# HP VISUALIZE $fx^2$+, $fx^4$+, $fx^6$+ and Texture Module User's Guide

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**HEWLETT® PACKARD**

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# Contents

# Preface

This guide describes how to configure and troubleshoot your HP VISUALIZE $fx^2+$, $fx^4+$ and $fx^6+$ Graphics Cards, herein referred to generically as *fx+*.

## Additional Information and Help

For more information on your graphics card and the accessories available with this product, you can visit the following page on HP's web site:

*   HP VISUALIZE Personal Workstation product specifications, latest drivers, FAQs, and support information:
    ```
    http://www.hp.com/visualize/support
    ```

## Electrostatic Discharge (ESD) Precautions

Electrostatic charges can damage the integrated circuits on printed circuit boards. To prevent such damage from occurring, observe the following precautions during board unpacking and installation:

*   Stand on a static-free mat.

*   Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to ground.

*   Create a common ground for the equipment you are working on by connecting the static-free mat, static strap, routing nodes, and peripheral units to that piece of equipment.

*   Keep uninstalled printed circuit boards in their protective antistatic bags.

*   Handle printed circuit boards by their edges, once you have removed them from their protective antistatic bags.

# Important Safety Information

**WARNING**

**If you have any doubt that you can lift the HP V<small>ISUALIZE</small> Personal Workstation or display safely, do not try to move it without help.**

**For your safety, always connect the equipment to a grounded wall outlet. Always use a power cord with a properly grounded plug, such as the one provided with this equipment, or one in compliance with you national regulations. This HP V<small>ISUALIZE</small> Personal Workstation is disconnected from the power by removing the power cord from the power outlet. This means the Personal Workstation must be located close to a power outlet that is easily accessible.**

**For your safety, never remove the HP V<small>ISUALIZE</small> Personal Workstation's cover without first removing the power cord from the power outlet, and any connection to the telecommunications network. Always replace the cover on the Personal Workstation before switching it on.**

**To avoid electric shocks, do not open the power supply. There are no user-serviceable parts inside.**

**This HP V<small>ISUALIZE</small> Personal Workstation is a class 1 laser product. Do not attempt to make any adjustment to the laser units.**

**Before handling the HP V<small>ISUALIZE</small> *fx* Graphics Card, first wait until the board has cooled down completely. The graphics card can become very hot during use.**

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# Installation Notice

Products designated in the applicable Hewlett-Packard price list as customer-installable can be installed by computer-knowledgeable customers who carefully read and follow the instructions provided. Customers who elect to have the product installed by our field personnel are charged the applicable field installation charge, as covered under the standard terms and conditions. For more information, please contact your local sales representative.

# Revision History

The revision history for each edition of the manual is listed below:

Edition             Revision History

E0600               Second Printing

**8**

# 1    HP VISUALIZE $fx^2$+, $fx^4$+, $fx^6$+ Graphics Cards and Texture Module

# Introduction

This section contains brief overviews of the HP VISUALIZE *fx+* Graphics Card and the HP VISUALIZE *fx+* Texture Module. This section then provides important safety instructions that you should follow when handling the HP VISUALIZE *fx+* Card and Texture Module.

## The HP VISUALIZE *fx+* Graphics Card



The HP VISUALIZE *fx+* Graphics Card is a high-end OpenGL graphics card that features the latest high-performance 3D graphics technology.

The OpenGL graphics card accelerates your 3D graphics design and visualization and improves the quality of your graphics.

The HP VISUALIZE *fx+* graphics subsystem occupies two accessory slots in your Personal Workstation (one PCI and one AGP Pro). It brings you:

- A world-class geometry engine, using dedicated floating-point processors based on PA-RISC technology

- 18MB SGRAM video memory

- Full OpenGL 1.1 hardware features and extensions support

- HP Color Recovery dithering

- Acceleration of the HP OpenGL occlusion culling extension.

- Stereo vision support

- Optional hardware texture accelerator module with 16MB SDRAM of dedicated texture memory.

## The HP VISUALIZE *fx+* Texture Module



The HP VISUALIZE *fx+* Texture Module is an add-on accessory for the HP VISUALIZE *fx+* Graphics card.

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The HP VISUALIZE *fx+* Texture Module provides:

• Accelerated hardware texture mapping

• 16MB dedicated SDRAM (Synchronous DRAM) memory for textures.

• Accelerated hardware accumulation buffer support.

## Important Safety Instructions

**CAUTION**    Static electricity can damage electronic components. Therefore, anytime you handle an accessory such as the HP VISUALIZE *fx+* graphics card or Texture Module, you should use an electrostatic strap if you have one. You should turn all equipment OFF. Do not let your clothes touch the accessory. To equalize the static electricity, rest the antistatic bag on top of the Personal Workstation while you are removing the accessory from it. You should also handle the accessory as little as possible and with care.

**WARNING**    **For your safety, never remove the Personal Workstation's cover panels without first removing the power cord from the power outlet and any connection to a telecommunications network. Always replace the cover panels on the Personal Workstation before switching it on again.**

**Before handling the HP VISUALIZE *fx+* Graphics card, first wait until the card has cooled down completely before touching it. The card can become very hot during use.**

# Installing the HP VISUALIZE *fx*+ Graphics Card

This section contains the following subsections:

- Removing the Left-Side Panel

- Installing the HP VISUALIZE *fx*+ Graphics Card

- Replacing the Left-Side Panel

- Updating the HP VISUALIZE *fx*+ Driver

- Configuring the HP VISUALIZE *fx*+ Driver

- Troubleshooting

# Removing the Left-Side Panel

The procedure in this section explains how to remove the left-side panel of your Personal Workstation (use the Personal Workstation's front panel as the reference).

Left-Side Panel →

Front Panel
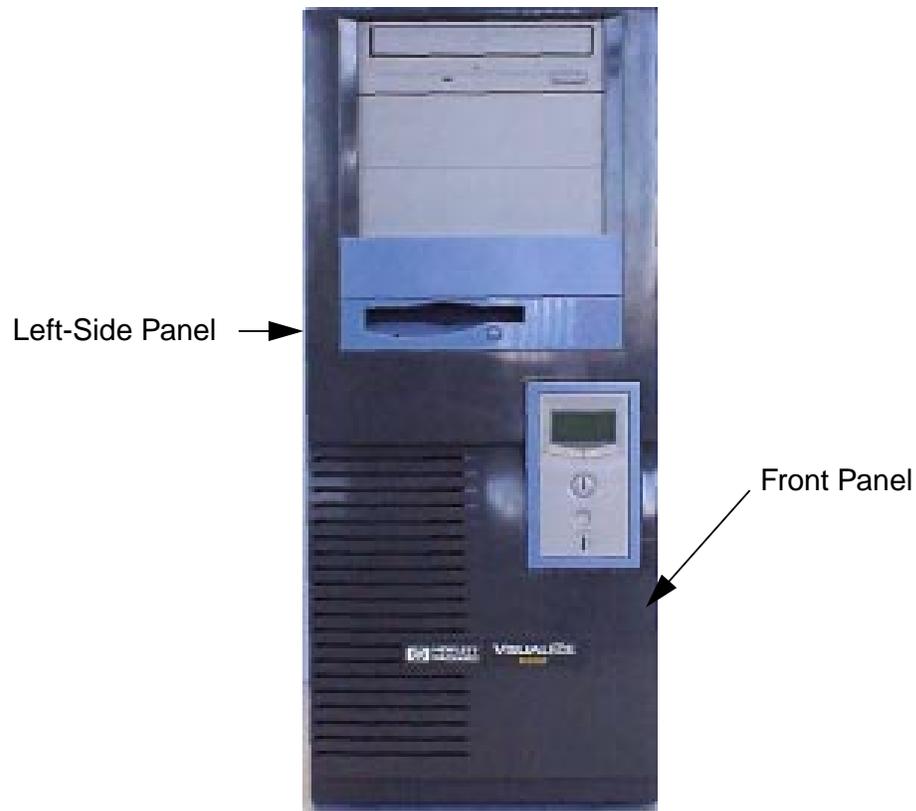
1. Remove the left-side panel's two thumb screws, found at the back of the unit. See Figure 1-1.

**Figure 1-1      Removing the Left-Side Panel Thumb Screws**



Thumb Screws

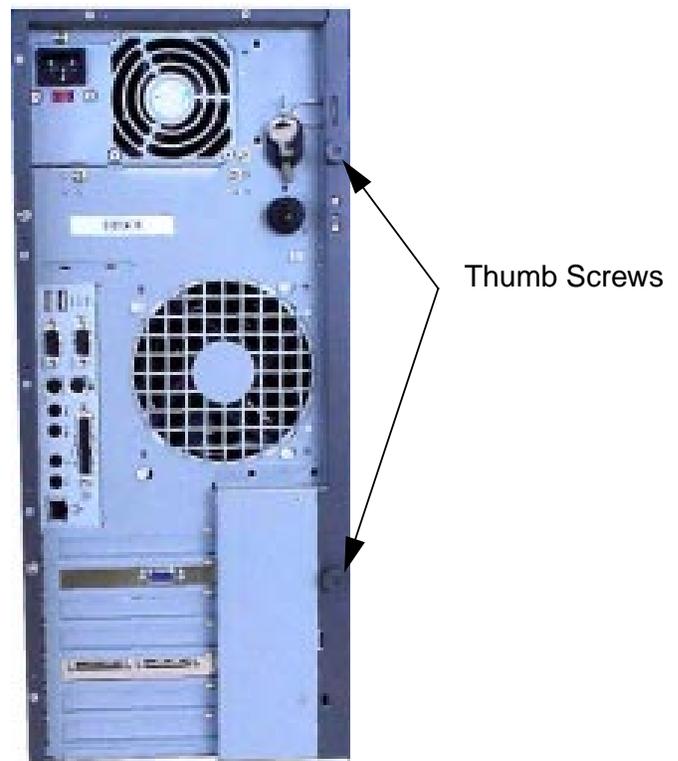2.  Slide the left-side panel toward the rear of the Personal Workstation approximately 0.5 inches as shown in Figure 1-2.

**Figure 1-2**    **Sliding the Left-Side Panel to the Rear of the Personal Workstation**



This gap is approximately 0.5 inches.

3.  Remove the left-side panel by grasping the rear part of the panel as shown in Figure 1-3 and pulling the panel outward. Next, lift the panel up and away from the Personal Workstation, and place it where its exterior surface cannot be damaged.

**Figure 1-3**    **Removing the Left-Side Panel**

## Installing the HP Visualize *fx+* Card

1.  If your system already has a HP Visualize *fx+* card occupying the AGP Pro and PCI accessory slots, please proceed to the section "Removing the HP Visualize *fx+* Graphics Card." If another vendor's card is occupying these slots, please follow this vendor's directions for removing the card before proceeding.

2.  Ensure that all power cords and telecommunications cables are disconnected.

3.  Ensure that all cables are correctly routed and flat against the system so that they do not obstruct the HP Visualize *fx+* Graphics card. Since the HP Visualize *fx+* Graphics Card occupies two accessory slots (one AGP Pro and one PCI), it may be necessary to remove two bulkhead blanks, using a Torx™ screwdriver.
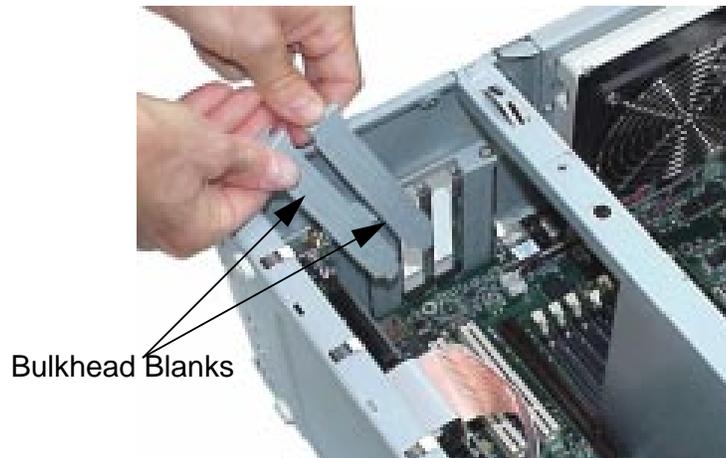


Bulkhead Blanks

4.  Place the Personal Workstation on its side.

5.  Hold the card with both hands, aligning the bulkhead edge of the card with the empty bulkhead slot, and the right edge of the card with the guide located to the right, on the plastic speaker and fan mount. Use the slot as a guide to carefully slide the card down toward the AGP Pro and PCI connectors on the system board.



Guide on
Fan Mount
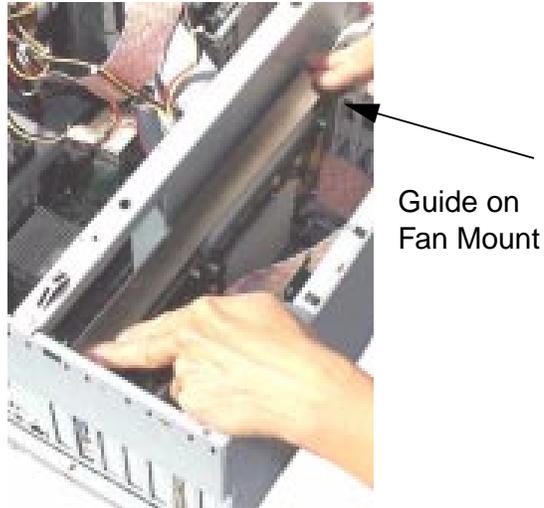
6.  Align the card's AGP contact fingers and PCI contact fingers with their appropriate system board connectors and push the card firmly into position.

7. Verify that the card's contact fingers are fully seated in their connectors before securing them with the three screws: two accessory slot screws and one retaining screw. The retaining screw you need to secure is located on the plastic speaker and fan mount as shown below.
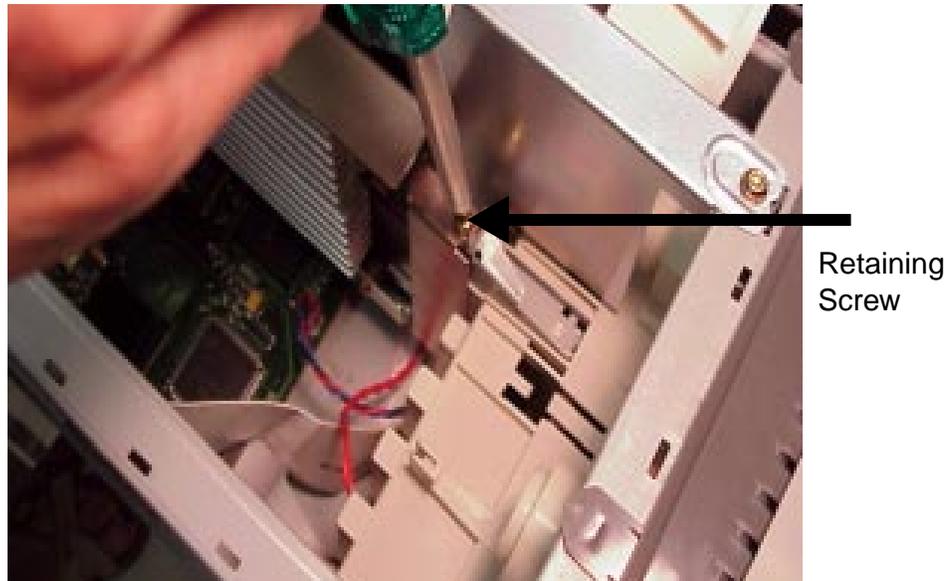


Retaining Screw

The accessory slot screws which must be secured are located on the bulkhead side of the chassis as shown below.
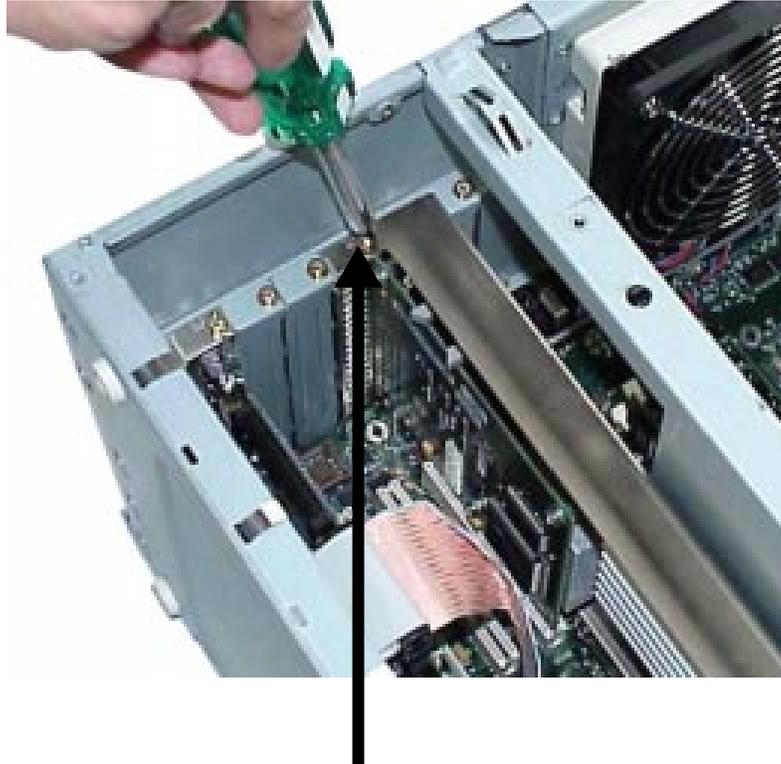
Accessory Slot Screw

## Replacing the Left-Side Panel

This section explains how to replace the left-side panel of your Personal Workstation (use the Personal Workstation's front control panel as the reference). The inside view of this panel is shown to help you with the terminology used in this manual.
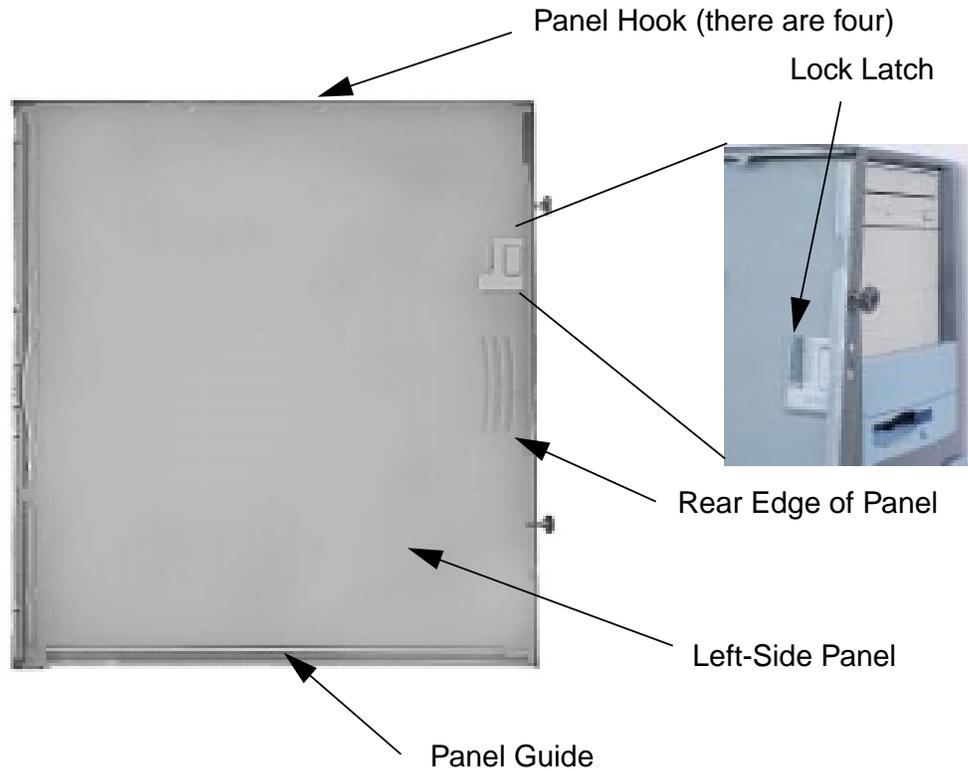


Panel Hook (there are four)

Lock Latch

Rear Edge of Panel

Left-Side Panel

Panel Guide

To replace the left-side panel, follow this procedure:

1.  Place the panel guide over the system's inside-bottom edge, leaving a half-inch gap between the front edge of the panel and the front of the chassis.
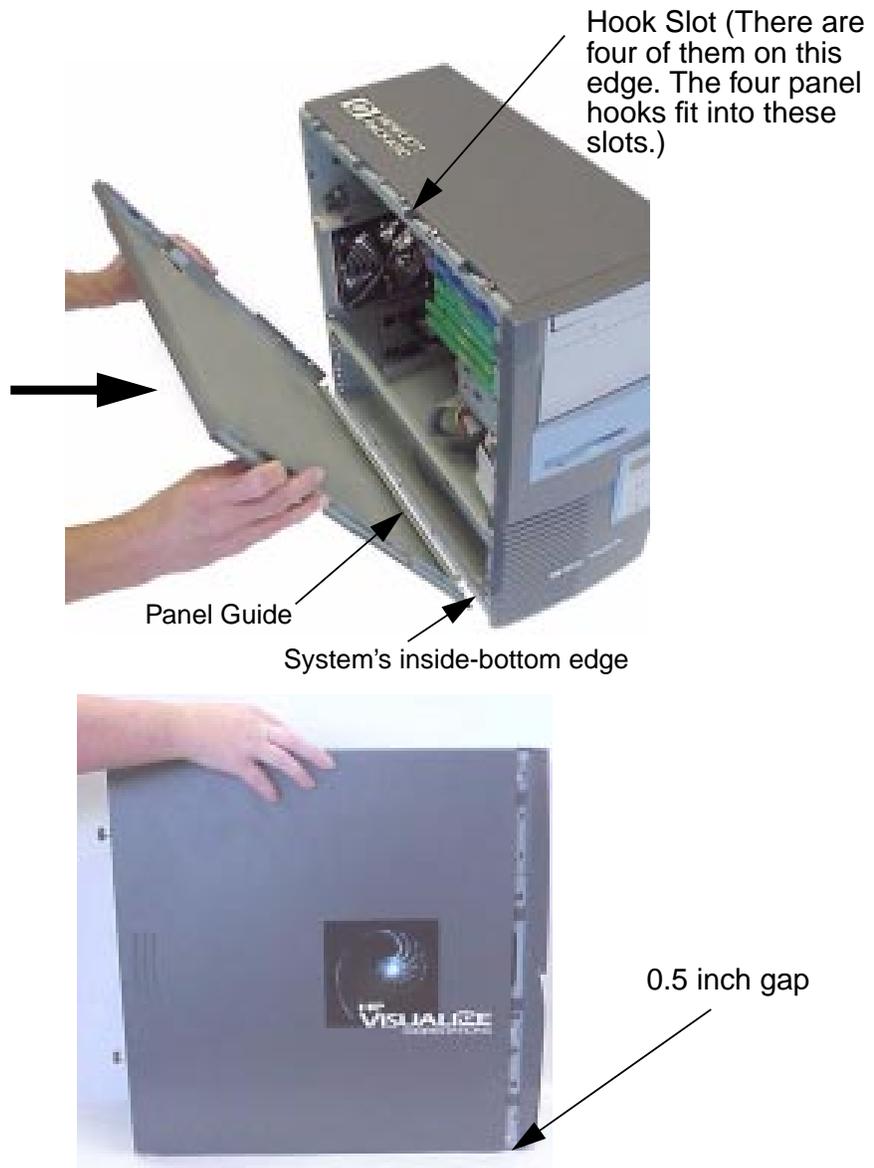
Hook Slot (There are four of them on this edge. The four panel hooks fit into these slots.)

Panel Guide

System's inside-bottom edge

0.5 inch gap

2. Locate the four hook slots on the top edge of the system and align these slots with the four panel hooks on the left-side panel. Next, push the left-side panel inward (in the direction of the arrow). Note that in some cases you might have to lift up slightly on the panel to get the panel hooks to fit in the slots.

Gap is aprox.
0.5 inches

3. Screw the left-side panel thumb screws in place to complete the left-side panel replacement on the Personal Workstation.

Thumb Screws

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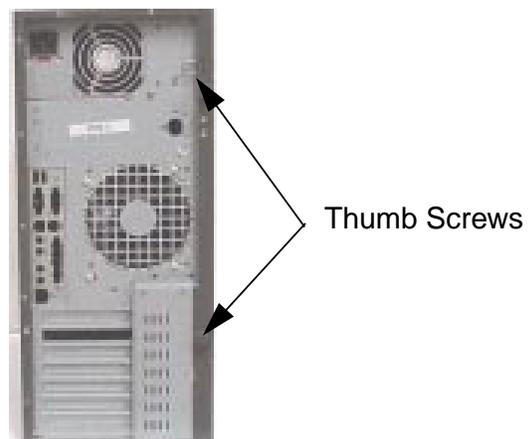
## Updating the HP VISUALIZE *fx*+ Driver

HP updates the HP VISUALIZE *fx*+ Driver as needed to incorporate feature and performance enhancements, or to fix problems found when running specific applications.

You can download the latest version of the HP VISUALIZE *fx*+ driver from HP's web site:

`http://www.hp.com/go/visualizesupport`

After accessing the HP VISUALIZE Support web site, you will notice a drop-down list of systems. Select the system you want to support, for example, an X Class system. On the next screen, click on the **Drivers** button. Scroll to the list entry for HP VISUALIZE $fx^4$+ and $fx^6$+ Open GL Graphics Accelerator. Then click on the link to download the driver.

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**NOTE**      A README file is supplied with the driver. Please read it carefully as it provides instructions to install the driver. Moreover, the information contained in the README file supersedes any information contained in this manual.

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To update the driver, follow these instructions:

1. Create a temporary directory such as `C:\TEMP\fx4+DRV\`

2. Download the driver from HP's web site to a temporary folder on your hard disk.

3. Run the executable file to decompress the contained files. You can do this by double-clicking on the file in Windows Explorer.

Follow the instructions provided in the README file that comes with the driver.

## Configuring the HP VISUALIZE *fx+* Driver

You can configure the HP VISUALIZE *fx+* driver using the **Display Properties** dialog box.

To display the **Display Properties** dialog box, click **Start**, point to **Settings**, and click **Control Panel**. In **Control Panel**, double-click **Display**.

When the HP VISUALIZE *fx+* driver is installed, the **Display Properties** dialog box contains four extra panels:

- About
- Administrator
- Gamma Correction
- Options

If you want information on an item, Click "?" at the top of the dialog box. To close the pop-up window, click inside it.

### The About Panel

The **About** panel displays useful information, including the version of the driver, OpenGL version and extensions, and the presence and size of the texture memory module.



The figure above shows the **About** panel for an HP VISUALIZE *fx*+ Graphics card with driver version FX.00.01.14 and a 16 MByte texture memory module installed.

**Driver Basic Configuration**

**The Options Panel**
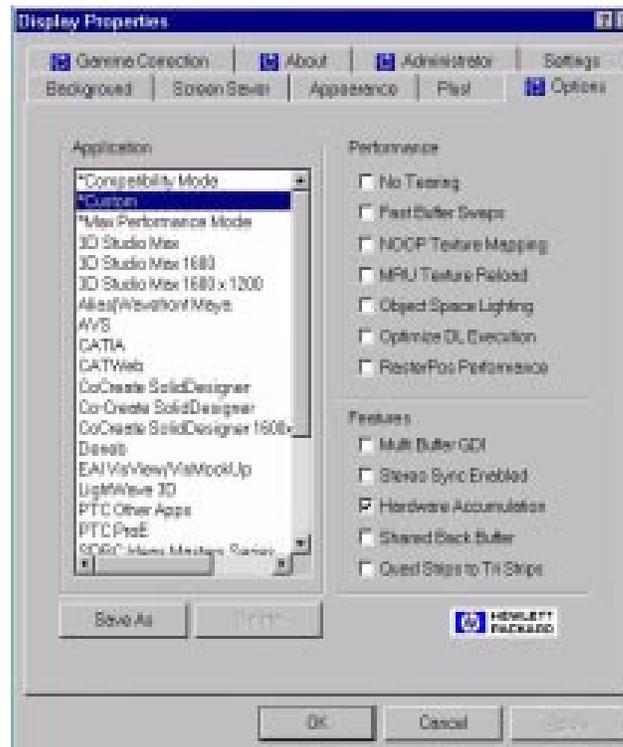


Configure the driver for the application you are using by selecting the application name in the **Application** group box. When you select an application, options in the **Settings** group box are automatically configured for the selected application.

If your application is not listed, select `*Compatibility Mode`.

**The Settings Panel**

Use the **Settings** panel to change the screen resolution, number of colors and refresh rate. Click **List All Modes** to view all combinations of colors, desktop area, and refresh frequency supported by the HP VISUALIZE *fx+* Graphics card. If you select a mode, click **Test** to see if your choice is compatible with your monitor.

You can display screen resolutions up to 1280×1024 in True Color(24 bit), double-buffered mode.

Using a resolution of 1600×1200 you can obtain True Color(24 bit) in single-buffered mode only. However, if the **Color Recovery** setting is enabled in the **Options** panel, the 1600×1200 resolution is obtained as 12-bit color, double-buffered mode. HP Color Recovery uses an advanced form of dithering to give near true color appearance.

**Driver Advanced Configuration**

**The Options Panel**

**Table 1-1          Application Group Box**

| Option | Description |
|---|---|
| Max Compatibility | The "Max Compatibility setting provides maximum compatibility for those applications that mix OpenGL and Windows GDI rendering in double-buffered windows, contrary to Microsoft requirements. If your application is not listed, choose this option. |
| Max Performance | The "Max Performance" setting will provide the maximum graphics throughput. However, many applications may exhibit visual anomalies. |
| Custom | The "Custom" setting becomes active when the user manually modifies one or more settings. For more information refer to "Creating Custom Driver Configurations" in a subsequent section. |
| Application Name | Select the application software you are using (for example, SoftImage, Solidworks). |

**NOTE**    Settings preceded with the "*" character, cannot be deleted by anyone, including the system administrator.

**Table 1-2**    **Setting Group Box**

| Option | Description |
|---|---|
| No Tearing | "No Tearing" prevents the tearing effect seen when rendering in the middle of a vertical refresh. The tearing effect is a discontinuity in the image appearing as a horizontal line, which is different from frame to frame. Enabling this option is similar to turning off "sync to vertical retrace" or "wait for v blank" with other graphics cards. When this option is enabled, performance may be reduced because rendering waits for a vertical refresh to finish. This is especially true for large windows. |
| Fast Buffer Swaps | "Fast Buffer Swaps" take advantage of HP's multi-buffer hardware. The hardware has a physical front and back buffer that can be swapped very quickly. For compatibility with some applications, this option can be turned off, and the back buffer copied to the front buffer instead. |
| Multi Buffer GDI | This option causes GDI (NT Graphics Device Interface) to draw to both the physical front and back buffers. This is useful for applications which use GDI to draw in an OpenGL window. This option must be disabled for 2D benchmarking purposes. |
| Quad Strips to Tri Strips | Applications that fail to conform to the OpenGL standard, by creating non-planar quad strips, may render incorrectly with this driver. This option causes quad strips to be converted to triangle strips, so that the geometry will render correctly. |

**Table 1-2**     **Setting Group Box**

| Option | Description |
|---|---|
| Color Recovery | Color recovery uses patented HP technology and is unique to HP VISUALIZE graphics cards. It generates near true color quality images from 8-bit or 12-bit source in OpenGL context without the grainy or patterned effect of 8-bit dithering. |
| Stereo Sync Enabled | When this option is set, stereo timing is enabled on the video output port and stereo pixel formats are made available to applications. Note that stereo timing is only supported in True Color screen formats of 1280×1024 and less in resolution. Additionally, the stereo effect is greatly enhanced at higher refresh rates, for example, 120 Hz. Finally, note that the stereo effect will only be visible when using appropriate stereographic glasses or headsets. |
| Hardware Accumulation | For formats of 1280×1024 and less, this option speeds the standard OpenGL functionality, which requires texture memory on the optional texture board. The following restrictions apply: only 8 bits of resolution are provided per color component; the accumulation buffer contains only unsigned values; the result of operations from the accumulation buffer to the color buffer are always automatically copied back to the accumulation buffer. |
| Optimize DL Execution | This option can improve the OpenGL display list execution performance for some display lists. It does this at the expense of a slightly increased display list compilation time. |

**Table 1-2**          **Setting Group Box**

| Option | Description |
|---|---|
| RasterPos Performance | This option can improve the OpenGL performance if an OpenGL application is using a large number of calls to glRasterPos, g1Bitmap, glDrawPixels, or glPushAttrib. This option can reduce performance for applications that are not heavy users of one of these calls, so it should only be used if the appropriate conditions exist. |
| NOOP Texture Mapping | When this option is set, texture mapping becomes NOOP (NO OPeration). All texture commands sent by an application are ignored. If the texture module is not installed, setting this option can be useful to simulate the performance with the texture module installed. However, visual results are poor, and actual hardware acceleration with the texture module will be slightly slower than this simulated performance. |
| MRU Texture Reload | When this option is set, the most recently used texture is replaced when texture memory is full. This is most useful when many textures are used sequentially, because it minimizes the number of textures that are downloaded. |
| Object Space Lighting | Enabling this feature optimizes lighting performance at the expense of matrix change performance. This may improve the performance of some applications. |
| Shared Back Buffer | Enabling this feature sets OpenGL rendering to be clipped only to the window boundaries, ignoring any obscuring windows. This option should normally not be set since it can cause unexpected interactions between OpenGL applications. It should only be set to improve the usage of the no Redarw on Window Expose option in 3D Studio MAX and Autocad 2000. |

**Chapter 1**                                                                       **31**

### The Administration Panel

The Administration panel is only available if the user has system administrator privileges. From this panel, the system administrator can enable the user to access the Gamma Correction and Options panels and allow the user to change and save the HP VISUALIZE *fx+* Custom configuration.

### The Gamma Correction Panel

Gamma correction is used to correct non-linearity in the phosphor brightness of monitors. It can be used to improve the appearance of antialiased lines, shaded graphic images, or scanned photographic images that have not already been gamma corrected.

### Creating Custom Driver Configurations

The **Options** panel allows you to create customized driver configurations for the HP VISUALIZE *fx+* graphics card. These configurations appear in the **Application** group box.

To create a customized profile:

1. Set the desired options in the **Settings** group box. This will select the `*Custom` setting in the **Application** group box.

2. Click the **Save As** button to save the current configuration. You are prompted for a profile name.

3. Type a configuration name in the **Save Configuration** dialog box. This name will appear in the **Application** group box.

### Save As Button

Allows you to save the current `*Custom` configuration as a named user-specific configuration.

### Delete Button

Allows you to delete a custom configuration.

# Troubleshooting

This section describes how to troubleshoot problems that may arise with your graphics subsystem. It also provides some tips on how to improve the graphics performance.

### Troubleshooting Video Problems

**Problem**: At boot time, the screen is blank and there are no error messages.

| Solution | Explanation |
|---|---|
| Check that the computer and display are turned on. (The power light should be illuminated.) | Useful routine checks, especially if you have just moved the Personal Workstation. |
| Check the display's contrast and brightness settings. | |
| Make sure that all cables and power cords are plugged in. | |
| Make sure the power outlet is working. | |
| If possible, try another monitor and set of cables. | Useful routine checks, especially if you have just moved the computer. |
| Check the LCD screen of your Personal Workstation. If the LCD screen reports 'Error – No Video,' check that the HP VISUALIZE *fx+* graphics card is correctly inserted into the AGP Pro and the PCI slots. | At boot time, the display's signal is provided by the VGA daughter of your HP VISUALIZE *fx+* graphics card. MaxiLife can check if the VGA daughter is running properly. |

| Solution | Explanation |
|---|---|
| If the LCD screen does not report any error, try another graphics card, if available. Even if it is not an HP VISUALIZE *fx+* graphics card, the boot sequence should be displayed using the VGA standard driver. | If the boot sequence is displayed correctly using a replacement graphics card, your HP VISUALIZE *fx+* graphics card may be faulty. |

**Problem**: The computer boots in AGP, but the screen goes blank or is corrupted when switching to high-resolution mode.

| Solution | Explanation |
|---|---|
| Remove the HP VISUALIZE *fx+* graphics card and then re-insert it. Ensure that the graphics card is properly inserted in the AGP Pro slot. | MaxiLife does not detect this error, as it only checks the VGA controller that is located on the PCI daughter. |
| Check that your monitor supports the HP VISUALIZE *fx+* graphics card resolution and refresh rate selected. If the monitor does not support the selected resolution, boot in VGA and then change your settings. | This problem may occur if you have just changed your monitor. |

| Solution | Explanation |
|---|---|
| If the texture module is not installed, check that a terminator is present and firmly connected. | The figure below shows the  location of the terminator. To check if the terminator is firmly connected, you may need to remove the card's strengthening bar and then replace it. (You can use a Torx™ screwdriver or a flat-blade screwdriver of the correct size.) |
| Run the diagnostics tool. | For more information on the diagnostics tool, see the section "Diagnostics Tool." |
| Check that you are using the correct video driver. The video driver version is displayed in the **About** panel. | you may have updated the HP VISUALIZE *fx+* driver with the wrong version. The *fx+* (*fx4+* and *fx6+*) drivers use the form FX.00.02.xx and the *fx4* driver uses the form FX.00.00.xx. |

**Problem**: The computer boots correctly in VGA and High-resolution mode, but visual anomalies are observed when using applications.

| Solution | Explanation |
|---|---|
| The driver may not be optimized for the application used. Open **Display Properties**, select the **Options** panel and select the appropriate application. For more information, see the section "Driver Basic Configuration." | When an application is selected, the driver settings are automatically configured for optimum performance and visual comfort for that application. |
| Run the diagnostics tool. | For more information on the diagnostics tool, see the section "Diagnostics Tool." |
| Check the HP web site for an updated driver version for your application.<br><br>`http://www.hp.com/go/`<br>`visualizesupport` | HP frequently updates the HP VISUALIZE *fx* driver to incorporate feature and performance enhancements, or to fix problems found when running specific applications. |

**Diagnostics Tool**

Your preloaded software includes a diagnostics tool to test your HP VISUALIZE *fx*+ graphics card. This tool is also available on the HP CD-ROM provided with your Personal Workstation and on the HP web site: `http://www.hp.com/go/visualizesupport`.

The diagnostics tests include an in-depth check of the graphics ASICS, frame buffer and texture module (if present).
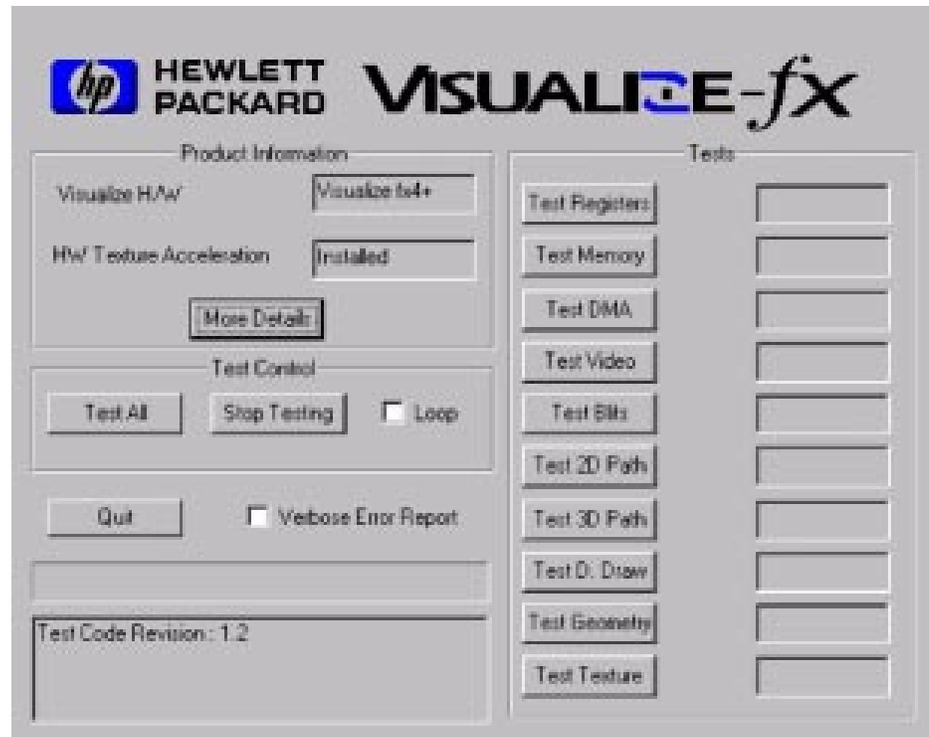


**CAUTION**        To run the diagnostics tools you must start Windows NT in VGA mode.

To run the diagnostics tool:

1. Shut down Windows NT and restart in VGA mode. You may receive a message saying that the current display settings are not valid. Click **OK** and then click the **Cancel** button in the **Display Properties** dialog box.

2. Click the **Start** button.

3. Point to **Programs**.

4. Point to **HP Diagnostics**.

5. Click on **HP VISUALIZE *fx* Diagnostics.**

The diagnostics tool appears. Click **Test All** to test each of the card's modules. The results for each test are displayed on the right side of the window.

**Troubleshooting Performance Problems**

**Problem**: Graphics performance is below expectations.

| Solution | Explanation |
|---|---|
| Check the HP web site for an updated driver version for your application.<br><br>`http://www.hp.com/go/visualizesupport` | HP frequently updates the HP VISUALIZE *fx* driver to incorporate feature and performance enhancements, or to fix problems found when running specific applications. |
| The driver may not be optimized for the application used. Open **Display Properties**, select the **Options** panel and select the appropriate application. | When an application is selected, the driver settings are automatically configured for optimum performance and visual comfort for that application. |

| Solution | Explanation |
|---|---|
| If the application used is applying texture mapping, you may need to install the texture module.<br><br>You can simulate the performance that would be obtained by installing the texture module by enabling the NOOP option in the **Settings** group box of the **Options** panel. | If the texture memory module is not installed, texture mapping is performed via the software. Since this involves a very high number of complex calculations, the performance impact can be significant. |

# Adding a Texture Module to Your *fx*+ Graphics Card

This section contains the following sub-sections:

- Removing the Left-Side Panel
- Removing the HP VISUALIZE *fx*+ Graphics Card
- Installing the HP VISUALIZE Texture Module
- Installing Your Graphics Card and Texture Module
- Replacing the Left-Side Panel
- Checking the HP VISUALIZE Texture Module Installation
- Troubleshooting

## Removing the Left-Side Panel

For information regarding the removal of the left-side panel of your Personal Workstation, read the subsection "Removing the Left-Side Panel" in the section "Installing the HP VISUALIZE *fx*+ Graphics Card."

## Removing the HP VISUALIZE *fx*+ Graphics Card

**CAUTION**      Be very careful when handling the HP VISUALIZE *fx*+ Graphics Card. Bumping, bending, or dropping the card can cause irreparable damage.

1. Ensure that all power cords and telecommunications cables are disconnected.

2. Ensure that all cables are correctly routed and out of the way so that they do not obstruct the removal of the HP VISUALIZE *fx*+ Graphics Card.

3. Carefully place the Personal Workstation on its side.

**WARNING**

**Before handling the HP VISUALIZE *fx*+ Graphics Card, first wait until the card has cooled down completely before touching it. The graphics card can become very hot during use.**

4.  Remove the two accessory card mounting screws located on the bulkhead and the retaining screw located on the plastic mount for the speaker and fan. Carefully ease the card up and out of the Personal Workstation's chassis using the card's bulkhead and right edge.



**CAUTION**

When sliding the card up, ensure that the card does not snag or catch against the Personal Workstation's chassis or cables.

5.  Place the card on an antistatic bag. In case an antistatic bag is not available, place the card on a static free surface.

# Installing the HP VISUALIZE Texture Module

This section explains how to add the HP VISUALIZE Texture Module to the HP VISUALIZE *fx+* Graphics Card.

fx+ Graphics Card

Texture Module

1.  Remove the two screws from the card's strengthening bar, and then remove the strengthening bar from the HP VISUALIZE *fx+* Graphics Card. (You can use a Torx™ screwdriver or a flat-blade screwdriver of the correct size.)
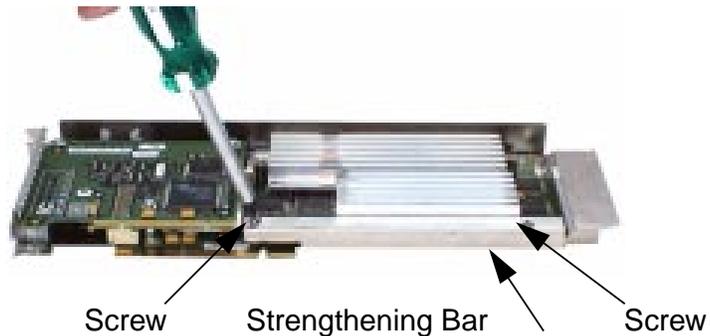
Screw          Strengthening Bar          Screw

2. Carefully remove the terminator from the HP VISUALIZE *fx+* graphics card. Store the terminator in a safe place (you may need it at a later date).
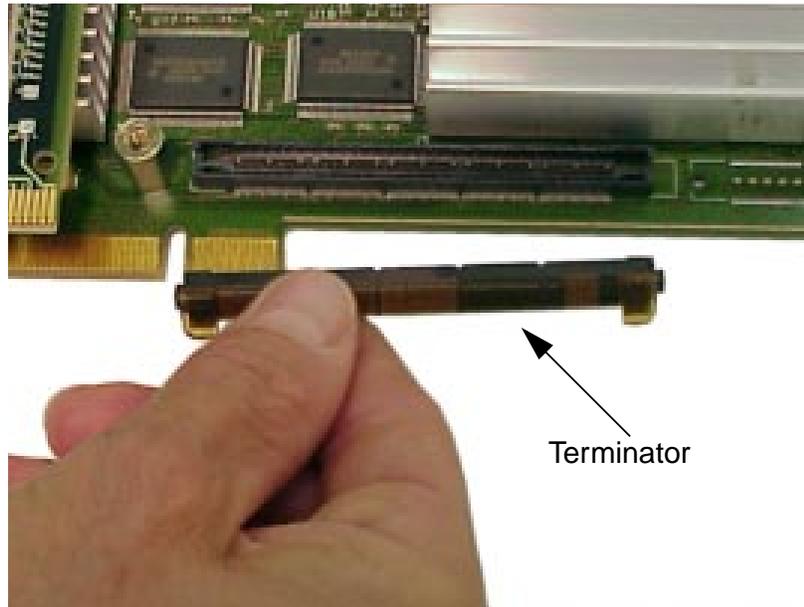


Terminator

3. Before installing the texture module, ensure that all four corner screws on the texture module are fully retracted and that the terminator and strengthening bar are removed.
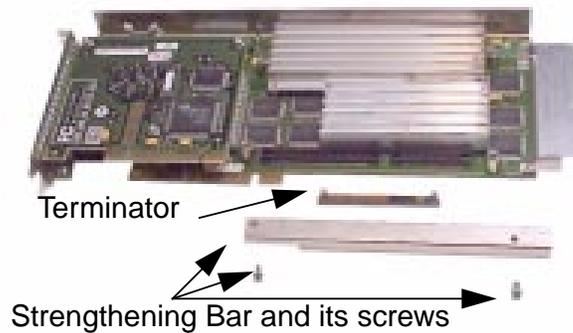


Terminator

Strengthening Bar and its screws

4.  Carefully line up the connectors on the HP VISUALIZE Texture Module and the HP VISUALIZE *fx+* graphics card.

Texture Module connectors          *fx+* connectors
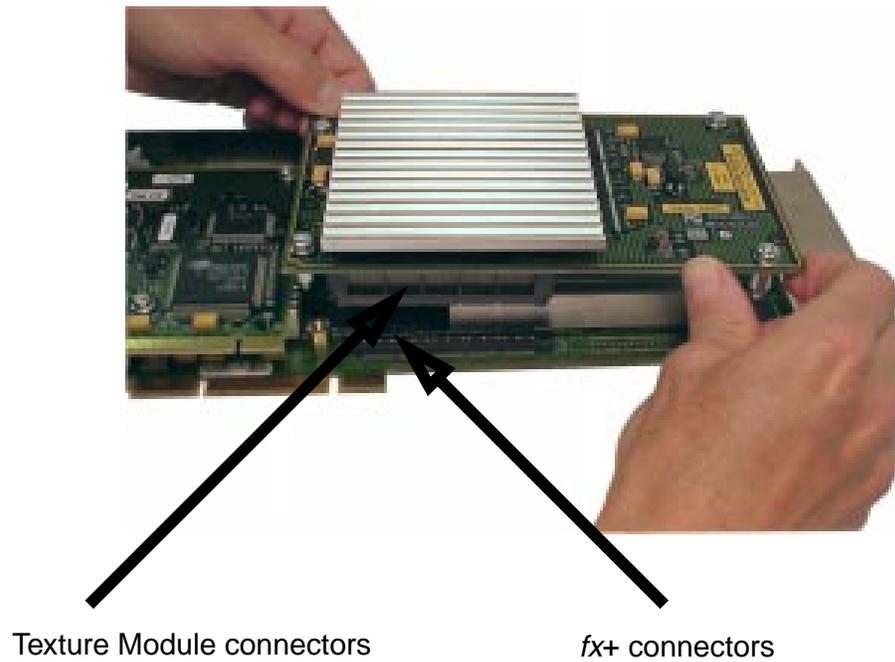
5.  Then using both thumbs, press the texture module into place.

6.  Ensure that the connectors on the HP VISUALIZE *fx+* Texture Module are fully inserted before securing it into place with the captive screws. Note that you need to use the four captive screws located on the texture module to mount it to the HP VISUALIZE *fx+* graphics card. The four captive screws will fit into the four screw standoffs on the fx+ graphics card.

Standoff

## Installing Your Graphics Card and Texture Module

1.  Ensure that the system data cables are correctly routed and flat against the system so that they do not obstruct the HP VISUALIZE *fx+* Graphics Card.

2.  Hold the card's bulkhead edge with your left hand and the card's right edge with your right hand. Align the card and then slide it downward toward the AGP Pro and PCI connectors, along the fan mount guide on the right and the bulkhead openings on the left.



3.  Align the cards's AGP contact fingers and PCI contact fingers with their appropriate system board connector slots and push the card firmly into position.

4. Verify that the card's contact fingers are fully seated in their connectors before securing them with the two accessory slot screws and one retaining screw. The retaining screw that you need to secure is located to the right, on the plastic speaker and fan mount as shown below.

The accessory slot screws, which must be secured, are located on the bulkhead side of the chassis as shown below.
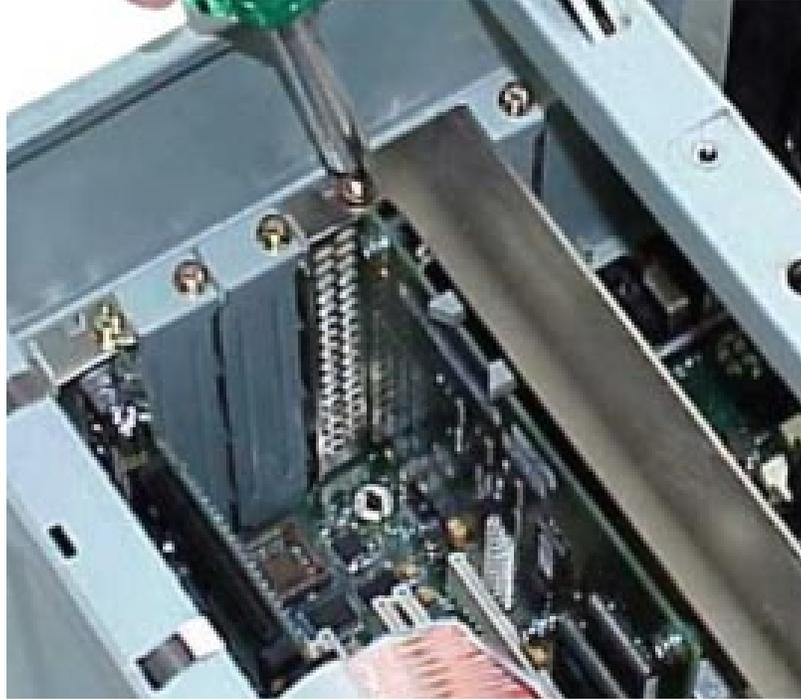


## Replacing the Left-Side Panel

For information regarding the replacement of the left-side panel of your Personal Workstation, read the subsection "Replacing the Left-Side Panel" in the section "Installing the HP VISUALIZE *fx+* Graphics Card."

## Checking the Installation

The HP VISUALIZE *fx+* texture module is automatically detected by the HP VISUALIZE *fx+* driver. No software configuration is necessary. To check that the Texture Module is correctly installed, follow these steps:

1. Switch on your Personal Workstation.

2. When in Windows NT, open the **Display Properties** window by clicking the **Start** button, selecting **Settings/Control Panel**, and double-clicking **Display**.

3. Click the About tab.
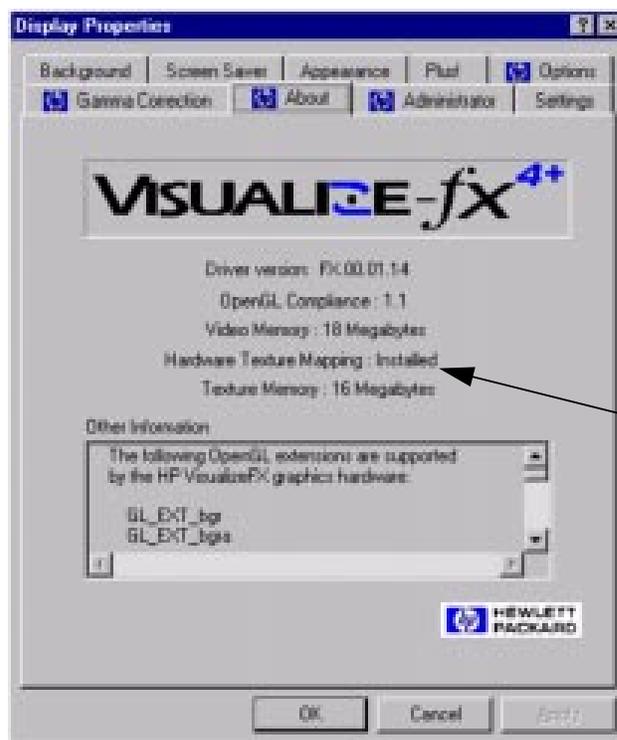


Installation Verification

If the texture module was correctly installed, the **About** window will contain the text: **Hardware Texture Mapping**: Installed.

To check that you have the latest version of this driver, refer to HP's web site at: `http:/www.hp.com/go/visualizesupport.`

# A  Regulatory Information and Warranty

# Regulatory Information

<div style="border:1px solid">

## Declaration of Conformity
according to ISO/IEC Guide 22 and EN 45014

**Manufacturer**:
Hewlett-Packard Company
3404 East Harmony Rd.
Fort Collins, CO 80528
USA

**Declares that the:**
**Product Name:**        VisualizeGraphics Boards
**Model Number:**        A1277A, A1278A, A1279A, A5022A and A5023A
**Product Options:**     All

## Conforms to the following specifications:

Safety.          IEC 950:1991+A1+A2+A3 / EN 60950:1992+A1+A2+A3

EMC.             CISPR 22: 1993+A1+A2 / EN 55022:1994+A1+A2 Class A conducted emissions
CISPR 22: 1997 / EN 55022:1998 Class A radiated emissions
   EN 55024:1998 / EN 61000-4-2: 1999-4kV CD, 8 kV AD
   EN 55024:1998 / EN 61000-4-3: 1995 - 10 v/m
   EN 55024: 1998 / EN 61000-4-4: 1995 - 2 kV Signal, 4 kV Power Lines
US FCC Part 15, Level A
Japan VCCI Class A

**and is certified by:**

British Standards Institute: ISO 9002 for Hewlett-Packard
Australia/New Zealand AS/NZS 3548: 1995
HP Fort Collins CCQD HTC

**Supplementary information:**

The product herewith complies with the requirements of the following Directives and carries the CE marking accordingly:

   - the EMC directive 89/336/EEC and 92/31/EEC and 93/68/EEC
   - the Low Voltage Directive 73/23/EEC and 93/68/EEC

This product was tested in a typical Hewlett-Packard workstation configuration.

Original signed by Ruth Lutes, Site Quality Manager, Fort Collins, CO, USA

**For Compliance Information ONLY, contact:**

European Contact:  Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE Standard Europe, Herrenberger Straße 130, D-71034 Böblingen (FAX: +49-7031-14-3143).

Americas Contact:  Hewlett-Packard, Fort Collins Site Quality Manager, mail stop 46, 3404 E. Harmony Rd. Bldg.6 Dock A, Fort Collins, CO 80528, USA

</div>

## FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules and the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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**NOTE**        You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

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If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

  Hewlett-Packard's FCC Compliance Tests were conducted with HP-supported peripheral devices and HP shielded cables, such as those you received with your system. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment.

**Notice for Japan (Class A)**

この装置は，情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

# HP Hardware Warranty

Important: This is your hardware product warranty statement. Please, read it carefully.

Warranty terms may be different in your country. If so, your Authorized HP Dealer or Hewlett-Packard Sales and Service Office can give you details.

HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.

HP products external to the system processor unit —such as external storage subsystems, displays, printers, and other peripherals— are covered by the applicable warranties for those products; HP software is covered by the HP Software Product Limited Warranty

FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT OR MODIFY AND ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

## HP Year 2000 Warranty

This HP Year 2000 Warranty is in addition to the HP Standard Commercial Warranties contained in Exhibit E16, HP Terms and Conditions of Sale and Service. HP warrants that each HP hardware, software, and firmware Product delivered under this HP Year 2000 Warranty will be able to accurately process date data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000, including leap year calculations, when used in accordance with the Product documentation provided by HP (including any instructions for installing patches or upgrades), provided that all other products (e.g. hardware, software, firmware) used in combination with such HP Product(s) properly exchange date data with it.

If the Specifications require that specific HP Products must perform as a system in accordance with the foregoing warranty, then that warranty will apply to those HP Products as a system, and Customer retains sole responsibility to ensure the Year 2000 readiness of its information technology and business environment. The duration of this warranty extends through January 31, 2001. The remedies available under this warranty will be defined in, and subject to, the terms and limitations of the warranties contained in HP's standard commercial warranties. To the extent permitted by local law, this warranty applies only to branded HP Products and not to products manufactured by others that may be sold or distributed by HP. This HP Year 2000 Warranty applies only to HP Products shipped after the effective date, July 01, 1998, of this warranty. Nothing in this warranty will be construed to limit any rights or remedies provided elsewhere in the HP Terms and Conditions of Sale and Service with respect to matters other than Year 2000 compliance.

## Three Year Limited Hardware Warranty

Hewlett-Packard (HP) warrants this hardware product against defects in materials and workmanship for a period of three years from receipt by the original end-user purchaser.

The three year warranty includes on-site service during the first year of use (free parts and labor), and parts service provided by an HP Service Center or a participating Authorized

HP Personal Computer Dealer Repair Center, during the second and third years of use.

If HP receives notice of above defined defects during the warranty period, HP will either, at its option, repair or replace products, which prove to be defective.

Should HP be unable to repair or replace the product within a reasonable amount of time, the customer's alternate exclusive remedy shall be a refund of the purchase price upon return of the product.

The system processor unit, keyboard, mouse, and Hewlett-Packard accessories inside the system processor unit —such as video adapters, mass storage devices, and interface controllers— are covered by this warranty.

This warranty is extended worldwide under certain conditions (please check with your local HP office) to products purchased from HP or an Authorized HP Personal Computer Dealer which are reshipped by the original purchaser either for use by the original purchaser or provided as an incidental part of systems integrated by the original purchaser. When available in the country of use, service is provided in the same manner as if the product was purchased in that country and can only be provided in countries where the product is designed to operate. If the product is not normally sold by HP in the country of use, it must be returned to the country of purchase for service. Response time for on-site service, and parts delivery turn-around time for parts service, are subject to changes from standard conditions based upon non-local
parts availability.

## Limitation of Warranty

The above warranty shall not apply to defects resulting from: misuse; unauthorized modification; operation or storage outside the environmental specifications for the product; in-transit damage; improper maintenance; or defects resulting from use of non-HP software, accessories, media, supplies, consumables, or such items not designed for use with the product.

Reloading the bundled or pre-loaded software on your Personal Workstation is not covered by the HP warranty.

HP MAKES NO OTHER EXPRESS WARRANTY, WHETHER WRITTEN OR ORAL, WITH RESPECT TO THIS PRODUCT. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS IS LIMITED TO THE THREE-YEAR DURATION OF THIS WRITTEN WARRANTY. SOME STATES OR PROVINCES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

This warranty gives you specific legal rights, and you may also have other rights, which vary, from state to state, or province to province.

## Limitation of Liability and Remedies

THE REMEDIES PROVIDED ABOVE ARE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL HP BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON WARRANTY, CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

The foregoing limitation of liability shall not apply in the event that any HP product sold hereunder is determined by a court of competent jurisdiction to be defective and to have directly caused bodily injury, death, or property damage; provided, that in no event shall HP's liability for property damage exceed the greater of $50,000 or the purchase price of the specific product that caused such damage.

Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages —including lost profit— so the above limitation or exclusion may not apply to you.

## Obtaining On-Site Warranty Service

To obtain on-site warranty service, the customer must contact an HP Sales and Service Office (in the US, call the HP Customer Support Center at (970) 635-1000) or a participating Authorized HP Personal Computer Dealer Repair Center. The customer must be prepared to supply proof of the purchase date.

The system processor unit, keyboard, mouse, and Hewlett-Packard accessories inside the system processor unit —such as video adapters, mass storage devices, and interface controllers— are covered by this warranty.

During the on-site warranty period, customer-replaceable components may be serviced through expedited part shipment. In this event, HP will prepay shipping charges, duty, and taxes; provide telephone assistance on replacement of the component when necessary; and pay shipping charges, duty, and taxes for any part that HP asks to be returned.

On-site visits caused by non-Hewlett-Packard products —whether internal or external to the system processor unit— are subject to standard per-incident travel and labor charges.

On-site service for this product is restricted or unavailable in certain locations. In HP Excluded Travel Areas— areas where geographical obstacles, undeveloped roads, or unsuitable public transportation prohibit routine travel— service is provided on a negotiated basis at extra charge.

Response time for HP on-site service in an HP Service Travel Area is normally next business day (excluding HP holidays) for HP Travel Zones 1-3 (generally 100 miles or 160 Km from the HP office). Response time is second business day for Zones 4 and 5 (200 miles, 320 Km); third business day for Zone 6 (300 miles, 480 Km); and negotiated beyond Zone 6. Worldwide Customer Support Travel information is available from any HP Sales and Service Office.

Travel restrictions and response time for dealer or distributor service are defined by the participating dealer or distributor.

Service contracts which provide after-hour or weekend coverage, faster response time, or service in an Excluded Travel Area are often available from HP, an authorized dealer, or authorized distributor at additional charge.

## Customer Responsibilities

The customer may be required to run HP-supplied diagnostic programs before an on-site visit or replacement part will be dispatched.

The customer is responsible for the security of its proprietary and confidential information

and for maintaining a procedure external to the products for reconstruction of lost or altered files, data, or programs.

The customer must provide: access to the product; adequate working space and facilities within a reasonable distance of the product; access to and use of all information and facilities determined necessary by HP to service the product; and operating supplies and consumables such as the customer would use during normal operation.

A representative of the customer must be present at all times. The customer must state if the product is being used in an environment which poses a potential health hazard to repair personnel; HP or the servicing dealer may require that the product be maintained by customer personnel under direct HP or dealer supervision.

## Obtaining Parts Warranty Service

When parts warranty service applies, the customer may be required to run HP-supplied diagnostic programs before a replacement part will be dispatched. The customer must be prepared to supply proof of purchase.

The customer shall return some defective parts upon HP demand. In that case, HP will prepay shipping charges for parts returned to the HP parts service center.

## HP Telephone Support Services

HP Free telephone support for your Personal Workstation is available during the first year from date of purchase. This service will also provide technical assistance with the basic configuration and setup of your HP VISUALIZE Personal Workstation and for the bundled or pre-loaded operating system.

Telephone support is available at the end of the first year from date of purchase, via the Lifeline program, which is a fee-based service (North America and Europe only).

HP does NOT provide telephone support for Personal Workstations configured as network servers. We recommend HP NetServers for your network server requirements.

(Rev. 17/03/98)

## HP Software Product License Agreement and Software Product Limited Warranty

Your HP VISUALIZE Personal Workstation contains preinstalled software programs. Please read the Software License Agreement before proceeding.

CAREFULLY READ THIS LICENSE AGREEMENT AND LIMITED WARRANTY STATEMENT BEFORE PROCEEDING TO OPERATE THIS EQUIPMENT. RIGHTS IN THE SOFTWARE ARE OFFERED ONLY ON THE CONDITION THAT THE CUSTOMER AGREES TO ALL TERMS AND CONDITIONS OF THE LICENSE AGREEMENT. PROCEEDING TO OPERATE THE EQUIPMENT INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE WITH THE TERMS OF THE LICENSE AGREEMENT, YOU MUST NOW EITHER REMOVE THE SOFTWARE FROM YOUR HARD DISK DRIVE AND DESTROY THE MASTER DISKETTES, OR RETURN THE COMPLETE COMPUTER AND SOFTWARE FOR A FULL REFUND.

PROCEEDING WITH CONFIGURATION SIGNIFIES YOUR ACCEPTANCE OF THE LICENSE TERMS.

## HP Software Product License Agreement

UNLESS OTHERWISE STATED BELOW, THIS HP SOFTWARE PRODUCT LICENSE AGREEMENT SHALL GOVERN THE USE OF ALL SOFTWARE THAT IS PROVIDED TO YOU, THE CUSTOMER, AS PART OF THE HP COMPUTER PRODUCT. IT SHALL SUPERSEDE ANY NON-HP SOFTWARE LICENSE TERMS THAT MAY BE FOUND ON-LINE, OR IN ANY DOCUMENTATION OR OTHER MATERIALS CONTAINED IN THE COMPUTER PRODUCT PACKAGING.

Note: Operating System Software by Microsoft is licensed to you under the Microsoft End User License Agreement (EULA) contained in the Microsoft documentation.

The following License Terms govern the use of the software:

USE. Customer may use the software on any one computer. Customer may not network the software or otherwise use it on more than one computer. Customer may not reverse assemble or decompile the software unless authorized by law.

COPIES AND ADAPTATIONS. Customer may make copies or adaptations of the software (a) for archival purposes or (b) when copying or adaptation is an essential step in the use of the software with a computer so long as the copies and adaptations are used in no other manner.

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PRODUCT RECOVERY CD-ROM. If your computer was shipped with a product recovery CD-ROM: (i) The product recovery CD-ROM and/or support utility software may only be used for restoring the hard disk of the HP computer with which the product recovery CD-ROM was originally provided.(ii) The use of any operating system software by Microsoft contained in any such product recovery CD-ROM shall be governed by the Microsoft End User License Agreement (EULA).

TRANSFER OF RIGHTS IN SOFTWARE. Customer may transfer rights in the software to a third party only as part of the transfer of all rights and only if Customer obtains the prior agreement of the third party to be bound by the terms of this License Agreement. Upon such a transfer, Customer agrees that his/her rights in the software are terminated and that he/she will either destroy his/her copies and adaptations or deliver them to the third party.

SUBLICENSING AND DISTRIBUTION. Customer may not lease, sublicense the software or distribute copies or adaptations of the software to the public in physical media or by telecommunication without the prior written consent of Hewlett-Packard.

TERMINATION. Hewlett-Packard may terminate this software license for failure to comply with any of these terms provided Hewlett-Packard has requested Customer to cure

the failure and Customer has failed to do so within thirty (30) days of such notice.

UPDATES AND UPGRADES. Customer agrees that the software does not include updates and upgrades which may be available from Hewlett-Packard under a separate support agreement.

EXPORT CLAUSE. Customer agrees not to export or re-export the software or any copy or adaptation in violation of the U.S. Export Administration regulations or other applicable regulation.

U.S. GOVERNMENT RESTRICTED RIGHTS. Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause in DFARS 252.227-7013. Hewlett-Packard Company, 3000 Hanover Street, Palo Alto, CA94304 U.S.A. Rights for non-DOD
U.S. Government Departments and Agencies are as set forth in FAR 52.227-19(c)(1,2).

## HP Software Product Limited Warranty

THIS HP SOFTWARE PRODUCT LIMITED WARRANTY SHALL COVER ALL SOFTWARE THAT IS PROVIDED TO YOU, THE CUSTOMER, AS PART OF THE HP COMPUTER PRODUCT, INCLUDING ANY OPERATING SYSTEM SOFTWARE. IT SHALL SUPERSEDE ANY NON-HP WARRANTY TERMS THAT MAY BE FOUND ON-LINE, OR IN ANY DOCUMENTATION OR OTHER MATERIALS CONTAINED IN THE COMPUTER PRODUCT PACKAGING.

Ninety-Day Limited Software Warranty. HP warrants for a period of NINETY (90) DAYS from the date of the purchase that the software product will execute its programming instructions when all files are properly installed. HP does not warrant that the software will be uninterrupted or error free. In the event that this software product fails to execute its programming instructions during the warranty period, Customer's remedy shall be a refund or repair. Should HP be unable to replace the media within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the product and all copies.

Removable Media (If supplied). HP warrants the removable media, if supplied, upon which this product is recorded to be free from defects in materials and workmanship under normal use for a period of NINETY (90) DAYS from the date of purchase. In the event the media proves to be defective during the warranty period, Customer's remedy shall be to return the media to HP for replacement. Should HP be unable to replace the media within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the product and destruction of all other non removable media copies of the software product.

Notice of Warranty Claims. Customer must notify HP in writing of any warranty claim not later than thirty (30) days after the expiration of the warranty period.

Limitation of Warranty. HP makes no other express warranty, whether written or oral with respect to this product. Any implied warranty of merchantability or fitness for a particular purpose is limited to the 90-day duration of this written warranty. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty gives specific legal rights, and you may also have other rights which vary from state to state, or province to province.

Limitation of Liability and Remedies. THE REMEDIES PROVIDED ABOVE ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL HP BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFIT) WHETHER BASED ON WARRANTY, CONTRACT, TORT OR ANY OTHER LEGAL THEORY. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Obtaining Warranty Service. Warranty service may be obtained from the nearest HP sales office or other location indicated in the owner's manual or service booklet.

Consumer transactions in Australia and the United Kingdom: The disclaimers and limitations above shall not apply and shall not affect the statutory rights of a Consumer.

(Rev. 19/11/96)