

HP PCI AMD Radeon® 7000 Graphics Adapter Installation Guide

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About This Document

This preface contains the following sections:

- Intended Audience
- Document Organization
- Typographic Conventions
- Related Information
- HP Encourages Your Comments

Intended Audience

This document is intended for managers and operators of HP Integrity server systems, running either HP-UX 11i or HP OpenVMS I64 operating systems with the HP PCI AMD Radeon 7000 Graphics Adapter installed.

Document Organization

This document is organized as follows:

Chapter 1, Overview	This chapter provides a brief overview of the HP PCI AMD Radeon 7000 Graphics Adapter.
Chapter 2, Installation	This chapter describes the installation of the HP PCI AMD Radeon 7000 Graphics Adapter module in a supported HP product.
Chapter 3, HP OpenVMS I64 — Graphics Software Installation and Customization	This chapter provides information for installing and modifying the software required to support 2D (two-dimensional) graphics with the HP PCI AMD Radeon 7000 Graphics Adapter under the HP OpenVMS I64 operating system.
Chapter 4, HP-UX Configuration	This chapter provides information for installing and modifying the software required to support 2D (two-dimensional) graphics with the HP PCI AMD Radeon 7000 Graphics Adapter under the HP-UX operating system.

Typographic Conventions

This document uses the following typographical conventions:

<code>%</code> , <code>\$</code> , or <code>#</code>	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells. A number sign represents the superuser prompt.
Command	A command name or qualified command phrase.
Computer output	Text displayed by the computer.
Ctrl+x	A key sequence. A sequence such as Ctrl+x indicates that you must hold down the key labeled Ctrl while you press another key or mouse button.
ENVIRONMENT VARIABLE	The name of an environment variable, for example, <code>PATH</code> .
[ERROR NAME]	The name of an error, usually returned in the <code>errno</code> variable.
Key	The name of a keyboard key. Return and Enter both refer to the same key.
Term	The defined use of an important word or phrase.
User input	Commands and other text that you type.

<i>Variable</i>	The name of a placeholder in a command, function, or other syntax display that you replace with an actual value.
[]	The contents are optional in syntax. If the contents are a list separated by , you must choose one of the items.
{ }	The contents are required in syntax. If the contents are a list separated by , you must choose one of the items.
...	The preceding element can be repeated an arbitrary number of times.
Ⓢ	Indicates the continuation of a code example.
	Separates items in a list of choices.
WARNING	A warning calls attention to important information that if not understood or followed will result in personal injury or nonrecoverable system problems.
CAUTION	A caution calls attention to important information that if not understood or followed will result in data loss, data corruption, or damage to hardware or software.
IMPORTANT	This alert provides essential information to explain a concept or to complete a task
NOTE	A note contains additional information to emphasize or supplement important points of the main text.

Related Information

Visit the HP Web site at:

<http://www.hp.com>

for service tools and more information about the HP PCI AMD Radeon 7000 Graphics Adapter. The *Graphics Administration Guide: for HP-UX 11.X Servers* is a highly recommended resource. Locate this guide at:

<http://docs.hp.com/>. Enter the following part number in the **search** box to access the document: 5991-7583.

You can find other information on HP server hardware management , Microsoft® Windows®, and diagnostic support tools in the following publications.

Web Site for HP Technical Documentation:

<http://docs.hp.com/en/index.html>

This is the main web site for HP technical documentation.

Server Hardware Information:

<http://docs.hp.com/en/hw.html>

This is the main web site for the systems hardware. This web site provides HP nPartition server hardware management details, including site preparation, installation, and more.

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HP encourages your comments concerning this document. We are committed to providing documentation that meets your needs. Send any errors found, suggestions for improvement, or compliments to:

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Include the document title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document.

1 Overview

This chapter provides a brief overview of the HP PCI AMD Radeon 7000 Graphics Adapter. Reference to the HP PCI AMD Radeon 7000 Graphics Adapter is also known by its HP Product Number: AH391A. They are interchangeable.

Module Description

The HP PCI AMD Radeon 7000 Graphics Adapter module is a single 32-bit expansion-slot, 66/33MHz Universal PCI option that provides 2D graphics acceleration for HP Integrity systems running HP-UX 11i and HP OpenVMS I64 operating systems.

The HP PCI AMD Radeon 7000 Graphics Adapter card is based on AMD's RV100 graphics chip.

Table 1-1 Option Numbers

Option	Description
AH391A	HP PCI AMD Radeon 7000 Graphics Adapter.

For minimum operating system and firmware revision information supported for the HP PCI AMD Radeon 7000 Graphics Adapter, see the *I/O Cards and Networking Software* website located at:

<http://docs.hp.com/en/netcom.html>.

Click open the **Remote Manageability & Graphics/USB Cards** link for current information.

Figure 1-1 The HP PCI AMD Radeon 7000 Graphics Adapter



1. HP PCI AMD Radeon 7000 Graphics Adapter
2. DVI-I connector
3. Standard 15-pin VGA connector

The HP PCI AMD Radeon 7000 Graphics Adapter has a standard 15-pin VGA connector and a DVI-I connector. There is no VGA switch; VGA functions are automatically configured through the console firmware and software.

DVI-I to VGA Connector adapter

HP OpenVMS I64 does not support direct DVI to DVI operation on the HP PCI AMD Radeon 7000 Graphics Adapter card. The DVI port is only usable with a DVI to analog (VGA) adapter

or cable (this part is not supplied for HP Itanium servers). If a DVI to analog adapter or cable is used, OpenVMS drives both the VGA and DVI interface with the same image.

HP-UX does support all video connections, including direct DVI to DVI, DVI to analog (VGA) and VGA to VGA.

Connector Pinouts

Table 1-2 contains a listing of the pins and signals found on the standard 15-pin VGA connector and the DVI-I to VGA adapter (part number 209815-001 not included in kit).

Table 1-2 Standard 15-Pin VGA Connector Pinout

Pin No.	Signal
1	RED VIDEO
2	GREEN VIDEO
3	BLUE VIDEO
4	No connection
5	GROUND
6	GROUND
7	GROUND
8	GROUND
9	+5V SUPPLY
10	GROUND
11	No connection
12	BI-DIRECTIONAL DATA
13	HORIZONTAL SYNC or COMPOSITE SYNC
14	VERTICAL SYNC (VCLK)
15	DATA CLOCK

2 Installation

Introduction

This chapter provides information on unpacking the graphic adapter and installing the HP PCI AMD Radeon 7000 Graphics Adapter module in supported HP equipment.

Unpacking

The graphics option hardware is packaged in a single carton that contains one graphic adapter and one installation guide.

Table 2-1 Contents of the HP PCI AMD Radeon 7000 Graphics Adapter Box

Qty.	Description	Product and Part Number
1	HP PCI AMD Radeon 7000 Graphics Adapter, 64Mb	Product No.: AH391A PN: AH391-60001
1	HP PCI AMD Radeon 7000 Graphics Adapter Installation Guide	PN: AH391-9000A

Installation Procedure



CAUTION: Static electricity can damage sensitive electronic components. When handling your graphics option, use an anti-static wrist strap that is connected to a grounded surface on your computer system.



NOTE: Before installing the module, check your monitor specification for signal compatibility and supported features offered by the HP PCI AMD Radeon 7000 Graphics Adapter. See the system owners guide for information about supported graphics option PCI slots.

The following section describes how to install the HP PCI AMD Radeon 7000 Graphics Adapter. To install the module, perform the following steps:

1. Perform a normal power-down of the selected computer system. Disconnect the monitor cable.
2. Disconnect all AC power cables from the computer chassis to remove power from the system (or turn off the circuit breakers if applicable).
3. Control any ESD by grounding yourself to the system chassis or cabinet with an anti-static wrist strap.
4. Remove the cover from the system to expose the PCI slots (see the 'Remove & Replace' section of the system hardware support documentation).
5. If the computer has an existing graphics module, remove the screw that secures it. Remove the module. Set aside on an ESD-safe surface.
6. Ensure the new graphics adapter is installed in a supported PCI slot. Remove any slot cover if not currently populated. If the system had a graphics adapter previously installed, that expansion slot may be used. See the system owners guide for information about supported graphics option slots.
7. Carefully insert the new graphics adapter into the supported slot and seat it firmly.
8. Secure the card to the chassis by installing and tightening the screw.
9. Replace the system cover.
10. Connect the monitor cable to the selected video output on the graphics card bulkhead. Ensure the connection is secure.

11. Reconnect the AC power cables to the computer chassis to restore power to the system (or turn on circuit breakers if applicable).
12. Perform a normal power-up of the computer system.

3 HP OpenVMS I64 — Graphics Software Installation and Customization

This chapter provides information to install and modify the software required to support 2D graphics with the HP PCI AMD Radeon 7000 Graphics Adapter under the HP OpenVMS I64 operating system.

The HP PCI AMD Radeon 7000 Graphics Adapter is directly supported by HP OpenVMS I64 without additional software. Bug fixes and new feature support are supplied using the standard OpenVMS downloadable patch support mechanism, and with new versions of the operating system.

The behavior of the HP PCI AMD Radeon 7000 Graphics Adapter's support software may be modified after installation on OpenVMS by editing the appropriate files and issuing DCL commands (see "Multiple Graphics Cards Support" (page 15)).

Video Resolutions Supported

The HP PCI AMD Radeon 7000 Graphics Adapter is capable of supporting the graphics resolutions, color depths, and refresh rates shown in Table 3-1:

Table 3-1 Supported Video Modes — HP OpenVMS I64

Resolution	Color Depths (Bits per Pixel)	Refresh Rates (Hertz)
640 x 480	8, 16, 24	60, 72, 75, 85
800 x 600	8, 16, 24	60, 72, 75, 85
1024 x 768	8, 16, 24	60, 70, 75, 85
1024 x 864	8, 16, 24	60, 70, 75, 85
1152 x 864	8, 16, 24	60
1280 x 1024	8, 16, 24	60, 72, 75, 85
1600 x 1200	8, 16, 24	60, 65, 75, 85
1792 x 1344	8, 16, 24	60, 75
1856 x 1392	8, 16, 24	60, 75
1920 x 1080	8, 16, 24	60, 75
1920 x 1200	8, 16, 24	60, 75
1920 x 1440	8, 16, 24	60, 75
2048 x 1536	8, 16, 24	60, 65, 70, 75
2048 x 2048	8, 16, 24	57

The video mode selected should match your monitor's capabilities. In general, refresh rates below 70Hz are discouraged on CRT monitors, as they tend to show flicker based on the lighting source and surrounding equipment. Flat panel displays generally prefer a 60Hz refresh rate.

The available resolutions are monitor dependent.

The default video mode is 1024 x 768 @70Hz and 24 bits per pixel depth.

Restrictions, Limitations, and Defaults

This section of the document contains limitations, restrictions, and defaults for the HP PCI AMD Radeon 7000 Graphics Adapter hardware and software.

Minimum Console Revision

The minimum console firmware version supporting the HP PCI AMD Radeon 7000 Graphics Adapter under HP OpenVMS I64 is system dependent. Please consult your platform option information for minimum requirements.

VGA Console Support

Support for the VGA console was added to HP OpenVMS I64 in V8.3–1H1 on all platforms supporting graphics except the HP Integrity rx2600. To select the HP PCI AMD Radeon 7000 Graphics Adapter as the console, use the **EFI Boot Options** menu to select the card as the Primary console.

HP Integrity Platform Support

HP OpenVMS I64 release version v8.3–1H1 supports the HP PCI AMD Radeon 7000 Graphics Adapter on two (2) HP Itanium platform types:

- HP Integrity rx2660
- HP Integrity rx3600

Default Depth (24 Bits Per Pixel)

Traditionally, HP OpenVMS I64 has set the default pixel depth to 8 bits per pixel on 2D graphics options, and 24 bits per pixel on 3D options. With the expanding use of applications such as MOZILLA and increased use of various types of images, such as GIF and JPEG, the default depth for 2D has been changed to 24 bits per pixel.



NOTE: Many older applications may assume a specific depth and visual type — in particular, 8 bits per pixel and `PseudoColor`. If your graphics application or a utility depends upon the depth, you can either modify the application or change the default pixel depth.

For example, the PAINT program which ships on DECwindows Motif currently only supports 8 bits per pixel.

For instructions on changing the pixel depth, see “Overriding the Default Settings” (page 16).

Multiple Colormaps (8 Bits Per Pixel)

Multiple colormaps are not supported by the hardware. The HP PCI AMD Radeon 7000 Graphics Adapter supports only one installed colormap at one time. Exceeding this limit of 8 bits per pixel depth, may cause colormap “flashing”.

Applications should not install or uninstall colormaps themselves. The window manager should perform these actions. However, the application is responsible for providing the window manager with hints as to which colormaps to install or uninstall.

Single Pixel Depth (No Mixed Depth Windows)

Some workstation 3D graphics options in the past provided the ability to mix windows of different pixel depths on the same screen. The HP PCI AMD Radeon 7000 Graphics Adapter card can only support a single pixel depth at a time. This means that all windows on a specific screen must all have the same pixel depth (no mixed depth windows).

Visual Types

A visual type defines how the X11 server interprets the contents of a pixel. While the HP PCI AMD Radeon 7000 Graphics Adapter hardware only supports a single pixel format at a time, the X11 server can emulate various visual types depending on the pixel depth. For example,

when using 24 bits per pixel both `DirectColor` and `TrueColor` can be used. At 8 bits per pixel, all visual types are available.

The default visual types are: `TrueColor` for 16 and 24 bits per pixel, and `PseudoColor` for 8 bits per pixel.

For information on changing the default visual, see “[Overriding the Default Settings](#)” (page 16).

Open3D Support

The HP PCI AMD Radeon 7000 Graphics Adapter is not supported for 3D graphics.

Multiple Graphics Cards Support

The HP PCI AMD Radeon 7000 Graphics Adapter software has been tested for up to four (4) cards per system. All operations are supported on every card in the system. Consult your Integrity system options documentation for detailed information on number of cards supported and configuration limitations.

The embedded graphics available on most HP Integrity systems that are based on the HP PCI AMD Radeon 7000 Graphics Adapter and AMD RN50 are compatible with multi-headed operation.

Multi-Screen Versus XINERAMA

By default, multiple screens are handled as traditional X11 multiple screens. However, the screens can be handled as a single “virtual” screen using the XINERAMA extension. This is documented in two (2) places:

- in the `DECW$PRIVATE_SERVER_SETUP.COM` procedure.
- in the Motif documentation.

Screen Order and Forcing Single Headed Operation

Screen order is determined by the bus ordering of devices, and will vary across platforms. The `DECW$PRIVATE_SERVER_SETUP.COM` file allows the user to override the ordering of screens, or to force single headed operation. See the documentation in the file, and in the Motif documentation for more information.

For example, to force a specific graphics option to be used in single head mode (in this case `GHBO`), add this line:

```
$ DEFINE/SYSTEM/NOLOG DECW$PRIMARY_DEVICE_ "GHBO"
```

Modifying the Graphics Configuration

The following sections describe graphic configuration settings.

HP PCI AMD Radeon 7000 Graphics Adapter Default Graphics Settings

The default graphics resolution is 1024 x 768. The default refresh rate is 70Hz. The default pixel depth is 24 bits per pixel and the default visual type is `TrueColor`.

Determining Current settings

To find the current settings under HP OpenVMS I64, enter these commands in the following order at the DCL prompt:

```
$ @decw$utils:decw$define_utils  
$ xdpiinfo
```

In addition, you can show the following logical names at the DCL prompt:

```

$ SHOW LOGICAL/SYSTEM DECW$SERVER_PIXEL_DEPTH
$ SHOW LOGICAL/SYSTEM DECW$SERVER_REFRESH_RATE
$ SHOW LOGICAL/TABLE=DECW$SERVER* DECW$XSIZE_IN_PIXELS
$ SHOW LOGICAL/TABLE=DECW$SERVER* DECW$YSIZE_IN_PIXELS
$ SHOW LOGICAL/TAB=DECW$SERVER* DECW$SERVER_DEFAULT_VISUAL_CLASS

```

If any logical name is not defined, then the respective default is in effect.

You can also confirm the settings and any errors in the setup by examining the server error log file:

```

$ TYPE SYS$MANAGER:DECW$SERVER_0_ERROR_LOG

```

Overriding the Default Settings

The `SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM` procedure contains documentation for many of the default X11 server settings that may be changed. For more information on making changes to the default settings, symbols, and system-wide logical names, see the manual titled *Managing DECwindows Motif for HP OpenVMS I64 Systems*. An online version of this document is available at:

<http://h71000.www7.hp.com/DOC/73final/6300/6300PRO.html>

A complete list of available DECwindows Motif v1.3–1 documentation is available at:

<http://h71000.www7.hp.com/DOC/decwin131.html>

For later releases of documentation, see the main HP OpenVMS I64 Systems Documentation site at:

<http://h71000.www7.hp.com/DOC/index.html>

HP OpenVMS Alpha and I64 use the same implementation of X11 and Motif. Documentation for one generally applies to the other, unless otherwise noted.

To override the default settings, follow these steps:

1. Copy or rename the `SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE` file to create a new command (`.com`) file called `DECW$PRIVATE_SERVER_SETUP.COM`.
2. Now make the edits for the settings you want to change using a text editor, and save the file.
3. For the changes to take effect immediately, you must restart the X server so that the new command file and changed settings will be used. The command to do this is as follows:

```

$ @SYS$MANAGER:DECW$STARTUP RESTART

```

The new file settings will now override the original default settings.



NOTE: By renaming this template file to `.COM`, you will enable multi-head operation. Many HP Integrity servers provide an embedded graphics option (currently based on the HP PCI AMD Radeon 7000 Graphics Adapter and RN50). The order of the screens is based on the bus order of the options, and will vary based on platform. For information and restrictions on configuring multiple heads, see “Restrictions, Limitations, and Defaults” (page 13). For information on how to force single headed operation, see “Screen Order and Forcing Single Headed Operation” (page 15).

Additional system logical names are described in:

```

SYS$MANAGER:DECW$DEVICE_CONFIG_GH.COM

```

However, this file should **not** be modified. If you wish to make changes to the default logical names, redefine them in the `DECW$PRIVATE_SERVER_SETUP.COM` file. These changes will supersede the values assigned in the device configuration file.

Many common items are changed by symbolic values in this file, however items are graphics card specific and are modified by defining system logical names. The settings include the following items:

```
DECW$XSIZE_IN_PIXELS
DECW$YSIZE_IN_PIXELS
DECW$SERVER_REFRESH_RATE
DECW$SERVER_PIXEL_DEPTH
```

For Example, to change the default settings from 1024 x 768, 24 bits per pixel and 70Hz to 1280 x 1024, 8 bits per pixel and 60Hz:

```
$ DEFINE/SYSTEM/EXEC/NOLOG DECW$XSIZE_IN_PIXELS 1280
$ DEFINE/SYSTEM/EXEC/NOLOG DECW$YSIZE_IN_PIXELS 1024
$ DEFINE/SYSTEM/EXEC/NOLOG DECW$SERVER_PIXEL_DEPTH 8
$ DEFINE/SYSTEM/EXEC/NOLOG DECW$SERVER_REFRESH_RATE 60
```

Note that all of these logical names can also be specified as a comma separated list of values. A single value will be applied to all screens. If a list of values is provided they are applied to the individual screens in order starting at screen 0.

Note that the visual class automatically defaults to `PseudoColor` at the 8 depth, which is generally what most users want. For example, to change the visual type to `TrueColor`, add:

```
$ DECW$SERVER_DEFAULT_VISUAL_CLASS == 4
```

Server Startup and Configuration Messages

Server messages are typically logged to the `DECW$SERVER_0_ERROR.LOG` file located in the `SYSS$MANAGER` directory. If problems are encountered during setup of the X11 server, or when a problem is discovered during normal use, be sure to check this file first for messages.

More extensive logging of server events can be enabled by modifying the `DECW$PRIVATE_SERVER_SETUP.COM` DCL procedure and setting:

```
$ DECW$SERVER_AUDIT_LEVEL == "n"
```

Where “n” is a value between 0 and 4 (with 0 representing none and 4 being high).

Troubleshooting

Table 3-2 Troubleshooting Criteria

Problem	Description	Solution
Cannot boot using VGA console.	The EFI console displays and takes input by default from all connected console devices. However, prior to v8.3–1H1, HP OpenVMS I64 only supports use of serial consoles (or a network console using the server management option).	Prior to v8.3–1H1, connect a serial console or setup a network console. Check the EFI setting for the PRIMARY console (found under boot setup). By default multiple devices will respond as EFI console devices, but only the PRIMARY console will be used by OpenVMS.
X11/Motif does not start on the graphics display and the screen remains blank.	After booting OpenVMS, no DECW\$SERVER process is observed.	Did you install Motif when OpenVMS was installed? Check console log for incorrect SYSGEN parameters or quotas. Is a keyboard and mouse connected? Both must be connected when X11/Motif is started. Messages will be displayed on the console for 15 seconds waiting for the devices. Sometimes this can be caused by KVM switches. Look at the contents of: SYS\$MANAGER:DECW\$SERVER_0_ERROR.LOG for possible error messages.
No Motif login box is displayed.	After booting HP OpenVMS I64, DECW\$SERVER is running but there is no login box.	Check for valid Motif license using the command LICENSE LIST. Check the console log for incorrect SYSGEN parameters or quotas.
Some 2D applications do not run.	Application errors with Bad Window or ColorMap errors.	Your application may be expecting an 8-bit PsuedoColor default. The HP PCI AMD Radeon 7000 Graphics Adapter defaults to 24-bit TrueColor. Either change the settings or fix the application. See (page 15).
OpenGL applications do not work.	3D applications fail to run.	Accelerated 3D operation (OpenGL) is not supported on the Radeon 7000. 3D applications “may” work slower, or may not work at all.

Table 3-2 Troubleshooting Criteria *(continued)*

Problem	Description	Solution
Blank or corrupt screen display.	The DECW\$SERVER_0 process is running as is DTGREET, but the screen is blank or corrupt.	<p>Is the screen saver active? Press a KB key or move the mouse.</p> <p>Is the monitor connected to the VGA output on the HP PCI AMD Radeon 7000 Graphics Adapter card?</p> <p>Does the monitor support the resolution and refresh rate being used? Some monitors may need to be manually adjusted using their front panel controls.</p> <p>Are you connected to the HP PCI AMD Radeon 7000 Graphics Adapter card or to the embedded graphics option?</p>
Visual noise or anomalies on the screen.	Flashes of dots or other random artifacts on the screen.	<p>This type of problem can arise at high resolutions and refresh rates.</p> <p>Use only high quality cables and connectors.</p> <p>Change orientation of the monitor which may be exposed to RF interference.</p> <p>Lower the refresh rate or the resolution.</p>

4 HP-UX Configuration

This chapter describes how to configure the HP PCI AMD Radeon 7000 Graphics Adapter in a system running the HP-UX operating system.



NOTE: Chapter 4 focuses on the HP-UX operating system only. If you are running the HP OpenVMS I64 operating system, see [Chapter 3 \(page 13\)](#).

The following slot restrictions are applicable to the following HP-UX servers:

- HP 9000 rp3410 — The HP PCI AMD Radeon 7000 Graphics Adapter card is supported in PCI slots 1 or 2.
- HP 9000 rp3440 — The HP PCI AMD Radeon 7000 Graphics Adapter card is supported only in PCI slot 4.
- HP 9000 rp4410/rp4440 — The HP PCI AMD Radeon 7000 Graphics Adapter card is supported in PCI slot 7. For a dual card configuration, only PCI slots 7 and 8 are supported.

The examples in this guide show version numbers valid at publication. To determine the most recent version of the video driver, see <http://www.hp.com/country/us/en/welcome.html#Support>.

For documentation of released operating systems, see <http://docs.hp.com/en/index.html>.

Verification of Software Installation

To use the HP PCI AMD Radeon 7000 Graphics Adapter, your system must have installed an up-to-date patch version for the `Xserver`. Additionally, a patch for the `gvid` kernel module must be installed on PA-RISC systems for the HP PCI AMD Radeon 7000 Graphics Adapter display to be found and claimed by the HP-UX OS. The kernel patch is not required on the Integrity line of servers.

The patch version must be at least the following (a superseding patch is OK):

- HP-UX 11.23: PHSS_37971 or later `Xserver` patch.
HP-UX 11.23: PHKL_38110 or later `gvid` patch (required on PA-RISC only).
- HP-UX 11.31: PHSS_37621 or later `Xserver` patch.
HP-UX 11.31: PHKL_38109 or later `gvid` patch (required on PA-RISC only).

To check the patch version of the `Xserver`, run the following command:

```
swlist -l patch | grep "Xserver cumulative patch"
```

To check the patch version of the `gvid` kernel module, run the following command:

```
swlist -l patch | grep "gvid"
```

If any version of these patches is installed on your system, the output will look similar to this output:

```
# PHSS_37971 1.0 Xserver cumulative patch
```

or

```
# PHKL_38110 1.0 cumulative gvid patch
```

The patch version will have a format of `PHSS_?????`, where `?????` is the patch number. If this version is equal to or greater than the required level indicated above, the system is ready to use the HP PCI AMD Radeon 7000 Graphics Adapter. If the patch version is less than the required level, install the latest patch.

The following list explains the order to capture the patch:

1. Login or register to the HP patch catalog. The URL is: <http://www11.itrc.hp.com/service/patch/mainPage.do?admit=109447626+1210714508998+28353475>.
2. Go to the **find a specific patch** search, enter its name (e.g. PHSS_37971) and press **enter**. This brings up a new screen. If there is a newer patch that supersedes this patch, it will be listed under the **Most Recent** heading. You will need to download the latest patch.
3. Click in the box next to selected patch then click the **add to selected patch list** button. This brings up a new screen that displays the patch along with any other dependent patches.
4. Click the **download selected** button. This brings up a new screen.
5. Select the server to use and the format of the patch bundle. Once these options are chosen, click the **download** button.
6. This downloads the patch bundle to your system. Save the patch bundle to a convenient place on your system. For this example, we will assume the patch bundle is downloaded into the `/tmp/PHSS_37971` directory file.
7. Once the patch bundle is downloaded, `unzip/gunzip/tar` the patch bundle depending on the format of the patch bundle. This extracts the patch bundle. Each bundle is a `shar` file. To create a depot for loading, run the `create_depot_hp-ux_11` script as root. This creates a bundle in `/tmp/PHSS_37971/depot`.
8. As root, run the `swinstall` command using the newly created bundle.


```
swinstall -s /tmp/PHSS_37971/depot
```

Including the gvid Module in the Kernel

To enable graphics on an HP-UX server, the kernel must have the `gvid` module configured in it. On the Integrity line of servers, this will happen automatically when the system is first installed and there is a graphics display detected in the system. On the Precision Architecture line of servers, or if a graphics display is not initially present, this may have to be done manually.

To determine if the `gvid` module is configured into your system's kernel, use the `kcmodule` command. See the following example:

```
kcmodule gvid
```

If your kernel is correctly configured, you will see the following output:

```
Module   State   Cause
gvid     static  explicit
```

If the state shown for `gvid` is anything other than `static`, the `gvid` driver must be configured into your system's kernel before you can use the HP PCI AMD Radeon 7000 Graphics Adapter card. To configure `gvid` into the kernel, enter the following command as *superuser*:

```
kcmodule gvid=static
```

This will build a new kernel containing the `gvid` driver. You must reboot your system to run this new kernel.

Verification of Hardware Installation

After the HP PCI AMD Radeon 7000 Graphics Adapter has been installed and the system has rebooted, verify the graphics card was correctly installed. Identify which device file corresponds to which card.

1. Run the following command:

```
ioscan -fun -C graphics
```

The following output should appear. Notice there is one line for every graphic device claimed in the systems bus. Each device should have `gvid_core` for a driver and the *S/W State* should be *CLAIMED*.

```

Class      I  H/W Path  Driver      S/W State  H/W Type  Description
=====
graphics  0  0/3/1/0  gvid_core  CLAIMED    INTERACE  PCI Display (10025159)

```

2. Display the contents of `/dev/gvid_info` by executing the following command:

```
cat /dev/gvid_info
```

The following output should appear. There should be one line (i.e. one device file) for every graphics device in the systems bus:

```
/dev/gvid0
```

```
/dev/gvid1
```

3. Determine the association of physical graphics cards to special device files (`/dev/gvid?`) by running the command:

```
/opt/graphics/common/bin/setmon -N /dev/gvid0
```

If the device is the HP PCI AMD Radeon 7000 Graphics Adapter card, the output should look like:

```
Device /dev/gvid0 is a ATI Radeon 7000 Graphics Adapter
```

You will also see this output for various integrated and manageability card displays.

HP PCI AMD Radeon 7000 Graphics Adapter as Default Xserver Device

The program utility `sam` (pre HP-UX 11.31 release) or `smh` can be used to make the HP PCI AMD Radeon 7000 Graphics Adapter the default Xserver device. This is for a single-screen Xserver configuration. For a multihead Xserver configuration, see “Multihead Support” (page 25).

1. Login as `root`.
2. Run `/usr/sbin/sam` (pre HP-UX 11.31 release) or `/usr/sbin/smh` (HP-UX 11.31 and later).

Select **Display->Xserver Configuration**. All graphics cards in the system are listed. Select the graphics device that is the current Xserver device. This device may or may not be the HP PCI AMD Radeon 7000 Graphics Adapter. From the pull down menu, select **Actions->Remove Screen from Configuration**. Select the new device you would like to be the default Xserver device. The new device should be one of the HP PCI AMD Radeon 7000 Graphics Adapter device entries. From the pull down menu, select **Actions->Add Screen to Configuration**.

3. Restart the Xserver.

Resolutions

The HP PCI AMD Radeon 7000 Graphics Adapter can support various graphics resolutions and refresh rates as shown in Table 4–1. If your monitor supports the DDC/EDID protocol, the EDID information from the monitor will override which resolutions are available.

Table 4-1 Standard Supported Video Modes — HP-UX

Resolution	Color Depths (Bits per Pixel)	Refresh Rates
1024 x 768	8, 24	60, 70, 75, 85Hz
1280 x 1024	8, 24	60, 75, 85Hz
1600 x 1200	8, 24	60, 65, 75, 85Hz

Restrictions and Limitations

This section provides information on the limitations and restrictions of the HP PCI AMD Radeon 7000 Graphics Adapter hardware and software.

No Accelerated 3D Support

The HP PCI AMD Radeon 7000 Graphics Adapter does not support accelerated 3D (e.g. OpenGL).

Multiple Colormaps

Multiple installed colormaps in depth 8 `PseudoColor` visual are not supported. The HP PCI AMD Radeon 7000 Graphics Adapters support only one installed colormap at one time. Exceeding this limit will cause colormap “flashing”.

Applications should not install or uninstall colormaps themselves. The window manager should perform these actions. However, the application is responsible for providing the window manager with hints as to which colormaps to install or uninstall. You provide this information using the following `Xlib` function:

`XSetWMColormapWindows ()`. This function sets the `WM_COLORMAP_WINDOWS` property for a given window.

Default Visual Information

The HP PCI AMD Radeon 7000 Graphics Adapter can only support one visual type at one time. Supported default visual types are 8-bit `PseudoColor` and 24-bit `TrueColor`. The default depth and visual class is 24-bit `TrueColor`. To change the default visual, you must edit the Xserver's configuration file which is located at:

```
/etc/X11/Xf86Config.
```

The depth is set in the **Screen** section of the `Xf86` configuration file. There also needs to be a **Display** subsection with the correct depth. For example, the following lines will select a 24-bit default visual:

```
Section "Screen"
  Identifier "Screen 0"
  DefaultDepth 24
  [...]

  SubSection "Display"
    Depth 24
    [...]
  EndSubSection
  SubSection "Display"
    Depth 8
    [...]
  EndSubSection
EndSection
```

The following lines will select an 8-bit default depth visual:

```
Section "Screen"
  Identifier "Screen 0"
  DefaultDepth 8
  [...]

  SubSection "Display"
    Depth 24
    [...]
  EndSubSection
  SubSection "Display"
    Depth 8
```

```
[...]  
EndSubSection  
EndSection
```

Restart the Xserver after editing the Xserver configuration file for the new default depth to take effect.

Configuring Graphics Resolution or Vertical Refresh Rates for HP-UX

Use the `sam` (pre HP-UX 11.31 release) or `smh` (HP-UX 11.31 and later) program to modify the graphics resolution or refresh rate.

Default Graphics Resolution

The default graphics resolution and refresh rate on a newly installed system is 1280 x 1024 at 75Hz.

How to Change the Resolution and Refresh Rate

1. Log in to the system as `root`.
2. Run `/usr/sbin/sam` (pre HP-UX 11.31 release) or `/usr/sbin/smh` (HP-UX 11.31 and later). Select **Display->Monitor Configuration**. All graphics cards in the system are listed. Select the graphics device to be updated. From the pull-down menu, select **Actions->Modify Monitor Type**. A new menu appears that contains all of the possible resolutions and refresh rates. Select the new setting and press **OK**. The selected values will be the new resolution and refresh rate for the Xserver.



NOTE: See Table 4-1 (page 23) for supported resolution and refresh rates.

3. Restart the Xserver.

Multihead Support

By default, an HP PCI AMD Radeon 7000 Graphics Adapter appears as a single screen device. Multihead support for two or more screens is provided through changes to the Xserver's configuration file which is located at `/etc/X11/Xf86Config`.

You can change this file by using `/usr/bin/sam` (pre HP-UX 11.31 release) or `/usr/sbin/smh` (HP-UX 11.31 and later). Select **Display->X Server Configuration**. All graphics cards in the system are listed. Some may have more than one video connector. Select the cards and video connectors you want to configure. Then select **Actions->Modify Multi-Screen Layout** or **Actions->Single Logical Screen (SLS)** to configure multiple screens as individual screens or as a Single Logical Screen.

Manual Multi-Screen Configuration

Alternatively you can configure multiple screens by manually editing the `/etc/X11/Xf86Config` file. The following example will show you how to configure three (3) screens.

Xf86Config Changes

There are three sections in the configuration file you need to change:

1. `ServerLayout` section contains references to the `Screen` sections.
2. `Screen` sections contain references to the `Device` sections.
3. `Device` sections.

For this example, we will assume there are two (2) HP PCI AMD Radeon 7000 Graphics Adapters in the system. These graphics cards have the device files `/dev/gvid0` and `/dev/gvid1`. We will change the `Xf86Config` file to allow for a three-screened (3) multi-head system. In this configuration, two (2) screens will come from the first graphics card (e.g. `/dev/gvid0`) and the remaining screen will come from the second graphics card (e.g. `/dev/gvid1`).

The lowest level is the Device section. This maps a physical device to a device identifier. The three (3) Device sections for this example follows:

```
Section "Device"
  Identifier "ATI Radeon 7000 (0) Connector 1"
  DeviceFile "/dev/gvid0"
EndSection

Section "Device"
  Identifier "ATI Radeon 7000 (0) Connector 2"
  DeviceFile "/dev/gvid0"
  Screen 1
EndSection

Section "Device"
  Identifier "ATI Radeon 7000 (1) Connector 1"
  DeviceFile "/dev/gvid1"
EndSection
```

The first device, `ATI Radeon 7000 (0) Connector 1` is the first screen on the first device. the second device, `ATI Radeon 7000 (0) Connector 2` is the second screen on the first device. Note that it has the `Screen 1` field, which selects the second video output on the graphics card. The third device, `ATI Radeon 7000 (1) Connector 1` is the first screen on the second device.

Once the Device sections are defined, you can define the Screen section, which maps a screen to a physical device. The Screen sections use the Identifier field that was defined for each of the Device sections. The three (3) Screen sections for this example follows:

```
Section Screen
  Identifier "Screen 0-1"
  Device "ATI Radeon 7000 (0) Connector 1"
  Monitor "Monitor 0"
  # Include other Screen info here, including other SubSections
EndSection

Section Screen
  Identifier "Screen 0-2"
  Device "ATI Radeon 7000 (0) Connector 2"
  Monitor "Monitor 0"
  # Include other Screen info here, including other SubSections
EndSection

Section Screen
  Identifier "Screen 1-1"
  Device "ATI Radeon 7000 (1) Connector 1"
  Monitor "Monitor 0"
  # Include other Screen info here, including other SubSections
EndSection
```

The first Screen section maps the screen `Screen 0-1` to the physical device `ATI Radeon 7000 (0) Connector 1`. The second Screen section maps the screen `Screen 0-2` to the physical device `ATI Radeon 7000 (0) Connector 2`. The third Screen section maps the `Screen 1-1` to the physical device `ATI Radeon 7000 (1) Connector 1`.

Once you have the Screen sections set up, you can set up the `ServerLayout` section. The `ServerLayout` section uses the Identifier field that was defined for each of the Screen

sections. The `ServerLayout` section describes all of the screens used by the Xserver. The `ServerLayout` section for this example follows:

```
Section ServerLayout
Identifier "Main Layout"
Screen 0 "Screen 0-1" 0 0
Screen 1 "Screen 0-2" RightOf "Screen 0-1"
Screen 2 "Screen 1-1" RightOf "Screen 0-2"
InputDevice "Mouse0" "CorePointer"
InputDevice "Keyboard0" "CoreKeyboard"
EndSection
```

This `ServerLayout` has three (3) screens associated with it. These screens are accessed through the 0.0, 0.1 and 0.2 displays. The first screen is associated with the `Screen 0-1` section and is the anchor screen (at location 0, 0). The second screen is associated with the `Screen 0-2` section and its screen coordinates are to the right of the first screen. The third screen is associated with the `Screen 1-1` section and its screen coordinates are to the right of the second screen.

Messages

Xserver messages are typically logged to `/var/X11/Xserver/logs`. The two files that contain the messages are:

```
/var/X11/Xserver/logs/Xf86.*.log
/var/X11/Xserver/logs/Xstartup.*.log
```

Where `*` is the display instance of the Xserver, which is usually 0. The `Xstartup.*.log` file contains messages from the X loader. The `Xf86.*.log` file contains messages from the Xf86 Xserver. The `Xf86.*.log` file is the file that should be checked first, should problems arise.

Troubleshooting

Table 4-2 Troubleshooting Criteria

Problem	Description	Solution
Can not boot using VGA console.	The PA-RISC server systems do not support VGA as a console.	Serial console must be used.
CDE does not start on the graphics display.	After booting CDE does not come up on the HP PCI AMD Radeon 7000 Graphics Adapter display.	CDE starts at run level 3. Check your run level with <code>who -r</code> command. Change it with the command <code>/sbin/init 3</code> . Check your <code>/etc/dt/config/Xservers</code> file, if it exists. There should be a line at the bottom such as <code>* Local@console /usr/bin/X11/X :0</code> that is not commented out. This line might get commented out by the system if there is no mouse or graphics. Is a keyboard and mouse attached? The Xserver will not start unless a mouse and keyboard are attached. Is the Xserver configured with the correct <code>/dev/gvid</code> devices?
OpenGL applications do not work.	3D applications fail to run or run very slowly.	Accelerated 3D is not supported on the HP PCI AMD Radeon 7000 Graphics Adapter. Some 3D applications may run through emulation mode at greatly reduced performance.

Table 4-2 Troubleshooting Criteria *(continued)*

Problem	Description	Solution
Blank or corrupt screen.	The dtlogin process is running but the monitor is blank or corrupted.	Is the monitor connected to the correct display connection on the HP PCI AMD Radeon 7000 Graphics Adapter? Does the monitor support the resolution and refresh rate that the Xserver is running at?
Visual noise is present on the monitor.	Flashes, dots, or other random artifacts are present on the monitor.	At high resolutions and refresh rates this type of problem can occur on some monitors. Use only the cables provided with the monitors. Lower the refresh rate and/or resolution.



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