

# installation and user's guide

hp visualization center sv6



**Manufacturing Part Number: A6062-90005**

**Edition: E0302**

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## hp product warranty statement

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### NOTE

This warranty statement supersedes any and all previous HP-UX workstation warranty statements for the Hewlett-Packard workstations specified herein. The Parts-Only Base Warranty is offered only in the U.S.; for country-specific warranties, contact your HP Country Sales Representative. The information contained in this document is subject to change without notice. For warranty information on the other components of the hp visualization center sv6 system, see the warranty documentation that accompanies those components.

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**HP PRODUCT:**

hp workstations j6000, j6700 and b2600

**DURATION OF WARRANTY:**

1 Year

1. HP warrants HP hardware, accessories and supplies against defects in materials and workmanship for the period specified above. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.
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## for additional information

There are several sources of hp visualization center sv6 documentation that were either shipped with your system or are available at various Web sites:

- *hp visualization center sv6 Site Preparation Guide* (HP Part No. A6062-90006)
- *hp visualization center sv6 Troubleshooting Guide* (available on <http://www.hp.com/go/workstationsupport> Web site)
- *hp visualization center sv6 Recovery Instructions CD Booklet* (HP Part No. A6062-90010 included in the Recovery CD jewel case)
- hp ProCurve Switch User's Guide
  - hp 10/100 ProCurve (J4813A)
  - hp ProCurve Switch 4108gl (J4865A)
- Digi EtherLite-32 terminal Server documentation (CD instructions or <http://www.digi.com>).

For further information, refer to these Web pages:

- HP immersive environments page:  
<http://www.hp.com/go/immersive/index.html>

- User Guides for hp workstations:  
[http://www.hp.com/go/workstationsupport/documentation/manuals/user\\_guides](http://www.hp.com/go/workstationsupport/documentation/manuals/user_guides)

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**NOTE**

Every effort was made to make sure this information was complete at the time it was printed. However, additional information and troubleshooting tips may have become available after this guide was printed. For the very latest information, please visit the <http://www.hp.com/go/workstationsupport> Web site.

---

#### viewing documentation on the recovery CD

All hp visualization center sv6 documentation is also included on the *hp visualization center sv6 Installation/Recovery CD* that is shipped with your system. To view these documents:

1. Mount the CD by executing:

```
mount /dev/dsk/c0t0d0 /cdrom
```

2. Make sure the directory for your Adobe Acrobat Reader is in your PATH:

```
export PATH=$PATH:/opt/Acrobat4/bin
```

3. The following hp visualization center sv6 documentation is available:

*sv6SitePrepGuide.pdf*

*sv6InstUsersGuide.pdf*

*sv6TroubleShootGuide.pdf*

4. To view the files:

```
acroread /cdrom/<filename.pdf>
```

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# Contents

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# **1** safety and support information

Proper site preparation and maintenance are vital to the reliability of any computer hardware component. In order for HP to provide you with quality service, please ensure that the proper computer room conditions are maintained. This allows HP to provide support services in

accordance with your Customer Support Services Agreement.

For your protection, HP products are tested for conformance to various national and international regulations and standards. The scope of this regulatory testing includes electrical and mechanical safety, electromagnetic emissions, electromagnetic immunity, ESD (electrostatic discharge), acoustics, and hazardous materials. Where required, certifications are obtained from third-party test agencies. Certification marks appear on the product label. In addition, various regulatory bodies require information to appear in User Manuals.

---

## how to obtain support for your sv6 system

If you know you have a hardware problem:

1. Retrieve the model number and serial number of the failed hardware.
2. Call the HP Customer Care Center for your region, country or province. These numbers can be found at: <http://www.hp.com> under Technical Support. For example, use 1-800-633-3600 for North America.
3. When you reach the appropriate Customer Care Center, you will have several options. Press 1 for Hardware Support.
4. For warranty verification and to help track your call, you will be asked to provide the model number and serial number for the failed hardware (see Step 1 above).
5. If the HP Call Agent cannot resolve your problem, then tell the Call Agent that the failed or problematic hardware is part of an hp sv6 scalable visualization system. Your call will be re-directed to an hp sv6 expert who is trained to provide solution-level assistance.

If you have a software problem or don't know the source of the problem:

1. Retrieve the software “handle” (a unique support identifier) that was provided with the hp sv6 system at installation.

2. Call the HP Customer Care Center for your region, country or province. These numbers can be found at: <http://www.hp.com> under Technical Support. For example, use 1-800-633-3600 for North America.
3. When you reach the appropriate Customer Care Center, you will have several options. Press 2 for Software Support.
4. For call tracking purposes, you will be asked to provide the HP Call Agent with your software “handle” (see Step 1 above).
5. Tell the Call Agent that you have an hp sv6 scalable visualization system. The Call Agent will re-direct your call to an hp sv6 expert who is trained to provide assistance with your system

## safety warnings

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**WARNING** An hp visualization sv6 product rack can weigh 1500 lbs. (681 kg) when fully loaded with hardware components. Heed all of the conditions in the **WARNING** statement under the **RACK STABILITY** subsection below when moving and servicing an HP product rack and its rack-mounted hardware components.

---

**WARNING** Your hp visualization center sv6 product may not have been evaluated for connection to an IT power system (an AC distribution system having a high impedance connection to earth according to IEC 950).

---

## rack stability

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**WARNING** To reduce the risk of rack instability:

- **Install the heavier hardware components at the bottom of the rack, below the center of gravity for the rack. *Never* install heavier components in the top or upper portion of the rack.**
- **Make sure that the anti-tip plate is installed on the rack. Do *not* remove the anti-tip foot from the rack.**
- ***Always* extend the anti-tip plate before extending a rack-mounted component for servicing.**
- **Extend only one rack-mounted component at a time.**
- **Do not stand or sit on any extended component.**
- **Have all non-operator servicing done by qualified HP service personnel.**

---

## power distribution units (PDUs)

A Power Distribution Unit (PDU) is equipment located in or near a computer room which breaks down electric power from a high-voltage source to appropriate levels of distribution to the central processing unit and peripheral devices of a computer system. Figure 1-1 shows an example PDU that is used with the HP product racks. This example is the HP E7674A 16 Amp 100-240VAC PDU (part number A5137AZ).

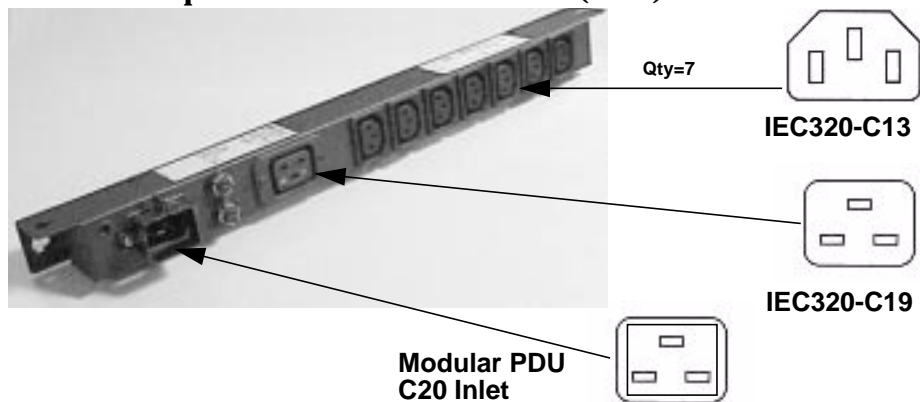
---

### CAUTION

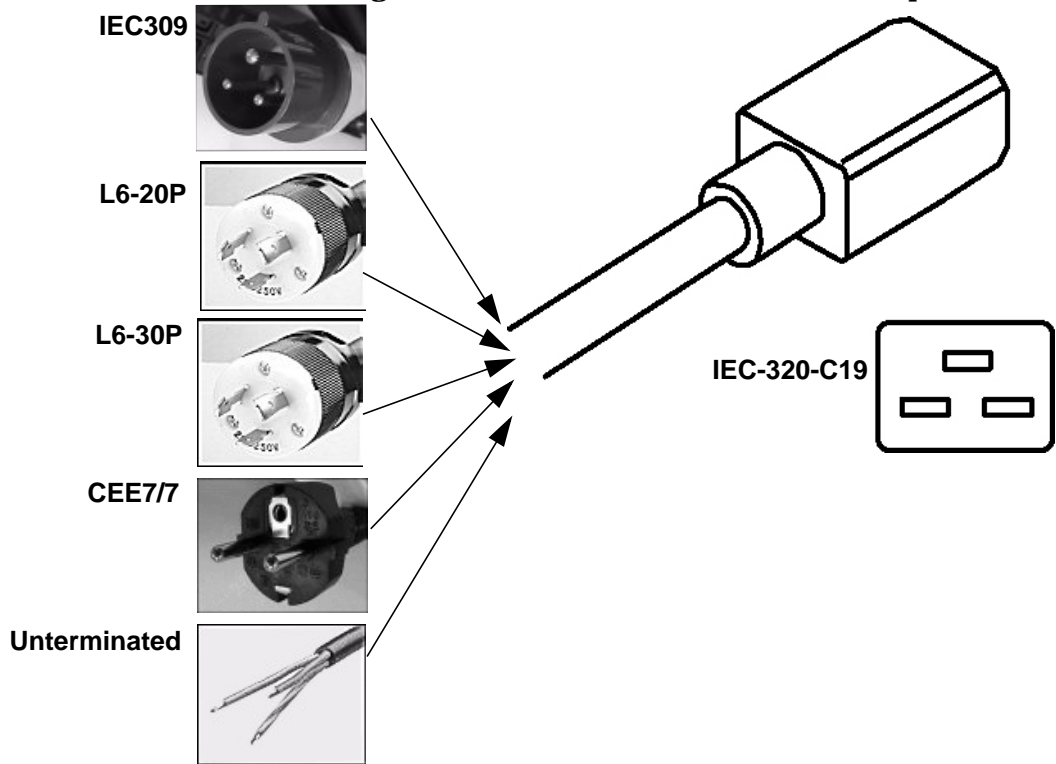
Some components have been designed to be used with specific electrical accessories such as PDUs. The use of any accessory other than those specified is neither recommended nor supported.

---

**Figure 1-1**      **A Sample Power Distribution Unit (PDU)**



**Figure 1-2 Cable and Plugs Between the PDU and the Wall Receptacle**



PDU leakage current

---

**WARNING**

**Due to the number of components that can be installed on one Power Distribution Unit (PDU), there may be a risk of high leakage current (>3.5mA). Reliable ground circuit continuity is vital for safe operation of such components. To reduce the risk of electric shock, connect each component to a grounded outlet only. Never operate any component with its ground pin disconnected from the socket of a grounded outlet.**

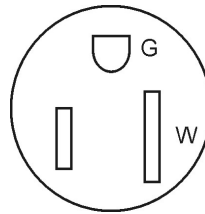
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## PDU power limitations

To reduce the risk of overload, do not exceed the rated load of any single PDU. In addition, do not load a single NEMA 5-15 (see Fig. 1-3) receptacle with more than 15 Amperes and any single IEC 320-1/C13 receptacle with more than 10 Amperes. In general, make sure that the power source circuits are able to safely provide the current that will be required by all components drawing power from them. This document assumes that 220V and 240V cables are used.

### NEMA 5-15 Receptacle



**Do not load this  
connector with  
more than 15 Amps**

## metallic particulate contamination

Metallic particulates can be especially harmful around electronic equipment. This type of contamination may enter the data center environment from a variety of sources, including, but not limited to, raised floor tiles, worn air conditioning parts, heating ducts, rotor brushes in vacuum cleaners or printer component wear. Because metallic particulates conduct electricity, they have an increased potential for creating short circuits in electronic equipment. This problem is exaggerated by the increasingly dense circuitry of electronic equipment.

Over time, very fine whiskers of pure metal can form on electroplated zinc, cadmium, or tin surfaces. If these whiskers are disturbed, they may break off and become airborne, possibly causing failures or operational interruptions. For over 50 years, the electronics industry has been aware of the relatively rare, but possible, threat posed by metallic particulate contamination. During recent years, a growing concern has developed in computer rooms where these conductive contaminants are formed on the bottom of some raised floor tiles.

Although this problem is relatively rare, it may be an issue within your computer room. Since metallic contamination can cause permanent or intermittent failures on your electronic equipment, Hewlett-Packard strongly recommends that your site be evaluated for metallic particulate contamination before installation of electronic equipment.

---

## **2** installation and user information

## document purpose

The purpose of this document is to provide information on installing, customizing and using hp visualization center sv6 systems. Because the workstations will arrive racked, pre-cabled and pre-configured, minimal information about hardware setup is included in this document. Sections of this document provide steps for setting up and configuring systems. There are also sections that provide instructions on how to use hp visualization center sv6-specific tools. Refer to the Glossary for definitions of terms used in this document.

See the following documents for additional information:

- *hp visualization center sv6 Site Prep Guide* for cooling, space and power requirements, etc.
- *hp visualization center sv6 Troubleshooting Guide* - see <http://www.hp.com/go/workstationsupport> for tips on how to resolve problems you may encounter during the initial setup and customization.
- hp disk system ds2100 - see [http://www.hp.com/products1/storage/disk\\_arrays/disksystems/ds2100/supplies/index.html](http://www.hp.com/products1/storage/disk_arrays/disksystems/ds2100/supplies/index.html)
- `/etc/X11/X0screens` for X server configuration details or `/usr/lib/X11/Xserver/misc/slsd/templates/` for hp visualization center sv6 X0screens templates.
- `/usr/lib/X11/Xserver/info/screens/hp` for non- hp visualization center sv6 X server configuration details.
- `/opt/graphics/OpenGL/sv/doc/README.*` for details about hp visualization center sv6 tools.

## section descriptions

- **Product Overview** - Provides a general hardware and software architecture overview.
- **Installation** - Steps that the hp visualization center sv6 installer will help you accomplish.

- **Software Set-Up Specifications** - Reference for the software that was pre-loaded on your system.
- **Updating Software** - Explains how and when to do software and firmware updates. Keeping your graphics patches updated is essential for taking full advantage of this new technology.
- **Advanced Set-Up for Multiple Channels** - Gives an overview of how to use multiple hp visualization center sv6 clusters to output across multiple display devices. This is a reference for anyone who wants to upgrade to multiple channels.
- **Usage** - General instructions on how to do typical tasks. Although you can run applications on the hp visualization center sv6 the same way you would on any HP-UX workstation, there are a few hp visualization center sv6-specific tasks that can be performed.
- **How To Use hp visualization center sv6 Tools** - Reference for hp visualization center sv6-specific tools.
- **Stereoscopic Viewing** - Describes both active and passive stereo options and how to enable them.
- **Optimization** - Suggests methods for optimizing both rendering performance and image quality for your application or data sets.

## product overview

The hp visualization center sv6 solution is a system developed to meet your visualization performance and image quality needs. The key attributes that make this system unique from existing scalable solutions include:

- scalable rendering performance, image quality and resolution,
- resources can be dynamically switched between performance and image quality,
- use of standard SPU and graphics components.

The hp visualization center sv6 provides the following benefits:

- Applications that currently run on standalone hp visualization center systems today can also run unmodified on hp visualization center sv6 systems and immediately take advantage of the scaling and image quality improvements.
- The use of standard components with the ability to add, re-deploy or upgrade these components provides significant investment protection.
- The individual workstations of the scalable system can be used as computational resources when not being used for visualization.

**Figure 2-1** hp visualization centers sv6 (j6700) and mini-sv6 (b2600)



The hp visualization center sv6 is:

- A scalable solution for OpenGL display list-based applications that provides geometry acceleration of aliased rendering that is greater than stand-alone hp workstation performance.
- A solution that offers increased visual quality via anti-aliasing at stand-alone hp workstation performance rates, or better.
- A solution that is scalable in any combination of performance, visual quality or screen resolution; limited only by supported configurations.
- A solution that is transparent to the application.
- A solution that involves multiple standard graphics pipelines rendering a common model with a single view frustum.
- An OpenGL HP-UX 11.0 based solution only.

hp visualization center sv6 employs a parallel rendering architecture. It uses dedicated accelerators for rendering portions of a given screen. The resulting renderings (called “screen rectangles”) are synchronized and displayed as a single image through additional hardware.

hp visualization center sv6 is based on a client/server architecture called Distributed Single Logical Screen (SLS/d). This technology transparently manages multiple clients that render portions of a given screen. Each hp

visualization center hp visualization center sv6 cluster is made up of one 2D master node and a supported number of 3D slave nodes. The 2D node is responsible for rendering the GUI and X11 rendering primitives. The 3D slave nodes, also called “pipes,” are responsible for rendering all or some part of the 3D scene. The video output from each node is then combined, or composited, to a single monitor.

To obtain multiple channels of output, multiple clusters can be used. A “channel” refers to one output device, typically a monitor. This allows for more screen “real estate” (two or three displays) by using multiple hp visualization center sv6 clusters.

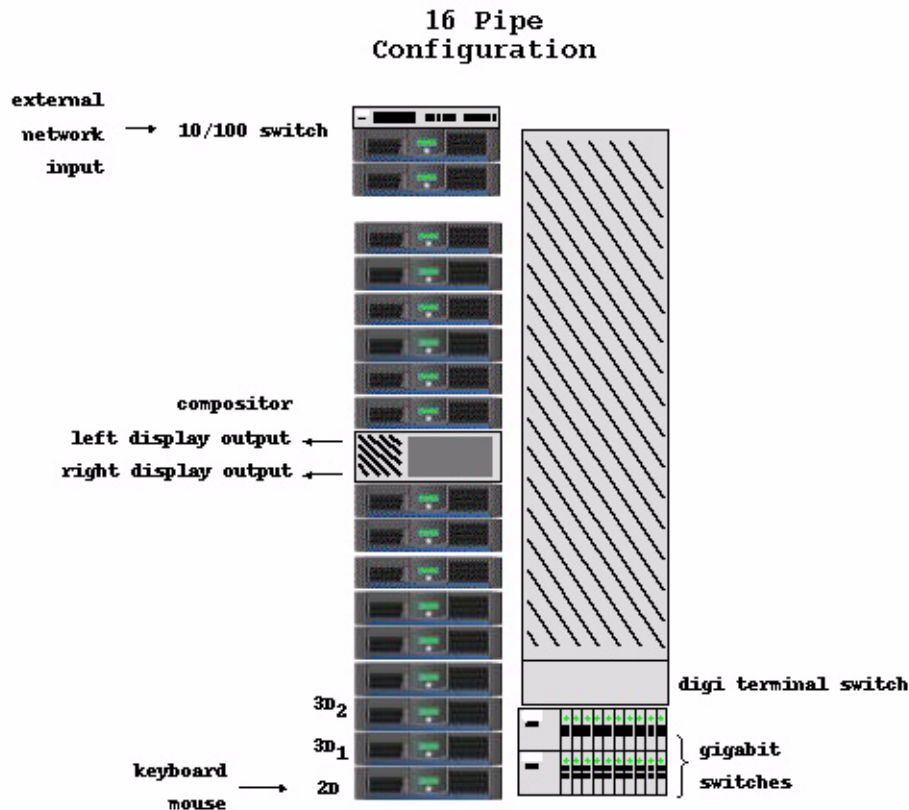
## hp visualization center sv6 components

- A cluster of racked, graphics-enabled hp workstations j6000 (A5990A), j6700 (A7278B) or b2600 (A6070A).
- Scalable Visualization Digital Compositor (A6061A).
- Private, High-Speed Gigabit Network - hp ProCurve switch 4108gl (J41865A).
- hp ProCurve 10/100 Base-T 2524 switch (J4813A) for LAN connection.
- Digi EtherLite-32 Terminal Server (DGZ1469C).
- EasySetup HP-UX 11.0 operating system (B5532A).
- Scalable Visualization-enabled software (X Server, OpenGL, 3DCommon, etc.).
- Customized Configuration Files (see Chapter 3).

Figure 2-2 is an example of a 16-pipe system that shows the hardware components.



Figure 2-2 16-pipe system configuration



---

**NOTE**

Arrangement of the hardware in the racks may vary.

---

The 2D master system controls the rendering that happens on the 3D pipes. The output of each pipe is then fed into hardware called the Digital Compositor. The Compositor combines the inputs into a single output stream to the display. A local high-speed Gigabit Ethernet switch (hp ProCurve Switch) which connects the systems.

The Digi EtherLite-32 terminal server (D GZ1469C) is a low-cost option for consolidating consoles. Each Digi switch provides remote access for up to 32 systems. The Digi EtherLite driver runs on the master system.

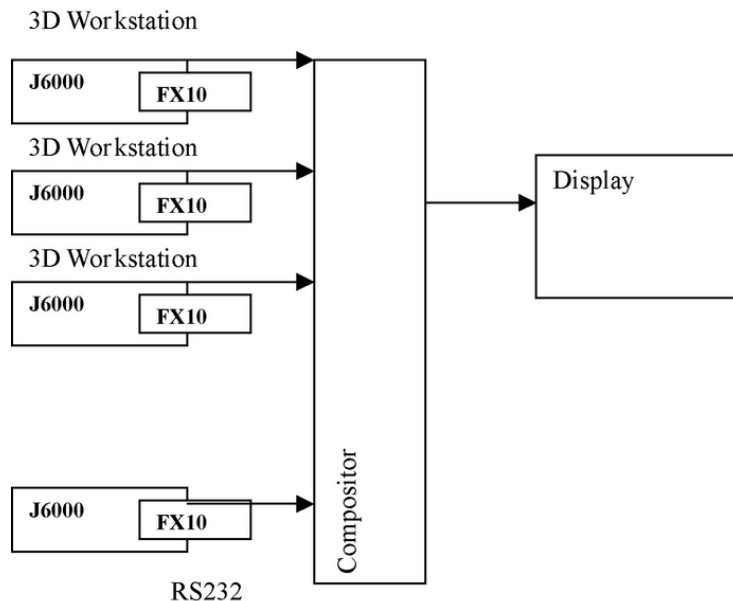
This driver communicates with the EtherLite-32 and makes the Digi switch's serial connections appear as though they were direct serial connections to the master system. Thus, the master node communicates with the slave node via a serial port communications program, such as cu on HP-UX or the dinc program supplied with the Digi switch.

Examples for accessing slave node #2:

```
cu -l/dev/tty01 -s 9600  
/usr/local/bin/dinc /dev/digi/sv2
```

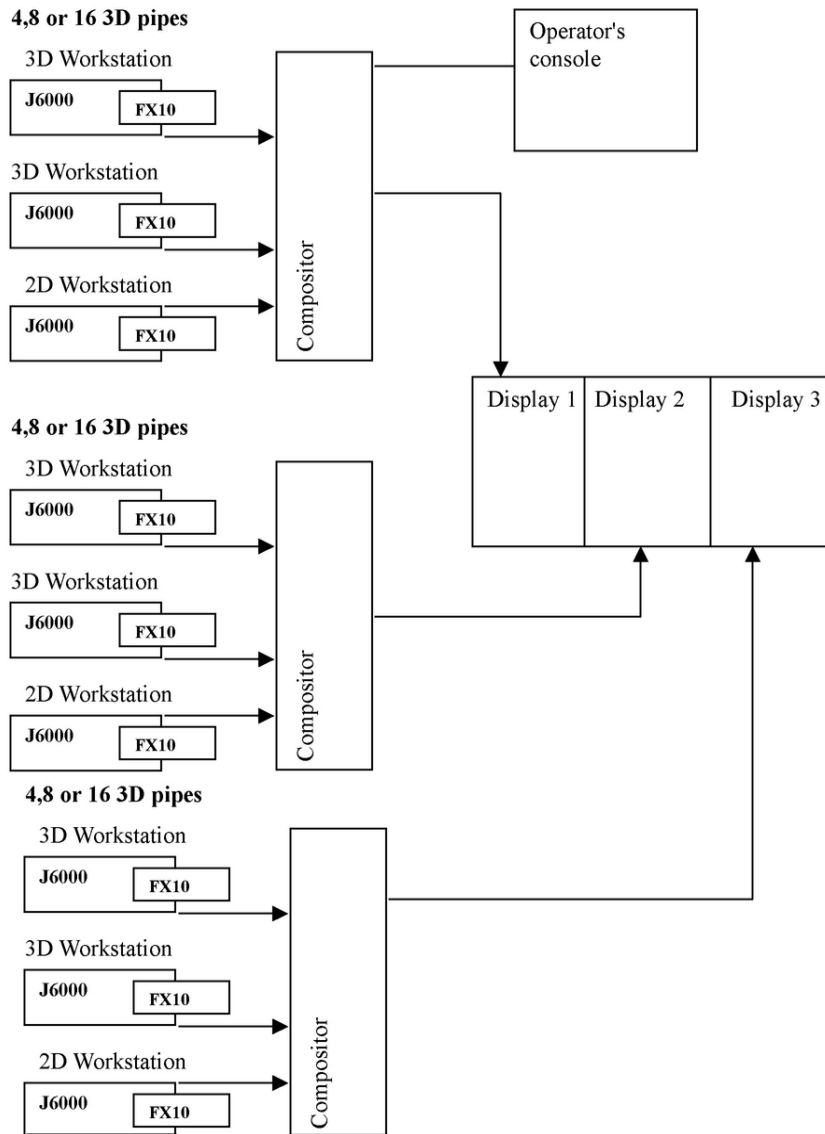
The Digi EtherLite-32 has its own IP address and is connected to the 10/100 hub. RJ45 ports are connected to serial port 1 of each slave node via an RS-232 adapter.

**Figure 2-3**      **Single Display Channel**



Each workstation has one graphics card. The master workstation does 2D rendering and the rest of the workstations do 3D rendering. Each hp visualization center sv6 cluster outputs to a single display. Each graphics device is connected to the compositor through a digital video connection. Each workstation is connected to the hp ProCurve 10/100 BaseT switch (J4813A) which provides a connection to the site's LAN.

**Figure 2-4 Multiple Display Channels**

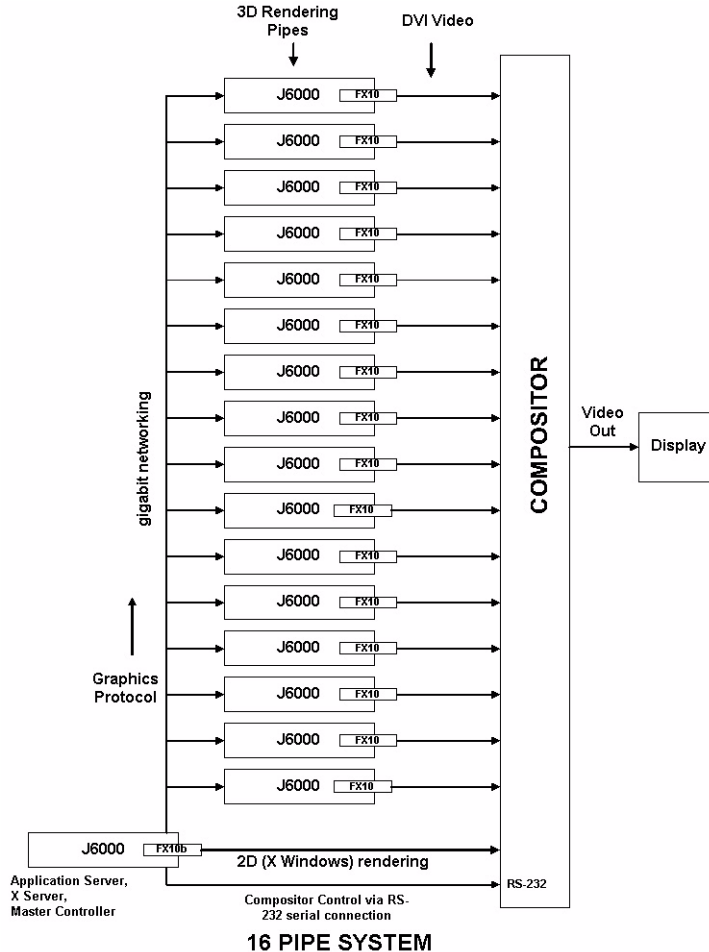


For multiple displays (up to three displays) additional hp visualization center sv6 clusters can be added to increase screen real-estate. “Screen real estate” describes the expanded workspace created by spreading one continuous screen across several display devices.

## hp visualization center sv6 architecture

This section discusses a general overview of how the hardware is used by the hp visualization center sv6 architecture, using a 16-pipe system as an example:

**Figure 2-5** 16-pipe System Architecture



The 16-pipe system contains 16 hp workstations j6000 (A5990A) or j6700 (A7278A) which perform the 3D rendering. Each of these machines contain the hp fx<sup>10</sup> Graphics Accelerator Card (A1299B). Each fx<sup>10</sup> DVI (Digital Video Interface) output connects to an input of the digital compositor (A6061A).

The 17th hp workstation fulfills three roles:

1. **Application Server:** This is the machine on which the application runs. Graphics protocol based on OpenGL is sent to the 16 3D systems via high-speed Gigabit networking.
2. **Xserver:** In addition to running the application, this machine also renders the 2D X window system and responds to the keyboard and mouse.
3. **Compositor Controller:** This machine controls operation of the Compositor via an RS-232 serial connection.

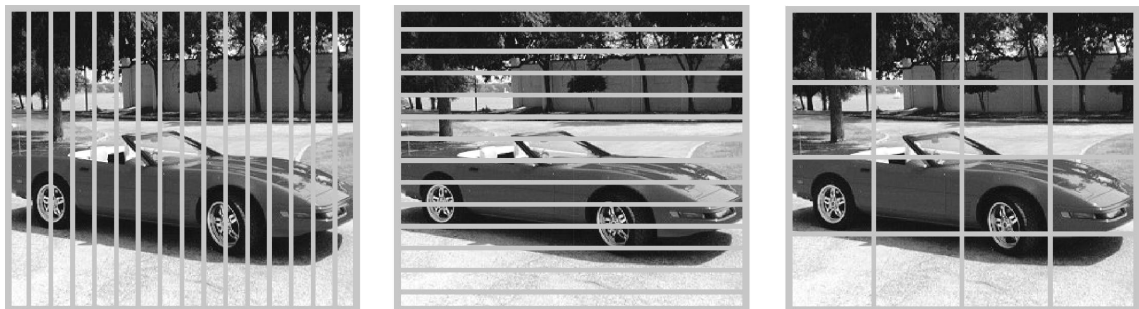
The Compositor processes the DVI video from each hp fx10 card and generates the output video. The Compositor can be programmed to process the video input signals in a number of ways.

#### hp visualization center sv6 operating modes

The key to understanding the hp visualization center sv6 configurations is to understand its three operating modes - Accelerate, Accumulate and Mixed. These modes can be changed using the `/opt/graphics/OpenGL/sv/bin/setpipes` command. In the descriptions below, a “pipe” refers to a workstation that does 3D rendering. A “channel” is the output sent to one output device.

- **Accelerate Mode:** Enhances rendering performance  
Each pipe renders a fraction of the screen, thus speeding up performance.

**Figure 2-6 Accelerate Mode - Vertical slice, Horizontal slice and Grid**



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**NOTE**

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Each fraction of the screen is called a “screen rectangle.”

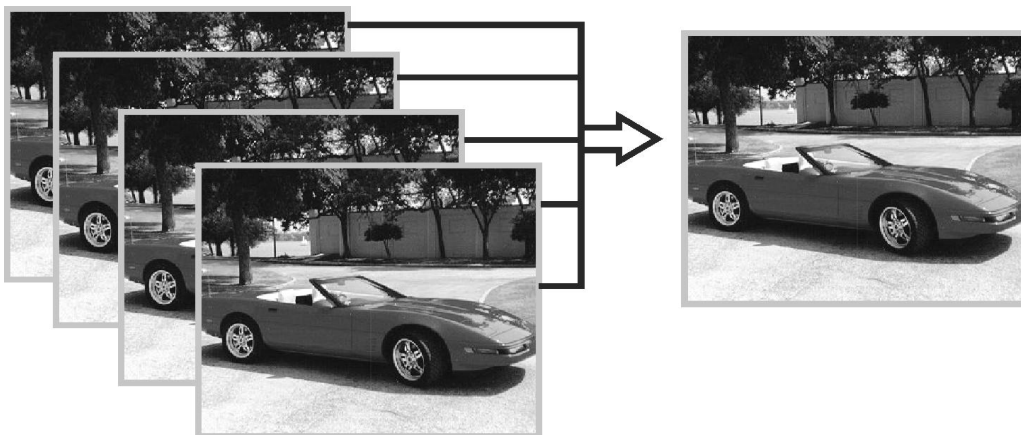
**Example:** In a configuration with five workstations (one doing 2D rendering and four doing 3D rendering), each 3D workstation would output one of the four screen rectangle areas on the display.

You can specify how the screen is dissected. The basic options are grid, vertical slice, horizontal slice and pane. See the `/opt/graphics/OpenGL/sv/doc/README.setpipes` file for more details.

- **Accumulate Mode:** Improves Image Quality

Each pipe generates the complete screen, “jittered” by sub-pixel values. These jittered images are averaged together to achieve a better quality image. This mode is sometimes referred to as the anti-aliasing mode. The more workstations you add, the more samples can be taken, and the better the resulting image quality.

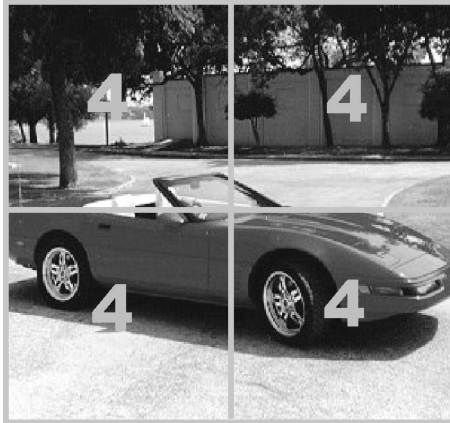
**Figure 2-7**      **Accumulate Mode**



- **Mixed Mode:** Combination of both Accelerate and Accumulate Modes

Each screen rectangle is generated (jittered and averaged) by the number of samples designated. There is improved image quality (anti-aliasing), and also improved performance (acceleration) since each area is generated by multiple workstations.

**Figure 2-8**      **Mixed Mode**



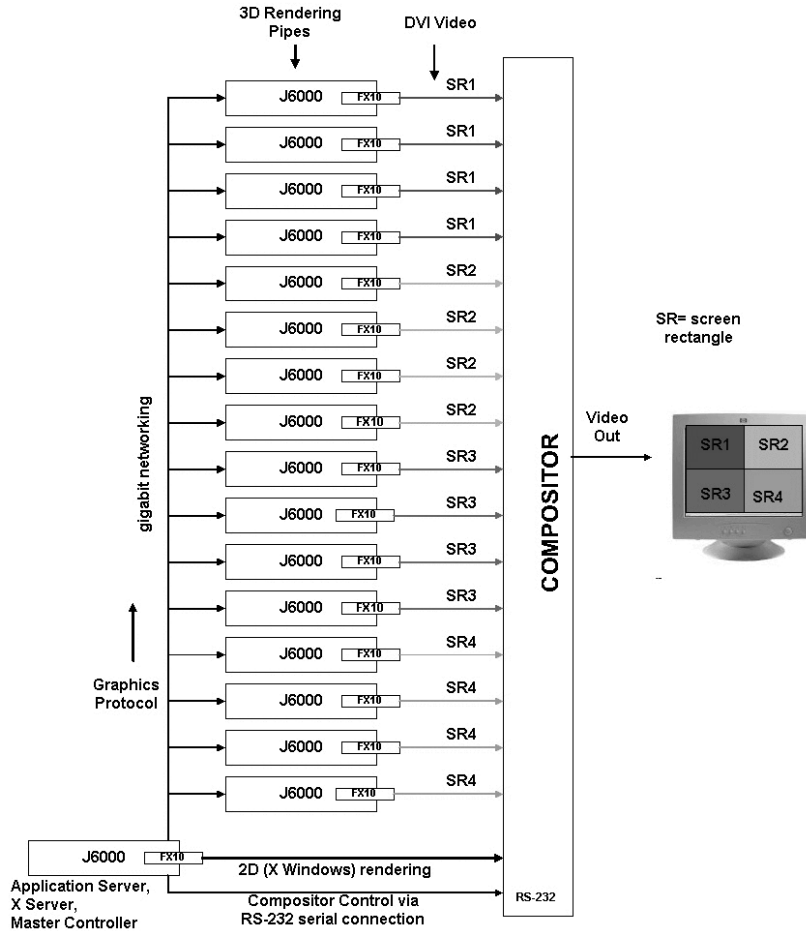
For example, with a 16-pipe hp visualization center sv6, each of the quadrants pictured above could be accumulated by  $N$  graphics-enabled workstations ( $N$  is equal to the number of samples to be jittered). If  $N=4$ , then you get four samples for accumulation on each section and since the screen has been split into four sections, you also get improved acceleration.

To increase the rendering performance, use the Accelerate Mode. To increase image quality, use Accumulate Mode. To improve both, experiment with Mixed Mode to achieve the desired balance of both.

Figure 2-9 shows the hardware arrangement needed to produce the output in Figure 2-8.

**Figure 2-9 Mixed Mode 16-Pipe Example**

16-PIPE SYSTEM ( 4x Accel and 4x Accum = 4x4 Mixed Mode)



**supported configurations**

Each channel is driven by a set of workstations assigned to do 3D rendering (3D pipes) plus one to do 2D rendering (2D pipe). This table shows the hardware combinations that are supported.



**Table 2-1 Hardware Configurations**

3D pipes /channel	Number of Display Channels		
	1 channel	2 channel	3 channel
3** 4	4 workstations 5 workstations	NA 10 workstations	NA 15 workstations
7 ** 8	8 workstations 9 workstations	NA 18 workstations	NA 27 workstations
16	17 workstations	34 workstations	51 workstations

\*\* Mini-sv6 configurations have slightly lower performance because their second master node doubles as a 3D render node using its 2D HP fx10 graphics card.

Given enough 3D pipelines, both acceleration and image quality can be achieved. With 16 systems, the screen can be split into four screen rectangles. Four workstations can be assigned for each quadrant to produce four samples per pixel from full scenes jittered by sub-pixel values. The digital compositor can both average these values into a single value and recombine the four quadrants into a single image. The possible configurations include:

**Table 2-2 Three or Four 3D Pipes Per Channel**

Screen Rectangles	Pixel Samples*	Mode
1	4	Accumulate (fastest)
4	1	Accelerate (best image)

**Table 2-3 Seven or Eight 3D Pipes Per Channel**

Screen rectangles	Pixel Samples*	Mode
1	8	Accumulate (fastest)
2	4	Mixed
8	1	Accelerate (best image)

**Table 2-4**                    **Sixteen 3D Pipes Per Channel**

Screen rectangles	Pixel Samples*	Mode
1	16	Accumulate (fastest)
2	8	Mixed
4	4	Mixed
8	2	Mixed
16	1	Accelerate (best image quality)

\* Default shown is one pixel sample per graphics card. Each workstation's fx10 graphics card can take four samples of each pixel when hardware anti-aliasing is enabled. See Optimization on page 69.

### software configurations

The following software is installed on your systems and is included on the CDs in the Installation/Recovery Kit.

- Easy Setup HP-UX 11.0
- Gigabit Ethernet Driver
- Digi EtherLite Terminal Server Driver
- Latest graphics patches (X server, OpenGL, etc.)
- hp visualization center sv6 software (additional tools, patches, etc.)
- Additional file configuration (See Chapter 3 for details.)

### software NOT supported

- HP-UX 10.20 and HP-UX 11.11 are not supported at this time.
- Graphics Patches
  - Pre-hp visualization center sv6 graphics patches -- To get hp visualization center sv6 functionality, you MUST have June 2001 graphics patches or later.
  - Old graphics patches -- Keeping your graphics patches updated to the latest versions is HIGHLY RECOMMENDED.
  - Mismatched versions -- All workstations in your hp visualization center sv6 configurations must have the same version of patches installed.

- Drivers or other software not compatible with HP-UX 11.0 (64-bit) **MUST NOT** be installed on hp visualization center sv6 workstations.
- The hp visualization center sv6 is not equivalent to an HP compute farm mp6 and should not be expected to support tools (LSF, monitoring tools, etc.) that are specially customized for HP compute farms. However, hp visualization center sv6 workstations, like HP compute farms, when not being used for visualization can be used as separate compute nodes.

---

## installation process

---

### NOTE

Before attempting to install your hp visualization center sv6 system, please read the Safety Information in Chapter 1 of this document.

---

This installation process assumes the following steps:

**Table 2-5**

Assessment	Thoroughly review the <i>hp visualization center sv6 Site Prep Guide</i> . Register an IP address and hostname for each workstation and Digi switch in the system. Take future upgrades into consideration. Confirm all system and display requirements with the vendor of your display(s)
Preparation for Wide Field Displays	Order appropriate equipment and services Prepare site as recommended in the <i>hp visualization center sv6 Site Prep Guide</i>
Workstation Installation	Locate and setup: <ul style="list-style-type: none"><li>• rack(s) of workstations</li><li>• console monitors, keyboard, peripherals</li><li>• cabling including power, network, etc.</li></ul>
Configuration	Configure workstations including passwords, networking, etc. Configure and calibrate any display options
Verification	Locate and run verification test and demos

### assessment

The assessment phase ensures that your computing needs are appropriately addressed. Options or future opportunities are considered at this stage so that system upgrade requirements are anticipated.

1. Review the *hp visualization center sv6 Site Prep Guide* to ensure that all space, power, cooling equipment handling requirements, etc. are understood. Take any future upgrades into consideration. For

example, if you plan to add more hp visualization center sv6 systems or large display devices later, take those requirements into consideration.

2. Verify that you will have an ergonomically correct place to set up a monitor, keyboard and mouse. Optional: projector screens or other advanced displays.
3. Verify that delivery and moving arrangements have been made:
  - size and weight restrictions are understood,
  - safety precautions are understood,
  - if anything other than a standard monitor will be used as an output display device, schedule an installer from your display vendor to be on-site the same day that your hp visualization center sv6 installer is there.
4. Have a hostname and IP address registered at your site for each workstation. You'll also need an additional IP address for the Digi EtherLite-32 Terminal Server (DGZ1469C). For example, you would need 18 hostnames and IP addresses for a 16-pipe system.
5. Have a network connection available.

## preparation for wide field displays

The preparation phase ensures that system specific requirements are addressed. hp visualization center sv6 systems minimally require one HP monitor. If wide field display options are ordered for projection systems, passive stereo or for multiple channel support, appropriate installation consulting should occur with the display vendor ahead of time.

This guide does not cover how to integrate hp visualization center sv6 with wide field displays, nor does HP's installation service provide this.

---

### TIP

Have your display installer on-site at the same time as the hp visualization center sv6 installer is there. The display installer has the ultimate responsibility to make sure the displays are properly aligned and functioning.

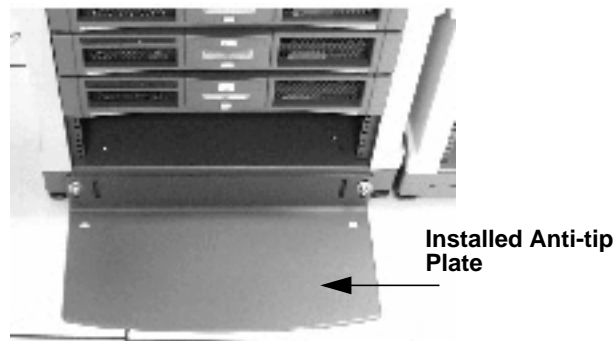
---

## hp visualization center sv6 installation

Here are the steps for hp visualization center sv6 system installation that will be completed by your hp installer:

- Position racks
- Position console monitors
- Connect power & I/O devices
- Configuration
- Boot Up
- Verification
- Run Your Application

**Figure 2-10**      **Anti-Tip Plate**



---

### WARNING

**Pull out or attach the anti-tip plate located at the bottom of each rack (see Figure 2-10) when systems are being set up and configured. Failure to do so could cause the entire rack to tip over. The anti-tip plate should remain deployed. See the *hp visualization center sv6 Site Prep Guide* for further precautions.**

---

#### 1. Position rack(s)

Some hp visualization center sv6 solutions require racks of machines to be located next to each other. Several cabling options between the racks are necessary to realize full functionality and performance.

Adequate ventilation and cable pathways should be provided between all machines. Refer to the *hp visualization center sv6 Site Prep Guide* for the specifications for your configuration.

## 2. Position console monitors

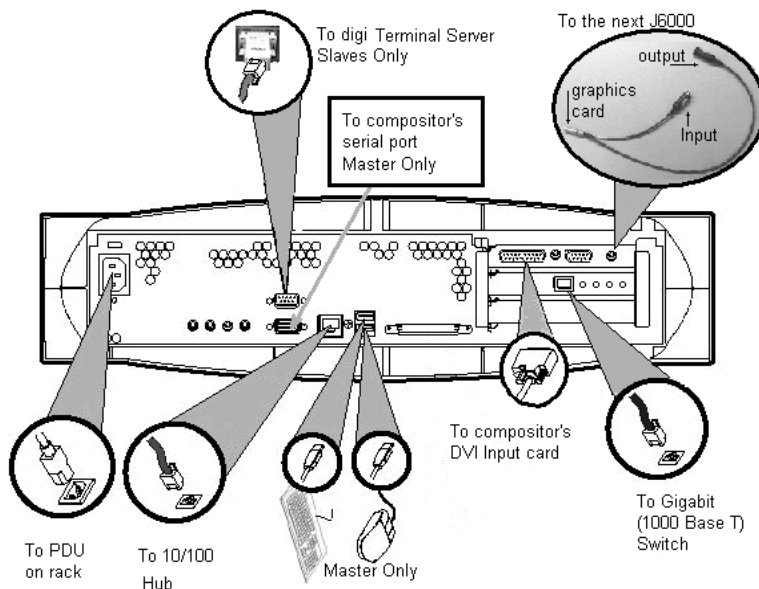
Set up console monitor(s) according to their respective installation instructions. Pay close attention to both ergonomic positioning recommendations and the monitor's relationship to a wide field display option if it is used.

See the "Working In Comfort" documentation at <http://www.hp.com/ergo> for complete information on safely preparing your work environment and other ergonomic issues.

## 3. Connect Power, I/O Devices

If you have multiple racks, connect them as indicated by the labels on the disconnected cables. Use the diagram below as a general cable reference:

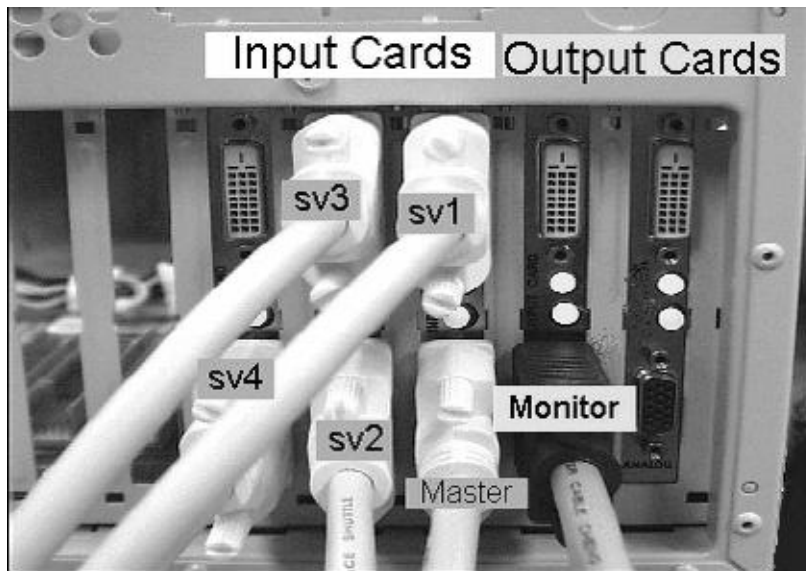
**Figure 2-11 Workstation Cabling**



- See power, space, and cooling requirements in the *hp visualization center sv6 Site Prep Guide*.

- Verify that the switches on all workstations, Compositors, and any additional equipment are plugged into the PDU, or directly into an outlet that meets the requirements of the *hp visualization center sv6 Site Prep Guide*.
- Attach keyboard and mouse to the system labeled master.
- Plug in any 'dangling' cables that are needed to connect the racks together. All cables will be labeled for where they need to be plugged in.
- Attach your display device to the output card of the compositor. Use a standard analog monitor cable. Note that two output cards will be connected to the output device(s) if you are using passive stereo as pictured in Figure 2-12. The left output card corresponds to the left eye and the right card corresponds to the right eye.

**Figure 2-12 Connecting Compositor to Monitor or Other Display Device**



- Connect hp ProCurve 10/100 (J4813A) to site's Local Area Network.



**Figure 2-13 Connecting HP ProCurve Hub to LAN**



- Connect one standard CAT5 cable (RJ45 connector) to an empty port on the hub to connect the hp visualization center sv6 to your site's network.

**Figure 2-14 Power I/O Devices**



- Plug in power from the Power Distribution Units (PDUs) on each rack. Be sure to heed all warnings and suggestions outlined in the *hp visualization center sv6 Site Prep Guide*.

#### 4. Configuration

For hp visualization center sv6 configurations, follow these procedures:

**Table 2-6**

Boot up	<p>BOOT AND CONFIGURE THE MASTER SYSTEM BEFORE BOOTING THE SLAVE SYSTEMS. Have a list of hostnames and IP addresses to assign to the systems so they will be visible on your site's network. Run</p> <pre>set_parms addl_netwrk</pre> <p>to set the master's network information.</p> <p>Optional: Set up networking and root passwords on slave nodes using:</p> <pre>/var/opt/ignite/sps/sv6files/sv_config</pre> <p>See the "How to Use hp visualization center sv6 Tools" section for more information on sv_config.</p>
Specify Compositor serial port	<p>If possible, leave the Compositor connected to the default port on the master workstation (serial port 2, /dev/tty1p0). If you wish to move the Compositor to a different port, this change must be specified in the /etc/X11/X0screens file.</p>
Configure system software	<p>When each computer comes up, it can be customized for the local environment (networking info, user accounts, passwords, etc.) Ensure that all systems are compatible with your working environment before moving to the next step.</p>

#### 5. Boot Up

---

**NOTE**

---

BOOT AND CONFIGURE THE MASTER SYSTEM BEFORE BOOTING THE SLAVE SYSTEMS.

- The boot console on the master will prompt you for a hostname, an IP address and other system and network settings.
- After you have answered all of the startup questions, power on all of the other workstations and network switchboxes.

- Set up network information on the slave nodes.

At boot up, all installed graphics devices will be set to default mode - 1280x1024, 75Hz. See the “Changing Resolutions” section for details.

a. **Specify Compositor Serial Port (Optional)**

By default, the compositor is connected and configured on serial port2 of the master 2D workstation(s). If you wish to move it to port1, specify the serial port address in the `/etc/X11/X0screens` file under the 'ScreenOptions' section:

```
ScreenOptions  
SlsdCompositorSerialport /dev/tty0
```

b. **Configure System Software**

- To alter any network settings not done during the initial boot, log in to one system at a time and use `set_parms` `addl_netwrk`
- Set the root password
  - log in as root
  - Type `passwd`
  - Type in and verify new password
- Run HP's System Administration Manager (SAM) to create new logical volumes
- Add user accounts, passwords and other desktop customizations settings.

If the configuration was successful, running your master system at init level 3 or 4 (`/etc/init 4`) will bring up a Common Desktop Environment (CDE) session across all of your screens.

---

**TIP**

If a wide field display option is being installed with your system, now is the time for configuration and calibration to occur. Your chosen vendor may have additional software and files required to set up these display systems. Consult the display vendor for details.

---

## 6. Verification

Run the verification test to verify that the cabling and network information are correct:

- log in to the master system as root
- `init 3`
- Log in at the CDE screen.
- Open a terminal window and run:  
`/opt/graphics/OpenGL/bin/setpipes -test`

---

### WARNING

---

#### **Do not use any other options with -test**

- If you see:
  - Solid red, green or blue triangles rotating in each rectangle (at varying speeds).
  - Black background.
  - Numbers are in order, left to right, top to bottom.
  - PASS: System is Ready
- If you see:
  - Speckles.
  - Strange color changes.
  - Missing triangles.
  - Unexpected patterns (e.g. checkerboard pattern, completely black or red rectangle).
  - FAIL: See the *hp visualization center sv6 Troubleshooting Guide* at <http://www.hp.com/go/workstationsupport> to correct the cabling or networking problem. Check the `verify.log` file created in the current directory.
- Touch any key on the keyboard or press a mouse button to exit the animation
- Use `CTRL+SHIFT+BREAK` to get back to the log in prompt.

## 7. Configure ds2100

If you ordered and HP SureStore Disk System ds2100 (A5675AZ), it will be installed and configured with default settings. See the following documentation for usage and configuration information:

ds2100 User's Guide:

[http://www.hp.com/cposupport/manual\\_set/lpg28796.pdf](http://www.hp.com/cposupport/manual_set/lpg28796.pdf)

Product Web Site:

[http://www.hp.com/products1/storage/disk\\_arrays/disksystems/ds2100/supplies/index.html](http://www.hp.com/products1/storage/disk_arrays/disksystems/ds2100/supplies/index.html)

## 8. Run Your Application

- log in to the master system
- `init 3`
- This will bring up the default window manager, CDE
- Run your application the same way you would run it on any hp workstation running HP-UX 11.0
- Refer to the “How To Use hp visualization center sv6 Configuration Tools” or “Usage” sections for details about how to customize your hp visualization center sv6 system.

## software setup specifications

Your systems will arrive fully loaded with all of the appropriate software and specially configured files. This includes, in some cases, new versions of commands and patches that have not yet been released on media. This section is meant to be used as a reference for what is on the systems when they are shipped. Consider customizing your system and then creating your own 'golden image' for use in restoring systems in the event that the systems need to be rebuilt. A Recovery CD that automatically loads this software has also been provided for your convenience.

- Each workstation was ignited with EasySetup HP-UX 11.0
- Additional Software
  - Latest graphics patches (June 2001 or later)
  - hp visualization center sv6 software (additional tools, patches, etc.)
  - Gigabit Ethernet and Digi EtherLite driver
- Default Gigabit Ethernet hostnames, IP addresses and other network settings were applied.
- The default monitor resolution mode for fx<sup>10c</sup> graphics cards in hp visualization center sv6 systems is 1280x1024 at 75 Hz. Different video timing settings can be specified in the `/etc/X11/X0screens` file. See the Changing Resolution section for more details.
- File configurations based on the descriptions in Chapter 3 were done on your workstations.

---

### NOTE

If you have problems with any of the workstations, use the Recovery CDs instructions to get the system back to a clean state.

---

---

## updating software

### maintain current graphics patches

To fully take advantage of your hp visualization center sv6 systems, be sure to update them with the latest graphics software enhancements available. New sv6 software can be downloaded from <http://h20000.www2.hp.com>. Click on the following links:  
download drivers & software  
workstations  
hp scalable computing - UNIX  
hp visualization center sv6

This software package contains graphics software updates specifically designed for hp scalable visualization sv6 workstations. It will update your current X server and OpenGL software.

### how to determine your current version

As root, enter these commands:

```
swlist | grep 'SV6 Core Update'  
what /opt/graphics/OpenGL/lib/libGL.1
```

The output will look like this:

```
# swlist |grep 'SV6 Core Update'  
Sv6_Enhancements B.11.00.05 HP Visualization Center SV6  
Core Update  
  
# what /opt/graphics/OpenGL/lib/libGL.1  
/opt/graphics/OpenGL/lib/libGL.1:  
OpenGL 1.1 Revision 1.26.1 (ov 0201) on HP-UX 11.00  
$Date:09-Jan-02.13:38:48 $ $Revision: 20020109.28119 $  
libGL.1
```

If you have installed sv6 enhancements software on your system before, skip to step 3 (below).

## Installation Steps

1	Find out current version	<ol style="list-style-type: none"> <li>1. Verify that you have previous sv6_enhancements software on your master system.</li> <li>2. If you do not have a previous version of this sv6 software and/or June 2001 or later X server and OpenGL on your system, do not install the sv6_enhancements bundle. Contact HP Support.</li> </ol>
2	Verify prerequisites.	<ol style="list-style-type: none"> <li>1. Must be able to login as root on master node, which is connected to an HP sv6 compositor.</li> <li>2. Verify that /var/opt/sps/sv6files/sv6_targets contains gigabit hostnames for all systems in the configuration. (i.e. svm sv1 ...sv16)</li> <li>3. Must be a rack of HPUX 11.0 workstations configured according to sv6 standards which includes these critical ones:           <ul style="list-style-type: none"> <li>• A recent version of the Quality Pack is highly recommended. It contains graphics patches and other standard HP patches.</li> <li>• Must have June 2001 or newer X server and OpenGL (PHSS_23546, PHSS_23544,5) and/or an SV6 Core Update patch installed. Check date by running:  <code>what /opt/graphics/OpenGL/lib/libGL.1</code></li> <li>• SD tools must be configured for swinstall to multiple targets (touch /var/adm/sw/.sdkey) and allow root access from the master node to all slave nodes (swacl).</li> <li>• Master has root permissions assigned in /.rhosts on all slave nodes.</li> <li>• Gigabit network must be functional:  <code>(remsh sv1 echo hello)</code></li> <li>• See other details in the scalable visualization guides at:  <a href="http://www.hp.com/workstations/support/documentation/hpux_manuals.html#scalablevis">http://www.hp.com/workstations/support/documentation/hpux_manuals.html#scalablevis</a></li> </ul> </li> </ol>
3	Download software and install script	<ol style="list-style-type: none"> <li>1. Download and save the sv6_enhancements and install_sv6_enhancements files on the master system.</li> </ol>



4	Run install script	<ol style="list-style-type: none"> <li>1. init 2 to stop the X server</li> <li>2. rlogin to the master system as root</li> <li>3. Execute the install_sv6_enhancements script</li> </ol>
5	Re-start X server	<ol style="list-style-type: none"> <li>1. When complete, look for errors or warnings.</li> <li>2. init 3 or /tmp/startx0 to restart the X server</li> </ol>
6	Check log files	<ol style="list-style-type: none"> <li>1. Check /tmp/sps/enhancements.log and /var/adm/sw/swinstall.log for errors.</li> <li>2. A common error when installing with out the install_sv6_enhancements script is 'cannot install from tape device'.            To fix this, use:  <pre>swcopy -s /tmp/tapedepot \  -x enforce_dependencies=false\  \* @ /tmp/diskdepot</pre>           This will copy the software into a more accessible format.</li> </ol>

---

**WARNING**

Uninstalling sv6\_enhancements completely removes all X server and OpenGL software and may not roll back to the previous version. Reinstalling a new sv6\_enhancements package or new X server and OpenGL patches is required.

---

### uninstallation steps

1	swremove	<p>As root, run: swremove          Add target group:          /var/opt/ignite/sps/sv6files/sv6_targets          Select: <b>Actions, Show Software</b> and <b>Mark sv6_enhancements</b> for removal          Select: <b>Remove</b> from the <b>Actions</b> menu          Reboot as requested</p>
---	----------	---

2	Install another version of graphics software	Re-install sv6_enhancements on all systems . . .or for stand-alone sv6 systems, download and install the latest X server and OpenGL patches from <a href="http://itrc.hp.com">http://itrc.hp.com</a> .
---	--	--

## installing to all sv6 systems using HP Software Distributor

There are many ways to utilize HP's Software Distributor (SD) tools to install software. The previous section uses scripts with command line SD calls to make it easy to update the sv6\_enhancements package.

This section describes one way to use the SD GUI tools to install depots or patches onto all systems in your sv6 configuration at the same time. See the man page for 'swinstall' or <http://managementsoftware.hp.com/products/swdist/> for details on HP Software Distributor usage.

---

### WARNING

**When installing patches that require a reboot, switch to a stand-alone workstation X server instantiation. If you wish to use the SD GUI tools instead of the command line or terminal versions, either login remotely to perform the install, or configure the X server to run as it would on a stand-alone workstation. (Example: Temporarily move the /etc/X11/X0screens file to X0screens.save then restart the X server.) Failure to do this could result in an incomplete installation. On sv6, when the first slave node reboots, it kills the X server on the master node, which kills the remaining swinstall GUI windows.**

---

### NOTE

The examples below assume a single-channel system with a master gigabit hostname of svm and an example patch number of PHSS\_25612, which is in tape depot format. Make appropriate substitutions as needed.

Here is a summary of the following installation steps:

- Download and unpack software.
- If the software requires a reboot, change to a stand-alone workstation X server.

- Add `/var/opt/ignite/sps/sv6_files` to path.
- Verify `sv6_targets` list.
- `all touch /var/adm/sw/.sdkey`
- `all /usr/sbin/swacl -l root -M user:root@svm:crwit`
- `swcopy`
- `swinstall`

## step 1: preparation

1. Back up your system before installing a patch.
2. Login as root.
3. Add the `sv6files` directory to your path to access helpful scripts.

Example:

```
export PATH=$PATH:/var/opt/ignite/sps/sv6files
```

4. Download software to a temporary directory on the master node.

Example:

```
Save As /tmp/PHSS_25612
```

Before installing, observe any special instructions or patch dependencies.

Individual HP-UX patches are available at <http://itrc.hp.com>

5. Unpack compressed packages if necessary.

Example:

```
cd /tmp
sh PHSS_25612
```

6. Set root access permissions for SD (Software Distributor) tools.

Verify that you have a recent version (PHCO\_23966, PHCO\_25875, or newer) of the software distributor tools, which have the ability to install to multiple targets.

```
swlist |grep SD
```

Use the default target list which is generated during the initial installation of sv6 systems, /var/opt/sps/sv6files/sv6\_targets, or create a new file containing the gigabit hostnames of all systems in your sv6 configuration. The first name in the list must be the gigabit hostname of the master system. For single-channel configurations, the default master hostname is svm, and for multi-channel the default is svm\_c1. For this example, our sv6\_targets file contains:

```
svm  
sv1  
sv2  
sv3  
sv4
```

Touch the .sdkey file on each system to allow for the SD “install to multiple targets” functionality. Use the /var/opt/ignite/sps/sv6files/all script to automatically run this command on all systems in the targets list.

```
all touch /var/adm/sw/.sdkey
```

Enable SD root permissions from the master system to all systems in the target list.

```
master=$(head -1 /var/opt/ignite/sps/sv6files/sv6_targets)  
all /usr/sbin/swacl -l root -M user:root@$master:crwit
```

## step 2: copy and register locally

This step meets the requirement of the SD “install to multiple targets” functionality. The patch or depot being applied must be registered on the local (not network mounted) hard drive of the master system. Tape depot format is not supported. The swcopy command converts tape depots into an acceptable format.

Key to steps below		Example
Menu Selections	(xxx)	(Actions)
Buttons	[xxx]	[OK]
Text or commands to be entered	Plain, bold	<b>svm</b>

7. Start the SD copy GUI: **swcopy**

8. In the target selection window:

(Actions)

(Add Targets)

Hostname: svm

[Add]

Target Depot Path: /var/opt/sps/depots

[OK] [OK]

(Actions)

(Show Software For Selection)

Source Host Name: svm

Source Depot Path: /tmp/PHNE\_25612.depot

9. In the software selection window:

Left click to select PHNE\_25612

Right click on PHNE\_25612

(Mark for copy)

(Actions)

(Copy)

Assign an optional job title for monitoring and reference purposes.

Example: march gb

[OK]

Watch for warning or error messages that need to be resolved.

(File)

(Exit)

step3: install

---

**WARNING**

**When installing patches that require a reboot, switch to a stand-alone workstation X server instantiation. If you wish to use the SD GUI tools instead of the command line or terminal versions, either login remotely to perform the install, or configure the X server to run as it would on a stand-alone workstation. (Example: Temporarily move the /etc/X11/X0screens file to X0screens.save then restart the X server.) Failure to do this could result in an incomplete installation. On sv6, when the first slave node reboots, it kills the X server on the master node, which kills the remaining swinstall GUI windows.**

---

10. Start install GUI: **swinstall**

11. In the target selection screen:

**(Actions)**

**(Add Target Group)**

name: `/var/opt/ignite/sps/sv6files/sv6_targets`  
[OK]

**(Actions)**

**(Show Software For Selection)**

Source Host Name: `svm`  
Source Depot Path: `/var/opt/sps/depots`  
[OK]

12. In the software selection window:

Left click to select `PHNE_25612`

Right click on `PHNE_25612`

**(Mark For Install)**

**(Actions)**

**(Install)**

Assign an optional job title for monitoring and reference purposes.

Example: `march gb patch`

[OK] [OK]

Watch the Job Browser and Job Results window for confirmation, warning, or error messages, which may need your response.

[Done]

#### step 4: verification

13. Check logs for errors.

Highlight the system with errors or warnings, then click **[Show Log]**.

Copies of SD logs can be found at `/var/adm/sw/*.log`

14. If a pop-up window requests a mandatory reboot, click **[Done]**. By default, auto-reboot is disabled for the master node only, so the slaves will automatically reboot.

Reboot the master system: `/sbin/reboot -q`

15. Verify that the new software shows up in the software list.

**swlist |grep PHNE\_25612**

The name and description should show up as output. Example:

`PHNE_25612 1.0 1000Base-SX/T B.11.00.[02-11] cumul. patch`

---

## advanced setup for multiple display channels

For multiple displays (up to 3 displays) multiple hp visualization center sv6 clusters can be combined to increase screen real estate.

**Figure 2-15**

### **Multiple Channel View**



### **additional X server**

An additional X server called the 'head' controls the other X servers. In addition to the master X server, the head X server is run on the first master workstation listed in the `/etc/x11/X0screens` file. This simply adds one more layer to the X server hierarchy. The head X server controls the master X servers running on each 2D node. The master X servers control the slave X servers running on each 3D slave node. Notice in the following 8-pipe, 2 channel sample X0screens file, that each hp visualization center sv6 cluster has an ID associated with its 2D master node. A row, column order for the displays is also specified. Position the displays left to right top to bottom to match the row, column order you specify in this file.

installation and user information  
advanced setup for multiple display channels

```
Master
  Hostname          svm_c1          #master system's hostname
  ID                sv_c1_master          #a unique label describing
                          the master system

  sv1_c1            #3D slave nodes for this cluster
  sv2_c1
  sv3_c1
  sv4_c1
  sv5_c1
  sv6_c1
  sv7_c1
  sv8_c1
  svm_c1

  Mode      Accelerate
  End

  Master
  Hostname          svm_c2
  ID                svm_c2_master
  sv1_c2
  sv2_c2
  sv3_c2
  sv4_c2
  sv5_c2
  sv6_c2
  sv7_c2
  sv8_c2

  svm_c22

  Mode      Accelerate
End
SLSd
  svm_c1_master_1
  svm_c2_master_2
SlaveLayout
  Rows      1
  Columns   2
```

There are template X0screens files for various types of configurations in the `/usr/lib/X11/misc/slsd/config` directory. A template for the configuration you ordered will be put into place (`/etc/X11/X0screens`) before HP ships your system.



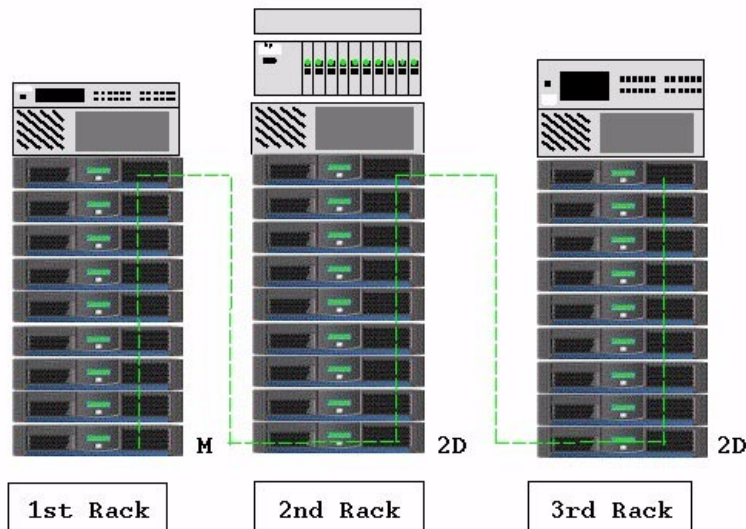
See the comments in `/etc/X11/X0screens` for more information on syntax for multiple channels.

#### additional equipment

A separate hp visualization center sv6 cluster must be added for each additional channel of output, as desired.

A continuous chain, starting at the master system (M) which is the 2D pipe in the first rack, connects all workstations. The chain is formed by synchronization cables between the racks. See the diagrams below.

**Figure 2-16 Synchronization cable chain**

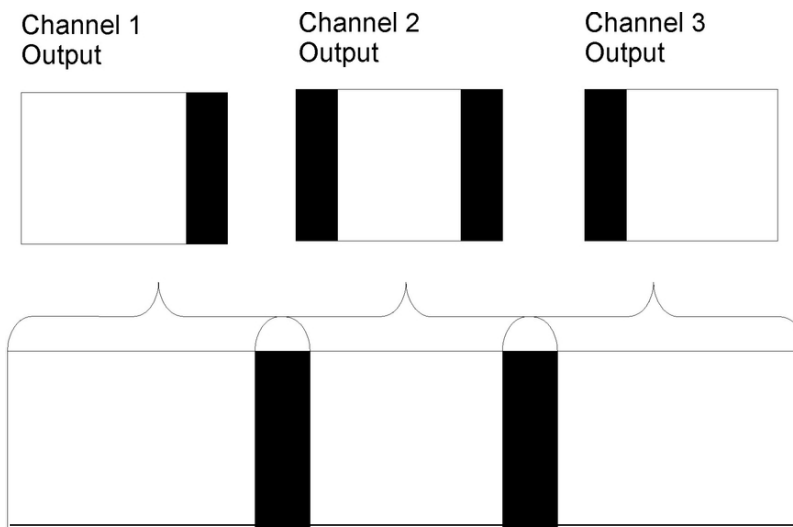


#### configuring offset overlap

When running a configuration where the output is displayed by projectors, it is often necessary to overlap the output channels to ensure proper video intensity across the entire display (see Figure 2-22). Edit the `/etc/X11/X0screens` file to include the following `ScreenOption` to specify the amount of each screen to use for blending:

```
SlsScreenBlendOffsetPercent 25
```

**Figure 2-17**      **Edge Blending**



This raises the intensity of the pixels on the edges of the physical screens so that the overall projected image is consistently bright. These blending options are only meaningful in multi-channel configurations. The default is to not enable screen blending

`SlsScreenBlendOffsetPixels` is similar to `SlsScreenBlendOffsetPercent`, except you specify the exact number of pixels to blend instead of a percentage of the screen width. Specify either pixels or a percentage. These two options are mutually exclusive.

#### configuring offset overlap for multiple rows

The previous edge-blending example shows a simple three-channel configuration with one row and blending between the three columns. For blending of multiple rows, also add one of the following `ScreenOptions` to specify the amount of each screen to use for blending between the rows:

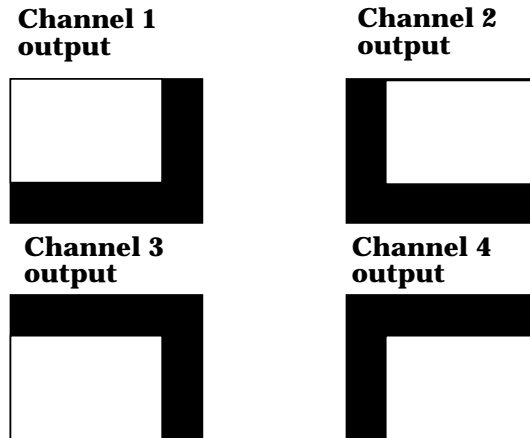
```
SlsScreenBlendHeightPercent <percent>  
SlsScreenBlendHeightPixels <pixels>
```

#### Example:

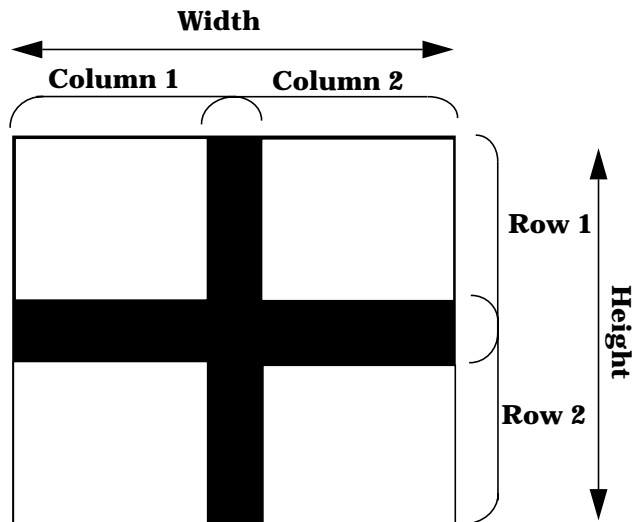
```
SlaveLayout  
  Rows 2  
  Columns 2  
ScreenOptions  
  SlsScreenBlendOffsetPixels 256
```

SlsScreenBlendHeightPixels 256

**Figure 2-18 Multi-channel Edge Blending**



**Figure 2-19 Height Edge Blending**



See also the “usage”, “changing resolution” section for details about setting a width, height, and frequency that are compatible with your projector.

## backdrops

In addition to the standard CDE patterns, your hp visualization center sv6 system comes with special high resolution CDE backgrounds for configurations with two or three display channels.

The following files are for use with the HP-UX Common Desktop Environment (or CDE). They are formatted as pix map files to be used as backdrops for a user's account.

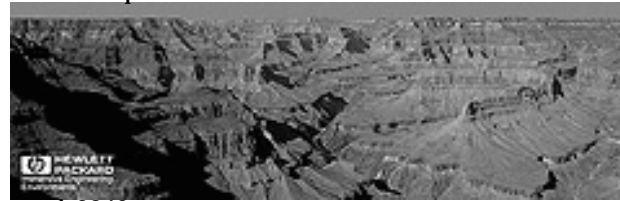
1. Choose the desired resolution file from `/.dt/backdrops`
2. Select the **Backdrop** option from the **Style Manager**
3. It may take some time to open the menu as CDE first scans the large files and adds them to the file browser. Open the menu when ready.
4. Select a backdrop to display as depicted in the following page. Select the **Apply** button to make it the current backdrop.

**Figure 2-20**

**3840 x 1024 3x(1280 x 1024)**



cst3840.pm



grdc3840.pm



fish3840.pm

**Figure 2-21**

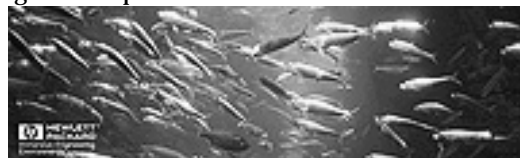
**3072 x 768 3x(1024 x 768)**



cst3072.pm



grdc3072.pm



fish3072.pm

---

## usage

This section covers some general tasks the hp visualization center sv6 user may do. If you are looking for descriptions of hp visualization center sv6 tools, skip to the How To Use hp visualization center sv6 Tools section.

- **X Server**

To start the X server on the master system, run `X:0` or go to `init 3` to start up the X server and CDE. The master's X server will automatically start and control all slave X servers on the other systems.

To kill the X server, press `<Ctrl>+<Shift>+<Break>`, then wait for the X servers to stop.

Press `<Ctrl>+<Shift>+<Break>` again.

Press enter a couple of times to get the prompt back.

- **X0screens Description**

The `/etc/X11/X0screens` file details the X server configuration information for the HP X server. The X0screens file is used to configure many aspects of hp visualization center sv6 including which systems are to be involved in the hp visualization center sv6 configuration, video timing data, and options to obtain diagnostic information.

The X0screens file on the hp visualization center sv6 master system is used to configure the X servers on each of the hp visualization center sv6 slave systems. This single-file configuration maintains consistency between all nodes.

---

**NOTE**

---

This file must be edited as root and must be located in `/etc/X11/X0screens`

- **Loading X0screens templates**

A template `/etc/X11/X0screens` file is on the master system. There are several additional X0screens template files available. Copy or link the desired (and compatible) template to X0screens. For

instance, if you have a three channel system, but you want to temporarily set the configuration to use only two of the channels, you could save the current X0screens file and move a two channel template into place:

```
cp /etc/X11/X0screens /etc/X11/X0screens.orig
cd /usr/lib/X11/Xserver/misc/slzd/templates

cp X0screens.pl6c2 /etc/X11/X0screens

... or

ln -s /etc/X11/X0screens.16c2 /etc/X11/X0screens
```

---

**NOTE**

Early versions of SLS/d required the `/etc/X11/X0devices` and `/etc/X11/X0screens` files on the slave systems to be edited. This is no longer necessary, since the master system uses the information in its X0screens file to do automatic configuration on the slaves via the X server.

---

## changing resolution

Use one of the methods below to specify the resolution in the `/etc/X11/X0screens` file. Each method automatically sets all graphics cards in the hp visualization center sv6 configuration to the specified resolution. If no video timing information is specified, the default settings will be used.

Do not use the setmon program to change resolutions on your systems. It does not have the functionality to change all necessary settings.

- **Standard Resolutions:**

To set a standard resolution, add the following lines to the **ScreenOptions** section of the `/etc/X11/X0screens` file. The example below is the default for fx<sup>10</sup> graphics cards in an hp visualization center sv6 configuration (1280x1024 at 75 Hz):

```
ScreenOptions
SlzdVideoTimingWidth 1280
SlzdVideoTimingHeight 1024
SlzdVideoTimingFrequency 75
```

- **Customized Resolutions:**

If you wish to customize to a non-standard video format or specify precise timing parameters:

Select one of the video timing files from

`/usr/lib/X11/Xserver/misc/slzd/videotiming`

Reference it in the `/etc/X11/X0screens` as follows:

```
ScreenOptions
```

```
SlzdVideoTimingFile
```

```
/usr/lib/X11/misc/slzd/videotiming/<timingfile>
```

- **Stereo Resolutions**

For active stereo, add the following line under the **ScreenOptions** section of `/etc/X11/X0screens`:

```
SlzdCompositorStereo Active
```

For passive stereo:

```
SlzdCompositorStereo Passive
```

See the Stereoscopic Viewing section for details about active and passive stereo.



---

## how to use hp visualization center sv6 tools

See the README files at:

```
/opt/graphics/OpenGL/sv/doc/sv/README.*
```

The following tools can be used to make on-the-fly configuration changes.

- **sv\_config** -This script allows you to customize the site-visible host names and IP addresses for slave systems. It is not necessary to set the IP addresses on the slave systems for the system to operate properly. Use this script to set root passwords on the slave systems. This is only necessary if you want access to these systems for other uses.

First, you must know the new host names and IP addresses for all the systems, including the IP address of the Digi-Etherlite terminal server. When you have this information you can run `sv_config (/var/opt/ignite/sps/sv6files/sv_config)` and it will prompt you for the new information for each system.

You may also prepare a file with this information for `sv_config` to read. First copy the `sv6_targets` to a temporary file (for example: `cp /var/opt/ignite/sps/sv6files/sv6_targets /tmp/sv6_newnames`). Then edit `/tmp/sv6_newnames` to add the required information. It should look like the example below:

```
svm  
sv1  
sv2  
sv3  
...
```

Append after each `sv` name the hostname and IP address you want the system to be known as within your site network. The first line (`svm`) is the master system, `sv_config` doesn't change the master's hostname or IP address, use `set_parms` to do that. `sv6_newnames` will then look like this:

```
svm mymastername 111.222.123.1  
sv1 myname1 111.222.123.2  
sv2 myname2 111.222.123.20  
sv3 myname3 111.222.123.17  
.
```

Then run `./sv_config -f /tmp/sv6_newnames`

`sv_config` will then use that file to determine how to set each system's hostname and IP address. It will then ask you to enter the IP address for any Digi-Etherlite Terminal servers you have. Once all the data has been collected the changes are made to the systems and `sv_config` asks to reboot. A reboot is needed for all the changes to take effect. If you are not able to reboot at this time you can use `sv_config -rebootall`

`sv_config` always saves the files it will be changing so that the system can be restored later. Use `sv_config -restore` to put the saved files back in place.

---

**NOTE**

---

This does not change the Gigabit Ethernet hostnames or IP addresses.

- **xsetpipes GUI** - The Xsetpipes GUI allows you to change and manipulate the layout and pipe arrangement while viewing 3D changes. The same functionality can be used via the command line. See the 'setpipes Command Line Tool' section below.

For information about how to use this tool:

```
/opt/graphics/OpenGL/sv/bin/xsetpipes -help
```

or read `/opt/graphics/OpenGL/sv/doc/README.xsetpipes`

- **xadvsetpipes GUI**

This is an advanced version of the `xsetpipes` tool that allows the screen rectangle lines to be dragged across the display. Both GUIs take advantage of the same core functionality, which is provided by the command line tool.

For information about how to use this tool, log in to CDE, then run:

```
/opt/graphics/OpenGL/sv/bin/xadvsetpipes -help
```

or read `/opt/graphics/OpenGL/sv/doc/README.xadvsetpipes`

- **setpipes Command Line Tool**

For information about how to use this tool:

```
/opt/graphics/OpenGL/sv/bin/setpipes -help
```

The following section is a copy of

```
/opt/graphics/OpenGL/sv/doc/README.setpipes
```

Note: the 'VisCenter' sections refer to multi-channel configurations.

Hewlett-Packard Visualize Center sv6

NAME

setpipes - sv6 Pipe Configuration Tool

SYNOPSIS (sv6 Configuration)

setpipes [options]

[options]

- h - Arrange Pipes in Horizontal Bands
- v - Arrange Pipes in Vertical Stripes
- grid - Arrange Pipes in a Regular Grid
- full - Each Pipe covers the entire screen
- pane - Arrange Pipes in a "Pane"
- pr l r t b - Pane Rectangle: Specifies the inner pane rectangle in terms of percentages from the left, right, top, and bottom of the screen
- po <mode> - Pane Orientation: Specifies the orientation of the Pipes within the Pane. This can be either h,v or grid.
- samples [ 2 | 4 | 8 | 16 ] - Number of jitter samples per Pipe
- jf <file> - Read jitter values from file <file>
- js <scale> - Scale the jitter values by <scale>
- show - Show Pipe Rectangle indicators on the display
- hide - Hide Pipe Rectangle indicators on the display
  
- xdist x1 x2 ... - X Distribution percentage of each Pipe relative to the screen width
- ydist y1 y2 ... - Y Distribution percentage of each Pipe relative to the screen height

SYNOPSIS (sv6 VisCenter Configuration)

setpipes [glob\_options] -0 [Master 0 Options]  
-1 [Master 1 Options]  
-2 [Master 2 Options]

[glob\_options]

-show, -hide, -samples, -jf, -js

[Master <x> Options]

-h, -v, -grid, -pane, -full, -samples, -js,  
-show, -hide -pr, -po, -xdist, -ydist

DESCRIPTION

The setpipes program modifies the location and size of the rendering area for each 3D Slave. In addition, the number of jitter samples per 3D Slave can also be specified.

NOTES:1) When experimenting with different values in xdist and ydist, it is possible that the values will not total 100% of the screen width or height. In this case, the command will be executed and the compositor will display a test pattern in the areas not covered by a pipe. The test pattern is a block grid pattern that rotates between red, green, and blue continuously.

2) When running setpipes on an sv6 VisCenter configuration, the "-" is optional between the master specifier (e.g, "-0") and the Pipe orientation (e.g., grid). In other words, on an sv6 VisCenter:

```
setpipes -0 grid -1 grid
```

is identical to

```
setpipes -0 -grid -1 -grid
```

EXAMPLES

1) sv6 Configuration: 8-Pipe System, Horizontal Stripes

```
setpipes -h
```

```
+-----+
|-----|
|-----|
|-----|
|-----|
|-----|
|-----|
|-----|
|-----|
+-----+
```

2) sv6 Configuration: 8-Pipe System, Grid

```
setpipes -grid
```

```
+---+---+---+---+
|   |   |   |   |
|   |   |   |   |
|   |   |   |   |
+---+---+---+---+
|   |   |   |   |
|   |   |   |   |
|   |   |   |   |
+---+---+---+---+
```

- 3) sv6 Configuration: 8-Pipe System, 2 jitter samples per pipe

```
setpipes -grid -samples 2
```

```
+-----+-----+
|       |       |
|  2x   |  2x   |
|       |       |
+-----+-----+
|       |       |
|  2x   |  2x   |
|       |       |
+-----+-----+
```

- 4) sv6 Configuration: 8-Pipe System, 4 jitter samples per pipe

```
setpipes -grid -samples 4
```

```
+-----+
|           |
|          4x |
|           |
+-----+
|           |
|          4x |
|           |
+-----+
```

- 5) sv6 Configuration: 8-Pipe System, Pane Orientation Grid

```
setpipes -pane -po grid
```

```
+---+-----+---+
| |       | |
| +---+---+ |
| | | | | |
| +---+---+ |
| | | | | |
| +---+---+ |
| |       | |
+---+-----+---+
```

6) sv6 VisCenter Configuration: Show Pipe Indicators

Master 0: 8-Pipe System, Grid

Master 1: 8-Pipe System, Horizontal

Master 2: 8-Pipe System, Vertical

```
setpipes -show -0 grid -1 h -2 v
```

```
+---+---+---+---+ +-----+ +---+---+---+---+
| | | | | | |-----| | | | | | | | |
| | | | | | |-----| | | | | | | | |
| | | | | | |-----| | | | | | | | |
+---+---+---+---+ |-----| | | | | | | | |
| | | | | | |-----| | | | | | | | |
| | | | | | |-----| | | | | | | | |
| | | | | | |-----| | | | | | | | |
+---+---+---+---+ +-----+ +---+---+---+---+
```

7) sv6 Configuration: 4-Pipe System, Grid

Left-Half Pipes take up 60% of the screen

Top-Half Pipes take up 70% of the screen

```
setpipes -grid -xdist 60 40 -ydist 70 30
```

```
+---+-----+
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
+---+-----+
| | | | |
+---+-----+
```

- **jitter file tool**

The jitter tool can be used to generate a custom jitter file which can then be loaded and used with setpipes. This tool allows you to manually select custom jitter points, thus customize/increase the quality of their output by controlling how samples are taken for Accumulate Mode.

For information about how to use this tool:

```
/opt/graphics/OpenGL/sv/bin/jitter -help
```

or see `/opt/graphics/OpenGL/sv/doc/README.jitter`

- **Other tools**

See the `/opt/graphics/OpenGL/doc/sv/README.*` files for details about other hp visualization center sv6 tools

## sv6 diagnostics

Use the diagnostic tool for troubleshooting. The executable is `/usr/local/bin/sv6diag`. More usage details can be found by viewing the man page for `sv6diag`, or running `sv6diag -h`. Diagnostic results are generated as a table showing the pass/fail status for each component in the system.

`sv6diag` runs the following sequence of tests:

Back - Verifies name resolution on slaves

Comp - Tests RS232 connectivity to the compositor(s)

Digi - Verifies connectivity to slaves through the Digi-Etherlite terminal server

Forw - Verifies name resolution on master

Giga - Tests connectivity on 1000 baseT network

Ping - Verifies connectivity to terminal server

Rsh - Verifies Remote Shell Capability

Tnet - Tests connectivity on 10/100baseT network

**Usage:** To run the test suite, type: `sv6diag [-abcdglnprt]`

### **Description:**

Runs diagnostic tests on sv6 systems.

All tests run by default without logging.

### **Options:**

a - Run all tests

b - Verify name resolution on slaves

c - Test connectivity to the compositor(s)

d - Verify connectivity to slaves through the terminal server

g - Test connectivity on 1000baseT network

l - Turn logging on

n - Verify name resolution on master

p - Verify connectivity to terminal server

r - Verify Remote Shell Capability

t - Test connectivity on 10/100baseT network

Executing `sv6diag` with no arguments runs all of the tests.

### sample output from running sv6diag on a standard sv6 system

```
Fri Jul 20 09:33:20 MDT 2001
sv6diag version 1.0
(c) Copyright 2001, Hewlett-Packard Company, all rights
reserved
Hewlett-Packard sv6 Configuration
```

#### Product Information

```
graphics product:      sv6
Displays:              3
Pipes/Display:         16
spu description:       9000/785
```

#### Configuration Information

```
image planes:          48
overlay planes:        8
Resolution:             1280 x 1024 @ 75 Hz
```

#### HP OpenGL Support

```
direct rendering (hardware):  yes
receive indirect rendering (protocol):  yes
emit indirect rendering (protocol):     yes
virtual GL rendering (VGL):            yes
```

```
Running pingDigi: .
Running verifyNameF: .....
Running pingJGiga: .....
Running remsh: .....
Running testCompConnect: .
Running pingJHub: .....
Running pingJDigi: .....
Running verifyNameB: .....
```

#### Test Name Key

-----

```
Back - Verify name resolution on slaves
Comp - Test RS232 connectivity to the compositor(s)
Digi - Verify connectivity to slaves through the
Digi-Etherlite terminal server
Forw - Verify name resolution on master
Giga - Test connectivity on 1000baseT network
Ping - Verify connectivity to terminal server
Rsh - Verify Remote Shell Capability
Tnet - Test connectivity on 10/100baseT network
```



Test Results

```
-----  
Machine Name      Forw Giga Rsh  Back Tnet Comp Ping Digi  
-----  
svm_c1            ok   ok  ok   ok   ok   ok  
sv1_c1            ok   ok  ok   ok   ok  
sv2_c1            ok   ok  ok   ok   ok  
sv3_c1            ok   ok  ok   ok   ok  
sv4_c1            ok   ok  ok   ok   ok  
els0              ok
```

## stereoscopic viewing

This section covers basic installation issues for stereoscopic viewing options. Please consult your chosen provider for complete details on their products.

### active stereo overview

Most output devices are only compatible with active stereo. For active stereo, only one output card per digital compositor (A6061A) is needed. Synchronized emitter and stereo eye wear are connected to the controller card on the digital compositor.

Hardware:

- One digital compositor output card for each channel.
- Monitor or other standard output device.
- Stereo Emitter(s) and eyewear synchronized to block out left or right eye at appropriate times.

See <http://www.hp.com/go/workstations> for an overview of immersive environment products and hp visualization center sv6 certified output devices.

### passive stereo overview

Most output devices use active stereo as described above. With the passive stereo capability, no emitter is needed. It uses a combination of polarized eye wear and special output display devices (such as, specially aligned projectors or passive stereo work bench displays). Two output cards must be used for the compositor to produce the entire left-eye scene and entire right-eye scene. Both scenes are overlapped. The polarized eye wear filters out the correct image for the right and left eye.

Hardware:

- Two digital compositor output cards per channel.
- Output device that supports passive stereo.
- Polarized stereo eye wear.

---

## stereo hardware installation

The following steps are recommended for installing stereo hardware packages for use with a multi-channel hp visualization center sv6 solution. The same principles apply to single channel configurations.

### 1. **Unpack and inventory components**

Emitters should have a stereo-sync BNC type connector and a 9-pin D-sub connector for the separate power transformers. BNC coaxial type cables are necessary for signal transfer between the graphics card and the emitters. BNC "T" connectors are often used to split stereo signals from the controller card on the compositor to several emitters.

### 2. **Ensure eye wear is functioning and clean**

Follow the manufacturer's suggestions for cleaning the eye wear.

### 3. **Position emitter in viewing area**

For hp visualization center sv6 systems that use monitors as display devices, one emitter is usually sufficient for small groups. The emitter is usually placed strategically on top of the user's console monitor(s) in the center of the user's direction of gaze.

If more than one emitter is needed, they are usually positioned such that the coverage angles (approximately 90 degrees horizontal arc, 40 degrees vertical arc) are sufficient for audience members to "see" at least one infrared emitter when viewing a screen.

Always ensure that the sight line between an emitter and sensor on the eye wear is unobstructed from all relevant angles of view.

### 4. **Connect emitters to the Compositor**

Recommended signal distribution from the graphics cards to emitters is from a single point (the compositor controller card on the master system) to the emitters. Emitters are serially connected (daisy chained) with "T" BNC connectors using coaxial (BNC tipped) cables between emitters.

Under normal circumstances, the master system's compositor drives one active stereo emitter. Greater numbers of emitters or longer cable lengths may require signal amplification. Consult the stereo equipment vendor for more information

Connect power supply transformers to their respective emitters at this stage. As with all computer equipment, emitters should be surge-protected from hazardous power spikes wherever possible.

---

**CAUTION**

---

It is recommended that all emitters be powered OFF when connecting or disconnecting their cables to any other equipment. This can reduce the possibility of harmful power surges to other equipment when handling this signal source.

### 5. Power up the emitters

The power switch for emitters is located on the back side of the device. The switch has three positions -- high, off, and low power. It is recommended that you use the high power position to improve signal performance, especially in rooms with high ambient light or that accommodate larger audiences.

## changing to stereo monitor mode

Use the following instructions to change graphics cards and compositor settings to a stereo mode.

### 1. Add ScreenOption

log in to the master system as root

```
init 2
```

In addition to the `SlsdVideo` resolution settings or the `videotiming` file specified in `/etc/X11/X0screens`, add one of the following lines under the `ScreenOptions` section:

```
SlsdCompositorStereo Active  
SlsdCompositorStereo Passive
```

Save the `/etc/X11/X0screens` file

### 2. Start up the new X server:

```
init 3
```

This will set all graphics cards in the configuration to the new stereo setting and then bring up CDE.

See `/usr/lib/X11/Xserver/misc/slsd/videotiming/` for videotiming files.

#### verification

The synchronized stereoscopic feature can be tested with the `simple_stereo` example OpenGL application located at:

```
/opt/graphics/OpenGL/demos/stereo/simple_stereo.c
```

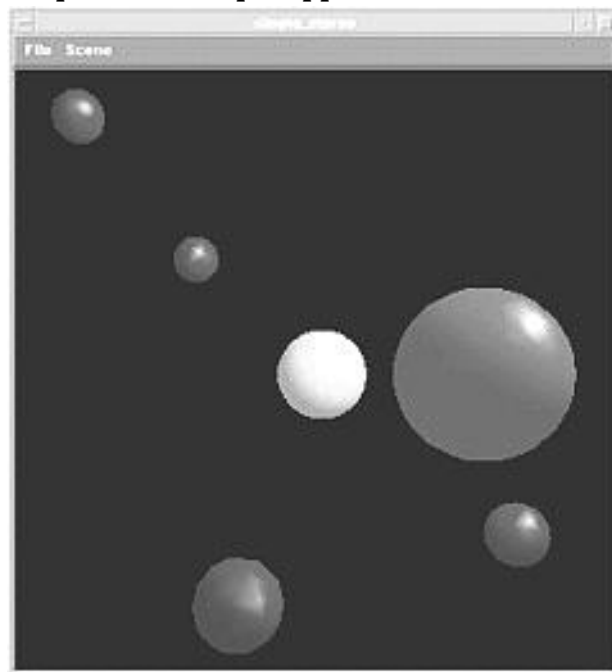
To test stereoscopic output, complete the following:

First compile the source code in an appropriate directory. (Executable provided for run-time only environments.)

Log in and execute application

**Figure 2-22**

#### **Simple stereoscopic application**



## optimization

- **Application suggestions**
  - Applications that primarily use display lists for rendering, perform best on the hp visualization center sv6 systems.
  - The use of vertex arrays by the application can also be helpful in cases where it is not possible to use display list.
  - Immediate mode applications are likely to run slower because of the excessive network traffic. Use pass through mode to overcome this issue.
- **Using NFS to mount hard drives**
  - All applications and models should be installed on the master system for the best performance
  - If extra disk space is needed, adding an additional hard drive to the master system is recommended. As an alternative, the hard drives of the slave machines may be mounted using the standard NFS commands or by running HP's System Administration Manager (SAM) as follows:

---

### CAUTION

---

This may slightly increase the wait time during loading and hard drive access.

- Run SAM; choose **Networking and Communications, Networked File Systems** then **Export** or **Mount** the hard drive you want to share.
  - See the **Help** menu for more details
- **Optimizing performance**

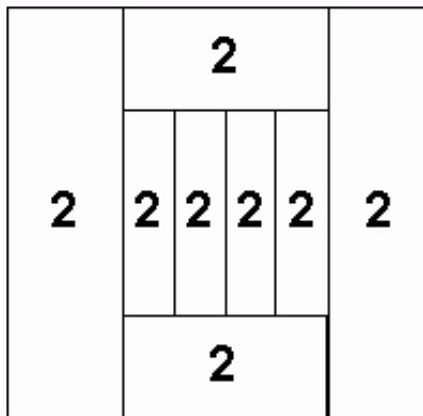
For each application and model type, try experimenting with some different screen layout x and y offsets and other setpipes options. By adjusting the pipe rectangle slices to fit the model's proportions, you can maximize the rendering performance.

- **Accelerate Mode** - See the README.\* setpipes files for instructions for specifying a screen layout in accelerate mode.  
`/opt/graphics/OpenGL/sv/doc/README.*setpipes`
- **Panes** - In this screen layout, the center of the screen is sub-divided into one of the basic layouts: grid, horizontal slices, or vertical slices. Four larger screen rectangles form the outside borders of the screen. Use one of the setpipes tools to select the panes layout. By putting the smaller screen rectangles over the center where rendering demands will probably be greatest, you can achieve faster performance.

At this time, this functionality only works for 8- and 16-pipe systems. For 8-pipe configurations (accelerate mode only) set `samples=1`, and for 16-pipe `samples=2` (mixed mode only).

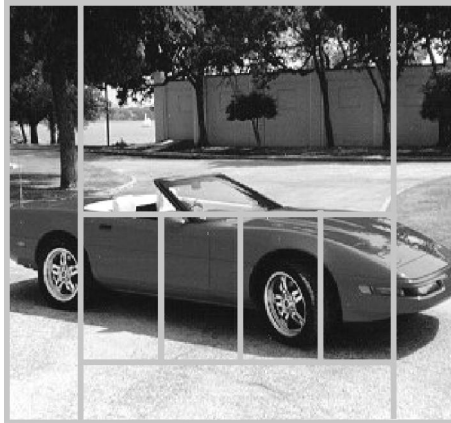
In this 16-pipe example, there are two 3D rendering nodes accumulated to display to each screen rectangle. More of the computing resources are focused on the center where there is more geometry to be rendered

**Figure 2-23 Panes**



- **X and y offset adjustments** - Use the `xadvsetpipes` tool (see `/opt/graphics/OpenGL/sv/doc/README.xadvsetpipes`) to adjust the size of the screen rectangles. Place the smaller rectangles over the areas where rendering demands will be the greatest. For example, you may choose to expand the top screen rectangle to be very large if that region doesn't have very much geometry as pictured in Fig. 2-26.

**Figure 2-24 X and Y Offset Adjustments**



- **Environment Variables** - use the following environment variable to measure and compare performance:

**HPOGL\_LOG\_FRAME\_RATE** - Is an application environment variable, which can be used to get a display of the frame rate for bench marking and performance comparisons.

On the master system at a command line prompt:

```
export HPOGL_LOG_FRAME_RATE=1
```

From the same prompt, run the application you wish to measure

Move something in the application window and watch for frame rates in the window where the prompt is.

When finished:

```
unset HPOGL_LOG_FRAME_RATE
```

**Pixel Zoom** - when **HPOGL\_DSM\_DISABLE\_FAST\_ZOOM** is enabled, the OpenGL Pixel Zoom rendering reverts to its previous slower behavior. If you want to determine the amount of this Pixel Zoom performance tuning, set this environment variable and compare with not setting it. This feature was released in software version 0201 in January 2002.

**Example:**

To see the slower mode:

```
export HPOGL_DSM_DISABLE_FAST_ZOOM=1
```



The default is for fast zoom to be enabled. To put it back to its original setting:

```
unset HPOGL_DSM_DISABLE_FAST_ZOOM
```

The environment variable `HPOGL_OPT_CACHE_MATRICES` can be used with any application, but has the most impact on applications that benefit from matrix caching. Matrix caching is an optional client side optimization that detects successive `glPushMatrix()`, `glMultMatrix()`, `render`, `render`, `glPopMatrix()` sequences where the exact same matrix is redundantly sent.

To enable this feature, set the environment variable before running the application:

```
export HPOGL_OPT_CACHE_MATRICES=1
```

- **Optimizing image quality**

By adjusting the number of pipes used for accumulation (using `setpipes`) and turning on hardware scene anti-aliasing (described below), you can maximize the image quality.

**Accumulate Mode** - See the

`/opt/graphics/OpenGL/sv/doc/README.*setpipes` files for instructions on specifying an accumulate mode screen layout. This can be done with either a GUI or via command line options.

There are two methods of turning scene anti-aliasing on and off for `fx10` graphics cards in your hp visualization center sv6 workstations:

**Method #1:**

The environment variables, `HPOGL_FORCE_SCENE_AA` and `HPOGL_FORCE_SCENE_AA_DBL` can be used by any application without any code changes. The first one forces all 24-bit OpenGL rendering to be scene anti-aliased and the second one restricts scene anti-aliasing to only double buffered visuals.

This will turn on scene anti-aliasing for all OpenGL applications. To enable one of these, add it to the Environment section of the `/etc/X11/X0screens` file then restart the X server.

**Method #2:**

An application can turn on/off scene anti-aliasing on the fly by using the OpenGL calls:

```
glEnable(GL_SUPERSAMPLE_HP);  
glDisable(GL_SUPERSAMPLE_HP);
```

---

**CAUTION**

Depending upon application frame rates and window size, enabling scene anti-aliasing can impact performance significantly. With low frame rates and/or small windows, the performance impact is minor (5% or less). Also, when scene anti-aliasing is turned on, there is much less fx10 memory available for caching texture maps, so this can also impact rendering performance.

---

## pass through mode

Applications that run in OpenGL immediate mode rather than running in display list mode do not scale well in performance. Immediate mode applications tend to run slower when executed on the sv6 architecture due to excessive network traffic.

To provide the best performance for immediate mode applications running on sv6 systems, a special mode called “pass through mode” has been implemented. When an application runs in pass through mode on an sv6 system, it bypasses the sv6 architecture and runs as if it were executing graphics on a standard workstation. This is the optimal mode for executing immediate mode OpenGL code on an sv6 configuration.

To enable pass through mode, simply set this variable right before you run the application then unset it before you start any other applications from the same shell:

Example (for Korn Shell):

```
export HPOGL_PASS_THROUGH=1  
/applications/abc/run_abc  
unset HPOGL_PASS_THROUGH
```

or (for C Shell)

```
setenv HPOGL_PASS_THROUGH 1  
/applications/abc/run_abc  
unsetenv HPOGL_PASS_THROUGH
```

---

**WARNING**

**Do not add this environment variable to `/etc/X11/X0screens`. That would disable all scaling for everything rendered to the screen. By applying it only to the desired application, you can leave scaling enabled for everything else not inside the immediate mode application's windows. In short, you should never set this variable so that it is applied to your user or system environment. It MUST be applied specifically to the invocation of applications that require it. A good way to do this is to set it in a script, which invokes the application.**

---

### gamma correction in pass through mode

The hp visualization center sv6 supports 3-channel gamma correction (i.e. red, green, and blue can all be controlled individually). However, pass through mode only allows for 1-channel gamma correction. To allow for normal sv6 mode and pass through mode to co-exist, the pass through mode simply uses the sv6's red gamma channel as the pass through gamma correction value for red, green, and blue.

### pass through mode on a multi-channel sv6

A side effect of pass through mode is that an application cannot use the full area of a multi-channel display such as a power-wall. This is because the application is operating exactly as it would on a standard desktop workstation, and so it has no access to the sv6 channels, which are driving other monitors or projectors in the display. The result of this is that an application in pass through mode is constrained to the area of the display handled by the channel driven by the application master workstation. Typically, for a two- or three- channel system, this is the left-most channel. Furthermore, if the display is projected and uses edge-blending technology for a seamless image, the overlap region may prove out-of-bounds too, because the brightness of the application's window will fall off as it approaches the edge of the channel (because its pixels are not duplicated in the channel next to it). Therefore it may be necessary to resize the window a little to ensure that it doesn't enter the blend region.

Note that applications that do not require pass through mode can use any region of the full multi-channel display, and are not affected by pass through applications that may be running at the same time.

## gamma value

Another way to fine-tune the image quality is to adjust the gamma correction. Specify the default values to be used for 3D gamma correction. using the instructions in the `/opt/graphics/OpenGL/sv/doc/README.gamma` file.

## HPOGL\_PUSH\_ENVIRONMENT

To override the default environment specified in the SlaveEnvironment section of the `/etc/X11/X0screens` file, have the application startup script set HPOGL\_PUSH\_ENVIRONMENT.

By setting HPOGL\_PUSH\_ENVIRONMENT, all HPOGL\* environment variables are passed across to the slave nodes. With this mechanism, each application can have its own individual environment. In the absence of HPOGL\_PUSH\_ENVIRONMENT, slave environments default to X0screens settings at the time that the Xserver was started.

As an example, assume X0screens has:

```
SlaveEnvironment
HPOGL_FORCE_SCENEEAA=1
HPOGL_LIGHTING_SPACE=EC
```

Application abc's startup script contains:

```
export HPOGL_BOUNDING_VOLUME_ENABLE=1
export HPOGL_BOUNDING_VOLUME_GLOBAL=1
export HPOGL_BVOL_MIN_VERTS=5
export HPOGL_BVOL_MAX_VERTS=10
export HPOGL_PUSH_ENVIRONMENT=1
/opt/apps/abc
```

For this example, application abc will run with the four variables set in its environment and WILL NOT have HPOGL\_FORCE\_SCENEEAA or HPOGL\_LIGHTING\_SPACE=EC set.

Any other application that is run without HPOGL\_PUSH\_ENVIRONMENT will have only the X0screens values.

---

## **3** file configuration

You must be logged in as root to edit the following files. These are samples and based on an 8-pipe configuration, but can be modified for any of the supported configurations. During the software installation

process, all of the following files are automatically configured. Use these instructions to verify that all files are customized appropriately for any hardware changes, hostnames or IP addresses that were made.

- **`/.rhosts`** - Editing this file allows root access to other systems. Root permissions are required to edit many of the configuration files described in this section. It is very handy to allow root access to all systems so it's easy to use `remsh` to access each of them. A copy of this file is on each system.

Optionally, you may choose to remove this file from each system to disallow root access from other systems.

```
svm root
sv1 root
sv2 root
sv3 root
sv4 root
sv5 root
sv6 root
sv7 root
sv8 root
```

- **`/etc/X11/X0screens`** - Edit the X0screens file on the MASTER ONLY!
  - There is a sample X0screens file template for each supported hardware configuration. Use these templates to create the `/etc/X11/X0screens` file to be used to configure the X server. For example, if you had an 8-pipe, two channel system (18 workstations displaying to two monitors):

To replace the existing X0screens file on the master system:

```
cd /usr/lib/X11/xserver/misc/slsd/templates
cp X0screens.p8c2 /etc/X11/X0screens
```

- Edit the file to change hostname and IP addresses. Add or remove comment delimiters (`#`) to enable the desired screen options or environment variables.
- See `/usr/lib/X11/Xserver/info/screens/hp` for general X0screens syntax that is not hp visualization center sv6-specific.

---

**CAUTION**

---

For networking to function properly, hostnames used in X0screens must match the hostnames and IP addresses in all other files described here.

```
#####
# X0screens.p8c1
# /etc/X11/X0screens

#####
# See the template files under the
# /usr/lib/X11/Xserver/misc/slsd/templates directory
# for other options and syntax.
#####

# X*screens Configuration
# -----
# Place any additional/different configuration information
# below. Shown is an example sv6 configuration

SLSd

    sv1
    sv2
    sv3
    sv4
    sv5
    sv6
    sv7
    sv8
    svm

SlaveLayout

    Mode Accelerate

SlaveScreenOptions

    #DisableDma

SlaveEnvironment

    #HPOGL_DLM_BOUNDING_VOLUME_GLOBAL=1

# This can be set for applications whose display lists do NOT
# contain any state setting commands that must persist after
# the lists are called. Setting this when applicable can
# increase performance significantly.

    #HPOGL_FORCE_SCENEAA=1
    #HPOGL_FORCE_SCENEAA_DBL=1
```

```

# These variables turn on FX10 Scene Antialiasing. For
# applications that do UI in OG (e.g. Icem Surfe) the second
# should be used to limit SCENEAA to only double buffered
#visuals.

#HPOGL_DISABLE_FAST_BUFFER_SWAP=1

# If image tearing is noticeable, this will force all FX10's to
# wait for vertical retrace before buffer swapping. Setting
# this can cause performance degradation especially in high
#frame rate situations.

#HPOGL_BV_OCCLUSION_CULL=1
# By default, display-list view frustrum culling is enabled on
# all VIS Center and sv6 configurations. Setting this variable
# will cause a secondary occlusion cull test to be done
# whenever geometry passes the view frustrum test. This
# typically is only effective for applications that render
# models using an outside-to-inside ordering.

#HPOGL_BV_LINE_MODE_CULL=1

# Forces a line mode occlusion cull test rather than the
# default filled quad mode test.

```

- **/etc/inittab** - Change the init level to init state 4 on the master. Leave the other workstations at the default, init state 2. With these settings, CDE will start up after a reboot.

```

#/etc/inittab

init:4:initdefault:

```

- **/etc/hosts** - Update this file on ALL systems if it is changed.
  - This file contains hostnames and IP addresses used by the private Gigabit LAN. It also contains a second set of hostnames and IP addresses for the 10/1000 external LAN.
  - The 192.168.1.\* prefix is the static IP address.
  - Gigabit IP addresses are assigned in the same order as the machines are seated in the rack. i.e. the master system, svm, is at the bottom of the rack and is plugged into the left-most card in the Gigabit Ethernet switchbox and gets assigned the IP 192.168.1.1.
  - These IP addresses MUST match the IP in each system's /etc/rc.conf.d/netconf file.
  - The standard 127.0.0.1 loopback for the Gigabit LAN Ethernet switchbox must also be included.

```

#/etc/hosts

# @(#)hosts $Revision: 1.9.214.1 $ $Date: 96/10/08 13:20:01 $

```



```

# The form for each entry is:
# <internet address> <official hostname> <aliases>
# For example:
# 192.1.2.34 hpferm loghost
# See the hosts(4) manual page for more information.
# Note: The entries cannot be preceded by a space.
#DNS Server (optional)
15.6.180.221      dsnx.my.site      dsnx
15.1.170.0       myvis             #10/100 Ip8 hostname

127.0.0.1        localhost        loopback

#sv6 10/100 LAN host information
#Automatically generated, customize for your site.
15.1.170.1       sv1x             sv1x
15.1.170.2       sv2x             sv2x
15.1.170.3       sv3x             sv3x
.
.
.
15.1.170.8       sv8x             sv8x

#sv6 Gigabit host information
# Do not change
192.168.1.1      svm
192.168.1.2      sv1
192.168.1.3      sv2
192.168.1.4      sv3
192.168.1.5      sv4
192.168.1.6      sv5
192.168.1.7      sv6
192.168.1.8      sv7
192.168.1.9      sv8

```

- **/etc/rc.config.d/netconf** - On all systems, the lan1 section specifies the IP address that corresponds with the HP ProCurve Gigabit Ethernet module (J4115B) that was assigned in the /etc/hosts file. The lan0 section and hostname specify the 10/100 LAN information.

```

#/etc/rc.config.d/netconf
# netconf: configuration values for core networking subsystems

HOSTNAME="svm"
OPERATING_SYSTEM=HP-UX
LOOPBACK_ADRESS=127.0.0.1

```

```
INTERFACE_NAME[0]="lan0"
IP_ADDRESS[0]="16.6.176.65"
SUBNET_MASK[0]="255.255.255.0"
BROADCAST_ADDRESS[0]=" "
INTERFACE_STATE[0]=" "
DHCP_ENABLE[0]=0

INTERFACE_NAME[1]="lan1"
IP_ADDRESS[1]="192.168.1.9"
SUBNET_MASK[1]="255.255.255.0"
BROADCAST_ADDRESS[1]="192.168.1.255"
INTERFACE_STATE[1]=" "
DHCP_ENABLE[1]=0
```

- **/etc/rc.config.d/slsd** - This file enables the SLS/d daemon. After all reboots, the daemon will start automatically.

```
***** File: /etc/rc.config.d/slsd *****
#SLSD configuration. See /usr/lib/X11/Xserver/info/screens/hp
#SLSD_DAEMON:Set to 1 to start Distributed Single Logical Screen
#daemon. Set to 0 to disable Distributed Single Logical Screen
#daemon

SLSD_DAEMON=1
```

---

## **4** projector calibration targets

These calibration targets are for multi-channel hp visualization center sv6 systems using projectors as output devices. They are provided here as a courtesy. Contact your display vendor for instructions on how to install, configure, and calibrate projector equipment.

Copyright © 1999 Hewlett-Packard Company

The following grids are general setup and calibration targets exclusively for Hewlett-Packard visualization center systems when used with projector systems. All rights reserved. All other uses are expressly forbidden.

---

## how to use projector calibration targets

The following six targets at 256 x 256 resolution are provided under `/.dt/backdrops` on the master workstation.

- `hp_circ.pm` (Fig. 4-1)
- `hp_line.pm` (Fig. 4-2)
- `hp_gray.pm` (Fig. 4-3)
- `hp_colr.pm` (Fig. 4-4)
- `hp_eye1.pm` (Fig. 4-5)
- `hp_eye2.pm` (Fig. 4-6)

All files tile to be compatible with the following setup resolutions (or complete multiples of these dimensions):

- A) 1280 X 1024
- B) 1024 X 768

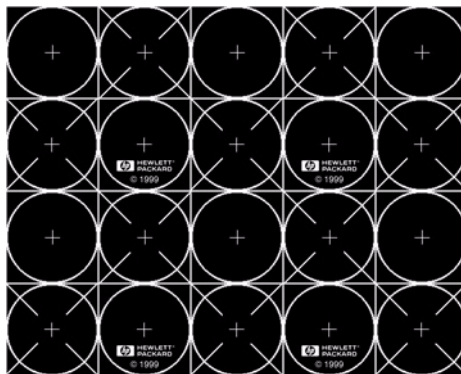
The above files are for use with the HP-UX Common Desktop Environment (CDE). They are formatted as pixmap files to be tiled as backdrops for an installer's account. To use, perform the following:

1. Extract the files from the tar format files with;  
`cd /.dt/backdrops`
2. Copy the necessary files into local user directory:  
`$HOME/.dt/backdrops`
3. Ensure that the current graphics mode is correct for the desired calibration (for example, 1280x1024 by 75Hz).
4. Select the **Style Manager** from the **Front Panel** .
5. Select the **Color** option from the **Style Manager**.

6. To perform the calibration session, select **More Colors for Desktop** option in the **Number of Colors To Use** menu.
7. Confirm **Okay** to both of the menus and return to the **Style Manager**.
8. Move to any part of desktop not in a window and click right mouse button - select **Restart Workspace Manager...** to allow color allocation increase to apply.
9. Select the **Backdrop** option from the **Style Manager**.
10. It may take some time to open the menu as CDE will scan the large files to add them to the file browser. Open when ready.
11. Select the appropriate backdrop to display as depicted in the following page. Select the **Apply** button to make it the current backdrop.
12. Iconify windows and menus to expose the backdrop for the projector technician.
13. Repeat process to apply other grids as necessary. Change monitor modes when necessary.
14. When finished with all calibrations, return **Number of Colors to Use** back to its original setting (most likely **Default**).

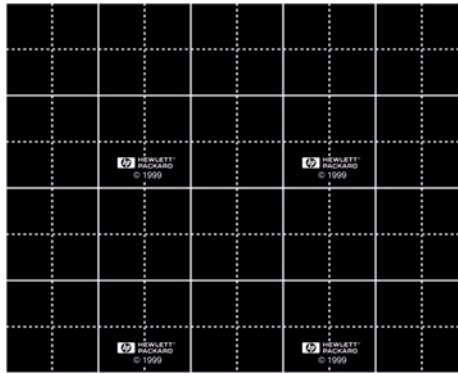
**Figure 4-1**

**hp\_circ.pm 128x128 circles (tiled example shown)**



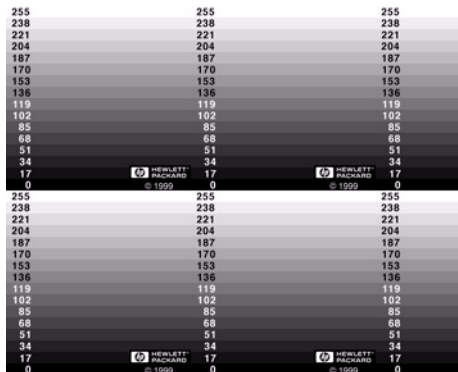
128 x 128 circles, grids, and diagonals to measure convergence and adjust projection geometry.;

**Figure 4-2** **hp\_line.pm 64X64 grid lines (tiled example shown)**



64 x 64 grids for horizontal and vertical convergence.

**Figure 4-3** **hp\_gray.pm gray scale (tiled example shown)**



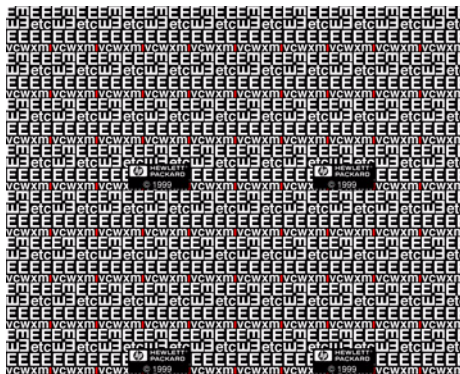
16 step gray scale on horizontal axis with 0-255 indicators to compute brightness.

**Figure 4-4** hp\_color.pm color scale (tilled example shown)



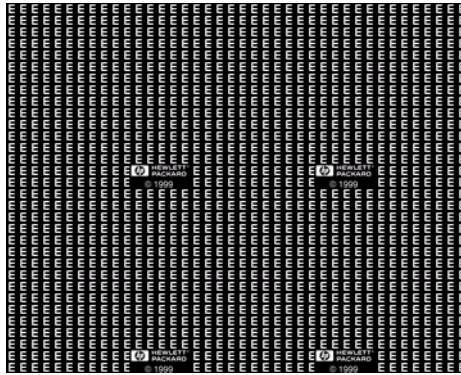
White, yellow, cyan, green, magenta, red, blue, black color bars.

**Figure 4-5** hp\_eye1.pm eye chart #1 (tilled example shown)



Fine grain “eye-chart” style letters for fine tuning and alignments.

**Figure 4-6**      **hp\_eye2.pm eye chart #2 (tiled example shown)**



Additional capital “E” letters for display alignments.



---

# A hp scalable visualization digital compositor

The hp scalable visualization digital compositor (A6061A) is a hardware component designed specially for scalable visualization. It consists of a

rack mountable box containing a fourteen-slot backplane. Into the backplane, three types of cards can be inserted: a controller card, an input card and output cards.

---

## compositor cards

The compositor must contain one controller card. It is responsible for initializing the system, updating firmware, and communicating with the master Workstation to update state information (mode, video rates, video stream state, etc.). This card also accepts the stereo sync signal from the graphics card on the master Workstation and produces the stereo sync needed by active stereo emitters. It also controls the power switch, fan, and status LEDs. After initialization, it only monitors the fan, power supply, and sets the LEDs.

The input card has connections for two video input streams. In a scalable visualization system, one input is used for the 2D stream while the second input on that card is used for 3D. Some number of additional input cards are used for 3D streams. The input card is responsible for taking in digital video streams, down-sampling the data (in super-sample scene anti-aliasing mode) and inserting the data into the appropriate location of an internal frame buffer (in all modes) while summing the data with the original frame buffer contents (in jitter scene anti-aliasing mode). This frame buffer is then sent to the next input card for insertion of its data. The final stage is for the 2D channel to optionally average the data (divide by the number of 3D input streams when in jitter mode), overlay its 2D rendering stream data and mask off the non-3D data from the previous input cards.

The output card takes the composited image and produces a digital or analog output signal that is appropriate for the display on a flat panel or monitor. For a given display there can be two output cards. Two are used to convert the sequential left/right image data from active stereo into a parallel left image and a right image needed for passive stereo. To support this, output card #1 has a frame buffer for holding the left image while output card #2 receives the right image. When the correct left and right images are completely received they are displayed simultaneously while new left/right images are received.

Figure A-1 shows the various cards contained in a scalable visualization system with the identification of the connectors on the boards.

**Figure A-1 Compositor Cards**

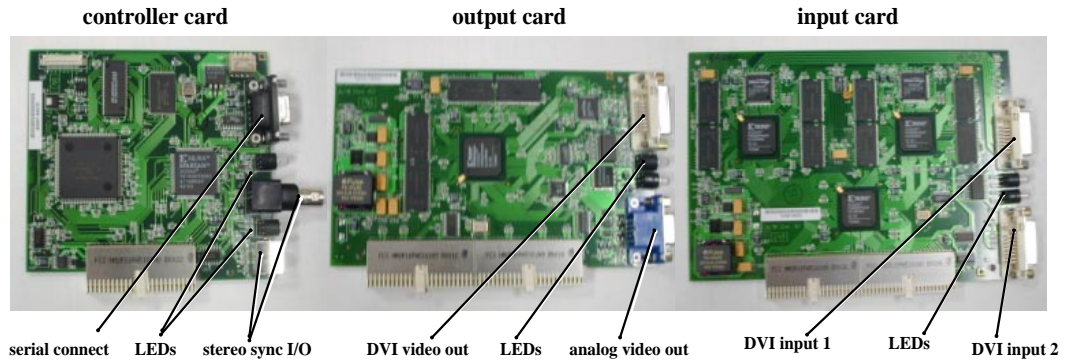
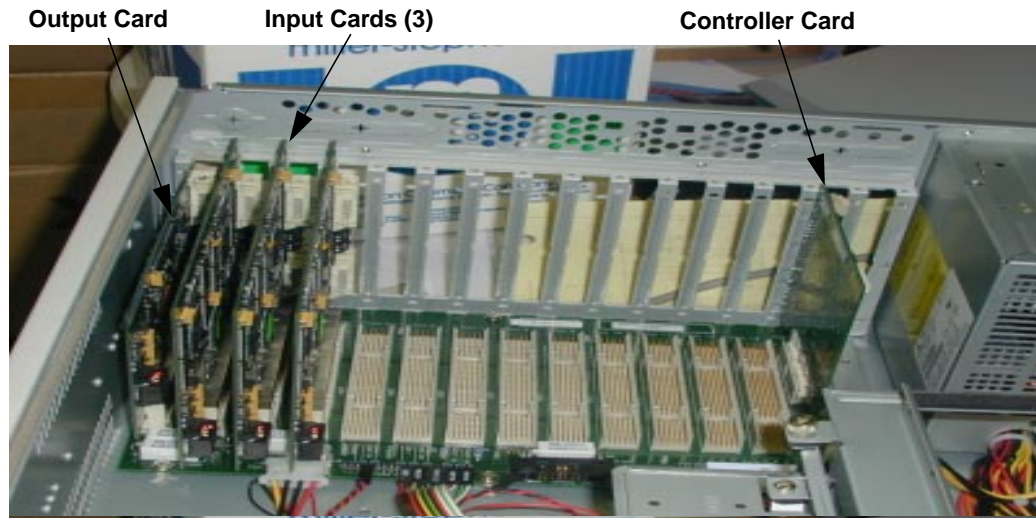


Figure A-2 shows a view of the compositor backplane with one controller card, one output card, and three input cards. This configuration would support a single display with four 3D rendering pipelines.

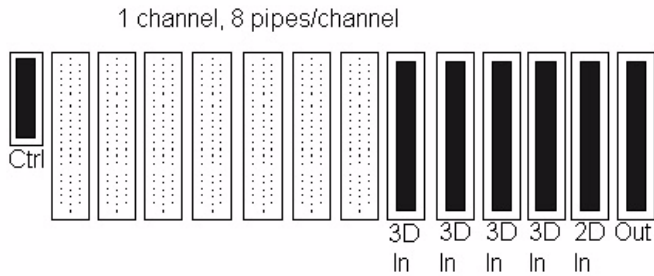
**Figure A-2 Compositor Backplane**



The scalable visualization solution supports both single screen and multi-screen configurations. In a multi-screen configuration multiple hp visualization center sv6 clusters, each with its own compositor, are used (as opposed to multiple output cards for a single display to support passive stereo).

Figure A-3 shows an example of a compositor backplane configuration (looking at it from the back at where the cables attach), one for an 8-pipe, single display system.

**Figure A-3**



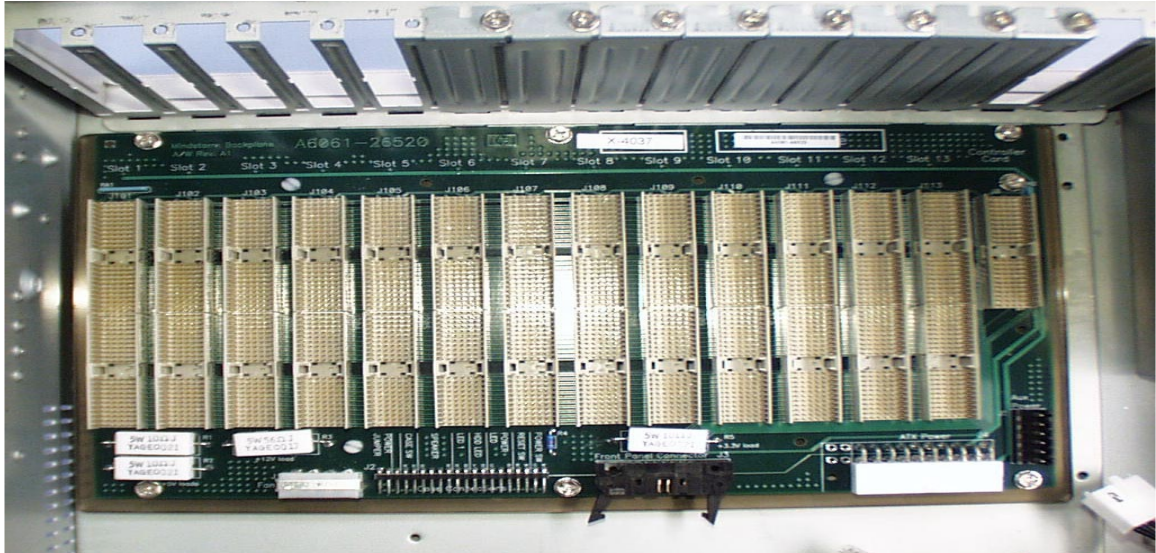
### compositor parts list

**Table A-1**

Part No.	Description
A6061-66510	Compositor controller card
A6061-66520	Compositor backplane
A6061-66530	Digital input card
A6061-66540	Digital output card
0950-3978	320W power supply
A6061-63001	Cable-3Pin, DIN to BNC
A6061-63002	Cable-6M Serial, DB9 Male/Female
A6061-63003	Cable-3M D

## compositor configurations

**Figure A-4**



Individual compositor configurations are listed below from left to right corresponding to slots 1 - 14 respectively:

**Table A-2**

3D Pipes/Channel	1 Channel	2 Channels	3 Channels
4	XOOIIIXXXXXXP	XOOIIIXXXXXXP (x 2 Compositors)	XOOIIIXXXXX P (x 3 Compositors)
8	XOOIIIXXXXXXP	XOOIIIXXXXXXP (x 2 Compositors)	XOOIIIXXXXXXP (x 3 Compositors)
16	XOOIIIIIIIXP	XOOIIIIIIIP (x 2 Compositors)	XOOIIIIIIIXP (x 3 Compositors)

O = Output Card, I= Input Card, P= Controller Card, X= Empty Slot

## sv6 compositor frame delay

This feature allows you to control when video frames are sent to the output device. The compositor is instructed to delay the output of the left-most (when viewed from the rear of the system) output card by one frame.

Some digital projectors internally delay the video display by one video frame. If a display is also connected to an hp visualization sv6 system, the display will be one frame ahead of the projector video. In many cases this is not an issue. However, if the compositor is driving an active stereo display (using stereo emitters and active glasses) the projector is displaying one eye, and the display is displaying the other eye at the same time. Using a single set of emitters, it is not possible to get an accurate stereo image on both the projector and the display.

Enabling frame delay tells the compositor to delay the output of the video signal going to the display device, thus causing the display and projector to match.

To enable this feature:

1. Add the **ScreenOption SisdCompositorEnableOutputFrameDelay** to `/etc/X11/X0screens`.
2. Connect the display to the left-most (when viewed from the rear of the system) compositor output card.
3. Connect the projector to the right-most (when viewed from the rear of the system) compositor output card.
4. Move the stereo emitter connectors from the back of the compositor to any fx<sup>10</sup> graphics cards in the sv6 workstations. This shifts the emitter signals by one frame so they're in synch with the output devices.
5. Update to April 2002 or later `sv6_enhancements` software.
  - Download the latest from <http://www.hp.com/go/workstationsupport>
  - Run the `install_sv6_enhancements` script to install it to all systems in the configuration.

6. Update compositor firmware. This will apply the latest firmware updates included in the `sv6_enhancements` software. Compositor firmware released earlier than April 2002 does not support frame delay.

- `cd /opt/graphics/OpenGL/sv/firmware/sv6/`
- `./loadfw`

---

**NOTE**

---

This mode is invalid with passive stereo.



---

## compositor self-test sequence

### introduction

All compositor cards are assumed to be fully functional before they are installed in a compositor chassis. They are all individually and functionally tested at the manufacturer. Once they are installed in the compositor backplane, however, they could fail by not being seated properly or by having bent bus pins. This test is a check of backplane connections to ensure that they are functional. This test is simply pass / fail, with the only feedback being which card failed.

### interface

This test uses the standard serial communications to the Field Programmable Gate Arrays (FPGA) on the controller card. Both controller FPGAs have registers allowing the controller to read the data values on the video data bus input pins. One of the two FPGAs also has the ability to drive a test value onto its video data bus output.

### procedure

This test is performed as part of the compositor initialization on power-up. First, the controller steps through all of the slots on the backplane, identifying the card type. At this point, invalid configurations are identified. Invalid configurations consist of configurations that have an output card with no card before it or an input card that has no card after it.

If the configuration is valid, then all cards are programmed. Card programming is verified by a successful serial transfer to each FPGA after programming. If a card fails the serial transfer test, it is identified as a failure. If one or more FPGA fails the serial transfer test, compositor initialization is aborted, and the failing cards are identified.

The ability of the cards to be configured and then communicate, tests all of the control signals to the cards. The video data bus remains to be tested. The controller tests these signals by instructing each FPGA to drive a specific bit pattern onto the video data bus, using the bus test registers. These test values are then read by the following I/O cards, and

the values should match. If the value does not match, two failing cards are identified, the one driving the test value and the one receiving the test value, as it is impossible to determine which of the two cards has the failing bus connection.

### testing output or input cards

The test can have two results. One is success. The other is failure, along with a list of one or more cards that failed. This result is accessible to the host through the compositor protocol. The result is also available without the host. A successful test puts the cards into normal operation. If the test fails, the speaker on the compositor sounds a long, low-pitch, failure beep. If the controller has the ability to talk to the failing card or cards, it will set the LEDs to red. This way the operator will be able to visually identify failing cards.

### testing controller cards

This procedure does not do any specific test of the controller card backplane connections. Being a single connector, and having a position that is the same for all configurations, it is believed that failure of the card upon installation is unlikely. In the event there is a bent pin or a poorly seated controller card, it is likely that the controller card will not function at all, since it controls the power switch and the processor that can test the other cards. Although very unlikely, it is possible that an input or output card that fails the test may actually be a failure of one of the pins on the controller card.

The test procedure depends of a few of the bus connections in order to detect that a card is present in a slot. If one of these critical signals is shorted or open, the test may miss a failure by not knowing that a card is even in the slot, or the test may misidentify a card.

### LED indicators

LED1	Card LEDs
ON=Compositor ready	Green = Working and connected
OFF= Compositor not ready	Yellow = Cable not connected, no signal
	Red = Unintialized or ERROR

---

## **B** hp mini-sv6 configuration

The mini-sv6 system is a low-cost, single channel configuration. An additional graphics card is installed in the j6700 master system which takes the place of a 3D render node. The other three render nodes are hp b2600 workstations.

This configuration allows a trade-off between the amount of rendering performance and cost. It falls between a stand-alone workstation and a standard 4-pipe sv6 configuration. For many uses, such as conference room demonstrations, this is the perfect amount of cost/performance scaling.

---

## mini-sv6 configuration

4-pipe sv6: five hp j-class workstations (one graphics card each)

3-pipe mini sv6: one hp j6700 workstation (two graphics card each)  
three hp b2600 workstations (one graphics card each)

**Figure B-1** mini sv6 configuration



Besides the X0screens file, the mini-sv6 is configured and used exactly the same way as any other sv6 system. The following is a sample configuration file for a 3-pipe mini-sv6:

```
***** File: /etc/X11/X0screens *****
ServerOptions
    Slave
        Hostname svm
        ID svm_2d
        Device /dev/crt0
    End
    Slave
        Hostname svm
        ID master_3d
        Device /dev/crt1
    End
    Slave
        Hostname sv1
        ID slave1_3d
        Device /dev/crt
    End
    Slave
        Hostname sv2
        ID slave2_3d
        Device /dev/crt
    End
    Slave
        Hostname sv3
        ID slave3_3d
        Device /dev/crt
    End
SLSD
    master_3d
    slave1_3d
    slave2_3d
    slave3_3d
    svm_2d
SlaveLayout
    Mode Accelerate
# *****
```

**See the template file at**  
</usr/lib/X11/Xserver/misc/slsd/templates/X0screens.p3c1>  
**for details.**

hp mini-sv6 configuration  
**mini-sv6 configuration**

---

# **C** regulatory information

**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:** hp visualization center sv6

**Base Product Number:** A6062A

**Product Options:** All

**conforms to the following specifications:**

**Safety** IEC 950:1991+A1+A2+A3+A4+A11/EN 60950:1992+A1+A2+A3+A4+A11  
IEC 60825-1:1993/EN60825-1:1994+A11 Class 1 for LEDs  
USA 21CFR Subpart J – for FC Laser module  
China GB4943-1995  
Russia GOST R 50377-92

**EMC** CISPR 11: 1997 / EN 55011: 1991 Class A  
CISPR 22: 1993 +A1+A2 / EN 55022: 1994+A1+A2 Class A  
EN 50082-1:1992 Also compliant with:  
IEC 1000-3-2: 1995 / EN 61000-3-2: 1998  
IEC 1000-4-2: 1995 +A1 / EN 61000-4-2: 1999 - 4kV CD, 8 kV AD  
IEC 1000-4-3: 1995 / EN 61000-4-3: 1996 - 10 v/m  
IEC 1000-4-4: 1995 / EN 61000-4-4:1995 -2 kV Signal, 4 kV Power Lines  
U.S. FCC Part 15, Class A  
Japan VCCI Class A  
Australia/New Zealand AS/NZS 2046.1/2:1992, AS/NZS 3548:1995, and  
AS/NZS 4251.1:1994  
China GB9254-1988  
Taiwan CNS13438 Class A  
Russia GOST R 29216-94

**and is certified by:** UL Listed to UL1950, 2nd edition, File E146385  
cUL Listed to CSA 22.2 No. 950-M93  
TUV Certified to EN60950 2nd edition with A1+A2+A3+A4+A11  
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, Dept. HQ-TRE Standards Europe, Herrenberger Strasse 130 Boeblingen (FAX: +49-7031-14-3143) Americas Contact: Hewlett-Packard, Fort Collins Site Quality Mgr., Mail Stop 64, 3404 E. Harmony Road, Fort Collins, CO 80528, U.S.A.



## FCC radio frequency interference statement (USA only)

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### NOTE

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 when the equipment is operated in a commercial environment. 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.

---

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

#### notice for Canada

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.  
Cet appareil numérique de la Class A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

#### safety warning for the USA and Canada

If the power cord is not supplied with the computer, select the proper power cord according to your local national electric code.

USA: use a UL listed type SVT detachable power cord.

Canada: use a CSA certified detachable power cord.

For your safety, never remove the Workstation's cover without first removing the power cord and any connection to a telecommunication network. Always replace the cover before switching on again.

Si le cordon secteur n'est pas livré avec votre ordinateur, utiliser un cordon secteur en accord avec votre code électrique national.

USA: utiliser un cordon secteur "UL listed," de type SVT.

Canada: utiliser un cordon secteur certifié CSA.

Pour votre sécurité, ne jamais retirer le capot de l'ordinateur sans avoir préalablement débranché le cordon secteur et toute connexion à un réseau de télécommunication. N'oubliez pas de replacer le capot avant de rebrancher le cordon secteur.

#### notice for the Netherlands

Bij dit apparaat zijn batterijen geleverd. Wanneer deze leeg zijn, moet U ze niet weggoien maar inleveren als KCA.

#### notice for Germany

Wenn die Batterie nicht korrekt eingebaut wird, besteht Explosionsgefahr. Zu ihrer eigenen Sicherheit sollten Sie nicht versuchen, die Batterie wiederaufzuladen, zu zerlegen oder die alte Batterie zu verbrennen. Tauschen Sie die Batterie nur gegen den gleichen oder ähnlichen Typ aus, der vom Hersteller empfohlen wird. Bei der in diesem PC integrierten Batterie handelt es sich um eine Lithium-Batterie, die keine Schwermetalle enthält. Batterien und Akkumulatoren gehören nicht in den Hausmüll. Sie werden vom Hersteller, Händler oder deren Beauftragten kostenlos zurückgenommen, um sie einer Verwertung bzw. Entsorgung zuzuführen.

#### noise declaration for Germany

Lärmangabe nach Maschinenlärmmverordnung - 3 GSGV (Deutschland)  
LpA < 70 db am Arbeitsplatz normaler Betrieb nach EN27779: 11.92.

#### 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。

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notice for Korea

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警告使用者：  
這是甲類的資訊產品，在居住的  
環境中使用時，可能會造成射頻  
干擾，在這種情況下，使用者會  
被要求採取某些適當的對策。

regulatory information

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## **glossary**

**accelerate mode** - In this hp visualization center sv6 operating mode, each pipe renders only a fraction of the screen, thus speeding up rendering performance.

**accumulate mode** - In this hp visualization center sv6 operating mode, image quality is improved. Each pipe generates the complete scene, jittered by sub-pixel values. These jittered images are then averaged together to get a better quality image. This mode is sometimes

**active stereo -**

referred to as the anti-aliasing mode. The more graphics-enabled workstations you add, the more samples can be taken, and the better the image quality gets.

**active stereo** - Standard stereo capability where glasses/emitter switch back and forth between the left and right eye to make an image appear to have depth on the z-axis of the screen.

**CAT 5 cable** - Regular twisted pair LAN cable. This is the standard rating for the cables used to connect hp visualization center sv6 10/100 Base-T network components. For the purposes of hp visualization center sv6, we use standard RJ45 connectors on the ends of the cable. CAT 6 cables can be used instead.

**CAT 6 cable** - LAN cable with a higher rating for faster network traffic. These cables are used for copper Gigabit switches. They also use standard RJ45 connectors.

**channel** - One monitor or other output device. This term is also used to describe the video output signal that results in output to a single output display device.

**cluster** - Several hp workstations which are configured to be used together. There is one 2D master node; 4, 8 or 16 3D nodes and one scalable visualization Compositor in each hp visualization center sv6 cluster.

**compositor** - Hardware that takes input from the graphics cards in the hp visualization center sv6 system and combines the information into one composite image which is then sent out through the analog output cable. The Compositor bases its output on the mode and resolution specified by the user in `/etc/X11/X0screens` and settings specified with the `setpipes`

command. The Compositor's official product name and HP Part Number are: Scalable Visualization Digital Compositor A6061A.

**display** - A single monitor or other type of output device

**DVI** - Digital Video Interface. Connectors for digital video input and output devices.

**gamma correction** - Corrects color values emitted by the Compositor to compensate for the non-linear response of various display devices. Apply gamma correction using the gamma tool

(`/opt/graphics/common/bin/gamma`) or by setting `GammaValueRed`, `Green` and `Blue` values in the `/etc/X11/X0screens` file.

See `/opt/graphics/OpenGL/sv/doc/README.gamma` for more details.

**DVI cable** - Digital Video cable that connects the graphics card on the workstation to the input card on the compositor (A6061A). These are typically wide, white cables.

**Gigabit Ethernet LAN** - Private, high-speed LAN that connects the Workstations in the hp visualization center sv6. The official product name is hp ProCurve Switch 8000M (J4110A) or 4108gl.

**jitter** - Pixel sampling method that uses either default jitter point values or customized setting specified with the `/opt/graphics/OpenGL/sv/bin/jitter` tool. Each pixel sample is offset by a sub-pixel amount. Samples are averaged together to increase image quality. This jitter sampling can be used in addition to the fx10 hardware scene anti-aliasing.

**master mode** - This is the workstation where the master X server is run to control all other rendering via the workstations assigned to do 3D rendering (slave nodes). This system also does all of the 2D rendering for the entire screen.

**mixed mode** - In this hp visualization center sv6 operating mode, the screen is divided among the 3D slaves for accelerate mode, but multiple workstations are assigned to render each subdivision for accumulate mode. This results in both improved rendering performance and image quality.

**mini-sv6**- Single channel systems with 3 or 7 slave rendering nodes. A second graphics card in the master system is used as the fourth or eighth 3D render node. Since there are fewer j-class workstations, both the cost and performance are lower than on standard 4-pipe or 8-pipe configurations.

**module** - The card inside the hp ProCurve Switch. Also known as a 'blade'. The official product name is the hp ProCurve 100Base-T Gigabit LAN Module.

**panes** - This is a setpipes screen rectangle layout that assigns four large screen rectangles to form a border around the center of the screen. This allows for a greater amount of the hp visualization center sv6's resources to be focused on rendering to the center where the most intense rendering demands are. The center of the screen can be sub-divided by grid, horizontal slices or vertical slices. The result of using this layout is faster rendering performance.

**passive stereo** - Stereo capability where no emitter is need. Uses a combination of polarized glasses and special output display devices (i.e. specially aligned projectors or

passive stereo work bench displays). The glasses filter out the correct image for the right and left eye. Two output cards must be used for the compositor to produce the entire left-eye scene and entire right-eye scene.

**PDU** - Power Distribution Unit on the rack. Use these special power strips to plug-in racked hardware.

**pipe** - A graphics enabled workstation. Usually refers to a 3D slave node that is rendering all or part of the screen.

**pipe rectangle** - A sub-division of the entire display. Each of the areas receives output from the group of 3D pipes assigned to render to it. Select a layout using `/opt/graphics/OpenGL/sv/bin/setpipes` or the GUIs. Also known as a screen rectangle.

**real estate** - Describes the continuous screen space spanning across multiple display devices.

**sample** - In accumulate mode, each graphics device is used to produce a slightly jittered sample of the entire screen. The compositor, to produce a higher quality image, then averages those samples together

**scalability** - hp visualization center sv6 is scalable in the sense that configurations with larger numbers of can achieve higher levels of performance and image quality. In the case of the multiple display HP visualization centers, more real-estate is achieved.

**screen** - The area to which the entirety of the output is sent. This can span more than one monitor and be fed by more than one graphics device.

**screen real estate** - Describes the entire continuous screen space which can span multiple display devices.

**screen rectangle** - A sub-division of the entire display. Each of the areas receives output from the group of 3D pipes assigned to render to it. Select a layout using `/opt/graphics/OpenGL/sv/bin/setpipes` or the GUI-based versions `xsetpipes` and `xadvsetpipes`. Also known as pipe rectangle.

**slave** - 3D rendering node. These graphics-enabled workstations are assigned to render all or part of the screen.

**SLS/d - Single Logical Screen/distributed** - A Hewlett-Packard technology which takes advantage of multiple workstations to enhance both 2D and 3D rendering. These enhancements include increased screen real estate, performance and image quality.

**sv6** - A new mode of SLS/d which uses a piece of hardware called the compositor to combine outputs from multiple workstations into a better quality image and/or faster rendering.



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