Tech Source

Raptor DL-Lite Drivers for Solaris Installation and Reference Manual

Addendum Information

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A	Initial Release	01-25-05

The product described in this manual may be protected by one or more U.S. patents, foreign patents, and/or pending patent applications.

PREFACE

This publication documents the Tech Source, Inc. Raptor DL-Lite Drivers 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 DL-Lite Drivers for Solaris software. All systems vary to a degree. Knowledge of the features of your system is helpful during the installation process.

WARRANTY

The Raptor cards are warranted for one (1) year from date of shipment. During the warranty period, Tech Source, Inc. will, at its discretion, repair or replace a defective component at its expense. Freight charges associated with the repair or replacement of components under warranty are to be shared by Tech Source, Inc. and the customer. All customers, domestic and international, shall bear the freight charges for the product return. Tech Source, Inc. shall bear the outbound freight charges up to $13.00 (USD) per returned product, whether domestic or international. Any additional freight charge shall be the responsibility of the customer. We suggest that you contact your dealer first with any questions you may have about the product. Unlimited technical support (via telephone/facsimile/email) is provided for one (1) year from date of shipment. The installation of any Tech Source, Inc. hardware/software product is the sole responsibility of the customer.

Tech Source, Inc. offers a continuing hardware/software support program that provides telephone consultation and any required hardware repair after the expiration of the warranty period. This is a billable annual maintenance contract. Contact Tech Source, Inc. for the available maintenance plans.

Customers will be charged an hourly rate plus materials ($300.00 USD minimum) for repairs and/or maintenance performed by Tech Source, Inc. that are not covered by a Tech Source, Inc. warranty or maintenance contract.

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Chapter 1

INTRODUCTION

1.1 Overview

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

The Raptor DL-Lite graphics card supports 2560x1600 resolution and drives the Apple 30-inch Cinema HD Display Flat Planel

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 DL-Lite Drivers 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 7 and higher.

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:

`prompt#`   used when the user is required to have root privileges

`prompt%`   used when the user is not required to have root privileges

`ok`   prompt displayed when the user is in Boot PROM mode

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.

Step 4: Connect the Dual Link DVI cable from the Apple HD panel to the Raptor DL-Lite card.

NOTE: If the system is currently using a secondary TSI graphics device, read section 3.5 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 the following software installation chapter.

The Raptor card is now installed and the system is ready for software installation.   Refer to Chapter 3 for instructions on installing the Raptor DL-Lite Drivers for Solaris software.

Chapter 3

SOFTWARE INSTALLATION

3.1 Overview

This chapter describes how to install and configure the Raptor DL-Lite Drivers software.

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

- `TSIrdlt`   Device drivers for the Raptor DL-Lite
- `TSIrdltw`   OpenWindows Software
- `TSImox`   MOX binaries and libraries

3.2 Requirements

The following are prerequisites for installing the Raptor DL-Lite Drivers for Solaris Software:

- The system is running Solaris 7 or higher.
- OpenWindows Version 3.7 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 `/`.
- The Raptor DL-Lite card is presently installed in the workstation.

3.3   CD-ROM Installation

The following are step-by-step instructions for installing the Raptor DL-Lite Drivers 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`**

   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
```

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 `rapdlt#` (where `#` represents an instance number assigned by the operating system).

Note: Device modes 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 the console resolution.) The resolution of the Raptor DL-Lite card is fixed at 2560x1600 at 60 Hz. However, at any time after installation you can change the other parameters by using the `dltconfig` utility.

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

3.4.1   dltconfig Utility

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

```
prompt# dltconfig
```

> **NOTE:**   If X Windows is running on the Raptor card(s) to be configured, please exit out of it before running `dltconfig`. 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 `dltconfig`. (See *Figure 3.1*).

```
┌───────────DLT Configuration v3.0───────────┐
│  ─DEVICE──────GFX-MODEL────────RESOLUTION@HZ────────────BITS──────OPTIONS─│
│  console [rapdlt0] RAPTOR DL-LITE [DEFAULT          ]  mox32      def   ▌│
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│                                                                          │
│                   Press SPACE to change option                           │
│                                                                          │
│        Arrow UP   and DOWN  to select DEVICE                             │
│        Arrow LEFT and RIGHT to select OPTION                             │
│        Press <T> to show test pattern on device                          │
│        Press <S> to save changes and exit program                        │
│        Press <Q> to exit program without saving changes                  │
│        Press <H> for help                                                │
└──────────────────────────────────────────────────────────────────────────┘
```

Figure 3.1 **dltconfig**

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)

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`'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 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,rapdlr@#`, 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,rapdlr@#`, 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,rapdlr@#
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`
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

OPENWINDOWS

4.1   Overview

This section describes how to start up OpenWindows on the Raptor cards. The examples in this chapter use `rapdlt0` as the device name but the device name of your card may be different depending on the instance number.

4.1.1 Raptor as the Console

If the Raptor is the console, type:

```
prompt# openwin
```

4.1.2 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/rapdlt0
```

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.

4.2   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/rapdlt0
```

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. `rapdlt0` or `rapdlt1`, 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.

4.3   Setting Bit-Depth

Raptor DL-Lite 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 `dltconfig` utility (see Section 3.4).

For an explanation of the various MOX modes, please see Section 4.4.

4.4   MOX Modes

The following MOX modes are available:

`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, 32-bit Group, 24-bit Absolute

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

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Chapter 5

UNINSTALLING DL-LITE DRIVERS SOFTWARE

5.1   Uninstalling Software

To uninstall the packages comprising the Raptor DL-Lite Drivers software, type:

```
prompt# pkgrm TSIrdltw TSIrdlt
```

The MOX package can be uninstalled by typing:

```
prompt# pkgrm TSImox
```

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Chapter 6

TECHNICAL ASSISTANCE

6.1   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:

<u>**DETAILS OF YOUR CARD(S):**</u>

P/N: _____

Model Name: _____

Serial Number(s):   _____

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

6.2   Email Address

Our email address is `hotline@techsource.com.`

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

6.3   Website

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

`http://www.techsource.com`

Appendix A

THE CONSOLE RESOLUTION

A.1   Overview

The Raptor DL-Lite card can be configured to be the console in the UltraSPARC workstation. The default resolution and depth are as follows:

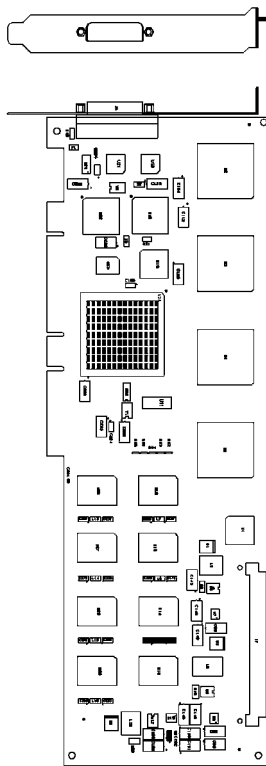| Board	Resolution	Refresh	Bits/Pixels	Sync
Raptor DL-Lite	2560x1600	60	8	Separate

The display resolution of the DL-Lite cannot be changed.

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Appendix B

CARD SPECIFICATIONS

B.1 Raptor DL-Lite 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 50^0C operating -10^0 to 70^0C non-operating
Humidity Rating:	5 to 90% (non-condensing)
Power Rating:	+5V @ 5 Amps
Dimensions:	312mm x 107mm (12.28" 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).

C.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 prefered, 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.

NOTES