SGI® Altix® 4700 and Altix 450 3D Graphics Option User's Guide

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TRADEMARKS AND ATTRIBUTIONS

Record of Revision

Version	Description
-001	February 2007 First release

Contents

SGI Altix 3D Graphics Option Information

Overview

Your SGI Altix system ships with a user document describing the use, operation and basic maintenance of the system. Figure 1-1 shows an example of the graphics board. Note that the small power cord that goes from the graphics processor fan should remain unplugged at all times.

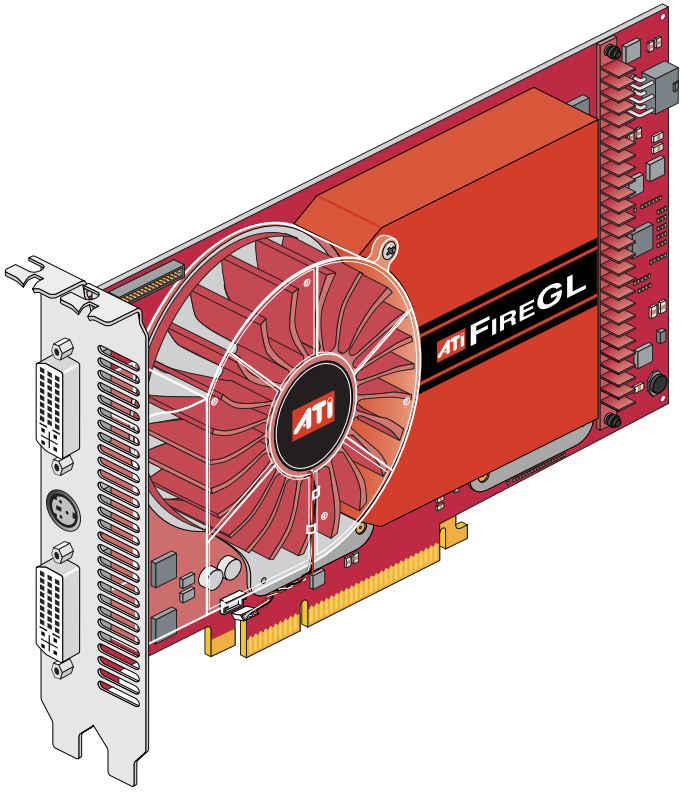

Figure 1-1 Freestanding 3D Graphics Card Option

Refer to these hard-copy manuals (shipped with your Altix system) for information not directly related to your 3D graphics option board:

- *SGI Altix 4700 System User's Guide* (P/N 007-4823-00*x*)
- *SGI Altix 450 System User's Guide* (P/N 007-4857-00*x*)

You can also down-load these documents via internet, from the SGI publications library at:

http://docs.sgi.com

Graphics Board Features

Your SGI 3D graphics board option is a true 64-bit per pixel rendering engine with fidelity circuitry capable of producing one trillion colors. Additional features include:

- Scalable ultra-threaded architecture
- Dynamic branching with high-performance parallel processing
- 128-bit full floating point precession
- 8, 10 or 16-bit RGB color component support
- Independent resolution and refresh rate selection in multi-monitor configurations
- Full OpenGL application support
- High-bandwidth PCI Express (PCIe) X16 lane support I/O

See the section *Overview of PCI Express Operation* in the Maintenance chapter of your system user's guide for an overview of PCIe features.

Note: Each 3D graphics board takes up two PCI slot widths. The single-wide (I2E) blade has two PCIe slots, but one 3D graphics card uses the total space in the blade. The double-wide (I4E) blade has two PCIe slots and two PCI-X slots, but with two 3D graphics cards installed, the PCI-X slots are not usable.

Getting Started

You should always attach your graphics keyboard, mouse and monitor(s) to the applicable connectors prior to booting your system. You must have at least two USB connectors (or one USB connector and a hub/expander) available to hook up the keyboard/mouse.

Connecting Keyboard and Mouse

Figure 1-2 on page 3 shows an example of connecting the USB keyboard and mouse to the IA (base I/O) blade in the system.

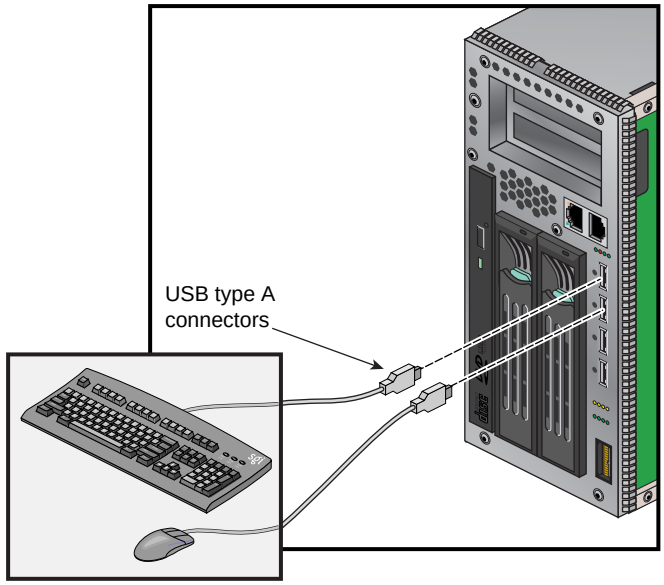

Figure 1-2 Connection Example for USB Keyboard/Mouse

Connecting Video Monitors

Figure 1-3 illustrates an example connection of monitors to the 3D graphics connectors on the I4E blade.

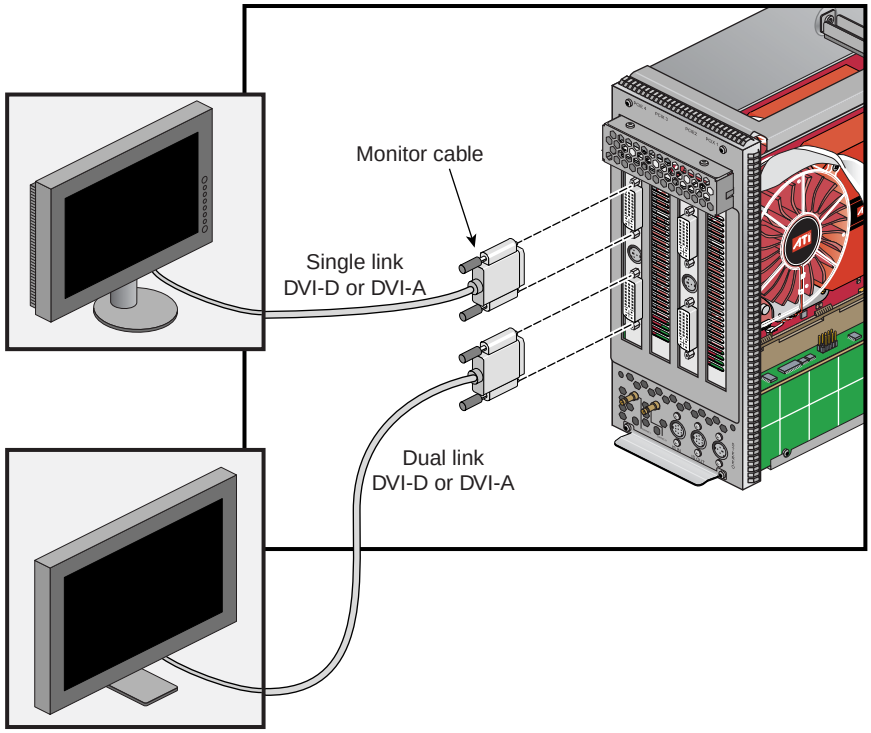

Figure 1-3 Video Monitor Connection Example

Modifying the Video Interface

The graphics cards should be installed before any software modification is done. The 3D graphics card is basically administered through use of two graphics configuration commands:

- `gfxconfig`

This command lets you configure the graphics card characteristics. The file /etc/X11/gfx.config will contain data such as:

```
xserver=:0 input=1 pipe=1 format=1280x1024_60
```

The command `man gfxconfig` provides information on how to use the gfxconfig command.

- `is3config`

The is3config command is used to lock graphics outputs from 3D cards, either to each other or to an incoming graphics or video level genlock signal. Note that graphics channels that will be genlocked should always use identical video formats.

The command `man is3config` provides information on how to use the is3config command.

The is3config function is only used when two or more graphics cards “pipes” are being operated. The ImageSync3 (IS3) circuitry is native to the double-wide (I4E) and single-wide (I2E) blades and is determined by the connectivity of the external IS3 DIN cables.

Figure 1-4 on page 6 shows an ImageSync3 cabling example.

Figure 1-5 on page 7 shows an example of synchronizing the 3D boards from two separate systems.

The length of the short external ImageSync cable is 2 feet (61 cm). This cable can make all connections between two adjacent IRU rows and can connect two I2E or I4E blades with an intervening IRU row as long as the horizontal displacement is not more than 2 slots. (i.e., IRU row 0, blade 2 to row 2, blades 4 through 0). The longer 10-foot (3 meter) external ImageSync cable must be used for connections that exceed these guidelines (or when the 3D cards are installed in separate racks).

Note: There is no restriction to the ordering of the external IS3 din cable connections. The blade that has the incoming external genlock (or no incoming genlock) cable will be defined as the “head” of the IS3 chain.

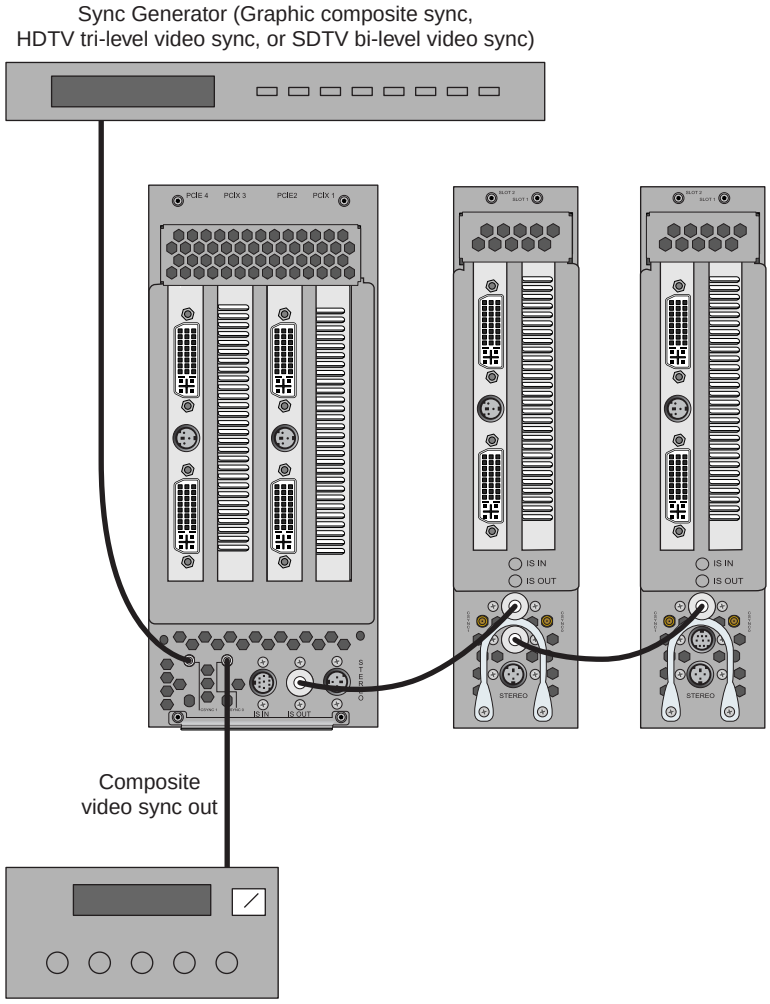

Figure 1-4 ImageSync Cabling Example

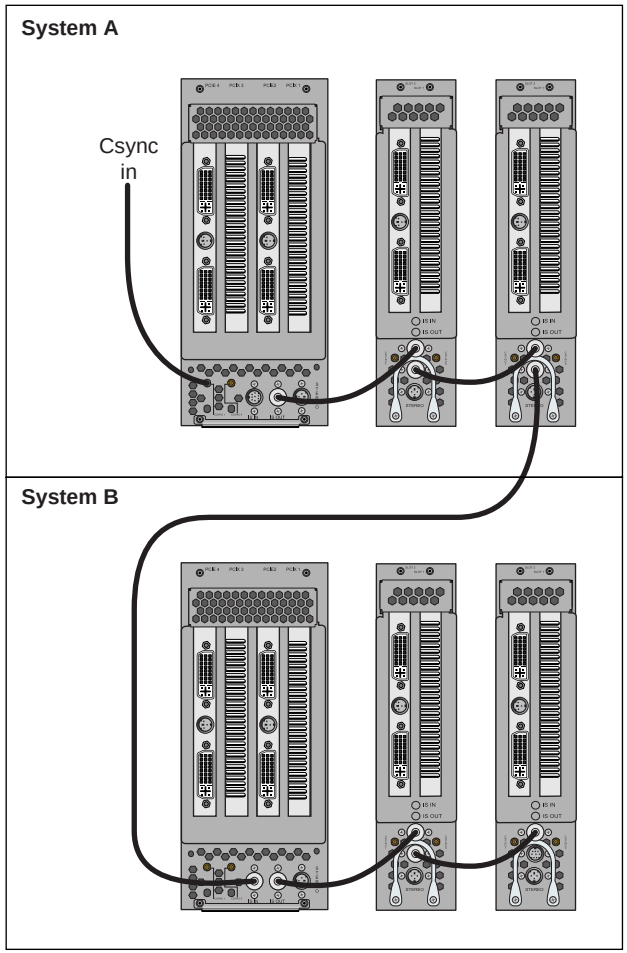

Figure 1-5 Two-System Video Synchronization Example

Graphics Board Remove/Replace

As this document will illustrate, the 3D graphics board can be installed in either a double-wide blade (I4E) or a single-wide blade (I2E). In each case the 3D board uses two PCI slot spaces. When adding or replacing a 3D graphics board, always confirm the small power cable below the processor is unplugged. See Figure 1-6 for the location of the power cable connection.

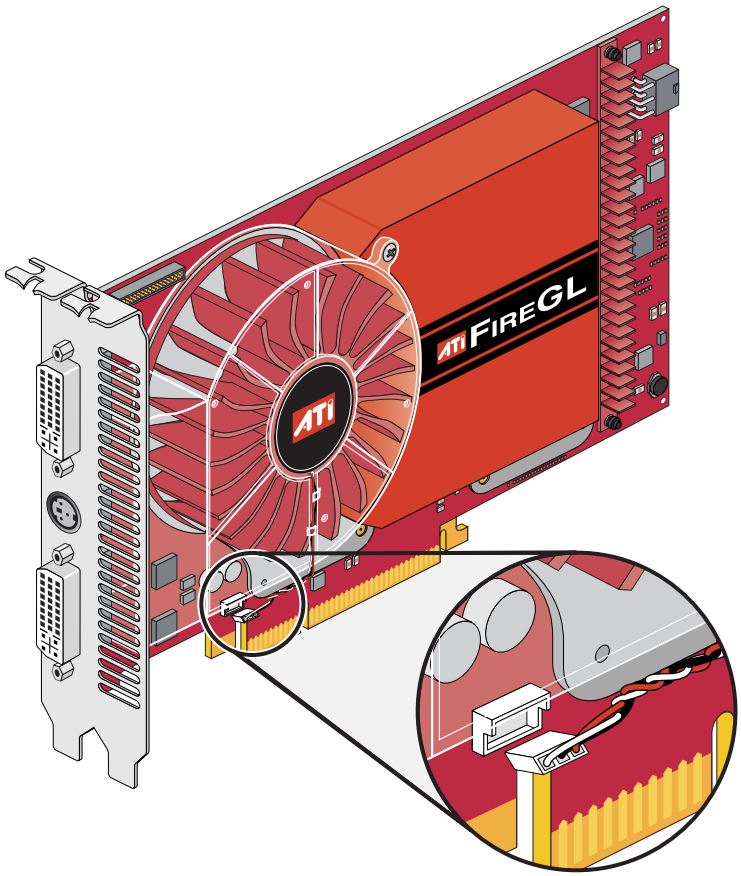

Figure 1-6 Power Cable Below Graphics Processor is Always Unplugged

Service and Removing Parts

If you are experiencing trouble with the graphics subsystem and determine that a replacement part will be needed, please contact your SGI service representative using the information in “Contacting the SGI Customer Service Center” on page 21. Return postage information is included with replacement parts.

Removal and replacement of the hardware components that make up the graphics options (blades, cables and graphics cards are documented in the following two subsections.

Replacing a 3D Graphics Board in the Double-Wide Blade (I4E)

The remove and replace procedures for the single-wide blade and the double-wide blade are somewhat different. Use the following steps to remove a 3D graphics board from the double-wide module and replace it with another board:

1. Shut down the Altix system, remove the double-wide blade from the IRU and place it on a static-free work surface.
2. Undo the screw on the left side of the blade and remove the top bracket that holds the card down within the blade. It must be removed before you can lift out the graphics card, see panel A in Figure 1-7 on page 10 for an example.
3. Remove the retention screws from the perforated front retainer (panel B). Remove this piece by pulling out towards the top (there are pins in the bottom of this that hold the cards in place).
4. Unplug the 6-pin cable (see panel C) on the back of the card (yellow and black).
5. Remove the ImageSync (flat ribbon cable) from the blade and/or the graphics card.
6. Remove the card from the slot (see panel D).
7. Reverse these procedures to install a new 3D graphics card, see Figure 1-8 on page 11.

Figure 1-9 on page 12 shows the 3D cards fully installed in the double-wide blade.

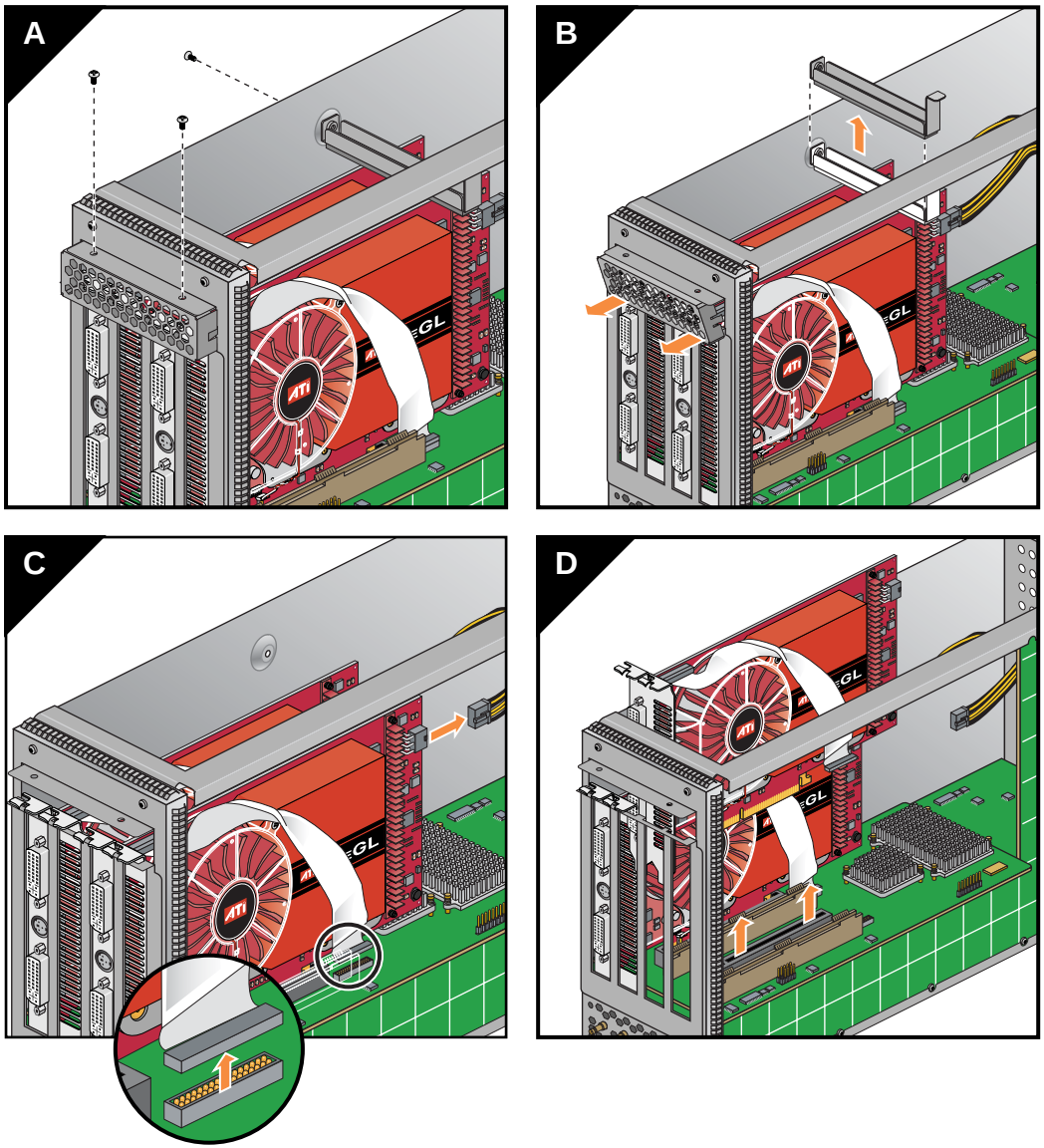

Figure 1-7 Double-Wide Graphics Blade (I4E) Remove Example

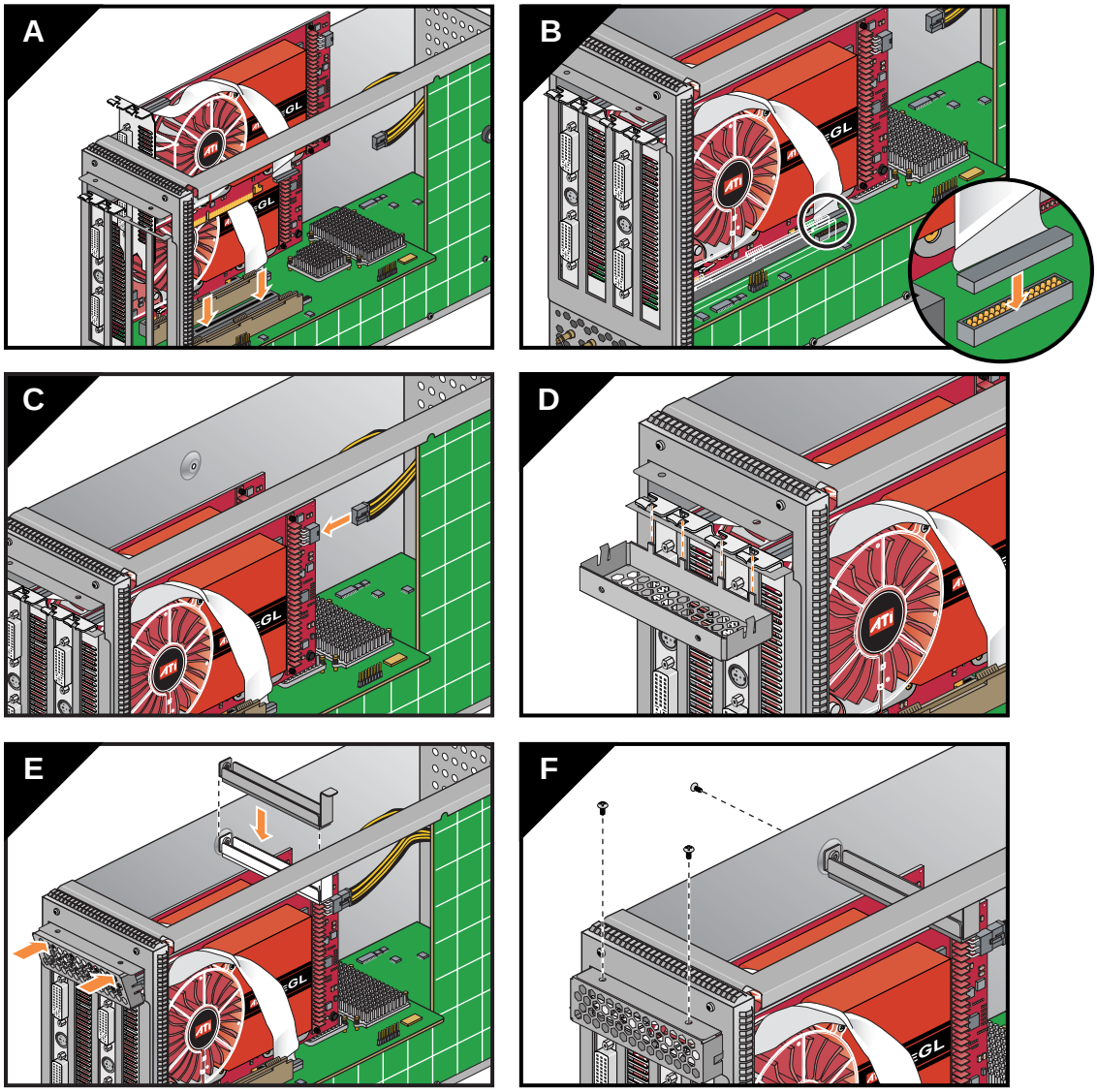

Figure 1-8 Replacing a Graphics Card in the Double-Wide (I4E) Blade

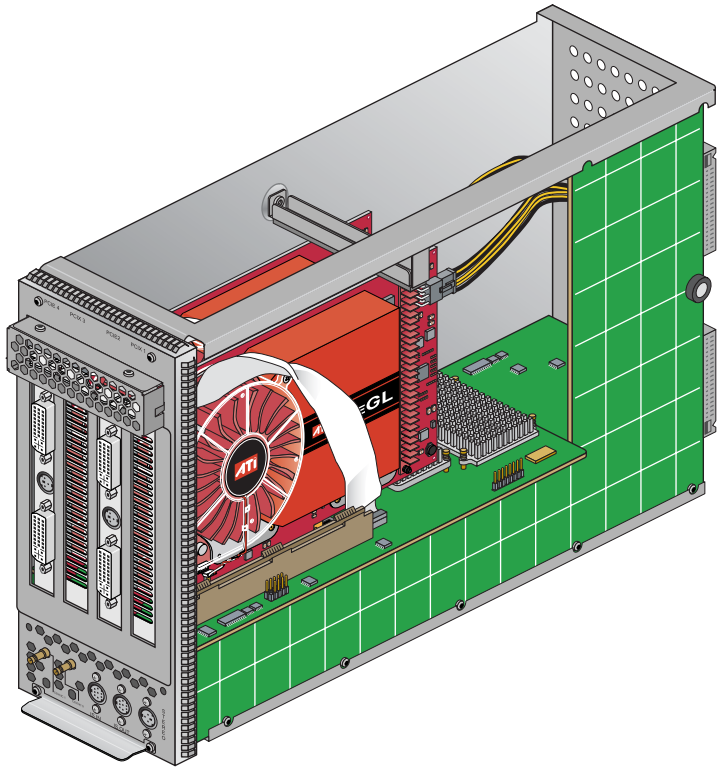

Figure 1-9 Double-Wide (I4E) Graphics Blade With Two Boards Installed

Remove and Replace the 3D Card in a Single-Wide (I2E) Blade

If your 3D graphics option is installed in a single-wide (I2E) blade, removal and replacement is slightly more constrained by the space within the blade. See Figure 1-10 and use the following instructions for removal of a card. Replacement is done by reversing the removal steps.

1. Shut down the Altix system, remove the blade from the IRU and place it on a static-free work surface.
2. Remove the retention screw from the top bracket and perforated front retainer (panel A).
3. Remove the top and front brackets holding the graphics card in place (panel B).
4. Undo the front screw (panel C) that holds the card's front bracket to the blade.
5. Carefully remove the ribbon connector from the upper front section of the card (panel D).

Note: The ribbon cable should attach to the upper of the two connectors present within the blade. Do *not* use the lower connector when you re-assemble the blade.

6. Remove the 6-pin power cable from the rear (panel E) and gently lift the card free (panel F).
7. Reverse these procedures to install a new 3D graphics board, see Figure 1-11 on page 15.

Figure 1-12 on page 16 shows the 3D board completely installed in the blade.

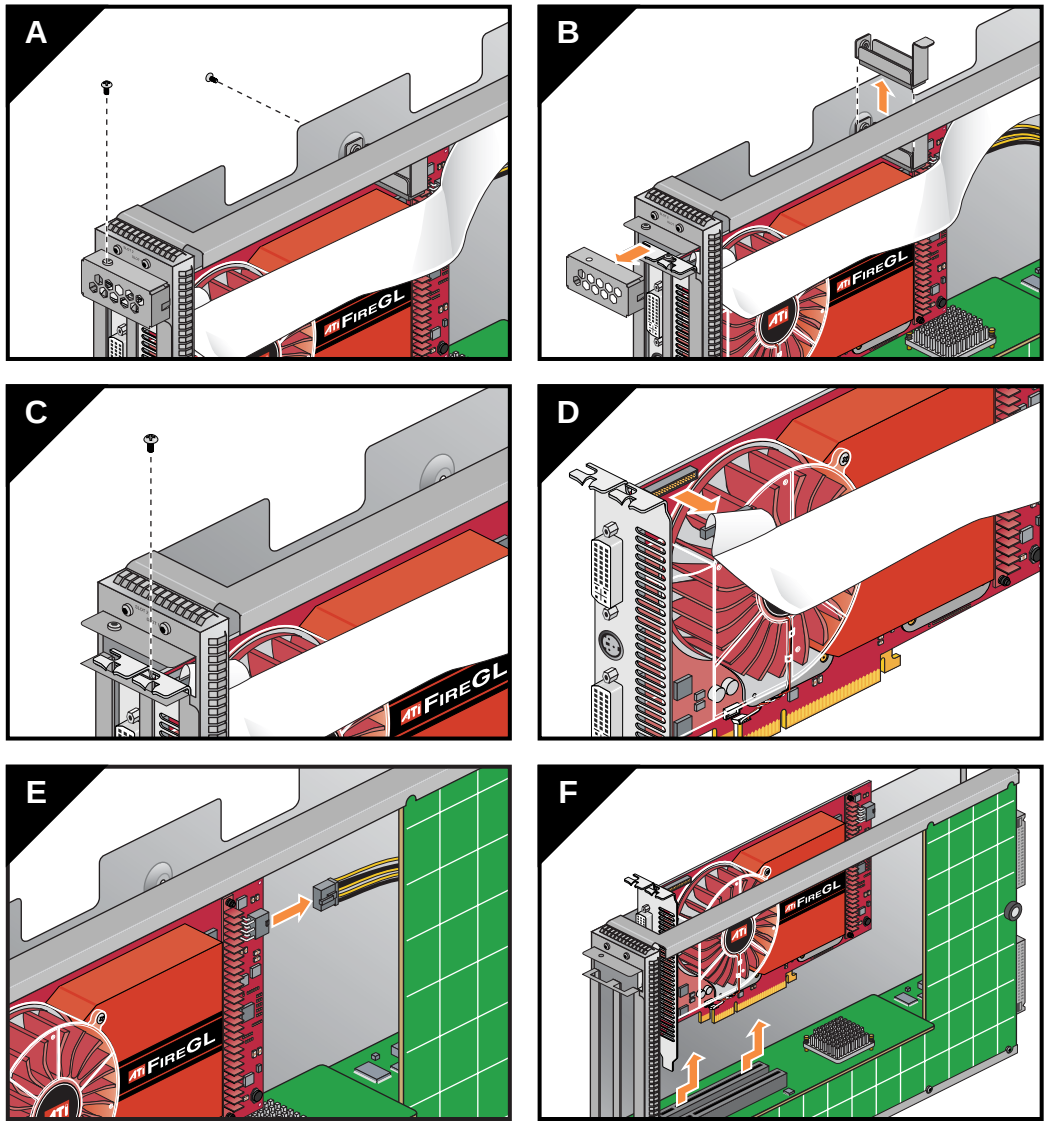

Figure 1-10 Single-Wide (I2E) 3D board Remove Example

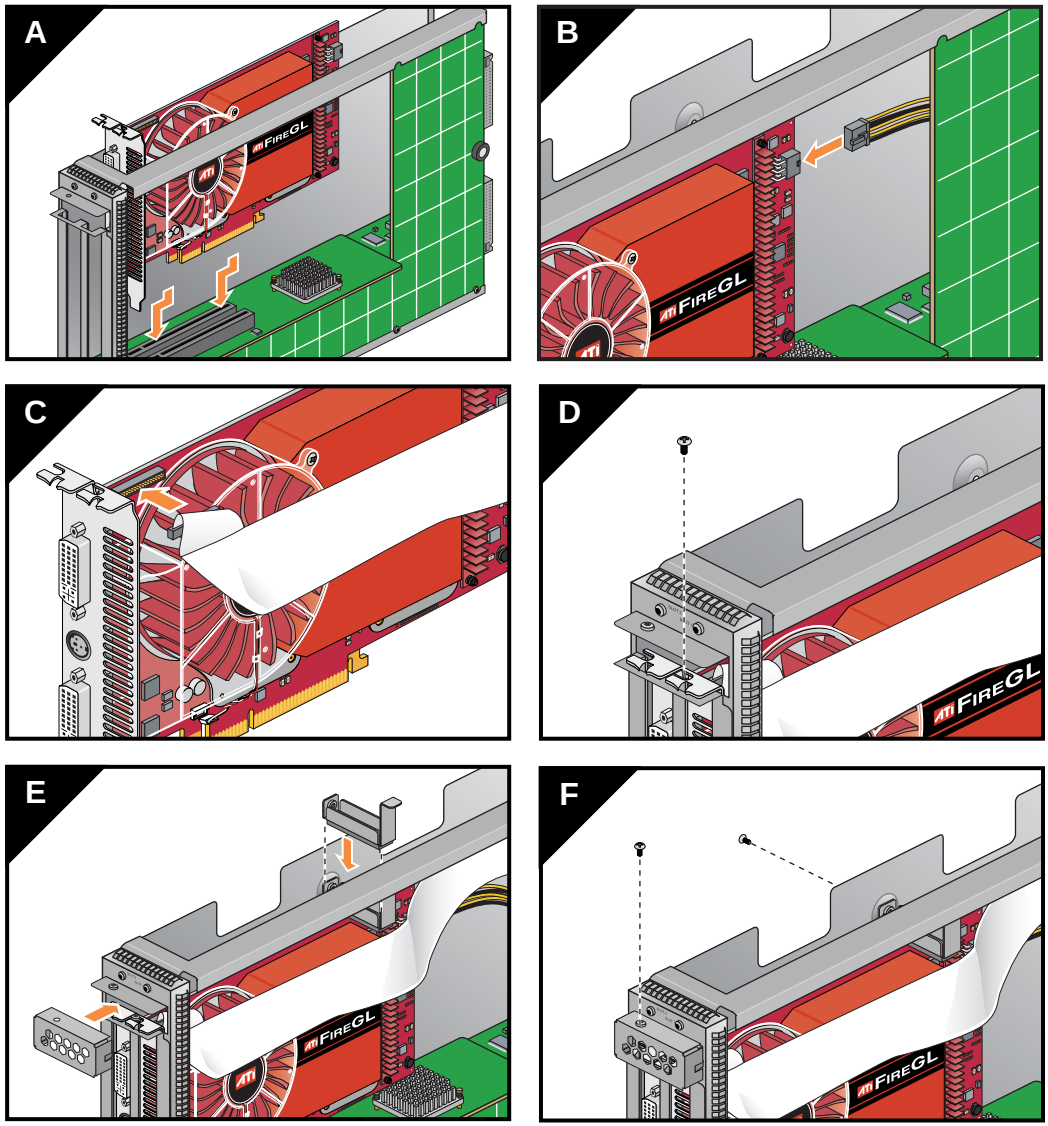

Figure 1-11 Replace the Graphics Card in the Single-Wide (I2E) Blade

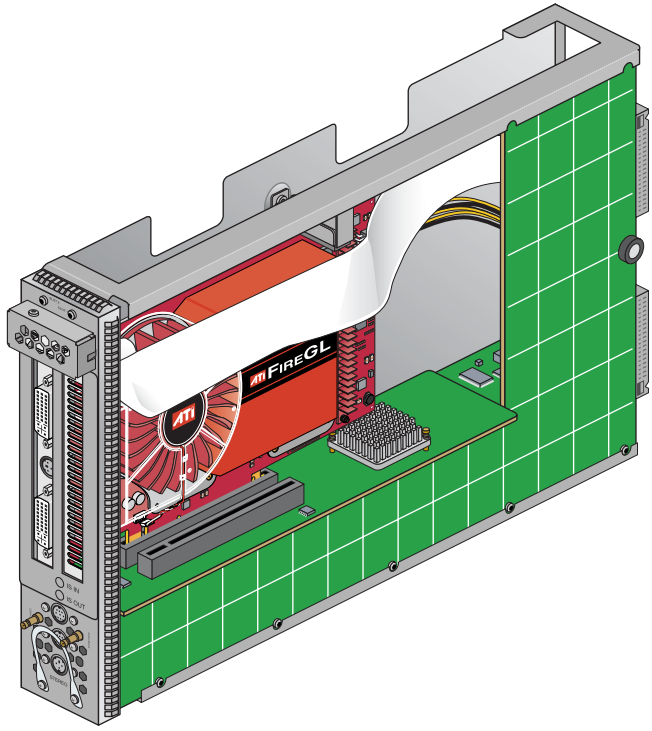

Figure 1-12 3D Graphics Card Installed in a Single-Wide Blade

Connector and Pin Locations

The following sections show the pin assignments for the 3D graphics option.

3D Graphics DVI Connector

Figure 1-13 shows the pin locations for the DVI connectors on the 3D graphics boards.

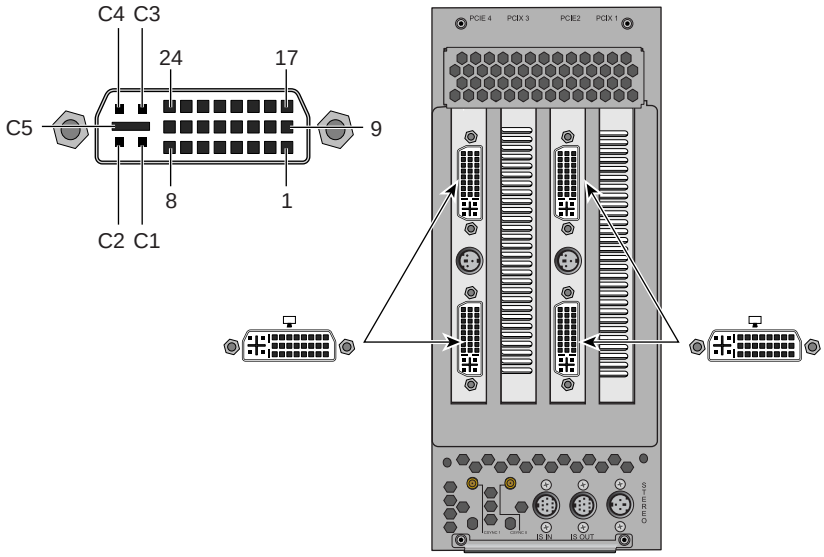

Figure 1-13 3D Graphics Board DVI Connector Pin Locations

Table 1-1 shows the port pinout assignments for the DVI port(s).

Table 1-1 DVI 3D Graphics Port Connector Pinouts

Pin	Assignment	Pin	Assignment
1	DATA 2-	16	HOT_POWER
2	DATA2+	17	DATA 0-
3	SHIELD 2/4	18	DATA 0+
4	DATA 4-	19	SHIELD 0/5

Table 1-1 (continued) DVI 3D Graphics Port Connector Pinouts

Pin	Assignment	Pin	Assignment
5	DATA 4+	20	DATA 5-
6	DDC_CLOCK	21	DATA 5+
7	DDC_DATA	22	SHIELD CLOCK
8	VSYNC	23	CLOCK -
9	DATA 1-	24	CLOCK +
10	DATA 1+	C1	A_RED
11	SHIELD 1/3	C2	A_GREEN
12	DATA 3-	C3	A_BLUE
13	DATA 3+	C4	HYNSC
14	+5V DC_POWER	C5	A_GROUND2
15	A_GROUND1	C6	A_GROUND3

3-Pin Stereo Emitter Connector

Location and pin identification for the stereo emitter connectors are shown in Figure 1-14.

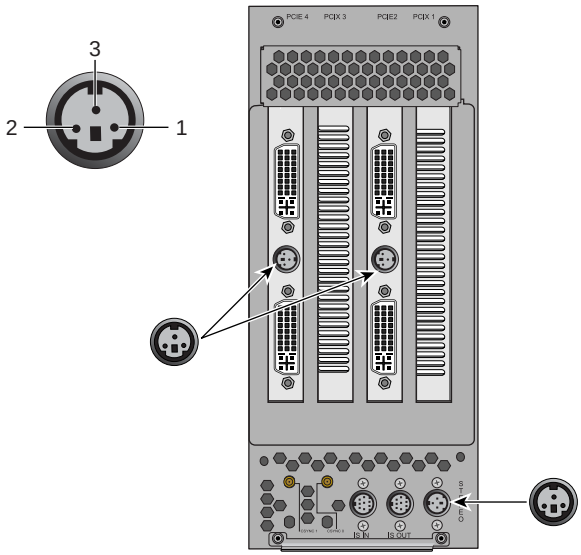

Figure 1-14 Stereo Emitter Graphics Output Connectors

Table 1-2 lists the pin functions for the stereo emitter connectors.

Table 1-2 Stereo Emitter Connector Pinouts

Pin Number	Function
1	+5V DC power out
2	Ground
3	Stereo sync out

ImageSync Connector Pinouts

Figure 1-15 shows the ImageSync connector and pin locations on an I4E graphics blade. Table 1-3 provides the pin functions.

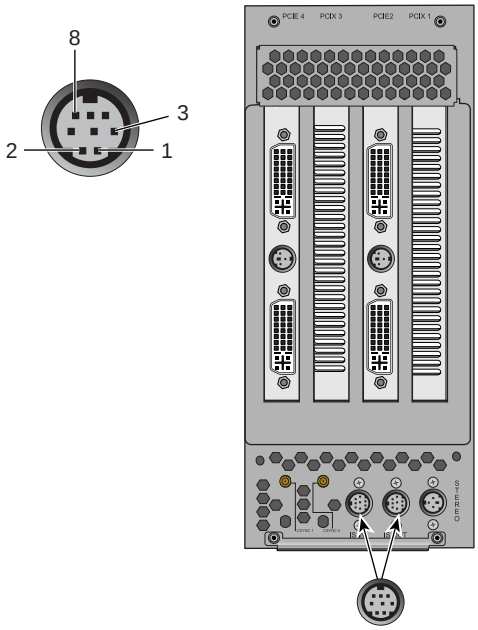

Figure 1-15 ImageSync Connector Pin Locations Example

Table 1-3 ImageSync Connector Pinouts

Pin number	Function
1	Csync in
2	Stereo in
3	Swap-ready A
4	Swap-ready B
5	Aux in 1 (TTL horizontal sync)
6	Aux in 2 (TTL vertical sync)

Table 1-3 (continued) ImageSync Connector Pinouts

Pin number	Function
7	Aux in 3 (cable present)
8	Aux in 4 (spare)

Contacting the SGI Customer Service Center

To contact the SGI Customer Service Center, call 1-800-800-4SGI, or visit: http://www.sgi.com/support/customerservice.html

Customers with support contracts can also obtain information from:

https://support.sgi.com/login

From outside the United States contact your local SGI sales office.