Autodesk®
Visual Effects and Finishing
2010 Extension 1 Edition

Installation and Configuration Guide

Autodesk®

Autodesk® Visual Effects and Finishing 2010 Extension 1

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Part 1: Introduction

Part 1 includes these chapters:

- About This Guide on page 3
- Installation Workflows on page 5

About This Guide

1

Topics in this chapter:

- Overview on page 3
- Intended Audience on page 4
- Notation Conventions on page 4
- Related Documentation on page 4
- Contacting Customer Support on page 4

Overview

This guide provides information about installing and configuring the following Autodesk Visual Effects and Finishing applications:

- Autodesk® Inferno® 2010 Extension 1,
- Autodesk® Flame® 2010 Extension 1,
- Autodesk® Flint® 2010 Extension 1,
- Autodesk® Smoke® 2010 Extension 1 for Linux® workstations,
- Autodesk® Backdraft® Conform 2010 Extension 1.

For instructions on installing and configuring Autodesk® Smoke® for Mac OS® X, or Autodesk® Flare™, see the dedicated installation and configuration guides for those applications, available at *www.autodesk.com/me-documentation*.

Use this guide in conjunction with the *Autodesk Visual Effects and Finishing Hardware Setup Guide* for your hardware platform to install and configure the hardware and software components of your Autodesk Visual Effects and Finishing workstation.

NOTE In most cases, both hardware setup and application installation are done on delivery by an authorized technician, so you may not need to perform all of the procedures in these guides.

Intended Audience

This guide assumes you have knowledge of the Linux® operating system, preferably a distribution from Red Hat® Linux. It also assumes familiarity with Linux networking terms, tools, and procedures.

If you plan to reconfigure your workstation or your storage, knowledge of computer hardware, storage and networking in a professional video/film production environment is recommended.

Do not attempt to carry out the procedures in this guide if you are not familiar with the concepts they present. Contact Autodesk Media and Entertainment Customer Support if you require further assistance.

If you are upgrading an existing workstation without reinstalling the operating system, this document assumes you have *root* access to your system. If you do not have *root* access, contact your system administrator. The default root account password on an Autodesk workstation is *password*.

Notation Conventions

A number of style conventions are used throughout your documentation. These conventions and examples of their use are shown as follows.

Convention	Example
Text that you enter in a command line or shell appears in Courier bold. Press the Enter key after each command.	**`install rpm -qa`**
Variable names appear in Courier, enclosed in angle brackets.	`<filename>`
Feedback from the command line or shell appears in Courier.	`limit coredumpsize`
Directory names, filenames, URLs, and command line utilities appear in italics.	*/usr/discreet*

Related Documentation

Documentation for this release is installed with the product as PDF files and as an HTML help system, and is also available on the Autodesk web site at *http://www.autodesk.com/me-documentation*. From this page you can access the complete documentation library.

You should also refer to the product release notes for all late-breaking release information.

Contacting Customer Support

For Autodesk Media and Entertainment Customer Support, visit *http://www.autodesk.com/support*.

Customer support is also available through your Autodesk reseller. To find a reseller near you, consult the reseller look-up database at *http://www.autodesk.com/resellers*.

Installation Workflows

2

Topics in this chapter:

- Overview on page 5
- Workflow for Upgrading the Software on page 5
- Workflow for Installing from Scratch or Upgrading Linux on page 6
- Workflow for Connecting New Stone Direct Storage on page 8

Overview

Your system is shipped with the operating system and the software already installed.

This chapter highlights three common installation workflows that you may need to perform.

- Workflow for Upgrading the Software on page 5
- Workflow for Installing from Scratch or Upgrading Linux on page 6
- Workflow for Connecting New Stone Direct Storage on page 8

For details on the workstation hardware setup, it is recommended that you visit *www.autodesk.com/me-documentation*, select your application and version, and download the *Hardware Setup Guide* for your workstation model.

Workflow for Upgrading the Software

Follow this workflow to upgrade your software to a new version, service pack, or extension without reconfiguring your hardware or reinstalling your operating system.

To determine whether you need to install a new version of Linux for a new software version or hardware platform, see Do I Need to Reinstall Linux? on page 29. If you do need to upgrade Linux, follow the steps in the Workflow for Installing from Scratch or Upgrading Linux on page 6 rather than this workflow.

To upgrade the software:

1 Gather the following materials and documentation for your installation:

- The *Discreet Kernel Utilities* (DKU) installation package. For major releases, the DKU is available on the application DVD. If you are installing a service pack or an extension, download the DKU *tar* file from the link provided in the Release Announcement you received from Autodesk. The DKU also contain the files needed to upgrade your system BIOS and the firmware of the AJA OEM-2K card.
- The Autodesk Visual Effects and Finishing software installation package. For major releases, the application is available on DVD. If you are installing a service pack or an extension, download the application *tar* file from the link provided in the Release Announcement you received from Autodesk.
- The Release Notes for the software version or service pack you plan to install. The Release Notes contain important procedures that you might need to perform **before** upgrading your software, as well as information on supported hardware, required system memory, BIOS version, Linux distribution, DKU version and AJA OEM-2K firmware version.
  To download the latest Release Notes, go to *www.autodesk.com/me-documentation*, then select your application and the version or service pack you plan to install.

2 Make sure the hardware still meets all the system requirements for the new software version or service pack, as specified in the Release Notes for the version you plan to install.

3 Upgrade the Discreet® Kernel Utilities (DKU) to the required version. Refer to the latest Release Notes for the required DKU version and for update instructions. DKU update instructions are also available in Installing the DKU on page 37.

4 Update the AJA OEM-2K card firmware if necessary. Refer to the latest Release Notes for the required firmware version and for update instructions. Firmware update instructions are also available in Upgrading the AJA OEM-2K Firmware on page 38.

5 Install the software. See Installing the Application on page 49.

6 If you are upgrading from a previous version, run the *copyProjects* utility to copy projects from previous versions of the application to the most recently installed version. See Upgrading Projects to the Current Version on page 60.

NOTE This step is not necessary if you are upgrading to a service pack of the same application version or to a service pack of the same extension.

7 License your software, and start it for the first time. See Licensing and Starting the Application on page 63.

NOTE Re-licensing is not necessary if you are upgrading to a service pack of the same software version or to a service pack of the same extension.

8 Read the Help to get familiar with your application. To open the Help, press **`Ctrl+=`** or click the Help button.

Workflow for Installing from Scratch or Upgrading Linux

Follow this workflow when you need to completely rebuild your system: from connecting the hardware peripherals and storage arrays, to installing the operating system, and installing, licensing, and configuring the software components.

Most of this workflow also applies when you need to reinstall or upgrade the operating system without changing your hardware or storage setup. A new distribution of Linux may sometimes be required for a new version or service pack of the software, or for newer hardware platforms. To determine whether you need

to upgrade Linux for a new application version or hardware platform, see Do I Need to Reinstall Linux? on page 29.

To install your system from scratch or upgrade Linux:

1 Gather the following materials and documentation for your installation:

- The installation disc of the Red Hat Enterprise Linux operating system. Visual Effects, Finishing and Colour Grading workstations ship with the custom Autodesk distribution of Red Hat Enterprise Linux on DVD. For information on the version of Linux required for your hardware platform, see Do I Need to Reinstall Linux? on page 29.
- The *Discreet Kernel Utilities* (DKU) installation package. For major releases, the DKU is available on the application DVD. If you are installing a service pack or an extension, download the DKU *tar* file from the link provided in the Release Announcement you received from Autodesk. The DKU also contain the files needed to upgrade your workstation BIOS and the firmware of the AJA OEM-2K card.
- The Autodesk Visual Effects and Finishing software installation package. For major releases, the application is available on DVD. If you are installing a service pack or an extension, download the application *tar* file from the link provided in the Release Announcement you received from Autodesk.
- The Release Notes for the software version or service pack you plan to install. The Release Notes contain important procedures that you might need to perform **before** upgrading your software, as well as information on supported hardware, required system memory, BIOS version, Linux distribution, DKU version and AJA OEM-2K firmware version.
- The Hardware Setup Guide for your workstation. This document contains detailed information on setting up your workstation.

To download documentation, go to *www.autodesk.com/me-documentation*, then select your application and the version or service pack you plan to install.

2 Make sure the hardware meets all the system requirements.

3 If you are installing your hardware perform the following tasks:

- Verify your hardware shipment, and make sure your facility meets the documented power and air conditioning requirements for the hardware components.
- Connect all peripherals (mouse, keyboard, Wacom® pen tablet, graphics monitor, house network) to the proper ports on the workstation.
- Connect your workstation to the Autodesk Wire® network, using either Gig-E or InfiniBand®.
- Connect a VTR and a broadcast monitor to your workstation.
- Connect and configure the audio hardware for your workstation.
- Connect your storage arrays to the workstation, but **DO NOT** power them on before having installed Linux, to prevent the Linux installer from attempting to format the arrays and use them as system drives.

NOTE Instructions and wiring diagrams for each of these steps can be found in Setting Up Your Workstation Hardware on page 13.

4 If necessary, update and configure the BIOS of your workstation. See Configuring your System BIOS on page 26.

NOTE The BIOS settings must be properly configured **before** installing Linux.

5 Install the required Autodesk distribution of Red Hat® Enterprise Linux. See Installing Red Hat Enterprise Linux on page 29.

6 Perform the tasks in Linux Post-Installation Tasks on page 32 to configure your operating system.

7 Install the required version of the Discreet Kernel Utility (DKU). Refer to the latest Release Notes for the required version and for update instructions. DKU update instructions are also available in Installing the DKU on page 37.

8 Update the AJA OEM-2K card firmware on your workstation if necessary. Refer to the latest Release Notes for the required firmware version and for update instructions. Firmware update instructions are also available in Upgrading the AJA OEM-2K Firmware on page 38.

9 If you are using a new Stone® Direct storage array, configure the RAID volumes, mount the storage, and format it. See Configuring Storage on page 41 for LUN creation instructions and XFS filesystem creation instructions.

10 Install the software. See Installing the Application on page 49.

11 Configure the application to use your media storage filesystem. See Configuring a Direct Attached Storage or SAN as Media Storage on page 54.

12 Configure the Wire network, background Wire and proxy generation. See Setting up the Wire Network on page 57.

13 Optional: Install any additional Autodesk utilities if necessary. See Installing Additional Utilities on page 61.

14 License your software, and start it for the first time. See Licensing and Starting the Application on page 63.

NOTE Re-licensing is not necessary if you are upgrading to a service pack of the same software version or to a service pack of the same extension.

15 Read the Help to get familiar with your application. To open the Help, press **`Ctrl+=`** or click the Help button.

Workflow for Connecting New Stone Direct Storage

Follow this workflow when you need to rebuild your Stone Direct storage array. For instance, this may be required when you purchase supplementary storage enclosures to expand available disk space.

NOTE You do not need to reinstall or re-license the software after changing your storage configuration.

To connect new or expanded Stone Direct storage:

1 Connect your storage enclosures to the workstation. See Connecting Media Storage on page 18.

2 Configure the RAID volumes and mount the storage. See Configuring Storage on page 41 .

3 Configure your application to use the new media storage filesystem. See Configuring a Direct Attached Storage or SAN as Media Storage on page 54.

4 Your new storage is now ready to use.

Part 2: Preparing Your Workstation

Part 1 includes these chapters:

- System Requirements on page 11
- Setting Up Your Workstation Hardware on page 13
- Installing Red Hat Enterprise Linux on page 29

System Requirements

3

Topics in this chapter:

- Supported Workstations on page 11
- Memory Requirements on page 11

Supported Workstations

The following table lists the workstations and operating systems supported in this release, as well as the supported BIOS version for each workstation.

Workstation	Supported BIOS Versions	Operating System
HP Z800	1.17	Red Hat® Enterprise Linux® Desktop 5.3 with Workstation Option (64-bit)
HP xw8600	1.32	Red Hat Enterprise Linux WS 4, Update 3 (64-bit)
HP xw9400	3.05	Red Hat Enterprise Linux WS 4, Update 3 (64-bit)
HP xw8400	2.26	Red Hat Enterprise Linux WS 4, Update 3 (64-bit)

See the latest *Hardware Setup Guide* for your workstation for BIOS update instructions.

Memory Requirements

Use the following table to determine the minimum memory requirements for your Visual Effects and Finishing system. The recommended amount of memory depends on the resolution of your projects, the type of work you perform and, in some cases, the platform on which you are running the application. Large projects, in particular, may benefit from increased memory.

The table also includes the recommended amount of memory where appropriate. The recommended amount of memory ensures optimal interactivity and stability when using complex setups.

Project Resolution	Minimum RAM	Recommended RAM
NTSC, PAL, HD	12.0 GB for HP Z800 4.0 GB for other platforms	12.0 GB for HP Z800 16.0 GB for other plaftorms
Long-form editing (Smoke)	12.0 GB for HP Z800 8.0 GB for other platforms	12.0 GB for HP Z800 16.0 GB for other plaftorms (highly recommended)
Long-form editing with 2K or 4K film (Flame, Inferno, Smoke, Backdraft Conform)	12.0 GB for HP Z800 8.0 GB for other platforms	12.0 GB for HP Z800 16.0 GB for other plaftorms (highly recommended)
2K film (Smoke, Backdraft Conform)	12.0 GB for HP Z800 8.0 GB for other platforms	12.0 GB for HP Z800 16.0 GB for other plaftorms (highly recommended)
2K film (Flame, Inferno)	12.0 GB for HP Z800 8.0 GB for other platforms	12.0 GB for HP Z800 16.0 GB for other plaftorms (highly recommended)
4K film (Flame, Inferno, Smoke, Backdraft Conform)	12.0 GB for HP Z800 8.0 GB for other platforms	12.0 GB for HP Z800 16.0 GB for other plaftorms (highly recommended)

For projects based on long form 2K or 4K film on workstations other than the HP Z800, 16 GB of system memory are highly recommended for optimal interactivity and stability while using complex setups.

You can adjust the MemoryApplication keyword in the software initialization file (*init.cfg*). For example, a system running at 8GB with a 2K project could benefit from having the MemoryApplication keyword set to 5500. See MemoryApplication on page 80.

Setting Up Your Workstation Hardware

4

Topics in this chapter:

- Overview on page 13
- Overview of Peripheral Connections on page 15
- Connecting Video Components on page 16
- Connecting Audio Components on page 16
- Connecting Media Storage on page 18
- Connecting Archiving Storage on page 24
- Configuring your System BIOS on page 26

Overview

This section contains wiring diagrams for HP® Z800 workstation peripherals, video hardware, and storage, as well as BIOS settings. For detailed information about the workstation, including power consumption, air conditionning requirements, rack mount requirements, and BIOS upgrade procedures, consult the latest version of the *Autodesk Visual Effects and Finishing HP Z800 Workstation Hardware Setup Guide*.

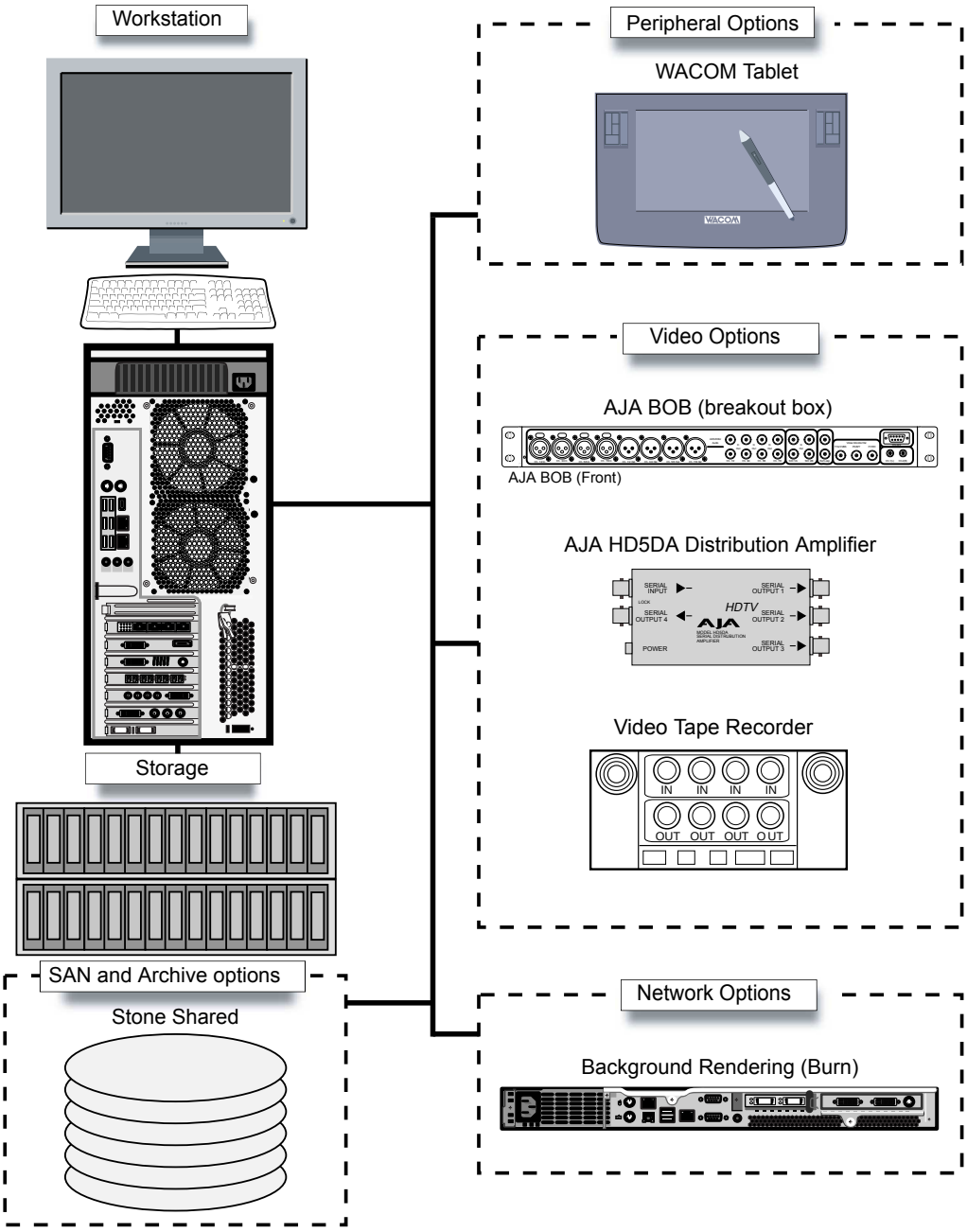
NOTE If you are only upgrading an existing application, you do not need to reconfigure your hardware.

This section does not contain information and diagrams for the older workstations supported in this version. For detailed information about setting up each workstation, see the Hardware Setup Guide for the respective workstation.

WARNING Before working with hardware components, make sure to read the safety guidelines in the Hardware Setup Guide. Hardware setup should only be performed by an experienced technician.

Typical Configuration Overview for Visual Effects and Finishing Applications

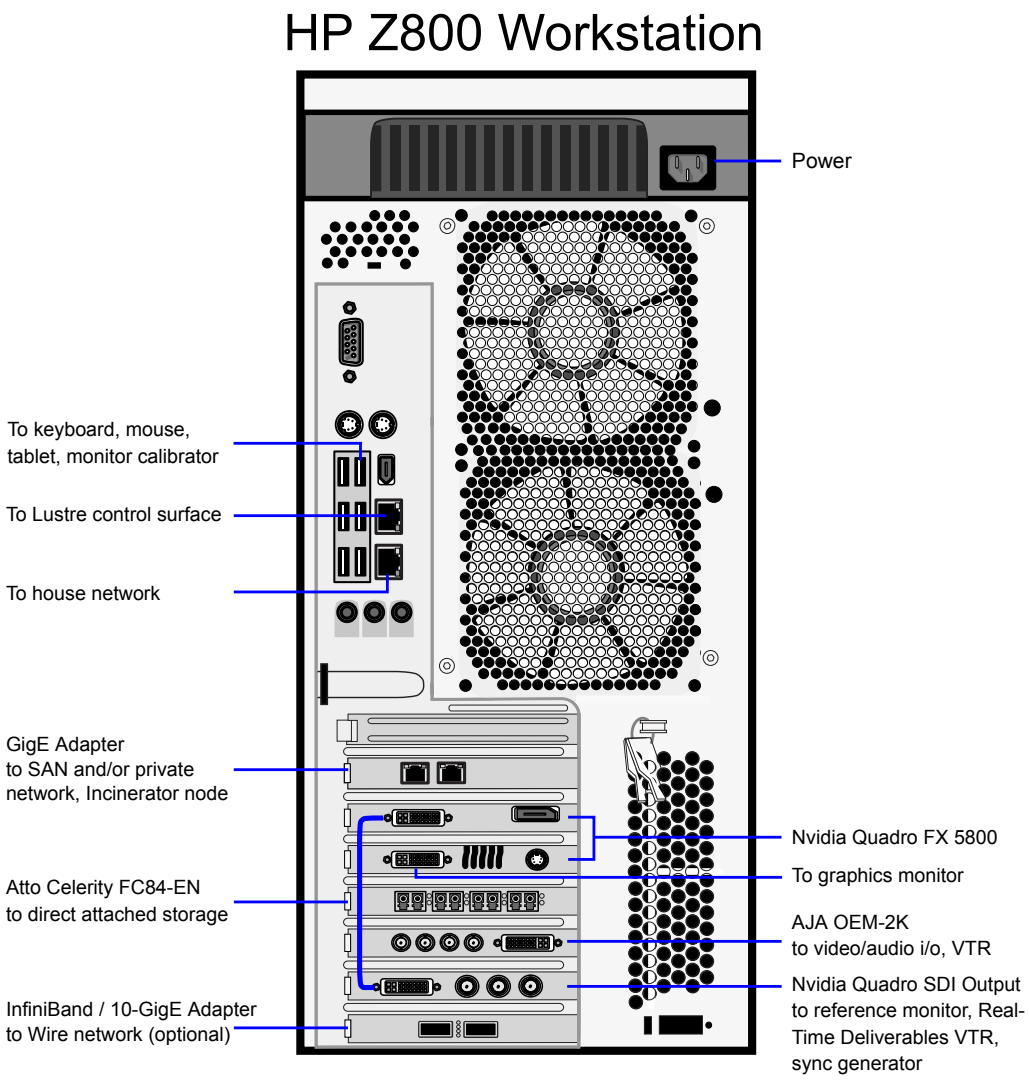
The following illustration shows a typical configuration, including the Wacom tablet, and other optional components.



Overview of Peripheral Connections

The following diagram provides an overview of the adapter card positions, and illustrates how to connect peripherals, such as the graphics monitor, keyboard, mouse, Wacom Intuos pen tablet, and house network, to the HP Z800 workstation.

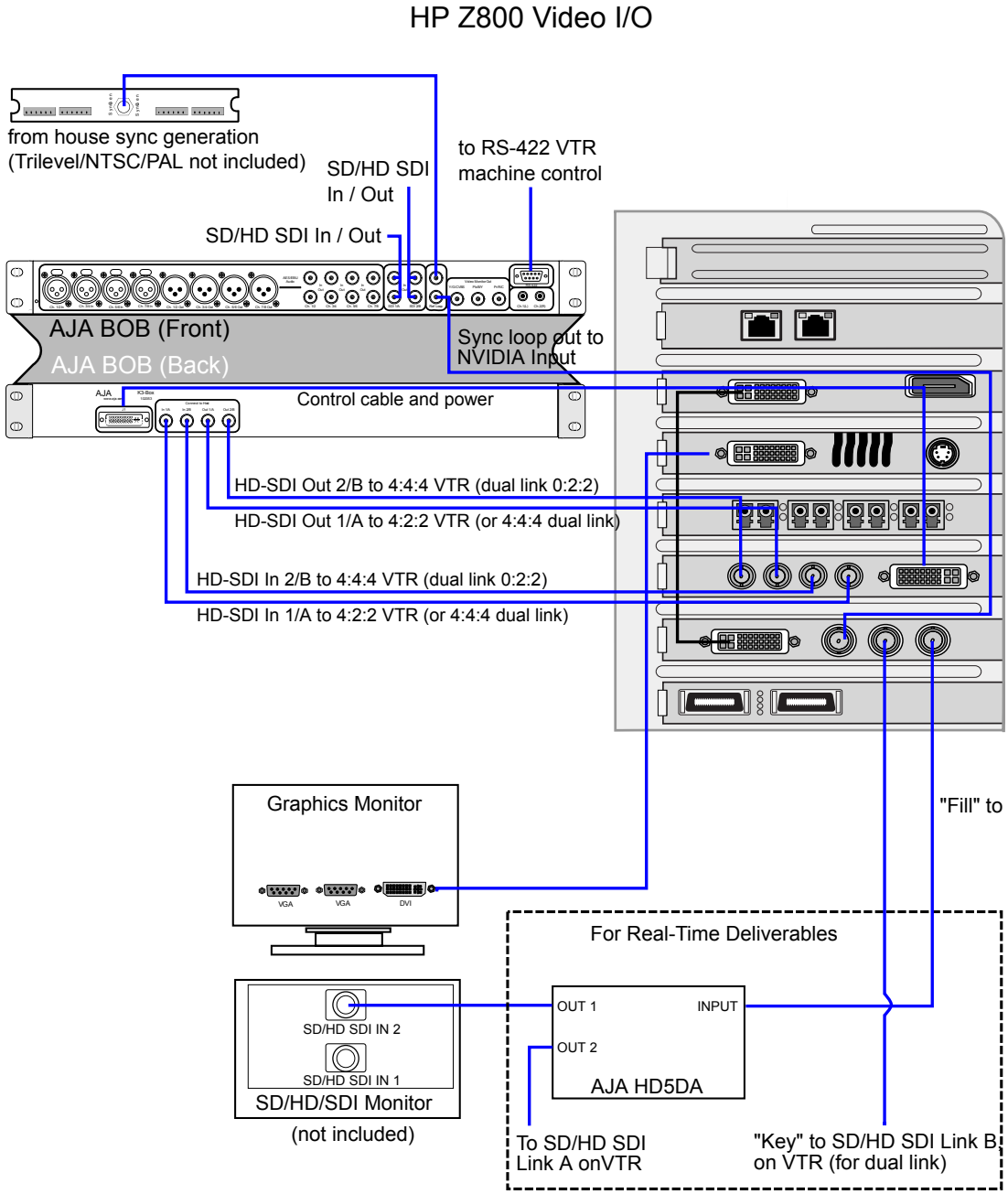
It is recommended you connect all hardware peripherals, as instructed in this chapter, before booting the workstation for the first time.



NOTE This diagram depicts the HP Z800 workstation with a 2-port GigE adapter in slot 1 (top to bottom), and a Mellanox QDR InfiniBand / 10-GigE adapter in slot 7. Optionally, your workstation can be set up with a second ATTO Fibre Channel adapter in slot 1. Note also that a number of HP Z800 workstations shipped with a 4-port GigE adapter, a Qlogic DDR InfiniBand adapter, or a separate Myricom 10-GigE adapter.

Connecting Video Components

The following diagram illustrates how to connect the video hardware components included in your shipment. The only video hardware you must provide are a sync generator, VTR, HD/SDI-ready broadcast monitor and patch panel (if desired).



Connecting Audio Components

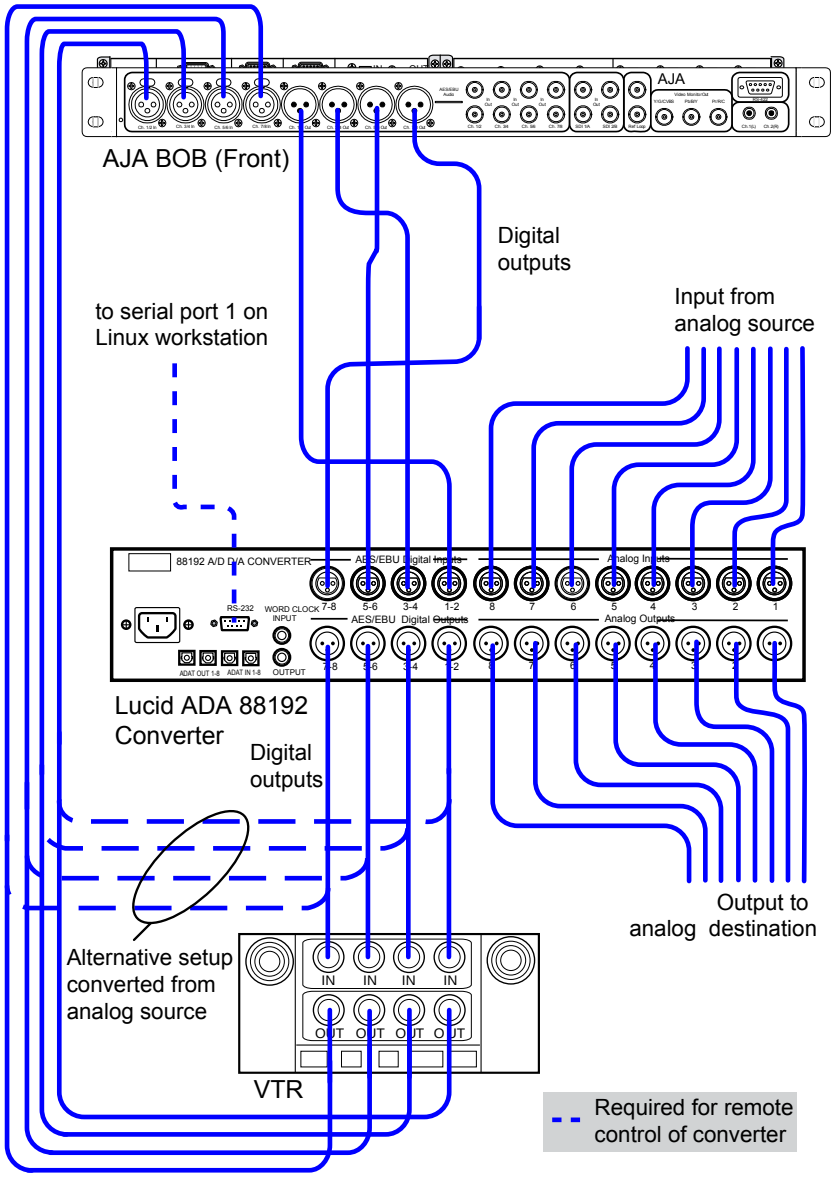
Your application uses the Discreet Native Audio subsystem. Discreet Native Audio uses the following hardware components, shipped with your system.

Lucid ADA 88192 Audio Converter Converts signals between the workstation and all digital or analog audio I/O devices.

AJA Balanced Audio breakout box and AJA OEM-2K adapter card The Balanced Audio breakout box is the audio component of the AJA breakout box. It provides connections for audio I/O. This breakout box connects to the AJA OEM-2K adapter on your workstation. The OEM-2K adapter provides real-time input and output of uncompressed SD and HD video signals as well as audio data at 24-bit resolution. The OEM-2K adapter handles balanced AES/EBU audio signals from the Balanced Audio breakout box.

Wiring Audio Components

The following diagram illustrates how to connect the Discreet Native Audio hardware components to the AJA breakout box.



Connecting Media Storage

The workstation can be connected to two types of media storage.

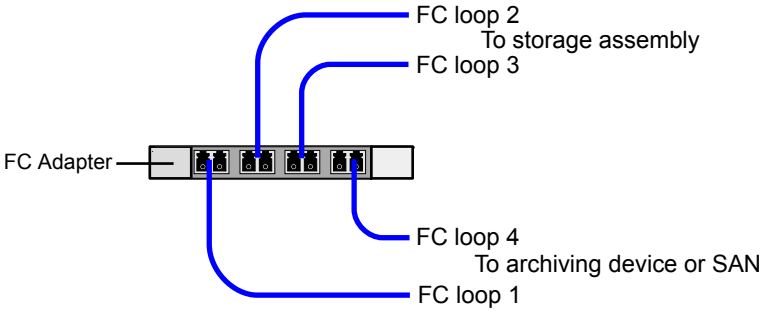
- **Stone Direct XR-series disk arrays** Autodesk's high-performance direct-attached storage (DAS) solution designed to address the different real-time playback requirements of various workflows. Direct attached storage devices provide storage to individual workstations, and can be made available to other Autodesk Visual Effects and Finishing workstations via the Autodesk Wire network.
- **A SAN** A storage infrastructure that allows multiple workstations to share simultaneous access to a central storage enclosure.

Connecting the Fibre Channel Adapter

On HP Z800 workstations, connections to media storage are made using the ATTO Celerity FC84-EN fibre channel adapter, located in slot five (top to bottom).

NOTE If you need more storage connections, you can also have your HP Z800 workstation configured with a second ATTO fibre channel adapter in slot 1, instead of the GigE adapter.

The fibre channel adapter is equipped with four ports, called *loops*. You can connect your storage enclosure to the fibre channel cards using either 2 loops or 4 loops. A 2-loop device can be connected to either the inner pair of ports or the outer pair of ports. A 4-loop device requires both the inner pair and the outer pair.



NOTE If you are not using all the ports of a fibre channel adapter, terminate the two unused ports with the FC loopback couplers that shipped with your system. Terminating these ports significantly decreases the time required to boot the system.

Connecting Stone Direct Storage

The diagrams in this section illustrate how to connect the fibre channel loops to the Stone Direct storage enclosures supported with your workstation. For technical details on each storage model, see the Storage chapter in the hardware setup guide.

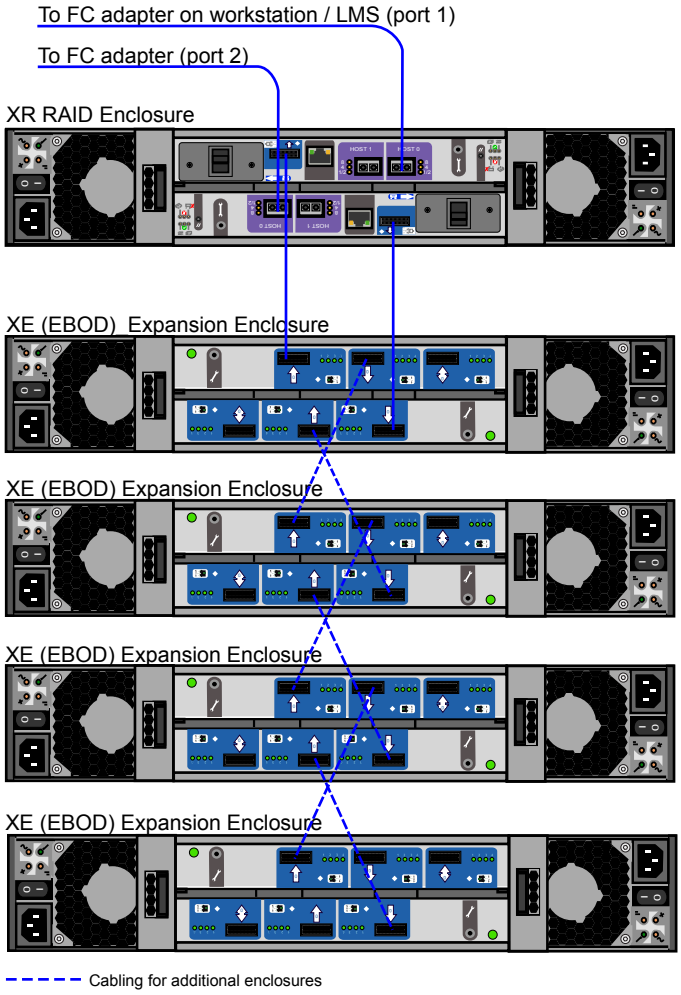
Connecting XR 6500 Storage

The following diagrams illustrate 2-loop and 4-loops connections for XR 6500 series storage assemblies. Cable your storage exactly as illustrated to ensure proper functionality.

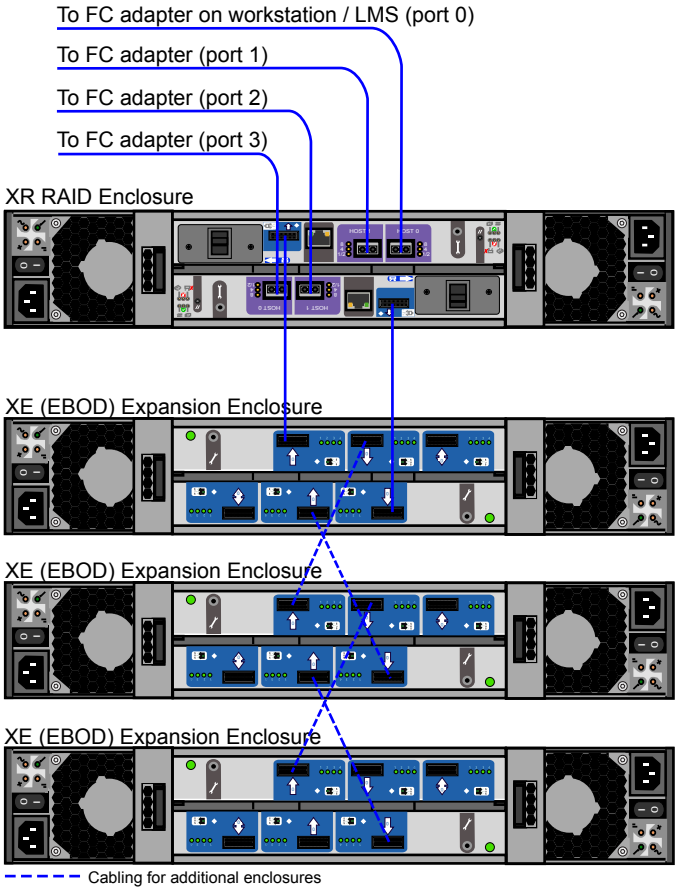
A XR 6500 RAID enclosure supports a maximum of seven XE expansion enclosures. Configurations with two XR RAID enclosures are not supported.

WARNING Do not power on your storage before installing Linux, otherwise the Red Hat installer might attempt to format the storage array and use it as the system disk.

Single XR 6500 RAID enclosure, 2 loops



Single XR 6500 RAID enclosure, 4 loops



NOTES:

- In a 4-loop configuration, you need a minimum of one XE expansion enclosure attached to the XR 6500 RAID enclosure.
- The total number of enlcosures must be an even number.

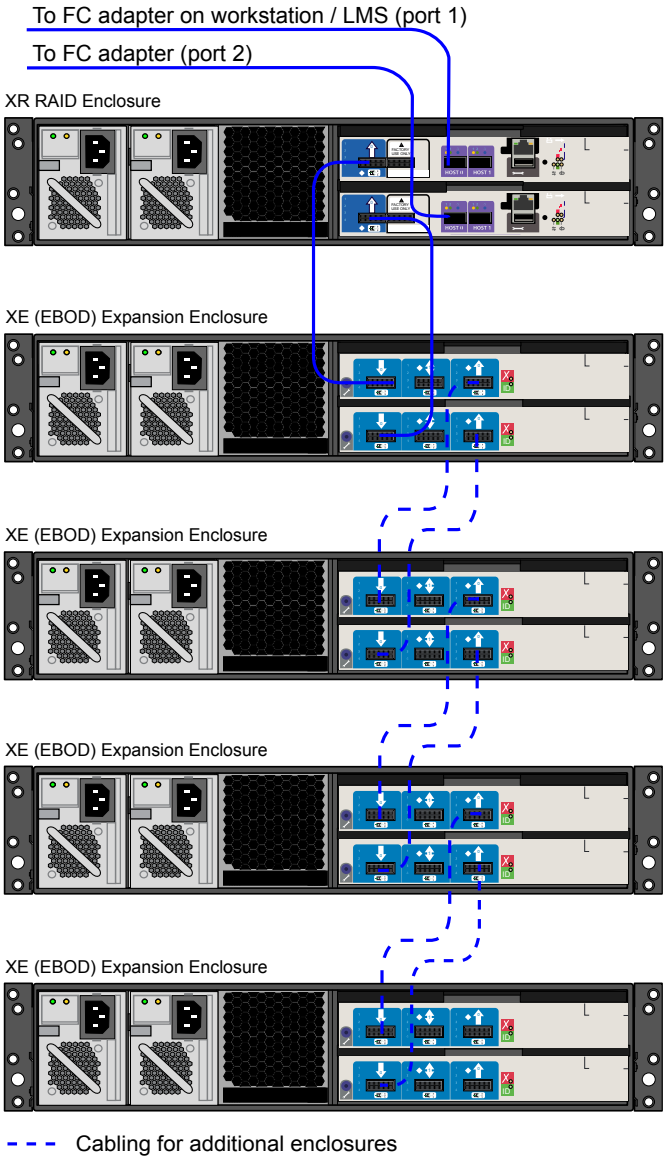
Connecting XR 6412 Storage

The following diagrams illustrate 2-loop and 4-loops connections for XR 6412 series storage assemblies.

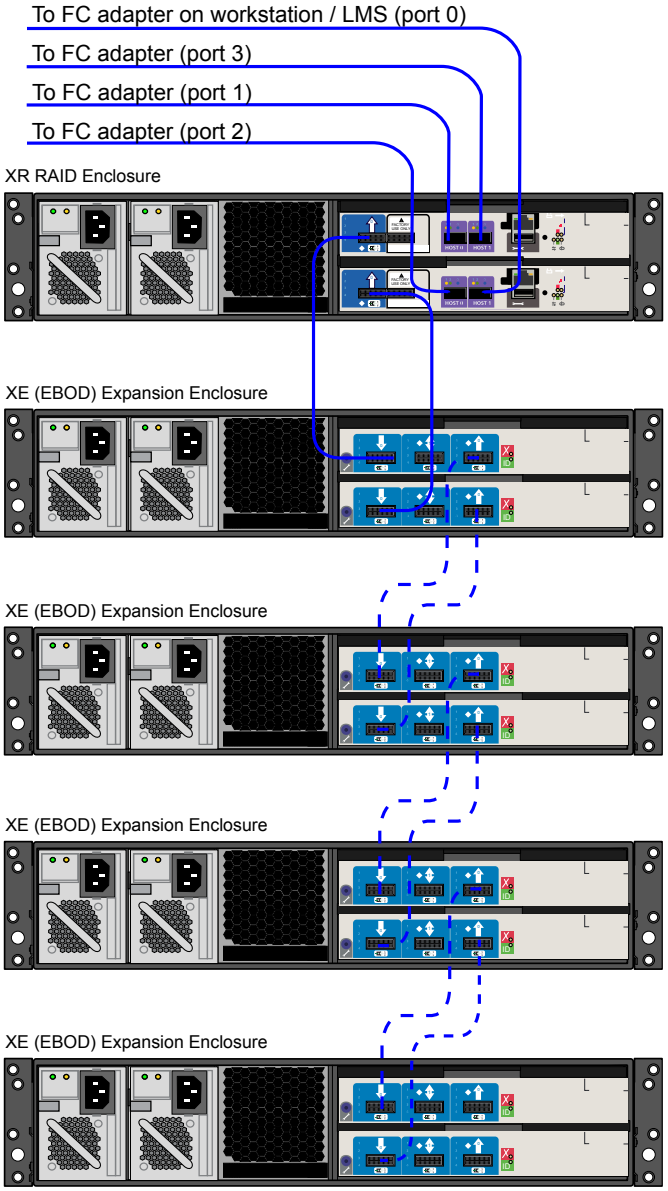
A XR 6412 RAID enclosure supports a maximum of seven XE expansion enclosures. Configurations with two XR RAID enclosures are not supported.

WARNING Do not power on your storage before installing Linux, otherwise the Red Hat installer might attempt to format the storage array and use it as the system disk.

Single XR 6412 RAID enclosure, 2 loops



Single XR 6412 RAID enclosure, 4 loops



Cabling for additional enclosures

NOTE In a 4-loop configuration with a XR 6412 RAID enclosure, you need a minimum of one XE expansion enclosure attached to the XR RAID enclosure.

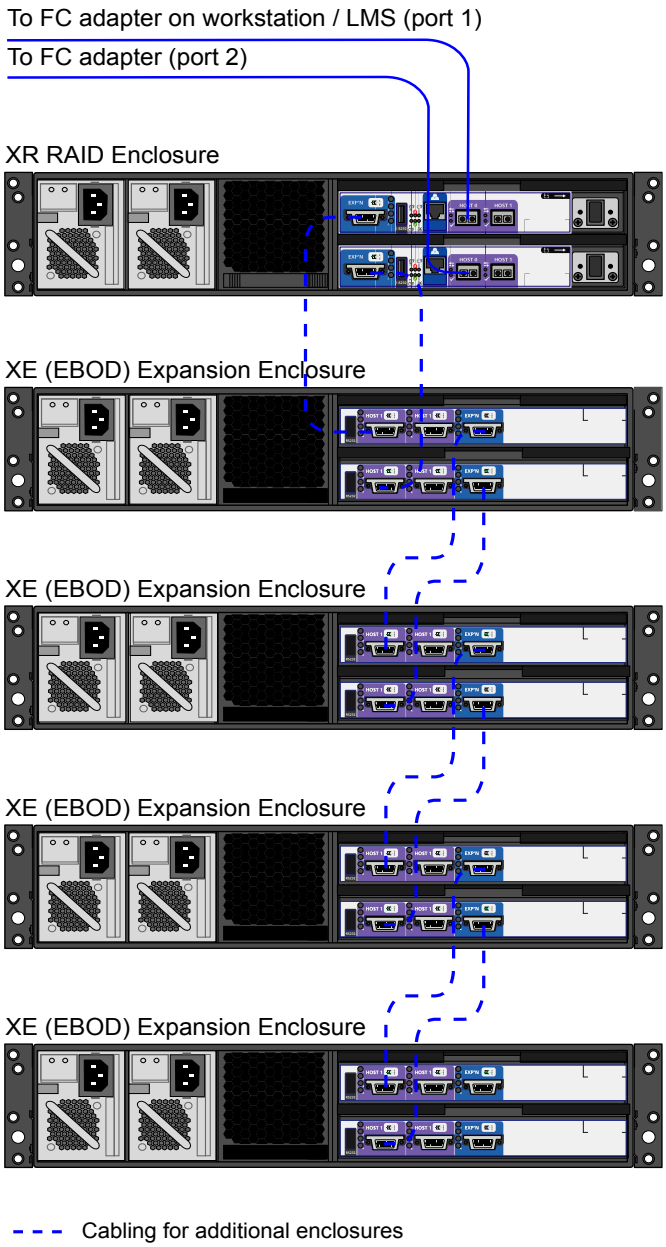
Connecting XR 5402 and XR 5412 Storage

The following digrams illustrate 2-loop and 4-loop connections for XR 5402 and XR 5412 series storage assemblies.

XR 5402 and XR 5412 series storage assemblies support 2-loop configurations with one XR RAID enclosure, and 4-loop configurations with two XR RAID enclosures.

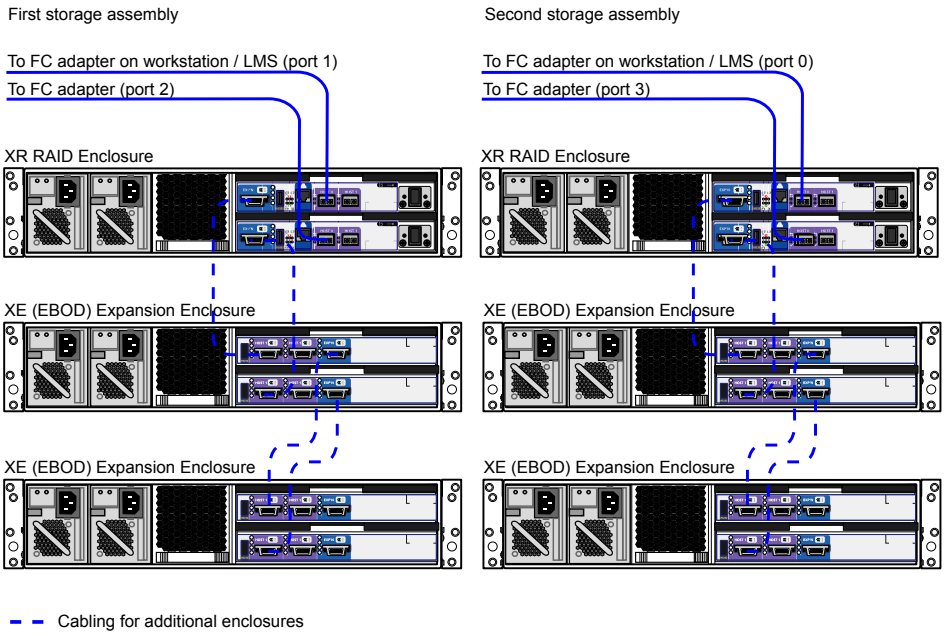
WARNING Do not power on your storage before installing Linux, otherwise the Red Hat installer might attempt to format the storage array and use it as the system disk.

Single XR 5402 / 5412 RAID enclosure, 2 loops



NOTE The XR 5402 and XR 5412 RAID enclosures support a maximum of four XE expansion enclosures.

Two XR 5402 / 5412 RAID enclosures, 4 loops



NOTE In a configuration with two XR RAID enclosures, the number of XE extension enclosures per XR RAID enclosure must be the same. The total number of enclosures in the storage assembly must be an even number.

Connecting Archiving Storage

Visual Effects and Finishing applications support archiving to USB 2.0, FireWire® (IEEE 1394) and fibre channel devices. This includes filesystems, VTRs and tape drives. This section discusses the requirements for filesystem and tape drive devices. For information on connecting a VTR, see Connecting Video Components on page 16.

Filesystem Devices

USB 2.0 and FireWire (IEEE 1394) attached devices must be formatted with one of the following filesystems: XFS, ext2, ext3, or HFS (Mac®). NTFS is not supported.

NOTE Care must be taken to ensure that the filesystems used to store archives are reliable, stable and properly backed up so as to protect the archive integrity. This functionality is not provided by the application.

SCSI Tape Drive Devices

SCSI tape drives can be connected to a fibre channel port of the workstation by way of a fibre-channel-to-SCSI bridge, such as the Atto FibreBridge 2390D. The tape drive device must meet two criteria. First, the device's driver must accept standard UNIX tape device calls. Second, the device must be certified for use with the currently supported version of the workstation operating system and kernel.

While Autodesk Media and Entertainment makes no certification statement about any tape drive device, you can use the "Tape Drive Test" plug-in in Autodesk SystemCentral to test SCSI tape drives for compatibility. For more information, see the *Autodesk System Central User Guide*.

Configuring your System BIOS

This section contains information on the certified BIOS settings for the HP Z800 workstation, as well as instructions on updating your BIOS and restoring it to the default factory settings. For information on updating your BIOS version, or reverting the BIOS to factory defaults, consult the Hardware Setup Guide.

NOTE The BIOS of your workstation is correctly configured prior to shipping, so you normally do not need to perform the procedures in this section.

Checking the BIOS Settings

After wiring the workstation and **before** installing Linux, turn the workstation on and check the BIOS version and BIOS settings.

WARNING If BIOS settings are not set up correctly before installing Linux, you will need to reinstall the OS.

The certified BIOS version for your workstation is **1.17**.

Make sure the BIOS version number that appears on screen while booting the workstation matches the certified version. If the versions do not match, update the BIOS to the certified version, after configuring BIOS settings. BIOS update instructions are at the end of this chapter.

To adjust system BIOS settings, press **F10** while booting the workstation.

The following table lists the Autodesk certified BIOS settings. Items not listed are set to their default factory settings.

BIOS Menu	Submenu	Item	Value
Storage	Storage Options	SATA Emulation	RAID+AHCI
	Boot Order	Optical Drive	
		USB Device	
		Hard Drive	<hard drive model>
			Integrated SATA
Power	OS Power Management	Runtime Power Management	Disable
		Idle Power Saving	Normal
		MWAIT Aware OS	Disable
		ACPI S3 Hard Disk Reset	Disable
	Hardware Power Management	SATA Power Management	Disable
		Intel Turbo Boost Technology	Disable
Advanced	Processors	Hyper-Threading	Enable
	Chipset/Memory	Memory Node Interleave	Enable
		NUMA Split Mode	Disable

BIOS Menu	Submenu	Item	Value
	Device Options	S5 Wake on LAN	Disable
		Internal Speaker	Disable
		NIC PXE Option ROM Download	Disable
	Slot 1 PCIe2 x8(4)	Option ROM Download	Disable
	Slot 3 PCIe2 x8(4)	Option ROM Download	Disable
	Slot 4 PCIe2 x16(8)	Option ROM Download	Disable
	Slot 6 PCI32	Option ROM Download	Disable

Installing Red Hat Enterprise Linux

5

Topics in this chapter:

- Do I Need to Reinstall Linux? on page 29
- Linux Installation Workflow on page 30
- Linux Post-Installation Tasks on page 32
- Configuring an InfiniBand Card on page 35

Do I Need to Reinstall Linux?

Visual Effects, Finishing and Colour Grading workstations ship with the correct Autodesk distribution of Red Hat Enterprise Linux already installed and configured. Thus, you should only need to install Linux in the following situations:

- You plan to upgrade your software on an older supported hardware platform running a version of Red Hat Enterprise Linux no longer supported by the current version of the software. In this case, you must perform a fresh install of the required Red Hat Enterprise Linux version.
- Your system experienced an unrecoverable hard disk failure and you had to replace the system disk.

NOTE If you must replace the hard disk of your workstation, you need to obtain a new license. Contact Customer Support for assistance.

Use the following table to determine the correct version of Red Hat Enterprise Linux required for your hardware platform .

Hardware Platform	Linux Version
HP Z800	Custom Autodesk distribution of Red Hat Enterprise Linux Desktop 5.3 with Workstation Option
HP xw8400, HP xw9400, HP xw8600	Custom Autodesk distribution of Red Hat Enterprise Linux WS 4, Update 3

To determine the version of Red Hat Enterprise Linux your system is currently running, open a terminal and type:

`cat /etc/redhat-release`

The Linux version appears. For example:

```
Red Hat Enterprise Linux Client release 5.3 (Tikanga)
```

If your system is not currently running the correct version of Red Hat Enterprise Linux, install the required version of the operating system.

Linux Installation Workflow

Perform the following procedure to prepare your system and perform a fresh install of the customized distribution of Red Hat Enterprise Linux.

To install Linux:

1. Locate the installation media.

   The DVD containing the customized Autodesk distribution of Red Hat Enterprise Linux is included with your shipment. The customized Autodesk distribution installs certain Linux packages that are required by Autodesk applications but are not installed by the commercial distribution of Red Hat Enterprise Linux.

   WARNING Even though your shipment may also include the disc set for the commercial distribution of Red Hat Enterprise Linux, **DO NOT** install the commercial distribution. Autodesk Visual Effects, Finishing and Colour Grading software only works on the custom Autodesk distribution of Red Hat Enterprise Linux.

2. Power off all storage enclosures connected to the system, to prevent the Red Hat installer from attempting to reformat them as part of the installation process.

   WARNING Do not skip this step. Failure to power off or disconnect your storage before installing Linux may result in data loss.

   NOTE Turn off the XR RAID controllers first, then the XE expansion enclosures.

3. If you are reinstalling Linux on an existing system, back up all user settings, project settings, and media from the system to another system or to a removable drive. The Linux installation erases and formats the system disk, so this information is lost if it is not backed up. In addition, back up the following directories:

   - **`/usr/discreet`** (for software setup and configuration files)
   - **`/etc`** (for Linux configuration files, networking, etc)

- **`/usr/lib/DPS`** (for fonts)
- **`/usr/local/flexlm/licenses`** (for the license file)

4 Make sure your system is in the following state:
- Mouse, keyboard and graphics monitor are connected, and the graphics monitor is powered on.
- Other peripherals, such as the tablet and video breakout box are connected and powered on.
- If you are using a KVM switch, it is switched to the system on which you want to install Linux.
- The storage array is powered off.
- If a DVI-Ramp is part of your configuration, the DVI-Ramp is connected and powered on.

5 Insert the DVD of the custom Autodesk distribution of Red Hat Enterprise Linux in the DVD-ROM drive, and power off the system.

WARNING If your system is equipped with internal media storage, after turning the system off, open the side panel and disconnect the main connector for the internal storage drives. Make sure you do not disconnect the system drive!

6 Restart the system.

7 When the system starts to boot, press **F10** to enter the BIOS and make sure the BIOS settings reflect the recommended values in Setting Up Your Workstation Hardware on page 13. The BIOS must be correctly configured **before** installing Linux.

NOTE If the keyboard is connected to the system through a KVM switch, you may have to press **F10** repeatedly or hold it down to enter the BIOS.

8 Save the correct BIOS settings and reboot the system.

The system should boot to the Linux installation disc. If it does not, review your BIOS settings to make sure the DVD / CDROM drive is set as the primary boot device.

9 When the Red Hat Linux installation screen appears, press **F8** to display the Autodesk Red Hat Linux installation menu.

10 At the boot prompt in the Red Hat Linux installation menu, type **`iffsbc`** and then press **Enter** to launch the Linux installation.

WARNING You must use this exact command to start the Linux installation. If you use the default options presented by the Linux installation prompt, the installation proceeds, but some important packages required by Autodesk software are not installed.

The command launches the Linux installation. The system spends several minutes loading drivers. The installer guides you through the rest of the process.

11 The installation process may ask you to initialize the system disk. Follow the prompts to initialize the disk, if necessary.

12 The remainder of the installation process is automated.

When the installation completes, you are prompted with “Congratulations, the installation is complete”.

13 Eject the disc and click Reboot to reboot the system. After the system reboots, perform the post-installation tasks in the following section.

NOTE After the system reboots, you may be prompted by the Kudzu hardware setup utility to set up new hardware detected for your system. You can ignore these prompts and allow the utility's count-down to expire since the hardware for the system is unchanged.

Linux Post-Installation Tasks

After booting into your new Linux installation, perform the following post-installation tasks:

1. Change the default root password to secure the system.
   - Log into your system as *root*, using the default password *password*.
   - Open a terminal and type:
     `passwd`
   - Enter your current password when prompted, and then enter the new password.
2. Configure the time zone for your geographic location. The automated Autodesk installation sets the time zone to North American Eastern Standard Time (EST) by default.
   - Log into the Linux Desktop as root.
   - Right-click the clock, and select Configure Clock from the context menu.
   - Click the Timezones tab, and select the city closest to you from the list of locations.
   - Click Apply to save the new settings, and then click OK to close the window.
3. Configure the network settings for your system to match the ones used in your facility. The automated Linux installation sets a default IP address and hostname for your system, which may not be suitable for your facility network. See Configuring Basic Network Settings on page 32.
4. Install the Discreet Kernel Utilities (DKU), and upgrade the firmware of your AJA OEM-2K card. See Installing the DKU and the AJA OEM-2K Firmware on page 37.

Configuring Basic Network Settings

This section provides instructions on configuring your workstation network settings to match those of your facility.

Before configuring your network settings, gather the following information from your network administrator:

- An available IP address on your network, to assign to your workstation. The IP of your workstation must not change over time, and must not be used by any other system on your network.
- A unique host name for your workstation.
- The IP address of the gateway system on your network.
- The subnet mask of your network.
- The IP addresses of one or more DNS servers.

The following files contain the network settings of your Linux system.

Networking Configuration File	Description
/etc/sysconfig/network	Contains global networking settings, such as the system host name, Gateway IP address, and NIS domain name, if applicable.
/etc/resolv.conf	Contains DNS server information.
/etc/hosts	Contains IP/host name pairs for host name resolution.
/etc/sysconfig/network-scripts/ifcfg-eth<x>, where <x> specifies the ethernet port number, usually 0 for the first on-board port.	Contains interface-specific configuration.

The following procedures provide instructions on setting up each configuration file. Log is as root before editing these files. When you are done changing the network settings, restart your workstation for the changes to take effect.

To configure the workstation hostname and the default Gateway:

1. Open the */etc/sysconfig/network* file in a text editor.
2. Make sure the `NETWORKING` keyword is set to *yes*.
3. Configure the `HOSTNAME` keyword with the hostname you want to use for your workstation. For example:

   ```
   HOSTNAME=flame1
   ```

4. Configure the `GATEWAY` keyword with the IP address of the gateway system on your network. For example:

   ```
   GATEWAY=192.168.0.1
   ```

   This is the global default gateway that will be used by the system if no gateway is defined in a network port's individual configuration file.

5. Save and close the file.

To configure the workstation IP address and netmask:

1. Open the */etc/sysconfig/network-scripts/ifcfg-eth*<x> file in a text editor, where <x> is the number of the network port your system uses to connect to the facility network, typically 0.

   NOTE In most cases, the network port *eth0* is the first on-board port on the back of your workstation. Note however that, if your workstation has an add-on Ethernet card installed, the Linux operating system may assign ports *eth0* through *eth3* to the add-on card. In such a case, the on-board Ethernet ports become *eth4* and *eth5*.

2. Make sure the `BOOTPROTO` keyword is set to *static*. Visual Effects and Finishing applications do not support DHCP network configurations.

   ```
   BOOTPROTO=static
   ```

3. Set the `IPADDR` keyword to the IP address you want to use for the workstation. Make sure this IP is not used by any other system on your network. For example:

   ```
   IPADDR=192.168.0.100
   ```

   NOTE It is not recommended to change this IP address once you have installed your Autodesk software.

4 Set the `NETMASK` keyword to the netmask used by your network. For example:

```
NETMASK=255.255.255.0
```

5 Make sure the `ONBOOT` keyword is set to yes.

```
ONBOOT=yes
```

6 Optional: If you have not specified a global default gateway for your system, or if you want to use a different gateway for this particular network port, add a `GATEWAY` keyword in this file, and set it to the IP address of the gateway. For example:

```
GATEWAY=192.168.0.1
```

7 Save and close the configuration file.

To configure host name resolution:

1 Open the */etc/hosts* file in a text editor.

2 Locate the loopback setting in the *hosts* file. By default, the loopback setting is identified by the IP address 127.0.0.1, for example:

```
127.0.0.1 vxfhost.localhost.localdomain localhost
```

3 Remove the host name preceding `localhost.localdomain` from the loopback setting.

For example, if you remove the host name `vxfhost` in the example above, the loopback setting should appear as follows:

```
127.0.0.1 localhost.localdomain localhost
```

4 On a new line, type the IP address of the workstation, press **Tab**, and then enter the explicit host name of the system.

The new line defines the network IP address and host name of the system. For example, if the IP address is 192.168.0.100 and the host name is *workstation1*, your *hosts* file should be as follows:

```
127.0.0.1 localhost.localdomain localhost
192.168.0.100 workstation1
```

5 Optional: Add hostname / IP address pairs for other workstations on your network. For example:

```
192.168.0.150 flame1
```

6 Save and close the file.

To configure DNS server information:

1 Open the */etc/resolv.conf* file in a text editor.

2 Add a line for each DNS server IP address you want to use. The syntax is:

```
nameserver <DNS_server_IP>
```

For example:

```
nameserver 22.10.50.101
nameserver 22.10.50.102
```

NOTE Be careful when editing the *resolv.conf* file. The syntax is very strict, and any extra spaces or carriage returns can render the file unusable by the system.

Configuring an InfiniBand Card

If your workstation is equipped with a Mellanox QDR InfiniBand / 10 GigE adapter card, or a QLogic 9000 DDR InfiniBand adapter card, perform the procedures in this section to configure the IP address of the InfiniIBand port.

NOTE Install the DKU before performing the procedures in this section. If the Mellanox or QLogic InfiniBand adapter card is present in the workstation when the DKU is installed, the drivers are automatically installed and configured by the DKU. If you add an InfiniBand card to your workstation after having installed the DKU, run the DKU installer again to configure the required drivers.

To configure the IP address for a Mellanox QDR InfiniBand card:

1. If the InfiniBand card was not installed into your workstation when you last upgraded the DKU, re-run the DKU installation script to setup the drivers for the InfiniBand card.
2. Open a terminal and log in as root.
3. Navigate to the OFED Distribution directory:

   `cd /usr/discreet/DKU/InfiniBand/ofed*`
4. Run the OFED Software Installation script:

   `./install.pl`
5. Choose option **4** in the main menu.
6. Type **Y** when asked if you want to configure ib0.

   The current configuration is displayed. For example:

   ```
   DEVICE=ib0
   BOOTPROTO=static
   IPADDR=10.10.11.3
   NETMASK=255.255.255.0
   NETWORK=10.10.11.0
   BROADCAST=10.10.11.255
   ONBOOT=yes
   ```
7. Type **Y** to change the configuraton.
8. Enter the new IP address, netmask, broadcast address and base network address for the InfiniBand port.

   The settings are saved in the */etc/sysconfig/network-scripts/ifcfg-ib0* file, and you are returned to the main menu.
9. Type **Q** to exit the configuration utility.
10. Reboot your workstation.

NOTE To achieve best performance from a Mellanox QDR InfiniBand card, make sure you start your Visual Effects and Finishing application from the Linux user account automatically created when you installed the software. If you plan to use a Visual Effects and Finishing application from a different Linux user account, type the following commands in a terminal before starting the software:

```
setenv LD_PRELOAD libsdp.so
setenv LIBSDP_CONFIG_FILE /etc/libsdp.conf
```

To configure the IP address for a QLogic DDR InfiniBand card:

1. If the InfiniBand card was not installed into your workstation when you last upgraded the DKU, re-run the DKU installation script to setup the drivers for the InfiniBand card.
2. Open a terminal and log in as root.
3. Run the Silverstorm InfiniBand configuration utility:

   `/sbin/iba_config`
4. Choose option **2** in the main menu.
5. Follow the on-screen instructions to configure the IP address of the InfiniBand card.

   The settings are saved in the */etc/sysconfig/network-scripts/ifcfg-ib1* file, and you are returned to the main menu.
6. Type **x** to exit the configuration utility.
7. Reboot your workstation.

Installing the DKU and the AJA OEM-2K Firmware

6

Topics in this chapter:

- Installing the DKU on page 37
- Upgrading the AJA OEM-2K Firmware on page 38

Installing the DKU

Before installing your software, you must install the required version of the DKU. See the Release Notes for the required DKU version for this version.

For major releases, the DKU is available on optical media or as a download from Autodesk. For extensions and service packs, the DKU is only available for download. The download link is provided in the release announcement you received from Autodesk.

To install the DKU:

1. Open a terminal and log in as root.
2. If you are upgrading an existing application, check the currently installed DKU version by typing:

   `head -n1 /etc/DKUversion`

   If the DKU version output by the command does not match the version required for the new application version, perform the remaining steps in this procedure.
3. Access your DKU installation package:
   - If you are installing from an application disc, insert and mount the disc using the command:
     `mount /dev/cdrom`

     The disc mounts on the */mnt/cdrom* directory. The DKU installation directory is located at the top level of the disc.

- Otherwise, download the latest DKU *tar* file from the download link provided in the release announcement, then go to the directory where the *tar* file was downloaded, and unpack it by typing:
  `tar -zxvf DKU_``<version_number>`**`.tar.gz`**

  The DKU *tar* file is unpacked into a new directory.

4 Go to the DKU installation directory (*/mnt/cdrom/DKU-<version>*, if you are installing from the application DVD) and launch the DKU installation script:

  `./INSTALL_DKU`

  WARNING If you attempt to install the DKU on an unsupported platform, the installation script only installs a generic configuration. Such a configuration can render your operating system unusable. Never attempt to install the current version of the DKU on unsupported platforms, including older Visual Effects and Finishing or Colour Grading systems that are no longer supported in the current version.

  When the DKU installation script completes, a warning to update the AJA card or DVI-Ramp firmware may appear and you are returned to the command prompt. See the following section for information on updating your AJA card firmware.

5 If you installed from a disc, return to the root directory, and eject the disc by typing:

  `eject`

6 Before rebooting the system, make sure that the Wacom tablet is connected. If storage devices (external disk arrays or internal storage) were previously disconnected or turned off as part of an operating system installation, reconnect them and power them up.

  NOTE Power on the XE expansion enclosures first and the XR RAID controller units last. This ensures the RAID controllers detect the other units in the Stone Direct storage.

  Wait for all the disks in the storage devices to fully power up before rebooting the system. The green light for each disk stops flashing once it is fully powered up.

7 Reboot the system. Type:

  `reboot`

  NOTE After the workstation reboots and until you install the application, the Wacom tablet might not behave correctly. Installing the application, then logging out of the KDE desktop and logging back in should eliminate this problem.

Upgrading the AJA OEM-2K Firmware

The firmware on your AJA OEM-2K card must correspond to the certified version required by your application version. Refer to the Release Notes for the required AJA OEM-2K firmware version.

The AJA firmware update utilities required to check your firmware version are included with the DKU version for your application.

The following procedure describes how to verify and update the firmware version of the AJA OEM-2K card.

To verify and upgrade the AJA OEM-2K firmware:

1 Open a terminal and type:

  `cat /proc/driver/aja`

  If the `PCI version` line in the output lists a different version than the required one, perform the following steps to upgrade the firmware.

NOTE Before upgrading the AJA firmware, make sure you have upgraded the DKU, and that you have restarted the system.

2 Go to the */usr/discreet/DKU/current/Utils/AJA_firmwareUpdate* directory.

3 Run the *AJAfw_update* utility to scan the AJA current firmware and, if required, update to the latest firmware version. Type:

```
./AJAfw_update
```

If the utility detects that the firmware and drivers need to be updated, it prompts you to start the update.

4 Start the firmware update by typing **Y** and then pressing **Enter**.

While the AJA firmware and drivers are being updated, your workstation appears to be frozen and your mouse and keyboard do not work. This is normal and indicates that the firmware is being updated. Once the firmware update is complete, you are returned to the terminal.

5 Shut down your workstation by typing:

```
shutdown -g0
```

If your workstation does not prompt you to power down, press the power button for 10 seconds to force a power down.

6 Disconnect the power cord.

7 Wait 10 seconds, reconnect the power cord, then restart your workstation.

NOTE For more details about the AJA firmware procedures, consult the *README* file located in the current directory.

Configuring Storage

7

Topics in this chapter:

- Overview on page 41
- Powering Up Your Storage on page 42
- Partitioning the Storage and Creating the XFS Filesystem on page 42

Overview

This chapter describes how to configure a direct-attached storage array connected to the workstation.

If you are also configuring a Storage Area Network (SAN), it is recommended that you configure the SAN prior to configuring a direct-attached storage.

Before you can configure the storage, the workstation must be up and running the custom Autodesk distribution of Red Hat Enterprise Linux, as well as the version of the DKU required for your application version.

WARNING When configuring a storage array, it is strongly recommended to disconnect any other storage device (DAS or SAN) connected to the workstation.

Do I Need to Perform these Procedures?

If you are reinstalling your system from scratch, or adding new storage devices, refer to the procedures in this section for information on partitioning the storage and setting up the XFS filesystem.

If you are only upgrading an existing application installation without adding new storage, skip to the next chapter for instructions on installing the software.

Powering Up Your Storage

Powering your system and storage up or down should be done in a proper sequence. This ensures that the system functions properly.

WARNING An incorrect power up sequence can mean your system does not recognize all drives.

NOTE If you are configuring a storage array with two sets of enclosures, connect only one set of enclosures at this point, and then perform the filesystem creation procedures in the next section. Then disconnect the storage, and repeat the entire process for the second set of enclosures.

To power up your system:

1. Make sure your workstation is shut down.
2. Power up the XE expansion enclosures.
3. Power up the XR RAID controller enclosures.
4. Wait about 90 seconds for all the drives to spin up. Their lights are solid green when they are spun up.
5. Power up your workstation.

To power down your system, shut down your workstation first, then the XR RAID controller enclosures, and finally the XE expansion enclosures.

Partitioning the Storage and Creating the XFS Filesystem

Before you can use a new storage array, you need to create logical units (LUNs) on it, partition them, group the partitions into a logical volume, and then create the XFS filesystem on the logical volume.

All these operations can be easily performed using version 1.5 of the *XR Configuration Utility* from Autodesk. This version of the *XR Configuration Utility* is available in versions 4.5.1 and newer of the *Discreet Kernel Utilities* (DKU).

If your workstation is using an older version of the DKU that does not have the latest *XR Configuration Utility*, or if you prefer to manually partition your storage array and configure the filesystem, refer to Manually Configuring Media Storage on page 125.

Perform one of the following procedures to configure your storage using the *XR Configuration Utility*. The procedures are different for storage arrays with a single set of enclosure, and for arrays with two sets of enclosures.

Note that the *XR Configuration Utility* exits without configuring your storage if any of the following issues are detected:

- The total number of disks is not a multiple of 12.
- One of more of the enclosures do not have the correct firmware.
- When using two sets of enclosures, the number of expansion chassis attached to each XR RAID enclosure is not the same.
- An odd number of enclosures in a 4-loop configuration. Only even numbers of enclosures are supported.

To configure arrays with a single set of enclosure:

1. Open a terminal and log in as root.

2 Go to the */usr/discreet/DKU/current/Utils/Storage/current/* directory, and run the *XR Configuration Utility* by typing:

```
./XR_config.pl
```

The script displays information on the storage, such as: enclosure type, RAID controller firmware version, number of enclosures, number of loops.

3 If a LUN configuration already exists on the storage, you are prompted for confirmation to overwrite that configuration.

WARNING LUN configuration is destructive. Make sure you want to overwrite an existing configuration before you confirm.

4 After the utility detects the number of enclosures and drives, it presents you with a list of options.

5 Type **2** and press **Enter**.

This option instructs the configuration utility to create LUNs with a sector size of 512 bytes. This is the optimal sector size for XFS DAS (direct-attached) storage of Visual Effects, Finishing and Colour Grading applications.

6 When asked if you have a 2-loop or a 4-loop configuration, select the option that applies to your storage. Note that 4-loop configurations are only supported for XR 6412 and XR 6500 storage.

The utility creates LUNs on your storage. This process might take a few minutes.

When the LUN creation process completes, the configuration utility asks you if you want to create the XFS filesystem on the storage array.

7 Type **Y** (the default answer).

The configuration utility partitions the storage array, groups the partitions into a logical volume, creates the XFS filesystem on the volume, and mounts the volume to */mnt/StorageMedia* on HP Z800 workstations, or */mnt/stoneMedia* on older workstations.

NOTE If the storage driver does not reinitialize quickly enough after LUN creation, the filesystem creation step may fail, and the *XR Configuration Utility* gives you an error message similar to the following:

```
Can't open /dev/sdb1 exclusively. Mounted filesystem?
```

In such cases, reboot your workstation, and perform the steps in Performing only the filesystem creation operations on page 44.

8 Type **x** to exit the configuration utility.

NOTE Even though your storage array is usable at this point, the drives are still initializing following the LUN creation. Your storage operates at reduced performance until the initialization process completes. This might take a few hours. To check the progress of the initialization type:

```
./XR_config.pl --arrayStatus
```

9 Once the initialization process completes, create a back-up of the storage configuration by typing:

```
./XR_config.pl --saveConfig
```

A back-up of the storage configuration is saved.

To configure arrays with two XR enclosures:

1 Open a terminal and log in as root.

2 Make sure only one set of enclosures is connected to the workstation.

3 Go to the */usr/discreet/DKU/current/Utils/Storage/current/* directory, and run the *XR Configuration Utility* by typing:

```
./XR_config.pl
```

The script displays information on the storage, such as: enclosure type, RAID controller firmware version, number of enclosures, number of loops.

4 If a LUN configuration already exists on the storage, you are prompted for confirmation to overwrite that configuration.

WARNING LUN configuration is destructive. Make sure you want to overwrite an existing configuration before you confirm.

5 After the utility detects the number of enclosures and drives, it presents you with a list of options.

6 Type **2** and press **Enter**.

This option instructs the configuration utility to create LUNs with a sector size of 512 bytes. This is the optimal sector size for XFS DAS (direct-attached) storage of Visual Effects, Finishing and Colour Grading applications.

7 When asked if you have a 2-loop or a 4-loop configuration, select the option that applies to your storage. Note that 4-loop configurations are only supported for XR 6412 and XR 6500 series storage.

The utility creates LUNs on your storage. This process might take a few minutes.

When the LUN creation process completes, the configuration utility asks you if you want to create the XFS filesystem on the storage array.

8 Type **N**.

NOTE If you answered *Y* by mistake (the defalt answer), you get another chance to answer *no* after the system rescans the disks. It is very important that you do not create the filesystem at this point.

9 Type **x** to exit the configuration utility.

10 Once the initialization process completes, create a back-up of the configuration for this set of enclosures by typing:

```
./XR_config.pl --saveConfig
```

A back-up of the configuration is saved. Note that you can only save the configuration for one set of enclosures at a time.

11 Power off the workstation, disconnect the storage enclosures, and connect the second set of enclosures.

12 Power the workstation back on.

13 Perform steps 3 through 10 in this procedure on the second set of enclosures.

14 Power off the workstation again, connect both sets of enclosures to the workstation.

15 Power the workstation back on and perform the tasks in the following procedure.

Use the following procedure if you need to perfrom just the partitioning and filesystem creation operations on a storage array where LUNs have already been created.

To perform only the filesystem creation operations:

1 Open a terminal and log in as root.

2 Go to */usr/discreet/DKU/current/Utils/Storage/current/*, and type:

```
./XR_config.pl --createFS
```

The configuration utility partitions the storage array, groups the partitions into a logical volume, creates the XFS filesystem on the volume, and mounts the volume.

NOTE Using this parameter has the same effect as running the *XR Configuration Utility* with no parameter, and choosing option *4* from the main menu.

---

3 Create a back-up of the storage configuration by typing:

```
./XR_config.pl --saveConfig
```

NOTE You can only back-up your storage configuration after the drives have finished initializing. This process might take a few hours. To check the progress of the initialization type:

```
./XR_config.pl --arrayStatus
```

To get a complete list of the command-line parameters available for the *XR_config.pl* script, type:

```
./XR_config.pl --help
```

Part 3: Installing and Configuring Your Software

Part 1 includes these chapters:

- Installing the DKU and the AJA OEM-2K Firmware on page 37
- Configuring Storage on page 41
- Installing the Application on page 49
- Post Installation Tasks on page 53
- Licensing and Starting the Application on page 63
- Uninstalling the Application on page 69

Installing the Application

8

Topics in this chapter:

- Installing the Application on page 49

Installing the Application

Use the following procedure to install or upgrade your application.

NOTE To ensure optimal performance, it is recommended that only Autodesk Visual Effects, Finishing and Colour Grading applications and required Red Hat Enterprise Linux packages be installed on the workstations.

To install the application:

1. Log in to your workstation as root and open a terminal.
2. Archive existing media on the framestore (highly recommended). Refer to the "Archiving" topic in the application help.
3. If you are not installing from an application DVD, download the application *tar* file from Autodesk.

   The download link is provided in the release announcement you received from Autodesk.

   TIP After downloading the *tar* file, verify its integrity using the Linux md5 checksum provided. In the directory where you saved the *tar* file and the checksum file, type **`md5sum`** `<filename.tar.gz>`, and make sure the checksum displayed matches the Linux md5sum listed in the checksum file.

4. If you need to change your system date or time, do it **before** installing the application.
5. Access your installation package:
   - If you are installing from an application DVD, mount the disc, then go to the root directory of the mounted disc. For example:
     `mount /mnt/cdrom`

cd /mnt/cdrom

- If you are installing from a downloaded application *tar* file, unpack the *tar* file to a temporary directory:
  tar -zxvf `<filename.tar.gz>`
  The file is uncompressed and an installation directory is created on your system.

6 Go to the application installation directory.

7 Start the application installation script by typing:

./INSTALL_`<application_name>`

where `<application_name>` is in upper case. For example, if you are installing Smoke, type:

./INSTALL_SMOKE

NOTE If you are installing an educational version, start the initialization script by typing **./INSTALL_**`<application_name> --edu`, for example **./INSTALL_SMOKE --edu**

The installation script verifies the installation packages and checks your system for previously installed versions of the application. This process may take a few minutes.

8 The following prompts appear:

- **Backburner Manager configuration: Do you want to automatically run the Backburner Manager on this machine?**
  Backburner™ Manager is an optional component. Click yes if you want to install it (if no other system on your network is configured as a Backburner Manager). Otherwise, continue to the next step.

- **Backburner Server configuration: Do you want to automatically run the Backburner Server on this machine?**
  Click Yes. This component is required for background tasks such as background Wire transfers and background proxy generation.

- **Backburner Server configuration: Do you want to enter the manager for this server?**
  Click Yes.

  The */usr/discreet/backburner/cfg/manager.host* file opens in a text editor. If you know the hostname or IP address of your Backburner Manager system, enter it here. Otherwise, close the file without saving it. You can edit this file later.

9 If you are upgrading from a previous version of the application, earlier versions are detected and the installer asks you to select one of those versions. Do one of the following:

- Click None if you would like a clean installation of the application.

- Click one of the previous versions if you want to copy its custom resource and setup directories to the new version.

10 The installation script asks you if you want to create an application user:

- Answer Yes if you want to create a Linux user account for the application, or No if you want to run the application with an existing user account.

- If you answered No, a list of all the existing users in the system is displayed. Select the users accounts you plan to use the application with.

  TIP You can use **CTRL+click** to select multiple entries.

  The application icon is placed on the Linux Desktop of the selected users.

11 When prompted to configure the software initialisation file (*init.cfg*), click OK.

The software initialisation file contains general settings the application reads on startup.

- If you are installing the application for the first time, the *init.cfg* file appears in a text editor.
- If you are upgrading the application, the old (previous) and new *init.cfg* files appear beside each other in an *xxdiff* window. The left panel displays the old *init.cfg* file. The right panel displays the new *init.cfg* that is installed with your application. The vertical bar on the right side indicates where differences exist between the two panels.

12 Scroll through the *init.cfg* file, verify the keywords, and modify their values as necessary. It is recommended to verify at least the following keywords to make sure they reflect your hardware configuration.

Keyword	Setting
Video	The video card used by your workstation. It can take the following values: AJA_OEMLH for the AJA OEMLH card used in SD configurations AJA_OEM2K for the AJA OEM2K card used in HD/2K configurations See Video on page 81 for details about the keyword.
DVIRamp	The DVIRamp keyword is applicable only if your workstation is equipped with a Miranda DVI-Ramp. See DviRamp on page 82 for details about the keyword.
VideoPreviewDevice	The VideoPreviewDevice keyword is applicable only if your workstation is equipped with a Miranda DVI-Ramp or an NVIDIA® SDI card. You can use the VideoPreviewDevice keyword to enable alternate SD or HD broadcast monitors. See VideoPreviewDevice on page 82 for details about the keyword.
TabletDriver	`wacom`® See TabletDriver on page 84 for details about the keyword.
VTR	Enable the VTR keywords that have settings corresponding to the VTRs you intend to use. See Vtr on page 84 for details about the keyword.
Audiodevice	`AJA` See Audiodevice on page 87 for details about the keyword.

13 To modify the *init.cfg* file, do one of the following:

- If the file opened in a text editor, edit the values as needed, then save and exit the *init.cfg* file.
- If you are in *xxdiff*, each difference between the old and the new *init.cfg* files is highlighted. Click the correct value for each keyword, regardless of whether it is in the left or right panel. Make sure you select a value for each highlighted difference. Then open the File menu and choose Save as Right. After the file is saved, close *xxdiff*.

14 If any changes are detected in the */etc/X11/xorg.conf* file, you are prompted to configure this file:

- To keep the old configuration settings, when the file appears in the *xxdiff* editor, in the Global menu, choose Select Left, and then, in the File menu, choose Save as Right. If prompted to overwrite, click OK.
- To use the new configuration file without adding the settings from the old configuration file, just close the program.

WARNING The */etc/X11/xorg.conf* file contains specific parameters for the graphics display, tablet, and other external devices. It is customized prior to shipping to reflect your configuration. It is strongly recommended that you never manually edit this file, as incorrect entries may result in peripherals that do not function properly, or an inability to launch the user interface. Use *xxdiff* to move entries from one version of the file to another.

15 If you modified the *xorg.conf* file, you receive a message to restart the X server. When the installation script completes, log out of the Linux desktop and then log in again to restart the X server.

The application, as well as additional components (WiretapCentral™, Wiretap™ Gateway, Backburner Server, Backburner Manager, Backburner Media I/O Adapter) are installed on your workstation.

16 Prior to licensing and starting the application for the first time, perform the post-installation procedures necessary for your system. See Post Installation Tasks on page 53.

Post Installation Tasks

9

Topics in this chapter:

- Do I Need to Perform These Tasks? on page 53
- Overview of Storage Configurations on page 53
- Configuring a Direct Attached Storage or SAN as Media Storage on page 54
- Setting up the Wire Network on page 57
- Setting Up Background Wire and Background Proxy Generation on page 59
- Upgrading Projects to the Current Version on page 60
- Transferring Clip Libraries to 2010 Extension 1 Projects on page 61
- Installing Additional Utilities on page 61

Do I Need to Perform These Tasks?

If you installed your application from scratch, perform the procedures in this chapter to configure your application to access the media storage, and to use the Wire network.

If you are upgrading an existing application, you have already performed most of the procedures in this chapter during the original installation. You do not need to repeat these procedures, unless you are adding new media storage devices to your workstation.

The only task you might need to perform when upgrading from a previous version is to transfer your projects and clip libraries to the new version. See Upgrading Projects to the Current Version on page 60 and Transferring Clip Libraries to 2010 Extension 1 Projects on page 61.

Overview of Storage Configurations

You can use your application with the following storage configurations:

- A standard UNIX-compatible filesystem on a centralised SAN in your facility. See Configuring a Direct Attached Storage or SAN as Media Storage on page 54.

- A standard UNIX-compatible filesystem on a direct attached storage (DAS) device. See Configuring a Direct Attached Storage or SAN as Media Storage on page 54.
- A standard UNIX-compatible filesystem on a Network Attached Storage (NAS) based on the Network File System (NFS) protocol.

NOTE The fact that all I/O operations occur over the network makes it impossible to reliably predict steady performance for NAS filesystems. Note also that the NFS protocol features built-in cache and time-out mechanisms, which may cause several workstations working on the same media source to appear de-synchronized.

Configuring a Direct Attached Storage or SAN as Media Storage

This section provides an overview of the steps involved in defining a standard UNIX®-compatible filesystem to be used as media storage by your application.

Media can be stored on any of the following hardware, *as long as it is not the system drive*:

- A direct-attached storage device (DAS), such as an Autodesk Stone Direct XR-series disk array
- A storage area network (SAN)

NOTE When attached to a CXFS SAN declared as a standard filesystem partition to Stone and Wire, Visual Effects and Finishing workstations running the current release have shown optimal (real-time) performance with version 4.02 of the CXFS client, and the following mount options for the CXFS volume: `rw,noatime,filestream,inode64`

Autodesk recommends using a properly configured and maintained XFS filesystem installed on Stone Direct XR-series disk arrays.

Concepts and Terminology

If this is the first time you are configuring an Autodesk Visual Effects and Finishing filesystem, familiarize yourself with the following key concepts.

If you are already familiar with these concepts, continue with Configuring your Application to Use the Media Storage Filesystem on page 55.

Stone and Wire The software package that encompasses local management of media and the transferring of media between Visual Effects and Finishing workstations. This package is installed automatically with the application.

Partition In Stone and Wire, a partition (also referred to as “volume”) is defined as a volume of media storage. When creating a project, the Visual Effects and Finishing applications permanently associate it to one of the available partitions. This association means that the project inherits the rules and media preferences of the partition. You can define up to eight partitions.

Managed Media Media is said to be managed when the media assets, typically DPX files, are managed or “owned” by the Visual Effects and Finishing application. The application deletes managed media it no longer needs. All managed media is stored in a Managed Media Cache.

Unmanaged Media Unmanaged media refers to media assets that are used by, but not exclusively owned by, the Visual Effects and Finishing application. Soft-imported clips are an example of unmanaged media. This is relevant in shared access workflows, where numerous applications are using the same media. Unmanaged media is used in projects and clip libraries in the same way as managed media. However, the application does not delete it when it is no longer needed.

Managed Media Cache A directory residing on a standard FS volume, to which all managed media is written. This includes intermediates, imported media, captured video, audio, and proxies. Although the Managed Media Cache can be accessed by standard operating system tools such as defragmentation and backup tools, it is not meant to be accessed by any other application or user than the Visual Effects and Finishing and Wiretap applications.

Media Database The standard filesystem media database plays a central role in the management of media residing on standard filesystems. It is responsible for mapping frame IDs to the location of the media on disk. Database entries are created for all managed media and soft-imported media. There is one standard filesystem media database file per volume.

Clip library A clip library is a catalog maintained locally by its Visual Effects and Finishing application. It is used, internally by the application, to store clip metadata, including frame IDs. The artist acts upon portions of it indirectly, via the application User Interface.

Configuring your Application to Use the Media Storage Filesystem

To set up a standard filesystem as media storage:

1. Make sure the disk array or SAN storage is connected to your workstation and powered up, and that a UNIX-compatible filesystem exists on the storage. See Partitioning the Storage and Creating the XFS Filesystem on page 42 for details on formatting your storage array to the recommended XFS filesystem.

2. Stop Stone and Wire with the command:

   `/etc/init.d/stone+wire stop`

   Messages appear in the terminal indicating that Stone and Wire is stopped.

3. Perform the following steps to create the Managed Media Cache directory:

   - If a mount point for your storage does not exist, create a directory that will serve as the mount point. For example:

     `mkdir -p /mnt/StorageMedia`

     or

     `mkdir -p /mnt/SAN1`

     NOTE If you are configuring a direct-attached storage array, the DKU installer should have already created a mount point for it under */mnt/StorageMedia* (for HP Z800 workstations) or */mnt/stoneMedia* (for older workstations).

     WARNING Do not use the word "stonefs" as the name for your mount point directory. "Stonefs" is a reserved word, and can cause issues if used as the mount point directory name.

   - Mount the filesystem to the newly created directory. For example:

     `mount -av -t xfs -o rw,noatime,inode64 /dev/vg00/lvol1 /mnt/StorageMedia`

     Type **`man mount`** in a terminal for more information on mounting filesystems.

     NOTE To set the filesystem to automatically mount at boot, create an entry for it in the */etc/fstab* file. Type **`man fstab`** in a terminal for details.

   - Create the Managed Media Cache directory on the mounted filesystem, in a directory named after the workstation hostname. The Managed Media Cache directory should be named after the partition name (by default, partition 7, or *p7*).
     For example, if the filesystem mount point is */mnt/StorageMedia*, your workstation hostname is *smoke1*, and the partition name is *p7*, type:

     `mkdir -p /mnt/StorageMedia/smoke1/p7`

   - Set the ownership for the directory created in the previous step to the root user. For example:

```
chown -R root:users /mnt/StorageMedia/smoke1/p7
```

- Set permissions for the directory to be readable, writable, and searchable by the owner and its group, and readable and searchable by all. For example:
  `chmod -R 775 /mnt/StorageMedia/smoke1/p7`

4. Optional: If you want to use several media storage volumes (for example, additional direct-attached storage arrays, or SAN volumes), repeat step 3 to create separate mount points and Managed Media Cache directories for each additional volume. The DKU only creates the mount point and */etc/fstab* entry for the initial volume (*/dev/vg00/lvol1*).

5. To make your application aware of the standard filesystem volumes, define the Managed Media Cache of each volume as a partition in the Stone and Wire configuration file, and set its preferences:
   - Open the file */usr/discreet/sw/cfg/stone+wire.cfg* in a text editor.
     The settings for each partition are defined in a `[Partition<partition_number>]` section of the file, for example `[Partition7]`.

     NOTE By default, the *stone+wire.cfg* file contains only one `[Partition]` section. If you are using multiple volumes, create copies of the `[Partition]` section for each volume, and configure them accordingly.

   - Uncomment the `Name` keyword and enter a meaningful name for the volume. For example:
     `Name=XFS_partition`

     This name identifies your storage volume in the application.

   - Uncomment the `Path` keyword, and specify the path to the Managed Media Cache directory on the mounted volume. For example:
     `Path=/mnt/StorageMedia/smoke1/p7`

   - Optional: Flag the partition as shared by uncommenting the `Shared` keyword and setting it to `True`.

     NOTE Always set the `Shared` keyword to `True` for a SAN volume.

   - Enter the media preferences for the platform by uncommenting the desired bit depth and setting the file format to one of the supported formats. These are set in the `[DefaultFileFormats]` section. The frames for each bit depth will be saved to the media storage using the file formats specified here (for example *DPX* or *JPG*).

     NOTE The settings in the `[DefaultFileFormats]` section apply to all volumes. If you want to customize file formats settings for certain volumes, copy the file format lines to the `[Partition]` section for the respective volumes. Settings defined in a `[Partition]` section overwrite the settings in the `[DefaultFileFormats]` section.

   - Optional: If using the *JPG* file format, uncomment the `JpegCompressionFactor` keyword and set JPEG compression to a value between `0` and `100`.

   - Optional: To prevent the use of symbolic links across filesystems, uncomment the `SymlinkAcrossFilesystems=False` keyword.

   - Save and close the *stone+wire.cfg* file.

6. If this is the first filesystem you are configuring for this workstation, perform the following additional steps:
   - Open the */usr/discreet/sw/cfg/sw_framestore_map* file in a text editor and locate the framestore ID in the `[FRAMESTORES]` section. It contains a line similar to the following:

```
FRAMESTORE=smoke1 HADDR=192.168.1.152 ID=152
```

- Write down the value of the `ID` field.
- Open */usr/discreet/sw/cfg/sw_storage.cfg* in a text editor (create it if it does not exist) and enter the ID value you wrote down in the previous step. For example, if the ID value is 152, the *sw_storage.cfg* file should now look like this:

```
[Framestore]
ID=152
```

- Save and close *sw_storage.cfg*.

7 Optional: To prevent other Visual Effects and Finishing tools and applications (such as background Wire, Wiretap™, or remote Visual Effects and Finishing applications) from impacting the performance of your local application, configure bandwidth reservation for your partition in the */usr/discreet/sw/cfg/sw_bwmgr.cfg* file. For details and examples, see Configuring Bandwidth Reservation on page 135 and the comments inside the */usr/discreet/sw/cfg/sw_bwmgr.cfg.sample* file.

8 Restart Stone and Wire by typing:

```
/etc/init.d/stone+wire restart
```

A message appears indicating Stone and Wire has restarted.

9 Make sure the filesystem is mounted. Type:

```
/usr/discreet/sw/sw_df
```

A report appears providing information about the total, free, and used disk space in the partition.

Any project created in your application after this point has the new standard filesystem partition as its primary partition. Any pre-existing projects are unaffected by this setting and remain associated to their respective partitions.

Setting up the Wire Network

This section provides instructions for setting up the Wire network and associated components, such as Wiretap.

Wire is a component that enables the high-speed transfer of uncompressed video, film, and audio between Autodesk workstations, over industry-standard TCP/IP and InfiniBand networks.

Wiretap is a networking protocol that allows products that do not run Stone and Wire to access the filesystem of a Visual Effects and Finishing product.

Perform the following sequence of procedures to configure your Wire and Wiretap settings. You must stop all Stone and Wire daemons before editing any of the following configuration files.

To stop Stone and Wire:

1 Open a terminal and log in as root.

2 Stop Stone and Wire services by typing:

```
/etc/init.d/stone+wire stop
```

To specify the network interfaces to be used by Wire:

1 Open the */usr/discreet/sw/cfg/sw_framestore_map* file in a text editor.

2 Specify the network interfaces that you will use for Wire networking, in the `[INTERFACES]` section. This task must be performed on every host that is a part of the Wire network.

NOTE The interfaces are listed in the order of preference. Wire will try to connect to other hosts using the first interface in the list first.

For example:

```
[INTERFACES]
FRAMESTORE=kamloops
PROT=IB_SDP IADDR=192.168.0.1 DEV=1
PROT=TCP IADDR=10.0.0.5 DEV=1
```

- The `FRAMESTORE` keyword sets the name that identifies the framestore when remote hosts attempt to connect to it.
- The `PROT` keyword defines the network protocol used to communicate to the framestore: `TCP` for TCP/IP or `IB_SDP` for InfiniBand.
- The `IADDR` keyword specifies the IP address of the network card.

NOTE If you are using an InfiniBand card, make sure the IADDR is different from the host address (HADDR) of the card, otherwise the workstation sends house network traffic through the InfiniBand network and impairs Wire transfers.

To configure Wire self-discovery:

1. Open the */usr/discreet/sw/cfg/sw_probed_cfg* file in a text editor
2. Make sure the `SelfDiscovery` parameter is set to "yes".
3. Make sure the value of the `Port` keyword matches the value used by the other workstations in your network.

   If these values are set properly, Stone and Wire uses its self-discovery mechanism to locate all other Wire hosts on your network and make their framestores accessible to your application.

To enable remote access to clip libraries, projects, users and setups:

1. Open the */etc/exports* file in a text editor.
2. specify all directories you want remote hosts to be able to access.

   You can export the entire */usr/discreet* directory to enable remote access to all clip libraries, projects, user preferences and setups. Or you can export only certain subdirectories, such as */usr/discreet/clip* or */usr/discreet/project*.

   For example, to export the */usr/discreet/clip* directory, add the following line to the end of the *exports* file:

   ```
   /usr/discreet/clip *(rw, sync, no_root_squash)
   ```

3. After saving the updated exports file, type the following command in the terminal to apply the changes:

   ```
   exportfs -a
   ```

To configure the Wiretap server:

1. Open the file */usr/discreet/wiretap/cfg/wiretapd.cfg* in a text editor.
2. Locate the `[Server]` section of the file.

That section contains the IP addresses of all the network interfaces that will be published for self-discovery. The house network IP address should already be present in the file, as it is added automatically during installation.

3 Specify any additional IP addresses Wiretap should broadcast for self-discovery, besides the house network IP. For example:

```
IP1=10.10.0.1
IP2=10.10.11.200
```

To restart and test Wire:

1 To restart Stone and Wire, type:

```
/etc/init.d/stone+wire restart
```

2 To test that Wire is working, type:

```
/usr/discreet/sw/tools/sw_framestore_dump
```

This command should show all Wire hosts discovered on your network.

Setting Up Background Wire and Background Proxy Generation

Background Wire transfers and proxy generation rely on Backburner. The Backburner Server that automatically installs with the Autodesk Visual Effects and Finishing application communicates with a Backburner Manager on the Wire network to accomplish background transfers or generate the proxies.

Use the following procedure to set up background Wire transfers and proxy generation.

To set up background Wire and proxy generation:

1 Make sure Backburner Server is set to run automatically on your workstation. Type:

```
chkconfig --list | grep -i backburner
```

The following line should be part of the command output:

```
backburner_server 0:off 1:off 2:on3:on4:on5:on6:off
```

If backburner_server is not set to "on" for run levels 2, 3, 4, and 5, type the following commands to enable and start it:

```
chkconfig backburner_server on
/etc/init.d/backburner restart
```

2 Make sure there is a Backburner Manager system on your network, and that the hostname or IP address of the Manager system is set in the */usr/discreet/backburner/cfg/manager.host* file on your workstation.

3 Make sure the following Backburner keywords in the */usr/discreet/*`<product_home>`*/cfg/init.cfg* file are configured properly.

Keyword	Setting
BackburnerManagerHostname `<hostname>`	Set `<hostname>` to the hostname or IP address of the workstation running Backburner Manager. This hostname or IP address must match the one in the */usr/discreet/backburner/cfg/manager.host* file. If it does not, background Wire transfers will fail. For a detailed description of this keyword, see BackburnerManagerHostname on page 95.

Keyword	Setting
BackburnerManagerPriority `<priority>`	Set `<priority>` to a value from 0 to 100. The default is 50. For a detailed description of this keyword, see BackburnerManagerPriority on page 96.
BackburnerManagerGroup `<groupname>`	Set `<groupname>` to the name of a group of computers on a Burn® rendering network. For example, if the name of the group is "renderfarm1", you would set this keyword to BackburnerManagerGroup renderfarm1. For a detailed description of this keyword, see BackburnerManagerGroup on page 96.

Upgrading Projects to the Current Version

You can automatically upgrade your projects from a previous version of your application to version 2010 Extension 1 using the *copyProjects* command-line tool.

NOTE You do not need to perform this task if you are upgrading to a service pack of the same version or to a service pack of the same extension.

Using this tool instead of manually re-creating your projects is the recommended approach, as it reduces the time needed to migrate multiple projects, and prevents human error.

NOTE The *copyProjects* tool does not copy any media. It only re-creates projects and copies their settings and setups to the current version. You still have to transfer your media using the network library.

To copy projects using the *copyProjects* tool:

1. Open a terminal and log in as root.
2. Run the *copyProjects* script:

   /usr/discreet/`<product_home>`**/bin/copyProjects**

   NOTE The *copyProjects* tool requires no command-line arguments.

   The tool detects all projects from previous versions, and returns the following message:

   ```
   Projects will be copied to version 2010 Extension 1
   Do you wish to continue?
   ```

   If the version returned by the script is the newly installed version, answer Yes and continue this procedure. Otherwise, perform the steps in the next procedure to change the application version to which projects are copied.
3. Confirm each project you want to copy to the new version, or answer **a** to copy all projects.

   The tool creates a copy of each project for the current version. The string *_copy* is appended to the end of the new project name.
4. Use the network library to transfer media into the copied projects.

To change the application version projects are copied to:

1. Stop Stone and Wire by typing:

   /etc/init.d/stone+wire stop
2. Unlink the Wiretap startup script by typing:

```
unlink /usr/discreet/sw/sw_wiretapd
```

3 Link the Wiretap startup script to the latest version by typing:

```
ln -s /usr/discreet/wiretap/<version>/ifffsWiretapServer
/usr/discreet/sw/sw_wiretapd
```

4 Start Stone and Wire by typing:

```
/etc/init.d/stone+wire start
```

5 Run the *copyProjects* script again.

See the following section for instructions on transferring clip libraries from previous versions.

Transferring Clip Libraries to 2010 Extension 1 Projects

To access clip libraries from version 2007, 2008, 2009 or 2010 projects, you must transfer the clip libraries to a project created in version 2010 Extension 1.

You can install version 2010 Extension 1 on the 2007, 2008, 2009, or 2010 system and use Wire to transfer the clip libraries from 2007, 2008, 2009, or 2010 projects to a version 2010 Extension 1 project. See your application help.

For a Linux system running a 2007, 2008, 2009, or 2010 release where you do not wish to install 2010 Extension 1, or for IRIX® systems, you can also use the following procedure to transfer media from 2007, 2008, 2009, or 2010 to 2010 Extension 1.

To transfer clip libraries from version 2007, 2008, 2009, or 2010 projects to a 2010 Extension 1 project:

1 Use Backdraft® Conform 2007 or any 2008, 2009, or 2010 application to create a project and a clip library on the 2010 Extension 1 system. See your application help. The project and library is formatted for 2007, 2008, 2009, or 2010.

2 Use the 2007, 2008, 2009, or 2010 application to move clips from the 2007, 2008, 2009, or 2010 system over the network into the previously created project on the 2010 Extension 1 system. You can use Background Wire to help free up the resources of the workstation running the older version of the application. See your application help.

3 Create a new project on the version 2010 Extension 1 system. If you have many projects, use the *copyProjects* script.

4 Use the 2010 Extension 1 application to open the library created in step 1 (the library is read-only).

5 Use Dual View to drag the clips into the 2010 Extension 1 project and library.

6 Use the older application version to remove the project created in step 1. 2010 Extension 1 applications cannot remove projects created with previous versions because they are read-only.

TIP If you have 2007, 2008, 2009, or 2010 installed on your 2010 Extension 1 system, you can access the 2007, 2008, 2009, or 2010 system remotely to transfer the media using Wire without interrupting a session on that station. See your application help.

Installing Additional Utilities

This section lists some additional Autodesk utilities that you can install on your workstation, along with the relevant documentation for each of them.

NOTE You can obtain the latest version of the guides mentioned in this section by going to *www.autodesk.com/me-documentation*.

- If you do not wish to use the automatically-installed WiretapCentral or Wiretap Gateway on your local workstation, you can install these components on dedicated systems in your facility network. For system requirements and installation instructions, see the *Autodesk WiretapCentral and Wiretap Gateway Installation Guide*.

  NOTE If you relocate WiretapCentral, update the value of the `WiretapCentralUrl` keyword in the */usr/discreet/*`<product_home>`*/cfg/init.cfg* file to point to the new location of WiretapCentral. See WiretapCentralUrl on page 95.

- If you intend to use Cleaner® XL to encode video over the network, install and configure the necessary components. Refer to *Using Cleaner XL with Autodesk Visual Effects and Finishing Applications*.
- If you intend to use the generic 3D lookup tables (LUTs) or the monitor calibration utility provided by Lustre® Color Management, install the necessary components. Refer to the latest *Lustre Color Management user guide*.
- To view system statistics and perform system tests from a user-friendly Web-based application, install the free Autodesk SystemCentral™ application on your workstation. See the *Autodesk SystemCentral Installation and user guide* for installation instructions.

Licensing and Starting the Application

10

Topics in this chapter:

- Licensing Workflow on page 63
- Determining the Licenses You Require on page 64
- Obtaining the Host ID on page 64
- Requesting License Codes on page 64
- Entering License Codes on page 66
- Starting the Application for the First Time on page 67

Licensing Workflow

If you have purchased subscription and are upgrading to a new release, your new license is sent to you by the Autodesk Media and Entertainment department. After receiving your license, perform the following tasks:

1. Install the new license. See Entering License Codes on page 66.
2. Start the application and accept the license agreement. See Starting the Application for the First Time on page 67.

If you are installing the application for the first time, use the following steps to obtain and install license codes.

To obtain and install license codes for the application:

1. Determine which license codes you require. See Determining the Licenses You Require on page 64.
2. Request temporary license codes. See Requesting License Codes on page 64.

3 Install the temporary license codes. See Entering License Codes on page 66.

4 Start the application and accept the license agreement. See Starting the Application for the First Time on page 67.

5 When you receive permanent license codes, install those codes. See Entering License Codes on page 66.

Determining the Licenses You Require

You may need more than one license code. Refer to the following table to determine which license codes you require.

License Code	Required/Optional	Description
Application	Required	Runs the application.
Cleaner XL	Optional	Makes it possible to perform remote encoding of video or audio using Cleaner XL. For help licensing Cleaner XL, refer to the documentation included with Cleaner XL.
di	Optional (Smoke only)	Enables support for Batch FX.

Obtaining the Host ID

To request a license code, you must provide the unique host ID of your workstation. The host ID is used to authenticate your registration.

To obtain the host ID:

1 Open a terminal and run the *dlhostid* script by typing:

```
dlhostid
```

A message similar to the following one appears, containing the host ID:

```
dlhostid — Copyright © 2005 by Autodesk, Inc./Autodesk Canada Co. All
rights reserved.
The lmhost ID of this machine is "00110910DA2E" (eth0)
The Discreet host ID of this machine is
"DLHOST01=25231AEF83AD9D5E9B2FA270DF4F20B1"
```

2 Send the Discreet host ID to the Autodesk Licensing Department to receive your application license code. When you record the Discreet host ID, make sure you include the `DLHOST01=` string as well as the code; for example, `DLHOST01=25231AEF83AD9D5E9B2FA270DF4F20B1`

NOTE Make sure you obtain a host ID for each workstation on which you install the application.

Requesting License Codes

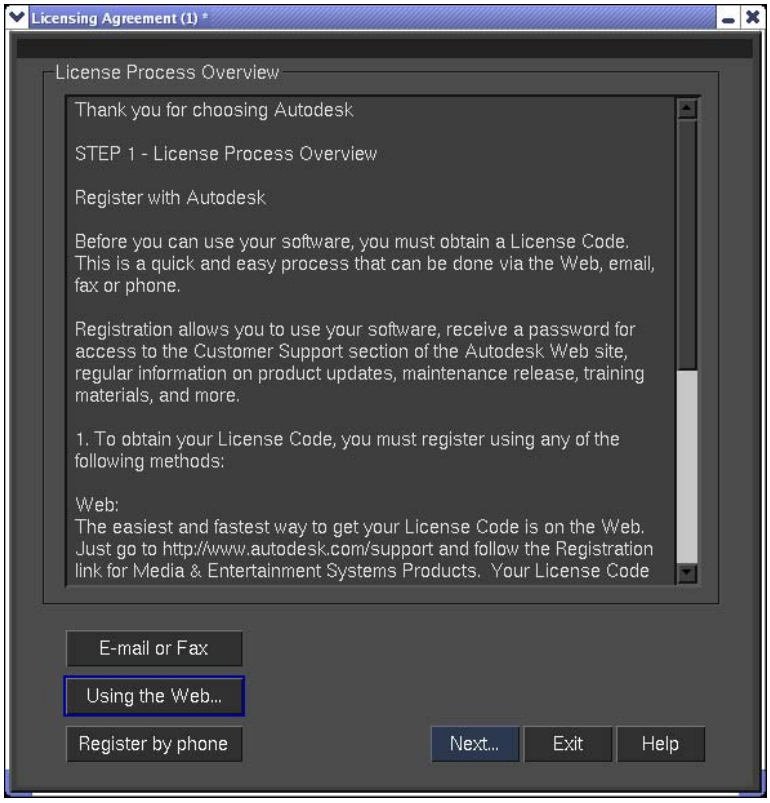
You can obtain application license codes by registering the application with the Autodesk Media and Entertainment Licensing Department by e-mail or telephone.

NOTE For emergencies, you can acquire an immediate temporary emergency license using the emergency license generator at *http://melicensing.autodesk.com/templicensing/*. A 4-day license code is e-mailed to the address you provide.

Use the License Wizard to license your application. The Wizard starts automatically when you launch an unlicensed application.

To obtain license codes:

1. On your workstation, log into the user account you want to use your application with.
2. Double-click the application icon to start the application.
   After a few moments, the License Wizard appears.



3. Read the License Process Overview and click E-Mail or Fax.
4. Fill in the required information, and click Save.
   The form is saved as a text file in the */usr/tmp/* directory.
5. Send the form by e-mail to *me.support@autodesk.com*.
   You will receive your temporary license code within eight business hours.

To obtain license codes by telephone:

➤ Speak to a licensing representative by calling the Autodesk Licensing Department toll-free in North America at 1-800-925-6442 between 8 AM and 8 PM eastern standard time (EST). Outside of North America, call 1-514-954-7199.

Entering License Codes

The easiest way to enter the license codes for your application is to use the License Wizard. This wizard automatically appears when you start an unlicensed application.

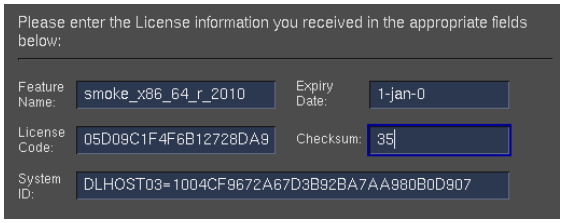
To enter software license codes:

1. On your workstation, log into the user account you want to use your application with.
2. Double-click the application icon on the Linux Desktop to start the application.

   After a few moments, the License Wizard appears.
3. Click Next.
4. Enter values for the Feature Name, Expiry Date, License Code, and Checksum fields in the Wizard, and verify the automatically generated value in the System ID field. All of these values appear in the codes you received from the Licensing Department.

   The image below illustrates how to fill in the fields in the Wizard using the values in this license code sample:

   ```
   FEATURE smoke_x86_64_r_2010 discreet_l 2010.999 1-jan-0 0
   \0D506C1F4F6B12728DA9 \HOSTID=DLHOST03=1004CF9672A67D3B92BA7AA980B0D907
   ck=35
   ```

   NOTE An expiry date of 1-jan-0 means the license never expires.
5. Click Install.

   The License Wizard installs the license, and displays a message indicating the install was successful and asking you to restart the application.
6. Click Finish to exit the License Wizard.

   Your application is now licensed.

   NOTE License codes are unique for each workstation, and are tied to the system hardware. If you replace major system components in your system, you must request and install a new license code for your software.

Manually Adding Licenses to the License File

To add additional license codes you receive from the Licensing Department (such as the DI license), open the file */usr/local/flexlm/licenses/DL_license.dat* in a text editor and paste the license text into that file.

WARNING Edit this file with care; an incorrect character or missing space may prevent the application from recognizing the license.

Starting the Application for the First Time

After you enter the license code for the application, you are ready to start the application for the first time.

To start the application the first time:

1 Log into your workstation.

2 Do one of the following:

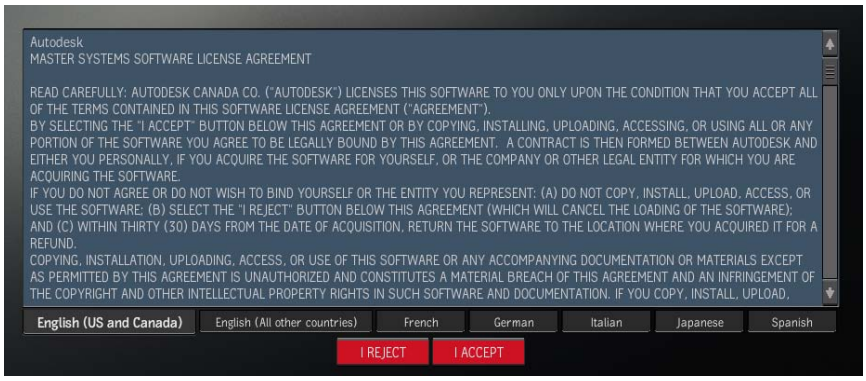
- If this is the first time you are starting the application on a new system, open a terminal and type **/usr/discreet/**<product_home>**/bin/startApplication -v** to initialize the framestore and start the application. For example:
  /usr/discreet/flame2010.1/bin/startApplication -v

  WARNING The **-v** option deletes all material on the framestore. Use this option only if you have no material that you want to preserve on the framestore.

  NOTE For information on all the command-line options available, see Application Command Line Start-up Options on page 105.

- If you want to start the application without initializing the framestore, double-click the application icon on the Desktop.

The Autodesk Master Systems Software License Agreement appears.



3 (Optional) To view the License Agreement in another language, click a language tab at the bottom of the License Agreement window.

The localized version of the License Agreement appears in a new window.

4 Read the text carefully, and click I Accept if you agree to all the terms in the License Agreement.

The Project Management menu appears.

5 Use the Project Management menu to create a project and a user.

For information on creating projects and users, see the application Help.

6 Click Start or press **Enter**.

7 When prompted to confirm the framestore initialisation, answer “yes”.

After a few moments, the following message appears:

```
Startup complete.
```

You are ready to start working in the application. If you see a splash screen rather than the application interface, click anywhere on the screen.

NOTE If you use the pen and tablet while the application is starting, the tablet will fail to initialise. Press **Shift+T+Insert** to initialise the tablet if it does not function during a work session.

Uninstalling the Application

11

Topics in this chapter:

- Using rmsoft to Uninstall your Application on page 69

Using rmsoft to Uninstall your Application

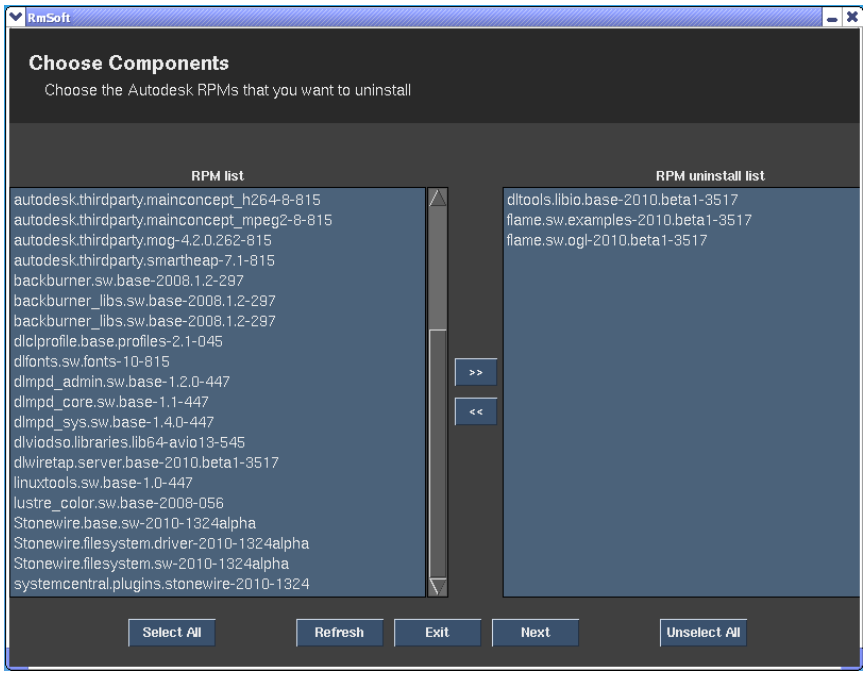
The *rmsoft* utility enables you to easily uninstall Autodesk Visual Effects and Finishing or Colour Grading applications from your workstation.

To uninstall your application using *rmsoft*:

1. If you are logged in as the application user in KDE, log out and log back into KDE as root.
2. As root, open a terminal, and type:

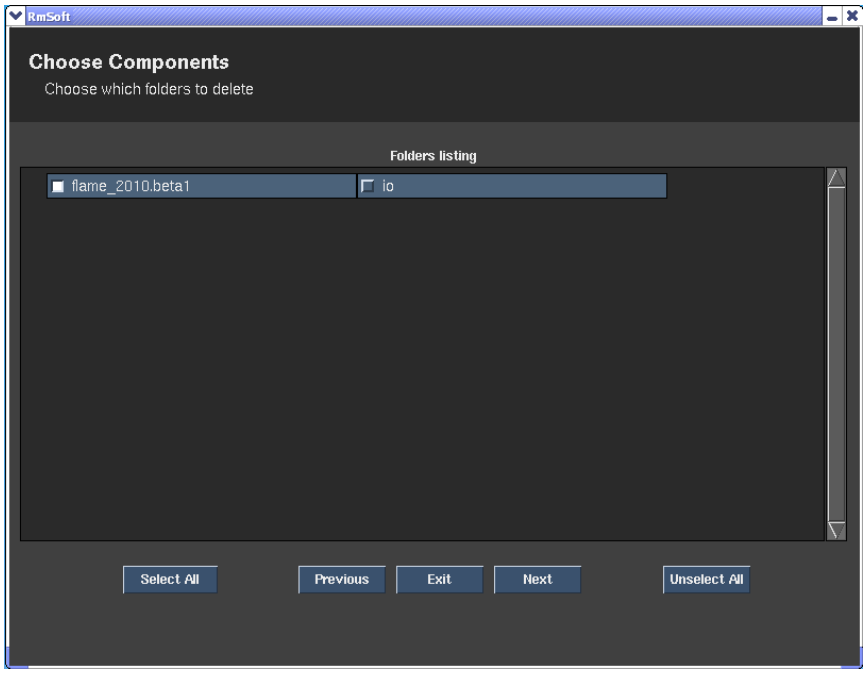
   ```
   rmsoft
   ```

   The *rmsoft* user interface appears.



3 Select the RPM packages you want to uninstall in the RPM list on the left (click Select All to select all the packages), then click to move them to the RPM uninstall list on the right.

4 Click Next.
The Choose folders window appears.



5 Select the application directories you want to remove from the */usr/discreet* directory, and click Next.
A confirmation dialog appears.

6 Click Uninstall & Remove to confirm the removal of the selected packages and directories.

The uninstallation starts and *rmsoft* displays details on the process.

7 When the operation completes, click Exit to close *rmsoft*.

8 Optional: You can also delete the log files associated with a given application version in the */usr/discreet/log* directory.

Part 4: Advanced Configuration and Troubleshooting

Part 1 includes these chapters:

- Configuration Files on page 75
- Application Command Line Start-up Options on page 105
- Troubleshooting on page 109
- Manually Configuring Media Storage on page 125
- Standard Filesystem Maintenance on page 133

Configuration Files

12

Topics in this chapter:

- Overview on page 75
- About the Software Initialisation Configuration File on page 75
- About Project Configuration Files on page 78
- Software Initialisation File Keywords on page 80
- Project Configuration File Keywords on page 98

Overview

Configuration files are ASCII text files that define the working environment for your application. Keywords in the configuration files define certain global and project-specific parameters such as I/O devices, workstation display settings, project environment directory paths, framerate, timecode, and colour space. You can open a configuration file using any text editor, such as *kedit*.

There are two kinds of configuration files:

- **The software initialisation configuration file** is parsed when you launch the software.
- **The project configuration file** is parsed when you select a project in the software.

Although you should not have to regularly edit these files, it is important that you become familiar with them for the occasional instance where editing them is necessary.

About the Software Initialisation Configuration File

The software initialisation configuration file (by default, */usr/discreet/*`<product_home>`*/cfg/init.cfg*) is parsed when you launch the software.

Keywords in the configuration file define parameters such as I/O devices, peripherals, workstation display settings, and environment directory paths. These parameters are independent of the project you select from the Project Management menu when you begin a session.

NOTE For information on each keyword in the software initialisation configuration file, see Software Initialisation File Keywords on page 80.

When you first install the software, you are prompted to edit the default software initialisation configuration file.

As you work with the software, you may have to edit this file under certain conditions, such as:

- After making changes to your hardware configuration
- When setting session-based keyword values, such as specifying an archiving device

You may choose to create different versions of the software initialisation configuration file to accommodate session-based needs that change through the course of a project.

To view the default software initialisation file, browse to the */usr/discreet/*`<product_home>`*/cfg/* directory, and open the *init.cfg* file in any text editor.

The file contains comments that provide brief descriptions of each keyword, keyword syntax, as well as usage examples.

In some cases keyword examples are not commented out and are used as the default settings. They are parsed during software initialisation and the corresponding parameter is set.

Sample Software Initialisation Configuration Files

The Visual Effects and Finishing application installation packages come with sample software initialisation configuration files for the usual needs of working with NTSC, PAL, HDTV, or film material.

These samples are located in the */usr/discreet/*`<product_home>`*/cfg/linux-x86_64/sample* directory .

You should never edit the sample configuration files. Instead, either make a copy of the sample software initialization configuration file that you like or just edit the real *init.cfg* file.

These samples are starting points toward configuring the software to best suit your needs.

Using a text editor, you can open a software initialisation configuration file for viewing. For example, you may want to read the keywords in different software initialisation configuration samples to see the differences. This is a good way to learn more about configuration keywords.

Modifying a Software Initialisation Configuration File

Software initialisation configuration files have open read/write permissions, and anyone can modify them. In some cases, you may want to restrict access to the files using the *chmod* command.

Here are some basic guidelines for modifying software initialisation configuration files:

- Do not modify the sample software initialisation configuration files. Make copies of the samples and work on those instead.
- Create a backup of a file before making any changes to it.
- After modifying a software initialisation configuration file, restart the software for the changes to take effect.

- To launch the software with a custom software initialisation configuration file, use the **-c** start-up option. For example:
  smoke -c /usr/discreet/smoke_2010.1/cfg/my_custom_init.cfg

  NOTE If you saved your custom software initialisation configuration file in a directory other than */usr/discreet/<product_home>/cfg*, be sure to use the full directory path. If the custom file is not found, the application automatically uses the default *init.cfg* file.

Updating the Software Initialisation Configuration File

The *xxdiff* utility is normally used during software installation to transfer facility-specific modifications in a customized software initialization configuration file from an earlier application version to the current one.

The following procedure describes how to manually run *xxdiff* to compare old and new configuration files. While you may never need to do this, this procedure can be useful for troubleshooting problems in your facility. For example, you can use *xxdiff* to troubleshoot problems in a workstation by comparing its *init.cfg* file against the *init.cfg* file of a workstation without problems.

NOTE If you are upgrading from an earlier version of the application, several changes may have been applied to the software initialisation configuration file. Because of this, you may want to select the entire contents of the new *init.cfg* configuration file and then customize it to avoid adding obsolete keywords.

To update the software initialisation configuration file:

1. In a terminal, start *xxdiff* and load the two files for comparison by typing the following:

   xxdiff <old_file> <new_file>

   For example, to launch *xxdiff* to compare the previous and current software configuration files, you would type:

   xxdiff /usr/discreet/<product_home1>**/cfg/init.cfg /usr/discreet/**<product_home2>**/cfg/init.cfg**

   where <product_home1> is the home directory for the previous version and <product_home2> is the home directory for the current version.

   The previous and new configuration files appear beside each other in an *xxdiff* window. The left panel displays the previous file settings and the right panel displays the current file settings. The path to both files is displayed in the title bar. The vertical bar on the right indicates where differences exist between the two panels.

2. Scan the old configuration file for custom directories or keywords that you want to copy to the new *init.cfg* file.

   On a line-by-line basis, the differences between the old and new configuration files are highlighted.

3. For each highlighted difference, click the line that you want to keep:
   - To keep the setting in the old configuration file, click the line in the left window.
   - To keep the setting in the new configuration file, click the line in the right window.

   Highlighted lines change colour when you click them. You must select a line in the left or right window for each difference detected by *xxdiff*.

4. When you have finished updating, choose File | Save As Right to save the selected line differences under the name *init.cfg*.

5. Click OK to confirm, and then exit *xxdiff*.

About Project Configuration Files

A project configuration file is a text file that is parsed when you select a project in the application. A project configuration file uses the same name as the project, but with a *.cfg* extension. For example, the project configuration file for a project called "my_project" uses a project configuration file called *my_project.cfg*.

Project configuration files are located in the */usr/discreet/project/<project_name>/cfg* directory. You can open a project configuration file in any text editor.

NOTE Although you can modify project configuration files, the Project Management menu provides editing tools to modify projects from session to session as needed. In general, you should not have to modify project configuration files manually.

For information on project configuration file keywords, see Project Configuration File Keywords on page 98.

Project Configuration File Templates

When you create a project, you select a template from which your project's configuration file is generated. These templates are based on a resolution and framerate, and define the display environment. Project templates do not prevent you from working with clips of other resolutions and frame rates. However, some functions, such as display on a broadcast monitor, may not be supported.

These templates are located in the */usr/discreet*`<product_home>`*/cfg/linux-x86_64/template* directory.

TIP This directory contains an extensive list of templates for all supported display environments, some of which may not be suitable for your workflow. To make template selection easier, use the **`mkdir`** command to create a directory called *unused* in the directory */usr/discreet/*`<product_home>`*/cfg/linux-x86_64/template*. Use the **`mv`** command to move templates you do not use to this folder. When you use the Create Project menu, only those templates that remain will be available.

Select the template from the following table that corresponds to the resolution of your project.

The configuration file template:	Sets parameters for projects to work with:
ntsc.cfg	NTSC 601 material. The external sync source is NTSC blackburst.
pal.cfg	PAL 601 material. The external sync source is PAL blackburst.
24p.cfg	24p material of any resolution.
24p_ntsc.cfg	Film-based material that has been transferred to NTSC 601 video. The external sync source is NTSC blackburst.
film.cfg	Film-based material.
film_ntsc.cfg	Film-based material that has been transferred to NTSC video. The external sync source is NTSC blackburst.
24p_1920x1080@5994i.cfg *24p_1280x720@5994p.cfg* *24p_1280x720@5994p_free.cfg* *24p_1280x720@6000p.cfg* *24p_1280x720@6000p_free.cfg* *24p_1920x1080@5994i.cfg*	Film-based material that has been transferred to HD video. The external sync source is NTSC blackburst.
1280x720@5994p_free.cfg *1280x720@6000p_free.cfg*	The corresponding HD standard on workstations to which no external sync source is connected.

The configuration file template:	Sets parameters for projects to work with:
1920x1080@23976psf_free.cfg *1920x1080@24000psf_free.cfg* *1920x1080@25000psf_free.cfg* *1920x1080@50i_free.cfg* *1920x1080@5994i_free.cfg* *1920x1080@6000i_free.cfg*	
1280x720@5994p.cfg *1280x720@6000p.cfg* *1920x1080@23976psf.cfg* *1920x1080@24000psf.cfg* *1920x1080@25000psf.cfg* *1920x1080@50i.cfg* *1920x1080@5994i.cfg* *1920x1080@6000i.cfg*	The corresponding HD standard on workstations. The external sync source corresponds with the HD format.

Supported HD Formats in Project Templates

The names of project templates for HD formats contain a string that identifies the format's resolution, framerate, and scan mode.

Project configuration templates with the following string in their name:	Correspond to the following HD format:
1280x720@5994p	1280x720 progressive scan at 59.94 frames per second (720/59.94p, SMPTE-296M)
1280x720@5000p	1280x720 progressive scan at 50 frames per second (720/50p, SMPTE-296M)
1280x720@6000p	1280x720 progressive scan at 60 frames per second (720/60p, SMPTE-296M)
1920x1080@23976psf	1920x1080 progressive segmented frame at 23.976 frames per second (1080/23976psf, SMPTE-274M, RP-211)
1920x1080@24000psf	1920x1080 progressive segmented frames at 24 frames per second (1080/24psf, SMPTE-274M, RP-211)
1920x1080@25000psf	1920x1080 progressive segmented frames at 25 frames per second (1080/25psf, SMPTE-274M, RP-211)
1920x1080@50i	1920x1080 interlaced scan at 50 fields per second (1080/50i, SMPTE-274M)
1920x1080@5994i	1920x1080 interlaced scan at 59.94 fields per second (1080/59.94i, SMPTE-274M)
1920x1080@6000i	1920x1080 interlaced scan at 60 fields per second (1080/60i, SMPTE-274M)

Modifying Project Configuration Files

Project configuration files have open read/write permissions and anyone can modify them. In some cases, you may want to restrict access to them using the *chmod* command.

Here are some basic guidelines for modifying project configuration files:

- Do not modify the template project configuration files. These are used by the software to generate new project configuration files and should not be altered. Create a copy of the desired project *.cfg* file, and modify that in a text editor as needed.
- Create a backup of the project configuration file before making any changes to it.
- Modified project configuration files must end with *_custom.cfg*.
- You cannot use multiple project configuration files with a single project. A project configuration file must have the same name as its corresponding project and it must be located in the project's *cfg* directory.

Software Initialisation File Keywords

This section describes each keyword in the software initialisation configuration file */usr/discreet/*`<product_home>`*/cfg/init.cfg*.

DiskHealthNotify

The `DiskHealthNotify` keyword defines an e-mail address to which a message is sent if any framestore disk health problems occur. Only one address can be listed. The mailer daemon for the workstation must also be properly configured for notification e-mails to be sent.

The DiskHealthNotify keyword uses the following syntax

```
DiskHealthNotify <e-mail_address>
```

where `<e-mail_address>` is the address to which you want the message sent.

Example of use

```
DiskHealthNotify sysadmin@here.com
```

MemoryApplication

The `MemoryApplication` keyword allocates memory for frame buffers. A frame buffer is a chunk of memory set aside to store image data in RAM for the fastest possible display of frames while working in the application.

In most cases, the `MemoryApplication` keyword should be commented out. When it is commented out, the default memory configuration is used, and is based on the physical memory installed on the system. This default configuration is sufficient for most projects, regardless of the different resolutions you may be working with.

Uncommenting the `MemoryApplication` keyword overrides the default memory configuration. You should only override the default memory configuration by uncommenting the `MemoryApplication` keyword under the following conditions:

- You are working with 4K 12-bit material.
- You are working in the application and receive “cannot allocate memory buffer” messages.
- Your system fails due to memory panic.

The MemoryApplication keyword uses the following syntax

```
MemoryApplication <megabytes>
```

where `<megabytes>` is the amount of memory dedicated to the corresponding token, in megabytes.

Example of use

```
MemoryApplication 400
```

Working with 4K 12-bit Film

Even with the recommended amount of RAM, working with 4K 12-bit film puts great demands on memory management. Set the RAM allocated for buffering frames to between 2000 and 4000.

The ability to mix different resolutions in a 4K 12-bit film project increases memory requirements even further. Even with an override of the default memory management configuration, working at this resolution may not support some advanced features that require a large amount of memory such as the Colour Warper™.

Cannot Allocate Memory Buffer Messages

"Cannot allocate memory buffer" messages indicate a shortage of memory allocated to frame buffering, so uncommenting the `MemoryApplication` keyword and defining an amount of memory for frame buffers can resolve this problem. The amount to set in this case depends on how much RAM your system has: start with 400 MB for Finishing applications or 700 MB for Visual Effects applications. Allocate more memory to frame buffers in increments of 50 MB as required.

Memory Panic

A memory panic indicates the system is running out of heap memory. Heap memory is memory allocated for use by applications and the operating system. Make sure no other applications are running. If memory panic still occurs, lower the amount of memory allocated to frame buffers.

Remember that overriding the default memory management configuration is only required under these specific conditions. If your system experiences problems related to memory management under normal conditions, contact Autodesk Media and Entertainment Customer Support. See Contacting Customer Support on page 4.

Video

The `Video` keyword initialises the video device and specifies the video input type.

Video device The video input devices supported are AJA_OEMLH, and AJA_OEM2K.

Default video input format The default video input format that corresponds to the input configuration of the video card. This setting is overridden by the video input formats specified by the lines you uncomment for each VTR under the Vtr keyword heading.

The Video keyword uses the following syntax

```
Video <video_device>, <default_video_format>
```

Where:	Is:
`<video_device>`	The video card used by your workstation. It can take the following values: AJA_OEMLH for the AJA OEMLH card used in SD configurations on HP® platforms AJA_OEM2K for the AJA OEM2K card used in HD/2K configurations on HP platforms

Where:	Is:
`<default_video_format>`	The video input type. For all AJA cards, the supported video input types are `Serial1` and `SerialDual`.

Examples of use

```
Video AJA_OEMLH, Serial1
Video AJA_OEM2K, Serial1
```

DviRamp

The `DviRamp` keyword enables control of the Miranda DVI-Ramp external device. The DVI-Ramp outputs a standard definition serial digital video signal (SMPTE-259M-C) or a high-definition serial digital video signal (SMPTE-292M).

NOTE Enable this keyword only if you are using the Miranda DVI-Ramp external device. The `DviRamp` keyword is automatically commented out if the application installation script detects a NVIDIA® SDI card connected to the system.

The DviRamp keyword uses the following syntax

```
DviRamp <serial port>, <baud rate>, <parity>, <size>, <stopBits>
```

Where:	Is:
`<serial_port>`	The type of connection to the DVI-Ramp external device. The values are: ■ `ttyS0` for a DVI-Ramp1 connected on a serial port. ■ `usb/dviramp` for a DVI-Ramp1 connected on a USB port using a USB-Serial adaptor. ■ `usb/dviramp2` for DVI-Ramp2 connected on a USB port.
`<baud rate>`	The baud rate used to communicate with the DVI-Ramp.
`<parity>`	The parity setting to communicate with the DVI-Ramp. It can be set to EVEN, ODD, or NOPARITY.
`<size>`	The number of transmitted bits per packet.
`<stopBits>`	The size of the stop bit.

Example of use

```
DviRamp ttyS0, 38400, none, 8, 1
```

VideoPreviewDevice

The `VideoPreviewDevice` keyword specifies the device used for the graphics-to-video display.

Specify entries for the resolutions of the projects on which you will be working as well as the resolutions supported by your hardware configuration.

The *init.cfg* file contains all supported tokens for the `VideoPreviewDevice` keyword. The project configuration file will determine which one of these should be enabled for a given project.

VideoPreviewDevice is also used in conjunction with the VideoPreviewWindow keyword in the project configuration template files; VideoPreviewWindow specifies the width and height of the window and the refresh rate. See VideoPreviewWindow on page 100.

When the application is started and a project is selected, the VideoPreviewWindow must match one of the VideoPreviewDevice entries. If no match is found, graphics-to-video output is unavailable.

The VideoPreviewDevice keyword applies to workstations configured with either a Miranda DVI-Ramp external device, a NVIDIA SDI card, or graphics readback (SD timings only) if the hardware is not available.

The VideoPreviewDevice uses the following syntax

```
VideoPreviewDevice <description>, <device>, <channel_number>, <xsize>,
<ysize>, <refresh>, <syncsource> [, <xoffset>, <yoffset>
```

Where:	Is:
<description>	A string describing the resolution and sync configuration of the video preview device: ntsc, pal, or an HD resolution and timing.
<device>	The graphics-to-video configuration for your system. Set to dviramp (if you are using a DVI ramp), nvidia (if you are using a NVIDIA SDI card), or readback.
<channel_number>	The channel on which the signal is output.
<xsize>, <ysize>	The width and height of the area of the image window output to the graphics-to-video display.
<refresh>	The refresh rate of the corresponding resolution.
<syncsource>	The reference sync. Set to 601sync when you are using NTSC or PAL timing and you are connected to an external sync generator. Set to DTVsync when you are using HD timing and you are connected to an external sync generator. Set to freesync when you are not connected to a sync generator.
<xoffset>, <yoffset>	The horizontal and vertical offset of the video sent to the broadcast monitor relative to the graphics display. These parameters are required for some resolutions to display accurate field dominance during playback. Use these optional parameters with NTSC.

Examples of use

```
VideoPreviewDevice ntsc, dviramp, 1, 720, 486, 30, 601sync, 0, 1
```

```
VideoPreviewDevice pal, nvidia, 1, 720, 576, 25, 601sync
```

```
VideoPreviewDevice 1920x1080@50i, nvidia, 1, 1920, 1080, 50i, DTVsync
```

When working with variable framerate material, enable the video preview device token corresponding to the 720p timings, for example:

```
VideoPreviewDevice 1280x720@5994p, nvidia, 1, 1280, 720, 5994p, 601sync
```

Configuring Readback Mode

On systems without a DVIramp or a NVIDIA SDI card, you must enable the following lines to ensure video preview using the readback mode:

```
VideoPreviewDevice pal, readback, 2, 720, 576, 25, 601sync
```

```
VideoPreviewDevice ntsc, readback, 2, 720, 486, 30, 601sync
```

TabletDriver

The `TabletDriver` keyword identifies the tablet driver. Only Wacom® Intuos-series USB tablets are currently supported.

The TabletDriver keyword uses the following syntax

```
TabletDriver wacom
```

MidiDevice

The `MidiDevice` keyword identifies MIDI devices that are used with Autodesk Visual Effects and Finishing systems. Only one device is recognized at a time.

The MidiDevice keyword uses the following syntax

```
MidiDevice <name>, <device_configuration_file>, <serial_port>, <protocol>,
<baud_rate>, <parity>[, <stopbit>]
```

Where:	Is:
`<name>`	The name by which you want to identify the MIDI device in the application.
`<device_configuration_file>`	The name and path of the device configuration file for the MIDI device. The path is optional.
`<serial_port>`	The serial port to which the MIDI device is connected.
`<protocol>`	The protocol used to communicate with the MIDI device. It can be either `direct_RS422 or direct_RS232`.
`<baud_rate>`	The baud rate used to communicate with the MIDI device.
`<parity>`	The parity setting to communicate with the MIDI device. It can be set to `EVEN, ODD, or NOPARITY`.
`<stopbit>`	The size of the stop bit (optional).

Example of use

```
MidiDevice myMidiDevice, midi_LUCID_ADA8824_A232, /dev/ttyS1, direct_RS232,
9600, NOPARITY
```

Vtr

The `Vtr` keyword identifies video tape recorders that can be used for clip I/O. You can uncomment VTRs of different video formats. Any enabled VTR can be selected for a project, regardless of the project's video I/O timings.

You can also use the `Vtr` keyword to identify supported High-Speed Dual-Link (HSDL) devices for clip I/O, such as telecines. HSDL devices appear as separate entries in the list of supported decks for the `Vtr` keyword.

The Vtr keyword uses the following syntax

```
Vtr <protocol>, <name>, <input_format>, <timing>,<colorspace_mode>,
<output_format>, <output_sync>, <serial_port>, <timecode_type>,
<video_output_delay>, <video_input_delay>, <pre_roll>, <post_roll>,
```

<audio_input_delay>, <audio_output_delay>, <video_precision> [, <cueup_mode>, <TC_transition_delay>, <edit_on_delay>, <edit_off_delay>, <vtr_command_delay>]

Where:	Is:
<protocol>	The VTR control protocol (SONY, BTS, BVW50, TASCAM, or NONE).
<name>	The name by which you want to identify the VTR in the Input Clip and Output Clip menus (D1, DigBeta, D1 BTS, D5, and DVCpro, for example).
<input_format>	The video input format. Set to Serial1 to input using a single-link (4:2:2) connection from a device. Set to SerialDual to input using a dual-link (4:4:4) connection from a device.
<timing>	The I/O timing associated with the video standard of the VTR (NTSC, PAL, or HD, if applicable).
<colorspace_mode>	The mode that indicates whether colourspace conversion and/or headroom is required for clip I/O. See Configuring Colourspace Conversion for Device I/O on page 86.
<output_format>	The video output type. Set to Serial1 to output using a single-link (4:2:2) connection to a device. Set to SerialDual to output using a dual-link (4:4:4) connection to a device.
<output_sync>	The sync source used for clip output. For AJA cards, the possible values are STANDALONE, HOUSE, or DIGITAL1.
<serial_port>	The serial port to which the VTR is connected. It takes the value AJA:0:1 for workstations using an AJA OEM-2K or an AJA OEM-LH.
<timecode_type>	The timecode type to be returned by the VTR (Auto, LTC, or VITC).
<video_output_delay>	Video output delay in frames.
<video_input_delay>	Video input delay in frames.
<pre_roll>	Preroll in frames or seconds: Use integers to specify preroll in frames. Use decimals to specify preroll in seconds.
<post_roll>	Postroll in frames or seconds: Use integers to specify postroll in frames. Use decimals to specify postroll in seconds.
<audio_input_delay>	The offset value to have sync audio with video on input. Integer units represent frames; this delay should be 0 by default.
<audio_output_delay>	The offset value to have sync audio with video on output. Integer units represent frames; this delay should be 0 by default.
<video_precision>	The precision of the video interface (8 or 10 bits).
<cueup_mode>	The method by which the VTR is cued. This parameter is optional. Use vtrcueing to make the application use the VTR Cue command directly to cue the VTR. Use vtrff if using vtrcueing causes the VTR to react slowly when cued, such as with a Betacam SP™.

Where:	Is:
`<TC_transition_delay>`	The delay in milliseconds after a vertical sync, before requesting the VTR timecode. This value should only be set or changed with the help of technical support. **NOTE** The value '99' is a special case to be used strictly with HDCAM-SR/720P and AJA. It is not to be used in other circumstances unless specified by technical support.
`<edit_on_delay>`	The delay in frames before the edit sync point to send the ON command. This parameter is optional and it applies only to BVW50.
`<edit_off_delay>`	The delay in frames before the edit sync point to send the OFF command. This parameter is optional and it applies only to BVW50.
`<vtr_command_delay>`	The delay in milliseconds before the application sends certain commands to the VTR. This parameter is optional, but useful for older VTRs such as the BTS.

NOTE The *init.cfg* file contains a comprehensive list of `Vtr` keyword examples for supported devices. In most cases you just have to uncomment the lines for the device that you want to use. In some cases minor changes to parameters are required.

Configuring Colourspace Conversion for Device I/O

When you set the input or output format for a device in the `Vtr` keyword, you should also specify its colourspace conversion method using the `<colorspace mode>` parameter. The supported conversion methods depend on whether a single-link or dual-link connection is used for I/O with the device. The following table shows the colourspace conversion methods that are available for single-link and for dual-link I/O connections.

Colourspace Conversion Method	Supported for Single-Link Serial (4:2:2) I/O	Supported for Dual-Link Serial (4:4:4) I/O
YCbCR -> RGB	Yes	No
YCbCR -> RGB + Headroom	Yes	No
No Conversion	No	Yes
No Conversion + Headroom	No	Yes

Emulator

Use the `Emulator` keyword to enable the VTR Emulation feature and configure your workstation to emulate a Sony™ VTR that is controllable via the RS-422 serial port. For help configuring the hardware for VTR emulation, see the hardware setup guide for your workstation.

The VTR Emulation feature supports SD and HD video timings. This feature is available in Backdraft Conform and Smoke Advanced.

You can specify more than one emulator. Any enabled emulator can be selected for a project, regardless of the project's video I/O timings.

The Emulator keyword uses the following syntax

```
Emulator sony, <name>, <input_format>, <timing>, <colorspace_mode>,
<output_format>, <output_sync>, <serial_port>, <emulator_output_delay>,
```

```
<emulator_input_delay>, <audio_input_delay>, <audio_output_delay>,
<video_precision (8 to 10 bits)>
```

Where:	Is:
`<name>`	The name for the emulator.
`<input_format>`	The video input format. For a list of the video formats supported by your workstation, see Video on page 81.
`<timing>`	The video resolution and timing of the VTR to be emulated.
`<colorspace_mode>`	The colourspace mode for video transfers.
`<output_format>`	The video output format. For a list of the video formats supported by your workstation, see Video on page 81.
`<output_sync>`	The source used to synchronize the video output. By default, this value is set to *Autodetect*.
`<serial_port>`	The serial port to which the VTR control cable is connected.
`<emulator_output_delay>`	The video output delay used by the emulator in frames.
`<emulator_input_delay>`	The video input delay used by the emulator in frames.
`<audio_input_delay>`	The audio input delay used by the emulator in frames.
`<audio_output_delay>`	The audio output delay used by the emulator in frames.
`<video_precision>`	The interface precision used for video transfers.

Examples of use

```
Emulator sony, NTSC, SERIAL1, NTSC, YCBCR_RGB_CONVERSION, SERIAL1, HOUSE,
AJA:0:1,-5, 1, 0.00, 0.00, 8
```

```
Emulator sony, HSDL 1499 sf, SERIALDUAL, 2048x1556_1499SF, NO_CONVERSION,
SERIALDUAL, STANDALONE, AJA:0:1, -6, 1, 0.00, 0.00, 10
```

Audiodevice

The `Audiodevice` keyword initialises the specified audio device.

The Audiodevice keyword uses the following syntax

```
AudioDevice <type>
```

where `<type>` can only be `AJA`.

`AJA` specifies that the audio subsystem is part of the AJA audio/video I/O device, respectively. Note that for the audio to work, the `Video` keyword must be configured with the corresponding video device.

Example of use

```
Audiodevice AJA
```

ClipMgtDevice

The `ClipMgtDevice` keyword defines the devices used for archiving.

The following archiving devices are supported:

- VTR
- HDCAM
- Tape (SAIT and DTF2 fibre archiving devices only)
- File

You can set multiple archiving devices for use with the application. The first device that is defined will be the default device.

ClipMgtDevice Vtr

You can specify only one VTR for a VTR clip management device. The `ClipMgtDevice Vtr` keyword contains an optional start timecode parameter:

- If you specify a default start timecode for VTR archiving, the specified timecode is always used. You cannot override the default start timecode using the Archive menu.
- If you want to determine through the application the start timecode for archives created with a VTR, do not add the start timecode parameter.

The ClipMgtDevice Vtr keyword uses the following syntax

```
ClipMgtDevice Vtr[, <timecode>]
```

where `<timecode>` is an optional start timecode for the archive.

Example of use

```
ClipMgtDevice Vtr, 01:00:00:00
```

ClipMgtDevice HDCAM

To archive to a Sony HDCAM VTR, you must use the `ClipMgtDevice HDCAM` keyword and not the `ClipMgtDevice Vtr` keyword. `The ClipMgtDevice HDCAM` keyword adjusts the metadata encoding mechanism to account for the compression method used by the HDCAM VTR.

The `ClipMgtDevice HDCAM` keyword contains an optional start timecode parameter:

- If you specify a default start timecode for HDCAM VTR archiving, the specified timecode is always used. You cannot override the default start timecode using the Archive menu.
- If you want to determine through the application the start timecode for archives created with an HDCAM VTR, do not add the start timecode parameter.

The ClipMgtDevice HDCAM keyword uses the following syntax

```
ClipMgtDevice HDCAM[, <timecode>]
```

where `<timecode>` is an optional start timecode for the archive.

Example of use

```
ClipMgtDevice HDCAM, 01:00:00:00
```

ClipMgtDevice Tape

You can specify several tape devices for clip management. SCSI tape archiving devices are not supported. Use only fibre channel archiving devices, specifically, SAIT and DTF2 devices.

To use a tape device for archiving, you must define the filename, the block size, and the name for the device you are using.

The ClipMgtDevice Tape keyword uses the following syntax

```
ClipMgtDevice Tape, <file_name>, [<block_size>, [<device_name>
```

Where:	Is:
`<file_name>`	The filename of the fixed block size device.
`<block_size>`	The amount of data per block written to tape.
`<device_name>`	The name of the tape device as it will appear in the Archive menu.

Examples of use

Tape Device	Keyword Example
DTF2	`ClipMgtDevice Tape, /dev/st0, 65536, DTF2`
SAIT	`ClipMgtDevice Tape, /dev/st0, 65536, SAIT`

ClipMgtDevice File

You can define a portion of your system disk or another volume as the destination for archives created using the application.

The ClipMgtDevice File keyword uses the following syntax

```
ClipMgtDevice File, <file_name>, <size>
```

Where:	Is:
`<file_name>`	The path for archives created using the application.
`<size>`	The maximum size for a file archive in MB.

You can also modify the parameters of this keyword through the application.

- You can use a path other than the default filename by entering one in the Archive menu.
- You can change the default maximum size of a file archive in the Archive menu in the application.

Example of use

```
ClipMgtDevice File, /var/tmp/archive, 1024
```

MaxLibrarySize

The `MaxLibrarySize` keyword indicates the maximum size for any single clip library, in megabytes. The higher the value, the more memory the application uses. Using a larger value reduces memory fragmentation, which optimizes memory use. However, the value should not be so high as to compromise system performance.

The software also uses this keyword to determine whether there is enough free hard drive space available at start-up. To start the software, you must have at least 10 megabytes of free hard drive space in addition to the value set by this keyword.

The size of your libraries can be determined using the following command in a terminal:

```
ls -lh /usr/discreet/clip/*/*/*.000.clib
```

The MaxLibrarySize keyword uses the following syntax

```
MaxLibrarySize <size>
```

where `<size>` is the maximum library size in megabytes.

Example of use

```
MaxLibrarySize 75
```

ArchiveLibrary

The `ArchiveLibrary` keyword identifies the directory to which online HTML and ASCII tables of contents are saved when archiving. Its default value is *usr/discreet/archive*.

You can make the target directory relative to the home directory of the application by prefixing the path with a tilde (e.g. *~/archive*).

NOTE The `ArchiveLibrary` keyword of the project configuration file, if set, has precedence over the one in the software initialisation configuration file.

The ArchiveLibrary keyword uses the following syntax

```
ArchiveLibrary <directory_path>
```

where `<directory_path>` is the path to which online HTML and ASCII tables of contents are saved.

Example of use

```
ArchiveLibrary /usr/discreet/archive
```

SetupArchiveTape

The `SetupArchiveTape` keyword identifies the device to which setup information for an archived project is saved. A project's setups are saved as a *.tar* format archive, creating a single file that can be extracted, preserving the original directory structure.

The SetupArchiveTape keyword uses the following syntax

```
SetupArchiveTape <device_type>
```

where `<device_type>` is the path to the device where you want to save the setup archive. You can set the path to point to a tape device or use a file destination as a virtual device. If you set a file destination, you must add a filename ending with the *.tar* extension that you want to use for the setup archive.

Example of use

```
SetupArchiveTape /var/tmp/setups.tar
```

Environment Directory Pathnames

The three keywords in the Environment Directory Pathnames section specify the paths to directories for resources shared by all projects. These directory paths should not be modified.

Menu

The `Menu` keyword specifies where application menu files are stored.

Example of use

```
Menu ~/menu, menu
```

where the ~ in the directory path stands for */usr/discreet/*`<product_home>`.

Model

The `Model` keyword specifies where 3D models used by Action are stored.

Example of use

```
Model ~/dve
```

where the ~ in the directory path stands for */usr/discreet/*`<product_home>`.

HtmlTemplates

The `HtmlTemplates` keyword specifies where HTML templates used for archive online tables of contents are stored.

Example of use

```
HtmlTemplates ~/templates
```

where the ~ in the directory path stands for */usr/discreet/*`<product_home>`.

HtmlLog

The `HtmlLog` keyword allows you to specify a directory in which to write the Batch module HTML status and log.

The HtmlLog keyword uses the following syntax

```
HtmlLog <directory_path>
```

where `<directory_path>` is the destination directory.

Example of use

```
HtmlLog /usr/discreet/html
```

TextDefaultFont

The `TextDefaultFont` keyword sets the default font for the Text, Paint, and Action modules.

The TextDefaultFont keyword uses the following syntax

```
TextDefaultFont <font>
```

where `<font>` is the name of the font you want to set as the default.

Example of use

```
TextDefaultFont Discreet
```

FontDPSBase

The `FontDPSBase` keyword identifies the directory in which PostScript® fonts are stored. At initialisation, the application creates links in the */usr/discreet/font* directory that point to fonts in the directory identified by this keyword.

The FontDPSBase keyword uses the following syntax

```
FontDPSBase <directory_path>
```

where `<directory_path>` identifies the directory in which fonts are stored.

Example of use

```
FontDPSBase /usr/lib/X11/fonts/Type1
```

If you do not specify the directory pathname, the application uses */usr/lib/DPS/outline/base*. In most cases this directory—created when you installed the Display PostScript software as part of the installation—should be the one identified by the `FontDPSBase` keyword. Using this directory provides access to PostScript fonts.

NOTE To use TrueType fonts with the application, copy these fonts into the */usr/discreet/font* directory. For the application to recognize TrueType fonts in this directory, they must have the *.ttf* extension.

FontDPSAFM

The `FontDPSAFM` keyword identifies the directory in which font metrics are stored. Font metrics provide information about each font that improves kerning. At initialisation, the application creates links in the directory */usr/discreet/font* that point to font metric files in the directory identified by this keyword.

The FontDPSAFM keyword uses the following syntax

```
FontDPSAFM <directory_path>
```

where `<directory_path>` identifies the directory in which font metrics are stored.

Example of use

```
FontDPSAFM /usr/lib/X11/fonts/Type1
```

If you do not specify a directory pathname, the application uses */usr/lib/DPS/AFM*. In most cases this directory—created when you installed the Display PostScript software as part of the installation—should be the one identified by the `FontDPSAFM` keyword.

FontProxyLowString

The `FontProxyLowString` keyword, along with the `FontProxyHighString` keword, specifies which characters to draw in font proxies. By default, the proxy string is “Aa”. You can override the default string for non-extended character sets by uncommenting and editing the `FontProxyLowString` keyword option.

Both `FontProxyLowString` and `FontProxyHighString` keyword options can be uncommented at the same time. Extended character sets try the `FontProxyHighString` keyword first. If the values in the `FontProxyHighString` keyword option do not apply to the font, the `FontProxyLowString` keyword option is used instead.

The FontProxyLowString keyword uses the following syntax

```
FontProxyLowString <code>[, ...]
```

Where:	Is:
`<code>`	The Unicode value associated with the character that you want to display.
`...`	Up to four (for a total of five) more Unicode values for the font proxy string.

Example of use

```
FontProxyLowString 0x41, 0x61
```

This example displays the default proxy string, “Aa”.

FontProxyHighString

The `FontProxyHighString` keyword, along with the `FontProxyLowString` keword, specifies which characters to draw in font proxies. By default, the proxy string is “Aa”. If a font includes glyph definitions for extended character sets (such as Asian character sets), you can set a proxy string by uncommenting and editing the `FontProxyHighString` keyword.

Both `FontProxyHighString` and `FontProxyLowString` keyword options can be uncommented at the same time. Extended character sets try the FontProxyHighString keyword first. If the values in the `FontProxyHighString` keyword option do not apply to the font, the `FontProxyLowString` keyword option is used instead.

The FontProxyHighString keyword uses the following syntax

```
FontProxyHighString <code>[, ...]
```

Where:	Is:
`<code>`	The Unicode value associated with the character that you want to display.
`...`	Up to four (for a total of five) more Unicode values for the font proxy string.

Example of use

```
FontProxyHighString 0x3042, 0x30a2
```

This example displays the Japanese “Hiragana A” and “Katakana A” characters.

TextFileEncoding

The `TextFileEncoding` keyword is the list of file encodings that will be supported for importing text files. The encoding must be supported for “iconv”. To get the list of supported encodings, type **`iconv -l`** in a terminal.

NOTE The current local encoding and UCS-2 unicode encoding are always included by default.

The TextFileEncoding keyword uses the following syntax

```
TextFileEncoding <character_set>
```

Examples of use

```
TextFileEncoding ISO8859-1
TextFileEncoding EUCJP
```

Image File Extensions

This list defines the supported image and movie file formats that the application can input or output. These extensions are used to filter files of the corresponding format when you use the file browser. This list may be edited to suit your particular needs.

Image Format	Extension
Alias®	als
Cineon®	cin
Digital Picture Exchange	dpx
Jpeg	jpg
Pict	pict
Pixar	picio
Sgi®	sgi
Softimage®	pic
Targa®	tga
Maya®	iff
Tiff	tif
Wavefront®	rla
Photoshop®	psd
OpenEXR	exr
REDCODE RAW	r3d
Quicktime®	mov
MXF	mxf
MPEG-4	mp4

Audio File Extensions

This list defines the supported audio file formats that the application can input or output. The extensions are used to filter files of the corresponding format when you use the file browser. This list may be edited to suit your particular needs.

Audio Format	Extension
AIFF (standard)	aiff
AIFFC (extended)	aifc
Sun	au
Microsoft®	wav

Audio Format	Extension
Berkeley (BSD)	bsf
AVR (Audio Visual Research)	avr
MPEG-1 Layer3	mp3

WiretapCentralUrl

The `WiretapCentralUrl` keyword sets the URL that opens in the default Web browser when you click the WiretapCentral button in the Import Image menu of the application.

The `WiretapCentralUrl` keyword points to the WiretapCentral Web server on the local machine by default.

You only need to modify this keyword if you relocated the WiretapCentral server to another system in your network.

The WiretapCentralUrl keyword uses the following syntax

```
WiretapCentralUrl <url>
```

where `<url>` represents the URL of the WiretapCentral Web server.

Example of use

```
WiretapCentralUrl http://localhost/wiretapcentral/
```

DefaultWebBrowser

The `DefaultWebBrowser` keyword identifies the Web browser used by the application to browse the Help, open WiretapCentral, and view HTML tables of contents for archives.

The DefaultWebBrowser keyword uses the following syntax

```
DefaultWebBrowser <browser>
```

where `<browser>` identifies the Web browser you want to use.

Example of use

```
DefaultWebBrowser firefox
```

BackburnerManagerHostname

The `BackburnerManagerHostname` keyword serves two functions:

- It locates the Backburner Manager on your rendering network. Enable this keyword if you are running an Autodesk Backburner background processing network in your facility or will be using Cleaner® XL to encode jobs exported from the application. All four BackburnerManager keywords must be set correctly for jobs to be sent to the rendering network.
- It enables the Background Wire® and Background Proxies buttons in the application; they are otherwise greyed out. Uncomment the `BackburnerManagerHostName` keyword to enable the buttons.

The BackburnerManagerHostname keyword uses the following syntax

```
BackburnerManagerHostname <host_name>
```

where <host_name> is the hostname of the Windows® workstation that is running Backburner Manager.

Example of use

```
BackburnerManagerHostname titan.saturn.com
```

BackburnerManagerPriority

The BackburnerManagerPriority keyword sets the priority for jobs created on your application for Backburner Manager on your rendering network. Enable this keyword if you are running an Autodesk Backburner background processing network in your facility or will be using Cleaner XL to encode jobs exported from the application. All four BackburnerManager keywords must be set correctly for jobs to be sent to the rendering network.

The BackburnerManagerPriority keyword uses the following syntax

```
BackburnerManagerPriority <priority>
```

where <priority> is a value from 0 to 100, where 0 is highest priority and 100 is lowest. The default is 50.

Example of use

```
BackburnerManagerPriority 25
```

BackburnerManagerGroup

The BackburnerManagerGroup keyword defines the group of machines to which jobs created in your software application will be submitted. Enable this keyword if you are running an Autodesk Backburner background processing network in your facility or will be using Cleaner XL to encode jobs exported from the application. All four BackburnerManager keywords must be set correctly for jobs to be sent to the rendering network.

The BackburnerManagerGroup keyword uses the following syntax

```
BackburnerManagerGroup <group_name>
```

where <group_name> is the name of a group of computers on an Autodesk® Burn® rendering network.

Example of use

```
BackburnerManagerGroup renderfarm1
```

BackburnerManagerGroupCapability

The BackburnerManagerGroupCapability keyword specifies whether the nodes in your rendering network are equipped with GPU-accelerated graphics cards or not. Based on the value of this keyword, the Visual Effects and Finishing application enables or disables the submission of jobs that require a GPU (such as floating point jobs) to the rendering network.

The BackburnerManagerGroupCapability keyword uses the following syntax

```
BackburnerManagerGroupCapability <group_capability>
```

where <group_capability> can be *software*, *gpu*, or *hybrid* depending on the hardware of the nodes in the rendering network.

- If none of the nodes in your rendering network are equipped with GPUs, set the value of the keyword to *software*. The application does not send jobs that require a GPU to the rendering network, but only jobs that can be rendered in software mode (using OSMesa) by the render nodes.

- If ALL the nodes in your rendering network are equipped with GPUs, set the value of the keyword to *gpu*. The application sends all jobs to the GPU-equipped nodes, even if some jobs do not specifically require a GPU render node. The GPU-equipped render nodes will render jobs that require a GPU, as well as OSMesa jobs.

  NOTE If your rendering network also contains render nodes without a GPU, but the `BackburnerManagerGroupCapability` keyword is incorrectly set to *gpu*, all jobs are sent only to GPU-equipped render nodes, and the nodes without a GPU are never used.

- If your rendering network contains a mix of nodes with GPUs and without GPUs, set the keyword to *hybrid*. The application sends all jobs to the rendering network, and Backburner Manager distributes each job to the appropriate type of render node. Jobs that require a GPU are sent only to GPU-equipped render nodes, while jobs that do not require a GPU are sent to any available render node (GPU or non-GPU) to be rendered in software mode.

  NOTE Set the BackburnerManagerGroupCapability keyword to *gpu* or *hybrid* only if you are sure that at least one node in your rendering network is equipped with a GPU. Attempting to submit a job that requires a GPU to a rendering network with no GPU-equipped render node results in the job being stuck in the rendering queue indefinitely.

Example of use

```
BackburnerManagerGroupCapability software
```

CleanerDestinationPath

The `CleanerDestinationPath` keyword sets the default path on a Windows workstation where clips are saved after encoding by Cleaner XL.

The default path you enter appears in the Cleaner Destination Path field when you select Cleaner in the Format Box of the Image Export menu. You can edit the path there. If there is an ftp path in the output profile, the ftp path is used as an additional destination for encoded jobs. See your application help.

The CleanerDestinationPath keyword uses the following syntax

```
CleanerDestinationPath <path>
```

By default, `<path>` is set to *C:\Tmp*, which is the default file path where Cleaner XL saves exported clips after encoding.

NOTE Make sure the folder to which the path points exists and is accessible from the Windows workstation where Cleaner XL jobs will be encoded. Also make sure that this folder has write privileges and has enough space to accommodate encoded jobs.

Example of use

```
CleanerDestinationPath C:\Cleaner\exported
```

LogDailyReports

The `LogDailyReports` keyword specifies the number of application log files that are kept. When the number of application log files on the workstation exceeds this value, the oldest log is deleted to preserve space.

The LogDailyReports keyword uses the following syntax

```
LogDailyReports <number>
```

where <number> is the number of log files to be kept on the workstation. Set this value to 0 to keep all application log files.

Example of use

```
LogDailyReports 10
```

NetworkPanelDisplay

The NetworkPanelDisplay keyword filters the list of framestores in the Network panel to show framestores that are either available on the network and mounted, or available on the network but with undetermined mount status.

The NetworkPanelDisplay keyword uses the following syntax

```
NetworkPanelDisplay <filter_setting>
```

where <filter_setting> is set to either ShowMounted or ShowAll.

Use:	To:
ShowMounted	Show only framestores verified as both mounted and available on the Wire network.
ShowAll	Show all framestores available on the network without first checking whether they are mounted. Using this option slightly reduces the time needed for your application to start because no further checks are performed on remote framestores.

Example of use

```
NetworkPanelDisplay ShowMounted
```

Project Configuration File Keywords

This section describes the keywords used in project configuration files.

Framerate

The Framerate keyword sets the default framerate for the project work session.

The Framerate keyword uses the following syntax

```
Framerate <frame_rate>
```

where <frame_rate> is 23.976, 24, 25, 29.97, 30, 50, 59.94 or 60 frames per second.

Example of use

```
Framerate 29.97
```

Timecode

The Timecode keyword sets the default timecode format used by the project.

The Timecode keyword uses the following syntax

```
Timecode <format>[, DF]
```

Where:	Is:
`<format>`	One of the following timecode formats: 23.976, 24, 25, 29.97, 30, 50, 59.94, or 60.
`DF`	An optional parameter indicating drop-frame timecode for 29.97 or 59.94 fps timecode formats.

Examples of use

Timecode Format	Keyword Example
30 fps	`Timecode 30`
29.97 fps (drop frame)	`Timecode 29.97, DF`

ColourSpace

The `ColourSpace` keyword defines how RGB/YUV conversions are handled. By default, for NTSC or PAL projects, the ITU-R BT.601-5 colour space is used. For DTV projects, the ITU-R BT.709-3 colour space is used.

The ColourSpace keyword uses the following syntax

```
ColourSpace <space_type>
```

where `<space_type>` is the colour space type used by the project.

Examples of use

Project	Keyword Example
NTSC and PAL standard projects (ITU-R BT.601-5)	`ColourSpace 601`
DTV standard projects (ITU-R BT.709-3)	`ColourSpace 709`
1920x1035 projects (SMPTE-240M)	`ColourSpace 240`

Hires

The `Hires` keyword sets the refresh rate of the graphics monitor. Note the following when setting the refresh rate:

- The rate is measured in Hertz (Hz).
- When using the video card in conjunction with an external sync source, the refresh rate should match the framerate.
- If you are using a non-integer framerate (for example, 29.97), set the refresh rate to the nearest integer (in the previous example, 30).

The Hires keyword uses the following syntax

```
Hires [Custom,]<refresh_rate>
```

Where:	Is:
`Custom`	An optional parameter that overrides the application's refresh rate. For example, you may choose to override the 60-Hz refresh rate for an NTSC project by using the Custom option with a value of 30Hz.

Where:	Is:
`<refresh_rate>`	The refresh rate of the graphics monitor. Append Hz for free-running configurations, Hzf for configurations that are fixed to an external sync source.

Examples of use

Project Resolution	Keyword Example
NTSC	`Hires 60Hz`
PAL	`Hires 50Hz`
NTSC (external sync source)	`Hires 30Hzf`
PAL (external sync source)	`Hires 25Hzf`
Film	`Hires 48Hz`
24p Multi-Master Editing™	`Hires 60Hz`
Custom	`Hires Custom, 30Hz`

VideoPreviewWindow

The `VideoPreviewWindow` keyword is used when using a Miranda DVI-Ramp device. It locates a preview device that has a matching size and refresh rate in the `VideoPreviewDevice` list specified in the *init.cfg* configuration file. When you start the application or switch to another project from the application, the graphics-to-video display is mapped to the appropriate device according to the width, height, and refresh rate specified with this keyword.

The VideoPreviewWindow keyword uses the following syntax

```
VideoPreviewWindow <xsize>, <ysize>, <refresh_rate>
```

Where:	Is:
`<xsize>, <ysize>`	The horizontal and vertical size of the area of the image window output to the graphics-to-video display.
`<refresh_rate>`	The refresh rate of the output.

Example of use

```
VideoPreviewWindow 720, 486, 30
```

ArchiveLibrary

Online HTML and ASCII tables of contents will be saved to the filesystem. You can specify the destination directory by setting this keyword. Its default value is */usr/discreet/archive*. You can make the target directory relative to the project directory by prefixing the path with a tilde (e.g. *~/archive*).

NOTE This keyword, if set, will take precedence over the `ArchiveLibrary` keyword in the *init.cfg* file.

The ArchiveLibrary keyword uses the following syntax

```
ArchiveLibrary <directory_path>
```

where <directory_path> is the path to which online HTML and ASCII tables of contents are saved.

Example of use

```
ArchiveLibrary /usr/discreet/archive
```

Environment Directory

Environment directory keywords specify the paths to directories containing resources for all projects. For example, the LUTs that Autodesk provides are located in the directory */usr/discreet/*<product_home>*/lut*. You can place resource files in these directories that you want to be able to share between projects more easily.

Not all directories are relevant to the application. However, the inclusion of directories pertaining to other Visual Effects and Finishing products allows for cross-product project compatibility.

The ~ in the following table stands for */usr/discreet/*<product_home>.

Resource	Path	Resource File Extension
Action	*~/action*	.action
Audio	*~/audio*	.audio
AudioDesk	*~/audio*	.audiodesk
Audio ImpExp	*~/audio*	.aiff
AutoMatte	*~/automatte*	.automatte
AutoPaint	*~/paint/autopaint*	.auto
Average	*~/average*	.average
Axis	*~/axis*	.dve
Batch	*~/batch*	.batch
BatchClip	*~/batchclip*	.clip
Blur	*~/blur*	.blur
Burnin	*~/burnin*	.burnin
ColourCurves	*~/ccurves*	.ccurves
ColourFrame	*~/colourframe*	.col
Colour Warper	*~/colourwarper*	.cw
Composite	*~/composite*	.composite
Compound	*~/compound*	.compound
Correct	*~/correct*	.correct
Cutout	*~/paint/cutout*	.sgi
Deal	*~/deal*	.deal

Resource	Path	Resource File Extension
DeGrain	*~/degrain*	`.degrain`
DeInterlace	*~/deinterlace*	`.deinterlace`
Desktop	*~/desktop*	`.desk`
Difference	*~/difference*	`.diff`
Dissolve	*~/dissolve*	`.dissolve`
Distort	*~/distort*	`.distort`
Documentation	*~/documentation*	`.pdf`
DVE	*~/dve*	`.dve`
Edge	*~/edge*	`.edge`
EDL	*~/edl*	`.edl`
Export	*~/export*	`.export`
ExprUserFun	*~/expressions/userfun*	`.expressions`
FieldMerge	*~/fieldmerge*	`.fieldmerge`
Filter	*~/filter*	`.filter`
FilmCompress	*~/filmcompress*	`.compress`
FilmExpand	*~/filmexpand*	`.expand`
Flip	*~/flip*	`.flip`
Geometry (Paint)	*~/paint/geometry*	`.geom`
GMask	*~/gmask*	`.GMask`
Guides	*~/guides*	`.guide`
Histo2d	*~/histo2d*	`.histo2d`
HotKey	*~/hotkey*	`.hotkey`
Image	*~/images*	See Image File Extensions on page 94.
Import	*~/import*	`.import`
Interlace	*~/interlace*	`.interlace`
Key	*~/key*	`.key`
Keyer3d	*~/keyer3d*	`.key3d`
LensDistort	*~/lensDistort*	`.lensDistort`
Letterbox	*~/letterbox*	`.letterbox`

Resource	Path	Resource File Extension
LogicOp	*~/logicop*	`.logicop`
Lumkey	*~/lumkey*	`.lumkey`
Lut	*~/lut*	`.lut`
Mask (Paint)	*~/paint/mask*	`.sgi`
MasterKeyer	*~/masterkeyer*	`.mkeyer`
Mix	*~/mix*	`.mix`
Moncal	*~/monitor*	`.monitor`
ModularKeyer	*~/modularKeyer*	`.modularKeyer`
Mono	*~/mono*	`.mono`
Morf	*~/morf*	`.morf`
MotionAnalyse	*~/motionAnalyse*	`.motionAnalyse`
MotionBlur	*~/motionBlur*	`.motionBlur`
NormalMap	*~/normalmap*	`.normalmap`
Note	*~/note*	`.note`
Omf®	*~/images*	`.omf`
Optics	*~/optics*	`.optics`
Output	*~/output*	`.output`
Paint	*~/paint*	`.paintnode.xml`
Picture	*~/paint/picture*	`.sgi`
Play	*~/play*	N/A
Posterize	*~/posterize*	`.posterize`
Pulldown	*~/pulldown*	`.pulldown`
QComp	*~/quickcomp*	`.qcomp`
ReGrain	*~/regrain*	`.regrain`
Repeat	*~/repeat*	`.repeat`
Resize	*~/resize*	`.resize`
Restore	*~/filmrestore*	`.restore`
Spark	*~/sparks*	`.spark`
Stabilizer	*~/stabilizer*	`.stabilizer`

Resource	Path	Resource File Extension
Text	*~/text*	`.ttg`
Timewarp	*~/timewarp*	`.timewarp`
VectorViewer	*~/vectorViewer*	`.vectorViewer`
Wipe	*~/wipe*	`.wipe`

Application Command Line Start-up Options

13

Topics in this chapter:

- Overview on page 105
- Media Storage-Related Start-up Options on page 106
- Project Management-Related Start-up Options on page 106
- Miscellaneous Start-up Options on page 107

Overview

There are a number of options you can use with the application start-up command under special circumstances.

NOTE More than one start-up option can be specified on the command line. These start-up options are case-sensitive.

To start the application using a command line option, open a terminal and type:

```
<application_name> -<option>
```

For example, **`smoke -H`**.

To see a list of all start-up options, use the **`-H`** option.

NOTE Running the application start-up command with the **`-H`** option does not launch the application.

Media Storage-Related Start-up Options

The following table lists the start-up options that enable you to initialize the storage, delete clips from a project, or troubleshoot missing frames.

Type:	To:
-v	Initialise the media storage volume (all projects). **WARNING** When you use the **-v** option, all data on the storage is deleted, with no possibility of recovery. **NOTE** Initialising the storage also removes all audio clips from the project.
-H	Specify the remote host name.
-V	Specify the media storage name.
-i	Remove all clips from the project.
-r	Initialise only the Desktop or Edit Desk for the selected project.
--red-frames	Activate repair mode. This option enables *vic* to search the media library and replace missing frame ids with a LOST frame label. In the library, the names of impacted clips appear red. When these clips are loaded into the record timeline, the names of the affected segments also appear red. Lost frames are displayed with the LOST label over them. The flag set on clips is not permanent, so resaving the clip will remove the red from the names.

Project Management-Related Start-up Options

The following table lists the start-up options that enable you to specify a custom application configuration file, as well as choose the default user and project the application starts with.

Type:	To:
-c <filename.cfg>	Use a configuration file other than the default, where <filename.cfg> is the name of the file. The specified file supersedes the default configuration file. If you do not use this option, the application looks first for *init.cfg*, and if that is not found, it looks for *flame.cfg*, *inferno.cfg*, *smoke.cfg*, or *conform.cfg*.
-J <project>	Define the project that appears in the Project Management menu when you start the application, where <project> is the name of the project you want to use. If you start the application with both the **-J** and **-U** options, the application bypasses the Project Management menu.
-U <user>	Define the user that appears in the Project Management menu when you start the application, where <user> is the name of the user you want to use. If you start the application with both the **-J** and **-U** options, the application bypasses the Project Management menu.

Miscellaneous Start-up Options

The following table lists start-up options that enable you to install new fonts, handling log files, managing the amount of memory and number of CPU cores used by the application.

Type:	To:
-F	Force the application to install new fonts that you added to the */usr/lib/DPS/outline/base* directory (and the */usr/lib/DPS/AFM* directory, if you have also installed the corresponding font metric file). See the application help.
-B	Prevent the broadcast monitor from blanking when an image viewer or Player is not displayed. The broadcast monitor then displays the screen content that is displayed in the corresponding region. **NOTE** This option is hardware dependent and may not work on all hardware configurations.
-L	Disable writing to the *.log* file. The application keeps a log of your actions in a text file (*.log*) in your application home directory. This file is usually cleared and recreated every time the application starts. (Note that the log file is useful when reporting problems to Autodesk Customer Support.)
-l	Append the current session to the existing log file. (See description of the log file above.)
-M	Define the amount of memory assigned to frame buffering. This option overrides the default settings, or if it has been uncommented, the value set by the MemoryApplication keyword in the *init.cfg* file.
-p <n>	On multi-processor machines, start the application using less than the full array of processors, where <n> is the number of processors to be used. Normally, the application uses all available processors.
-f <filename>	Use a custom menu file, where <filename> is the name of the menu file. For information on custom menus, see the application help.
-J <project> **-U** <user> **-b** <batch_setup>**-N**	Launch the application and specify a Batch setup to render. The application launches, renders the setup, and exits. **NOTE** Use the **-N** option only if you want to use Burn for rendering. **WARNING** To avoid corrupting the render, which uses the graphics hardware, you should not use the graphics console of the system (such as command shells) while the render is taking place.
-Z	Starts the application, and skips the integrity check.

Troubleshooting

14

Topics in this chapter:

- General Application Troubleshooting Procedures on page 109
- Troubleshooting Filesystem Problems on page 110
- Troubleshooting Wire Network Problems on page 117

General Application Troubleshooting Procedures

Forcing an Application to Exit

If a Visual Effects and Finishing application hangs but you can still interact with the operating system, you can terminate it using either a custom command alias for your application, or the generic Linux **`kill`** command in conjunction with the application's process ID.

WARNING These procedures should only be used if the application is hung or otherwise not responding. Killing processes indiscriminately can cause system problems. Under normal conditions, you should use the normal exit procedures described in the application help.

Killing All Application-Related Processes

When yous install a Visual Effects and Finishing application, a special command alias is defined that can be used to kill all Visual Effects and Finishing application processes at once.

To kill all application-related processes:

1. Open a terminal, and type one of the following commands:
2. **`kf`** to kill Flame, Flint or Flare

ks to kill Smoke

ki to exit Inferno

kc to kill Backdraft Conform

3 To verify that all application-related processes have been killed, type:

```
ps -fu <application account name>
```

This command displays information about all active processes, including the application with which each process is associated, and a process ID number. If all application processes have been successfully killed, this command should return no results.

WARNING Never restart an application if there are still processes left over from a previous session. If some processes persist after using the kill alias, perform the following procedure to kill them individually.

Killing Processes Individually

Use the **kill** Linux command to kill processes individually, using their process ID number.

To kill processes individually:

1 Press **Alt+F3** to send the application to the background.

2 Open a terminal and type:

```
ps -fu <application account name>
```

This command displays information about all active processes, including the application with which each process is associated, and a process ID number.

3 Determine the process ID number of the Visual Effects and Finishing application.

4 At the command line, type:

```
kill <process number>
```

where `<process number>` is the process number you determined in the previous step. This command terminates the Visual Effects and Finishing process that is currently executing.

NOTE There may be more than one Visual Effects and Finishing process running at any time. For example, there may be one process per CPU, plus some additional processes to manage the framestore. Kill each of these processes.

5 Restart the application.

Troubleshooting Filesystem Problems

This section describes some common filesystem problems and steps you can take to solve them.

When troubleshooting storage or wire issues, you should always start by verifying that Stone and Wire processes are running properly, and by checking the log files.

Verifying that Stone and Wire Processes Are Running

There are five processes that must be running for Stone and Wire to work:

- *sw_serverd*

- *sw_probed*
- *sw_dbd*
- *sw_bwmgr*
- *ifffsWiretapServer*. This process is started by the *sw_wiretapd* script.

To verify that Stone and Wire processes are running:

1. Type the following command:

   `ps -ef | grep sw_`

   This command should return several lines similar to the following:

   ```
   root 9447 1 0 Feb25 0:00:35 /usr/discreet/sw/sw_probed --daemonize
   root 9455 1 0 Feb25 0:00:35 /usr/discreet/sw/sw_dbd -d
   root 9463 1 0 Feb25 0:08:11 /usr/discreet/sw/sw_bwmgr -d
   root 9472 1 0 Feb25 0:08:11 /usr/discreet/sw/sw_serverd -d
   root 9513 1 0 Feb25 0:00:00 /bin/sh /usr/discreet/sw/sw_wiretapd
   ```

2. To verify that the *ifffsWiretapServer* process is running, type:

   `ps -ef | grep Wire`

   The command should return a line similar to the following:

   ```
   root 9522 9513 0 Feb25 00:03:29
   /usr/discreet/wiretap/2010/ifffsWiretapServer -c
   /usr/discreet/wiretap/cfg/wiretapd.cfg
   ```

3. If Stone and Wire processes are not running, start them.

Starting Stone and Wire Processes

All Stone and Wire processes should start when you restart your system. If they are not running, check that they are configured to run and then restart Stone and Wire. To start Stone and Wire processes, you must modify a text file listing of all processes.

To start Stone and Wire processes:

1. Use a text editor to open the Stone and Wire configuration file */etc/sysconfig/stone+wire*.

   The file should include the following:

   ```
   dl_stone=on
   dl_wire=on
   dl_wiretap=on
   dl_vic=on
   ```

   If any of the processes you need are set to “off”, change them to “on” and then restart Stone and Wire.

2. To restart Stone and Wire, type:

   `/usr/discreet/sw/sw_restart`

   If any Stone and Wire process is still not running, check the error logs.

Checking Stone and Wire Error Logs

Every Stone and Wire process has a log file. You can find these log files at */usr/discreet/sw/log*.

The current log file is named `<process>`.log, where `<process>` is the name of the Stone and Wire process or daemon. The next time Stone and Wire creates a log file for the process, it renames the previous log file by adding a number to the file name.

For example, the *sw_served* process log file is named *sw_served.log*. The next time the process is launched, the first log file is renamed to *sw_served.log.1*. Each time Stone and Wire creates a new log file, the old log file is renamed by incrementing the number that appears at the end of the filename.

You can also use the terminal to list the most recent version of the log files. Type the following in a terminal:

```
ls -altr
```

Enabling Verbose Stone and Wire Driver Error Reporting

Use the *swr_set_debug* utility to enable verbose reporting of Stone and Wire driver errors.

When you turn on error reporting, Stone and Wire outputs error messages in the following locations:

- */var/log/messages*
- Console window

NOTE You must disable verbose error reporting after you have finished troubleshooting. The messages generated by this process can fill up the system drive.

To enable verbose Stone and Wire driver error reporting:

1. Run *swr_set_debug*. Type:

   `/usr/discreet/sw/tools/swr_set_debug` `<level>`

   where `<level>` is the number representing the verbosity of the report.

   Choose from one of the following levels:

   - **1 -** turns on error reporting. This is the default level.
   - **2 -** provides more detailed reporting. All operations and errors are logged.
   - **0 -** disables error reporting.

2. Check the terminal and the log files for error information.

Troubleshooting Missing Frames

If the application cannot find some of the frames referenced by your clips, the following error message is displayed when the application starts:

- In the terminal:

  `WARNING: <nnnn> <volume_type> frames are missing on this volume; see the application installation guide for corrective measures.`

  Where `<nnnn>` represents the number of missing frames, and `<volume_type>` can be stonefs or standardfs.

- In the application start-up screen:

```
VOLUMEMGT: WARNING: Some frames not found;see the application installation
guide for corrective measures.
```

NOTE By default, the message only appears in the terminal. To have it appear also in the start-up screen, open the *~/.cshrc* file in a text editor and add the following on a new line: setenv **DL_IC_NOTIFY_MISSING 1**. Then log out of the KDE desktop, and log back in.

The error message appears in one or both of the following situations:

- Some clips in your libraries or desktops reference missing frames on a remote volume.
- Some clips in your libraries or desktops reference local frames that no longer exist.

To identify the type of issue:

1. Open a terminal and type:

   vic -v <volume_name> **-s remote -s lost**

   where <volume_name> is the name of the affected volume, for example stonefs or standardfs.

   The output of this command should be similar to the following:

   ```
   Checking libraries for remote and lost frames...
   /usr/discreet/clip/stonefs/My_Project1/editing.000.desk has none
   /usr/discreet/clip/stonefs/My_Project1/Default.000.clib references 30
   missing frames.
   /usr/discreet/clip/stonefs/My_Project2/editing.000.desk has none
   /usr/discreet/clip/stonefs/My_Project2/from_caplan.000.clib references
   70 remote frames
   ```

2. Depending on the result of the previous command, do one of the following:
   - For clips with frames listed as missing, contact your local Autodesk support representative for help on resolving this issue.
   - For clips with frames listed as remote, perform the following procedure.

To recover remote frames:

1. Archive all clip libraries that are reported as containing remote frames. In the previous example, the fourth library (from_caplan) contains remote frames.
2. Rename the libraries you just archived, such as by adding the remote suffix to the library name.
3. Restore the clip libraries from the archive. All the frames referenced by the clips should now be stored locally.
4. Delete the original libraries.

Verifying that the Disks are Available to the Operating System

If your disks or logical drives are not visible in the output of the *sw_df* command, verify that they are visible to the operating system.

To verify that the disk/controller is available to the operating system:

1. Run the command that will provide you with a list of all the controllers or disks on your system.

```
cat /proc/scsi/scsi
```

A listing of all controllers and hard disks attached to your system appears.

2 If any controllers or hard disks in your configuration are not visible, check the connections and cabling to your storage device, and ensure that your storage hardware is running.

If you must reconnect or tighten connections to your storage hardware, it is a good idea to rescan your hardware to ensure that the operating system is able to communicate with it.

To scan your storage hardware:

1 Unload the Stone and Wire driver. Type:

```
/etc/init.d/stone+wire unload
```

2 Unload and reload the fibre channel drivers. Type one of the following sequence of commands, according to your fiber channel card model.

- If you have a QLogic™-based card, type:

```
rmmod qla2300
rmmod qla2400
rmmod qla2xxx
rmmod qla2xxx_conf
modprobe qla2xxx
modprobe qla2300
modprobe qla2400
```

- If you have an ATTO-based card, type one of the following sequences of commands:
  For HP Z800 workstations, type:

```
rmmod celerity8fc
modprobe celerity8fc
```

  For older HP workstations, type:

```
rmmod celerityfc
modprobe celerityfc
```

NOTE Depending on the storage you are running, your system might not use all of the drivers listed. If your system does not use a driver listed, the commands to unload or reload the drivers will fail. You can ignore these failures. They just indicate that the driver is not required by your system.

3 Reload the Stone and Wire driver. Type:

```
/etc/init.d/stone+wire reload
```

Your filesystem should now be mounted.

Verifying Disk Usage

You cannot write to storage partitions that are completely full.

If you receive error messages stating that the framestore is full, use the *sw_df* command to check disk usage.

To use the *sw_df* command to see if the filesystem is full:

➤ Go to the Stone and Wire directory */usr/discreet/sw* and run the *sw_df* tool:

```
./sw_df
```

This command returns the amount of free or used space on your filesystem.

If your filesystem is full or almost full, consider deleting or archiving older material from clip libraries to free disk space.

NOTE VTR archiving in Visual Effects and Finishing applications requires free space on the framestore to generate slates, test patterns, headers, and audio encoding.

You can also clear the Undo Buffer to free up space.

Clearing the Undo Buffer

The Undo Buffer takes up space on your filesystem. Consider clearing it if your filesystem is full or almost full to free disk space.

WARNING Clearing the Undo Buffer cancels any undoable operation. Consider what operations might be stored in the Undo Buffer before you clear it.

To clear the Undo Buffer:

1. Open your Visual Effects and Finishing application, and go into the Preferences menu.
2. Click Clear Buffer in the Undo section.

Solving a Framestore ID Mismatch

The framestore ID must match the filesystem ID for the workstation to mount your filesystem.

If you must change your framestore ID to ensure that all hosts on your Wire network have a unique ID.

To resolve a Framestore ID mismatch error:

1. Open the */usr/discreet/sw/cfg/sw_storage.cfg* file in a text editor.
   The *sw_storage.cfg* file includes the `[Framestore]` section, which lists the framestore `ID`.
2. Open the */usr/discreet/sw/cfg/sw_framestore_map* file in a text editor.
   The *sw_framestore_map* file includes a section similar to the following:
   ```
   [FRAMESTORES]
   FRAMESTORE=london HADDR=172.16.129.32 ID=32
   ```
   The Framestore ID value in the *sw_framestore_map* file must match the Filesystem ID value listed in the *sw_storage.cfg* file.

   NOTE If the framestore ID in the *sw_storage.cfg* file is not the same as the one in the *sw_framestore_map* file, the ID listed in *sw_storage.cfg* has priority.
3. Change the Framestore ID value in the *sw_framestore_map* file to match the Filesystem ID listed in the *sw_storage.cfg* file.

   NOTE The last sequence of numbers in the IP address defined by the HADDR keyword in the *sw_framestore_map* file does not have to match the Framestore ID. These values are often the same by default, but it is not a requirement for Stone and Wire operation.
4. Save and close the file.

5 Restart Stone and Wire. Type:

```
/usr/discreet/sw/sw_restart
```

6 If you continue to get error messages, contact Customer Support.

Solving a Partition ID Conflict

Each partition must have a different partition ID. If there are multiple partitions using the same ID, you will receive an error message.

To solve a Partition ID conflict:

1 Note the ID listed in the error message.

2 Stop Stone and Wire. Type:

```
/etc/init.d/stone+wire stop
```

3 Open the */usr/discreet/sw/cfg/stone+wire.cfg* file in a text editor.

4 Find the [PARTITION#] section, where # is the ID listed in the error message. Change the # for an unused ID.

NOTE Partition identifiers go from 0 to 7, giving a total of 8 possible partitions. Stone filesystem and standard filesystem partitions share the same pool of identifiers, but only standard filesystem ones are listed in *stone+wire.cfg*. It is recommended to start numbering standard filesystem partitions at 7, decrementing with each additional standard filesystem partition.

5 Save and close the *stone+wire.cfg* file.

6 Start Stone and Wire. Type:

```
/etc/init.d/stone+wire start
```

A message appears in the terminal indicating that Stone and Wire is restarted.

7 Start your Visual Effects and Finishing application to verify that the partition ID conflict is resolved.

Removing Invalid Frame References from the Stone and Wire Database

Stone and Wire has a database inconsistency detection mechanism. If you change the framestore ID of a Stone filesystem or standard filesystem partition in your system without reformatting the Stone and Wire database, the inconsistency check mechanism detects invalid frame references in the database, and prevents the Stone and Wire database server (*sw_dbd*) from starting.

If you receive an error message that *sw_dbd* could not be started when you start a Visual Effects and Finishing application or Stone and Wire, perform the following steps to determine if the problem is related to invalid frame references, and to remove those references from the Stone and Wire database.

To remove invalid frame references from the Stone and Wire database:

1 Open a terminal and log in as root.

2 Search the */usr/discreet/sw/log/sw_dbd.log* file for the text “Bad framestore ID”:

```
cat /usr/discreet/sw/log/sw_dbd.log | grep -i bad/ framestore/ id
```

- If the search returns one or more lines, the problem is related to invalid frame references. Perform the remaining steps in this procedure to clean up the Stone and Wire database.

- If the search returns no results, the problem is not related to invalid frame references. Read the */usr/discreet/sw/log/sw_dbd.log* file to determine the cause of the problem.

3 Stop Stone and Wire by typing:

```
/etc/init.d/stone+wire stop
```

4 Clean up the Stone and Wire database by typing:

```
/usr/discreet/sw/sw_dbd -C
```

A message is displayed in the terminal asking you to confirm the deletion of invalid entries from the database.

5 Type **Y** to confirm the operation.

Invalid entries are removed from the Stone and Wire database.

6 Restart Stone and Wire by typing:

```
/etc/init.d/stone+wire start
```

Troubleshooting Wire Network Problems

This section describes some common Wire problems and steps you can take to solve them.

Testing Wire Using *sw_framestore_dump*

Use *sw_framestore_dump* to identify the Wire hosts that are reachable from one workstation. You should do this if you are having any problems with Wire or after you configure Wire for the first time.

NOTE You must have at least two Wire hosts set up to test Wire connectivity.

To verify that you can access the framestores on other Wire hosts:

1 Type:

```
/usr/discreet/sw/tools/sw_framestore_dump
```

A list of all the available framestores appears in the terminal. Review the output and verify that all the framestores on your Wire network appear in the list.

You can also verify that each framestore on your network is using a unique framestore ID.

If:	Then:
You are unable to see other Wire hosts on your network	Check: ■ The filesystem and networking configurations in the *sw_framestore_map* file. ■ The *sw_probed.cfg* port number. ■ You may also have problems with your Wire network. Use *sw_ping* to test that you can connect to other Wire hosts. See Using sw_ping to Test Wire Communication on page 118.
You see only some of the Wire hosts (as opposed to all or none)	Check that each framestore has a unique Framestore ID.

2 Repeat this procedure on each Wire host.

Using *ping* to Test Network Communication

Try to ping your local host from a client machine. If this works, ping all other machines that should be accessible through Wire.

To use ping to test network communication:

1. Type the following command:

   ping <host_name>

2. If ping fails, try using the machine's IP address (for example, 172.16.100.23) instead of its name. Type:

   ping <IP_address>

   If this is successful, verify how the machine resolves host names on the network. You should set the order of host name resolution to first look at the local setup file, then validate on the network. The */etc/nsswitch.conf* file should include a "hosts" line that has the name validation process in the following order:

   ```
   hosts: files nis dns
   ```

Using *sw_ping* to Test Wire Communication

If you are unable to connect to a Wire host, use *sw_ping* to determine if you can connect to the other Wire host over the Wire network.

To use *sw_ping* to test Wire communication:

1. Change to the Stone and Wire directory:

   cd /usr/discreet/sw

2. Start *sw_ping*. Type:

   ./sw_ping -host <host_name> **-loop** <count> **-size** <packetsize> **-r -w**

Where:	Is:
<host_name>	The name of the host to ping.
<count>	The number of times to execute this test.
<packetsize>	The size of the read/write buffer (in bytes).

For example, type:

./sw_ping -framestore tunisia -loop 4 -size 9000000 -r -w

Results similar to the following are reported to the terminal:

```
Using Stone+Wire API 2009 [ProductSW_1166] (64 bits).
Stone+Wire TCP port set to 7000.
Ping successful to host tunisia (186)
Buffer size = 9043968
Sending data to tunisia, filesystem id 186
MB/sec: 111.460127
Ping successful.
```

```
Buffer size = 9043968
Sending data to tunisia, filesystem id 186
MB/sec: 111.509057
Ping successful.
Buffer size = 9043968
Sending data to tunisia, filesystem id 186
MB/sec: 111.500577
Ping successful.
Buffer size = 9043968
Sending data to tunisia, filesystem id 186
MB/sec: 111.516597
Ping successful.
Minimum MB/sec: 111.460127
Maximum MB/sec: 111.516597
Average MB/sec: 111.496590
```

If:	Then:
An *sw_ping* from machine 1 to machine 2 is successful and you still cannot access the remote framestore through your Visual Effects and Finishing application	Check that the remote system has exported its directories so that the local system has read/write access. See Verifying Remote Clip Library Access and Permissions on page 120.
An *sw_ping* from machine 1 to machine 2 is unsuccessful	■ Validate the *sw_framestore_map* file on both machines. ■ Check that *sw_probed* and *sw_serverd* are running on both machines.

Using *sw_ping* to Test Network Performance

Use the *sw_ping* command to test network performance. For more significant results, run the test 100 times.

To test network performance:

➤ Start *sw_ping*. Type:

/usr/discreet/sw/sw_ping -framestore <framestore_name> **-r -w -size** <packetsize> **-loop** <n>

Option:	Description:
-framestore <framestore_name>	Is the name of the framestore to ping.
-r	Reads a buffer from the remote framestore.
-w	Writes a buffer to the remote framestore (non-destructive).
-size <packetsize>	Reads/writes a buffer of packetsize bytes.
-loop <n>	Executes this test n times.

The following is an example for an NTSC (720 x 486 x 3) frame format, sent 100 times in read and write mode to framestore *my_framestore*:

```
/usr/discreet/sw/sw_ping -framestore my_framestore -read -write -size
1049760 -l 100
```

Verifying Remote Clip Library Access and Permissions

Verify that the local host has write permissions to the clip library directory of the remote host.

To verify remote clip library access and permissions:

1. Try to access the clip library directory of the remote host. Type:

   cd /hosts/<remote_machine>**/usr/discreet/clip**

2. If an error message appears on the client machine, check to see that the required network daemons are on.

3. If you have access to */hosts/<remote_machine >/usr/discreet/clip*, make sure you have root privileges to read and write to this directory.

   Type the following command:

   touch /hosts/<remote_machine>**/usr/discreet/clip/deleteme**

   If error messages appear, verify the permissions in the */etc/exports* file on the server machine. Read and write permission must be given to the hosts. The appropriate line should look similar to the following:

   /usr/discreet/clip *(rw,sync,no_root_squash

Verifying that NFS and Automounting Daemons are Running

Network File System (NFS) and automounting daemons (AMD on Linux) must be running for Wire transfers to work.

These daemons are installed and running by default. Use the following procedures to verify that these daemons are running.

To start NFS and AMD:

1. Type the following command:

   chkconfig --list | grep nfs

   chkconfig --list | grep amd

2. Verify that NFS and AMD are set to “on” for run levels 3,4, and 5.

3. If NFS or AMD is off on any of those run levels, type:

   chkconfig nfs on

   chkconfig amd on

4. Restart your network. Type:

   /etc/init.d/network restart

   You might also consider rebooting your workstation.

Checking the Status of Network Interfaces

If you continue to have problems with your network, you should verify that your network interfaces are up and running.

To check the status of your network interfaces:

➤ Check the status of your network interfaces, by typing:

ifconfig

- If your network interface is up and running, an "up" appears in the broadcast report for the interface. The report includes a line similar to the following:
  `UP BROADCAST RUNNING MULTICASTMTU:1500Metric:1`
- If your network interface is not up and running, check the connections on your network card. A green light appears when there is a good connection between your network card and its destination. If you must reconnect cables on Linux, you must restart the network interface.

To restart a network interface:

➤ Type the following command:

ifconfig <interface_name> **up**

Viewing InfiniBand Statistics

This section describes how to view port statistics for the workstation and InfiniBand switch, and how to obtain InfiniBand log files.

For more information about configuring, monitoring, and managing the InfiniBand switch and network, see the documentation provided by the manufacturer of your InfiniBand switch.

Viewing InfiniBand Information for a Workstation

The InfiniBand driver installed on your workstation provides two commands that output statistics and information about InfiniBand ports.

To review statistics and information about a port:

➤ Log in as root, and type the following commands in a terminal:

cat /proc/iba/<driver_id>**/1/port**<x>**/stats**

cat /proc/iba/<driver_id>**/1/port**<x>**/info**

where <x> is the port number on the device, and <driver_id> is the HCA driver ID for your device, for example: *mt25218*.

NOTE To find out the HCA (Host Channel Adapter) driver ID, type **ls /proc/iba/ | grep mt**. The driver number, beginning with *mt*, will be returned.

A report appears in the terminal for each command.

Generating InfiniBand Log Files for Support

The script */sbin/iba_capture* gathers information about your system and InfiniBand configurations that can be useful for troubleshooting InfiniBand issues. This script outputs a GZIP file.

To run the InfiniBand log file capture script:

➤ As root, open a terminal on your workstation and type:

```
/sbin/iba_capture <path and name of output gzip file>
```

A GZIP file is generated that includes a number of log files from your system.

NOTE The help for this command incorrectly indicates that the output is a TAR file, when it is in fact a GZIP file.

Viewing Port Statistics for a Mellanox IS5030 Switch

The Mellanox IS5030 switch is the recommended switch model for QDR InfiniBand networks. It comes with a Web-based management console that you can use to configure the switch and monitor the InfiniBand network.

When you suspect that performance is not optimal on your QDR switch, it is a good idea to view statistics for each connected port, to determine if they are running normally. The nominal speed for DDR InfiniBand connections is 5 Gbps, and the nominal speed for QDR connections is 10 Gbps.

To access the management console, your browser must be on the same subnet as the InfiniBand switch, which has a default IP address of 10.10.10.252.

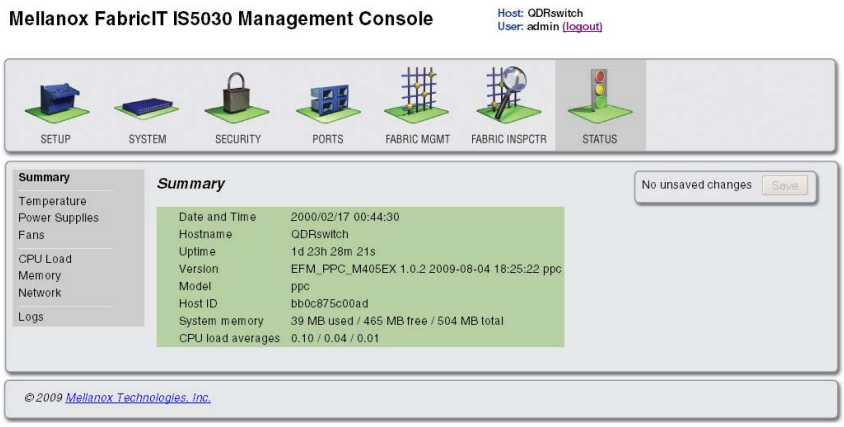
To view switch port statistics:

1. Open a Web browser and enter the IP address of the InfiniBand switch. The default IP for switches shipped from Autodesk is 10.10.10.252.

   The login page appears.

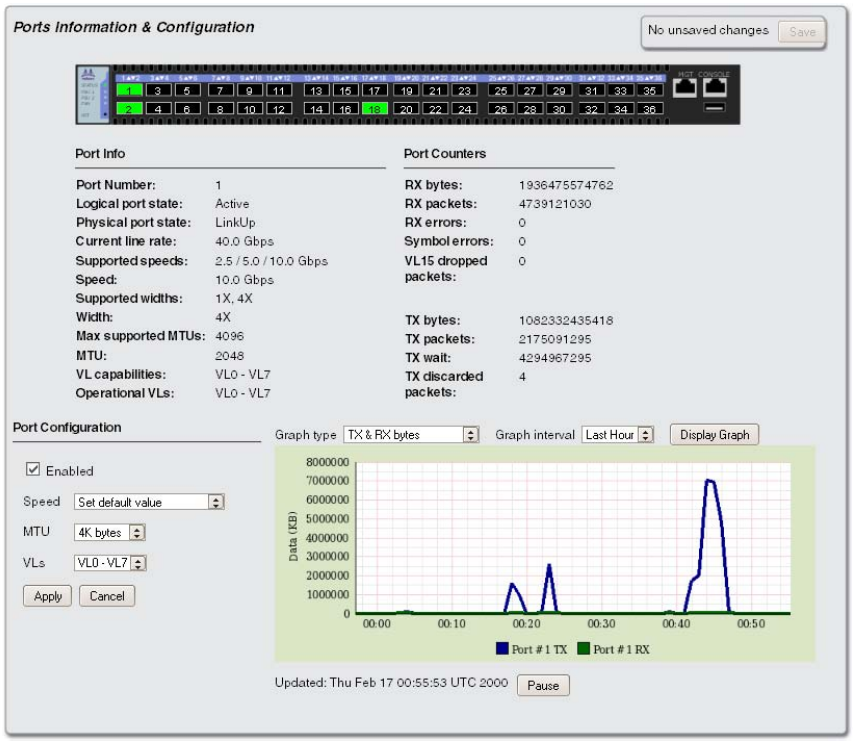
2. Enter your user name and password. The defaults are *admin* / *admin*.

   The Summary page appears.



3. Click Ports in the menu at the top.

   The Ports page appears, displaying an overview of the switch. Connected ports are displayed in green.



4 Click a port to view information and statistics on it.

NOTE If you have ports with DDR connections that appear to be running at SDR speed (2.5 Gbps instead of 5 Gbps), unplug the cable and then plug it back in. The connection should run at normal DDR speed afterwards. This issue occurs because of a bug in the switch firmware.

Viewing Port Statistics for an InfiniCon InfinIO 9024 Switch

The InfinIO 9024 InfiniBand switch is the recommended switch model for DDR InfiniBand networks.

The InfinIO switch comes with a Web-based application, the InfiniView Device Manager™, that you can use to configure, monitor, and manage the InfiniBand network.

When you suspect that performance is not optimal on your QDR switch, it is a good idea to view statistics for each connected port, to determine if they are running normally. The nominal speed for DDR InfiniBand connections is 5 Gbps.

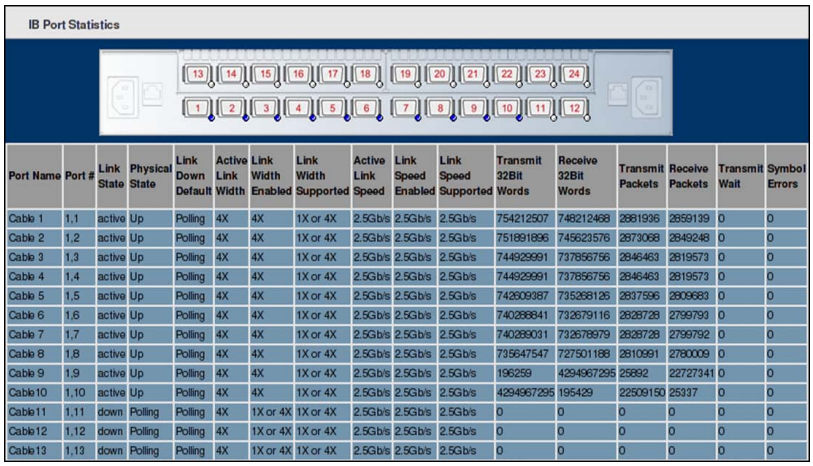
To access the Device Manager, your browser must be on the same subnet as the InfiniBand switch, which has a default IP address of 10.10.10.252.

To view switch port statistics:

1 Open a Web browser and enter the IP address of the InfiniBand switch, usually 10.10.10.252.
The main page of the Device Manager appears.

2 Click Port Stats in the menu on the left.

The IB Port Statistics page appears.



IB Port Statistics

Port Name	Port #	Link State	Physical State	Link Down Default	Active Link Width	Link Width Enabled	Link Width Supported	Active Link Speed	Link Speed Enabled	Link Speed Supported	Transmit 32Bit Words	Receive 32Bit Words	Transmit Packets	Receive Packets	Transmit Wait	Symbol Errors
Cable 1	1,1	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	754212507	748212468	2881936	2859139	0	0
Cable 2	1,2	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	751891896	745623576	2873068	2849248	0	0
Cable 3	1,3	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	744929991	737856756	2846463	2819573	0	0
Cable 4	1,4	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	744929991	737856756	2846463	2819573	0	0
Cable 5	1,5	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	742609387	735268126	2837596	2809683	0	0
Cable 6	1,6	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	740288841	732679116	2828728	2799793	0	0
Cable 7	1,7	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	740289031	732678979	2828728	2799792	0	0
Cable 8	1,8	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	735647547	727501188	2810991	2780009	0	0
Cable 9	1,9	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	196259	4294967295	25892	22727341	0	0
Cable10	1,10	active	Up	Polling	4X	4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	4294967295	195429	22509150	25337	0	0
Cable11	1,11	down	Polling	Polling	4X	1X or 4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	0	0	0	0	0	0
Cable12	1,12	down	Polling	Polling	4X	1X or 4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	0	0	0	0	0	0
Cable13	1,13	down	Polling	Polling	4X	1X or 4X	1X or 4X	2.5Gb/s	2.5Gb/s	2.5Gb/s	0	0	0	0	0	0

The page displays the status of each port on the switch.

3 Optional: Click Refresh to update the data on the page.

Manually Configuring Media Storage

15

Topics in this chapter:

- Overview on page 125
- Creating Hardware LUNs on page 125
- Partitioning Disks or LUN devices as Primary Partitions on page 126
- Assembling the Disk or LUN Devices into a Logical Volume on page 128
- Creating the XFS Filesystem on the Logical Volume on page 130
- Manually Creating a Mount Point and Mounting the Storage on page 131

Overview

This section provides advanced instructions for manually configuring a storage array. Normally, you do not need to perform any of these tasks, as they are all automatically performed by the *XR Configuration Utility*.

Creating Hardware LUNs

LUNs, also referred to as Logical Units or Logical Drives, are groups of disk drives that are striped together to provide optimal performance and RAID protection. Once configured, LUNs are seen by the Linux operating system as if they were single disk drives.

To create the LUNs on your XR-series storage, use the *XR Configuration Utility* supplied by Autodesk. This utility is installed with the DKU and automates the LUN creation process.

NOTE For systems having two sets of enclosures, you have to configure one set at a time with the *XR Configuration Utility*. Connect the first set of enclosures, and use the utility to configure it. When done, disconnect the first set and connect the second set. When the second set of enclosures is configured, re-connect both sets.

To configure LUNs on XR-series storage:

1. Open a terminal and log in as root.
2. Go to the directory */usr/discreet/DKU/current/Utils/Storage/current/*, and run the *XR Configuration Utility* by typing:

   ./XR_config.pl

   The utility detects whether a LUN configuration exists on the storage attached to that workstation.
3. If a LUN configuration already exists on the storage, you are prompted for confirmation to overwrite that configuration.

   WARNING LUN configuration is destructive. Make sure you want to overwrite an existing configuration before you confirm.
4. After the script detects the number of enclosures and drives, it prompts you to indicate the filesystem your storage uses.

   Type **2**
5. When asked if you have a 2-loop or a 4-loop configuration, select the option that applies to your storage.

   The *XR Configuration Utility* configures your storage.
6. Type **x** to exit the *XR Configuration Utility*.
7. Reboot your workstation, so that the newly-created LUNs are rescanned by the operating system.

Note that the *XR Configuration Utility* exits without configuring your storage if any of the following issues are detected:

- An incorrect number of disks. The total number of disks must be a multiple of 12.
- One of more of the enclosures do not have the correct firmware.
- In a dual RAID enclosure environment, the number of expansion chassis on each RAID enclosure is not the same.
- An odd number of enclosures in a 4-loop configuration. Only even numbers of enclosures are supported.

Partitioning Disks or LUN devices as Primary Partitions

To achieve optimal performance, each disk or LUN in the array should be partitioned as a single primary partition.

On storage arrays with 450 GB drives, use the *parted* utility to create GPT (GUID Partition Table) type partitions. On arrays with smaller drives, use the *fdisk* utility to create Linux LVM type partitions.

NOTE Make sure you do not re-partition the system drive or any other disks that you want to preserve as they are. Partitioning destroys all data on the disks.

To partition disk or LUN devices with 450 GB drives or larger:

1. Reboot your system to reload the fibre channel adapter drivers.
2. Open a terminal, and log in as root.
3. View a list of disks or LUN devices detected by the operating system, using the following command:

   fdisk -l | grep dev

Identify the disk or LUN devices that are part of the storage array to be configured with a standard filesystem. These devices will be re-partitioned.

4 Use the *parted* command to re-partition each disk device identified in the previous step. Type:

```
/sbin/parted -s -- <disk name> mklabel gpt mkpart primary 0 -1
```

where `<disk name>` is the name of a disk device identified in step 1, without a partition number, such as */dev/sdb*. For example:

```
/sbin/parted -s -- /dev/sdb mklabel gpt mkpart primary 0 -1
```

5 Repeat the command for each disk.

To partition disk or LUN devices with drives smaller than 450 GB:

1 Reboot your system to reload the fibre channel adapter drivers.

2 Open a terminal, and log in as root.

3 If you are repurposing a Stone FS storage

4 View a list of disks or LUN devices detected by the operating system, using the following command:

```
fdisk -l | grep dev
```

Identify the disk or LUN devices that are part of the storage array to be configured with a standard filesystem. These devices will be re-partitioned.

5 If you plan to configure a standard filesystem on a former Stone FS storage array, delete the volume label and volume table on each LUN device that is part of the storage array. Type the following command for each LUN device:

```
dd if=/dev/zero of=<LUN device> count=4096
```

Where `<LUN device>` is the device name of a LUN in your storage array, such as */dev/sdc*.

WARNING When using the *dd* command, be very careful to not delete your system drive (usually */dev/sda*) or any other drive aside from the LUNs in your storage array.

6 Use the *fdisk* command to re-partition each disk device identified in the previous step.

Start the *fdisk* utility for the LUN. Type:

```
fdisk <disk name>
```

where `<disk name>` is a disk device name without a partition number, such as */dev/sdf*.

The *fdisk* utility starts, checks the disk device, and then displays its prompt.

NOTE When *fdisk* starts, a warning about the number of disk cylinders may appear. You can disregard this warning.

7 Type **n** to display the New partition creation menu.

fdisk displays the type of partitions you can create (primary or extended).

8 Create a primary partition on the disk device by typing **p** at the prompt.

9 When prompted to enter a partition number, type **1** to make the primary partition the first one on the LUN.

NOTE You may have to delete pre-existing partitions by entering **d** when prompted, and repeating step 3.

10 When prompted to set the starting cylinder number, press **Enter** twice to accept the defaults, which are the first and last cylinder on the device.

The *fdisk* prompt reappears.

11 Type **t** to set the partition type.
You are prompted to enter the hexadecimal code of the partition type to be created on the LUN.

12 Type **8e** to set the partition type to Linux LVM.
fdisk sets the partition as Linux LVM and the following output appears:

```
Changed system type of partition 1 to 8e (Linux LVM)
```

13 Type **w** to save the new partition table.

14 Repeat steps 2 through 9 for each disk or LUN device identified in step 1.

Assembling the Disk or LUN Devices into a Logical Volume

After you have formatted each disk or LUN device as a partition, you must assemble the LUNs into a single logical volume on which you create the XFS filesystem.

This procedure does not cover creating fault-tolerance and assumes that the LUNs are RAID-protected, as is the case with Stone Direct XR-series arrays.

To assemble a logical volume:

1 Verify that the disk or LUN devices are detected by the operating system. Type:

```
fdisk -l | grep dev
```

All devices appear in a list similar to the following example (your values may vary):

```
/dev/sdb1 1 180482 1449713663+ ee EFI GPT
/dev/sdc1 1 180482 1449713663+ ee EFI GPT
/dev/sdd1 1 180482 1449713663+ ee EFI GPT
/dev/sde1 1 180482 1449713663+ ee EFI GPT
```

Partitions created with the *parted* command for arrays with 450 GB disks are marked “EFI GPT”.

Partitions created in *fdisk* for arrays with smaller capacity disks are marked “Linux LVM”.

NOTE Other devices of different types may be listed before and after the GPT or LVM devices.

2 Create a physical volume on each of the devices using the following command:

pvcreate <list of devices>

where <list of devices> is a list of all the devices in the storage array. For example, if you have four devices, ranging from */dev/sdb1* to */dev/sde1*, you would type:

```
pvcreate /dev/sdb1 /dev/sdc1 /dev/sdd1 /dev/sde1
```

The physical volumes are created, and the command output should be similar to the following example:

```
Physical volume "/dev/sdb1" successfully created
Physical volume "/dev/sdc1" successfully created
Physical volume "/dev/sdd1" successfully created
Physical volume "/dev/sde1" successfully created
```

TIP You can use the command *pvremove* to delete any erroneously entered devices.

3 Verify that the physical volumes were initialized correctly. Type:

```
pvscan -v
```

A list of all of the physical volumes you created appears. The following sample output is for the previous example of 4 physical volumes created on devices */dev/sdb1* through */dev/sde1*:

```
Walking through all physical volumes
PV /dev/sdb1 lvm2 [2.03 TB / 2.03 TB free]
PV /dev/sdc1 lvm2 [2.03 TB / 2.03 TB free]
PV /dev/sdd1 lvm2 [2.03 TB / 2.03 TB free]
PV /dev/sde1 lvm2 [2.03 TB / 2.03 TB free]
Total: 4 [8.10 TB] / in use: 0 [0 ] / in no VG: 4 [8.10 TB]
```

4 Create the volume group "vg00" from the physical volumes you created in the preceding step, using the following command:

vgcreate vg00 `<list of volumes>`

where `<list of volumes>` is the list of physical volumes you created in the preceding step. For example:

vgcreate vg00 /dev/sdb1 /dev/sdc1 /dev/sdd1 /dev/sde1

TIP You can use the command *vgremove* to delete any erroneously entered volume.

---

5 Verify the volume was created and obtain the value of the "Free PE / Size" field. Type:

vgdisplay -v

In the output, find the line that contains the "Free PE / Size" field and write down the value of the "Free PE". For example, in the following example output the "Free PE" value is 2124556.

```
Free PE / Size 2124556 / 8.10 TB
```

6 Create a new logical volume on "vg00", using the following command:

lvcreate -l `<Free_PE_value>` **-i** `<#_of_physical_volumes>` **-I 32 -n lvol1 vg00**

where `<Free_PE_value>` is the "Free PE" value you noted in the preceding step and `<#_of_physical_volumes>` is the number of physical volumes. If we continue with the example used in the previous steps, you would type:

lvcreate -l 2124556 -i 4 -I 32 -n lvol1 vg00

The output confirms the creation of the logical volume:

```
Logical volume "lvol1" created
```

NOTE If the command outputs several lines about a file descriptor leaked on lvdisplay invocation, ignore them.

---

7 Check if the *adsk_lvm* startup script has been installed by the DKU to enable automatic logical volume reassembly upon reboot:

chkconfig --list | grep adsk_lvm

If the script is properly configured, the command output is the following:

```
adsk_lvm 0:off 1:off 2:on 3:on 4:on 5:on 6:off
```

If the command output is different, enable the script by typing:

chkconfig --add adsk_lvm

chkconfig adsk_lvm on

Creating the XFS Filesystem on the Logical Volume

After having created the logical volume, you are now ready to create and mount the XFS filesystem.

To create and mount an XFS filesystem:

1. Identify the optimal *agsize* value for your array by running the *mkfs.xfs* command. Type:

   `mkfs.xfs -d agcount=128 -f /dev/vg00/lvol1`

   This command displays diagnostics information similar to the following (your values may differ):

   ```
   meta-data=/dev/vg00/lvol1  agcount=128, agsize=1066667 blks
            =                 sectsz=512 attr=0
   data        =                bsize=4096 blocks=134400000, imaxpct=25
            =                 sunit=16   swidth=64 blks, unwritten=1...
   ```

2. From the diagnostic information printed in the previous step, note the following values:
   - *agsize* on the first line
   - *sunit* and *swidth* on the fourth line

3. Depending on the values of *sunit* and *swidth*, calculate a new *agsize* value using one of the following three methods:
   - If the values of *sunit* and *swidth* are both equal to 0, multiply the *agsize* value by 4096. For example (your values will differ):
     1066667 * 4096 = 4369068032

     Proceed to step 4 using the value calculated above as the new *agsize* value.
   - If the command displays a warning message about the *agsize* being a multiple of the stripe width, multiply the *agsize* value by 4096, and subtract the *sunit* value multiplied by 4096. For example (your values will differ):
     1066667 * 4096 = 4369068032

     16 * 4096= 65536

     4369068032 - 65536 = 4369002496

     Proceed to step 4 using the value calculated above as the new *agsize* value.
   - If the values of *sunit* and *swidth* are not equal to 0, and no warning message appears, proceed to step 4 using the *agsize* value displayed by the *mkfs.xfs* command in step 1.

4. Run the *mkfs.xfs* command again to create the XFS filesystem on the device */dev/vg00/lvol1* using the value calculated in one of the previous steps. Type:

   `mkfs.xfs -d agsize=``<new agsize>` **`-f /dev/vg00/lvol1`**

   For example (your values will vary):

   `mkfs.xfs -d agsize=4369068032 -f /dev/vg00/lvol1`

   The filesystem is created on the storage array.

   NOTE If the command fails, redo your calculations starting from step 1.

5. Verify that the storage can be mounted by typing one of the following commands:
   - For HP Z800 systems: **`mount /mnt/StorageMedia`**
   - For older systems: **`mount /mnt/stoneMedia`**

The storage should mount, as the DKU installation script should have created the mount point directory for your storage (*/mnt/StorageMedia* on HP Z800 workstations, or */mnt/stoneMedia* on older workstations), as well as the corresponding entry in the */etc/fstab* file.

If you receive an error message and the storage does not mount, follow the instructions in the next section to manually mount the storage.

Manually Creating a Mount Point and Mounting the Storage

If the mount point directory for your storage was not created automatically by the DKU, or if the storage does not mount, perform the following procedure to create the mount point and mount the storage manually.

To create a mount point and mount the storage:

1. Create the directory that will serve as the mount point for the filesystem, if it does not exist. For example:

   `mkdir /mnt/StorageMedia`

   WARNING Do not use the word "stonefs" as the name for your mount point directory. "Stonefs" is a reserved word, and can cause issues if used as the mount point directory name.

2. Mount the XFS filesystem from the logical volume */dev/vg00/lvol1* on the directory you created in the previous step. For example:

   `mount -av -t xfs -o rw,noatime,inode64 /dev/vg00/lvol1 /mnt/StorageMedia`

   The filesystem is mounted as */mnt/StorageMedia*.

3. Confirm that the storage is now mounted. Type:

   `df -h`

   The output should list */dev/mapper/vg00-lvol1* mounted on your mount point directory. For example:

   ```
   /dev/mapper/vg00-lvol1
    814G 547G 267G 68% /mnt/StorageMedia
   ```

4. Using a text editor, add an entry in the */etc/fstab* file so that the filesystem gets mounted automatically at startup. For example:

   ```
   /dev/vg00/lvol1 /mnt/StorageMedia xfs rw,noatime,inode64
   ```

5. Optional: Confirm that the filesystem can mount automatically by rebooting the workstation and using the command *df -h* again.

Standard Filesystem Maintenance

16

Topics in this chapter:

- Introduction on page 133
- Controlling Fragmentation on page 134
- Limiting Concurrent Usage on page 135
- Configuring Bandwidth Reservation on page 135
- Monitoring Partition Fill Rate on page 140
- Using Multi-Threaded Direct I/O on page 141
- Enabling Media Pre-allocation on page 141
- Testing Filesystem Performance on page 142

Introduction

Performance of a filesystem depends on a number of factors, including the following:

- Hardware and operating system
- Fragmentation
- I/O sizes
- Filesystem tuning parameters
- Free space available
- Concurrent I/O and metadata operations
- Number of I/O threads and processes in use at a given time

NOTE Standard filesystems tuned for a specific file format can under-perform for other file formats. For instance, a filesystem optimized and capable of delivering real-time performance for 2K 10-bit DPX files delivers lower real-time performance for SD media.

Filesystem performance progressively decreases over time, depending on various factors, such as fragmentation, fill rate, and concurrent use by several applications.

This chapter provides basic usage and maintenance guidelines to help you keep the performance of your standard filesystem at a steady level.

Terminology and Concepts

Before reading this chapter, familiarize yourself with the following concepts.

Fragmentation Fragmentation is a phenomenon that consists of a file being broken into several blocks, which are stored in non-contiguous sectors on the disk. This decreases filesystem performance, as it takes a lot of time to retrieve and reassemble the scattered pieces of the file before making it usable.

Locality of reference This principle states that files used in the context of the same application or procedure (for example, consecutive frames in a timeline) should be as close to each other as possible on the disk, in order to minimize seek times between two successive I/O operations. Locality of reference is good in the case of frames written on an empty partition, and decreases as the filesystem fills up and becomes fragmented.

Multi-threaded I/O Multi-threaded I/O is the use of multiple parallel I/O threads within a disk read process. This method allows the RAID array to optimize the fetching of multiple blocks of data.

Controlling Fragmentation

Filesystem fragmentation is directly related to the amount of mixing and interleaving of blocks of data of different sizes, and is aggravated by multiple I/O clients concurrently writing data to the partition.

Although some standard filesystems (such as XFS) feature advanced space allocation techniques, which make them more resistant to fragmentation, this problem still occurs as the filesystem's free space decreases and frequent file deletion, creation, and resizing operations take place.

Here are some steps you can take to counter filesystem fragmentation:

- Avoid storing mixed resolution projects on a standard filesystem partition. Workflows where many different media formats are used simultaneously tend to become fragmented more rapidly than if a single resolution media format is used consistently.
- Separate your media and metadata partitions. The worst contributors to fragmentation on a media storage device are the files used to store metadata. These include clip libraries, setup files, and databases. It is recommended to keep all metadata on a separate partition.

  NOTE You may keep the audio data on the same partition as the frames. This has no significant impact on performance or filesystem fragmentation.

- Use the defragmentation tools provided by your filesystem vendor on a regular basis.

  NOTE Defragmentation tools are often unable to realign files based on their locality of reference. Therefore, it is advisable to reinitialise your partition periodically, by archiving your projects, formatting the partition, and restoring the archives.

Limiting Concurrent Usage

A filesystem performs best when only one process is accessing it. In some workflows this is not always possible, which leads to a temporary decrease in performance. Furthermore, mixing read and write operations can have a detrimental effect on throughput.

Autodesk strongly advises against allowing any third-party application to access the storage at the same time as your Visual Effects and Finishing applications. The I/O operations from such applications may drastically decrease the bandwidth available to your Visual Effects and Finishing application and also contribute to filesystem fragmentation.

NOTE Unlike direct attached storage (DAS), a Storage Area Network (SAN) is typically designed to handle concurrent usage and will perform better under such situations.

Configuring Bandwidth Reservation

Stone and Wire provides a mechanism to reserve storage bandwidth for Visual Effects and Finishing applications and tools that use a local mount point to a standard filesystem (DAS or SAN) as their media storage. This ensures that the local application gets the bandwidth it requires and that real-time playback on the local system is not jeopardized by requests from concurrent processes, including access from remote hosts.

NOTE Bandwidth reservation policies apply only to I/O requests from Visual Effects and Finishing applications and tools. They cannot protect your storage bandwidth from I/O requests coming from third-party processes or user interactions. It is your responsibility to avoid using third-party tools with the frame storage. See Limiting Concurrent Usage on page 135.

Bandwidth requests are managed by the Stone and Wire Bandwidth Manager, based on the parameters in the */usr/discreet/sw/cfg/sw_bwmgr.cfg* configuration file.

When Stone and Wire starts up, the Bandwidth Manager automatically creates a `[Device]` section in the configuration file for each partition declared in */usr/discreet/sw/cfg/stone+wire.cfg*. The Manager sets total theoretical read and write bandwidth values for each device, as well as the default reservation values.

Adding a New Device to the Bandwidth Manager

Use the instructions in this section if you want additional standard filesystem mount points (such as mount points to SAN volumes or to any other standard filesystem volume that is not present in the */usr/discreet/sw/cfg/stone+wire.cfg* file) to be managed by the Bandwidth Manager. You may also use these instructions as guidelines for understanding and editing the settings in the predefined `[Device]` sections of the configuration file.

Each partition managed by the Bandwidth Manager must have a `[Device]` section associated to it in the */usr/discreet/sw/cfg/sw_bwmgr.cfg* file.

To add a new device to the Bandwidth Manager:

1. Open the */usr/discreet/sw/cfg/sw_bwmgr.cfg* file in a text editor.
2. Add a new `[Device]` section at the end of the file, using the following syntax:

   TIP You may also copy and paste an existing `[Device]` section, and change its parameters.

   ```
   [Device<device_number>]
   Path<path_number>=<device_mount_point>
   ```

```
TotalAvailableReadBandwidth=<total_read_bandwidth>
TotalAvailableWriteBandwidth=<total_write_bandwidth>
DefaultReservation=<default_reservation>
```

where:

- `<device_number>` represents the number of the `[Device]` section, starting at 0. For example: `[Device0]`
- `Path` specifies the partition's mount point. Since a partition can have several paths, `<path_number>` represents the number of the current path, starting at 0 for each device. For example:
  `Path0=/mnt/XYZ`
  `Path1=/usr/local/ABC`
- `TotalAvailableReadBandwidth` represents the estimated total reading bandwidth of the device, in megabytes per second. Based on this value, and on the amount of active reservations for the current partition, the Bandwidth Manager decides whether new reservation requests are granted or rejected. For example:
  `TotalAvailableReadBandwidth=200`
- `TotalAvailableWriteBandwidth` represents the maximum estimated writing bandwidth of the device, in megabytes per second. If this parameter is not specified, its value defaults to the value of `TotalAvailableReadBandwidth`. For example:
  `TotalAvailableWriteBandwidth=150`

  NOTE The total bandwidth parameters are estimates of the theoretical maximum bandwidth of the partition. The actual bandwidth is affected by several factors, including multiple applications trying to concurrently read or write to it. The Bandwidth Manager continuously measures partition performance and dynamically maintains the actual total available bandwidth for each partition.

- `DefaultReservation` sets the bandwidth assigned by default to applications that are denied a reservation request or that don't have individual or group reservations associated to them. The value is expressed in megabytes per second. For example:
  `DefaultReservation=10`

3. After setting up all the partition parameters described above, you can start defining reservations for the current partition. See Reserving Bandwidth for an Application on page 136.
4. Save and close the configuration file, and restart Stone and Wire by typing:

   `/etc/init.d/stone+wire restart`

Reserving Bandwidth for an Application

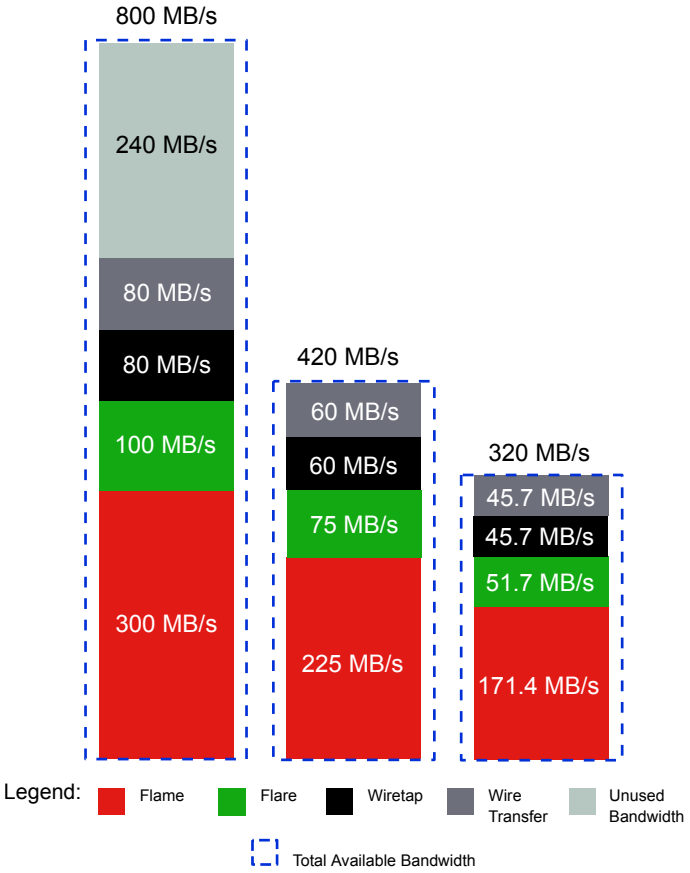
You may define a bandwidth reservation for each Visual Effects and Finishing application or tool that uses a certain partition. By default, a group reservation for the major Visual Effects and Finishing applications (Inferno, Flame, Flint, Smoke, and Backdraft Conform) running locally is already defined.

Remote applications are identified by application-specific tokens, workstation host name, as well as the user name under which the application is executed. You can use any or all of these parameters to create detailed bandwidth reservation rules.

You can also customize the way bandwidth is redistributed in low bandwidth situations. In low bandwidth situations, instead of reducing all reservations proportionally towards zero, the bandwidth manager first reduces the bandwidth of each process towards the low-bandwidth value specified for that process, and attempts to maintain that minimum for as long as possible. If the device bandwidth keeps degrading, then

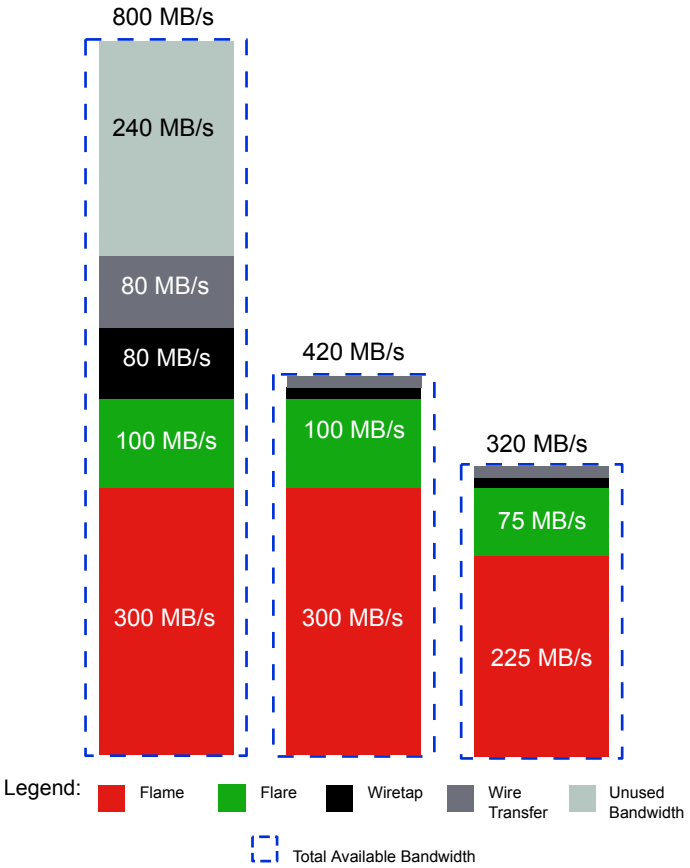
the bandwidth manager starts reducing bandwidth proportionally from the low-bandwidth values towards zero.

In the following example, low-bandwidth values are not specified in the Bandwidth Manager configuration file. The diagram illustrates the way the Bandwidth Manger redistributes device bandwidth in such a case, as the total available bandwidth decreases from 800 MB/s to 420 MB/s and then to 320 MB/s. Note how bandwidth is proportionally reduced for all processes.



In the following example, low-bandwidth values are configured for each process (300 MB/s for Flame, 100 MB/s for Flare, 10 MB/s for Wiretap and 10 MB/s for Wire). The diagram illustrates the way the Bandwidth Manger redistributes device bandwidth as the total available bandwidth decreases from 800 MB/s to 420 MB/s and then to 320 MB/s.

Note how the Bandwidth Manager keeps the bandwidth for each application at the low bandwidth watermark. When total available device bandwidth falls under the sum of the low bandwidth watermarks, the Bandwidth Manager decreases bandwidth for all processes proportionally towards zero.



Perform the steps in the procedure below to set up an optimal bandwidth reservation for the local application, as well as for remote workstations, based on your system configuration.

To set up bandwidth reservation:

1. Open a terminal and log in as root.
2. Open the */usr/discreet/sw/cfg/sw_bwmgr.cfg* file in a text editor.
3. Locate the `[Device]` section that corresponds to the standard filesystem partition (by default `[Device0]`), and uncomment it if it is commented out.
4. Add a `Reservation` line for each local or remote application, using the following syntax:

   ```
   Reservation<number>=<application_name> [<user_name>]
   [@<workstation_hostname>] <reading_bandwidth> [(<low_reading_bandwidth>)]
   [<writing_bandwidth>][)<low_writing_bandwidth>)]
   ```

   where:

   - `<n>` is the ID of the reservation, starting at 1 for each device.
   - `<application_name>` represents the name of the application that needs the reserved bandwidth. This parameter can take one of the following predefined values: “inferno”, “flame”, “flint”, “flare”, “smoke”, “imcopy”, “stonifiseTool”, “publishTool”, “S+W Server”, “IFFFS Wiretap Server”, or “IFFFSTool” for other Visual Effects and Finishing command-line tools. The “smoke” token also includes Backdraft Conform.

   NOTE Application names must use quotes if they contain spaces.

- `<user_name>` is the Linux user account under which the remote application is running. This parameter is optional.
- `<workstation_hostname>` is the hostname of the remote workstation that is accesing the storage. This parameter is optional.
- `<reading_bandwidth>` represents the minimum reading bandwidth required by the application, expressed in megabytes per second. If more bandwidth is available on the device, the Bandwidth Manager gives the application as much bandwidth as possible.
- `<low_reading_bandwidth>` represents the minimum value towards which reading bandwidth for this application is reduced in low-bandwidth situations. The Bandwidth Manager will attempt to maintain this minimum bandwidth allocation for as long as possible. If the device bandwidth keeps degrading, then the bandwidth manager starts reducing bandwidth proportionally from the low-bandwidth values towards zero for all applications.
- `<writing_bandwidth>` represents the minimum writing bandwidth required by the application, expressed in megabytes per second. If more bandwidth is available on the device, the Bandwidth Manager gives the application as much bandwidth as possible. If this parameter is not specified, the Bandwidth Manager automatically calculates a default value, based on `<reading_bandwidth>` and on the total configured read and write bandwidth values of the device.
- `<low_writing_bandwidth>` represents the minimum value towards which writing bandwidth for this application is reduced in low-bandwidth situations. The Bandwidth Manager will attempt to give the application this minimum amount of bandwidth for as long as possible. If the device bandwidth keeps degrading, then the bandwidth manager starts reducing bandwidth proportionally from the low-bandwidth values towards zero for all applications.

For example:

```
Reservation1=flame 500 (300)
Reservation2=flare artist@flare1 200 (100)
```

5 Save and close the configuration file, and restart Stone and Wire by typing:

```
/etc/init.d/stone+wire restart
```

NOTE Bandwidth for an application is actually reserved only when that application is running. Processes that do not have a bandwidth reservation setting in the *sw_bwmgr.cfg* file fall under the default combined reservation of 10 MB/s.

Defining Groups of Applications

The Stone and Wire Bandwidth Manager allows you to set up bandwidth reservations for custom groups of applications. All the applications in a group will share the same reservation.

By default, the configuration file already contains a definition for the “IFFFS” group, which includes the “inferno”, “flame”, “flint”, and “smoke” application tokens.

To set up bandwidth reservation for a group of applications:

1 Open the */usr/discreet/sw/cfg/sw_bwmgr.cfg* file in a text editor.

2 In the `[Groups]` section, add a line for each group of applications you want to define. The syntax of the line is as follows:

```
<group_name>=<application_name> <application_name>
```

where:

- `<group_name>` is the custom name of the group. The group name must not contain spaces and must not be the same as one of the predefined application names.
- Each `<application_name>` represents the name of an application in the group. This parameter can take one of the following predefined values: “inferno”, “flame”, “flint”, “smoke”, “imcopy”, “stonifiseTool”, “publishTool”, “S+W Server”, “IFFFS Wiretap Server”, or “IFFFSTool” for other Visual Effects and Finishing command-line tools.

For example:

```
[Groups]
IFFFSTools=imcopy stonifiseTool publishTool
```

3. After you have defined the group, go to the `[Device]` section for the appropriate partition and add a `Reservation` line for the new group. The syntax is the same as when adding a reservation for a single application. For example (using the “IFFFSTools” group from the previous step):

   ```
   Reservation1=IFFFSTools 50 50
   ```

4. Save and close the configuration file, and restart Stone and Wire by typing:

   `/etc/init.d/stone+wire restart`

For additional information on all the parameters in the Bandwidth Manager configuration file, and for a list of application names you can use when defining reservations, see the comments inside the configuration file.

Monitoring Partition Fill Rate

As each disk in a storage array gets filled near capacity, its overall read and write performance decreases once a certain threshold is reached.

Archive and delete projects as often as possible to free up space on your disk array. Alternatively, you may use the previously described steps to reinitialise your partition, making sure that you restore from archive only the projects you need to work on.

NOTE For an XFS filesystem on XR-series disk arrays, keep the partition fill rate below 90% for best performance.

Moreover, the Stone and Wire database may experience corruption if there is too little available space on the disk where clip metadata is stored.

To avoid this problem, you can set the Stone and Wire database to automatically shut off when free space falls below a certain threshold.

To configure the Stone and Wire database to automatically shut off when there is too little free space:

1. As root, open the */usr/discreet/sw/cfg/sw_dbd.cfg* file in a text editor.
2. Scroll to the `[Disk Check]` section.
3. Uncomment the `Enabled` and `Minimum` keywords.
4. Set the value of the `Minimum` keyword to the minimum allowed amount of free space on the disk (in Megabytes).

   If the amount of free space on the disk falls below this threshold, the Stone and Wire database daemon automatically shuts off.
5. Optional: Uncomment the `Timeout` keyword, and set how often the Stone and Wire daemon should check the available disk space. The default value is 30 seconds.

6 Save and close the configuration file.

7 Restart Stone and Wire. Type:

```
/etc/init.d/stone+wire restart
```

Using Multi-Threaded Direct I/O

Most filesystems perform best when the I/O is parallelised across multiple threads/processes and sent asynchronously. This allows the device to buffer I/O operations and reorganize requests for optimal performance.

Some applications perform better than others on the same storage device, based on how they perform their I/O. Applications that use single-threaded buffered I/O can be slow.

Your Visual Effects and Finishing applications use multi-threaded asynchronous direct I/O when capturing, playing back, and performing other I/O intensive operations.

Make sure that any third-party application you use in conjunction with your Visual Effects and Finishing application or to handle your media files uses direct I/O. This prevents needless CPU-intensive in-memory data copying, thus maintaining optimum storage performance and freeing resources for your Visual Effects and Finishing application.

Enabling Media Pre-allocation

By default, disk space for video files is allocated on-the-fly as the files are rendered or written. Concurrent I/O operations from multiple clients or background processes can generate frames with poor locality of reference, which leads to clip fragmentation and decreases playback performance.

To prevent this problem, Stone and Wire provides media file pre-allocation mechanisms that reserve the necessary space on the disk before the actual writing of the media files takes place. Pre-allocation reserves as many available contiguous disk sectors as needed for the file sequence to be written.

Depending on the filesystem you are using, you may choose between two media pre-allocation methods.

FALLOCATE The disk space needed for the file is allocated and filled with zeroes. On most filesystems, the performance impact of this operation is as serious as when writing the actual file.

RESERVE The disk space needed for the file is reserved, but not written to. The apparent size of the frame remains zero. This operation is much faster than `FALLOCATE`, but is supported only on certain filesystems, such as XFS.

By default, pre-allocation is turned off in Stone and Wire (the method is set to `NONE`). In order to enable it, you must modify a parameter in the *stone+wire.cfg* configuration file.

NOTE This is not a global setting. Pre-allocation must be individually enabled for each partition.

To enable media pre-allocation for a partition:

1 Open the*/usr/discreet/sw/cfg/stone+wire.cfg* file in a text editor.

2 Uncomment the `Preallocation` parameter in the section that configures the respective partition (for example `[Partition7]`).

3 Change the parameter value from the default `NONE` to the pre-allocation method you want to use. For example:

```
Preallocation=RESERVE
```

4 Save the configuration file and restart Stone and Wire.

NOTE If you are using XFS and unwritten extent flagging was disabled when creating the filesystem, the RESERVE pre-allocation method is not available for it. For more information about unwritten extent flagging, consult the Man page for *mkfs.xfs*. Type **`man mkfs.xfs`** in a terminal.

Testing Filesystem Performance

Each standard filesystem comes with its own set of tools to measure performance.

XFS comes with the *xfs_db* command line tool for troubleshooting various aspects of the filesystem, including fragmentation. For information on using the *xfs_db* tool, consult the man page for *xfs_db*.

Stone and Wire comes with a command line tool to measure filesystem performance called *sw_io_perf_tool*. This tool simulates I/O requests (audio and/or video) that would be issued by the Visual Effects and Finishing application, and reports the throughput and maximum latency of all the requested I/O operations.

Use *sw_io_perf_tool* to measure read and write performance of a volume declared and mounted by Stone and Wire. Several options are available to simulate many file formats and writing/reading patterns. Launching the command will display a list of available options.

NOTE To list all options available for *sw_io_perf_tool*, open a terminal and type **`/usr/discreet/sw/tools/sw_io_perf_tool -h`**.

To test a standard filesystem partition's performance for a specific resolution:

➤ Go to the directory */usr/discreet/sw/tools* and type:

`./sw_io_perf_tool` `<-p #> <options>`

Where `<-p #>` specifies a partition ID (0 to 7), and`<options>` can be a combination of several media format attributes.

For example, to test read performances for 10-bit HD on the partition7:

`./sw_io_perf_tool -p 7 -v HDTV -d 10`

You may also use *sw_io_perf_tool* with custom resolutions. For example, to test read performances for frames with a width of 1600 pixels and a height of 900 pixels:

`./sw_io_perf_tool -p7 -v 1600,900`

The command displays the throughput (in MB/sec) and maximum IO latency detected (in ms), as shown below:

```
Running Stone+Wire IO Performance Test (Partition 7)
Video: 1 stream(s) of HDTV @ 10bit
Proxy: None
Audio: None
This test will take approximately 11 seconds
*** Read Test ***
Bandwidth: 275.456 MB/s
Frame Rate: 39.351 Frames/s
Max Latency: 335.284 ms
```

Notes:

- The command can be run while other operations are ongoing to simulate how the application will behave under these conditions.
- The media used by *sw_io_perf_tool* is allocated and freed automatically.

- *sw_io_perf_tool* will not reserve any bandwidth on the storage device.
- Partitions/Volumes must be properly configured in the Stone and Wire configuration file.

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