Tech Source

Raptor X11R6.1 for AIX
Installation Manual

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Addendum Information

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REVISION NUMBER	CHANGES	DATE
A	Initial Release	10-23-96
B	Adding Stars Support	07-01-98
C	Minor updates	07-10-98
D	Name of card changed from STARS 2K to Raptor 2000. Deleted the DB chapter (not required anymore). Other minor enhancements including MOX info.	03-28-00
E	Support for Raptor 2000-AIX Cards	07-18-02
F	Support for T-Class Cards & AIX 5	09-23-04

PREFACE

This publication documents the Tech Source Raptor X11R6.1 for AIX Installation for use with the Tech Source, Inc. Raptor 2000 and 2100T cards. This manual is intended for users who incorporate the Tech Source Raptor cards into IBM RS/6000 workstations running AIX operating systems.

This is a guide to the installation of the Raptor software. All systems vary to a degree. Knowledge of the features of your system and an understanding of UNIX shell scripts are helpful during the installation process.

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.

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Chapter 1

INTRODUCTION

1.1 Overview

This manual describes the installation for Raptor X11R6.1 for AIX. This software supports the following cards:

- Raptor 2000-24M
- Raptor 2000-12M
- Raptor 2000-24M AIX
- Raptor 1100T
- Raptor 2100T
- Raptor 2500T

In this manual, the cards will be collectively referred to as “Raptor”. The Raptor 2000-12M, 2000-24M and Raptor 2000-24M AIX will be referred to as Raptor 2000. The Raptor 1100T, Raptor 2100T and Raptor 2500T will be referred to as Raptor T-Class. Knowledge of the AIX operating system and the SMIT installation tool will be useful during this installation. The AIX versions currently supported are AIX 4.3.3, AIX 5.1 and AIX 5.2.

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

The software is provided on a CD-ROM and consists of the following:

- Tech Source Raptor device-drivers for AIX
- X11R6.1 binary distribution (clients, libraries, fonts, etc.)
- X11R6.1 server for Tech Source Raptor cards
- MOX (Multiple Overlay eXtension) Client libraries, include files and examples

Note: Before installing this software, you must uninstall any previous versions of the software.

1.2 MOX Extension Support

Tech Source supports an X-server extension called MOX (Multiple Overlay eXtension) on the Raptor graphics cards. The underlying software (available as a server extension and a client library) needed for MOX support has been included as a part of this Raptor X11R6.1 for AIX software product. Enabling of this extension during the X-server startup is described in Section 4.4.

1.3 Conventions

This manual will follow certain conventions throughout.

Whenever a variable name, command name, directory, or filename is used in a paragraph they 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 similar to one the reader might see 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 software has been tested on and currently supports IBM RS/6000 systems (with PCI slots), running in single and multi-screen configurations. The RS/6000 systems currently tested on Raptor 2000 cards are:

- 43P
- 44P
- IntelliStation Power 275

The RS/6000 systems currently tested on Raptor T-Class cards are:

- 44P
- IntelliStation Power 275

This chapter discusses the installation of Raptor cards in one of these machines. Please contact Tech Source if you have installation issues on a different machine.

2.2 Installation Instructions

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

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

Step 1: Shutdown the system and turn the power OFF, remove the system's cover, find an available PCI Local Bus slot, and remove the bracket and screw.

Ground yourself by touching the metal part on the case.

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

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

The Raptor card is now installed and the system is ready for software installation. Refer to Chapter 3 for installing the Raptor X11R6.1 for AIX software. Sections 2.3 and 2.4 describe the cable connections for the Raptor FPS configurations.

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***.

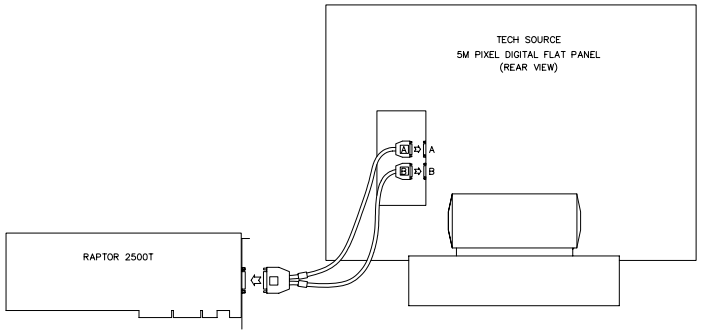

Figure 2-1 – 2500 FPS Digital Flat Panel Subsystem

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***.

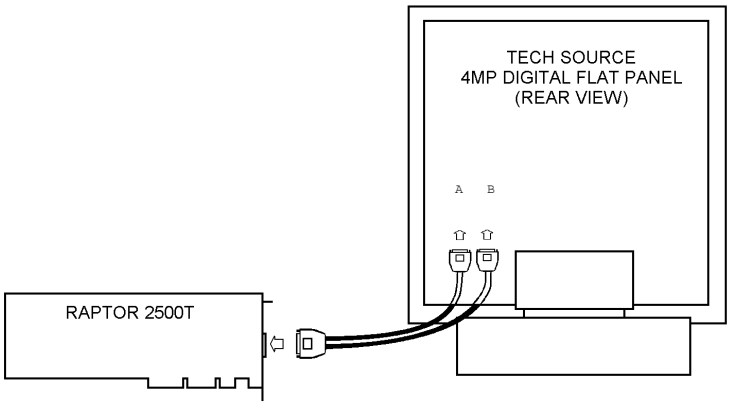

Figure 2-2 – 2100 FPS Digital Flat Panel Subsystem

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

3.1 Requirements

The following are prerequisites for installing Raptor X11R6.1 for AIX Software:

- The system is running AIX 4.3.3, AIX 5.1, AIX 5.2
- Any previous version of TSI software has already been uninstalled. (Please refer to the manual that accompanied that software for the appropriate uninstall procedure).
- 41MB of disk space is available in `/usr`.

One or more of the cards listed in Section 1.1 is presently installed in the workstation.

3.2 CD-ROM Installation

Installation of Raptor software can be done through SMIT. The following are the step-by-step instructions for installing Raptor X11R6.1 for AIX software from CD-ROM:

1. Install a Raptor card in the computer as described in Chapter 2.

2. Login as `root` on the target install machine.

3. Uninstall any previous version of TSI software in accordance with the instructions supplied with that software.

   The installation may fail if previous TSI software already exists on the system.

4. Insert the CD-ROM labeled “Raptor X11R6.1 for AIX" into the CD-ROM drive.

5. Mount the CD-ROM drive. To do this using SMIT, perform the following steps:

    - *Select System Storage Management* | *File Systems* | *Mount a File System*
    - In the *File System Name* box, select `/dev/cd0` (or the location of your CD-ROM device)
    - In the *Directory to Mount* box, select `/cdrom`
    - In the *Type of File System* box, select `cdrfs`
    - In the *Mount as READ-ONLY file system* box, select `yes`.

6. Install the software. To do this using SMIT, perform the following steps:

    - Select *Software Installation and Maintenance* | *Install and Update Software*
    - *Install Software*
    - In the *Input Device/Directory for Software* box, select the appropriate directory below based on the type of the system you use:

For 43P and 44P machines:

- `/cdrom/power3`

For IntelliStation Power 275:

- `/cdrom/power4`

- In the *Software to Install* box, make sure it says “`_all_latest`”.

After installing the drivers, reboot the machine. Turn on the machine and the AIX should now recognize the Raptor correctly. You can verify this by entering the following command:

```
prompt% lsdisp
```

If a Raptor 2100T card is present in the system, this command should return an entry like:

```
DEV_NAME  SLOT    BUS   ADPT_NAME DESCRIPTION
========  ====    ===   ========= ===========
rap2kt0     02    pci               Raptor2kt
                                    Graphics
                                    Adapter
```

Note: The Raptor cards are identified by the operating system as follows:

Raptor 2100T	`rap2kt#`
Raptor 2000-12M	`rap2kl#`
Raptor 2000-24M	`rap2k#`
Raptor 2000-24M AIX	`rap2ki#`
Raptor 1100T	`rap1kt#`
Raptor 2500T (5MP)	`raptfp5#`
Raptor 2500T (4MP)	`raptfp4#`

Where # is an instance number assigned by the operating system.

3.3 Configuring the Raptor as LFT Display

In order to use the Raptor card as the LFT display, use the `chdisp` command to change the current display device to the Raptor device.

For Raptor 2100T, type the following:

```
prompt% chdisp [-d|-p] rap2kt0
```

Note: Use "-d" for temporary change of display until the next reboot, or "-p" to make a permanent change of display

If the Raptor card is the only graphics device in the system, it will automatically be configured as the default LFT (console) device.

3.4 Supported Resolutions

3.4.1 Raptor 2000-12M, Raptor 2000-24M, Raptor 2000-24M AIX, Raptor 2100T

The resolution for Raptor 2000-12M, Raptor 2000-24M, Raptor 2000-24M AIX and Raptor 2100T is fixed at 2048x2048.

3.4.2 Raptor 1100T

The Raptor 1100T card is capable of supporting multiple resolutions and is software configurable. See Section 4.3.2 for details.

3.4.3 Raptor 2500T

The resolution for Raptor 2500T card and Raptor 2500 FPS Digital Flat Panel subsystem is set as 2560x2048.

The resolution for Raptor 2500T card and Raptor 2100 FPS Digital Flat Panel subsystem is set as 2048x2048.

Chapter 4

INVOKING X11R6.1

4.1 Overview

There are several ways to invoke X11R6.1 on your system:

- `xinit`
- `xdm`
- Common desktop Environment (CDE)
- All of the above with MOX extension enabled

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

```
prompt% setenv X11R6HOME /usr/X11R6.1

prompt% setenv LD_LIBRARY_PATH  \
            $X11R6HOME/lib

prompt% set path=($X11R6HOME/bin $path)
```

The `Xtsi` server is provided in the `$X11R6HOME/bin` directory.

The examples used in this chapter refer to the device `rap2kt0`. Your actual device name will vary according to the Raptor card type and the instance number.

4.2 xinit

The `xinit` program can be directly used to start the X Window System server. 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
```

Note that this assumes that there is a program named `X` in the current search path. The X11R6.1 server in this software is called `Xtsi` and is in the directory `$X11R6HOME/bin`. A symbolic link has been made from `X` to `Xtsi`.

To startup the server using `xinit`, type:

```
prompt% xinit -- $X11R6HOME/bin/Xtsi -P11
        rap2kt0
```

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

The X server can run in multi-screen mode. The example below shows how to start on Raptor 2100T and Raptor 1100T:

```
prompt% xinit -- $X11R6HOME/bin/Xtsi –P11 rap2kt0
        –P12 rap1kt0
```

NOTE: The Raptor 2000 and Raptor 200-12M cards cannot be used in multi-screen configurations.

4.3 Setting Bit-Depth and Resolution

4.3.1 Setting Bit-Depth

Raptor cards support various bit-depths and overlay configurations. This section describes the required settings for these configurations. The default bit-depth for all Raptor cards is 8-bit.

4.3.1.1 Setting Bit-Depth on Raptor 2000

The Raptor 2000 supports 8-bit, mox16 and mox24 modes (see ***Table 1***.)

Mode/Bit-Depth	Description of Mode
8-bit	8-bit PseudoColor visual
mox16	mox mode w/16 planes
mox24	mox mode w/24 planes

Table 1

An explanation of the different MOX modes can be found in Section 4.4.

To start X Windows with a specific depth on a Raptor 2000 card, the environment variable `STARSMODE` needs to be set. For example to start X Windows in 8-bit only mode set the `STARSMODE` environment variable to `+8` before starting up the X server.

```
prompt%  setenv STARSMODE +8
```

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

4.3.1.2 Setting Bit-Depth on T-Class Cards

The bit-depth of Raptor 1100T, Raptor 2100T and Raptor 2500T can be set to 8-bit only, 8+24-bit, 24-bit, mox16, mox24 or mox32 (see ***Table 2***.)

Mode/Bit-Depth	Description of Mode
8-bit	8-bit PseudoColor visual
8+24 mode	One 8-bit visual + One 24-bit visual (simultaneous)
24-bit	24-bit TrueColor visual only
mox16	mox mode w/16 planes
mox24	mox mode w/24 planes
mox32	mox mode w/32 planes

Table 2

An explanation of different MOX modes can be found in Section 4.4.

There are two ways to set bit-depth on Raptor 1100T, Raptor 2100T and Raptor 2500T:

- By setting the environment variable `STARSMODE`
- By editing the config file `/etc/X11/TSIScreenConfig`

4.3.1.2.1 STARSMODE Variable

The bit-depth of the Raptor T-Class card can be set using the `STARSMODE` environment variable. This variable should be set before starting up the X server.

For example, set the bit-depth of the Raptor T-Class card to 8+24

```
prompt%  setenv STARSMODE +8+24
```

To set the bit-depth of the Raptor T-Class card to mox16

```
prompt%  setenv STARSMODE +mox16
```

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

NOTE: In the case when both methods to set bit-depth are used, the STARSMODE variable takes precedence over the settings in the TSIScreenConfig file.

4.3.1.2.2 Config File

The depth and resolution of the Raptor T-Class card can be set using the /usr/X11R6.1/etc/TSIScreenConfig file. Each row in the file corresponds to a specific Raptor T-Class card that is identified by its device name. The fields in each row are separated by spaces. In the sample config file shown below the bit-depth of the Raptor 1100T (rap1kt0) card is set to 8+24. The cached pixmap field is used for debugging purposes only and should always be set to 1. The other fields are discussed in 4.3.2.

```
# device  Depth  Resolution Sync Cached Resfile
                                pixmap
rap1kt0    8+24   DEFAULT    1    1     trzresinfo
```

The default visual in 8+24-bit mode is PseudoColor. In order to set the default visual in the 8+24-bit mode to TrueColor, the X Server should be started with command line option cc set to 4. The example below shows how to set the default visual to TrueColor for the card rap2kt0.

```
#xinit -- $X11R6HOME/bin/Xtsi –Pll rap2kt0 –cc 4
```

NOTE: This method of setting the default visual has an effect only in the 8+24-bit mode.

4.3.2 Setting the Resolution

The resolution of the Raptor 2000 and Raptor 2100T cards is fixed at 2048x2048. The Raptor 2500T is configured in hardware to support either 2048x2048 or 2560x2048 resolutions. Therefore, depending on your flat panel subsystem, it will support the appropriate resolution. For example, Raptor 2500 FPS supports 2560x2048 and Raptor 2100 FPS supports 2048x2048. The Raptor 1100T supports multiple resolutions.

The resolution of the Raptor 1100T card can be changed by editing the `config` file the `/usr/X11R6.1/etc/TSIScreenConfig`. By default, the resolution of this card is set to 1280x1024x60. Each row in the `config` file corresponds to a Raptor card that is identified by its device name. The fields in each row are separated by spaces. The `resfile` field specifies the file that contains a list of available resolutions and the corresponding timing numbers. Normally, this file is called `trzresinfo` and is located in `/usr/X11R6.1/etc`. The cached pixmap field is used for debugging purposes only and should always be set to `1`.

The resolution field should contain the name of a resolution from the `resfile`. The sync field can be used to specify a sync flag. If it is set to `1`, the sync flag will default to the value specified in the `resfile`. An explanation of the various sync flags can be found in the `trzresinfo` file.

```
# device  Depth  Resolution Sync Cached Resfile
                                pixmap
rap1kt0    8+24   1600x1200x60 1    1     trzresinfo
```

4.4 Enabling MOX Extension During X11R6.1 Server Startup

By default, the X11R6.1 server starts in an 8-bit mode. However, on Raptor cards you may start the X11R6.1 server with MOX extension enabled. (Details of the MOX Extension to X Server are in separate technical white paper documentation.)

These MOX modes apply to 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 Raptor 1100T, Raptor 2100T and Raptor 2500T can support the following additional MOX mode.

`mox32`	MOX, 8-bit Normal, 29-bit Group, 21-bit Absolute

To enable MOX on a Raptor card, set the bit-depth to one of the MOX modes. Please refer to Section 4.3.1 for details.

4.5 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 `$X11R6HOME/lib/X11/xdm`. The configuration file `xdm-config` 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 device on which an `xdm` login screen is desired. Each startup line in `Xservers` file should be modified to look like the following to enable the Raptor device based `xdm` login screen:

```
:0 Local local-uid@console root \
/usr/X11R6.1/bin/Xtsi :0 –P11 rap2kt0
```

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.

4.5.1 MOX Mode Using xdm

In order to enable MOX under `xdm` you must make use of the `StartWin` script installed in `/usr/X11R6.1/etc`. The `Xservers` file should be modified as follows:

```
:0 local /usr/X11R6.1/bin/StartWin:0
```

Additional command line options can be appended at the end of this line. The following example `StartWin` script will start up the X Server in mox24 mode.

```
#!/bin/sh
      STARSMODE=+mox24
      export STARSMODE
      pass="/usr/X11R6.1/bin/Xtsi"$*
      exec $pass
```

NOTE: By default, the `StartWin` script starts up the X Server in mox24 mode. It can be edited in order to support other MOX modes.

4.6 Common Desktop Environment (CDE)

Common Desktop Environment (CDE) is available with AIX and is independent of the Raptor software. In order to use CDE, you need to configure only `/usr/dt/config/Xservers` file. The example below shows how to modify `Xservers` file to start CDE on Raptor 2100T.

```
:0 local /usr/x11R6.1/bin/Xtsi –Pll rap2kt0 :0
```

CDE can be started by typing:

```
prompt# /usr/dt/bin/dtlogin
```

4.6.1 MOX Mode Using CDE

In order to enable MOX when using CDE, you must make use of the `StartWin` script installed in `/usr/X11R6.1/etc`. The `Xservers` file should be modified as follows:

```
:0 local /usr/X11R6.1/bin/StartWin:0
```

Additional command line options can be appended at the end of this line. The following example `StartWin` script will start up the X Server in mox24 mode.

```
#!/bin/sh
      STARSMODE=+mox24
      export STARSMODE
      pass="/usr/X11R6.1/bin/Xtsi"$*
      exec $pass
```

NOTE: By default, the `StartWin` script starts up the X Server in mox24 mode. It can be edited in order to support other MOX modes.

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Chapter 5

UNINSTALLING RAPTOR X11R6.1 FOR AIX

5.1 Uninstall Using SMIT

To uninstall Raptor X11R6.1 for AIX using SMIT, perform the following steps:

- Select Software Installation and Maintenance | Maintain Installed Software | Remove Software Products
- In the Software Name box, select the installed Raptor software products.
- Click the button to complete the uninstallation.

The following are installed Raptor packages:

- `raptor.srv`
- `raptor.x11r61`
- `raptor.xmox`
- `devices.pci.27122000.rte`
- `devices.pci.27122000.msg.en_US.rte`
- `devices.pci.27120400.msg.en_US.rte`
- `devices.pci.27120400.rte`
- `devices.pci.27120500.rte`
- `devices.pci.27120500.msg.en_US.rte`
- `devices.pci.27120f00.msg.en_US.rte`
- `devices.pci.27120f00.rte`
- `devices.pci.27122700.msg.en_US.rte`
- `devices.pci.27122700.rte`
- `devices.pci.27126700.msge.en_US.rte`
- `devices.pci.27126700.rte`
- `devices.pci.27121d00.msge.en_US.rte`
- `devices.pci.27121d00.rte`

Note: Be sure that the ***Preview Only*** option is set to `no` prior to uninstalling, or else the uninstallation will not actually occur.

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

6.3 Website

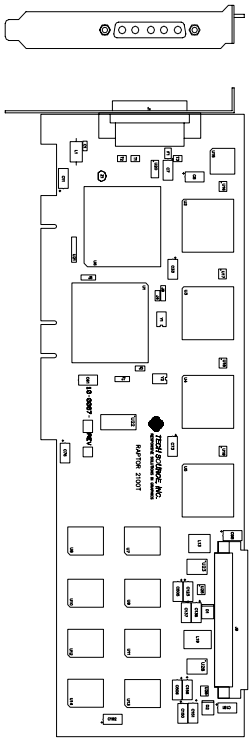
Detailed product information and Frequently Asked Questions (FAQs), are available on our website located at:

`http://www.techsource.com`

Appendix A

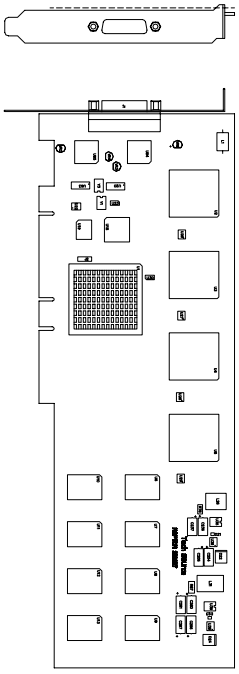
CARD SPECIFICATIONS

A.1 Raptor 2100T Specifications



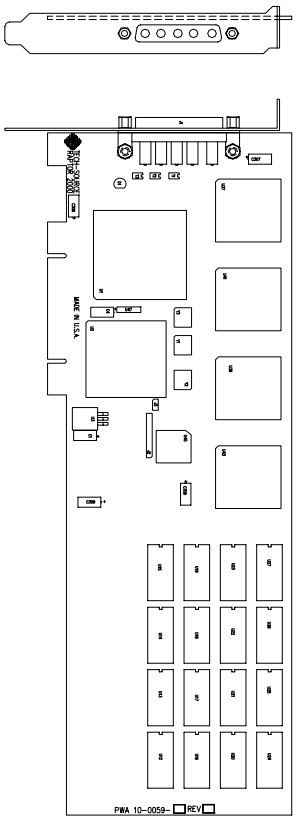
Frame Buffer:	64MB SGRAM
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Table(s)	2048 main, 512 auxiliary entries
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling
Video Interface:	Red, Green, Blue, at RS-343 (50 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:	+5 @ 5 Amps
Dimensions:	312mm x 107mm (12.28” x 4.2”)

A.2 Raptor 2500T Specifications



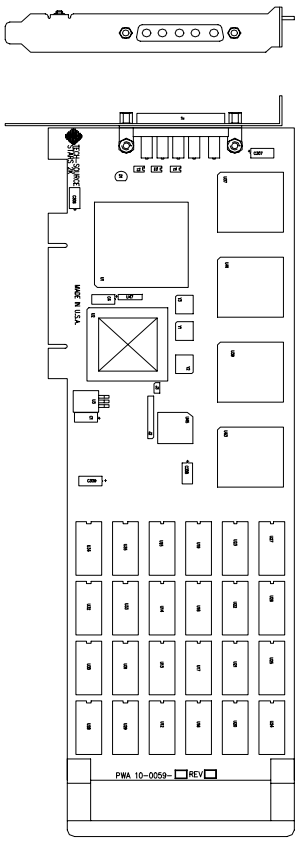
Frame Buffer:	64MB SGRAM
MOX Hardware:	Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers
Hardware Cursor:	Up to 3 cursors
Color Lookup Tables:	Primary color map with 2048 entries and two auxiliary color maps with 256 entries each
PCI Interface:	33/66 MHz, 32/64-bit Universal Signaling
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.3 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.4 Raptor 2000-24M Specification



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

Drawing Processor: Number 9 Imagine 128; Series 2

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

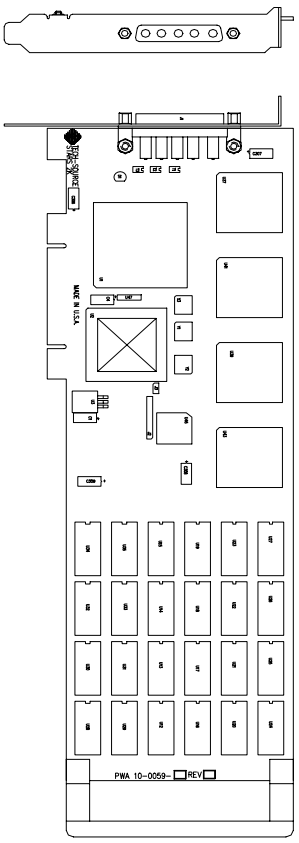
Temperature Rating: 10^0 to 50^0C operating
-10^0 to 70^0C non-operating

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

Power Rating: +5V @ 4 Amps; +12V @ 100mA

Dimensions: 312mm x 107mm (12,28” x 4.2”)

A.5 Raptor 2000–24M AIX 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

Drawing Processor: Number 9 Imagine 128; Series 2

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

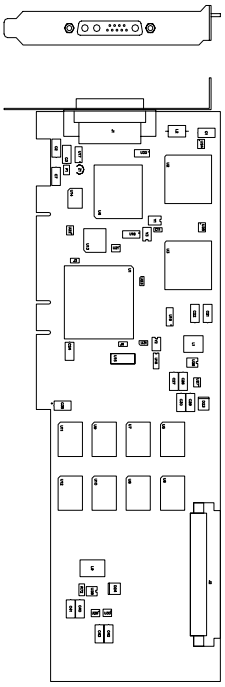
Temperature Rating: 10^0 to 50^0C operating
-10^0 to 70^0C non-operating

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

Power Rating: +5V @ 4 Amps; +12V @ 100mA

Dimensions: 312mm x 107mm (12,28” x 4.2”)

A.6 Raptor 1100T Specifications



Frame Buffer: 32MB SGRAM

MOX Hardware: Tech Source MOX ASIC; 32 layer Priority Management, 2 blending layers

Hardware Cursor: Up to 3 cursors.

Color Lookup Tables: Primary color map with 2048 entries and two auxiliary color maps with 256 entries each

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

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

Video Sync: Separate or composite syncs at TTL levels, (75 ohm)

Video Connector: DB-13W3

Temperature Rating: 10^0 to 50^0C 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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