

Tech Source

Raptor DL-Lite Drivers for Linux Installation and Reference Manual

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PREFACE

This publication documents the Tech Source Raptor DL-Lite Drivers for Linux Installation for use with the Tech Source, Inc. Raptor graphics cards. This manual is intended for users who incorporate the Tech Source Raptor graphics cards into x86 PC workstations/servers.

This is a guide to the installation of the Raptor DL-Lite Drivers for Linux 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 Raptor graphics card for use with your x86 PC workstation/server. This manual describes the installation of the Raptor hardware and the Linux drivers for the Raptor products. The “Raptor DL-Lite Drivers for Linux” software runs on x86 PC workstations/servers and supports the Tech Source Raptor DL-Lite graphics cards.

NOTE: For a list of supported Linux versions, please refer to sections 3.2 of this manual.

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

In this manual, the Raptor DL-Lite card is referred to as Raptor card.

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

The Raptor DL-Lite Drivers for Linux are provided on a CD-ROM which consists of:

- Tech Source Raptor device drivers for Linux
- XFree86 loadable DDX modules for Tech Source Raptor cards.
- MOX extension files

NOTE: In order to use the Tech Source Raptor DDX module, you must have XFree86 (v4.0 or later) previously installed.

1.2 MOX Extension Support

Tech Source provides and supports an X server extension called MOX (Multiple Overlay eXtension) on all supported Raptor cards.

Software support for MOX is provided by a server extension and a client library, which are included with this product. Installation of MOX software is discussed in Chapter 3. For more information about MOX, please contact Tech Source for a technical white paper.

NOTE: The MOX software **must** be installed only once.

1.3 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

Chapter 2

HARDWARE INSTALLATION

2.1 Hardware Configurations Supported

The Raptor card and software accompanying this manual have been tested on and currently support Intel and AMD x86 based computer systems running Linux. Raptor cards and software supporting other computer systems are available from Tech Source. All Raptor cards support single and multi-screen configurations.

Raptor cards use loadable drivers and, therefore, can co-exist in multi-screen configurations with other VGA/SVGA graphics cards, provided drivers are available for those cards under XFree86.

NOTE: The Raptor graphics cards cannot be used as a console in a PC. You must install a VGA/SVGA PC video card from another manufacturer for this purpose.

2.2 Installation Instructions

The Raptor graphics card installation 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, then find an available PCI slot, and remove the bracket and screw. Ground yourself by touching an unpainted section of the metal case.

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- Step 2: Install the Raptor graphics 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, attach any previously removed cables, and connect the video card to your monitor.

The Raptor graphics card is now installed and the system is ready for software installation. Refer to Chapter 3 for installing and configuring the "Raptor DL-Lite Drivers for Linux" software.

Chapter 3

SOFTWARE INSTALLATION

3.1 Overview

This installation chapter describes how to install and configure the drivers for the Raptor DL-Lite card.

3.2 Requirements

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

- At least 2MB of disk space available in / (root directory) and /usr for drivers.
- A Raptor card is presently installed in the workstation/server (See Chapter 2 for instructions on installing a Raptor graphics card).
- Linux kernel v2.2.x or v2.4.x installed
- XFree86 (v4.0 or later) installed and configured for the current console graphics card
- RPM (v3.0 or later) packaging tools for installing the package

The device driver and the DDX module for Linux and XFree86 are loadable. No kernel changes or X server rebuilds are required.

The software has been fully tested under Red Hat 7.3, Red Hat 8.0, Red Hat 9.0, Red Hat Enterprise Linux (x86 and x86_64) and SuSE 8.2. Updating or recompiling the kernel or the XFree86 distribution may cause the driver and DDX to fail to load. In this case, please contact our technical support team for a possible solution (See Chapter 6). The software consists of the following modules:

```
rapdlt.o      UP Kernel driver
rapdlt_smp.o  SMP Kernel driver
rapdlt_drv.o  XFree86 DDX module
libMOX.a     MOX extension module
```

3.3 CD-ROM Installation

NOTE: Rebooting the system after the Raptor card installation may cause the auto configuration manager to come up in some distributions. At this point, ignore the auto configuration. Refer to Section 3.6 to configure the Raptor card after the software is installed.

The following are step by step instructions for installing the Raptor DL-Lite Drivers for Linux from a CD-ROM.

1. Login as `root` on the target system, using `/bin/sh` as your shell.
2. Insert the CD-ROM labeled “Raptor DL-Lite Drivers for Linux” into the drive.

3. If the drive is already mounted, type:

```
prompt# cd /mnt/cdrom/linux/
```

4. If the CD-ROM is not already mounted, type:

```
prompt# mount /dev/cdrom /mnt/cdrom
```

```
prompt# cd /mnt/cdrom/linux/
```

5. The packages are in Red Hat's RPM format. For information on downloading, installing, and using the RPM utility, please refer to Red Hat's website and the related FAQ and HOWTO.

To install the driver package, type:

```
prompt# rpm -Uvh rapdlt-*.rpm
```

6. Reboot the system to make sure the drivers will be reloaded.
7. To verify that the device drivers were loaded correctly, type:

```
prompt# cat /proc/modules | grep rap
```

It should show the entry for the Raptor device drivers similar to the following:

```
rapdlt      20144      0(unused)
```

8. To install the MOX package, type:

```
prompt# cd /mnt/cdrom/linux/moxlib
```

```
prompt# rpm -Uvh tsimox-*.rpm
```

NOTE: You must install the MOX package if you plan on running the cards in MOX mode. The MOX package is common to all Raptor cards.

3.4 New Device

One new device name is created in the `/dev` directory for each Raptor card. It is denoted by `rapdlt#`, where `#` represents an instance number assigned by the operating system. For example, `/dev/rapdlt0` is the first Raptor card seen by the system. `/dev/rapdlt1` will be the second card seen by the system and so on.

3.5 Changing Resolution

The resolution of the Raptor DL-Lite is fixed at 2560x1600 for the Apple LCD monitor.

3.6 Configuring XFree86 Server for PC Graphics Hardware

This section assumes that the `XF86Config` file was configured to work properly with your existing VGA/SVGA cards. For documentation on how to install and configure your VGA/SVGA card, please refer to the XFree86 documentation.

After installing the Raptor drivers, three sections will be added to the `/etc/X11/XF86Config-4` file for each type of card, provided that the file exists in the system. Otherwise, `/etc/X11/XF86Config` will be used. If you are using another config file, the three sections can be imported from:

```
/etc/X11/XF86Config.rapdlt
```

NOTE: From this point on, the name `XF86Config` will be used to refer to the config file used by the `XFree86` server.

The sections for Raptor DL-Lite are listed below. The required modifications are explained in the following subsections.

```
# TSI Raptor DL-LITE XFree86 Configuration Sections
Section "Monitor"
    Identifier "Apple Panel"
    VendorName "Apple"
    HorizSync 31.5 - 150.0
    VertRefresh 50-90
    ModeLine "2560x1600" 292.00 2560 2561 2562 2563
    1600 1601 1602 1603
EndSection

Section "Device"
    Identifier "Rapdlt0"
    Driver "rapdlt"
    BusID "PCI:2:9:0"
    Card "TSI Raptor DL-LITE"
    Option "Device" "/dev/rapdlt0"
    Option "Mode" "8"
    Option "ScaleCursPos" "on"
# Option "BackingStore"
# Option "SaveUnder"
# Option "TranspColor" "0x0a3246"
EndSection

Section "Screen"
    Identifier "RaptorDL-LITE"
    Device "Rapdlt0"
    Monitor "Apple Panel"
    DefaultDepth 8
    SubSection "Display"
        Depth 8
        Modes "2560x1600"
    EndSubSection
    SubSection "Display"
        Depth 16
        Modes "2560x1600"
    EndSubSection
    SubSection "Display"
        Depth 24
        Modes "2560x1600"
    EndSubSection
EndSection
# TSI Raptor DL-LITE XFree86 Configuration Sections
```

3.6.1 Monitor Section

This section for Raptor cards should remain unchanged.

3.6.2 Device Section

Identifier: Each Raptor card instance should have a unique identifier. This identifier is used in the `Screen` section.

NOTE: The `BusID` value in the configuration file must be changed manually. Please see the description below for details.

BusID: Depending on the machine and the slot the card is in, it might receive a unique `BusID`. When the driver attaches, it will print out the device name and `BusID`. To check the `BusID`, type `dmesg|grep rap`. The output should look similar to the following:

```
TSI: rapdlt0 (BusID 0:9:0) is
Raptor DL-LITE @ 2560x1600
```

In the example above, the Raptor DL-Lite has a `BusID` of `PCI:0:9:0`. Change the `BusIDs` of the cards in the `XF86Config` file to match the `BusIDs` reported by the drivers.

Option "Device": This field specifies the device name of the Raptor card. The first Raptor card seen by the system will be `/dev/rapdlt0` and the second will be `/dev/rapdlt1` and so on. The device name and the `BusID` specified earlier in this section must correspond to the same card.

Option "Mode": This field specifies pixel modes. It can be one of the following.

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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

Option "ScaleCursPos": This boolean field is useful when monitors of different screen sizes are used together in a multi-screen configuration. When the cursor crosses screen boundaries, its position on the new screen will be adjusted to be proportional to where it was on the previous screen.

Option "TranspColor": This field is only used while in 8+8 mode. It allows the user to specify the RGB color values associated with the transparent color of the overlay. If an application is mistakenly using the transparent color, the value of the color can be changed so that the application no longer uses it. The default value is 0x0A3246.

If more than one Raptor DL-Lite card is installed, a separate `Device` section must be created for each card. Each `Device` section should have a unique `Identifier` `BusID` and `Device` option fields. Other fields should remain unchanged. For more information please refer to Section 4.5.

3.6.3 Screen Section

- Identifier:** Each screen must have a unique identifier which will be used in the `ServerLayout` section.
- Device:** This field specifies which device you want to use for this screen. It should match the Identifier specified in one of the `Device` sections.
- DefaultDepth:** Should be set to either 8 or 24 depending on the default visual desired. This is used when 24-bit visuals will be used on the screen, otherwise this field should be set to 8.
- Modes:** This field should remain unchanged.

If multiple Raptor cards are installed, additional `Screen` sections should be created. Each `Screen` section should have a unique identifier. For more information please refer to Section 4.5.

3.6.4 ServerLayout Section

This is the section which specifies the server layout for either single-screen or multi-screen configuration.

NOTE: The `ServerLayout` section should already exist in your `XF86Config` file. It must be modified manually to include the Raptor card.

This section is not modified automatically by the installation. It must be modified for your specific configuration.

The following example shows the `ServerLayout` Section for a single-screen configuration on the Raptor device.

```
Section "ServerLayout"  
    Identifier "XFree86 Configured"
```

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```
Screen      0  "RaptorDL-LITE" 0 0
InputDevice "Mouse0" "CorePointer"
InputDevice "Keyboard0" "CoreKeyboard"
EndSection
```

Assuming Screen0 is the console card, the following example shows the ServerLayout section with the Raptor card as the second screen.

```
Section "ServerLayout"
Identifier "XFree86 Configured"
Screen    0  "Screen0" LeftOf "RaptorDL-LITE"
Screen    1  "RaptorDL-LITE" RightOf "Screen0"
InputDevice "Mouse0" "CorePointer"
InputDevice "Keyboard0" "CoreKeyboard"
EndSection
```

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Chapter 4

INVOKING THE X SERVER

4.1 Overview

There are several ways to invoke the X server on your system:

- startx script provided in `/usr/X11R6/bin`
- `xinit`
- `xdm`
- Multi-screen operation

This section assumes the use of the `csh` environment. If you prefer a different shell, make the appropriate changes to the examples.

NOTE: For all these methods, there are some environment variables that **must** be set. These could be set in your `.cshrc` file.

```
prompt% setenv X11R6HOME /usr/X11R6
prompt% setenv LD_LIBRARY_PATH \
        $X11R6HOME/lib
prompt% set path=($X11R6HOME/bin $path)
```

All of the options specific to the Tech Source Raptor graphics accelerators are set through the option field in the Device section of the `XF86Config` file. No command-line options are necessary when using `startx`, `xinit` or `xdm` to start the X server

Please refer to Chapters 3 for information on how to configure the `XF86Config` file.

4.2 startx

This is the easiest way to start up the X server. The `startx` script is provided in `$X11R6HOME/bin` directory. To start up the X server in the default mode type:

```
prompt% startx
```

You may add any other standard command line arguments to the end of the line as necessary.

4.3 xinit

The `xinit` program can be used to start the X server directly. The `xinit` format is as follows:

```
xinit [[client] options][ -- [server]  
[display] options ]
```

If no specific client program is given on the command line, `xinit` will look for a file in the user's home directory called `.xinitrc` to run as a shell script to start up client programs. If no such file exists, `xinit` will use the following as a default:

```
xterm -geometry +1+1 -n login \  
-display :0
```

If no specific server program is given on the command line, `xinit` will look for a file in the user's home directory called `.Xserverrc` to run as a shell script to start up the server. If no such file exists, `xinit` will use the following as a default:

```
X :0
```

This assumes that there is a program named `x` in the current search path. The X server in the XFree86 4.0 (or later) distribution is called `XFree86` and is in the directory `$X11R6HOME/bin`. A symbolic link has been made from `x` to `XFree86`.

NOTE: Make sure that the environment is set as described in Section 4.1.

To start up the server using `xinit`, type:

```
prompt% xinit -- $X11R6HOME/bin/X
```

You may also add any other standard command line arguments to the end of the line. For additional information on the use of `xinit`, refer to the `xinit` man page.

4.4 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 `/etc/X11/xdm` (depending on the distribution on your system, the path to these files might be different). The configuration file, `xdmconfig`, contains references to the other files and is used to specify other 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 display devices on which an `xdm` login screen is desired. Once the `XF86Config` file is properly configured, a typical `Xservers` file should contain only one uncommented line, such as the following example:

```
:0 local /usr/X11R6/bin/X
```

You may also add any other command line arguments to the end of the line. For more information on `xdm`, refer to the `xdm` man pages.

4.5 Starting the X Server in Multi-Screen Mode

The `XF86Config` file determines whether the X server starts up in single-screen mode or multi-screen mode. Once the `XF86Config` file is set up, the procedure for starting the X server (whether in single-screen or multi-screen mode) will be the same.

To start the X server on multiple instances of the same type of card in multi-screen mode, changes need to be made to the `ServerLayout`, `Device` and `Screen` sections. The following example shows how to start X on two Raptor DL-Lite cards.

The `ServerLayout` section needs to be modified as shown.

```
Section "ServerLayout"
    Identifier "XFree86 Configured"
    Screen 0 "Screen0" 0 0
    #
    Screen 0 "RaptorDL-LITE" LeftOf "RaptorDL-LITE-1"
    Screen 1 "RaptorDL-LITE-1" RightOf "RaptorDL-LITE"
    InputDevice "Mouse[1]" "CorePointer"
    InputDevice "Keyboard[0]" "CoreKeyboard"
EndSection
```

The `Device` and the `Screen` sections in the `config` file need to be copied and modified. Each Raptor card has its own `Device` and `Screen` section. Each of the `Device` and `Screen` sections has a unique `Identifier` field. The `Screen` section of a given Raptor card has the `Device` field set to the `Identifier` of the corresponding `Device` section. In the example below we use two Raptor DL-Lite cards.

```
# TSI Raptor DL-LITE XFree86 Configuration Sections
Section "Monitor"
    Identifier "Apple Panel"
    VendorName "Apple"
    HorizSync 31.5 - 150.0
    VertRefresh 50-90
    ModeLine "2560x1600" 292.00 2560 2561 2562 2563 1600
    1601 1602 1603
EndSection

Section "Device"
    Identifier "Rapdlt0"
```

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```
Driver      "rapdlt"
BusID      "PCI:2:9:0"
Card       "TSI Raptor DL-LITE"
Option     "Device" "/dev/rapdlt0"
Option     "Mode" "8"
Option     "ScaleCursPos" "on"
# Option   "BackingStore"
# Option   "SaveUnder"
# Option   "TranspColor" "0x0a3246"
EndSection

Section "Device"
Identifier "Rapdlt1"
Driver    "rapdlt"
BusID    "PCI:2:10:0"
Card     "TSI Raptor DL-LITE"
Option   "Device" "/dev/rapdlt1"
Option   "Mode" "8"
Option   "ScaleCursPos" "on"
# Option "BackingStore"
# Option "SaveUnder"
# Option "TranspColor" "0x0a3246"
EndSection

Section "Screen"
Identifier "RaptorDL-LITE"
Device    "Rapdlt0"
Monitor   "Apple Panel"
DefaultDepth 8
SubSection "Display"
    Depth    8
    Modes    "2560x1600"
EndSubSection
SubSection "Display"
    Depth    16
    Modes    "2560x1600"
EndSubSection
SubSection "Display"
    Depth    24
    Modes    "2560x1600"
EndSubSection
EndSection

Section "Screen"
Identifier "RaptorDL-LITE-1"
Device    "Rapdlt1"
Monitor   "Apple Panel"
DefaultDepth 8
SubSection "Display"
    Depth    8
    Modes    "2560x1600"
EndSubSection
SubSection "Display"
    Depth    16
    Modes    "2560x1600"
EndSubSection
SubSection "Display"
    Depth    24
```

```
        Modes      "2560x1600"
      EndSubSection
EndSection

# TSI Raptor DL-LITE XFree86 Configuration Sections
```

4.6 Selecting Bit-Depths

4.6.1 Setting Bit-Depths

The DL-Lite card supports 8-bit, 24-bit, 8+24-bit, 8+8, mox16, mox24 and mox32 modes. By default these cards start up in 8-bit mode.

These modes can be selected by modifying the `Device` section and `Screen` section of the `XF86Config` file appropriately.

To set the bit-depth to 8-bit, the "Mode" option in the `Device` section needs to be set to 8 and the other values should remain unchanged.

To set the bit-depth to 24, the "Mode" option needs to be set to "24" as shown:

```
Section "Device"
  Identifier      "Raptordlt0"
  Driver          "rapdlt"
  Card            "TSI Raptor DL-LITE card"
  BusID          "PCI:0:12:0"
  Option         "Device" "/dev/rapdlt0"
  Option         "Mode" "24"
  Option         "ScaleCursPos" "on"
EndSection
```

To select the 8+24-bit mode, the "Mode" option should be set to 8+24 as shown in the following example. In this case the default visual is 8-bit `PseudoColor`.

```
Section "Device"
  Identifier      "Raptordlt0"
  Driver          "rapdlt"
  Card            "TSI Raptor DL-LITE card"
  BusID          "PCI:0:12:0"
  Option         "Device" "/dev/rapdlt0"
  Option         "Mode" "8+24"
  Option         "ScaleCursPos" "on"
EndSection
```

To run the X server in 8+24-bit mode with the 24-bit TrueColor visual as default, set the `DefaultDepth` option in the `Screen` section to 24 as shown.

```
Section "Device"
    Identifier      "Raptordlt0"
    Driver          "rapdlt"
    Card            "TSI Raptor DL-LITE card"
    BusID           "PCI:0:12:0"
    Option          "Device" "/dev/rapdlt0"
    Option          "Mode" "8+24"
    Option          "ScaleCursPos" "on"
EndSection

Section "Screen"
    Identifier      "RaptorDL-LITE"
    Device          "Raptordlt0"
    Monitor         "Apple Panel"
    DefaultDepth    24
    SubSection      "Display"
        Depth       8
        Modes        "2560x1600"
    EndSubSection
    SubSection      "Display"
        Depth       16
        Modes        "2560x1600"
    EndSubSection
    SubSection      "Display"
        Depth       24
        Modes        "2560x1600"
    EndSubSection
End Section
```

To select the 8+8-bit mode, the option `"Mode"` option should be set to `"8+8"`.

The following example shows the `mox16` mode being selected for a Raptor DL-Lite card. The `"Mode"` option is set to `"mox16"`.

```
Section "Device"
    Identifier      "Raptordlt0"
    Driver          "rapdlt"
    Card            "TSI Raptor DL-LITE card"
    BusID           "PCI:0:12:0"
    Option          "Device" "/dev/rapdlt0"
    Option          "Mode" "mox16"
    Option          "ScaleCursPos" "on"
EndSection
```

Other bit-depths can be selected in a similar manner.

4.6.2 MOX Modes

MOX (Multiple Overlay Extension) provides support for multiple drawing layers on graphics cards. MOX is available on all Raptor cards. Details about MOX can be obtained in a technical white paper available separately from Tech Source. The following MOX modes are supported on 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
<code>mox32</code>	MOX, 8-bit Normal, 32-bit Group, 24-bit Absolute

Chapter 5

UNINSTALLING RAPTOR SOFTWARE

5.1 Uninstalling the Software

To uninstall the software, type:

```
prompt# rpm -e rapdlt  
prompt# rpm -e 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:

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.

6.2 Email Address

Our email address is hotline@techsource.com.

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

6.3 Website

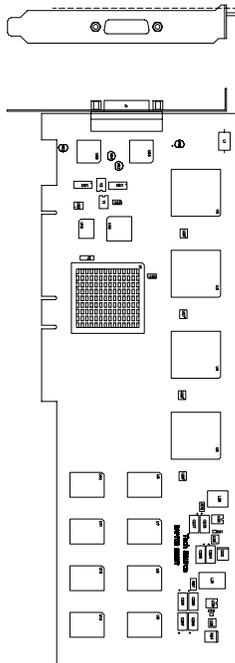
Detailed product information and Frequently Asked Questions (FAQs), are available on our website located at:

<http://www.techsource.com>

Appendix A

CARD SPECIFICATIONS

A.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:	Dual Link DVI connector [all digital interface]
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")

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Appendix B

X Windows System Screen Dump Utility

B.1 Overview

`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/X11R6/bin` directory.

B.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 imagefile
```

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. 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 that option.

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