

# 1

# Introduction

System Overview

*This chapter introduces you to the Discreet Audio system.*

## How to Use This Guide

This configuration guide is for the Discreet Audio 8 I/O unit.

The *Discreet Audio Hardware Configuration Guide* provides you with essential information about configuring your system. Each chapter in this guide covers one major step of the Discreet Audio configuration.

**NOTE:** Follow the instructions in every chapter to ensure your Discreet Audio system is configured properly.

- This chapter introduces you to the hardware components of Discreet Audio, explains notation conventions used in this guide, and provides information on contacting Customer Support.
- Chapter 2, “Site Preparation”, discusses site preparation and techniques, and the tools you need to configure Discreet Audio.
- Chapter 3, “Installing the USP and SCSI Boards”, describes how to install the USP and SCSI boards in the PCI card cage.
- Chapter 4, “Installing the PCI Card Cage”, describes how to install the PCI card cage in the Onyx or OCTANE.
- Chapter 5, “Discreet Audio Wiring Configuration”, provides wiring diagrams that show how to connect the Discreet Audio components.

- Chapter 7, “Formatting the Audiostore”, describes how to power on your Onyx or OCTANE, format the sound disk, and provides some troubleshooting tips.
- The Glossary contains hardware and software terms used in the *Discreet Audio Hardware Configuration Guide*.

## Introducing Discreet Audio

Discreet Audio is a PCI bus-based, audio-editing subsystem integrated with **inferno**®, **fire**®, **flame**® and **smoke**® systems. It offers eight I/O channels and eight tracks of disk playback. Discreet Audio’s functionality includes:

- Simultaneous input and output of audio and video
- Real-time multitrack editing, playback of fades and slipping
- Segment-based or clip-based panning, gain, and EQ parameters and channel assignment
- Crossfades without checkerboarding (uses 16 tracks of disk playback for crossfades)
- Audio network support
- Archiving support

Installing Discreet Audio is the final stage in your **inferno**, **fire**, **flame**, or **smoke** hardware installation. If the hardware components are not already installed, contact Discreet Customer Support before installing Discreet Audio (see “Getting More Help” on page 4).

## System Overview

Discreet Audio consists of:

- One USP (Ultra Sonic Processor) board
- One SCSI board
- One PCI card cage
- One analog/digital input/output adapter
- One external SCSI sound disk(s)

For a complete shipment checklist, see “Receiving Your Shipment” on page 8.

## PCI Card Cage

The PCI card cage is installed in the Onyx or OCTANE and houses the USP board in one of its two full-size PCI slots and the SCSI board in the half-size slot. See Chapter 3, “Installing the USP and SCSI Boards”.

## USP Board

The USP board processes all digital input and output in Discreet Audio, and connects the audiostore to the system through a dedicated SCSI port.

The USP board has multi-pin connectors for Serial and SCSI output on its rear panel. The USP board connects to digital or analog devices using an external converter unit.

## SCSI Board

The SCSI board is installed in the PCI card cage and provides a dedicated connection to the audiostore.

## Analog/Digital I/O Adapter

The analog/digital I/O adapter sends and receives analog and digital audio between the USP board and the analog/digital equipment (for example, analog consoles or audio monitor subsystems).

The analog/digital I/O adapter connect the USP board to a VTR, DAT recorder, professional CD player, or audio system using coaxial electrical AES/EBU, S/PDIF, or related formats of digital audio on XLR or RCA phono connectors.

The analog/digital I/O adapter can also connect Word Sync to the USP board using a Video Ref-to-Word Sync converter (not supplied with your Discreet Audio system.)

## SCSI Sound Disk

A Sound Disk (audiostore) is a large-capacity, high-performance SCSI hard disk that stores digital audio for use with Discreet Audio. The supported SCSI disk is a 9-GB Seagate Barracuda hard disk, model ST39216N.

## Connecting House Sync/AES Audio to Discreet Audio

By default, Discreet Audio connects to House Sync/AES audio by locking to the AES signal it receives from the AES audio source connected to the system. To lock to House Sync, the AES signal must originate from an audio device that supplies an AES signal derived from House Sync. See Chapter 6, “Connecting Discreet Audio to AES/Word Sync”.

## Connecting Word Sync to Discreet Audio

If you are using an analog-only system, we recommend that you sync Discreet Audio to Word Sync by using a Video Ref-to-Word Sync converter. See Chapter 6, “Connecting Discreet Audio to AES/Word Sync”.

**NOTE:** The Video Ref-to-Word Sync converter is not included with your Discreet Audio system.

## Notation Conventions

A number of notation conventions are used throughout this document.

<i>hinv</i>	The names of IRIX commands are in italics.
<i>/usr/fire/bin</i>	The names of directories and files are in italics.
<disk#>	Variable names are enclosed in angle brackets.
<b>cd /usr/fire</b>	Commands that you type in the command shell are in bold.

## Commands

The IRIX operating system is case sensitive. You must type commands, file names, and pathnames exactly as they appear in this manual.

For more information on the IRIX commands used in the hardware configuration, refer to the online operating system documentation. In an IRIX shell, type **man** followed by the name of the command. For example, to display information on copying files, type: **man cp**

## Variables

The commands in the guide use a number of variables. Variable names are always enclosed in angle brackets (<>). When you enter the command, replace the variable name with the correct value for your system. The variables that are used in this guide, as well as some examples, are shown below.

Variable:	Description:
<product_version>	The product and version number. For example, <b>fire_4.0</b>
<disk#>	The disk number of the mounted or unmounted sound disk.
<name>	The name you assign your sound disk.

## Platform Variations

Some hardware configuration information in this document applies only to Discreet Audio running on Onyx2 deskside (Desk) systems, only running on Onyx2 Rack (Rack) systems, or only running on OCTANE systems. Information that is specific to only one platform is marked with the appropriate icon.



## Getting More Help

If you receive damaged equipment, or if you need further hardware configuration information, contact Discreet Customer Support at one of the following numbers. You can also send queries by email.

**Discreet Customer Support**

North America:(800) 92LOGIC

Elsewhere: (514) 393-1616

Email: [discreet.support@autodesk.com](mailto:discreet.support@autodesk.com)

Fax: (514) 954-7254

WWW: <http://www.discreet.com>

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# Site Preparation

*Before you set up the system*

*This chapter describes site preparation for your Discreet Audio system, and discusses issues you should consider when setting up your equipment. This chapter also provides a checklist of the hardware components you should receive, and common safety practices you should use.*

## Summary

In this chapter, you learn about:

- “Site Preparation” on page 7
- “Receiving Your Shipment” on page 8
- “Tools and Techniques” on page 9
- “Setting Your Power Supply to the Correct Voltage” on page 10
- “Avoiding Damage from Static Electricity” on page 11
- “Grounding Techniques” on page 11

## Site Preparation

Install your Discreet Audio system in a rack, or on a flat table or surface. Use the following recommendations when selecting a site for installing Discreet Audio:

- If you install the system in a rack, the rack must be open or ventilated. Use the same ventilation specifications that apply to your Onyx2 or OCTANE.

- The equipment should be kept in a clean, dust-free location away from areas of excessive vibration, heat, cold, and dampness.
- Place all components in an air-conditioned environment. The machines generate heat and must be kept cool. Use the same air-conditioning specifications that apply to your Onyx2 or OCTANE.
- Do not block the vents on the component housing.
- Place all the components of your Discreet Audio system within five feet of a standard three-pronged (grounded) electrical outlet.
- Do not drape anything, such as a jacket or a blanket, over any part of the Discreet Audio system.
- Avoid placing components on surfaces that vibrate. Vibration can cause cable connections to come loose.
- Electro-magnetic noise can be caused by running digital data or power cables parallel to analog audio cables. The noise might sound like a hiss in the system. In order to minimize electro-magnetic noise, run the digital data and power cables in a separate duct from the analog audio cables.

## Receiving Your Shipment

When you receive your shipment, check all the boxes for dents or other markings that may 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 Discreet Logic Customer Support (see “Getting More Help” on page 4).

Use the following checklist to ensure you received all parts.

Discreet Audio Shipment Checklist		
Box	Received (✓)	Contents
USP Board Kit		<ul style="list-style-type: none"> <li>• 1 USP board</li> </ul>
Direct SCSI Kit		<ul style="list-style-type: none"> <li>• 1 PCI SCSI board (PCI-SCSI-Q-SE-IP)</li> <li>• 1 SCSI cable (50-pin to 68-pin)</li> </ul>



**Discreet Audio Shipment Checklist (Continued)**

Box	Received (✓)	Contents
<b>Analog/Digital I/O Adapter</b>		<ul style="list-style-type: none"> <li>• 1 analog/digital I/O adapter</li> <li>• 1 SCSI cable</li> <li>• 1 power cable</li> <li>• 1 gold-tipped BNC cable</li> <li>• 2 mounting brackets</li> <li>• 4 6/32x1/4" screws</li> <li>• 6 6/32" flat-head screws</li> <li>• 1 5/64" hex driver</li> </ul>
<b>SCSI Sound Disks</b>		<ul style="list-style-type: none"> <li>• 1 or more SCSI sound disk(s), Seagate Barracuda model ST39216N.</li> <li>• 1 power cable per disk</li> </ul>
<b>Cables and Terminators</b>		<ul style="list-style-type: none"> <li>• 1 digital audio cable</li> <li>• 1 75Ω BNC terminator</li> <li>• 1 SCSI/Serial cable</li> <li>• 1 SCSI cable</li> <li>• 1 SCSI terminator</li> </ul>

**NOTE:** You also need the PCI card cage to complete the Discreet Audio hardware configuration. The PCI card cage is shipped separately from your Discreet Audio system. If you have not received the PCI card cage, contact Discreet Customer Support (see "Discreet Customer Support" on page 5).

## Tools and Techniques

You must use the appropriate tools and exercise caution when configuring your Discreet Audio system.

Tools

You need the following tools to configure your Discreet Audio system (they are not supplied with your shipment).

Tools Checklist	
Tool	(✓)
Static wrist strap with alligator clip	
Slot screwdriver	
Phillips screwdriver	
Allen wrench/key	

Setting Your Power Supply to the Correct Voltage

Before powering on your system, you must set all components to the correct voltage for your country. Depending on your country’s voltage you must set your Discreet Audio hardware power supplies to either 110 or 220 volts.

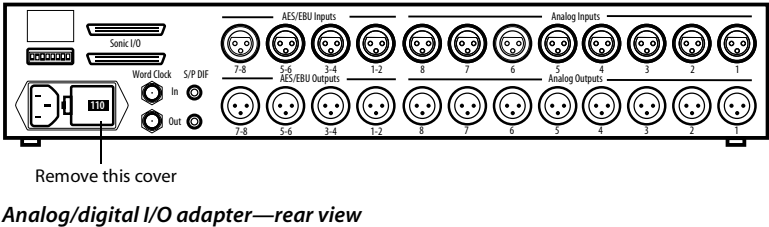
**WARNING:** Powering on your Discreet Audio system with the incorrect voltage settings will seriously damage your hardware components. Do not power on any Discreet Audio hardware component without ensuring it is set to the correct voltage.

Changing the Power Supply Voltage for the Analog/Digital I/O Adapter

To change the voltage for an analog/digital I/O adapter, you must first remove the fuse cover on the back of the adapter. A voltage key is located behind the fuse cover. The current voltage setting is visible through a small window in the fuse cover.

To change the voltage:

1. Make sure the unit is unplugged.
2. Remove the fuse cover on the back of the adapter.



3. Remove the small grey voltage key from the adapter. The voltage key has a voltage setting on its front and back.
4. Turn the voltage key until you see the correct voltage setting.
5. With the correct voltage setting facing up and towards you, slide it back into the converter.
6. Replace the fuse cover.  
The fuse clicks when it is properly seated.

### **Power Supply Voltage for the SCSI Sound Disk**

The SCSI sound disk shipped with your Discreet Audio system has a universal power supply. It automatically detects, and switches to, your country's voltage.

**NOTE:** If you are using a SCSI sound disk other than the one shipped with your Discreet Audio system, make sure it is set to the correct voltage.

### **Avoiding Damage from Static Electricity**

When installing any hardware equipment, take the following precautions to prevent damage to sensitive components from static discharge:

- Make sure power is turned off on the component you are working on.
- Always 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 the boards unnecessarily.

### **Grounding Techniques**

It is important to properly ground your Discreet Audio system. Otherwise, you may have ground loops, or humming in the system.

To ensure Discreet Audio is properly grounded, use the XLR-3 cables shipped with your system. Using any other cables may cause humming in the system.

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# 3 Installing the USP and SCSI Boards

*Configuring the Card Cage*

*This chapter explains how to add Dynamic RAM to the USP board and install the USP and SCSI boards in the PCI card cage.*

## Summary

In this chapter, you learn about:

“Warnings” on page 13

“Adding Dynamic RAM” on page 14

“Connecting the SCSI/Serial Cable” on page 15

“Installing the USP Board” on page 16

“Installing the SCSI Board” on page 17

## Warnings

Before working with the PCI card cage, observe the following precautions.

### Compression Connector

The PCI module uses compression connectors to interface with the system frontplane. These are also known as CPOP (Compression Pad-On-Pad) connectors. Special care must be taken to ensure that these connectors are not damaged. These connectors have gold-plated flat connectors called bristle pads, which conduct 96 connections between the frontplane and the

board. The bristle pads are extremely susceptible to contamination by dust or any other particles that could easily prevent contact between the connectors or cause permanent damage to the bristle pads. When working with the Discreet Audio boards, take the following precautions to avoid damaging the CPOP connectors:

- Do not touch the bristle pads in any way. Liquids or grease from your fingers could damage the pads.
- To prevent accidental contact with fingers or dust when removing the boards, you must always use the spare compression connector covers or caps that ship with the Onyx2 or OCTANE or those that come with the PCI card cage. When you receive a PCI module, keep the protective covers for when you need to remove or install a board or PCI module.



**WARNING:** Only SGI-certified service technicians can install hardware in an Onyx or Onyx2 system. If such an installation is performed by a non-certified person, the warranty may become void.

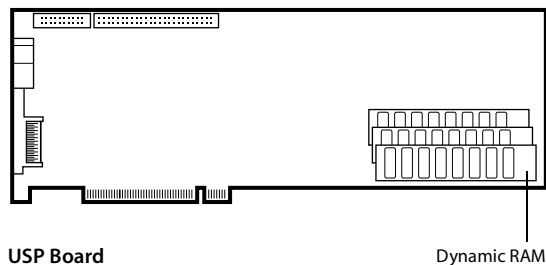
## Adding Dynamic RAM

The USP board has three SIMM sockets that hold the dynamic RAM. If the RAM is not already installed or if you are adding more RAM, do the following procedure.

### To install Dynamic RAM:

1. Make sure you are wearing a grounded static wrist strap.
2. Position the USP board so that the SIMM sockets are on the lower-left side.
3. Take the SIMM out of its antistatic packaging, and hold it so that the key, or notch, in the board is positioned in the upper-left side.
4. While holding the SIMM at a 45-degree angle, lay it inside the SIMM socket. Gently push or rock the SIMM down until the back of it is completely in the socket.
5. Pivot the SIMM backward until it locks into position.  
The SIMM clicks when it is properly seated.

6. Repeat steps 2 to 4 for each SIMM you are installing.

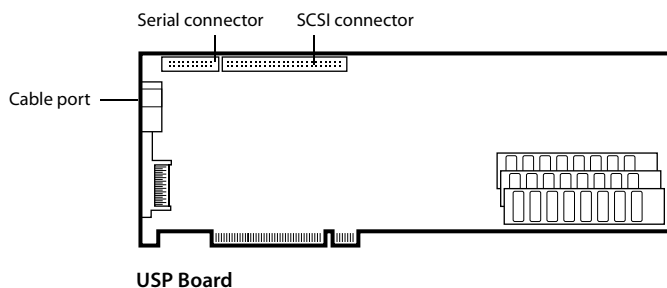


## Connecting the SCSI/Serial Cable

Before you install the USP board in the PCI card cage, you must attach the SCSI/Serial cable to the SCSI and Serial ports on the USP board.

### To connect the SCSI/Serial Cable:

1. Make sure you are wearing a grounded static wrist strap.
2. Turn the USP board so that you are facing the cable port.
3. Loosen the screw on the plate covering the cable port and remove the plate.
4. Connect the SCSI connector of the SCSI/Serial cable to the SCSI port on the USP board.
5. Connect the Serial connector of the SCSI/Serial cable to the Serial port on the USP board.
6. Feed the SCSI/Serial cable through the cable port on the USP board.
7. Replace the plate over the cable port and tighten the screw.



## Installing the USP Board

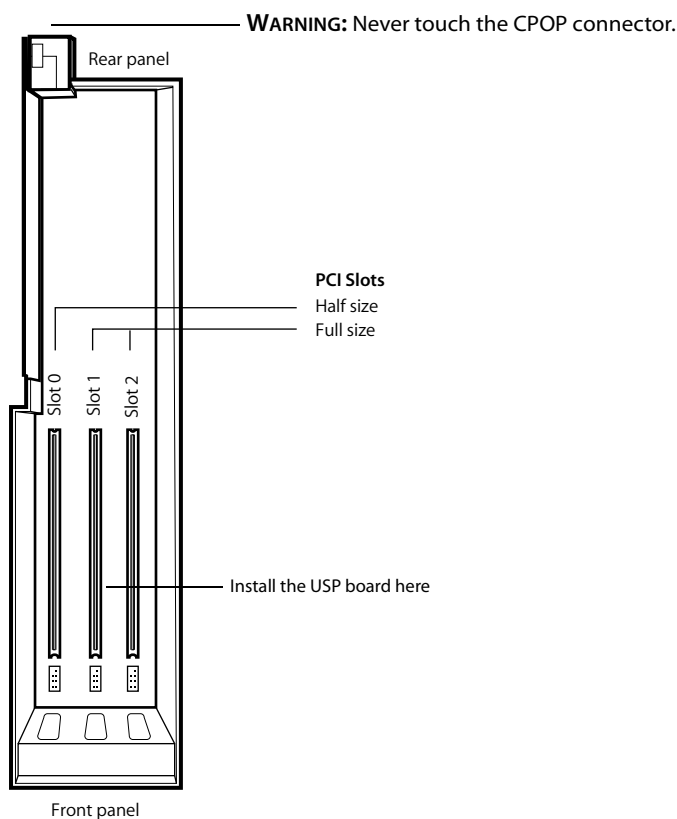
The PCI card cage has one half-size (Slot 0), and two full-size (Slot 1, Slot 2) slots. The USP board must be installed in one of the full-size slots. If the USP board is not already installed, do the following procedure.

### To install the USP board in the PCI card cage:

1. Make sure you are wearing a grounded static wrist strap.
2. Carefully remove the card cage from the antistatic packaging and place it on a flat, uncluttered surface.
3. Place the card cage so that the rear-panel plates are facing you.

The cover is secured to the card cage by a small bracket at the rear of the cover.

4. Pull the rear of the cover towards you until it is free from the bracket and remove the cover from the card cage.





5. Select a full-size PCI slot and remove the screw from its rear panel plate.
6. Remove the rear panel plate from the PCI slot.
7. Lower the USP board into the card cage and feed the SCSI/Serial cable through the rear panel.
8. Seat the USP board in the PCI slot.
9. Align the board, and push it into its slot so that it seats firmly, with the bracket at the rear of the board flat against the backplate.
10. Replace the screw to fasten the USP board to the backplate.
11. Replace the top cover to the card cage. The cover clicks when it is properly secured in the bracket.

## Installing the SCSI Board

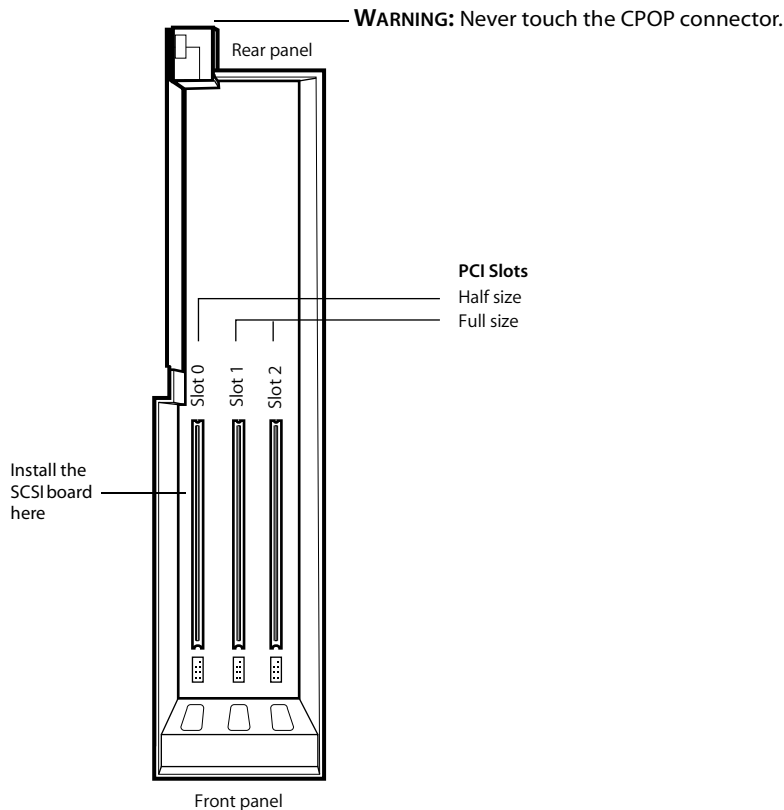
The PCI card cage has one half-size (Slot 0), and two full-size (Slot 1, Slot 2) slots. The SCSI board should be installed in the half-size slot. If the SCSI board is not already installed, follow the procedure below.

### **To install the SCSI board in the PCI card cage:**

1. Make sure you are wearing a grounded static wrist strap.
2. Carefully remove the card cage from the system or the antistatic packaging and place it on a flat, uncluttered surface.
3. Place the card cage so that the rear panel plates are facing you.

The cover is secured to the card cage by a small bracket at the rear of the cover.

4. Pull the rear of the cover towards you until it is free from the bracket and remove the cover from the card cage.



5. Select the half-sized PCI slot and remove the screw from its rear panel plate.
6. Remove the rear panel plate from the PCI slot.
7. Lower the SCSI board into the card cage and seat the SCSI board in the PCI slot.
8. Align the board, and push it into its slot so that it seats firmly, with the bracket at the rear of the board flat against the backplate.
9. Replace the screw to fasten the SCSI board to the backplate.
10. Replace the top cover to the card cage. The cover clicks when it is properly secured in the bracket.

# 4 Installing the PCI Card Cage

*Putting the cage in the machine*

*This chapter explains how to install the PCI card cage in the Onyx or OCTANE.*

**NOTE:** This chapter assumes that the USP and SCSI boards are already installed in the PCI card cage. If they are not, see Chapter 3, “Installing the USP and SCSI Boards”.

## Summary

In this chapter, you learn about:

“Warnings” on page 19

“Installing the PCI Card Cage” on page 20

## Warnings

Before installing the PCI card cage, to observe the following precautions.

### Compression Connector

The PCI module uses compression connectors to interface with the system frontplane. These are also known as CPOP (Compression Pad-On-Pad) connectors. Special care must be taken to ensure that these connectors are not damaged. These connectors have gold-plated flat connectors called bristle pads, which conduct 96 connections between the frontplane and the board. The bristle pads are extremely susceptible to contamination by dust or any other

particles that could easily prevent contact between the connectors or cause permanent damage to the bristle pads. When working with the card cage, take the following precautions to avoid damaging the CPOP connectors:

- Do not touch the bristle pads in any way. Liquids or grease from your fingers could damage the pads.
- To prevent accidental contact with fingers or dust when removing the boards, you must always use the spare compression connector covers or caps that ship with the Onyx or OCTANE or those that come with the card cage. When you receive a PCI module, keep the protective covers for when you need to remove or install a board or PCI module.



**WARNING:** Only SGI-certified service technicians can install hardware in an Onyx or Onyx2 system. If such an installation is performed by a non-certified person, the warranty may become void.

## Installing the PCI Card Cage

Once the USP board is properly installed, you can install the PCI card cage into the Onyx or OCTANE. If you are installing the cage into an Onyx2, you must install it into the IO2 slot on the Onyx I/O panel. The IO2 slot is located directly below the IO6G slot.

**NOTE:** The installation procedure is slightly different, depending on the type of system you are running. Follow the procedure that applies to your system.



### To install the PCI card cage in the Onyx Deskside:

1. Make sure you are wearing a grounded static wrist strap.
2. Remove the plates from the IO2 slot on the Onyx I/O panel.

**NOTE:** A portion of this slot is blocked by a cover plate. You must remove the cover plate before you can install the PCI card cage.

3. Remove the DG5 display generator and RM7 raster managers from the Onyx.  
You can now access the three screws that secure the cover plate.
4. Loosen the three screws, and remove the cover plate.
5. Replace the DG5 display generator and RM7 raster managers to the Onyx.  
You can now properly install the PCI card cage.
6. Remove the black protective cover from the connector on the rear of the card cage.



**WARNING:** Do not touch the connector on the rear of the PCI card cage or you will seriously damage the board on the card cage.

7. Turn the PCI card cage so that the black lock tab is on the upper-right corner and facing you.
8. Pull the lock tab until it is fully extended from the card cage.
9. Slide the PCI card cage carefully into the IO2 slot.  
If the card cage does not slide in easily, check for cables that may be in the way.
10. Push the PCI card cage until it is firmly installed in the Onyx.
11. Push the lock tab to lock the card cage in the Onyx.
12. Tighten the retaining screw on the underside of the card cage to secure the card cage in the Onyx.



#### To install the PCI card cage in the Onyx Rack:

1. Make sure you are wearing a grounded static wrist strap.
2. Remove the plates from the IO2 slot on the Onyx I/O panel.

**NOTE:** A portion of this slot is blocked by a cover plate. You must remove the cover plate before you can install the PCI card cage.

3. Remove any CPU or graphics boards that are blocking the cover plate.  
You can now access the three screws that secure the cover plate.
4. Loosen the three screws, and remove the cover plate.
5. Replace the CPU and graphics boards you removed.  
You can now properly install the PCI card cage.
6. Remove the black protective cover from the connector on the rear of the card cage.



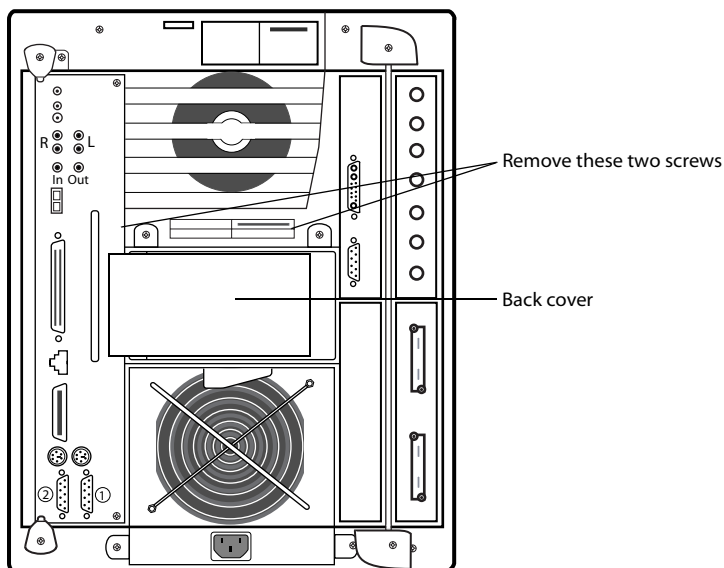
**WARNING:** Do not touch the connector on the rear of the PCI card cage or you will seriously damage the board on the card cage.

7. Turn the PCI card cage so that the black lock tab is on the upper-right corner and facing you.
8. Pull the lock tab until it is fully extended from the card cage.
9. Slide the PCI card cage carefully into the IO2 slot.  
If the card cage does not slide in easily, check for cables that may be in the way.
10. Push the PCI card cage until it is firmly installed in the Onyx.
11. Push the lock tab to lock the card cage in the Onyx.
12. Tighten the retaining screw on the underside of the card cage to secure the card cage in the Onyx.



**To install the PCI card cage in the OCTANE:**

1. Make sure you are wearing a grounded static wrist strap.
2. Face the rear of the OCTANE.



3. Remove the two screws from the back cover.
4. Pull the back cover toward you and lift up to remove it.

**NOTE:** Keep the back cover for future use. If you ever remove the PCI card cage, you must replace the back cover.

5. Remove the cover from the CPOP connector.

**NOTE:** Keep the protective cover for future use. If you ever remove the PCI card cage, you must replace the protective cover to prevent damage to the CPOP connector.

6. Hold the PCI card cage so that the bracket is on top.
7. Slide the card cage into the bay until the bracket is against the rear of the OCTANE.
8. Secure the card cage by turning the latch below the card cage to the left.
9. Replace the screws into the bracket.

# Discreet Audio Wiring Configuration

*Making the connections*

*This chapter describes the wiring configuration for Discreet Audio.*

## Summary

In this chapter, you learn about:

“Connecting Data Cables” on page 23

“Connecting Audio Cables” on page 25

“Wiring Overview” on page 27

“Recommended SCSI ID and DIP Settings” on page 28

## Connecting Data Cables



**WARNING:** Do not power on any Discreet Audio hardware component without ensuring it is set to the correct voltage. For more information, see “Setting Your Power Supply to the Correct Voltage” on page 10.

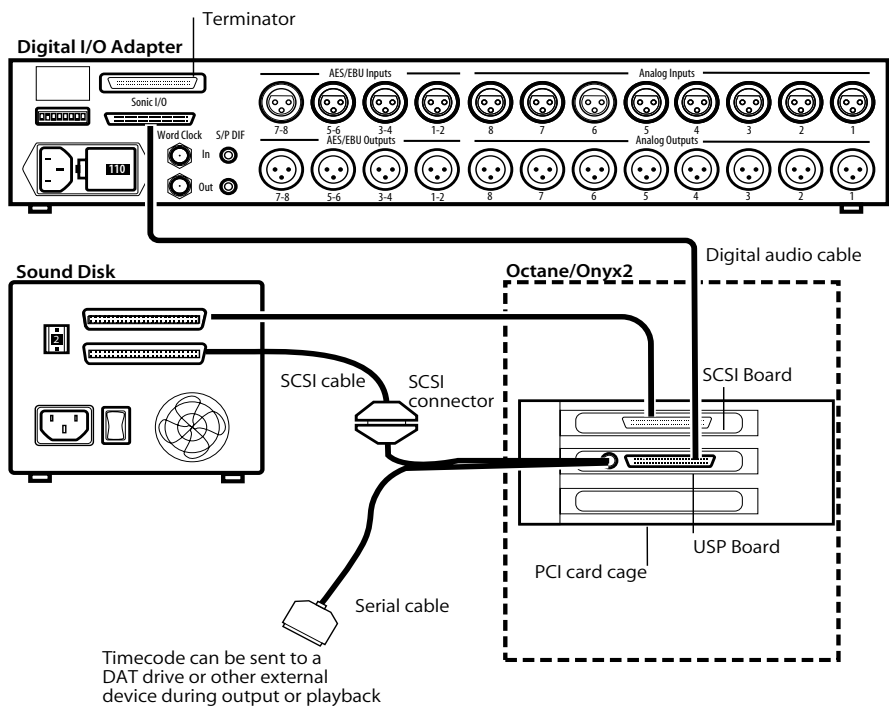
Before connecting the data cables, open the audiostore enclosure and make sure the audiostore does not have SCSI termination enabled.

**NOTE:** Termination on the audiostore is typically enabled or disabled through DIP switches or jumpers and will vary depending on the model of your drive.

**To connect data cables to Discreet Audio:**

1. Connect one end of the SCSI cable to the SCSI connector on the SCSI/Serial cable.
2. Connect the other end of the SCSI cable to the SCSI port on the back of the audiostore.
3. Connect the PCI SCSI board to the audiostore using one of the wide-to-narrow SCSI cables included in your Discreet Audio kit.
4. Connect your external devices to the external SCSI1 port in an SCSI chain. Terminate the last external device.
5. Connect the 50-pin connector of the digital audio cable to the 50-pin port on the back of the USP board.
6. Connect the 68-pin connector of the digital audio cable to the 68-pin port on the back of the digital I/O adapter.
7. Connect the 68-pin terminator to the digital I/O adapter.

If you are connecting more than one sound disk, attach a short SCSI extension cable from the remaining connector on the first sound disk to one of the connectors on the next sound disk.





## Connecting Audio Cables

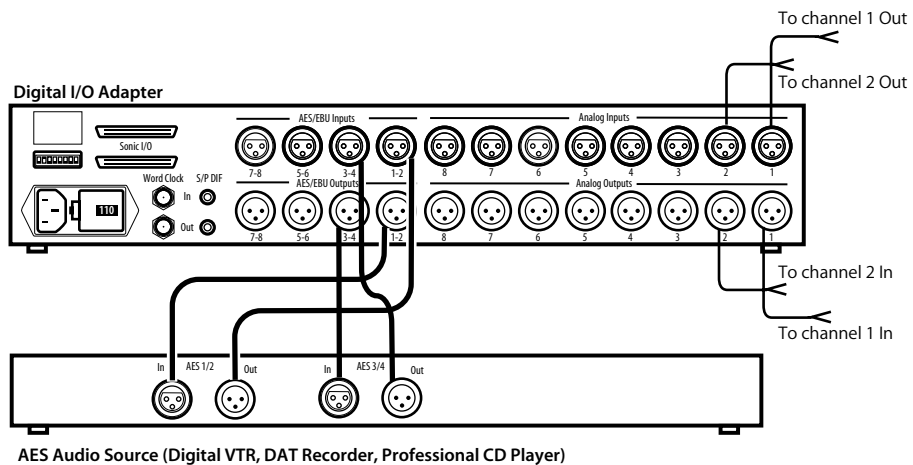


**WARNING:** Do not power on any Discreet Audio hardware component without ensuring it is set to the correct voltage. For more information, see “Setting Your Power Supply to the Correct Voltage” on page 10.

### To connect audio cables to Discreet Audio:

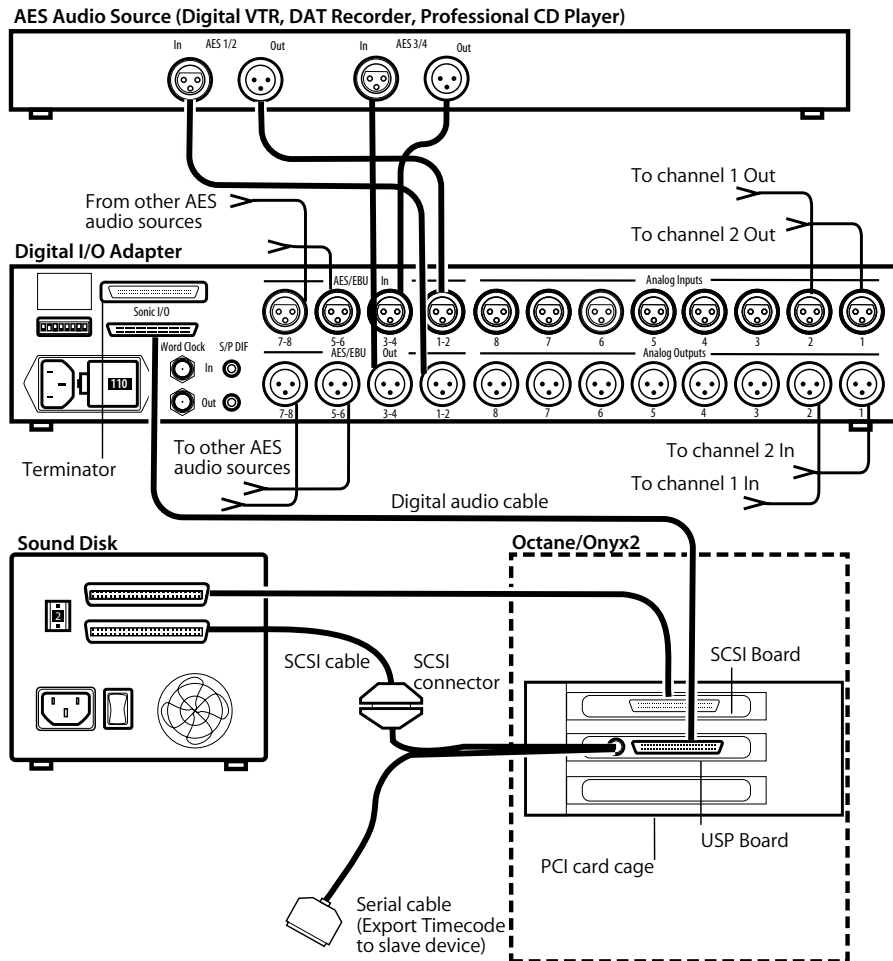
1. Connect the Analog 1 Out of the analog/digital I/O adapter to the channel 1 In of your audio monitor subsystem.
2. Connect the Analog 1 In of the analog/digital I/O adapter to the channel 1 Out of your external analog sources.
3. Connect the Analog 2 Out of the analog/digital I/O adapter to the channel 2 In of your audio monitor subsystem.
4. Connect the Analog 2 In of the analog/digital I/O adapter to the channel 2 Out of your external analog sources.
5. Connect the remaining Analog inputs and outputs of the analog/digital I/O adapter to any other external analog sources.
6. Connect the AES 1/2 Out of the digital I/O adapter to the Digital AES 1/2 In of the AES audio source (digital VTR, DAT recorder, or professional CD player.)
7. Connect the AES 1/2 In of the digital I/O adapter to the Digital AES 1/2 Out of the AES audio source.
8. Connect the AES 3/4 Out of the digital I/O adapter to the Digital AES 3/4 In of the AES audio source.
9. Connect the AES 3/4 In of the digital I/O adapter to the Digital AES 3/4 Out of the AES audio source.

10. Connect any other AES audio sources to the AES 5/6 and AES 7/8 Ins and Outs of the analog/digital I/O adapter.



## Wiring Overview

The complete wiring configuration for Discreet Audio is illustrated in the following diagram. Use this diagram to ensure all wiring is correct.





## Exporting Timecode Information

You can use the Serial cable on the Discreet Audio hardware to export timecode information when you output audio or monitor audio in the Player. For example, you can use this cable to slave an Audio DAT to the system during output, or playback in the Player.

When using this option, set the following TC Generator Delays preferences in the Preferences menu:

- Player Delay
- Output Clip Delay

## Recommended SCSI ID and DIP Settings

To avoid problems with your Discreet Audio setup, use the following recommended SCSI ID settings for your SCSI devices and DIP settings for your digital I/O adapter and analog/digital converters.

### Recommended Sound Disk SCSI ID Settings

Each USP board and sound disk is assigned a SCSI ID. Valid SCSI ID numbers, as defined by the protocol specification, range from 1 to 7.

**NOTE:** SCSI ID numbers 6 and 7 are reserved for use by the USP board. Only SCSI IDs 1 through 5 may be assigned to sound disks and other SCSI peripherals. Each SCSI device must have a different ID number between 1 and 5 or the system will not operate properly.

### Recommended DIP Settings

We recommend you use the manufacturer pre-set DIP settings for the analog/digital I/O adapter.

# Connecting Discreet Audio to AES/Word Sync

*Getting in Sync*

*This chapter explains the procedure for properly syncing your Discreet Audio system for both AES Lock and Word Clock.*

## Summary

In this chapter, you learn about:

“Discreet Audio and Sync” on page 30

“Normalizing Your Patch Bay for Digital Audio” on page 30

“Recommended Units” on page 31

“Digital Audio Configuration for Onyx2/OCTANE” on page 32

“Analog Audio Configuration for Onyx2/OCTANE” on page 33

Depending on your platform and other hardware components in your configuration, your setup will vary. Refer to the section in the chapter that pertains to your platform when configuring your Discreet Audio system for sync.

This chapter includes wiring diagrams for typical configurations, and explains in detail how to set up Discreet Audio for digital and analog audio I/O.

## Discreet Audio and Sync

You can use analog or digital audio with your Discreet Audio system. You must configure your system differently for synchronizing to analog and digital sources. When you do digital audio I/O, use AES Lock. When you do analog I/O, use Word Clock.

**NOTE:** We recommend the use of Word Clock only when doing analog I/O or for playback when no AES source is present.

Schematic diagrams for your specific configuration appear later in this chapter.

When doing digital audio I/O, providing a continuous AES signal is essential to ensure stable and reliable performance from the Discreet Audio system. The way to achieve this is by locking to an AES signal derived from genlock. We recommend normalizing your digital audio patch bays with a -20 dBFS AES tone derived from genlock. When doing I/O, lock directly to an AES source coming from a device which has genlock support and is receiving house sync (such as a Digi Beta).

If you are doing analog audio I/O, we recommend the use of Word Clock. See the schematic for analog audio configuration which applies to your platform.

There are numerous possible configurations, and many considerations when preparing to configure your Discreet Audio system for sync.

### Sample Rates

Discreet Audio always operates at 48kHz in **fire** and **smoke** and 48kHz or 44.1 kHz in **inferno** and **flame**. If you bring audio into the system that is a different sample rate, **fire**, **smoke**, **inferno** or **flame** automatically converts it to the operating sampling rate.

**NOTE:** When working in NTSC, do not set the sampling rate on your Word Clock generator to 47.952KHz as this is a film-to-video pull-down rate. Set the Genlock-to-Word Clock converter to 48 KHz.

## Normalizing Your Patch Bay for Digital Audio

You must provide a continuous AES signal to your Discreet Audio system to ensure stable audio. To do this, you should normalize the patch bays to an AES signal (-20 dBFS/1kHz tone or silence) derived from House Sync. When the patch bay is normalized, the master sync source (Genlock generator) will provide the AES tone when the system is disconnected from the VTR or other AES source.

The configuration for digital audio varies slightly for Onyx2 and OCTANE platforms. Read the section that pertains to your system. There are also preferences you need to set within the software depending on the sync source.

## Recommended Units

We strongly recommend the following units for the best results with Discreet Audio.

### Recommended House Sync/AES Sync Generator

The following House Sync/AES sync generators have been tested and are strongly recommended for using digital audio with your Discreet Audio system:

- Tektronix SPG 422. For more information, visit:

<http://www.tek.com/Measurement/Products/catalog/spg422/specs.html>

### Recommended House Sync/AES Sync/Word Sync Generators

The following generators have House Sync, AES Sync and Word Sync Outputs. They have been tested and are strongly recommended for using digital audio (AES Sync) or analog audio (Word Sync) with your Discreet Audio system:

- NVISION NV 5500
- NVISION NV 5000. For more information on the NVision generators, visit:

<http://www.nvision1.com>

**NOTE:** It is not recommended to use the Word Sync output from the NVision 5500 since its signal contains an overshoot not present on the NVision 5000. Therefore, if you wish to use Word Sync with the NVision devices, we recommend the Nvision 5000, not the NVision 5500.

### Recommended House Sync-to-Word Sync Converters

The following House Sync-to-Word sync generators have been tested and are strongly recommended for using analog audio with your Discreet Audio system:

- Aardvark AardSync II. For more information, visit:

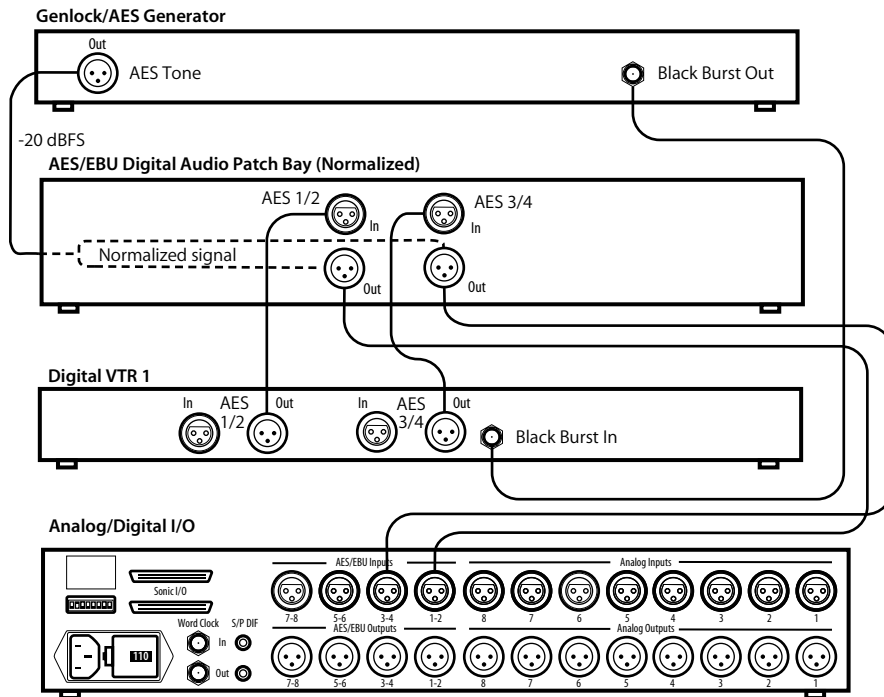
<http://www.aardvark-pro.com/sync.html>

- Digidesign Video Slave Driver. For more information, visit:

<http://www.digidesign.com>

## Digital Audio Configuration for Onyx2/OCTANE

The following diagram shows how to configure your Onyx2 or OCTANE for digital audio.



### Digital Audio Setup

When you use Digital Audio with the Onyx2 or OCTANE, you must also specify the correct settings in the software. Go to the Audio Preferences menu for the product you are using.

In the Audio Preferences in the software, make sure:

- Auto Set Clock is Off (fire\*/smoke\* only).
- The sync lock is set to "AES Lock" for the channels receiving the sync signal. For example, if the sync signal is connected to AES 1/2 in on the analog/digital I/O adapter, set the setting in the Audio Preferences menu to "AES Lock (Channels 1-2)".
- The Input source is set to "AES3 XLR".

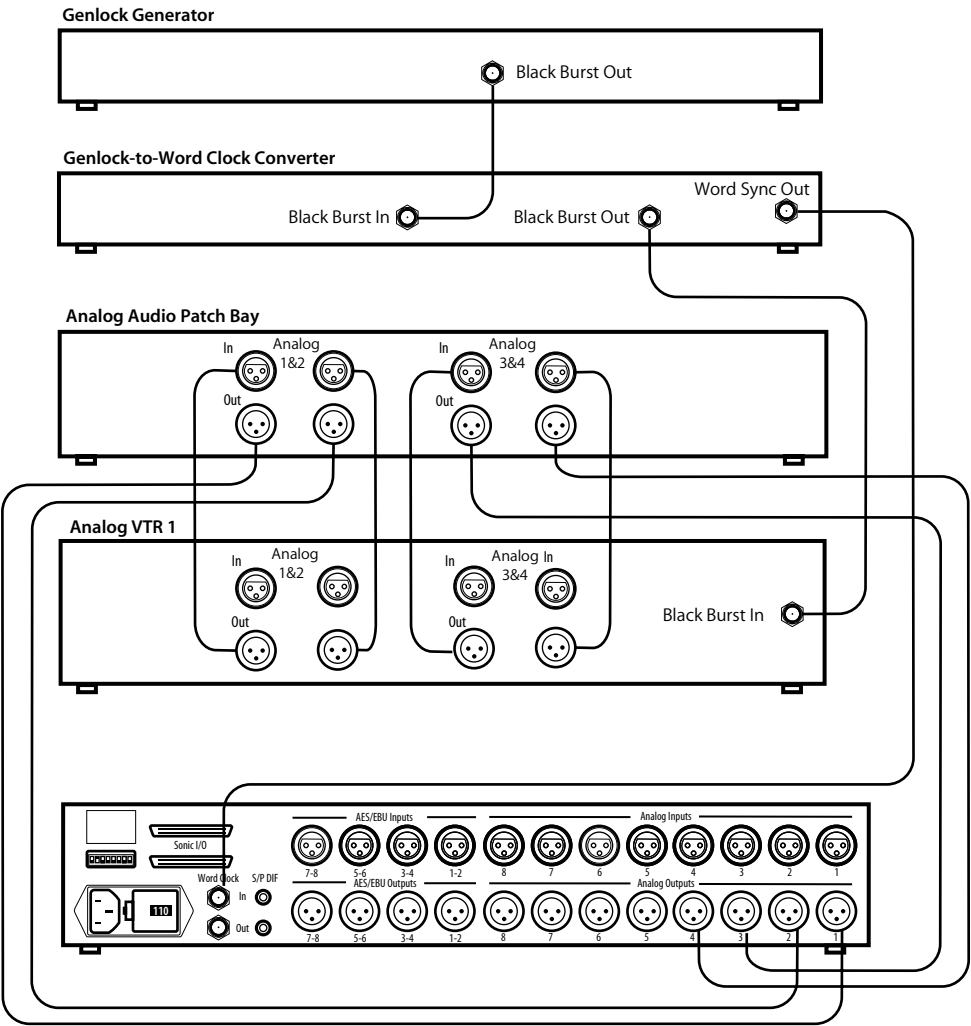




# Analog Audio Configuration for Onyx2/OCTANE

The following diagram shows how to configure your Onyx2 or OCTANE for analog audio.

**NOTE:** For analog audio I/O, you must use a Genlock to Word Clock converter (not supplied with your Discreet Audio system)



## **Analog Audio Setup**

When you use Analog Audio with the Onyx2 or OCTANE, you must also specify the correct settings in the software. Go to the Audio Preferences menu for the product you are using.

In the Audio Preferences in the software, make sure:

- Auto Set Clock is Off (fire\*/smoke\* only).
- The sync lock is set to Word Sync or Word Sync Inverted.
- The Input source is set to Input Analog.

# 7 Formatting the Audiostore

*Starting up and formatting*

*This chapter explains how to power on the system and format your audiostore for the first time.*

## Summary

In this chapter, you learn about:

“Powering On the System” on page 35

“Formatting the Sound Disk” on page 36

“Configuration File” on page 38

“Troubleshooting” on page 39

**NOTE:** The IRIX 6.5 operating system must be installed on your workstation so you can perform the basic diagnostic tests described in this chapter. If you have questions about IRIX or patches, see the *inferno, fire, flame* or *smoke Installation Guide*.

## Powering On the System



**WARNING:** Do not power on any Discreet Audio hardware component without ensuring it is set to the correct voltage. For more information, see “Setting Your Power Supply to the Correct Voltage” on page 10.

**To power on the system:**

1. Power on all the Discreet Audio components (the order in which you power on the components is not important):

- Analog/digital I/O adapter
- Sound disk(s)

**NOTE:** Make sure your sync source is connected and powered on. For more information, see Chapter 5, “Discreet Audio Wiring Configuration”.

2. Power on the disk array.
3. Power on your system:



- Turn the key on the front panel of the Onyx to the horizontal position (marked by a “●”).
- Open the door on the front of the OCTANE and press the power button.

Your system boots up.

4. Select the Start System button.
5. Log in as root.

**NOTE:** You must install the **inferno**, **fire**, **flame** or **smoke** software before formatting the sound disk. Go to the *inferno*, *fire*, *flame* or *smoke* *Installation Guide*, and then return to this chapter when the software is installed. Do not run the **inferno**, **fire**, **flame** or **smoke** software until you have formatted the sound disk.

## Formatting the Sound Disk

Before you start **inferno**, **fire**, **flame**, or **smoke** for the first time, format the sound disk.



**WARNING:** Formatting the sound disk erases all audio data.

**To format the sound disk:**

1. Make sure you are logged in as root.
2. Make sure your Discreet Audio hardware is properly connected and that the Discreet Audio driver is running properly. To test this, type:

```
more /var/adm/SYSLOG | grep Sonic
```

This command lets you view the Discreet Audio portion of the *SYSLOG* file. The *SYSLOG* file provides information about the hardware that is attached to the Onyx or OCTANE. The Discreet Audio portion of the *SYSLOG* file should look similar to:

```

Sonic Solutions USP: USP Driver (2.3) Copyright 1998.
Sonic Solutions USP: USP Driver registration SUCCESS.
Sonic Solutions USP: USP Driver (2.3) Copyright 1998.
Sonic Solutions USP: USP Driver registration SUCCESS.
Sonic Solutions USP: USP Driver (2.3) Copyright 1998.
Sonic Solutions USP: USP Driver registration SUCCESS.
    
```

If the Discreet Audio portion of the *SYSLOG* does not look similar to this, make sure all your cables are properly connected and that your Discreet Audio software is properly installed (for more information on checking your Discreet Audio software, see “Troubleshooting” on page 39).

**NOTE:** If you adjust loose cables, you must reboot the Onyx or OCTANE, and power cycle (power down, then on again) all Discreet Audio external devices. Check the *SYSLOG* again to verify that your setup is complete.

3. Go to the software directory by typing:

```
cd /usr/<product_version>/bin
```

4. Start the *Disk Configuration* utility by typing:

```
./sound_disk_util_IRIX_6.5_ip30 -s /dev/scsi/scXdYl0
```

Where X is the SCSI controller number and Y is the SCSI ID of the audiostream.

**NOTE:** The *sound\_disk\_util* should be able to automatically determine the path to the direct SCSI connection if the audiostream has previously been formatted. When using an unformatted audiostream, you must use the **-s** option in order to explicitly tell *sound\_disk\_util* which device to format.

You are prompted to enter a disk command.

Type:	To:
?, h	view the help menu
delete sound <name>	delete sound <name>
delete partition	delete all sounds on a partition. You are prompted for the partition name.
backup <name>	backup disks to <name>
restore <name>	restore disks from <name>
list sounds	display a list of sounds
list sounds <string>	display a list of sounds matching <string>

Type:	To:
list disks	display a list of disks
mount <disk#>	mount <disk #> in the disk volume list
unmount <disk#>	unmount <disk #> in the disk volume list
repair <disk#>	repair the (unmounted) disk
format <disk#> <name>	format the (unmounted) disk
rate	display the current sampling rate
scan	scan the SCSI bus for disks
quit	exit the configuration tool

A list of the current mounted and unmounted disks appears and looks similar to:

Current Disks: please use the number to identify disk.

\*\*\* Mounted Volumes:

\*\*\* Unmounted Volumes:

1:

In the above example, there are no mounted disks and there is one unmounted disk whose disk number is 1.

5. To format the sound disk, type:

**format** <disk#> <name>

where <disk#> is the number of the unmounted disk (or volume) that appears in the previous step.

6. Type **Y** when the following message appears:

WARNING: This operation will ERASE ALL DATA ON DISK.Continue?  
Y/N?

7. When the formatting is complete, type:

**quit**

This exits the *Disk Configuration* utility.

Return to the *inferno\**, *fire\**, *flame\** or *smoke\** *Installation Guide* to complete the software installation.

## Configuration File

Once you configure the hardware for Discreet Audio, you need to modify the configuration file.

In the *init.cfg* file, there is a token that defines the device to be used for the direct SCSI connection.

### Keyword

Audiostore

### Syntax

Audiostore /dev/scsi/scXdYl0

where X is the SCSI controller ID and Y is the SCSI ID of the audiostore.

## Troubleshooting

This section describes some possible problems and provides some troubleshooting tips. If the problems persist, contact Discreet Customer Support (see “Getting More Help” on page 4).

**Problem** I’m not sure if the Discreet Audio software was installed properly. How do I check?

**Try This** **To check if the Discreet Audio software is installed properly:**

1. Make sure you are logged in as root.

2. Type:

```
ls /var/sysgen/master.d/sonic_USP_
```

If the Discreet Audio software is installed properly, an echo of the command appears. If the software is not installed properly, the following message appears:

```
Cannot access /var/sysgen/master.d/sonic_USP: No such
file or directory
```

If the Discreet Audio software is not installed properly, refer to the ***inferno**, **fire**, **flame**, or **smoke** Installation Guide* for instructions on how to install the Discreet Audio software.

- |          |   |
|----------|---|
| Problem  | Discreet Audio isn't functioning. How do I know if all the components are properly connected to the system?   |
| Solution | If Discreet Audio is not functioning in <b>inferno</b> , <b>fire</b> , <b>flame</b> , or <b>smoke</b> , check the <i>SYSLOG</i> file to make sure that all the Discreet Audio components are connected to the system. |

**To check if Discreet Audio is connected properly:**

1. View the Discreet Audio portion of the *SYSLOG* file by typing:

```
more /usr/adm/SYSLOG | grep Sonic
```

The Discreet Audio portion of the *SYSLOG* file appears. It should look similar to:

```
Sonic Solutions USP: USP Driver (2.3) Copyright 1998.
Sonic Solutions USP: USP Driver registration SUCCESS.
Sonic Solutions USP: USP Driver (2.3) Copyright 1998.
Sonic Solutions USP: USP Driver registration SUCCESS.
Sonic Solutions USP: USP Driver (2.3) Copyright 1998.
Sonic Solutions USP: USP Driver registration SUCCESS.
```

2. If the Discreet Audio hardware does not appear in the Discreet Audio portion of the *SYSLOG* file, see “The USP Board does not appear in the *SYSLOG* file.” on page 40.

- |          |  |
|----------|--|
| Problem  | The USP Board does not appear in the <i>SYSLOG</i> file.   |
| Solution | Make sure the USP board is seated properly in the PCI card cage, and that the cable connecting the USP board to the external devices is securely connected at both ends. Also, verify that all drivers are installed properly. |



Problem	<p>I keep getting the following startup error message:</p> <pre>Loading keyed options.  Your Sonic Key file could not be read.  A valid Sonic Key file must be located in the Sonic Preferences folder.</pre>
Cause	<p>Your system can't find the <i>.Sonic</i> security <i>Key</i> (licence) file.</p> <p><b>NOTE:</b> Discreet Audio does not need this key file to run. You can ignore this error message and Discreet Audio will still operate properly. You can remove the error message by doing the following procedure.</p>
Solution	<p><b>To remove the error message:</b></p> <ol style="list-style-type: none"> <li>1. Make sure you are logged in as root.</li> <li>2. Go to the <i>Sonic_Solution</i> directory by typing: <pre>cd /usr/&lt;product_version&gt;/Sonic_Solution</pre> </li> <li>3. Install the <i>Key</i> file by typing: <pre>./INSTALL_SONICKEY</pre> <p>The <i>Key</i> file is installed into the <b>inferno</b>, <b>fire</b>, <b>flame</b>, or <b>smoke</b> home directory, and the error message no longer appears.</p> </li> </ol>
Problem	<p>I keep getting the following error message in the shell window during startup:</p> <pre>Disk needs repair</pre>
Cause	<p>You may have faulty sound files.</p>
Solution	<p><b>To repair a faulty file:</b></p> <ol style="list-style-type: none"> <li>1. Start the <i>Disk Configuration</i> utility by typing: <pre>./sound_disk_util_IRIX_6.5_ip30 -s /dev/scsi/scXdYl0</pre> <p>where X is the SCSI controller number and Y is the SCSI ID of the audiostream.</p> </li> <li>2. Repair a faulty file by typing: <pre>REPAIR &lt;disk#&gt;</pre> </li> </ol>

- Problem** The sound pitch and tone sound slow.
- Cause** You probably have a sampling rate problem. Discreet Audio is made to function properly at 48 kHz, because this rate is the professional industry standard for digital audio recording. If you are using Word Sync, and the reference signal is lost (for example, by a cable being unplugged by accident), then the internal clock reverts to 32 kHz, and recordings sound slow.
- Solution** To return the sampling rate to 48 kHz, reconnect the loose cable, and turn the recorder off, then on again.
- You can view the sampling rate by looking in the IRIX shell in which you started **inferno**, **fire**, **flame**, or **smoke**. The sampling rate appears right above the prompt. Once you reconnect a loose cable, the sampling rate automatically returns to 48 kHz in the IRIX shell.
- Problem** The sound disk is not responding to commands.
- Solution 1** If your sound disk does not respond to commands, you may need to power cycle (power down, then on again) the sound disk.

**To power cycle the sound disk:**

1. Exit **inferno**, **fire**, **flame**, or **smoke**.
2. Power down the sound disk.

**NOTE:** Do not power down the other Discreet Audio external units.

3. Power on the sound disk.
4. Make sure you are logged in as root.
5. Go to the software directory by typing:  
`cd /usr/<product_version>/bin`
6. Start the *Disk Configuration* utility by typing:  
`./sound_disk_util_IRIX_6.5_ip30  
-s /dev/scsi/scXdYl0`

where X is the SCSI controller number and Y is the SCSI ID of the audiostore.

You are prompted to enter a disk command.

7. Enter a disk command.

**Problem**      The sound disk is not responding to commands.

**Solution 2**    **8.** Unmount the sound disk by typing:

**umount** <disk#>

where <disk#> is the number of the mounted disk (or volume) that appears in the previous step.

**9.** To format the sound disk, type:

**format** <disk#> <name>

**10.** Type Y when the following message appears:

WARNING: This operation will ERASE ALL DATA ON DISK.  
Continue? Y/N?

**11.** When the formatting is complete, type:

**quit**

This exits the *Disk Configuration* utility.

[illegible]

# glossary

---

## Glossary

**analog**

Information that is represented electronically as a continuously varying electric signal.

**analog/digital converter**

The analog/digital converter connects the USP board to analog equipment and provides analog-to-digital (A/D), and digital-to-analog (D/A) conversion.

**audio cables**

XLR-3 cables that carry audio signals to and from the audio monitor subsystem.

**audio monitor subsystem**

The patch bay that routes all audio signals between external audio devices, the VTR, and your Discreet Audio system.

**boot**

To start up the system by turning on the workstation and monitor; the system is fully booted when you see the console login: prompt or the login screen.

**card guides**

Narrow metal tracks at the top and bottom of the chassis into which you slide printed circuit boards.

**data cables**

Cables that connect the USP board to external SCSI and Serial devices. For example, the SCSI cable and 50-pin to 68-pin cable are data cables.

**DAT**

Digital Audio Tape.

**diagnostics**

A series of tests that check the hardware components of your system.

**digital**

Information represented electronically as a series of discrete pulses, usually in the binary system.

**digital input/output converter**

The digital input/output converter sends and receives digital audio between the USP board and the analog/digital converters.

**DRAM**

Dynamic Random Access Memory chips. See also SIMM.

**drive**

A hardware device that lets you access information on various forms of media, such as hard and floppy disks, CD-ROM discs, and magnetic tapes.

**electro-magnetic noise**

A hissing noise in your audio system caused by electro-magnetic interference. It often results from running digital data or power cables parallel to analog audio cables.

**external device**

Any piece of hardware that is attached to the workstation with a cable.

**female connector**

A connector that has indentations or holes into which you plug a male connector. An example of a female connector is an electrical wall outlet that accepts an electrical plug.

**fibre-optic cables**

Cables that carry digital information in optical format.

**Genlock**

Synchronizing with another video signal serving as a master timing source. The master timing source can be a composite video signal, a video signal with no active video (only sync information), or, for video studio, a device called House Sync.

**ground loops**

Connecting cables to a ground at both ends creates ground loops and may cause humming in the Discreet Audio system.

**grounded electrical outlet**

An electrical wall outlet that accepts a plug with a grounding prong.

**hardware inventory**

An IRIX command (*hinv*) that you use to list the hardware, memory, and peripheral equipment in, or connected to, your computer or workstation.

**House Sync**

Master timing source that syncs all video and audio to the same signal.

**IRIX**

The Silicon Graphics version of the UNIX operating system.

**male connector**

A connector that has raised edges, pins, or other protruding parts that you plug into a female connector. An example of a male connector is an electrical plug that you plug into a wall outlet.

**outlets**

Openings in the hardware to which you attach connectors to make an electrical connection.

**PCI**

Peripheral Connector Interface. A specification used for communications between peripherals and the host computer.

**PCI card cage**

The peripheral chassis which is installed in the Onyx2 or OCTANE and houses the USP board.

**power cable**

The cable that connects the Onyx2 or OCTANE and external devices to a grounded electrical outlet.

**power cycle**

To turn off the power switches, then on again, on the Discreet Audio hardware components and Onyx2 or OCTANE.

**power down**

To turn off the power switches on the Discreet Audio hardware components and Onyx2 or OCTANE.

**power on**

To turn on the power switches on the Discreet Audio hardware components and Onyx2 or OCTANE.

**power supply**

The piece of hardware within the digital input/output and analog/digital converters, and SCSI sound disks that directs power from an electrical outlet to the converters, and external SCSI devices. It also contains the power switch, reset button, and fan.

**SCSI**

Small Computer System Interface. SCSI is a high-speed input/output specification for small computers.

**SCSI cable**

A cable that connects a SCSI device to a SCSI port on a workstation.

**SCSI device**

A hardware device that uses the SCSI protocol to communicate with the system. Hard disk and floppy disks, CD-ROM discs, and tape drives are all SCSI devices.

**SCSI ID**

A number from one to seven that uniquely identifies a SCSI device to a system. No two SCSI devices that

are physically connected to the same SCSI bus can have the same SCSI ID.

**SCSI terminator**

An electronics device, often an external plug, that is required at the end of each SCSI bus.

**SIMM**

Single Inline Memory Module; a small printed circuit board with DRAM (Dynamic Random Access Memory) chips.

**SIMM socket**

A long, thin, female connector located on the CPU board into which you insert a SIMM.

**static electricity**

Whenever your body comes in contact with metal parts (including printed circuit boards) of computer equipment there is the potential for you to feel an electrical shock (electric-static discharge, or ESD) which could damage the equipment. To prevent this, you must always wear a wrist strap when working with the internal parts of a workstation.

**sync**

An analog signal used to synchronize frame rates between broadcast devices.

**USP board**

The printed circuit board within the PCI card cage that processes all digital input and output in Discreet Audio.

**valid audio**

When an analog source is physically connected to your Discreet Audio system and all devices are powered on, the Discreet Audio system receives valid audio.

**VTR**

Video Tape Recorder.

**Word Sync**

A master timing source for audio systems.

**wrist strap**

A flat cable that you wrap around your wrist and also attach to a metal part of the workstation whenever you work with internal components of the workstation. This prevents electrical shocks to yourself and the components. See also static electricity.



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# Acknowledgments

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# audio

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