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PCI Digital Audio Board Installation Guide

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Introduction

This guide tells you how to locate instructions for installing the PCI Digital Audio Board in O2, OCTANE, OCTANE2, and Onyx 3000 workstations and Origin200 and Origin 3000 servers.

Note: The PCI Digital Audio Board can also be installed in Onyx2 workstations and in Origin2000 servers, and SGI 2000 series servers. However, the installation must be performed by an authorized SGI field engineer. These systems use internal electrical power that is hazardous if the equipment is improperly handled. Installation procedures require specific training and technical knowledge, as provided to SGI System Support Engineers or other personnel trained by SGI.

The following topics are covered in this guide:

- Chapter 1, "Installing the PCI Digital Audio Board" explains where to find PCI board installation instructions for your workstation or server, and describes how to verify the board installation after installing the software. It also explains how to connect cables once the board is in place.
- Chapter 2, "Using the Audio Panel Software" describes how to use the Audio Panel to display the ADAT® and AES-3id device controls and to set the default input and output audio devices.
- Chapter 3, "Technical Specifications and Product Support" provides technical information and explains how to contact SGI.

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If you have comments about the technical accuracy, content, or organization of this document, please send them to SGI. Be sure to include the title and document number of the manual with your comments. (Online, the document number is located in the front matter of the manual. In printed manuals, you can find the document number on the back cover.)

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Chapter 1

Installing the PCI Digital Audio Board

This chapter explains where to find PCI board installation instructions for your workstation or server, and describes how to verify the board installation. It also explains how to connect cables once the board is in place.

The following topics are covered:

- "PCI Digital Audio Board Package" on page 3
- "Installing the PCI Digital Audio Board in the O2 Workstation" on page 3
- "Installing the PCI Digital Audio Board in the Octane and Octane2 Workstations" on page 4
- "Installing the PCI Digital Audio Board in the Origin200 Server" on page 6
- "Installing the PCI Digital Audio Board in Onyx 3000 Workstations and Origin 3000 Servers" on page 7
- "Supported Configurations for All Silicon Graphics Systems" on page 8
- "Connecting the Cables" on page 9
- "Installing the Software" on page 10
- "Verifying the Hardware Installation" on page 11
- "Connecting ADAT Optical Devices" on page 11

The PCI Digital Audio Board (Figure 1-1) is a half size PCI expansion board that provides multichannel digital audio expansion via the PCI bus. It connects to consumer and professional audio and video equipment via industry-standard interfaces. If your workstation has multiple PCI slots, you can install multiple PCI Digital Audio Boards for more channels of synchronized digital audio. To determine the maximum number of boards you can install in your workstation or server, see the appropriate section later in this chapter.

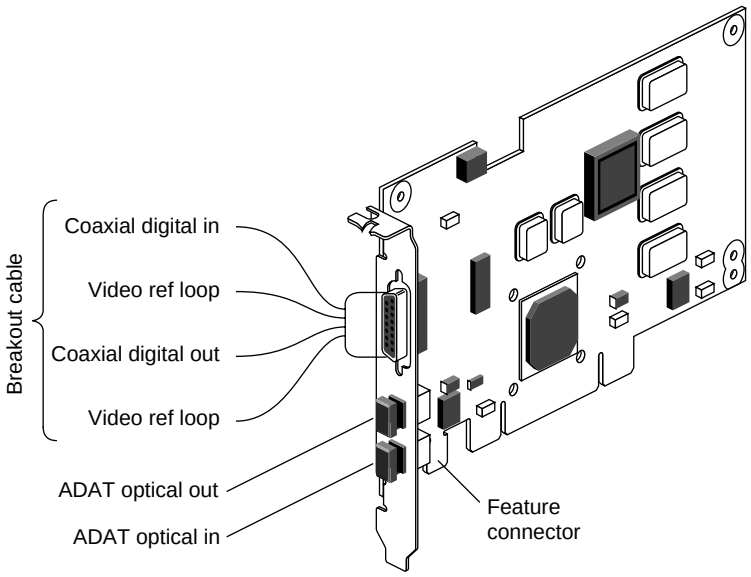


Figure 1-1 PCI Digital Audio Board

PCI Digital Audio Board Package

Your package includes all of the following items. If anything is missing, contact your sales representative.

- PCI Digital Audio Board
- breakout cable
- fiber optic cable
- feature cable (for use on media-ready Origin200 servers only)
- bag of hardware for installing the board
- antistatic wrist strap
- *PCI Digital Audio Board Installation Guide* (this manual)
- Compact disc (CD-ROM)

Installing the PCI Digital Audio Board in the O2 Workstation

In an O2 workstation, you install the PCI Digital Audio Board in the PCI module located on the system module.

Note: The feature connector (see Figure 1-1) is not used in the O2 workstation.

For instructions on how to install the board, see the section on installing PCI boards in the *O2 Workstation Owner's Guide*.

- If you don't have the printed manual handy, it is available on the Internet in the SGI Technical Publications Library at the following location:
  `http://techpubs.sgi.com/library/`

  Choose Catalogs> Hardware Catalog > and look in the O2 section for the *O2 Hardware Reference Guide*.

After installing the board in the PCI tray and before replacing the system module in the O2 chassis, connect the cables. In this guide, go to "Connecting the Cables" on page 9.

Installing the PCI Digital Audio Board in the Octane and Octane2 Workstations

In Octane and Octane2 workstations, you install the PCI Digital Audio Board in the PCI module, which is an optional module. You can install the board in any open PCI slot. A maximum of three PCI Digital Audio Boards can be installed.

For instructions on installing the board, see the *OCTANE PCI Module Installation Guide* that came with the optional PCI module. Or see the section on installing PCI boards in the printed *OCTANE or OCTANE2 Workstation Owner's Guide*, which is shipped with these workstations.

If you don't have either of the printed manuals handy, the manuals are available on the Internet in the SGI Technical Publications Library at the following location:
`http://techpubs.sgi.com/library/`

Choose Catalogs> Hardware Catalog > and look in the Octane section for the *OCTANE* or *OCTANE2 Workstation Owner's Guide,* or the *OCTANE PCI Module Installation Guide*.

After installing the board in the PCI module and before reinstalling the module in the workstation, connect the cables. In this manual, go to "Connecting the Cables" on page 9.

Placing a System Upgrade Label

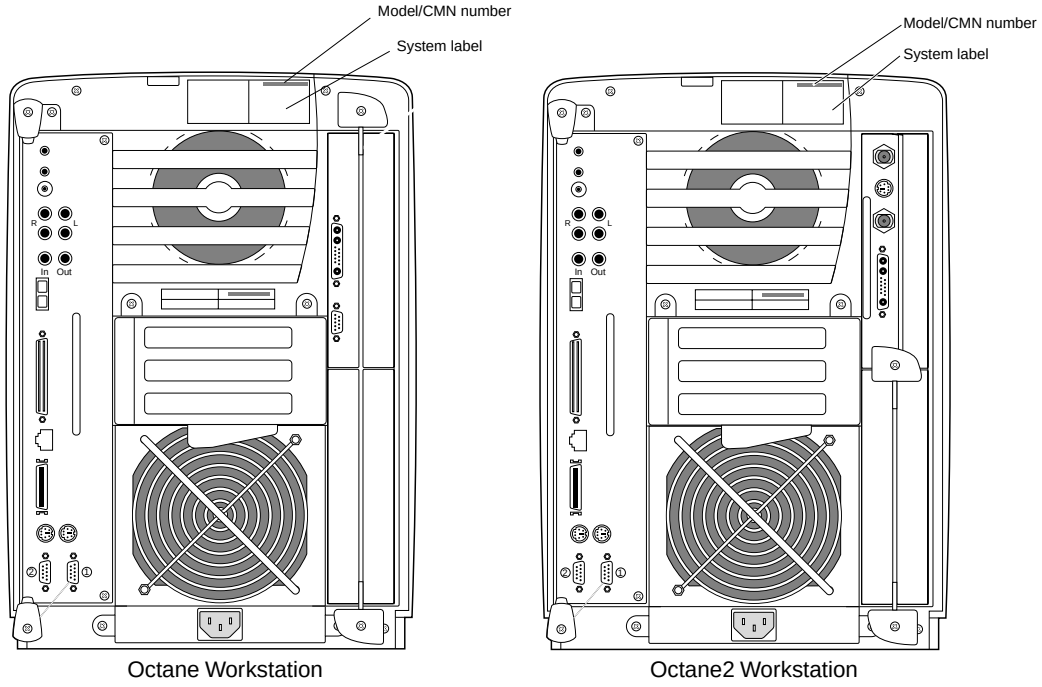


Figure 1-2 Rear Views of the Octane and Octane2 Workstations

If you received an Octane or Octane2 system upgrade label, place it on the system label as follows:

Face the rear of the workstation. The system label (containing the model/CMN number) is located at the top center of the rear of the workstation. Place the label over the VCCI and CISPR 22 information.

Installing the PCI Digital Audio Board in the Origin200 Server

Table 1-1 lists the maximum number of boards you can install in the Origin200 and Origin200 GIGAchannel servers and describes performance issues.

Table 1-1 Maximum Number of PCI Audio Boards in Origin200 Servers

Server Type	Maximum Number of PCI Digital Audio Boards	Where To Install the Boards for Optimum Performance
Origin200	3 per CPU module (6 max.)	Install boards starting with slot 5 in the CPU module.
Origin200 GIGAchannel	6 boards maximum in the entire system	Install boards anywhere in the GIGAchannel expansion cabinet first, then in the CPU module (starting with slot 5).

For instructions on installing the board, and how to connect the feature connector cable received with this package, see the *Origin200 and Origin200 GIGAchannel Maintenance Guide*.

Most manuals are available on the Internet in the SGI Technical Publications Library at the following location:
`http://techpubs.sgi.com/library/`

Choose Catalogs > Hardware Catalog and look in the Origin section for the appropriate manual.

After installing the board in the Origin200, return to this guide and go to "Connecting the Cables" on page 9.

Note: There are some versions of the audio board that do not support media synchronization on Origin200 servers. For a list of supported and non-supported configurations (by part number), see "Supported Configurations for All Silicon Graphics Systems" on page 8.

Installing the PCI Digital Audio Board in Onyx 3000 Workstations and Origin 3000 Servers

You can install a maximum of six PCI Digital Audio Boards in Onyx 3000 workstations and Origin 3000 servers. For instructions on installing the board, see the sections on installing PCI boards in the I-Brick and the P-Brick in the appropriate owner's guide.

Note: The Onyx 3000 ships with one PCI Digital Audio Board installed in the I-Brick.

Most manuals are available on the Internet in the SGI Technical Publications Library at the following location:
`http://techpubs.sgi.com/library/`

Choose Catalogs > Hardware Catalog and look in the Onyx or Origin section for the appropriate manual.

After installing the board in the Onyx 3000 or Origin 3000, return to this guide and go to "Connecting the Cables" on page 9.

Note: If you have more than one board installed and you want to reconfigure the slot numbers for the digital audio software, call your System Administrator.

Supported Configurations for All Silicon Graphics Systems

Warning: To prevent serious physical damage, do not use audio boards with part numbers 030-0950-001 and 030-0950-002 with the IRIX-based Onyx 3000 series and Origin 3000 series, or the Windows NT-based 320 and 540 Workstations.

Table 1-2 shows the audio board compatibility information for all Silicon Graphics systems.

Table 1-2 Supported Configurations

Board part number	Compatible platforms	Notes
030-0950-001	O2, Octane, Octane2	Do not use with Origin200 media-ready servers, Origin 3000 or Onyx 3000
030-0950-002	O2, Octane, Octane2, Origin200 media-ready servers	Do not use with Origin200 nonmedia-ready servers, Origin 3000, or Onyx 3000
030-1649-001	All platforms, except as noted	Do not use with Origin200 nonmedia-ready servers
030-1441-001	All platforms, except as noted	This board was designed for the Silicon Graphics 320 and 540 Windows NT systems but is compatible with all IRIX-based platforms if the required software is installed

Note: Do not install the 030-0950-001 audio board in Origin200 media-ready servers or the 007-1649-001 and 030-0950-002 boards in non media-ready Origin200 servers. Although these boards work, some of the functionality is lost. For example, with these boards, you cannot fully synchronize the audio in this module with audio in another module. For full operation of the PCI Digital Audio Board in an Origin200 media-ready server, use the board and the feature connector cable shipped in this package. If you install the 030-0950-001 board in a media-ready Origin200 server, the following error message appears:

```
The PCI Digital Audio I/O option feature connector is not detected. Be
sure that the feature connector is properly installed. Note that IP29
processor modules before 030-1244-001 rev A do not support the PCI Digital
Audio I/O option.
```

Connecting the Cables

You received three cables with your package—a fiber optic cable, a feature cable (for use on Origin200 servers only), and a breakout cable (Figure 1-3). Follow the steps below to remove the dust caps and connect the cables. (It's easier to remove the dust caps before reinstalling the PCI module in the chassis.)

1. Remove the dust caps from the ADAT® Optical interface connectors (see Figure 1-1).
2. Attach one end of the provided fiber optic cable to one of the ADAT connectors and the other end of the same cable to the second ADAT connector. This protects the connectors from dust until you are ready to connect a device. At that time, remove one end of the cable and connect it to the device. Use the cable provided with the optical device for the second optical interface connector.
3. Connect the breakout cable to the DB15 connector (see Figure 1-1). The breakout cable supports video synchronization and the AES-3id digital audio standard. The black and green video ref loop cables are interchangeable.

   Note: If you are using only a video input and not looping through to another device, you must terminate the unused video connector with a 75 ohm BNC terminator.

To verify that the system recognizes the new board, see "Verifying the Hardware Installation" on page 11.

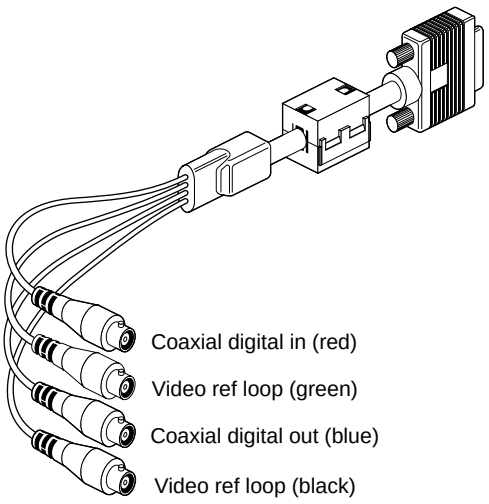


Figure 1-3 The Breakout Cable

Installing the Software

After installing the PCI Digital Audio Board, read any release notes on the CD that came in this package. In addition, read the booklet enclosed with the software CD for information on installing the software.

Verifying the Hardware Installation

After you install the PCI Digital Audio Board and the required software, follow these steps to verify that the system recognizes the new hardware:

1. Open a UNIX® shell. At the prompt type

   `hinv`

   The hardware inventory list appears.

2. Look for a line similar to this:

   ```
   Iris Audio Processor: version RAD revision 12.0, number 1
   ```

   A line appears for each PCI Digital Audio Board installed.

   If the board(s) do not appear in the hardware inventory list, turn off your workstation and repeat each step of the installation instructions. Make sure the board is fully seated in the slot.

Connecting ADAT Optical Devices

You can connect ADAT Optical interface-compatible devices to the optical input or output connectors on the PCI Digital Audio Board.

Note: Some of these devices provide the option of clocking their inputs either externally or internally. Often the default is set to internal clocking. For output to these devices to work properly, you must configure them to use external clocking. Refer to the manual that comes with the device for instructions on how to do this.

Chapter 2

Using the Audio Panel Software

This chapter describes how to use the Audio Panel to control ADAT Optical and AES-3id I/O.

If you did not install the software, do so now. For information on installing the software, read the release notes on the CD and the booklet enclosed with the CD.

Using the Audio Panel to Control ADAT and AES

You can use the Audio Panel program on your system to manage multiple audio inputs and outputs, and to control various audio settings. Refer to the Audio Panel Help menu for general information on using the Audio Panel.

Note: Software instructions included in this section are based on the IRIX 6.3, IRIX 6.4, and IRIX 6.5.x operating systems. If you upgraded to a subsequent operating system, some of the instructions may no longer be valid. If this is the case, check the latest information by using the online documentation that came with your new software.

When a PCI Digital Audio Board is installed, you can use the Audio Panel to display the ADAT and AES device controls, set the default input and output to ADAT or AES I/O, and set the audio signal path to ADAT or AES I/O.

Displaying ADAT and AES Device Controls

To display the ADAT and AES device controls:

1. Open Audio Panel:
2. From the Toolchest, choose Desktop > Control Audio.
3. Select the desired AES or ADAT device control panel from the view menu.

   The selected device control panel appears, where you can adjust parameters such as sample rate, input source, and output destination. For details, refer to the Audio Panel Help menu.

If more than one PCI Digital Audio Board is installed, the system names each board using an incremental prefix naming scheme. For example, if two PCI Digital Audio Boards are installed in your system, one ADAT input is displayed as “RAD 1.ADAT In” and the other as “RAD 2. ADAT In.”

Setting the Default Input and Output to ADAT or AES

Audio Panel displays device controls for ADAT In, ADAT Out, AES In, and AES Out for each PCI Digital Audio Board installed in your system. You can designate any of these devices as a default, which means your system uses the device as the internal audio device unless otherwise specified by another application. To set the default input and output, simply open Audio Panel and use the Default menu to select a default input and output and device.

Setting the Input and Output Signal Path

You can select either electrical or optical signal paths for the AES input and output devices. For ADAT input and output devices, you can select either the optical signal path or a disabled signal path (labeled “None”).

To set the input source with Audio Panel:

1. Position the cursor over the input device panel (if the device panel you need is not displayed, use the View menu), then hold down the right mouse button to display a menu that contains the Input Source option.
2. Choose the input source (for example, AES In or Optical In) that you want the input device to use. “AES In” is the electrical input.

   Selecting the optical input for AES disables the ADAT input, since the two devices share the same optical connector. Similarly, selecting the optical input for ADAT automatically switches the AES input to the coaxial digital electrical connector.

To set the output destination with Audio Panel:

1. Position the cursor over the output device panel (if the device panel you need is not displayed, use the View menu), then hold down the right mouse button to display a menu that contains the Output Destination option.
2. Choose the output destination (for example, AES Out or Optical Out) that you want the output device to use. “AES Out” is the coaxial digital electrical output.

   Selecting the optical output for AES disables the ADAT output, since the two devices share the same optical connector. Similarly, selecting the optical output for ADAT automatically switches the AES output to the coaxial digital electrical connector.

Chapter 3

Technical Specifications and Product Support

This chapter contains the following sections:

- "PCI Digital Audio Board Specifications" on page 18
- "DB15 Connector Pinouts" on page 19
- "Product Support" on page 20

PCI Digital Audio Board Specifications

Table 3-1 lists the PCI Digital Audio Board's features and specifications.

Table 3-1 PCI Audio Board's Specifications

Synchronization	Locks to professional video (via video sync) and audio equipment with professional jitter attenuation. Accepts video reference input, generates AES11 grade 2 (10ppm) clocks
Input Sample Rates	Continuous between 32 kHz and 48 kHz
Output Sample Rates	32 kHz, 44.1 KHz, and 48 KHz
Jitter Attenuation	For 44.1 kHz or 48 kHz sample rates
Video Reference Loop Through	75 ohm BNC connectors, breakout cable
Coaxial Digital Audio Input	AES-3id 75 ohm BNC connector, breakout cable AES11 synchronization input (for audio clock rates) AES3 professional 2-channel 24-bit digital Compatible with IEC958, S/PDIF consumer 2-channel digital (IEC958 is now officially designated IEC60958)
Coaxial Digital Audio Outputs	AES-3id 75 ohm BNC connector, breakout cable AES11 synchronization output AES3 professional 2-channel 24-bit digital Compatible with IEC958, S/PDIF consumer 2-channel digital (IEC958 is now officially designated IEC60958)
Optical Digital Input	12.8 Mbps SHARP multimode plastic fiber optic connector, PCI I/O panel 8-channel, 24-bit ADAT Optical interface Compatible with IEC958, S/PDIF consumer 2-channel digital (IEC958 is now officially designated IEC60958)
Optical Digital Output	12.8 Mbps SHARP multimode plastic fiber optic connector, PCI I/O panel 8-channel, 24-bit ADAT optical Compatible with IEC958, S/PDIF consumer 2-channel digital (IEC958 is now officially designated IEC60958)

DB15 Connector Pinouts

Table 3-2 shows the pinouts for the DB15 connector for video synchronization and AES-3id digital audio through the breakout cable.

Table 3-2 DB15 Connector Pinout Assignments

Pin	Assignment
1	COAXIAL DIGITAL_IN GND
2	COAXIAL DIGITAL_IN
3	VID_REF
4	VID_REF GND
5	VID_REF
6	VID_REF GND
7	NOT CONNECTED
8	CHASSIS GND
9	COAXIAL DIGITAL_OUT
10	NOT CONNECTED
11	COAXIAL DIGITAL_OUT GND
12	NOT CONNECTED
13	CHASSIS GND
14	CHASSIS GND
15	NOT CONNECTED

Product Support

SGI provides a comprehensive range of product support for its products. If you are in North America and would like support for your SGI supported products, contact the Technical Assistance Center at 1-800-800-4SGI or your authorized service provider. If you are outside North America, contact the SGI subsidiary or authorized distributor in your country.

Glossary

ADAT Optical interface

The ADAT Optical interface provides a unidirectional point-to-point connection of 8 tracks of 24-bit digital audio, with subcodes, at professional sampling rates, on a single consumer-grade optical fiber. A typical use is for a data connection between multiple ADAT tape decks, for bouncing tracks between decks.

AES3

The AES3-1992 specification of transmission format for digital audio data. This specification is also commonly referred to as AES/EBU. See also ANSI S4.4-1992 and IEC958 (now officially designated "IEC 60958), Audio Engineering Society, Inc., Vol. 40, No. 3, 1992, New York, NY 10165. For more information on this specification, see http://www.aes.org/publications/

AES-3id

An information document describing implementation of AES3-1992 (see above attribution) using 75-ohm coaxial cable with 1 V peak-to-peak signal levels. See http://www.aes.org/publications/

PCI

Peripheral Component Interconnect—a bus specification. The PCI bus is a high-performance local bus used to connect peripherals to memory and a microprocessor. A wide range of vendors make devices that plug into the PCI bus.

PCI I/O blank panel

A metal panel that fits on a slot in the I/O door. It must be in place if a PCI board is not installed in the corresponding slot in the PCI module.

S/PDIF

A serial interconnect standard for consumer digital audio equipment. This interface can transfer stereo or single channel audio content at sample resolutions up to 20 bits (or 24 bits using an extension to the specification) and sample rates of 32 kHz, 44.1 kHz, and 48 kHz. Physical connectors are typically RCA jacks or optical connectors. For a complete description of S/PDIF, see the IEC 958 specification (now officially designated “IEC 60958).

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