

**Autodesk®**

Visual Effects, Finishing, and  
Color Grading

# HP® Z800 Workstation Hardware Setup Guide

## Autodesk® Visual Effects, Finishing and Grading 2010

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Published by: Autodesk, Inc.  
111 McInnis Parkway  
San Rafael, CA 94903, USA

Title: Autodesk Visual Effects, Finishing, and Colour Grading HP Z800 Workstation Hardware Setup Guide  
Document Version: 7  
Date: March 1, 2010

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# Introduction

# 1

## Topics in this chapter:

- [About This Guide](#) on page 1
- [Related Documentation](#) on page 1
- [Notation Conventions](#) on page 2
- [Contacting Customer Support](#) on page 2

## About This Guide

This guide describes how to set up the HP Z800 workstation hardware and wiring for an Autodesk® Visual Effects, Finishing, or Colour Grading application. This includes Autodesk® Lustre®, and the following Visual Effects and Finishing applications: Autodesk® Inferno®, and Autodesk® Flame®, Autodesk® Flint®, Autodesk® Smoke®, and Autodesk® Backdraft® Conform.

If you already own an HP Z800 workstation shipped with a previous release of your Visual Effects, Finishing and Colour Grading application, you do not need to change its configuration. But, you do need to verify its BIOS settings.

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**NOTE** In most cases, both hardware setup and application installation is done on delivery by an authorized technician. If this is the case, please keep this guide as a reference, in case you decide to move the workstation, change a peripheral, replace an adapter card, etc.

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## Related Documentation

This release has additional documentation to help you install, configure, and use the hardware and software.

At various places in this guide, references are made to other documents. Depending on your hardware and software configuration and network topology, you may want to have additional documentation on hand before you begin setting up the hardware:

- *Autodesk Visual Effects and Finishing Installation and Configuration Guide*
- *Autodesk Lustre Installation and Configuration Guide for Linux Workstations*
- *Autodesk Lustre Colour Management User Guide*
- *Autodesk Lustre User Guide*
- *Autodesk Incinerator Installation and User Guide*
- *Autodesk Control Surface User Guide*
- *Autodesk System Central User Guide*

For a list of all available documentation, visit <http://www.autodesk.com/me-documentation>. From there you can access the complete documentation library and download PDF files. In addition, PDF files and an HTML help system are installed with the software. For Lustre, documentation is also included on the application CD.

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**NOTE** Please refer to the product's release notes for late-breaking release information.

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## 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.	<b>install rpm -qa</b>
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.	<i>/usr/discreet</i>

## 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>.

# Getting Started

# 2

## Topics in this chapter:

- [General Workflow](#) on page 3
- [Typical Configuration Overview for Visual Effects and Finishing Applications](#) on page 5
- [Typical Configuration Overview for Autodesk Lustre](#) on page 6
- [Hardware Configuration Guidelines](#) on page 9

## General Workflow

The following procedure provides the general workflow for connecting, configuring and installing an Autodesk® Visual Effects, Finishing, or Colour Grading application on a HP Z800 workstation.

### To install a Visual Effects, Finishing, and Colour Grading application on a HP Z800 workstation:

- 1 Review the guidelines for working with hardware components. See [Hardware Configuration Guidelines](#) on page 9.
- 2 Connect all peripherals (mouse, keyboard, Wacom® tablet, graphics monitor) to the proper ports, and connect the workstation to the Autodesk Wire® network. See [Connecting Peripherals](#) on page 13.
- 3 Connect the workstation to external storage. See [Connecting Storage](#) on page 31.

---

**NOTE** If repurposing existing storage, it is highly recommended you back up or archive the media and projects before connecting it to the new workstation. For more information, see the application help.

---

- 4 Connect a VTR and a broadcast monitor to the workstation. See [Setting Up Video Hardware](#) on page 21.
- 5 Set up the audio hardware. See [Setting Up Audio Hardware](#) on page 25
- 6 Install the operating system, as instructed in the application *Installation and Configuration Guide*.

---

**NOTE** The Windows operating system is not supported by Lustre on the HP Z800 workstation.

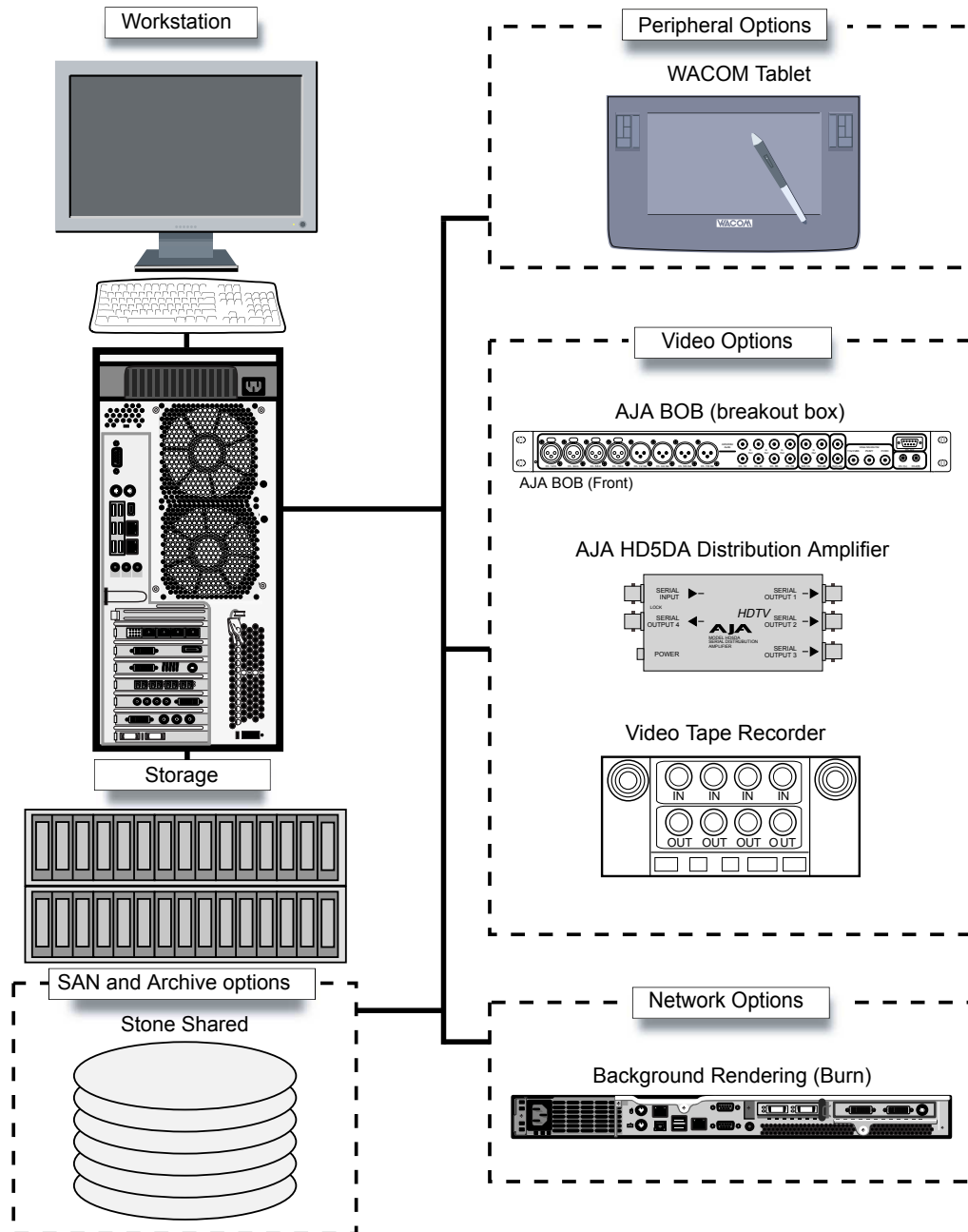
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- 7 Install and license the Visual Effects, Finishing, or Colour Grading application. As above, see the application *Installation and Configuration Guide*.



# Typical Configuration Overview for Visual Effects and Finishing Applications

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



# Typical Configuration Overview for Autodesk Lustre

A Lustre system consists of a number of different hardware and software components. This section describes each of the hardware components in a Lustre installation, and the software associated with each component. You may or may not have all of the components listed here in your Lustre setup. The type of workgroup, as well as the feature set you purchase for each of the workstations in that workgroup, determine the components in your installation.

## Lustre Workstations

There are three kinds of Lustre workstations: the Master Station, the HD Station, and the Lustre Station. Every Lustre installation is built around either a Master Station or an HD Station. The optional Lustre Station offers a way to improve the efficiency and cost-effectiveness of a pipeline by offloading tasks that do not require the full feature set of the Master Station or HD Station.

### Master Station

The Master Station is designed for GPU-accelerated sessions where the colorist works together with the cinematographer. It includes an extensive creative toolset for elaborate visual design and grading, using up to 4K resolution and 16-bit files and for completing tasks like dust busting, conforming, rotoscoping, and capture/payout. It also includes SD and HD I/O, dual link and HSDL video formats, and the film workflow features, which consist of infrared channel dust removal and support for all standard input and output resolutions and bit-depths.

The Master Station can support up to three panels of the Autodesk Control Surface and, with an additional license, a Slave Renderer.

### HD Station

The HD Station is a cost-effective GPU workstation for conforming, preparing, grading, and mastering short-form and long-form HDTV projects, as well as HD film projects, and mastering to different formats. It does not include the film workflow features. File input is limited to 10-bit 2K resolution, and file output is limited to SD and 10-bit HD resolution.

The HD Station can support up to three panels of the Autodesk Control Surface and, with an additional license, a Slave Renderer. Dual link and HSDL video formats are available with the purchase of a separate video I/O license.

### Lustre Station

Tasks that do not require the direct intervention or supervision of the colorist can be efficiently handled by a Lustre Station. Multiple Lustre Stations can work in parallel to increase throughput and can be used for tasks such as dust-busting, preparatory work, fine-tuning creative sessions, conforming data from EDLs, updating editorial changes, and mastering to different formats using the real-time deliverables function. The Lustre Station includes the film workflow features, and the ability to create geometries and masks.

Primary colour grading on the Lustre Station requires a separate license. The following features also require an additional license: SD and HD I/O, dual link and HSDL video formats.

The Lustre Station does not support the Slave Renderer.

## Other Components

You can expand the features of your Lustre system and improve the efficiency of your workflow by adding any of the following components.

**Control Surface** The Autodesk Control Surface provides improved interactivity when colour grading film and video footage. You can perform many of the same tasks you do in the Lustre user interface using the Control Surface.

You connect the Autodesk Control Surface to a Master Station or HD Station, and configure the Control Surface on the workstation to which it is connected.

**Video I/O Card and Breakout Box** On the HP Z800 workstation, video I/O is provided by the AJA card. The video I/O card consists of an HD/SD card and a breakout box. This configuration provides real-time SDI input and output of uncompressed 8- or 10-bit HD or SD video in both YUV (4:2:2) and RGB formats (4:4:4 or 4:2:2). For a list of supported video formats, see the *Autodesk Lustre User Guide*.

The drivers for the video card and breakout box are installed by the Discreet® Kernel Utility (DKU).

**Slave Renderer** The Slave Renderer is a rack-mounted server that frees system resources by automatically off-loading render tasks, thus ensuring real-time interaction on the Lustre system.

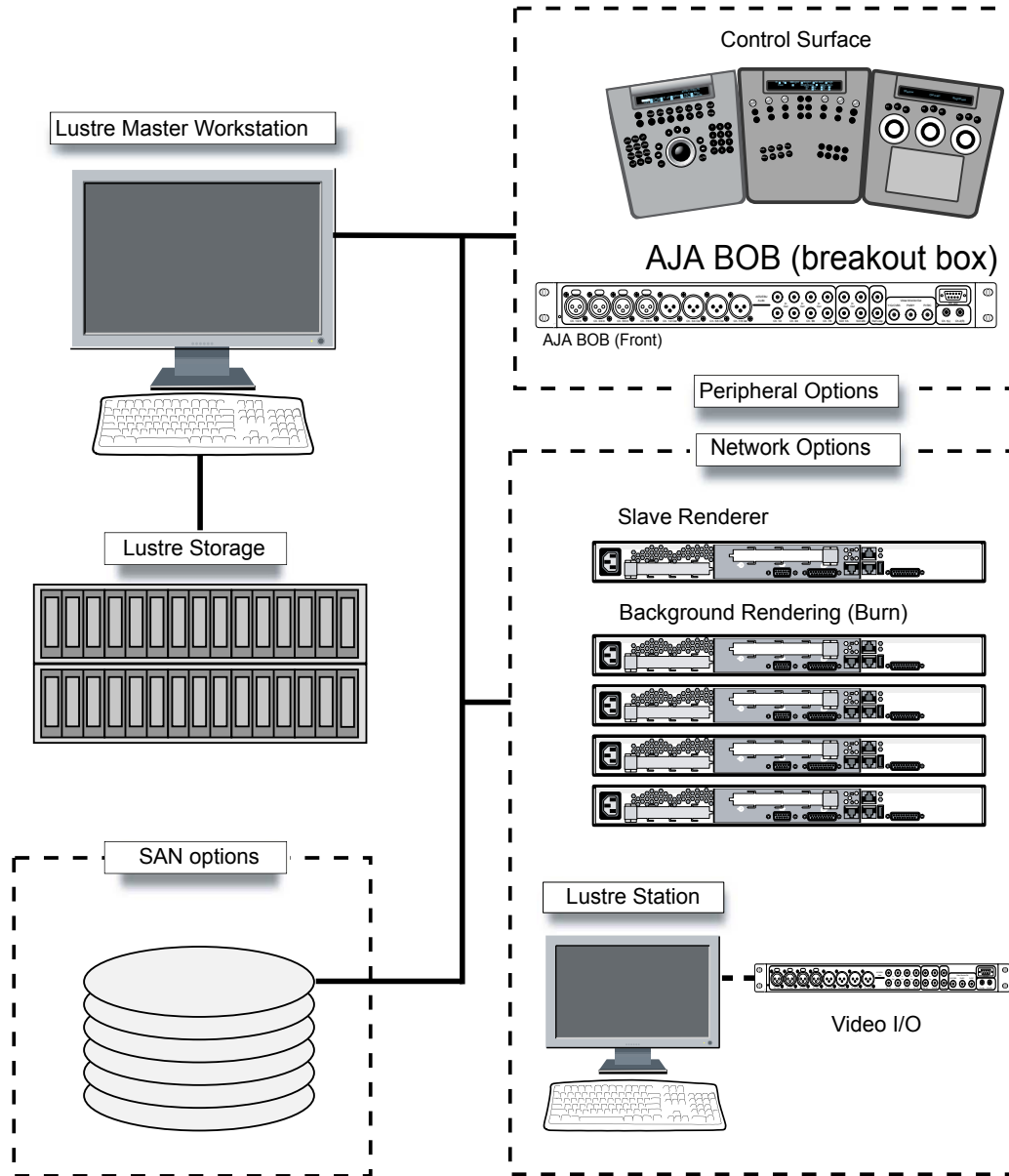
Connect the Slave Renderer to a switch on your house network. Note that only one Lustre Master station or HD station can use it.

You install the Slave Renderer software package on the Slave Renderer.

**Background Renderer** Background rendering frees up Lustre workstations for colour grading. You can use up to eight background rendering machines to process your final frames.

You install background rendering software on each background render node.

The following illustration shows a typical Lustre workgroup configuration built around a Master Station. It includes a Lustre Station, and other optional components.



# Hardware Configuration Guidelines

In most cases, hardware integration and application installation are done on delivery by an authorized technician, and some of the procedures in this guide may not be necessary. Still, it is a good idea to read through all chapters to familiarize yourself with the configuration procedures for the following reasons:

- Many suspected problems with your system may be due to loosened connections or improperly configured devices. This guide helps you troubleshoot problems by providing information about properly configured systems.
- If you need to call Customer Support, some familiarity with this guide will help you assist Customer Support in diagnosing problems.
- If you want to move your system at any time, or upgrade certain hardware components, this guide contains crucial information.

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**NOTE** It is recommended that all hardware configuration is performed by an experienced hardware integrator.

---

## Ensuring Proper Environmental Conditions

You should consider the following environmental guidelines for all hardware configuration:

- Place all components in an air-conditioned environment. All hardware components generate heat and must be kept cool.
- Make sure the rack on which hardware components are mounted is open or well ventilated. Follow the ventilation specifications that apply to your system.
- Keep all hardware components in a clean, dust-free location.
- Minimize vibration and humidity.
- Do not block the vents on the component housing.
- Do not drape anything, such as a jacket or a blanket, over hardware components.
- Minimize electromagnetic noise by separating digital data and power cables from analog audio cables and running them in different cable ducts.

## Power and Air Conditioning Requirements

The values for power consumption and heat output were recorded on an Autodesk certified system with all of the required peripherals and certified components.

---

**NOTE** These values can fluctuate if uncertified hardware components or third party applications are added to your system. The use of uncertified hardware components or third party applications is not supported. Please consult the manufacturer's documentation for standardized minimum and maximum values.

---

The following table summarizes the peak (at startup) power consumed by the system and the heat it generates under the maximum processing load produced by a Visual Effects, Finishing, or Colour Grading application. For more detailed specifications, including noise output, see the documentation provided by the manufacturer.

Component	Quantity	Startup Amps (120V / 240V)	Cont. Amps (120V / 240V)	Watts	Heat (BTUs)
Workstation (with cards)	1	4.0 / 2.0	3.8 / 1.9	456	1556
Lucid ADA 88192	1	0.5 / 0.25	0.5 / 0.25	60	205
Stone® Direct XR storage chassis	1	3.8 / 1.9	2.78 / 1.39	334	1140
Stone Direct XE expansion chassis	1	3.75 / 1.88	2.3 / 1.15	276	942
Stone Direct XR + Stone Direct XE	1	6.41 / 3.2	5.2 / 2.6	624	2130
Autodesk® Control Surface (Lustre only)	1	1 / 0.5	1 / 0.5	120	410

You must be able to meet the startup power requirement and have a climate control system with the capacity to maintain the temperature of these components under the maximum processing load. The following table shows standard conversion benchmarks and an example of how they can be used to determine climate control requirements.

Unit Conversion	Example
1 Watt = 3.413 BTU	456 Watts = 1556.33 BTU
12000 BTU = 1 Ton of air conditioning	1556.33 BTU = 0.13 Tons of air conditioning

## Rack Mount Requirements

If you plan to rack-mount your system, allow sufficient space for each component, as indicated in the following table.

Component	Quantity	Form Factor	Required Rack Space
Workstation	1	5U	5U
AJA OEM-2K breakout box	1	1U	1U
Stone Direct XR storage chassis	1	2U	2U
Stone Direct XE expansion chassis (optional)	1	2U	2U

## Avoiding Damage from Static Electricity

Take precautions to prevent damage to sensitive components from static discharge:

- Make sure power is turned off on the component you are working on. It is a good idea to unplug components until all other connections are configured.

- Wear a grounded static wrist strap. Attach the strap's alligator clip to any grounded metal surface on the component's chassis that you are working on. Place the wristband around your wrist.
- Do not handle any components unnecessarily, particularly boards and cards that slide in and out of PCI slots on their parent hardware components.

## Grounding Audio Hardware Components

It is important to properly ground the audio components. Otherwise, ground loops can occur, causing humming in the system. To ensure proper grounding, use the XLR-3 cables shipped with your system. Other cables may cause humming.

## Receiving Your Shipment

Check all boxes for dents or other markings that might indicate damage during transport. If you suspect a component is damaged, carefully inspect it before setting up the system. If you receive a damaged component, call Customer Support. See [Contacting Customer Support](#) on page 2.

Use the packing checklist enclosed with the shipment to ensure you received all parts.





# Connecting Peripherals

# 3

## Topics in this chapter:

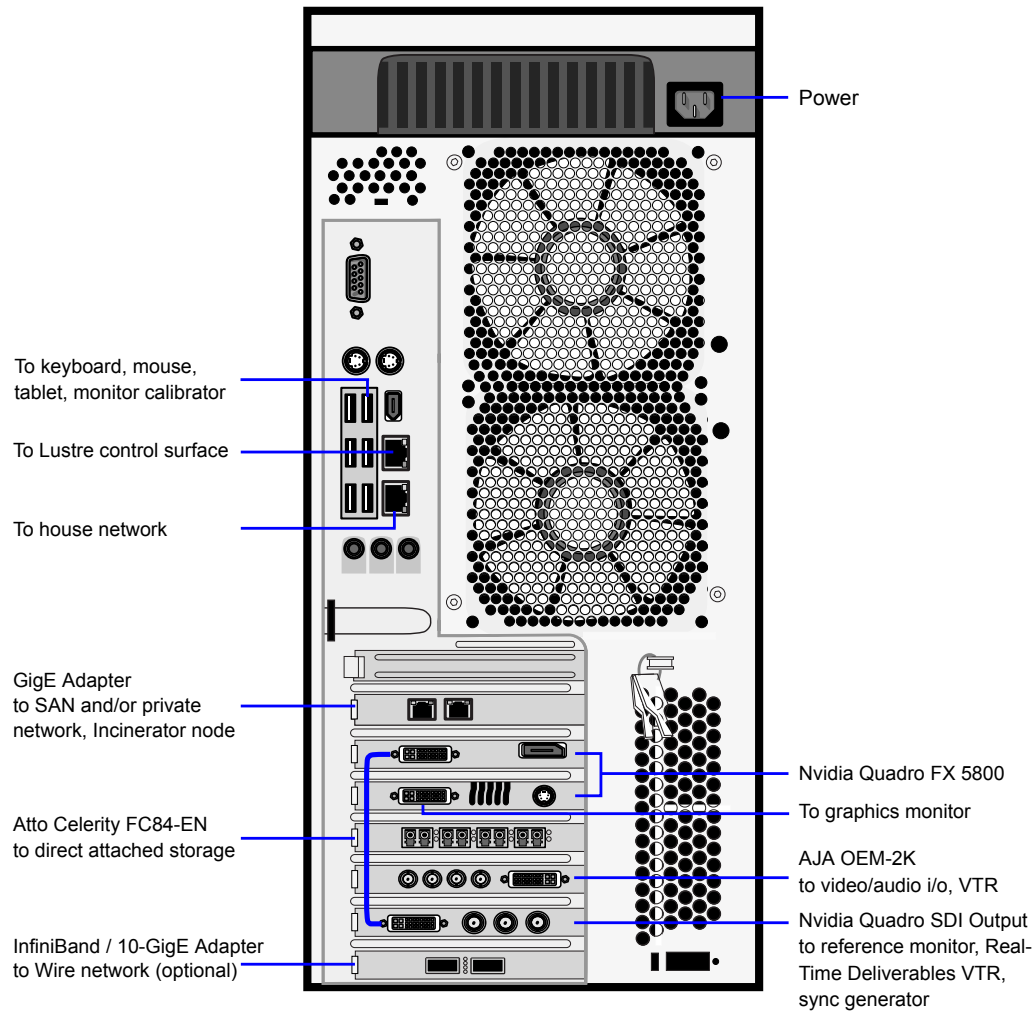
- [Overview of Peripheral Connections](#) on page 13
- [Connecting the Graphics Monitor](#) on page 14
- [Connecting the Keyboard, Mouse, and Tablet](#) on page 15
- [Connecting the Graphics Monitor Calibration Device](#) on page 15
- [Network Connections](#) on page 16
- [Connecting the Autodesk Control Surface to a Lustre Workstation](#) on page 18
- [Connecting the Slave Renderer to a Lustre Workstation](#) on page 19

## 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.

# HP Z800 Workstation



**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 the Graphics Monitor

The graphics monitor connects to the Nvidia® Quadro® FX graphics card. This is also an opportunity to connect the graphics adapter to its add-on card, the Nvidia Quadro SDI Output adapter.

### To connect the monitor:

- 1 Use the short DVI cable to connect port 1 of the Nvidia Quadro FX graphics adapter card to the DVI port of the Nvidia Quadro SDI Output adapter (the add-on card).
- 2 Use the longer DVI cable (F0-DVI-25-MN) to connect port 2 of the Nvidia Quadro FX graphics adapter card to the DVI-D IN port of the monitor.

---

**NOTE** Although each end of the DVI cable appears to be identical, this is not the case. Ensure the connector labeled *Computer* is connected to the workstation. Connect the one labeled *Monitor* to the monitor.

---

- 3 Optionally, extend the monitor cable to a machine room using the DVI extender cable (DL.CAB-HDTV-FO82MM).

## Connecting the Keyboard, Mouse, and Tablet

The keyboard, mouse and tablet connect to the workstation by way of the USB extender kit (TP.USB-EXT-410I). The USB extender kit consists of a remote unit and a local unit, joined by an Ethernet cable (DL.CAB-RJ45/RJ45).

### To connect the keyboard, mouse, and tablet:

- 1 Connect the keyboard, mouse, and tablet to the remote unit of the USB extender kit.

---

**NOTE** For Lustre workstations, a “standalone” tablet can nevertheless be installed and used, even if you are using an Autodesk Control Surface featuring a built-in tablet.

---

- 2 Connect the local unit of the USB extender kit to the workstation port indicated in the workstation connections overview illustration.
- 3 Use the supplied Ethernet cable to connect the remote and local units. If using an alternate cable, ensure it is of type Cat5.

### To calibrate the tablet:

- Visual Effects and Finishing: Calibrate all aspects of the tablet, including margins, in the Pointer area of the creative application’s Preferences menu.
- Lustre: In Lustre the tablet acts a mouse, and requires no particular calibration.

## Connecting the Graphics Monitor Calibration Device

To ensure the graphics monitor accurately represents colors and other visual information, a monitor calibration device (TP.MON-CAL-LCDCRT) has been supplied. This section explains how to connect the device to the workstation. It also presents information for later use, once you begin installing the operating system and application software.

---

**NOTE** This section applies only to workstations on which Autodesk Lustre will be installed. For non-Lustre workstations, refer to the *Lustre Color Management User Guide* for all steps, including attaching the monitor calibration device.

---

Connect the monitor calibration device to port 4 on the remote unit of the USB extender (TP.USB-EXT-410I).

Once the application software installation is complete, start the *eyeone27* daemon on the workstation by typing the following at the shell prompt: `/etc/init.d/eyeone27 start`

## Network Connections

Network connections enable the workstation to gain access to a wide variety of possible networks. The Gigabit Ethernet (GigE) ports built-in to the workstation, and those provided by the add-on GigE adapter, can provide access to the following:

- House network (e-mail, Internet, etc.)
- Private network
- Dedicated Autodesk Wire network
- NAS/SAN storage network
- Shared network mountpoints
- Remote Visual Effects and Finishing workstation direct attached storage (via Wire network)
- Background and/or network rendering
- Lustre Control Surface
- Link aggregation (port bonding) switch

The optional InfiniBand adapter in slot 7 enables the workstation to gain access to a high-performance InfiniBand network:

- Visual Effects and Finishing: InfiniBand is used to enhance the Autodesk Wire network.
- Lustre: InfiniBand is the high-performance option for connecting to an Incinerator node cluster. Note that InfiniBand configurations are only supported for Lustre workstations equipped with the older QLogic DDR InfiniBand adapter. The new Mellanox QDR InfiniBand / 10-GigE adapter is not supported.

---

**NOTE** Even though InfiniBand is a point-to-point architecture, an InfiniBand switch is nevertheless needed for any InfiniBand network. It is not possible to simply connect two workstations together via their InfiniBand adapters.

---

This section presents information on making the hardware connections to the available networks. The connections presented here are offered as guidelines. The actual connections you make will depend upon your particular network topology, including such factors as whether or not you have separate house and Wire networks (highly recommended), how many network switches you have for each network, etc.

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**TIP** It is recommended that you use Category 6 (Cat-6) cable for the GigE connections.

---

## Visual Effects and Finishing Workstation

As you make the GigE network connections, note the ports you use. You will need these later, when configuring the network.

**Connect the built-in GigE port as follows:**

- House network

**Connect the add-on GigE adapter as follows:**

- SAN
- Private and/or dedicated Wire network

- Link aggregation ( port bonding) switch, etc.

---

**NOTE** Do not use any of the ports on the add-on network card for your house network. If the house network is not connected to the on-board network port, consult your system administrator to reconfigure it.

---

**Connect the optional InfiniBand / 10 GigE adapter as follows:**

- Port one to the InfiniBand network switch
- Port two to a 10 GigE switch, if applicable

For information on network configuration see the *Autodesk Visual Effects and Finishing Installation and Configuration Guide*.

## Lustre Workstation

As you make the GigE network connections, note of the port numbers used. You will need these later, when configuring the network.

**Connect the built-in GigE ports as follows:**

- House network in port 0.
- Autodesk Control Surface (via network switch) in port 1

**Connect the GigE adapter as follows:**

- SAN
- Private and/or dedicated Wire network
- Incinerator private network. For more information, see the *Autodesk Incinerator Installation and User Guide*.

**Connect the optional InfiniBand adapter as follows:**

- Port one (right-most port) to InfiniBand network switch. This port is also used by Incinerator, to transfer frames.

---

**NOTE** Lustre and Incinerator only support the older QLogic DDR InfiniBand adapter. The newer Mellanox QDR InfiniBand / 10-GigE adapter is not supported.

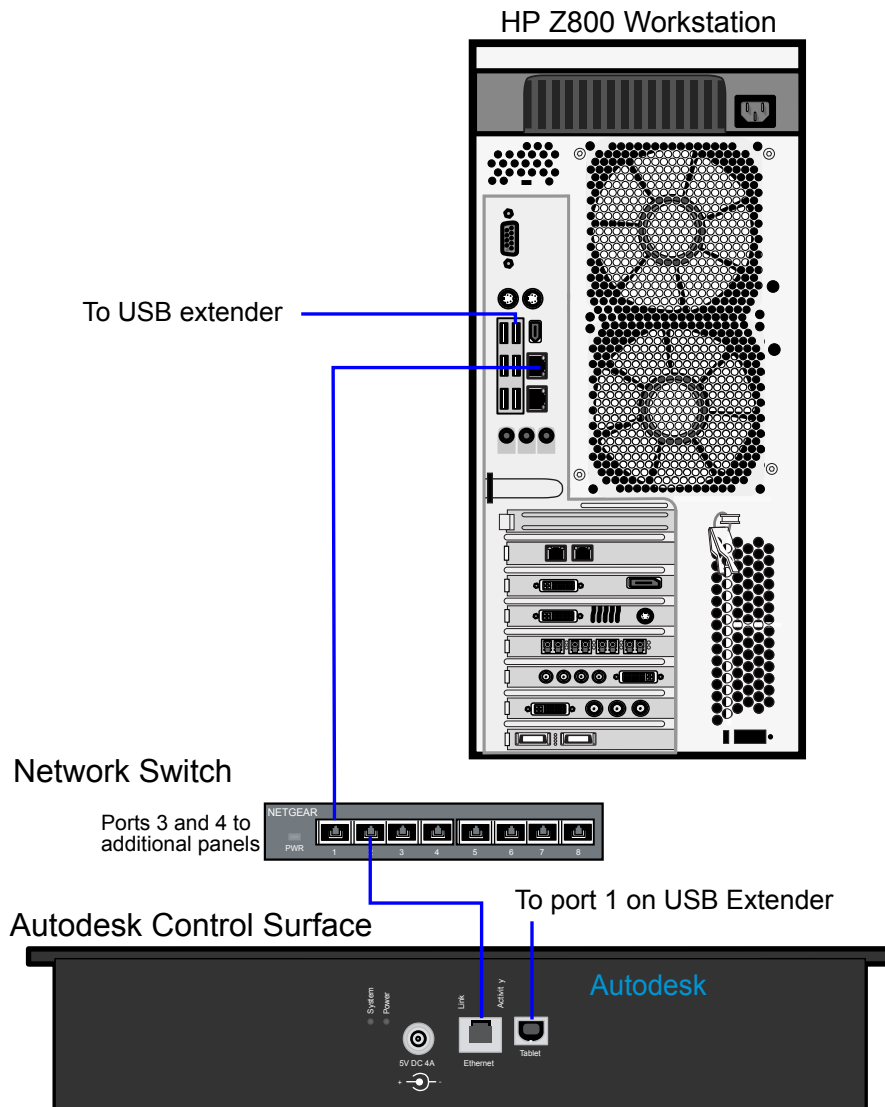
---

For information on network configuration, see the *Autodesk Lustre Installation Guide for Linux Workstations* and/or *Autodesk Lustre User Guide*.

# Connecting the Autodesk Control Surface to a Lustre Workstation

The Autodesk Control Surface consists of three panels connected to the workstation's on-board GigE port 1 by way of the supplied network switch. The central panel requires an additional connection to the remote unit of the USB extender kit.

This section provides information on making the physical connections needed to operate the Autodesk Control Surface. For information on using the Control Surface, see the *Autodesk Control Surface User Guide*.



**NOTE** The illustration shows the central panel only (the Colour Grading panel). This panel is easily identified, since it has both an Ethernet network port and a USB connector. It is also the panel with the built-in tablet.

## To connect the Autodesk Control Surface:

- 1 Connect each panel to a power supply using the AC power adapter cables.

- 2 Use network cables to connect each panel to the available ports in the network switch.
- 3 Additionally, connect the Colour Grading panel to the remote unit of the USB extender kit.
- 4 Use a network cable to connect an available port on the Netgear network switch to the workstation, as illustrated.
- 5 Refer to the application installation and configuration guide for instructions on assigning an IP address to the Autodesk Control Surface.

## Connecting the Slave Renderer to a Lustre Workstation

The Lustre Slave Renderer is a single render node that provides automatic background rendering on a shot-by-shot basis. It is available for the Lustre Master Station, the Station, and the HD Station.

---

**NOTE** In comparison, Autodesk Incinerator provides “in-line” processing by several nodes at once. For more information, see the *Autodesk Incinerator Installation and User Guide*.

---

Connect the Slave Renderer to a switch on your GigE house network. Note that the Slave Renderer can only be used by one Lustre workstation.

Although the Lustre Slave Renderer uses a standard GigE network connection, it requires the higher-bandwidth Cat-6 cable, to accommodate the increased data that is transmitted.

### To connect the Slave Renderer:

- 1 Connect one end of the Cat-6 cable to an available GigE port on your house network switch.
- 2 Connect the other end of the cable to one of the on-board GigE ports of the Slave Renderer machine.





# Setting Up Video Hardware

# 4

## Topics in this chapter:

- [Video Hardware Components](#) on page 21
- [Connecting Video Components](#) on page 22
- [Setting Up VTR Emulation](#) on page 23

## Video Hardware Components

This chapter explains how to set up video I/O for your workstation.

The following components are included in your shipment:

**Nvidia Quadro FX 5800 graphics adapter** The Nvidia Quadro FX 5800 graphics adapter drives the LCD monitor directly, and a broadcast monitor via the Nvidia Quadro SDI Output adapter.

**Nvidia Quadro SDI Output adapter** The Nvidia Quadro SDI Output adapter supplies 2K, HD, or SD video output to a broadcast monitor, VTR, or SDI projector. The card features a BNC genlock connector that connects to your facility's sync generator.

**AJA OEM-2K adapter and breakout box** The AJA OEM-2K adapter provides video and audio I/O, and VTR control. The adapter connects to the breakout box, and handles SD (NTSC, PAL), and HD at a depth of 8 and 10 bits.

**LCD graphics monitor** The graphics monitor features a wide screen with a 16:9 aspect ratio, and a maximum resolution of 1920x1200.

**AJA HD5DA video distribution amplifier** The AJA distribution amplifier receives its signal from the Nvidia SDI Output adapter and drives a VTR and broadcast monitor. The distribution amplifier is also necessary in order to use the Real-Time Deliverables feature.

# 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).

Note the following important points regarding connections to the Nvidia Quadro SDI Output adapter (slot 5):

- Input port A of the VTR connects to the AJA HD5DA distribution amplifier (for 4:2:2 signal), and input port B connects to the middle connector on the Nvidia SDI Output adapter (for dual link 4:4:4 signal). The VTR output ports A and B connect to the SDI In A and B ports of the AJA breakout box.
- The output of the AJA OEM-2K adapter, when ported through the AJA breakout box, can be used when connected to a VTR that is not being used for Real-Time Deliverables. You can switch the output between the AJA card and the SDI card through the application user interface.
- VTR control is achieved through the RS-422 port on the AJA breakout box.
- Your facility's sync source connects to the indicated connector on the Nvidia Quadro SDI Out adapter card.

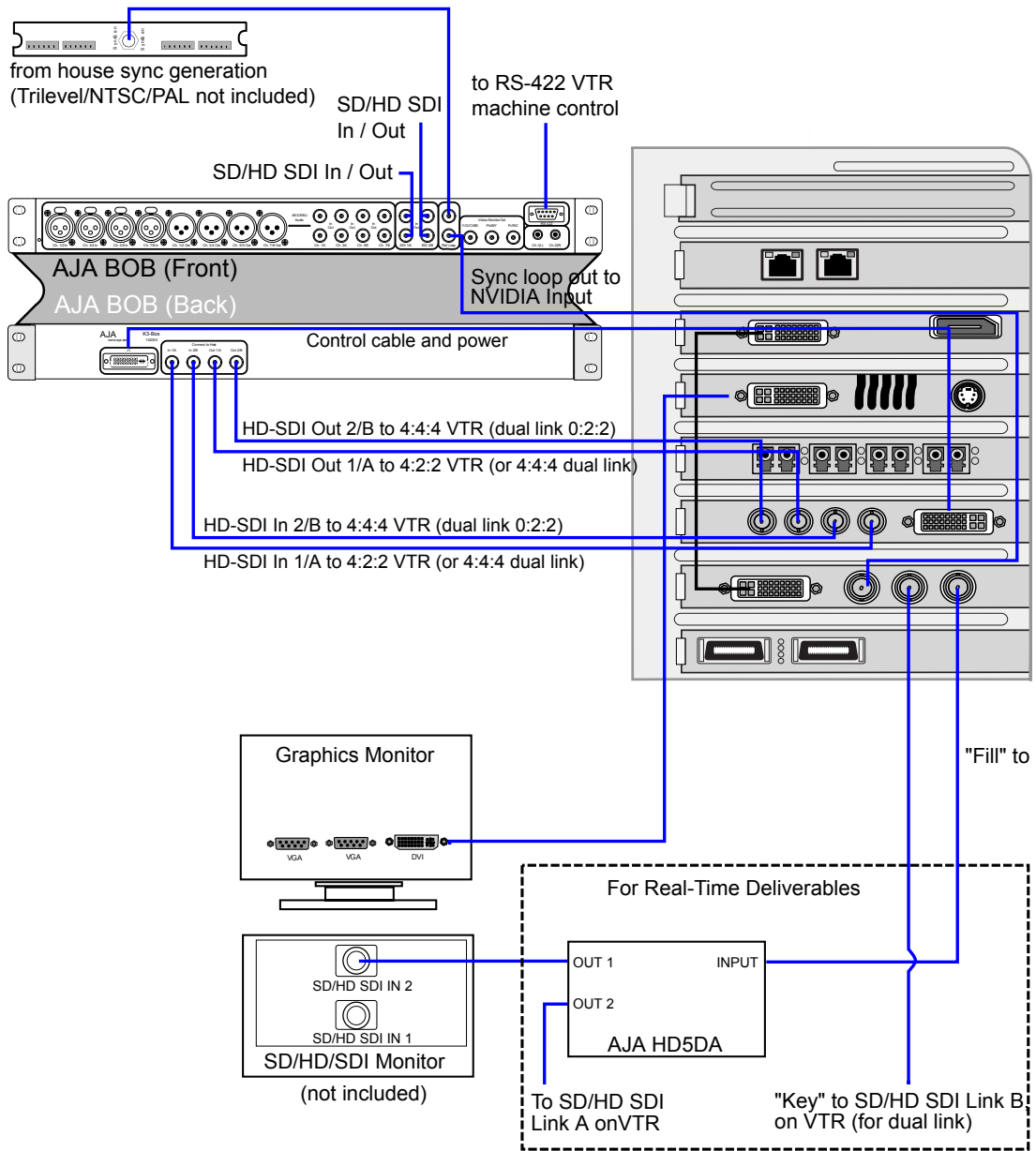
---

**WARNING** It is critical to connect the adapter card exactly as shown in the diagram to ensure the sync works correctly.

---

- Do not use an SD (NTSC or PAL) sync generator for HD projects. Always use a tri-level sync generator for HD projects. Using the wrong sync generator for a project may impact the stability of your workstation.

## HP Z800 Video I/O



## Setting Up VTR Emulation

You can configure your Autodesk Visual Effects, Finishing, and Colour Grading application to emulate a VTR for both input and output in real time. You control the emulator from the application or device that sees the Autodesk Visual Effects, Finishing, and Colour Grading application as a VTR.

The following procedure describes how to configure the hardware for VTR emulation. Consult the “VTR Emulation” chapter in your application User Guide for more information.

**To configure hardware for VTR emulation:**

- 1 Connect the video I/O cables between the devices involved in the VTR emulation process (out-to-in/in-to-out). Make sure the connections support the video standard you want to work with.  
If you intend to use the emulator as a Player, it is recommended that you connect one black or colour bar SDI signal to the input of the system serving as the VTR emulator. This ensures the Player is stable and correctly synced.

---

**NOTE** This applies to an Autodesk Visual Effects and Finishing application only: VTR emulation requires a workstation with a video adapter card. The *Video* keyword for the corresponding device must be uncommented in the software initialization configuration file, *init.cfg*. See the description of the *Video* keyword in the *Autodesk Visual Effects and Finishing Installation and Configuration Guide*.

---

- 2 Connect the audio I/O cables between the devices involved in the VTR emulation process (out-to-in/in-to-out).  
If you intend to use the emulator as a Player, it is recommended that you connect an external AES signal such as a tone to the input of the system serving as the VTR emulator. This ensures the Player is stable and correctly synced.

---

**NOTE** Connect an RS-422 control cable to the serial ports between the devices used in the VTR emulation process. This applies to an Autodesk Visual Effects and Finishing application only: Make sure that the serial ports correspond to those defined by the *Emulator* keywords in the software initialization configuration file. See the description of the *Emulator* keyword in the *Autodesk Visual Effects and Finishing Installation and Configuration Guide*.

---

---

**NOTE** The RS-422 cables for VTR emulation require custom pinouts. See [VTR Emulation RS-422 Control Cables](#) on page 48.

---

- 3 Make sure the appropriate video and audio sync setup is in place.

# Setting Up Audio Hardware

# 5

## Topics in this chapter:

- [Overview of Audio Components](#) on page 25
- [Wiring Audio Components](#) on page 26
- [Configuring the Lucid ADA 88192 Converter](#) on page 26
- [Audio Keywords in the Visual Effects and Finishing Configuration File](#) on page 29

## Overview of 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.

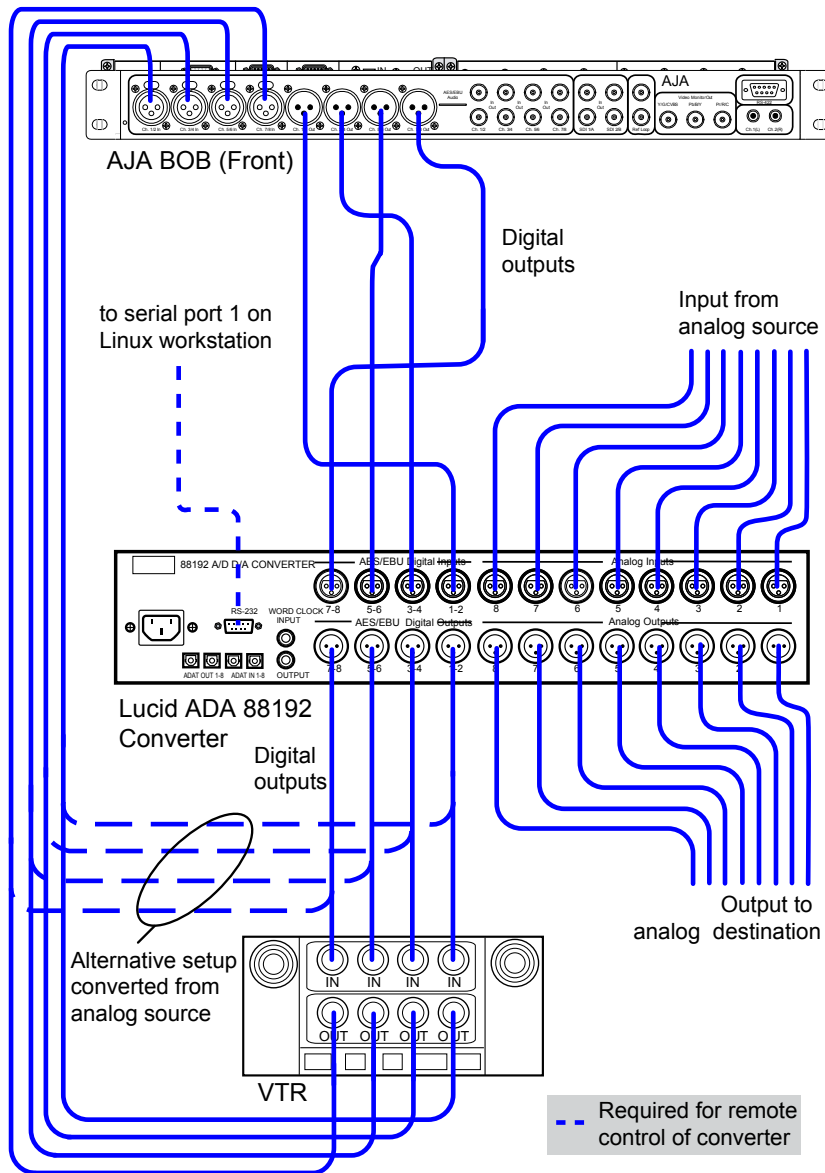
### To wire the audio subsystem:

- 1 Ensure all peripherals and video components are properly connected.
- 2 Determine whether you want to control the Lucid converter remotely or locally. This affects the way you wire the audio hardware. See [Understanding Remote vs. Local Control of the Lucid Converter](#) on page 27.
- 3 Connect your audio hardware devices. See [Wiring Audio Components](#) on page 26.
- 4 Configure the Lucid converter for remote or local control. See [Configuring the Lucid ADA 88192 Converter](#) on page 26.

- 5 Set the appropriate keywords in the software initialisation file. See [Audio Keywords in the Visual Effects and Finishing Configuration File](#) on page 29

## Wiring Audio Components

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



## Configuring the Lucid ADA 88192 Converter

You must manually configure the Lucid converter for either remote or local control. This section describes how to use the controls on the front of the converter to adjust settings, and lists the proper settings for remote control and for local control.

# Understanding Remote vs. Local Control of the Lucid Converter

You can control the converter either remotely or locally. Remote control of the converter means that you adjust converter settings through the audio preferences of the application. If you want to control the converter remotely, you must connect the converter to the serial port of the workstation. Local control means you adjust converter settings manually, using the controls on the front of the converter. Controlling the converter remotely is the recommended method as it does not require physical access to the converter to change settings.

Whether you control the converter remotely or locally, you should take any necessary precautions to prevent inadvertent adjustments to settings via the controls on the front of the converter. For example, if the converter is one of several in a machine room, you might label each with the name of the computer to which it is connected, along with whether control is local or remote.

## Adjusting Lucid ADA 88192 Converter Settings

You configure the converter through a series of setup menus that appear in the display on the front of the converter. Use the encoder dial and button immediately to the right of the display to navigate these menus and adjust settings.

The top level setup menu contains the following menu items: ADAT, AES, Analog, Meter, Route, Sync, and System. Each of these menu items takes you into a submenu, from which you can select and adjust settings.

The procedures below provide basic information on navigating and adjusting settings. If you require additional information, refer to the Lucid ADA 88192 manual included with your shipment.

### To navigate menus and adjust settings:

- Use the encoder dial and the button as follows.

To:	Do this:
Select a menu option	Rotate the dial to highlight the option, then press the dial to select that option. If the option you select has choices (as, for example, in the Route menu), rotate the dial again to move through the choices, and press the dial to select an option.
Back up one level in the menu tree	Press the button.
Navigate to the top level setup menu	Press the button. Repeat until you are in the top level setup menu.

### To reset all settings to their factory defaults:

- 1 In the top level setup menu, select System, then select Miscellany.
- 2 In the Miscellany menu, select Defaults: RESET.  
All settings are reset to their factory defaults.

---

**NOTE** The factory default for the items in the AES setup menu is SRC ON. Both local and remote control require these items to be set to SRC OFF. If you reset to defaults, be sure to manually set these items back to OFF (you cannot adjust these settings remotely).

---

## Lucid ADA 88192 Converter Settings for Remote Control

You must configure the following settings to control the converter remotely. Any setting not listed here either has no effect with the application or can be set through the audio preferences of the application.

Menu	Menu Item	Comment
ADAT	ADAT INs: SRC ON ADAT INs: SMUX OFF	
AES	AES IN1+2: SRC OFF AES IN3+4: SRC OFF AES IN5+6: SRC OFF AES IN7+8: SRC OFF	
Analog Analog INs: SoftClip	IN1+2: SoftClip OFF IN3+4: SoftClip OFF IN5+6: SoftClip OFF IN7+8: SoftClip OFF	
Meter	Clip Detect: 3	3 is the recommended setting
System Miscellany	Route Unit: 8	8 is the recommended setting

## Lucid ADA 88192 Converter Settings for Local Control

You must configure the following settings to control the converter locally. Any setting not listed here either has no effect with the application or can be set to any of the values available for it.

Menu	Menu Item	Comment
ADAT	ADAT INs: SRC ON ADAT INs: SMUX OFF	
AES	AES IN1+2: SRC OFF AES IN3+4: SRC OFF AES IN5+6: SRC OFF AES IN7+8: SRC OFF	
Analog Analog INs: SoftClip	IN1+2: SoftClip ON IN3+4: SoftClip ON IN5+6: SoftClip ON IN7+8: SoftClip ON	
Analog Analog INs: Gain	set each input channel to a value in the range -95.5 to +31.5 dB	
Analog Analog OUTs: Level	set either -10 or +4 for each output channel	
Meter	Clip Detect: 3	3 is the recommended setting
Route	For analog audio: AES INs --> ADAT OUTs Analog INs --> AES OUTs AES INs --> Analog OUTs	If these options do not appear, verify that Route Unit (in the System, Miscellany menu) is set to 8.



Menu	Menu Item	Comment
	For digital audio: AES INs --> ADAT OUTs AES INs --> AES OUTs AES INs --> ANALOG OUT	
Sync	Internal OFFExternal AES 1+2	External AES 1+2 is the recommended setting.
System Miscellany	Route Unit: 8	

## Audio Keywords in the Visual Effects and Finishing Configuration File

There are two keywords in the software initialisation file (by default, *init.cfg*) that must be uncommented and set to the correct values to ensure Discreet Native Audio works properly. The first, *Audiodevice*, enables Discreet Native Audio. The second, *MidiDevice*, determines whether control of the Lucid converter is remote or local.

---

**NOTE** This does not apply to Lustre.

---

Keyword:	Setting:
Audiodevice	AJA
MidiDevice	If you are using local control of the converter, comment out this keyword. If you are using remote control of the converter, uncomment the keyword, set the serial port parameter to <code>/dev/ttyS1</code> and leave all other parameters set to their default value.

For additional information on these keywords and help setting them, see the *Autodesk Visual Effects and Finishing Installation and Configuration Guide*.



# Connecting Storage

# 6

## Topics in this chapter:

- [Connecting Media Storage](#) on page 31
- [Connecting the Fibre Channel Adapter](#) on page 31
- [Connecting Storage Enclosures](#) on page 32
- [Connecting Archiving Storage](#) on page 39

## 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.

---

**NOTE** A Lustre workstation equipped with Incinerator does not use DAS storage. Incinerator storage is attached to the Lustre Media Server, accessed by way of the InfiniBand network.

---

- **A SAN** A storage infrastructure that allows multiple workstations to share simultaneous access to a central storage enclosure.

## Connecting the Fibre Channel Adapter

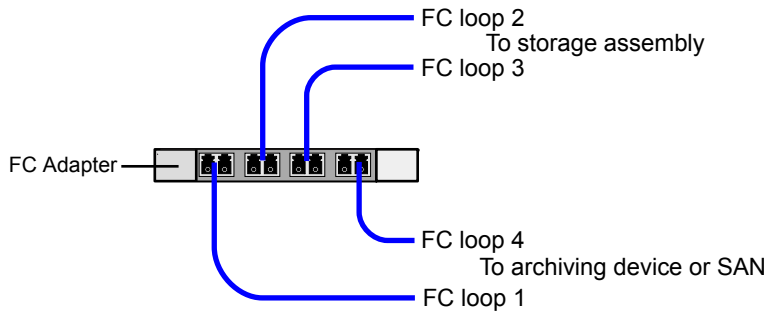
On HP Z800 workstations or Lustre Media Servers, connections to media storage are made using the ATTO Celerity FC84-EN fibre channel adapter, located in slot five (top to bottom).

---

**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 Storage Enclosures

Autodesk Stone Direct XR-series disk arrays provide two types of enclosures: a RAID enclosure (also called an XR enclosure), and an EBOD enclosure (also called an XE enclosure). XR RAID enclosures contain two RAID controllers.

Autodesk Stone Direct uses hardware RAID to provide high performance, reliability, and protection against data loss.

The following table outlines the drive sizes, maximum number of enclosures, and filesystem type supported by each model of Autodesk Stone Direct XR-series storage arrays.

Storage model	Max XE enc. per XR	Disk size	Supported Filesystem type
XR146 (XR 5402 or XR 5412)	4	146GB	<ul style="list-style-type: none"> <li>■ Stone FS, or</li> <li>■ Standard FS</li> </ul>
XR300 (XR 5412)	4	300 GB	<ul style="list-style-type: none"> <li>■ Stone FS, or</li> <li>■ Standard FS</li> </ul>
XR 6412	7	300 GB or 450 GB	<ul style="list-style-type: none"> <li>■ Stone FS, or</li> <li>■ Standard FS</li> </ul>
XR 6500	7	450 GB	Standard FS only

**NOTE** The Stone® filesystem is not supported on HP Z800 workstations.

XR 6500 and XR 6412 arrays require a single XR RAID enclosure for 2-loop or 4-loop hardware RAID storage configurations.

XR 5412 and XR 5402 arrays require a single XR RAID enclosure for 2-loop configurations, or two RAID enclosures for 4-loop configurations.

These configurations may include additional XE expansion enclosures, up to the maximum number supported. You can increase storage capacity by adding disk arrays.

A number of Stone Direct configurations will ensure optimal playback of the most demanding formats.

Storage Configuration	Loops	Expected Performance
Stone Direct XR	One 2-loop connection	<ul style="list-style-type: none"> <li>■ One stream SD/HD 10-bit (32 channel/8-bits per channel audio), or</li> <li>■ One stream 2K 12-bit unpacked (8 channel/8-bits per channel audio)</li> </ul>
Stone Direct XR plus Stone Direct XE	Two 2-loop connections (if permitted by chassis) – or – One 2-loop connection	<ul style="list-style-type: none"> <li>■ Two streams SD/HD 10-bit (32 channel/8-bits per channel audio), or</li> <li>■ One stream 2K 12-bit unpacked (8 channel/8-bits per channel audio)</li> </ul>
2 x Stone Direct XR	Two 2-loop connections (one per enclosure)	<ul style="list-style-type: none"> <li>■ Two streams SD/HD 10-bit (32 channel/8-bits per channel audio), or</li> <li>■ One stream 2K 12-bit unpacked (8 channel/8-bits per channel audio)</li> </ul>

## 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.

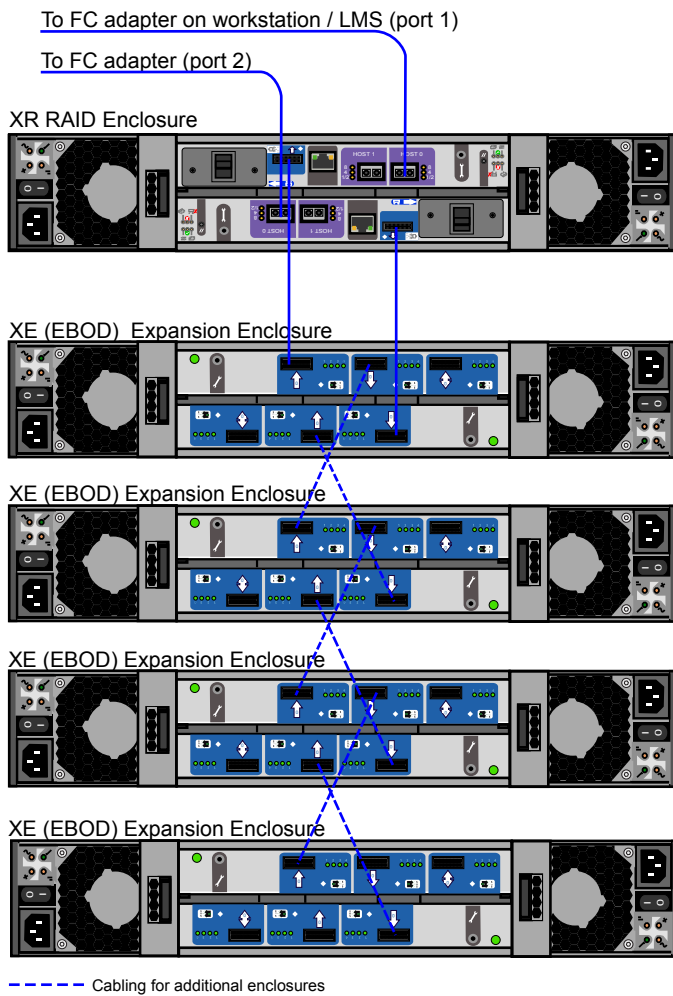
A XR 6500 RAID enclosure supports a maximum of seven XE expansion enclosures. Configurations with two XR RAID enclosures are not supported.

---

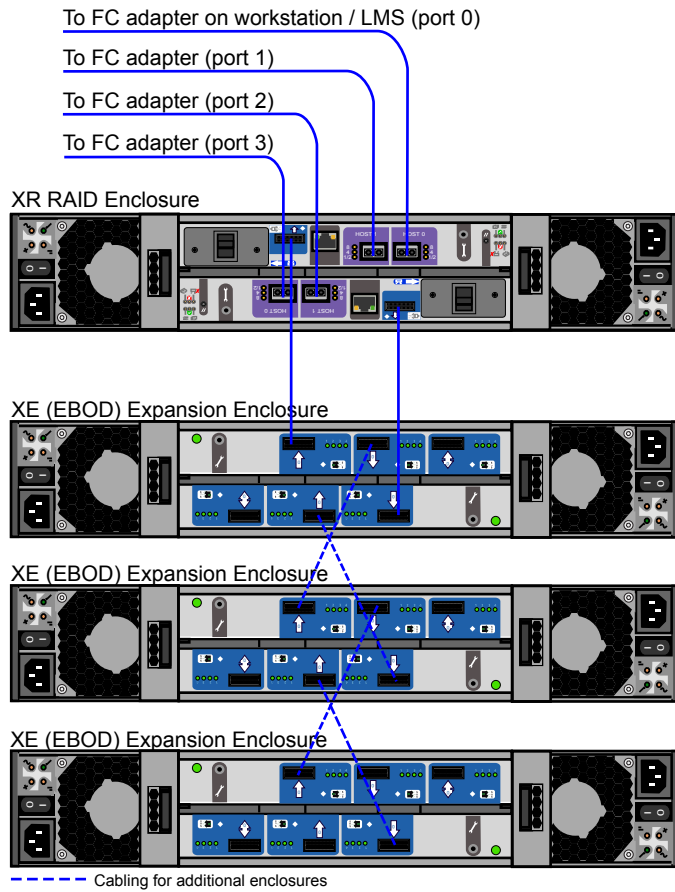
**WARNING** Do not power on your storage before installing Linux, otherwise the Red Hat installer might attempt to format the storage array and use it as the system disk.

---

### 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 enclosures 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.

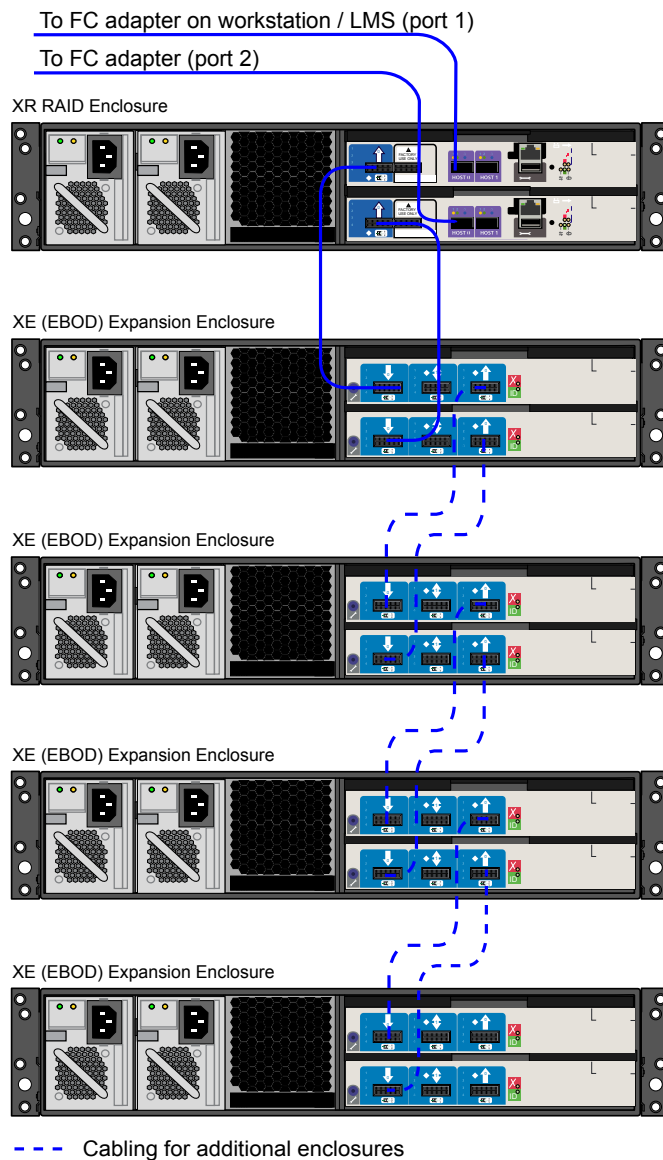
A XR 6412 RAID enclosure supports a maximum of seven XE expansion enclosures. Configurations with two XR RAID enclosures are not supported.

---

**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.

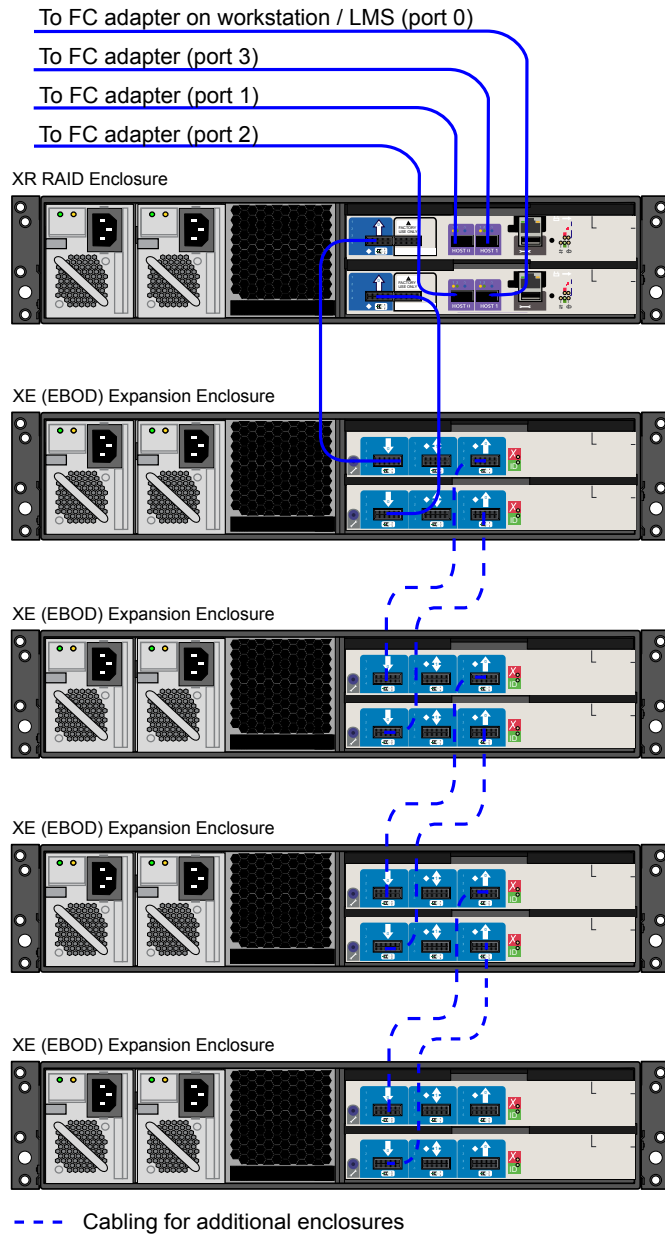
---

### Single XR 6412 RAID enclosure, 2 loops





## Single XR 6412 RAID enclosure, 4 loops



---

**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 diagrams 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.

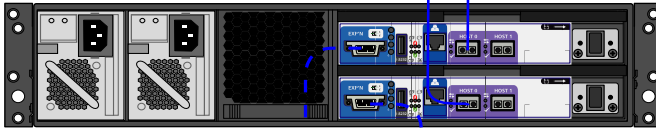
---

### Single XR 5402 / 5412 RAID enclosure, 2 loops

To FC adapter on workstation / LMS (port 1)

To FC adapter (port 2)

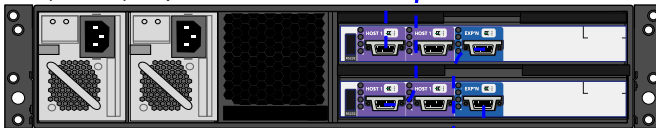
XR RAID Enclosure



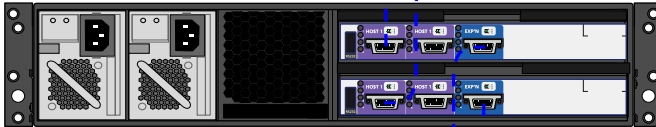
XE (EBOD) Expansion Enclosure



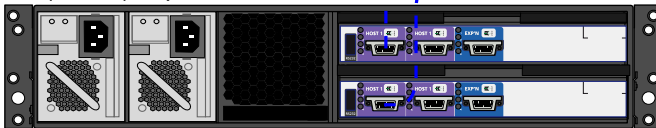
XE (EBOD) Expansion Enclosure



XE (EBOD) Expansion Enclosure



XE (EBOD) Expansion Enclosure



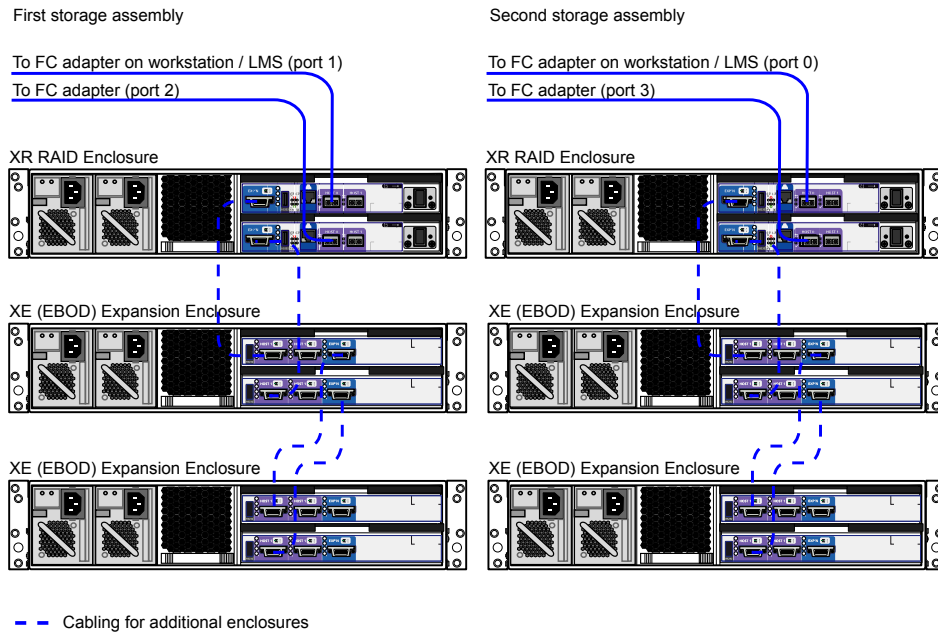
- - - Cabling for additional enclosures

---

**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

---

**NOTE** This section does not apply to Autodesk Lustre.

---

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 22.

## 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 the Workstation BIOS

# 7

## Topics in this chapter:

- [Checking the BIOS Settings](#) on page 43
- [Updating your System BIOS](#) on page 44
- [Restoring BIOS to Default Factory Settings](#) on page 45

## 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. See [Restoring BIOS to Default Factory Settings](#) on page 45 for instructions on restoring your BIOS settings to factory defaults.

BIOS Menu	Submenu	Item	Value
Storage	Storage Options	SATA Emulation	RAID+AHCI
	Boot Order	Optical Drive	

BIOS Menu	Submenu	Item	Value
		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
	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

## Updating your System BIOS

The BIOS version installed on your system appears on the screen while booting the workstation. The following procedure describes how to update a workstation to the certified BIOS version required by your application.

**NOTE** Before attempting to update the system BIOS, make sure the SATA Emulation option is properly set, otherwise your optical drive is not detected.

### To update the BIOS on your workstation:

- 1 Download the latest version of the DKU from Autodesk and extract the *tar* file into a temporary directory.
- 2 Go to the */Utils/BIOS* subdirectory of the DKU directory.  
In the *BIOS* directory there is a subdirectory for each platform supported by the current version of your Visual Effects, Finishing, and Colour Grading application.
- 3 Go to the directory that corresponds to your hardware platform.



The directory contains an *.iso* disc image file for each supported BIOS version, as well as a *README* text file that describes each file, and provides information on updating the BIOS.

- 4 Burn the correct *.iso* file to a CD and place it in the DVD-ROM drive on the workstation.
- 5 Reboot your workstation and press **F10** to enter the system BIOS.
- 6 Optional: Press **F8** to select a language.
- 7 In the Storage menu, select Storage Options, and set SATA Emulation to IDE. This option allows the BIOS to be updated from a CD.
- 8 Press **F10** to confirm the change.
- 9 In the File menu, select Save Changes and Exit.  
The workstation reboots.
- 10 Press **F10** to enter the BIOS again.
- 11 In the File menu, select Flash System ROM.  
A dialog box prompts you to select between USB and CD-ROM.

---

**NOTE** If the CD-ROM option does not appear, SATA emulation was not set correctly. Reboot your machine and redo this procedure from step 4.

---

- 12 Select CD-ROM and press **F10** to confirm.
- 13 Select the *.bin* file.  
A confirmation dialog box appears.
- 14 Press **F10** to confirm.
- 15 Press any key.  
A message stating that the system ROM flash was successful appears.
- 16 In the Storage menu, select Storage Options and set SATA Emulation back to the value documented in the previous table. This setting is required for Linux to work properly.
- 17 Press **F10** to confirm the change.
- 18 Verify all the BIOS settings again to make sure they correspond to the recommended settings.
- 19 In the File menu, select Save Changes and Exit.  
The workstation reboots.

## Restoring BIOS to Default Factory Settings

If necessary, perform the following procedure to restore the BIOS settings to factory defaults.

### To restore default factory BIOS settings:

- 1 Press **F10** while booting the workstation to enter the system BIOS.
- 2 In the File menu, select Default setup, then Restore Factory Settings as Default.
- 3 Press **F10** to accept the changes.
- 4 In the File menu, select Apply Defaults and Exit, then press **F10** to confirm.  
The factory system defaults are restored.

- 5 When the workstation reboots, press **F10** again to re-enter the BIOS, and configure the recommended Autodesk settings.

# VTR Control Cable Pinouts

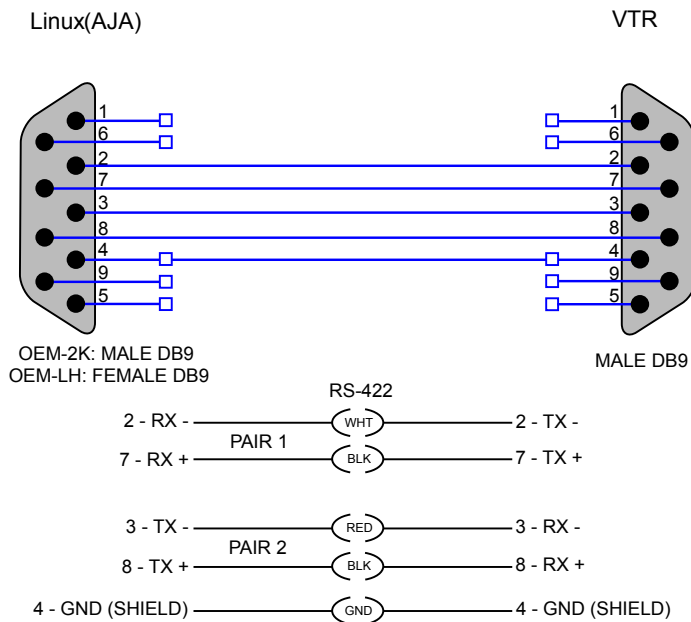
# A

## Topics in this chapter:

- [Standard VTR Control Cable Pinouts](#) on page 47
- [VTR Emulation RS-422 Control Cables](#) on page 48

## Standard VTR Control Cable Pinouts

The following diagram depicts the RS-422 control cable pinouts for the standard VTR control cable.



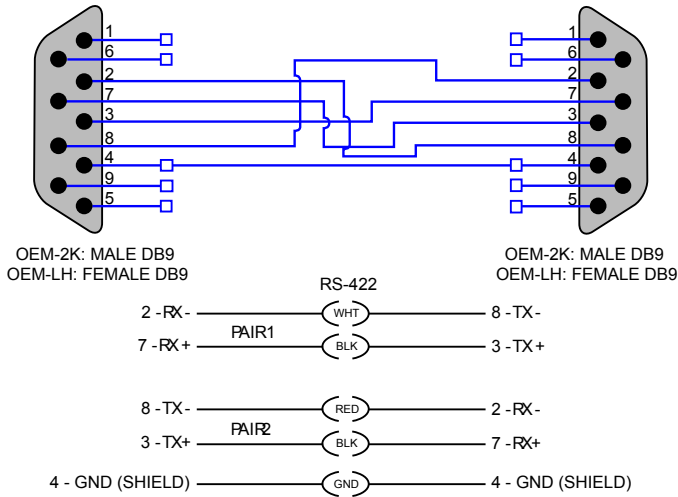
# VTR Emulation RS-422 Control Cables

Custom cables are required to control the VTR emulator. The pinouts required by the cable depend on the workstation and device involved in the VTR emulation process. The following diagrams depict the control cable pinouts required for the most common VTR emulation setups.

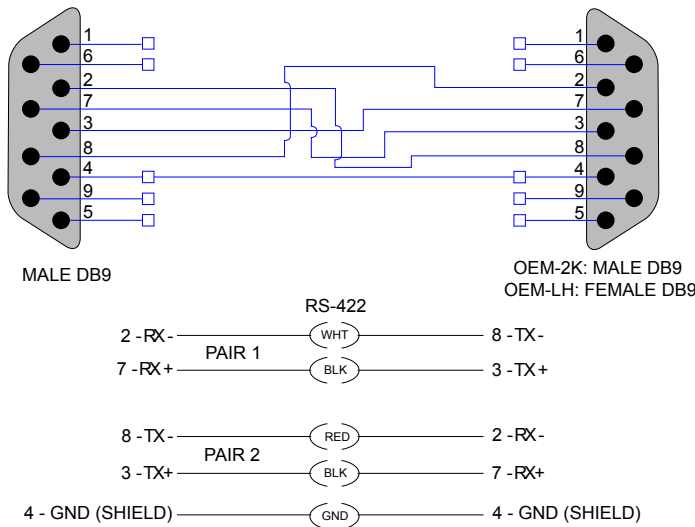
## Linux Master to Linux Emulator

Linux(AJA) Master

Linux(AJA) Emulator



## Third-Party Master to Linux Emulator



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