Tech Source

Raptor Drivers for Linux Installation and Reference Manual

Addendum Information
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Changes made to:

REVISION NUMBER	CHANGES	DATE
A	Initial Release	07-27-01
B	Raptor 2500 Support	12-17-01
C	SuSE, 1100T and 2100T Support	10-03-02
D	Raptor 2100D, MOX, Red Hat 8.0 and Raptor 3840T Support	03-06-03
E	Raptor 2500T & Red Hat 9.0 Support	04-28-03
F	Supports Radar Data	12-15-03
G	Supports Screen Dump Utility	01-05-05

PREFACE

This publication documents the Tech Source Raptor 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 Drivers for Linux 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.

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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 Drivers for Linux" software runs on x86 PC workstations/servers and supports two classes of Tech Source graphics cards. The I-Class graphics cards are a line of products that include Raptor 2000, and Raptor 2500. The T-Class graphics cards are a new line of Raptor cards based on the latest Tech Source graphics technology and offer higher performance than their predecessors. The T-Class cards that are supported on Linux are Raptor 1100T, Raptor 2100T, Raptor 2500T and Raptor 3840T.

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

> **NOTE:**   For a list of supported Linux versions, please refer to sections 3.2 and 4.2 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 different Raptor models are collectively referred to as Raptor cards.

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

The Raptor 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 Chapters 3 and 4. The MOX software must be installed only once. The same MOX software works for both I-Class and T-Class products. 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:

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

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

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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. Raptor 2100 FPS and Raptor 2500 FPS have several cable connections and are, therefore, discussed separately in Section 2.3 and 2.4.

> **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.

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 or 4 for installing and configuring the "Raptor Drivers for Linux" software.

2.3 Installation of the Raptor 2500 FPS

The Raptor 2500 FPS Digital Flat Panel subsystem is comprised of the Raptor 2500T graphics card (configured for 2560x2048 resolution), the Tech Source 2500 FPS digital flat panel, along with associated cables and software. The Raptor 2500T graphics card is connected to the Tech Source 2500 FPS digital flat panel using a cable as shown in *Figure 2-1*.

The Raptor 2500T card has one connector on the front bracket. One side of the provided cable has the LFH60 connector that connects to the graphics card. The cable splits into two with MDR26 connectors on the opposite end. These two connectors marked A & B get connected to the appropriately marked connectors on the back of the digital flat panel. They are shown in *Figure 2-1*.
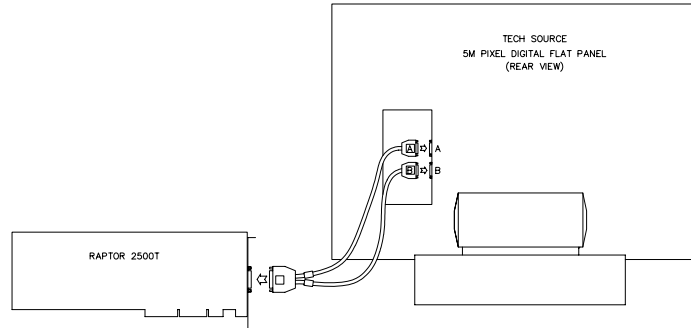
Figure 2-1 – 2500 FPS Digital Flat Panel Subsystem

2.4   Installation of the Raptor 2100 FPS

The Raptor 2100 FPS is comprised of the Raptor 2500T graphics card (configured for 2048x2048 resolution) and the Tech Source 2100 FPS digital flat panel, along with associated cables and software. The subsystem is connected together as shown in **Figure 2-2**.
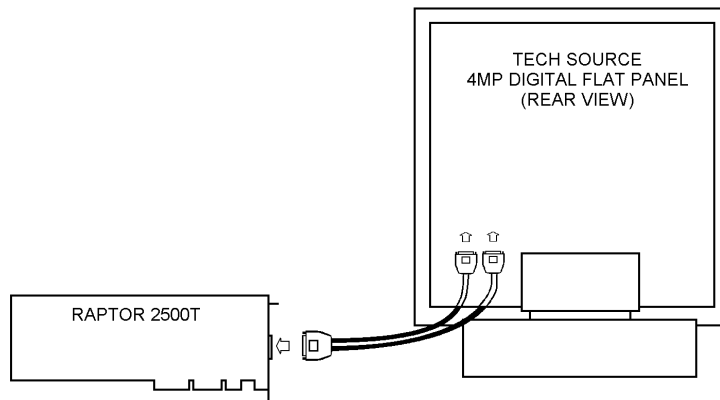
Figure 2-2 – 2100 FPS Digital Flat Panel Subsystem

2-3

The Raptor 2500T card has one connector on the front bracket. One side of the provided cable has the LFH60 connector that connects to the graphics card. The cable splits into two with MDR26 connectors on the opposite end. These two connectors marked A & B get connected to the appropriately marked connectors on the back of the digital flat panel. They are shown in *Figure 2-2*. On some models of the digital flat panel, the connectors may be recessed. In this instance, please remove the back panel, plug the cables into the two marked connectors and restore the back panel.

Chapter 3

SOFTWARE INSTALLATION FOR I-CLASS CARDS

3.1 Overview

This installation chapter describes how to install and configure the drivers for I-Class Raptor cards. The I-Class Raptor cards that are currently supported with this software are the Raptor 2000 and Raptor 2500. Installation of T-Class Raptor cards is covered in Chapter 4.

3.2 Requirements

The following are prerequisites for installing the Raptor 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 (32-bit only) 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 7). The software consists of the following modules:

`raptor.o`	Kernel driver for the Raptor 2000
`rapqfp.o`	Kernel driver for the Raptor 2500
`tsi_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 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 Drivers for Linux" into the drive.

3. If the drive is already mounted, type:

    `prompt#` **`cd /mnt/cdrom/linux/i-class`**

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

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

prompt# cd /mnt/cdrom/linux/i-class
```

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.

NOTE: If the currently installed version of the "Raptor Drivers for Linux" software is older than v2.0, the older version must be removed before installing the new version. Refer to Chapter 6 for instructions on removing the package.

To install the driver package, type:

```
prompt# rpm -Uvh raptor-*.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:

```
raptor      20144      0(unused)
rapqfp      463760     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 both I-Class and T-Class cards.

3.4 New Device

One new device name is created in the `/dev` directory for each Raptor card. It is denoted by `raptor#` for the Raptor 2000 and `rapqfp#` for the Raptor 2500, where `#` represents an instance number assigned by the operating system. For example, `/dev/raptor0` is the first Raptor card seen by the system. `/dev/raptor1` will be the second card seen by the system and so on.

3.5 Changing Resolution

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

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.raptor      or
/etc/X11/XF86Config.rapqfp
```

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 2000 are listed below. Similar sections are added for the Raptor 2500. The required modifications are explained in the following subsections.

```
# TSI Raptor 2000 XFree86 Configuration Sections
Section "Monitor"
        Identifier "Sony DDM Rap2k"
        VendorName "Sony"
        ModelName  "DDM-2800"
        HorizSync 31.5 - 150.0
        VertRefresh 50-90
        ModeLine "2048x2048" 357.18 2048 2088 2408
2816 2048 2051 2054 2114
        DisplaySize 498 498
EndSection

Section "Device"
    Identifier  "Raptor0"
    Driver      "tsi"
    BusID       "PCI:0:10:0"
    ChipSet     "i128v2"
    Card        "TSI Raptor 2000"
    Option      "Device" "/dev/raptor0"
#   Option      "MOX24"
EndSection

Section "Screen"
    Identifier "Raptor2000"
    Device     "Raptor0"
    Monitor    "Sony DDM Rap2k"
    DefaultDepth     8
    SubSection "Display"
        Depth     8
        Modes     "2048x2048"
    EndSubSection
EndSection
# TSI Raptor 2000 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 identifer 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:   rapqfp0 (BusID 0:9:0) is
Raptor 2500 @ 2560x2048
TSI:   raptor0 (BusID 0:10:0) is
Raptor 2000 @ 2048x2048.
```

In the example above, the Raptor 2000 has a `BusID` of `PCI:0:10:0`, while the Raptor 2500 has a `BusID` of `PCI:0:9:0`. Change the `BusID`s of the cards in XF86Config to match the `BusID`s 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/raptor0` and the second will be `/dev/raptor1` and so on. For Raptor 2500, the device name will be `rapqfp0` and so on. The device name and the `BusID` specified earlier in this section must correspond to the same card.

Option "MOX":   MOX (Multiple Overlay Extension) is a feature available on Raptor cards that provides multi-layer   capability.   Available   MOX modes are mox16 and mox24. The sample `Device` section listed uses mox24 mode. MOX is disabled by default. Therefore, this line is commented out in the example given. See Section 5.6 for more details on configuring MOX.

If more than one Raptor 2000 or Raptor 2500 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 5.5.

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.

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 5.5.

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"
  Screen      0   "Raptor2000" 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 "Raptor2000"
    Screen      1   "Raptor2000" RightOf "Screen0"
    InputDevice     "Mouse0" "CorePointer"
    InputDevice     "Keyboard0" "CoreKeyboard"
  EndSection
```

> **NOTE:** For the Raptor Drivers to work properly, **NO** other cards using the XF86 `i128` driver should be specified in the `ServerLayout` section. This limitation is due to the fact that the XF86 `i128` driver will claim all i128 based cards. Since the `i128` driver will not initialize the Raptor card correctly, the Tech Source driver must be used.

Chapter 4

SOFTWARE INSTALLATION FOR T-CLASS CARDS

4.1   Overview

This installation chapter describes how to install and configure the drivers for T-Class Raptor cards.   This class of cards includes the following:

- Raptor 2100T
- Raptor 2500T
- Raptor 1100T
- Raptor 3840T

The installation of I-Class Raptor cards is covered in Chapter 3.

4.2   Requirements

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

- At least 2MB of disk space available in "`/`" 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

The device driver and 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, Red Hat Enterprise Linux 64-bit, 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 7). The software consists of the following modules:

`raptfp.o`	Kernel driver for the Raptor 2500T
`rap1kt.o`	Kernel driver for the Raptor 1100T
`rap2kt.o`	Kernel driver for the Raptor 2100T
`rapifp.o`	Kernel driver for the Raptor 3840T
`rapt_drv.o`	XFree86 DDX module
`libMOX.a`	MOX extension module

4.3   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 4.6 to configure the Raptor card after the software is installed.

The following are step by step instructions for installing the Raptor 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 Drivers for Linux" into the drive.

3. If the drive is already mounted, type:

   ```
   prompt# cd /mnt/cdrom/linux/t-class
   ```

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

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

   prompt# cd /mnt/cdrom/linux/t-class
   ```

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.

NOTE: If the currently installed version of the "Raptor Drivers for Linux" software is older than v2.0, the older version must be removed before installing the new version. Refer to Chapter 6 for instructions on removing the package.

To install the driver package, type:

```
prompt# rpm -Uvh rapft-*.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:

   ```
   rap1kt      29712       0(unused)
   rap2kt      35056       0(unused)
   raptfp      33364       0(unused)
   rapifp      36272       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 both I-Class and T-Class cards.

4.4   New Device

One new device name is created in the `/dev` directory for each Raptor card. It is denoted by `rap2kt#` for the Raptor 2100T, `raptfp#` for the Raptor 2500T and `rapifp#` for Raptor 3840T and `rap1kt#` for the Raptor 1100T where `#` represents an instance number assigned by the operating system. For example, `/dev/rap2kt0` is the first Raptor 2100T card seen by the system. `/dev/rap2kt1` will be the second Raptor 2100T card seen by the system and so on.

4.5   Changing Resolution

The resolutions for Raptor 2100T and Raptor 2500T are fixed. They are shown in the table below. The resolution of the 1100T and Raptor 3840T can be changed by changing the value of the `Modes` field in the `Screen` section of `XF86Config`. See Section 5.7 for more information.

Graphics Card	Resolution	Monitor Supported	Interface
Raptor 2100T	2048x2048	Sony DDM 2800	Analog
Raptor 2500T	2560x2048	TSI 2500 FPS	Digital
	2048x2048	TSI 2100 FPS	
Raptor 1100T	Up to 1920x1200	Various	Analog
Raptor 3840T	Up to 3840x2400	9.2 Mega Pixel Color Display	Digital

4.6 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 of the cards, 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.rap2kt     or
/etc/X11/XF86Config.rap1kt     or
/etc/X11/XF86Config.raptfp     or
/etc/X11/XF86Config.rapifp
```

> **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 a Raptor 2100T are listed below. The `Device` and `Screen` sections for the other cards are similar. The required modifications are explained in the following subsections.

```
# TSI Raptor 2100T XFree86 Configuration Sections
Section "Monitor"
        Identifier "Sony DDM Rap2kt"
        VendorName "Sony"
        ModelName  "DDM-2800"
        HorizSync 31.5 - 150.0
        VertRefresh 50-90
        ModeLine "2048x2048" 357.18  2048  2088  2408
2816 2048 2051 2054 2114
        DisplaySize 498 498
EndSection
```

```
Section "Device"
    Identifier  "Raptor2.1KT"
    Driver      "rapt"
    Card        "TSI Raptor 2100T"
    BusID       "PCI:0:12:0"
    Option      "Device" "/dev/rap2kt0"
    Option      "ScaleCursPos" "on"
    Option      "Mode" "8"
#   Option      "TranspColor"  "0x0a3246"
EndSection

Section "Screen"
    Identifier "Raptor2100T"
    Device     "Raptor2.1KT"
    Monitor    "Sony DDM Rap2kt"
    DefaultDepth     8
    SubSection "Display"
        Depth     8
        Modes     "2048x2048"
    EndSubSection
    SubSection "Display"
        Depth     16
        Modes     "2048x2048"
    EndSubSection
    SubSection "Display"

        Depth     24
        Modes     "2048x2048"
    EndSubSection
EndSection
# TSI Raptor 2100T XFree86 Configuration Sections
```

4.6.1 Monitor Section

This section contains configuration information for the Sony DDM monitor and should remain unchanged.

4.6.2 Device Section

Identifier: Each instance of Raptor card should have a unique identifier. This identifer 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:   rap2kt0 (BusID 0:9:0) is
rap2kt @ 2048x2048
```

In the example above, the Raptor 2100T has a `BusID` of `PCI:0:9:0`. Change the `BusID`s of the cards in `XF86Config` to match the `BusID`s 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/rap2kt0` and the second will be `/dev/rap2kt1` 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.

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
mox16radar	MOX16 with radar scan converter input
mox24radar	MOX24 with radar scan converter input
8radar	8-bit PsuedoColor with radar scan converter input

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 card is installed, another `Device` section needs to be created with unique entries in the `Identifier,` `BusID` and `Device` Option fields that correspond to this additional card. For more information please refer to Section 5.5.

4.6.3 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.

Monitor: This field should remain unchanged for the Raptor 2100T, Raptor 3840T and the Raptor 2500T. For the Raptor 1100T, this field should contain the identifier of the `Monitor` section that will be used with this card. Refer to the `XFree86` documentation for instructions on how to create a custom `Monitor` section.

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 for the Raptor 2100T, Raptor 3840T and the Raptor 2500T. It may be modified to change the resolution of a Raptor 1100T card.

The following sample screen section shows the 1100T configured for 1280x1024.

```
Section "Screen"
    Identifier "Raptor1100T"
    Device     "Raptor1.1KT"
    Monitor    "CustomMonitor"
    DefaultDepth      8
    SubSection "Display"
        Depth     8
        Modes     "1280x1024"
    EndSubSection
    SubSection "Display"
        Depth     16
        Modes     "1280x1024"
    EndSubSection

    SubSection "Display"
        Depth     24
        Modes     "1280x1024"
    EndSubSection
EndSection
```

If multiple Raptor cards are installed, additional `Screen` sections should be created. Other fields should remain unchanged. For more information please refer to Section 5.5.

4.6.4 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"
  Screen      0  "Raptor2100T" 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 "Raptor2100T"
  Screen      1  "Raptor2100T" RightOf "Screen0"
  InputDevice     "Mouse0" "CorePointer"
  InputDevice     "Keyboard0" "CoreKeyboard"
EndSection
```

Chapter 5

INVOKING THE X SERVER

5.1   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 and 4 for information on how to configure the `XF86Config` file.

5.2 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 neccessary.

5.3 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 5.1.

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.

5.4   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.

5.5 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 1100T cards.

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

```
Section "ServerLayout"
        Identifier "XFree86 Configured"
#       Screen      0   "Screen0" 0 0
        Screen      0   "Raptor1100T" LeftOf "Raptor1100T-1"
        Screen      1   "Raptor1100T-1" RightOf "Raptor1100T"
        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 1100T cards.

```
# TSI Raptor 1100T XFree86 Configuration Sections
Section "Monitor"
        Identifier "CustomMonitor"
        VendorName "Unknown"
        ModelName  "Unknown"
        HorizSync  31 - 90
        VertRefresh 55 - 120
EndSection
```

```
Section "Device"
    Identifier   "Raptor1.1KT"
    Driver       "rapt"
    Card         "TSI Raptor 1100T"
    BusID        "PCI:0:11:0"
    Option       "Device" "/dev/rap1kt0"
    Option       "Mode" "8"
    Option       "ScaleCursPos" "on"
    Option       "Sync" "s"
#   Option        "TranspColor"  "0x0a3246"
EndSection

Section "Screen"
    Identifier "Raptor1100T"
    Device     "Raptor1.1KT"
    Monitor    "CustomMonitor"
    DefaultDepth     8
    SubSection "Display"
        Depth     8
        Modes     "1280x1024"
    EndSubSection
    SubSection "Display"
        Depth     16
        Modes     "1280x1024"
    EndSubSection
    SubSection "Display"
        Depth     24
        Modes     "1280x1024"
    EndSubSection
EndSection

Section "Device"
    Identifier   "Raptor1.1KT-1"
    Driver       "rapt"
    Card         "TSI Raptor 1100T"
    BusID        "PCI:0:12:0"
    Option       "Device" "/dev/rap1kt1"
    Option       "Mode" "8"
    Option       "ScaleCursPos" "on"
    Option       "Sync" "s"
#   Option        "TranspColor"  "0x0a3246"
EndSection
```

```
Section "Screen"
    Identifier "Raptor1100T-1"
    Device     "Raptor1.1KT-1"
    Monitor    "CustomMonitor"
    DefaultDepth     8
    SubSection "Display"
        Depth    8
        Modes    "1280x1024"
    EndSubSection
    SubSection "Display"
        Depth    16
        Modes    "1280x1024"
    EndSubSection
    SubSection "Display"
        Depth    24
        Modes    "1280x1024"
    EndSubSection
EndSection
# TSI Raptor 1100T XFree86 Configuration Sections
```

5.6   Selecting Bit-Depths

5.6.1 Setting Bit-Depth on I-Class Cards

I-Class cards support 8-bit, mox16 and mox24 modes. By
default windows comes up in 8-bit mode on these cards. For an
explanation of the various MOX modes, please see Section
5.6.3.

The following example shows the Device Section of the Raptor
2500 with mox24 mode enabled:

```
Section "Device"
   Identifier      "Rapqfp0"
   Driver          "tsi"
   BusID           "PCI:0:10:0"
   ChipSet         "i128v2"
   Card            "TSI Raptor 2500"
   Option          "Device"  "/dev/rapqfp0"
   Option          "mox24"
End Section
```

Similarly, changing the "mox24" to "mox16" will enable the
mox16 mode. To select 8-bit mode, just comment out that line.

5.6.2 Setting Bit-Depth on T-Class Cards

The T-Class cards support the 8-bit, 24-bit, 8+24-bit, 8+8, mox16, mox24 and mox32 modes. Radar Scan capable versions of T-Class cards additionally support mox16radar, mox24radar and 8radar. 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 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 bit-depth to 24, the `"Mode"` option needs to be set to `"24"` as shown:

```
Section "Device"
   Identifier           "Raptor1.1KT"
   Driver               "rapt"
   Card                 "TSI Raptor 1100T"
   BusID                "PCI:0:12:0"
   Option               "Device" "/dev/rap1kt0"
   Option               "Mode" "24"
   Option               "ScaleCursPos" "on"
EndSection
```

To select 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 `PsuedoColor`.

```
Section "Device"
   Identifier           "Raptor1.1KT"
   Driver               "rapt"
   Card                 "TSI Raptor 1100T"
   BusID                "PCI:0:12:0"
   Option               "Device" "/dev/rap1kt0"
   Option               "Mode" "8+24"
   Option               "ScaleCursPos" "on"
EndSection
```

To run 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        "Raptor1.1KT"
   Driver            "rapt"
   Card              "TSI Raptor 1100T"
   BusID             "PCI:0:12:0"
   Option            "Device" "/dev/rap1kt0"
   Option            "Mode" "8+24"
   Option            "ScaleCursPos" "on"
EndSection

Section "Screen"
    Identifier       "Raptor1100T"
    Device           "Raptor1.1KT"
    Monitor          "CustomMonitor"
    DefaultDepth     24
    SubSection       "Display"
        Depth        8
        Modes        "1280x1024"
    EndSubSection
    SubSection       "Display"
        Depth        16
        Modes        "1280x1024"
    EndSubSection
    SubSection       "Display"
        Depth        24
        Modes        "1280x1024"
    EndSubSection
End Section
```

To select 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 1100T card. The `"Mode"` option is set to "`mox16`".

```
Section "Device"
   Identifier        "Raptor1.1KT"
   Driver            "rapt"
   Card              "TSI Raptor 1100T"
   BusID             "PCI:0:12:0"
   Option            "Device" "/dev/rap1kt0"
   Option            "Mode" "mox16"
   Option            "ScaleCursPos" "on"
EndSection
```

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

5.6.3 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.

`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 the Raptor 2500T cards:

`mox32`   MOX, 8-bit Normal, 32-bit Group, 24-bit
                 Absolute

Radar Scan capable versions of T-Class cards support the following radar-scan modes as well.

mox16radar   MOX16, Radar Scan Input
mox32radar   MOX32, Radar Scan Input
8radar   no MOX, 8-bit, Radar Scan Input

5.7   Setting Resolution on Raptor 1100T and Raptor 3840T

The resolution and refresh rate of the Raptor 1100T and Raptor 3840T can be changed by modifying the `XF86Config` file. A list of supported resolutions for Raptor 1100T is given in Appendix B. Raptor 3840T supports the following resolutions:

- 1600x1200x60
- 1920x1200x41
- 3840x2400x41

If you need to support a resolution or refresh rate that is not listed, please contact Tech Source (see Chapter 7).

5.7.1 Setting Resolution

To select a specific resolution modify the `"Modes"` option in the `Screen` section of the `config` file. Only the subsection where the depth is the same as the `DefaultDepth` needs to be modified. The example below shows how to set the resolution to 1600x1200 in 8-bit mode. In this case the X server will automatically select the highest possible refresh rate for the monitor.

```
Section "Screen"
    Identifier "Raptor1100T"
    Device     "Raptor1.1KT"
    Monitor    "CustomMonitor"
    DefaultDepth      8
    SubSection "Display"
        Depth     8
        Modes     "1600x1200"
    EndSubSection
    SubSection "Display"
        Depth     16
        Modes     "1280x1024"
    EndSubSection
    SubSection "Display"
        Depth     24
        Modes     "1280x1024"
    EndSubSection
EndSection
```

If the desired resolution does not match a resolution in X server's internal list, it will be necessary to set both resolution and refresh rate as explained in Section 5.7.2.

5.7.2 Setting Resolution and Refresh Rate

To select both a specific resolution and a specific refresh rate, both the `Monitor` and the `Screen` sections of the `config` file need to be modified. A list of supported resolutions along with their corresponding timing numbers is available in the file `/etc/X11/tsi_modeline`. Extract the desired entry from `/etc/X11/tsi_modeline` and insert it into the `Monitor` section as shown.

```
Section "Monitor"
     Identifier "CustomMonitor"
     VendorName "Unknown"
     ModelName  "Unknown"
     HorizSync  31 - 90
     VertRefresh 55 – 120
     ModeLine "VESA1152x900x85" 121 1152 1216 1344 1568 900
901 904 947 +HSYNC +VSYNC
```

In addition, the option "`Modes`" in the `Screen` section should be changed to match the name of the resolution in the `ModeLine` field of the `Monitor` section as shown below. Please ensure that in the `Monitor` section, the `HorzSync` and `VertRefresh` fields are set to values that are supported by the monitor and correspond to the desired resolution.   In this example the resolution is set to `VESA1152x900x85` in 8-bit mode.

```
Section "Screen"
    Identifier "Raptor1100T"
    Device     "Raptor1.1KT"
    Monitor    "CustomMonitor"
    DefaultDepth      8
    SubSection "Display"
        Depth      8
        Modes     "VESA1152x900x85"
    EndSubSection
    SubSection "Display"
        Depth      16
        Modes     "1280x1024"
    EndSubSection

    SubSection "Display"
        Depth      24
        Modes     "1280x1024"
    EndSubSection
```

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Chapter 6

UNINSTALLING RAPTOR SOFTWARE

6.1 Uninstalling the Software

To uninstall the software, type:

```
prompt# rpm -e raptor (for I-Class driver software)
prompt# rpm -e tsimox
```

or

```
prompt# rpm -e rapft (for T-Class driver software)
prompt# rpm -e tsimox
```

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Chapter 7

TECHNICAL ASSISTANCE

7.1   Who to Call for Help

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

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

DETAILS OF YOUR CARD(S):

P/N: _____

Model Name: _____

Serial Number(s):   _____

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

7.2   Email Address

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

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

7.3   Website

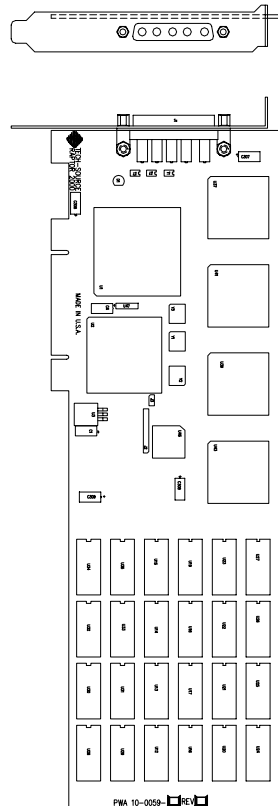Detailed product information and Frequently Asked Questions (FAQs), are available on our website located at:

`http://www.techsource.com`

Appendix A

CARD SPECIFICATIONS

A.1 I-Class Products

A.1.1 Raptor 2000 Specifications
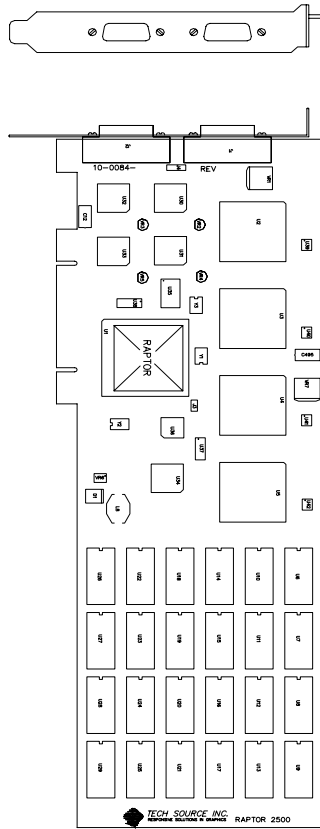
A.1.1.1 Raptor 2000-24M Specifications

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:	10^0 to 50^0C operating -10^0 to 70^0C 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")

A.1.1.2 Raptor 2000-12M Specifications
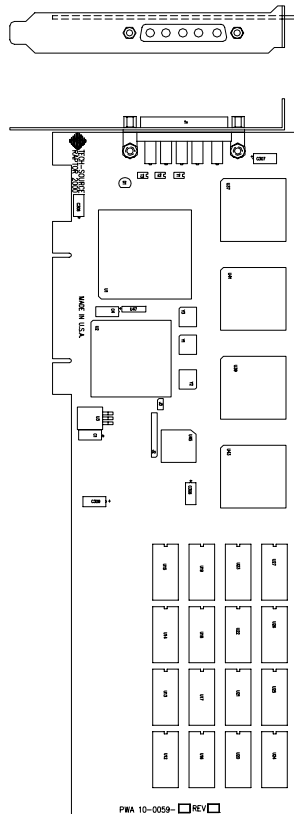
|	
Frame Buffer:	8-bit single or double buffered; 12 Megabytes VRAM
MOX Hardware:	Tech Source MOX ASIC; 24 layer Priority Management
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Table(s):	1024 entries
PCI Interface:	33 MHz, 32-bit
Video Interface:	Red, Green, Blue, at RS-343 (50 ohms)
Video Sync:	Separate sync at TTL levels (75 ohms)
Video Connector:	DB-5W5
Temperature Rating:	10^0 to 50^0C operating -10^0 to 70^0C 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")

A.1.2 Raptor 2500 Specifications

|	
Frame Buffer:	24 MB VRAM
MOX Hardware:	Tech Source MOX 32 ASIC; 24 layer Priority Management
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33 MHz, 32-bit (Universal)
Video Connector:	Dual MDR 26 (2)
Temperature Rating:	10^0 to 50^0C 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")

A.2   T-Class Products

A.2.1 Raptor 2100T Specifications
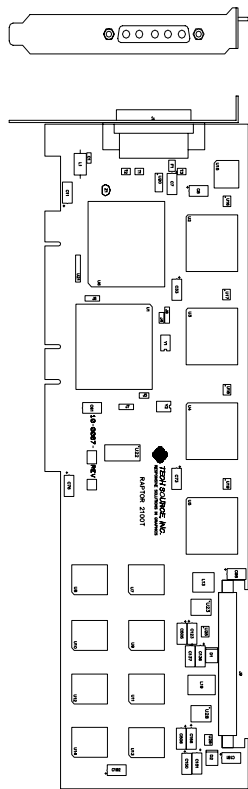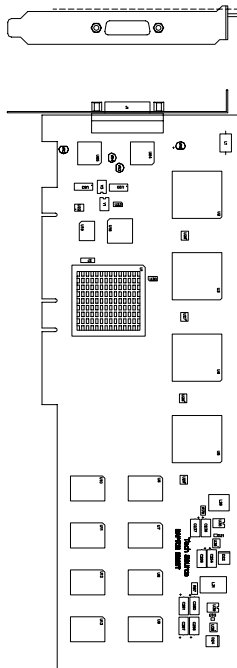
|	
Frame Buffer:	64MB SGRAM; 100 MHz
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling
Video Interface:	Red, Green, Blue, at RS-343 (50 ohm)
Video Sync:	Separate sync at TTL levels, (75 ohm)
Video Connector:	DB-5W5
Temperature Rating:	10^0 to 50^0C 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")

A.2.2 Raptor 1100T Specifications
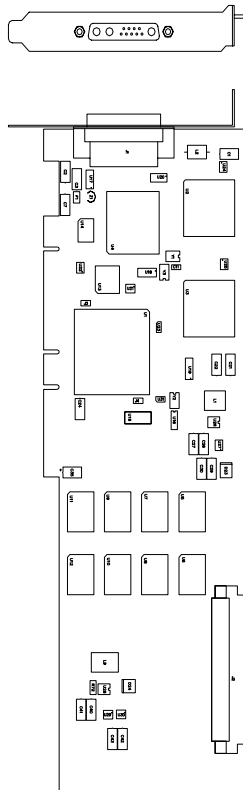
Frame Buffer:	32MB SGRAM; 100 MHz
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal 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 50^0C 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")

A.2.3 Raptor 2500T Specifications

Frame Buffer:	64MB SGRAM
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling
Video Connector:	One Low Force Helix 60-pin (LFH60) connector [all digital interface]
Temperature Rating:	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")

A.2.4 Raptor 3840T Specifications
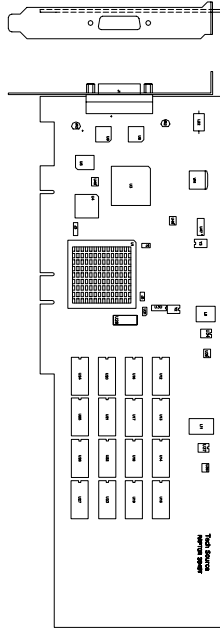
Frame Buffer: 256MB SDRAM

Hardware Cursor: Up to 3 cursors

PCI Interface: 33/66 MHz, 32/64-bit
Universal Signaling

Video Interface: Quad Head DVI

Video Connector: One Low Force Helix 60-pin
(LFH60) connector
[all digital interface]

Temperature 10^0 to 50^0C operating
Rating: 10^0 to 70^0C non-operating

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

Power Rating: +5V @ 2.5 Amps

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

A-7

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Appendix B

LIST OF RESOLUTIONS

B.1   List of Resolutions for Raptor 1100T

VESA640x480x60
VESA640x480x72
VESA640x480x75
VESA640x480x85
VESA800x600x60
VESA800x600x72
VESA800x600x75
VESA800x600x85
VESA1024x768x60
VESA1024x768x70
VESA1024x768x75
VESA1024x768x85
VESA1152x900x60
VESA1152x900x70
VESA1152x900x75
VESA1152x900x85
VESA1280x1024x60
VESA1280x1024x75
VESA1280x1024x76
VESA1280x1024x85
VESA1600x1200x60
VESA1600x1200x65
VESA1600x1200x70
VESA1600x1200x75
HD1280x800x76
HD1440x900x76
HD1600x1000x66
HD1600x1000x76
HD1920x1080x60
HD1920x1200x60

B.2   List of Resolutions for Raptor 3840T

1600x1200x60
1920x1200x41
3840x2400x41

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/X11R6/bin` 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 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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