Raptor 1000 and Raptor 1100T for Tru64 UNIX on HP/Compaq Alpha Workstations/Servers:

640x480x60
640x480x72
640x480x75
640x480x85
800x600x60
800x600x72
800x600x75
800x600x85
1024x768x60
1024x768x70
1024x768x75
1024x768x85
1152x900x60
1152x900x70
1152x900x75
1152x900x85
1280x1024x60
1280x1024x75
1280x1024x76
1280x1024x85
1600x1200x60
1600x1200x65
1600x1200x70
1600x1200x75

1600x1200x80
1600x1200x85
1600x1000x66
1600x1000x76
1440x900x76
1280x800x76
1920x1080x70
1920x1200x70

A.2 Raptor GFX-8PD

The following is a list of resolutions supported by the Raptor GFX-8PD for Tru64 UNIX on HP/Compaq Alpha Workstations/Servers:

640x480x60
640x480x72
640x480x75
640x480x85
800x600x60
800x600x72
800x600x75
800x600x85
1024x768x60
1024x768x70
1024x768x75
1024x768x77
1024x768x85
1024x800x85
1152x900x60
1152x900x66
1152x900x70
1152x900x75
1152x900x76
1152x900x85
1280x800x76

Appendix A – List of Resolutions

1280x1024x60
1280x1024x67
1280x1024x75
1280x1024x76
1280x1024x85*
1600x1000x66*
1600x1000x76*
1600x1200x60*
1600x1200x65*
1600x1200x70*
1600x1200x75*
1600x1200x85*
1600x1280x76*

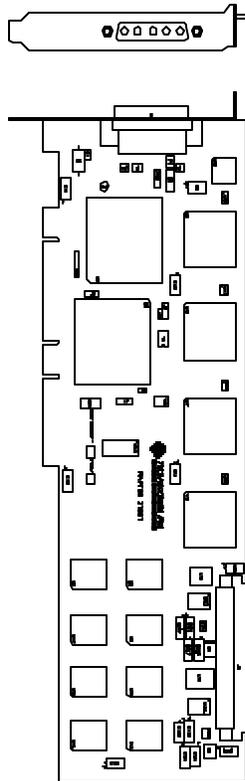
*Indicates that this resolution is supported at 8-bit depth only.

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Appendix B

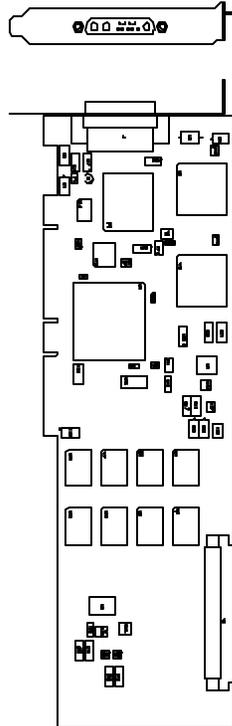
CARD SPECIFICATIONS

B.1 Raptor 2100T Specifications



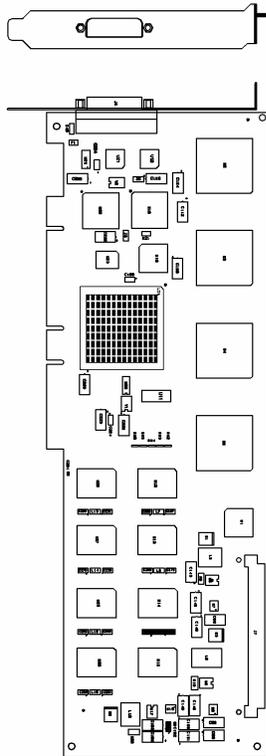
Frame Buffer:	64MB SGRAM
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling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

B.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")

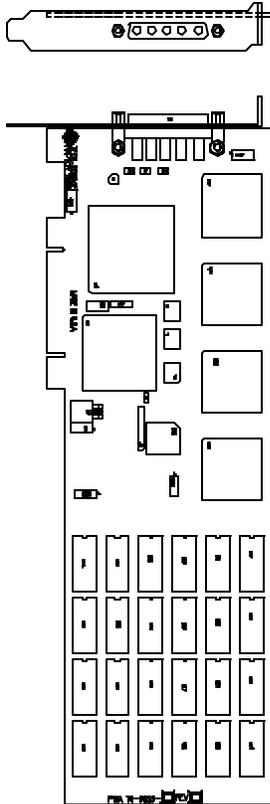
B.3 Raptor 2500T-DL Specifications



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 ^o to 50 ^o C operating -10 ^o to 70 ^o C non-operating
Humidity Rating:	5 to 90% (non-condensing)
Power Rating:	+5V @ 5 Amps
Dimensions:	312mm x 107mm (12.28" x 4.2")

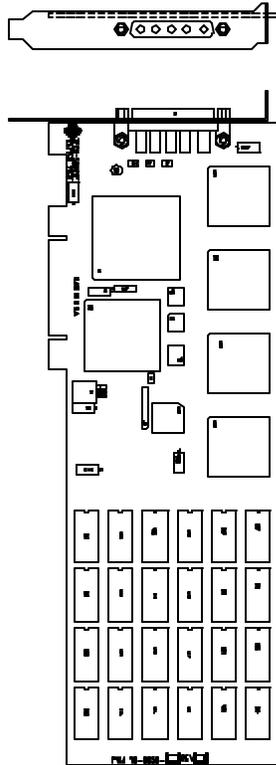
B.4 Raptor 2000 Specifications

B.4.1 Raptor 2000-24M Specifications



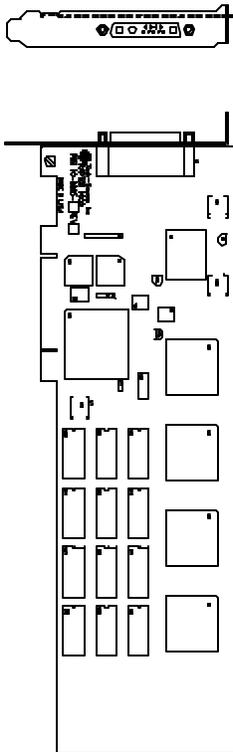
- Frame Buffer:** 8-bit single or double buffered;
24 Megabytes VRAM
- MOX Hardware:** Tech Source MOX ASIC; 24 layer
Priority Management
- Hardware Cursor:** 3 color, 64 x 64 bitmap
- Color Lookup
Table(s):** 1024 entries
- PCI Interface:** 33 MHz, 32-bit
- Video Interface:** Red, Green, Blue, at RS-343
(50 ohms)
- Video Sync:** Separate sync at TTL levels
(75 ohms)
- Video Connector:** DB-5W5
- Temperature
Rating:** 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")

B.4.2 Raptor 2000-12M 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
(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")

B.5 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

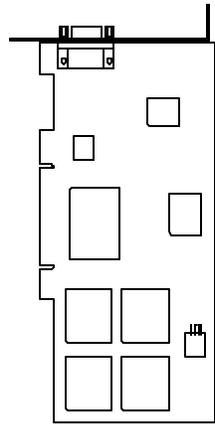
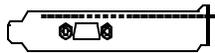
Temperature 10⁰ to 50⁰C operating
Rating: -10⁰ to 70⁰C non-operating

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

Power Rating: +5V @ 2.5 Amps

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

B.6 Raptor GFX-8PD Specifications



Frame Buffer:	8 Megabytes SGRAM
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Table(s):	256 entries
PCI Interface:	33 MHZ, 32-bit
Video Interface:	Red, Green, Blue, at RS-343 (75 ohm)
Video Sync:	Separate, Composite sync using special adapter
Video Connector:	15 pin High Density D-SUB (VGA)
Temperature Rating:	0 ^o to 60 ^o C operating -40 ^o to 70 ^o C non-operating
Humidity Rating:	10 to 95% (non-condensing)
Power Rating:	+5V @ 1.5 Amps (max)
Physical:	168mm x 107mm (6.625" x 4.2")

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Appendix C

X Windows System Screen Dump Utility

C.1 Overview

C.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). The `tsiwd` utility is installed in `/usr/bin/X11` directory.

C.2 Usage

The following is a description of the utility and its use:

```
prompt% tsiwd [-debug] [-nodisplay] [-geometry  
          x,y,width, height] [-dev path] [-pcmap]  
          [-ppm | -bmp] [-imgfile filename]
```

The `tsiwd` utility saves the contents of an X Window (or another region) and displays it on the screen. If the command line argument `-imgfile` and the file name are provided, the captured content is saved into a file.

By default `tsiwd` creates a new window and displays the captured image in it. Specifying the `"-nodisplay"` option turns off this feature. If the `"-pcmap"` option is specified, a private

colormap is used for the image display window. If this option is not provided, the default colormap is used.

The utility has two basic modes of operation:

- window capture
- 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 that is selected for capture. Selecting the root window in this manner will capture the entire screen's contents.

Alternatively, specifying the region's geometry with the `geometry` option can capture an exact region of the screen.

For example:

```
prompt% tsiwd -geometry 0,0,100,150 -imgfile  
filename
```

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

When the captured image is saved by default, the image file is in PNG format. The PNG format provides lossless compression, 24-bit color, and may be viewed with a variety of common imaging applications. The image can also be saved as BMP or PPM by using the `-bmp` or `-ppm` options on the command line.

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Publication # 65-0207-01