



TECH-SOURCE INC.

**Raptor *GFXtra*
Installation Manual**

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Chapter 1

INTRODUCTION

1.1 Overview

Thank you for purchasing the Tech-Source Raptor *GFXtra*. This manual discusses hardware and software installation, how to setup multiple console logins, and how to configure CDE to support multiple users. All systems vary to a degree, therefore knowledge of the features of your system and an understanding of UNIX shell scripts are helpful during the installation process.

The Tech-Source Raptor *GFXtra* is a graphics card designed to support multiple users on Sun Microsystems PCI-based Ultra workstations and Enterprise servers. The *GFXtra* is based on the popular Raptor GFX-8P (PGX32 from Sun Microsystems) platform and comes with a keyboard/mouse connector that enables one additional user to work locally on the same Sun Microsystems Ultra workstation or Enterprise server per card. Only the number of available PCI slots limits the number of additional local users.

The *GFXtra* can support 8 and 24-bit visuals (depths) simultaneously. The *GFXtra* can support resolutions up to 1600x1280. The resolutions and bit depths are software configurable.

NOTE: Raptor *GFXtra* and *GFXtra* are used interchangeably throughout this manual.

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Chapter 2

HARDWARE INSTALLATION

2.1 Installation Instructions

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

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

- Step 1: Turn your computer OFF, remove the computer'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 *GFXtra* 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 computer's cover, attach any previously removed cables, connect the video cable to your monitor, and connect the keyboard/mouse cable to the input port. Some Sun monitors may require the DB-15 to 13W3 adapter (Refer to Appendix B.6).
- Step 4: Turn ON the monitor before turning ON the computer so that the *GFXtra* can autodetect the proper resolution for your monitor.

NOTE: If the system is currently using a secondary graphics device, read section 3.6 on configuring the console device. The console device is the screen on which the boot up messages will appear. The monitor must be connected to the console device before you proceed to Chapter 3 Software Installation.

The *GFXtra* is now installed and ready for software installation. Refer to Chapter 3 for installing the *GFXtra* Driver Software.

2.2 Resolution Settings

The resolution of the *GFXtra* is software configurable. For more information on changing resolutions refer to Section 3.5 and Appendix A.

The default resolution for the *GFXtra* card is listed in the table below.

Board	Resolution	Refresh	Bits/Pixels	Sync
<i>GFXtra</i>	Auto Detect	-	24	separate/composite

If the monitor does not support DDC2B/EDID protocol (auto-detect), and the console resolution is not set using methods described in Appendix A, the resolution will default to 1152x900@66Hz.

Chapter 3

SOFTWARE INSTALLATION

3.1 Overview

This chapter describes the software installation for **GFXtra Driver Software**. This software supports the following Tech-Source products:

- Raptor *GFXtra*
- Raptor GFX-8M
- Raptor GFX-4M
- Raptor GFX-8P
- Raptor GFX-8P Dual Channel

Please note that this software must be installed on your system prior to running X Windows on these cards.

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

- | | |
|------------|--|
| • TSIPgxx | 64-bit device drivers |
| • TSIPgx.u | 32-bit device-drivers |
| • TSIPgxw | Loadable DDX (for accelerated OpenWindows) and other configuration utilities |
| • TSIPgxmn | Manual pages |
| • TSIPgxzs | Keyboard and mouse drivers |

3.2 Requirements

The software currently supports the following PCI based systems:

- Ultra 5
- Ultra 10
- Ultra 30
- Ultra 60
- Ultra 80
- Ultra AX
- Ultra AXi
- Enterprise 250
- Enterprise 450
- Enterprise 2500
- Enterprise 4500

NOTE: If your PCI system is not listed here, please contact Tech-Source.

The following are prerequisites for installing **GFXtra Driver Software**:

- The system is running Solaris 2.5.1 or higher.
- OpenWindows Version 3.5.1 or higher has already been installed on the system.
- **Any previous version of TSI software, including Raptor X Servers, has already been uninstalled.** (Please refer to the manual which accompanied that software for the appropriate uninstall procedure).
- At least 2MB of disk space is available in `"/usr."`
- One or more of the cards listed in Section 3.1 are presently installed in the workstation.

NOTE: All device drivers are loadable. No kernel changes need to be made.

3.3 Installing *GFXtra* Driver Software

This section describes software installation from a CD-ROM.

3.3.1 CD-ROM Installation

The following are step-by-step instructions for installing the **GFXtra Driver Software** from a CD-ROM.

1. Install a *GFXtra* card in the computer as described in Chapter 2.
2. Boot the computer with the "-r" (reconfiguration) option. To do this on a Ultrasparc workstation, perform the following steps:
 - Power ON the computer.
 - Wait until you see boot messages printing on the screen, then press and hold the `stop` (L1) key, and then press the "A" key.
 - At the "ok" prompt, type `boot -r`.
3. Log in as `root`.
4. Uninstall any previous version of TSI software in accordance with the instructions supplied with that software. To find out if Tech-Source software exists on your system, type the following:

```
prompt# pkginfo | grep TSI
```

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

5. Insert the CD-ROM labeled "*GFXtra* Driver Software" into drive.

6. If `/cdrom/cdrom0` exists, type:

```
prompt# cd /cdrom/cdrom0
```

Skip to step 7.

Otherwise, mount the CD-ROM by typing the following:

```
prompt# mount -F hsfs -O -o ro  
/dev/dsk/c0t6d0s0 /cdrom
```

```
prompt# cd /cdrom
```

7. The CD-ROM contains an `install_all` script. To install the software, type:

```
prompt# ./install_all
```

This script will ask you a number of yes-or-no questions (generated by Sun's `pkgadd` install script). Answer 'y' to all of these questions. See Figure 3.1 for an example of an installation.

8. Reboot the system to complete the installation.

Figure 3.1

```
#!/install_all

Processing package instance <TSIpgxx.u> from
</cdrom/cdrom0>

PGX32 (Raptor GFX) System Software/Device Driver (64-bit)
v2.3
(sparc.sun4u) 7.0.0,REV=1999.09.08
Copyright 1999 Sun Microsystems, Inc. All rights reserved.
Copyright 1999 Tech-Source, Inc. All rights reserved.

Using </> as the package base directory.
## Processing package information.
## Processing system information.
    5 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

Installing PGX32 (Raptor GFX) System Software/Device Driver
(64-bit) v2.3 as <TSIpgxx>

## Installling part 1 of 1.
/platform/sun4u/kernel/drv/sparcv9/gfxp
/platform/sun4u/kernel/drv/sparcv9/raptor
[ verifying class <none> ]

Installation of <TSIpgxx> was successful.

Processing package instance <TSIpgx.u> from </cdrom/cdrom0>

PGX32 (Raptor GFX) System Software/Device Driver v2.3
(sparc.sun4u) 7.0.0, REV=1999.09.08
Copyright 1999 Sun Microsystems, Inc. All rights reserved.
Copyright 1999 Tech-Source Inc. All rights reserved.
Using </> as the package base directory.
## Processing package information.
## Processing system information.
    4 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgrid programs.
```

Continued on next page...

Figure 3.1 Continued

This package contains scripts which will be executed with super-user permission during the process of installing this package.

```
Do you want to continue with the installation of <TSIpgx>
[y,n,?]y

Installing PGX32 (Raptor GFX) System Software/Device Driver
v2.3 as <TSIpgx>

## Installing part 1 of 1.
/platform/sun4u/kernel/drv/gfxp
/platform/sun4u/kernel/drv/raptor
[ verifying class <none> ]
## Executing postinstall script.

Installation of <TSIpgx> was successful.

Processing package instance <TSIpgxw> from </cdrom/cdrom0>

PGX32 (Raptor GFX) X Window System Support v2.3
(sparc) 7.0.0,REV=1999.09.08
Copyright 1999 Sun Microsystems, Inc. All rights reserved.
Copyright 1999 Tech-Source Inc. All rights reserved.
Using </usr> as the package base directory.
## Processing package information.
## Processing system information.
  7 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

The following files are being installed with setuid and/or
setgid
permissions:
  /usr/sbin/pgxconfig <setuid root>

Do you want to install these as setuid/setgid files
[y,n,?,q]y
This package contains scripts which will be executed with
super-user permission during the process of installing this
package.
```

Continued on next page.

Figure 3 Continued

```
Do you want to continue with the installation of <TSIpgxw>
[y,n,?]y
Installing PGX32 (Raptor GFX) X Window System Support v2.3
as <TSIpgxw>

## Installing part 1 of 1.
/usr/openwin/bin/gfxres
/usr/openwin/server/etc/pgxresinfo
/usr/openwin/server/modules/ddxTSIgfx.so.1
/usr/sbin/GFXconfig <symbolic link>
/usr/sbin/pgxconfig
[ verifying class <none> ]
[ verifying class <server> ]

Installation of <TSIpgxw> was successful.

Processing package instance <TSIpgxmn> from </cdrom/cdrom0>

PGX32 (Raptor GFX) Man Pages v2.3
(sparc) 7.0.0,REV=1999.09.08
Copyright 1999 Sun Microsystems, Inc. All rights reserved.
Copyright 1999 Tech-Source Inc. All rights reserved.
Using </usr> as the package base directory.
## Processing package information.
## Processing system information.
    3 package pathnames are already properly installed.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

Installing PGX32 (Raptor GFX) Man Pages v2.3 as <TSIpgxmn>

## Installing part 1 of 1.
/usr/share/man/man1m/GFXconfig.1m
/usr/share/man/man1m/pgxconfig.1m
[ verifying class <none> ]

Installation of <TSIpgxmn> was successful.

Processing package instance <TSIpgxzs> from</cdrom/cdrom0>

Raptor GFXtra kbms drivers and modules (v1.0)
(sparc.sun4u) 7.0.0,REV=1999.09.08
```

Continued on next page.

Figure 3.1 continued

```
Copyright 1999 Sun Microsystems, Inc. All rights reserved.
Copyright 1999 Tech-Source Inc. All rights reserved.
Using </> as the package base directory.
## Processing package information.
## Processing system information.
14 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with
super-user permission during the process of installing this
package.

Do you want to continue with the installation of <TSIpgxzs>
[y,n,?] y

Installing Raptor GFXtra kbms driver and modules (v1.0) as
<TSIpgxzs>

## Installing part 1 of 1.
/etc/init.d/tsitty
/etc/iu.ap.gfxtra
/etc/rc2.d/S90gfxpinit
/platform/sun4u/kernel/drv/sparcv9/tsicons
/platform/sun4u/kernel/drv/sparcv9/zspci
/platform/sun4u/kernel/drv/sparcv9/zspcikbms
/platform/sun4u/kernel/drv/tsicons
/platform/sun4u/kernel/drv/tsicons.conf
/platform/sun4u/kernel/drv/zspci
/platform/sun4u/kernel/drv/zspci.conf
/platform/sun4u/kernel/drv/zspcikbms
/platform/sun4u/kernel/drv/zspcikbms.conf
/usr/openwin/bin/cdeconfig
/usr/openwin/bin/openwin.tsi
/usr/openwin/bin/startwin
/usr/openwin/server/modules/ddxTSIkbd.so.1
/usr/openwin/server/modules/ddxTSImouse.so.1
[ verifying class <none> ]
## Executing postinstall script.

Installation of <TSIpgxzs> was successful.
```

3.4 Enabling *GFXtra* Login

NOTE: Skip this section if you are going to be using CDE login as described in section 4.2.

After installing the software, the various devices for the *GFXtra* will be created. To create additional logins, the following line needs to be added to your `/etc/inittab` file. This line must be inserted before the `co:` line in this file.

For example, for a *GFXtra* device `/dev/fbs/gfxp1`, the entry in the `/etc/inittab` will be:

```
t0:34:respawn:/usr/lib/saf/ttymon -g
-h -p "GFXtra console login:" -d
/dev/ttyC1 -l contty
```

Note that the first phrase in that entry, (`t0` in the above example) must be unique for each entry. The next entry could be `t1` and so on. The `ttyc#` entry corresponds to the `gfxp#` device. Also, the information for each entry must be contained on a single line.

For the extra login to work, a keyboard/mouse pair must be connected to the input on the *GFXtra* card. A second login will appear on the *GFXtra* screen after the next reboot.

3.5 Changing Resolutions on *GFXtra*

After installation you may want to configure the X Window screen resolution, bit-depth, and refresh rate for your monitor. (This resolution is independent of the console resolution described in the Appendix A.) The default resolution is accepted by skipping this section. The default for the *GFXtra* is as follows:

Board	Resolution	Refresh	Bits/Pixels	Sync
GFXtra	Auto Detect	-	24	separate/composite

The `GFXconfig` utility can be used any time after installation to change these parameters.

NOTE: You must be superuser to execute this program.

Please see the man page on `GFXconfig` for a detailed description.

The next two sections describe two methods of using `GFXconfig` to configure the *GFXtra* card.

3.5.1 Interactive Configuration

`GFXconfig` has an interactive menu-style interface (see Figure 3.2). To use this program to configure your *GFXtra* card, type:

```
prompt# GFXconfig -i
```

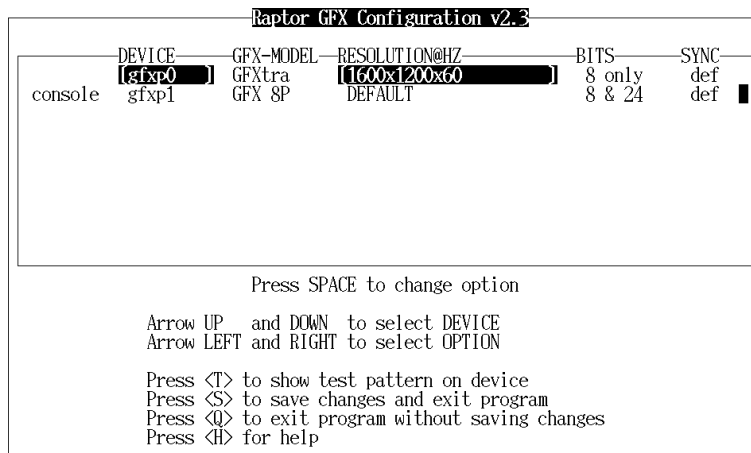
NOTE: If X Windows is running on the *GFXtra* cards(s) to be configured, please exit out of it before running `GFXconfig`. Failure to do so could result in a corrupted screen for the remainder of the X Window session.

The *GFXtra* device(s) will be listed in the left column. A description of the commands is as follows:

Up/Down Arrow	selects the desired graphics device to modify
Left/Right Arrow	selects the parameter to modify (e.g. resolution, bit-depth, or sync)

Space Bar	modifies the parameter for the selected graphics device (will bring up a menu when applicable)
't'	puts a test pattern on the entire display (hit any key to return to the main screen)
's'	saves current settings and exits
'h'	help
'q'	exits the program without saving any changes

Figure 3.2 Raptor *GFXtra* Configuration



3.5.2 Non-Interactive Configuration

Sometimes it is convenient to configure the *GFXtra* card non-interactively. This method is especially useful when configuring

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many systems identically or when the appropriate configuration for the system is already known.

GFXconfig uses the same conventions as Sun's `m64config` or `ffbconfig` utilities. All of the parameters which are set using the interactive version can be set by specifying the option followed by a desired value. The parameters are:

<code>-dev <device></code>	selects the device to configure
<code>-res <resolution></code>	sets the resolution
<code>-res \?</code>	shows resolutions
<code>-file machine system</code>	specifies whether to modify <code>OWconfig</code> from <code>/etc/openwin/server/etc</code> or <code>/usr/openwin/server/etc</code>
<code>-depth <depth></code>	shows the bit depth (8 or 24, or 8+24, default 24)
<code>-defaults</code>	resets device to default parameters
<code>-24only [true/false]</code>	forces all windows to use 24-bit visuals. This may prohibit some 8-bit applications from working
<code>-propt</code>	displays current settings

<code>-prconf</code>	displays hardware information
<code>-help</code>	shows usage

NOTE: The bit depth will be set to 8/24 for resolutions of 1280x1024 and less, or 8 only, for higher resolutions.

3.5.2.1 Examples

To configure the resolution on the *GFXtra* to 1152x900x66, type the following:

```
prompt# GFXconfig -res 1152x900x66
```

NOTE: If no device is specified, *GFXconfig* assumes that the *GFXtra* device is `/dev/fbs/gfxp0`.

To verify the resolution prior to setting it permanently, add the word "try" after the resolution name. This option will display a test pattern on the screen until a return key is hit. Then the resolution can be accepted or rejected. For example:

```
prompt# GFXconfig -res 1152x900x66 try  
          -dev /dev/fbs/gfxp0
```

To set the resolution to 1024x768x60 with a single TrueColor visual (no 8-bit PseudoColor visual):

```
prompt# GFXconfig -res 1024x768x60  
          -24only true
```

To display the current settings for `/dev/fbs/gfxp0`:

```
prompt# GFXconfig -propt  
          -dev /dev/fbs/gfxp0
```

3.6 Setting *GFXtra* as the Console (Optional)

This section describes how to configure the *GFXtra* as the console device in your system.

NOTE: If the procedure for your system is not described below, please contact Tech-Source.

3.6.1 *GFXtra* as the only framebuffer

3.6.1.1 Ultra 5 and Ultra 10

To use the *GFXtra* as the system console on an Ultra 5 or Ultra 10 as the only framebuffer, first disable the 8-bit card, which comes built in to the Ultra 5 and Ultra 10.

At the "ok" prompt, type:

```
ok setenv pcib-probe-list 1,3  
ok reset
```

Once the system is reset, all console messages will be directed to the *GFXtra* card.

To restore the motherboard's 8-bit graphics device as the console for any reason, simply add it back to the `pcib-probe-list` as below:

```
ok setenv pcib-probe-list 1,2,3  
ok reset
```

3.6.1.2 Ultra 30 and Ultra 60

If no other framebuffers are present in an Ultra 30 or Ultra 60, then the *GFXtra* will be the console by default, provided that the board is in a valid probed PCI slot.

3.6.2 *GFXtra* with a secondary framebuffer

The *GFXtra* can be made the console device when other secondary framebuffers are present in the system.

To configure the *GFXtra* card as the console when UPA framebuffers are in the system, the `output-device` variable in NVRAM must be changed to the actual path of the desired *GFXtra* cards. This path can best be determined by searching for the string "TSI" in the / tree at the "ok" prompt.

For example, to find the PCI devices, at the "ok" prompt, type the following:

```
ok show-devs
```

You should see at least one entry containing the string "TSI", ie. "TSI, gfxp@#", where '#' will be a digit representing your *GFXtra*'s slot location.

Use this entry as the console device for your desired *GFXtra*. For example, if the path is "/pci@1f,4000" to the device "TSI, gfxp@#", then type the following command:

NOTE: Replace '#' with whatever your <i>GFXtra</i> device requires.
--

```
ok setenv output-device /pci@1f,4000/TSI,gfxp@#  
ok reset
```

Once the system is reset, all console messages will be directed to the *GFXtra* card.

To restore the default graphics device as the console for any reason, simply set the `output-device` variable back to its default value of `screen` as below:

```
ok    setenv output-device screen
ok    reset
```

3.6.2.1 Other PCI framebuffer

To make the *GFXtra* the console device when other PCI framebuffers are present in the system, it may be necessary to change the `pcia-probe-list` to probe the *GFXtra*'s slot before that of the secondary framebuffer (in addition to making the changes in 3.6.1.1., if applicable).

Determine the slot numbers that correspond to these framebuffers, then ensure that the *GFXtra* slot number precedes that of the secondary framebuffer in the `pcia-probe-list`.

For example, if the *GFXtra* is located in slot 3, and the secondary framebuffer is located in slot 1, then update the `pcia-probe-list` so that slot 3 is probed BEFORE slot 1. A possible

configuration may resemble the following:

```
ok    setenv pcia-probe-list 3,2,1,4
ok    reset
```

Once the system is reset, all console messages will be directed to the *GFXtra* card.

Chapter 4

OPENWINDOWS

4.1 Overview

This section describes how to start up OpenWindows on the *GFXtra* cards. The *GFXtra* device name will be *gfxp*.

4.1.1 *GFXtra* as the console

If the *GFXtra* is the console, type:

```
prompt# openwin
```

4.1.2 *GFXtra* as the secondary framebuffer (with one keyboard and mouse)

If the PGX card is the console and the *GFXtra* is the second card, to start OpenWindows on both cards, type:

```
prompt# openwin -dev /dev/fbs/m640  
             -dev /dev/fbs/gfxp0
```

The order of the devices corresponds to the order of the screens.

4.1.3 Multiple *GFXtra* cards (with one keyboard and mouse)

To start OpenWindows on two *GFXtra* devices, *gfxp0* and *gfxp1*, type:

```
prompt# openwin -dev /dev/fbs/gfxp0  
             -dev /dev/fbs/gfxp1
```

NOTE: In the above example, the `gfxp` device numbers are 0 & 1. These may be different in your configuration. Please check in `/dev/fbs/` or `dmesg` for correct device numbers.

4.1.4 Multiple Consoles

If you enabled *GFXtra* login(s) in section 3.4, to start OpenWindows on each console, type:

```
prompt# openwin
```

4.2 CDE

CDE can be configured to have multiple logins, one on each of the *GFXtra* cards. This can be done by using the `cdeconfig` utility or by manually editing the `xservers` file, both methods are discussed in this section.

4.2.1 CDE Configuration Utility

CDEconfig is an interactive menu driven program that configures the `xservers` file. CDEconfig automatically detects all frame buffers and keyboards installed on the system. CDEconfig assumes that a mouse is connected to every keyboard. To use this program to configure your *GFXtra* card, type:

```
prompt# /usr/sbin/cdeconfig
```

NOTE: In the following example, the system has a *GFXtra* configured as the console and an additional *GFXtra* card with a keyboard and mouse attached.

1. Add a display entry for the *GFXtra* terminal by pressing "A" once (see Figure 4.1).
2. Select "Display 0" to configure the main console.

3. Press the right arrow key to move to the “Available Devices List” Window and select the card labeled “(console)” as the frame buffer for display 0 (see Figure 4.2).
4. Press “M” to return to the main menu and select “Display 1” to configure the additional *GFXtra*.
5. Press the right arrow key to move to the “Available Devices List” Window and select the card labeled “(w/ keyboard)” as the frame buffer for display 1. By default, the keyboard and mouse attached to this *GFXtra* card are selected for this display. If you need to change them, you can press “I” to do so.
6. Press “S” to save the settings and quit the program.

Figure 4.1 CDEconfig (Initial Screen)

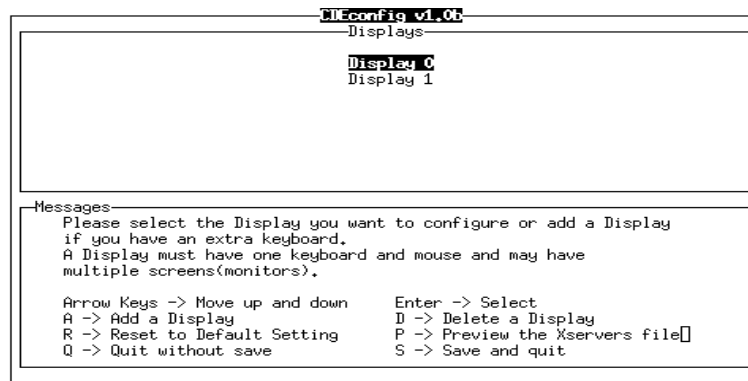


Figure 4.2 CDEconfig (Selecting available devices for displays)



4.2.2 Manually Configuring CDE

This section discusses how to modify the `Xservers` file to support various configurations. The default `Xserver` file is located in `/etc/dt/config`. If the file `/etc/dt/config/Xservers` does not exist, please copy it from the `/usr/dt/config/` directory.

Type:

```
prompt# cd /etc/dt/config
```

If the directory does not exist, type:

```
prompt# mkdir /etc/dt/config
```

```
prompt# cp /usr/dt/config/Xservers  
          /etc/dt/config
```

The `Xservers` file must be modified to support multiple users/logins or multiple monitors. It should contain a single line entry for each keyboard on the system.

To run two or more monitors from the same keyboard, include both devices on the same line in the `Xservers` file. For example, to start a session using both the console framebuffer and the `GFXtra` device, set the `Xservers` file as shown below. In this example, the first device listed will become `:0.0`, the second `:0.1`, etc.

```
:0 Local local-uid@console root /usr/openwin/bin/X
   :0 -nobanner -dev /dev/fb -dev /dev/fbs/gfxp0
```

To support multiple users (multiple logins), additional lines are required in the `Xservers` file, one for each new user. For example, to use the `GFXtra` device and its associated peripherals as display 1 and the default framebuffer as display 0, set the `Xservers` file as shown below.

```
:0 Local local-uid@console root /usr/openwin/bin/X :0
   -nobanner

:1 Local local@ttyC0 /usr/openwin/bin/startwin :1
   /dev/gfxpkbd0 /dev/gfxpmouse0 -dev /dev/fbs/gfxp0
   -nobanner
```

<p>NOTE: Please make sure that all the information that pertains to each display (in this example, it is 2 lines) is entered on a single line without any carriage returns <code><cr></code>.</p>
--

We have provided a generic `startwin` script that sets up the environment. The first argument should be the display number. The second and third arguments should be set to the keyboard and mouse devices respectively. The script will set the `KEYBOARD` and `MOUSE` environment variables. Then the script calls the server. Any other arguments will be passed directly through the server command line.

There is a small bug when the command line login option is left enabled on all heads. When a user logs on to a head other than the console (in command line mode), `dtlogin` will often reset

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the console keyboard, rendering it inoperative. To regain control, someone with root access must issue the following command:

```
prompt# /usr/openwin/bin/kbd_mode -u
```

Chapter 5

ADVANCED FEATURES

5.1 Overview

The *GFXtra* has several advanced features available through the X server. They are:

- 8/24-bit simultaneous visuals
- Off-screen pixmap caching
- OpenGL support

5.2 8/24 Simultaneous Visuals

The 8/24 mode supports 8 and 24-bit visuals simultaneously. This addresses the classic colormap flashing issue with a 24-bit visual while providing the 8-bit visual that is required by some legacy applications, such as SoftWindows.

The available visuals are PseudoColor and TrueColor. PseudoColor is the default visual.

The resolutions up to 1280x1024 default to 8/24 mode unless set explicitly using *GFXconfig*. All resolutions over 1280x1024 default to an 8-bit visual.

5.3 Cached Pixmap

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

The available off-screen memory depends on the amount of video memory, the current resolution, and depth settings. For example, the *GFXtra* card has 8MB of video memory. If it is running at 1024x768 resolution with a depth of 8-bits, 768K is used for on-screen memory. That leaves 7.2MB available for pixmaps. In 24-bit mode, the on-screen memory that is used is 4 times larger than what is used in the 8-bit mode.

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

5.4 OpenGL Support

OpenGL support is provided through the Direct Pixel Access (DPA) Extension. To use this function, OpenGL v1.1.1 or higher must be already installed on your system.

NOTE: In OpenGL v1.1.1 for Solaris, there is a bug in the DPA PCI 24-bit support that causes the red and blue colors to be swapped. There is a patch from Sun (Patch ID 106022-07) that fixes this problem. It is fixed in OpenGL v1.1.2.

Chapter 6

REMOVING GFXTRA SOFTWARE

6.1 Overview

To find out if Tech-Source software exists on your system, type:

```
prompt# pkginfo | grep TSI
```

To uninstall the *GFXtra* software, enter the following command:

For Solaris 7 (64-bit configuration), type:

```
prompt# pkgrm TSIPgxzs TSIPgxmn TSIPgxw TSIPgx  
TSIPgxx
```

For Solaris 2.5.1 and Solaris 2.6, type:

```
prompt# pkgrm TSIPgxzs TSIPgxmn TSIPgxw TSIPgx
```

Warning: This uninstall procedure may not work with older versions of the TSI software. It is important to use the procedure provided with the previous version.

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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 8:30am and 5:30pm EST.

Please have the software part number, version, and serial number for your *GFXtra* card(s) available when contacting Tech-Source in order to expedite support.

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

7.3 Website

Detailed product information, FAQ's, bug lists, and patches are available on our website located at:

<http://www.techsource.com>.

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Appendix A

CHANGING THE CONSOLE RESOLUTION

A.1 Overview

The *GFXtra* card can be configured to be the console in the UltraSparc workstation. Every Raptor GFX card type has its own default console resolution and default depth as shown in the following table:

Board	Resolution	Refresh	Bits/Pixels	Sync
GFX-8M	1024x768	60Hz	8	separate
GFX-4M	640x480	60Hz	8	separate
GFX-8P	Auto Detect	-	24	separate
GFXtra	Auto Detect	-	24	separate/composite

It is possible to change the console resolution on all Raptor GFX cards. The procedures described in this appendix are:

- EDID Auto-Detect feature (Raptor GFX-8P and *GFXtra* only)
- Output Device Method (Raptor GFX-8P and *GFXtra* only)
- Video-Mode Method
- Video-Timing Method

NOTE: The Raptor GFX-8M requires Boot Prom level 1.2 in order to change the console resolution.

This appendix includes a troubleshooting section describing possible problems and answers associated with changing the console resolution.

A.1.1 Reasons for changing the console resolution

Normally the default console resolution is sufficient for most users. Two examples of when you might be required to change the default resolution are described below:

- If you change the X Windows depth from the default listed in the table, we recommend that the console depth be configured to match the X Windows depth (**GFX-8P and *GFXtra* only**).
- If the monitor does not "sync up" at the default console resolution, it may be necessary to choose a different console resolution.

A.1.2 Guidelines for changing the console resolution

There are some general guidelines to follow when changing the default console resolutions. They are as follows:

- In order to run the X Windows environment in 8/24 mode, set the console resolution to 24-bit depth.

NOTE: Only the GFX-8P and *GFXtra* are capable of changing the console bit-depth.

- By default, console resolutions 1280x1024 and lower will automatically be set to 24-bit mode. Higher resolutions will default to 8-bit mode.
- It is recommended you use `GFXconfig -i` to test a resolution before configuring the console to that resolution.

A.1.3 EDID Auto-Detect feature (GFX-8P and GFXtra only)

If you are using a monitor with DDC2B/EDID protocol the default resolution will be determined using the Auto-Detect feature.

With this protocol, the GFX card first checks the Standard Timing Identifiers (taking the first one supported) then tries to match the Established Timings.

NOTE: The monitor must be turned ON prior to booting the system in order for the Raptor GFX to communicate with it. Some adapters and cables may block this signal.

If the Auto-Detect feature fails the card will default to 1152x900x66.

Other methods described in this appendix will override any information obtained via EDID.

A.2 output-device Method (GFX-8P and GFXtra only)

To specify the console resolution of a Raptor GFX card via the `output-device` environment variable use the format `screen:rAxBxC` where:

A is the desired horizontal resolution,
B is the desired vertical resolution,
C is the desired refresh rate.

The system will check these values against an internal list of resolutions (see section A.3 for valid list) and use the corresponding entry as the console resolution.

For example, to use VESA 1024x768x75 as the console resolution, type the following at the ok prompt:

```
ok setenv output-device screen:r1024x768x75  
ok reset
```

NOTE: The new console resolution will take effect following the reset, and will hold the resolution information until the `output-device` variable is changed manually.

A.3 Video-Mode Method

A.3.1 GFX-8P and *GFXtra*

At the "ok" prompt in Boot PROM mode, the console resolution can be easily set on Raptor GFX-8P and *GFXtra* cards by using one of the 34 preinstalled resolution modes. These resolution settings are identified by video modes 0-33.

NOTE: Use video modes 0-25 to select a console depth of 24 bits, or video modes 26-33 to select a console depth of 8 bits.

0	640x480@60
1	640x480@72
2	640x480@75
3	640x480@85
4	800x600@60
5	800x600@72
6	800x600@75
7	800x600@85
8	1024x768@60
9	1024x768@70
10	1024x768@75
11	1024x768@77 *
12	1024x768@85
13	1024x800@85 *
14	1152x900@60
15	1152x900@66 *

Appendix A – Changing the Console Resolution

16	1152x900@70
17	1152x900@75
18	1152x900@76 *
19	1152x900@85
20	1280x800@76 *
21	1280x1024@60
22	1280x1024@67 *
23	1280x1024@75
24	1280x1024@76 *
25	1280x1024@85
26	1600x1000@66 *
27	1600x1000@76 *
28	1600x1200@60
29	1600x1200@65
30	1600x1200@70
31	1600x1200@75
32	1600x1200@85
33	1600x1280@76

NOTE: Resolutions followed by an * use composite sync. Early versions of the Raptor GFX-8P support only separate sync without the use of an adapter. Later versions of the GFX-8P card and the *GFXtra* support both separate and composite sync.

A.3.2 All Raptor GFX cards (except GFX-8P and *GFXtra*)

At the `ok` prompt in Boot PROM mode, the console resolution can easily be set on all Raptor GFX cards (except the GFX-8P and *GFXtra*) by using one of the 29 preinstalled resolution modes. These resolution settings are identified by video modes 0-28:

0	VESA640x480x60
1	VESA640x480x72
2	VESA640x480x75
3	VESA640x480x85
4	VESA800x600x60

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5	VESA800x600x72
6	VESA800x600x75
7	VESA800x600x85
8	VESA1024x768x60
9	VESA1024x768x70
10	VESA1024x768x75
11	VESA1024x768x85
12	VESA1152x900x60
13	SUN1152x900x66 *
14	VESA1152x900x70
15	VESA1152x900x75
16	VESA1152x900x85
17	VESA1280x1024x60
18	VESA1280x1024x75
19	VESA1280x1024x85
20	VESA1600x1200x60
21	VESA1600x1200x65
22	VESA1600x1200x70
23	VESA1600x1200x75
24	VESA1600x1200x80

NOTE: Modes 25-28 are valid for the Raptor GFX-8M only.

25	VESA1900x1080x60
26	VESA1920x1200x60
27	VESA1920x1200x70
28	VESA1920x1200x76

NOTE: The resolution followed by an * uses composite sync.

The numbers 0-28 correspond to the video mode. Use `nvedit` to choose one of these values for the `video-mode` variable in NVRAM.

NOTE: Please refer to Appendix C for a description of `nvedit` commands.

Appendix A – Changing the Console Resolution

```
ok nvedit
  0: 8 value video-mode
  1: <ctrl-c>
ok nvstore
ok setenv use-nvramrc? true
ok reset
```

NOTE: The last three commands enable the NVRAM. Without these lines, the changes you make with `nvedit` will be ignored.

A.4 Video-Timing Method

If all of the previously described methods fail for your configuration, it is possible to specify the exact timing numbers for a particular resolution. The last method for setting the console resolution also uses `nvedit`. This method is more involved and requires knowledge of all timing parameters for the desired resolution, and is only meant for monitors whose resolutions are not available in the `Video-Mode Method`. Please refer to Appendix C for detailed instructions on using `nvedit`.

NOTE: The video-timing method should be used **only** if the previous methods have been unsuccessful.

For example, to set the console resolution to 1280x1024@76Hz, type the following:

```
ok nvedit
  0: : video-timing " 1280, 384, 32, 64,
      1024, 43, 3, 8, 135000000, 0" ;
  1: <ctrl-c>
ok nvstore
ok setenv use-nvramrc? true
ok reset
```

NOTE: The syntax is very important. The spaces must be present exactly as they appear in the example.

NOTE: The last three commands enable the NVRAM. Without these lines, the changes you make with `nvedit` will be ignored.

The following is a brief description of the 10 parameters used in this method.

- horizontal resolution (in pixels)
- horizontal blanking total
- horizontal front porch
- horizontal sync width
- vertical resolution (in lines)
- vertical blanking total
- vertical front porch
- vertical sync width
- dotclock in Hz
- sync value:

0 separate sync
256 sync on green
512 positive vertical sync pulse
1024 positive horizontal sync pulse
2048 composite sync

The sync values can be added together to select more than one of the above.

NOTE: To obtain the timing parameters required to use the video-timing method, please contact Tech-Source with your monitor's requirements.

A.5 Troubleshooting

Problem	Solution
Used the method described in the Appendix to configure the console resolution, but the card still defaults to something other than the resolution specified.	<p>A priority scheme is used to determine the boot console resolution. The GFX firmware checks the various methods in the order of priority discussed below. If it finds the resolution from the current method, it uses it; otherwise, it goes down the priority list to find the resolution information. Finally, if there is no resolution information, it uses the default resolution. The resolution-setting methods are enumerated in order of decreasing priority:</p> <ol style="list-style-type: none">1. <code>output-device</code> method (Section A.2) (GFX-8P and GFXtra only)2. <code>video-timing</code> method (Section A.4)3. <code>video-mode</code> method (Section A.3)4. DDC2B/EDID (Section A.1.3) (GFX-8P and GFXtra only)5. Default resolution for the card
The chosen resolution on the Raptor GFX-8P is compatible with my monitor, but there is still no video.	<p>Early versions of the GFX-8P card require an adapter (See section B.6) in order to support composite sync.</p>

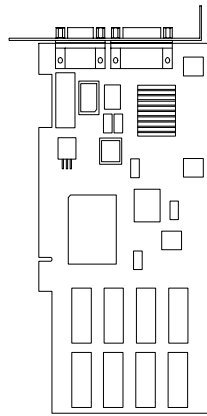
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Problem	Solution
You get a "failed to initialize core devices" error when you try to start OpenWindows on the <i>GFXtra</i> console.	<p>This results from invalid permissions on one or more key devices. The file that controls device permissions for Solaris is <code>/etc/logindevperm</code>. The default is typically:</p> <pre>/dev/console 0600 /dev/mouse:/dev/kbd /dev/console 0600 /dev/sound/* /dev/console 0600 /dev/fbs/*</pre> <p>In this example, when a user logs into <code>/dev/console</code>, ownership of all the listed devices are changed to that user, and the permissions of those devices are changed to 600 (or <code>rw----</code>). When a user logs into a <i>GFXtra</i> login (not via CDE), he will need access to 3 devices in order to run OpenWindows:</p> <pre>the screen (/dev/fbs/gfxpN) the keyboard (/dev/gfxpkbdN) the mouse (/dev/gfxpmouseN)</pre> <p>If the <i>GFXtra</i> card's instance number is 0 (<code>'prtconf'</code> will provide this number), <code>/etc/logindevperm</code> should be changed to:</p> <pre>/dev/console 0600 /dev/mouse:/dev/kbd /dev/console 0600 /dev/sound/* /dev/console 0600 /dev/fb # note the change here /dev/ttyC0 0600 /dev/gfxp0 /dev/ttyC0 0600 /dev/gfxpmouse0:/dev/gfxpkbd0</pre>

Appendix B

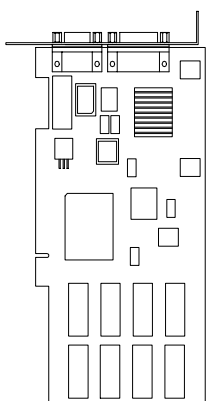
CARD SPECIFICATIONS

B.1 Raptor GFX-4M PCI Card and Specifications



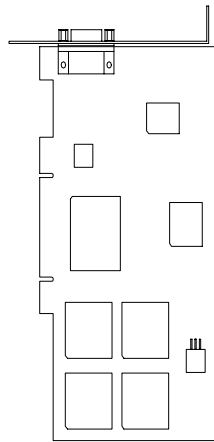
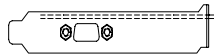
Frame Buffer:	4 Megabytes VRAM
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Table(s):	256 entries
PCI Interface:	33 MHZ, 32-bit
Video Interface:	Red, Green, Blue, at RS-343 (75 ohm)
Video Sync:	Composite or Separate
Video Connector:	15 pin High Density D-SUB (VGA) 15 pin Macintosh connector not available
Temperature Rating:	0 ⁰ to 50 ⁰ C operating -40 ⁰ to 75 ⁰ C non-operating
Humidity Rating:	20 to 80% (non-condensing)
Power Rating:	+5V @ 2 Amps (max)
Dimensions:	178mm x 107mm (7.0" x 4.2")

B.2 Raptor GFX-8M PCI Card and Specifications



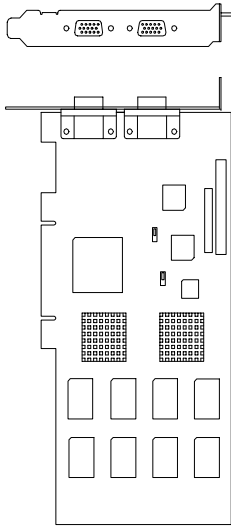
Frame Buffer:	8 Megabytes VRAM
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Table(s):	256 entries
PCI Interface:	33 MHZ, 32-bit
Video Interface:	Red, Green, Blue, at RS-343 (75 ohm)
Video Sync:	Composite or Separate
Video Connector:	15 pin High Density D-SUB (VGA) 15 pin Macintosh connector not available
Temperature Rating:	0 ^o to 50 ^o C operating -40 ^o to 70 ^o C non-operating
Humidity Rating:	20 to 80% (non-condensing)
Power Rating:	+5V @ 3.0 Amps (max)
Dimensions:	178mm x 107mm (7.0" x 4.2")

B.3 Raptor GFX-8P PCI Card and Specifications



Frame Buffer:	8 Megabytes VRAM
Hardware Cursor:	3 color, 64 x 64 bitmap
Color Lookup Table(s):	256 entries
PCI Interface:	33 MHZ, 32-bit
Video Interface:	Red, Green, Blue, at RS-343 (75 ohm)
Video Sync:	Separate, Composite sync using special adapter
Video Connector:	15 pin High Density D-SUB (VGA)
Temperature Rating:	0 ^o to 50 ^o C operating -40 ^o to 70 ^o C non-operating
Humidity Rating:	10 to 95% (non-condensing)
Power Rating:	+5V @ 1.5 Amps (max)
Dimensions:	168mm x 107mm (6.625" x 4.2")

B.4 Raptor GFX-8P Dual Channel PCI Card and Specifications



Frame Buffer: 8 Megabytes SGRAM (per channel)

Hardware

Cursor: 3 color, 64 x 64 bitmap (per channel)

Color Lookup Table(s): 256 entries (per channel)

PCI Interface: 33 MHZ, 32-bit

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

Video Sync: Separate, Composite sync using special adapter

Video Connector: 15 pin High Density D-SUB (VGA) (per channel)

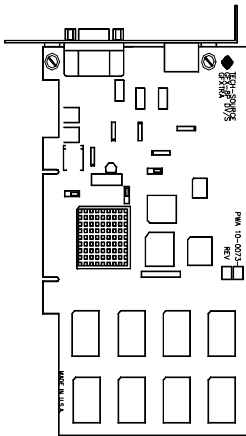
Temperature Rating: 0^o to 50^oC operating
-40^o to 70^oC non-operating

Humidity Rating: 10 to 95% (non-condensing)

Power Rating: +5V @ 3 Amps (max)

Dimensions: 229mm x 107mm (9.0in x 4.2in)

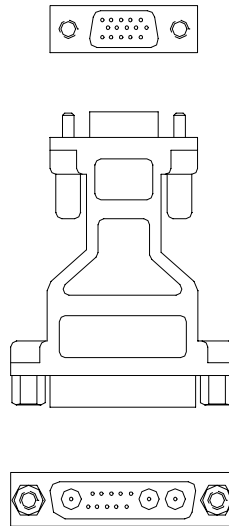
B.5 Raptor *GFXtra* PCI Card and Specifications



- Frame Buffer:** 8 Megabytes SGRAM
- Hardware Cursor:** 3 color 64x64 bitmap
- Color Lookup Table(s):** 256 entries
- PCI Interface:** 33MHz, 32-bit
- Video Interface:** Red, Green, Blue RS-343 (75 ohm)
- Video Sync:** Separate, Composite sync
- Video Connectors:** 15 pin High Density D-SUB (VGA)
- Keyboard/Mouse Interface Connector:** 8 pin mini Din
- Temperature Rating:** 0° to 50° C operating
-40° to 70° C non-operating
- Humidity:** 10 to 95% (non-condensing)
- Power Rating:** +5V @ 2.5 Amps (max)
- Dimensions:** 175mm x 107 mm (6.875"x4.2")

B.6 Special Adapter for Sun Monitors

The Raptor GFX series cards have a VGA connector for video output. This works with all PC monitors and most new Sun monitors. Some Sun monitors require the 13W3 connector. Tech-Source provides a 13W3-to-VGA adapter to support these monitors. The adapter that is provided with the *GFXtra* cards including the Raptor GFX-8P (Part #19-0091-01), is the 1396-R2 which facilitates composite synchronization. For separate syncs, the 1397 adapter must be used. The sync signals on the *GFXtra* are software configurable.



Appendix C

USING NVEDIT TO MODIFY NVRAM

C.1 NVRAM Edit Commands

This section discusses the use of NVRAM. The NVRAM is used for setting resolution in the Video-Mode and Video-Timing methods. To edit the NVRAM, begin `nvedit` at the `ok` prompt. There are several commands that you must use to edit the variables in NVRAM:

<Backspace>	deletes the character preceding the cursor
<Ctrl-l>	lists NVRAM current values
<Ctrl-p>	moves to the previous line
<Ctrl-n>	moves to the next line
<Ctrl-b>	moves to the previous character
<Ctrl-f>	moves to the next character
<Ctrl-u>	deletes to the beginning of the line
<Ctrl-k>	joins the current and next line
<Ctrl-u><Ctrl-k>	deletes the current line
<Ctrl-c>	exits the NVRAM editor (back to the <code>ok</code> prompt)

The changes will only take effect if they are stored using the **`nvstore`** command entered at the `ok` prompt. Once the changes are stored, the NVRAM must be enabled before the system will execute it. This is done by setting the environment variable `use-nvramrc?` to `true`. Please `reset` the system to make the changes effective.

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NOTES

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