POWER CHALLENGE™ to Extreme™ Graphics, and Onyx Extreme to RealityEngine²™ Graphics Upgrade Installation Instructions

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About This Guide

This manual provides field installers with the information needed to install the Extreme™ Graphics hardware option in POWER CHALLENGE™ L and XL systems. It also describes how to remove the Extreme™ Graphics hardware option from Onyx™ and POWER Onyx™ workstations, and replace it with RealityEngine^2 graphics. The manual is organized as follows:

Chapter 1 — "Extreme Option Overview" describes the necessary hardware configurations for a successful Extreme Graphics installation. It gives a product overview, discusses configuration issues, and provides a list of applicable parts.

Chapter 2 — "Extreme Installation in POWER Challenge L" covers the hardware-specific installation procedures required to unpack, cable, and configure the Extreme Graphics option for POWER Challenge L deskside systems.

Chapter 3 — "POWER Challenge XL Extreme Graphics Installation" describes how to unpack, cable, and configure the Extreme Graphics option for POWER Challenge XL rackmount systems.

Chapter 4 — "Onyx Deskside Extreme Graphics Removal and Upgrade to RealityEngine^2" describes how to remove the Extreme Graphics components and replace them with RealityEngine^2 graphics. Note that the Extreme Graphics option is *not* supported in rackmounted Onyx systems.

Start with the "Overview" chapter to familiarize yourself with the features and the individual components of the hardware option. Then, proceed to the chapter covering your system type and option installation.

System installation manuals for the POWER Challenge and Onyx products may provide additional helpful hardware and software information.

Chapter 1

Extreme Option Overview

This chapter introduces the Extreme Graphics hardware option for POWER Challenge and Onyx systems. It contrasts the differences between the CHALLENGE and Onyx versions, and provides the necessary safety and configuration information. This information is written for Silicon Graphics® system support engineers (SSEs), or other trained and authorized field personnel who are responsible for the installation, removal, or replacement of these hardware options.

1.1 Optional Extreme Graphics Product Description

The low-end graphics option now available for the POWER Challenge L and XL, as well as for the Onyx deskside systems, is the (Indigo$^{2™}$) Extreme board set. This board set is adapted to interface with the system's IO4 board. Because of the differences in the CHALLENGE and Onyx system backplanes, two different versions of this board set are required.

Both versions of the Extreme graphics option consist of a Graphics Channel Adapter Module (GCAM)-equipped IO4 board (instead of a VCAM-equipped primary IO4) and the Extreme Graphics board set (see Figure 1-1).

The GCAM contains a VME adapter subsystem and interfaces to the Extreme Graphics board set. One FCI interface connector is available on the front of the GCAM board.

The Extreme Graphics board set is made up of three graphics boards, stacked on an adapter board configured for either a Challenge or Onyx backplane.

Note: Installation of the graphics board set requires three adjoining card slots. The Extreme Graphics option is *not* supported in IP19-based Challenge servers or rackmount Onyx products. The rackmount Onyx supports only RealityEngine^2 or VTX™ graphics board sets.

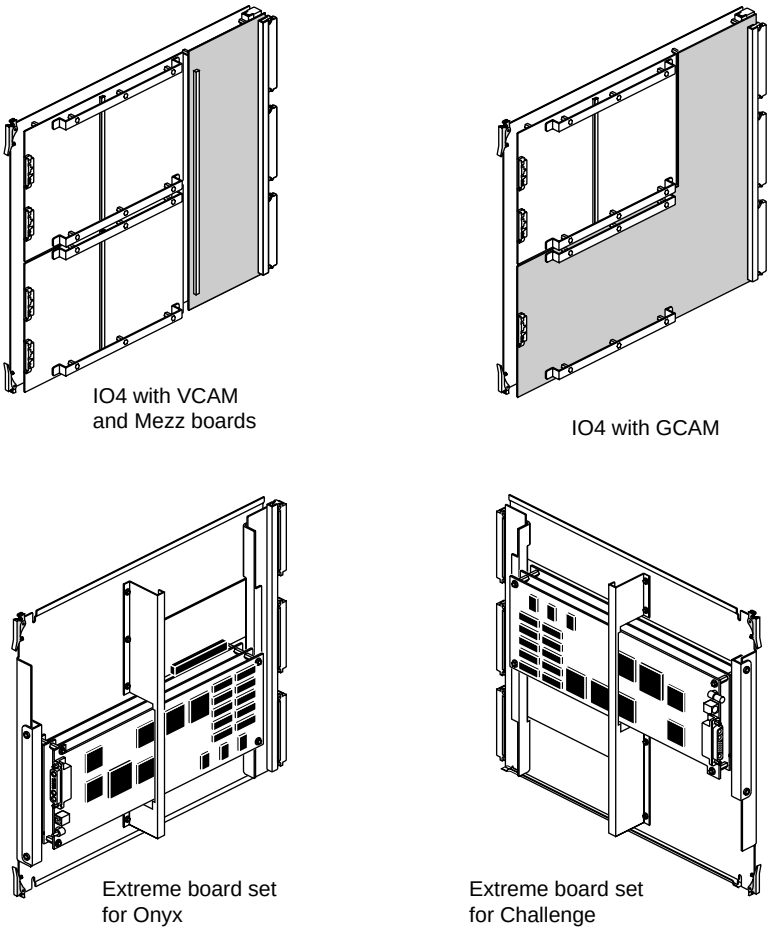

Figure 1-1 CHALLENGE and Onyx Versions of the Extreme Graphics Hardware Option

1.2 POWER Challenge and Challenge Configurations

The configuration issues governing the use of the Extreme graphics option in a Challenge system are listed below:

- A GCAM-equipped IO4 board replaces the VCAM-equipped primary system IO4
- The GCAM limits the primary IO4 to one short mezzanine (HIO) option board
- The GCAM has a single built-in FCI connector
- The Extreme Graphics board set is mounted on a 9U adapter frame that connects to the VME backplane using standard VME connectors
- The Extreme board set uses the last available VME slot and the two slots adjacent to it:
  - In a POWER Challenge L, the option is installed in chassis slot 11 and protrudes into slots 10 and 9
  - In a POWER Challenge XL, the option is installed in chassis slot 21 and protrudes into slots 20 and 19

1.3 Deskside POWER Onyx and Onyx Configurations

The configuration issues governing the use of the Extreme graphics option in a POWER Onyx or Onyx system are listed below:

- A GCAM-equipped IO4 board replaces the VCAM-equipped primary system IO4
- The GCAM limits the primary IO4 to one short mezzanine (HIO) option board
- The GCAM has a single built-in FCI connector
- The Extreme Graphics board set is mounted on a 9U adapter frame (called an AB4) that connects to the Onyx backplane using GE10-style connectors
- The Extreme board set uses the GE10 slot and the three slots adjacent to it. In both the POWER Onyx and Onyx, the option is installed in chassis slot 8 and protrudes into slots 9 and 10.

1.4 Unpacking and Checking the Parts

Before beginning the installation procedure, verify that all of the parts necessary for the installation are present. See Figure 1-2 and the applicable parts list in this section.

1.4.1 POWER Challenge Extreme Option Parts List

You should have all the parts in the following list in your upgrade kit:

- IO4 with GCAM board (P / N 013-0994-00x)
- Extreme board set in 9U adapter frame (P / N 013-0946-00x)
- 13W3 cable assembly (P / N 018-0442-00x)
- Genlock cable assembly (P / N 018-0443-00x)
- Stereoview cable assembly (P / N 018-0444-00x)
- 13W3 I / O plate and connector (P / N 040-0872-00x)
- Genlock I / O plate and connector (P / N 040-0882-00x)
- Stereoview I / O plate and connector (P / N 040-0883-00x)

Note: The 20- or 21-inch color monitor is a separate line item and is not included on the bill of material with the Extreme option for Challenge systems.

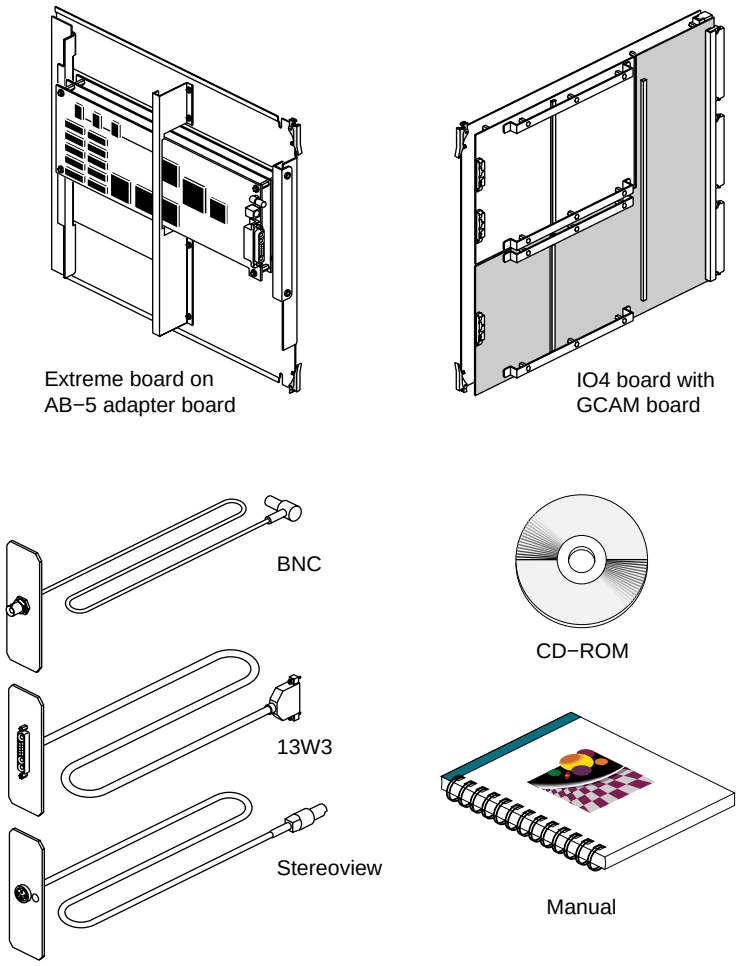

Figure 1-2 Parts for Challenge Extreme Graphics Option (Visualization Console)

1.4.2 POWER Onyx and Onyx Extreme Option Parts List

You should have all the parts in the following list in your upgrade kit:

- IO4 with GCAM board (P / N 013-0994-00x)
- Extreme board set in AB4 9U adapter frame (P / N 013-0925-00x)
- 13W3 cable assembly (P / N 018-0442-00x)
- Genlock cable assembly (P / N 018-0443-00x)
- Stereoview cable assembly (P / N 018-0444-00x)
- 13W3 I / O plate and connector (P / N 040-0872-00x)
- Genlock I / O plate and connector (P / N 040-0882-00x)
- Stereoview I / O plate and connector (P / N 040-0883-00x)

Note: The 20- or 21-inch color monitor is a separate line item and is not included on the bill of material with the Extreme option for Challenge systems.

1.5 Restrictions and Important Notes

The graphics workstation and server backplanes are fundamentally different – components designed to connect to the system backplane are not interchangeable.

Do not install the Extreme Graphics option in IP19 (R4400™) based Challenge systems.

The Extreme Graphics option uses these IRIX™ releases:

- For POWER Challenge systems you must use IRIX 6.0 or later
- For POWER Onyx systems you must use IRIX 6.0 or later
- For Onyx Extreme deskside systems, you should use IRIX 5.3 or later

Chapter 2

Extreme Installation in POWER Challenge L

2.1 Overview

This chapter describes how to unpack, cable, and configure the Extreme Graphics option for POWER Challenge L deskside systems.

2.2 Extreme Graphics System Installation Summary

Use the following steps as a quick installation checklist for the Extreme Graphics option:

- Read the safety precautions
- Shut down the system
- Open the I/O panel to access the board slots
- Remove the VCAM-equipped IO4 board
- Remove any mezzanine boards from the VCAM-equipped IO4
- Unpack the Extreme option boards and cables
- Reinstall the mezzanine boards on the GCAM-equipped IO4 and/or on another IO4 board
- Install the new GCAM-equipped IO4 in place of the existing VCAM-equipped IO4
- Install the Extreme board set
- Connect internal cables to the graphics board and I/O panel
- Close up and secure the I/O panel
- Connect the monitor
- Connect the keyboard and mouse
- Power up the system and verify normal operation
- Return IO4 with VCAM to Silicon Graphics

2.3 Safety

Read these safety statements carefully before you install or remove the optional components.

Warning: **Installation of this option requires specific training and technical knowledge. These instructions have been provided for use by Silicon Graphics system support engineers (SSEs) and Silicon Graphics trained personnel only. This equipment uses electrical power internally that is hazardous if the equipment is improperly assembled or disassembled.**

Caution: This equipment is sensitive to damage from electrostatic discharge (ESD) caused by the buildup of electrical potential on clothing and other materials.

Follow these ESD preventive measures:

- Attach a ground strap to your wrist when connecting or disconnecting boards.
- Ensure that you and all electrical equipment that you handle during this installation are at ground potential to avoid damage from ESD.
- Keep the boards in their antistatic bags until they are needed, and remove them only when you are properly grounded to the chassis ground.
- Place the boards only on an antistatic mat. Do not place boards on top of an antistatic bag unless the outside of the bag also has antistatic protection.
- If you are servicing a system or installing a hardware upgrade, do not disconnect the power cord from the wall socket *or* the chassis. You will lose the system ground and could damage the equipment as a result.
- Do not use an ohmmeter on the boards.

2.4 Extreme Option Installation in POWER Challenge L

Use the following steps to install and connect the Extreme graphics option in a POWER Challenge L.

1. As superuser, enter **`/etc/shutdown`** in a functional UNIX® window. Turn the System Controller key switch to the Off position, and switch the system circuit breaker to Off.
2. Open the front door and unfasten the I/O panel.
3. Disconnect the cables and remove the primary IO4 from slot 5 in the cardcage.

   Note: If there is a short mezzanine board on the primary IO4, move it to the upper position on the new GCAM-equipped IO4. If there are two short mezzanine boards installed on the primary IO4, move one of the mezzanine cards to another IO4. If there is no other IO4 in the system, it is possible to move the mezzanine card to another system or move an IO4 from another system to yours. Have the customer order another IO4 if necessary.

4. Install the new GCAM-equipped IO4 (see Figure 2-1) in slot 5 to replace the VCAM-equipped IO4. Make sure the new IO4 is properly seated into the backplane connectors and that the ejector tabs have engaged the top and bottom card guides.

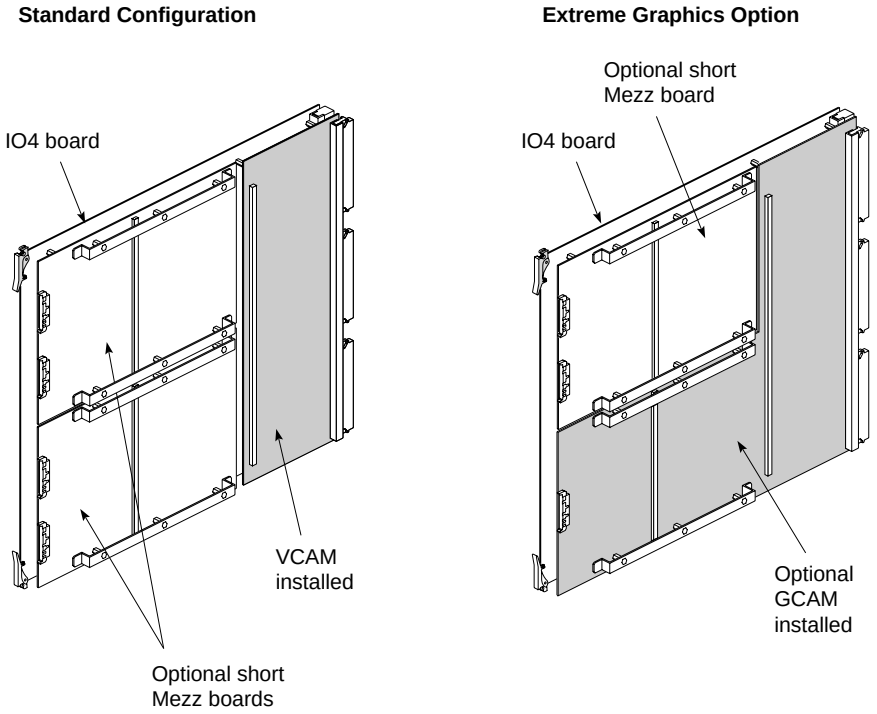

Figure 2-1 VCAM- and GCAM -Equipped IO4 Boards

5. Ensure that the GCAM plugs into slot 6 in place of the VCAM (see Figure 2-2).
6. Place the original VCAM-equipped IO4 in the antistatic bag and return it to Silicon Graphics.
7. Remove any VME boards from cardcage slots 9, 10, and 11.
8. Install the Extreme graphics board set in the last VME slot (11). Ensure that the board's backplane connectors seat properly in the system's backplane and that the ejector tabs have engaged the top and bottom card guides.

Note: The board set will protrude inward making it impossible to use slots 9 and 10.

9. Reinstall the VME boards, removed in Step 7, in other slots in the cardcage, or move them to another system if necessary. Ensure that the backplane connectors are seated and that the ejector tabs have engaged the top and bottom card guides.
10. Connect the 13W3, Genlock, and Stereoview connectors to the Extreme board, (see Figure 2-3).
11. Remove three short I/O plates and connect the 13W3, Genlock, and Stereoview I/O plate connectors to the I/O panel.
12. Connect the monitor, keyboard, and mouse using the information in the following sections.

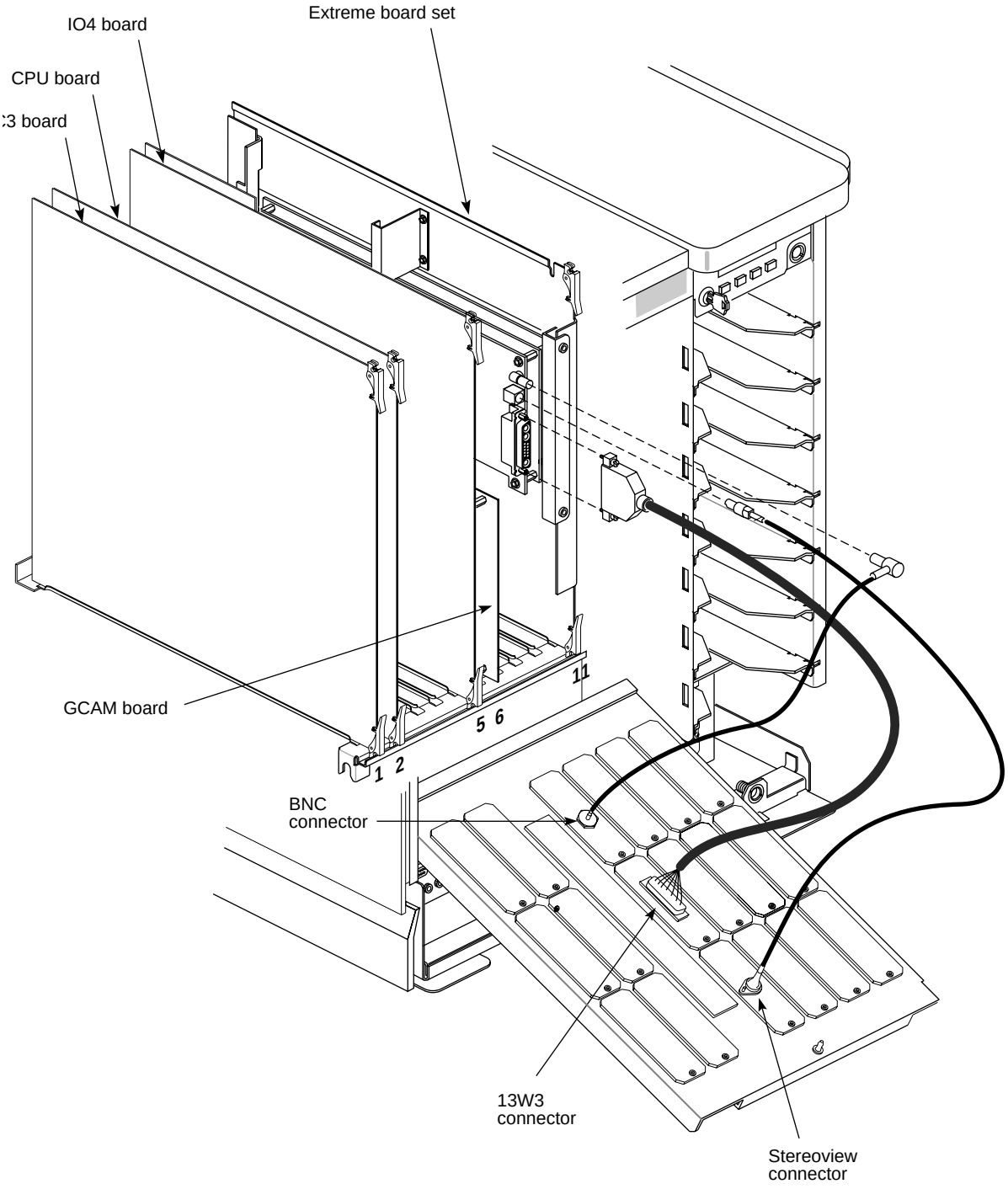

Figure 2-2 Extreme Installed in POWER Challenge L

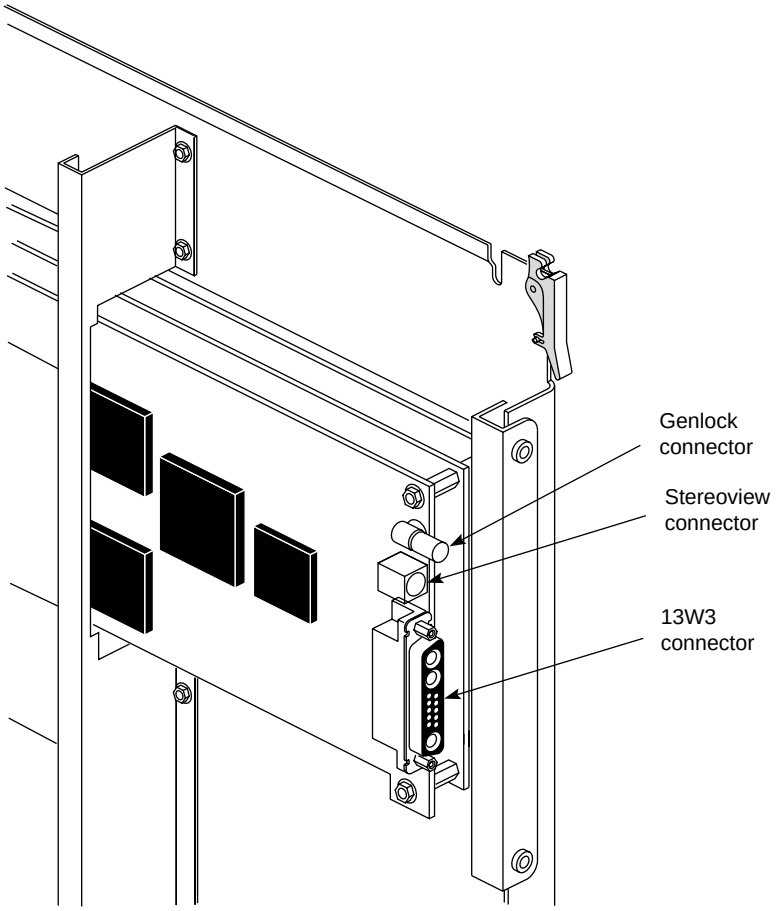

Figure 2-3 Extreme Board Set I/O Connectors

2.4.1 Monitor Cabling

The Extreme Graphics option configuration does not automatically ship with a color monitor (the monitor is listed as a separate line item from the Extreme graphics option). Regardless of the monitor's origin, it must use a 13W3 connector. See Figure 2-4 for the Silicon Graphics 20-inch monitor connectors and controls.

Note: For additional information regarding monitor operation, see the monitor user's guide.

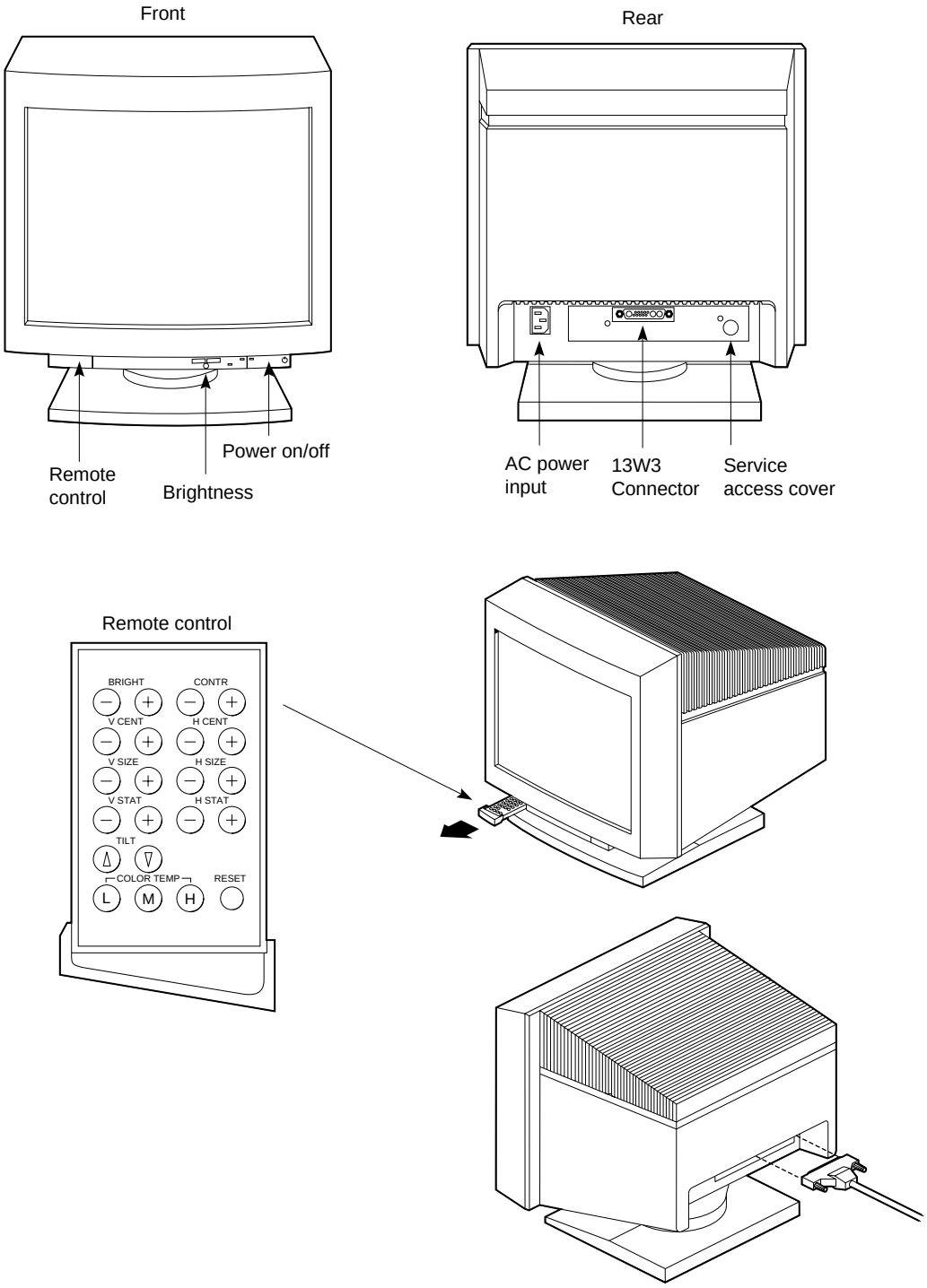

Figure 2-4 20-Inch Monitor Connectors and Controls

Use the following steps to connect a monitor to the system.

1. Locate the monitor video cable. It has large 13W3 connectors on each end.
2. Attach one end of the monitor video cable to the 13W3 connector on the back of the monitor. Secure the screws on either side of the connector.
3. Attach the other end of the monitor video cable to the 13W3 connector on the deskside system's I/O panel. Secure the screws on either side of the connector.
4. Plug in the monitor's power connector to a properly rated power source.

2.4.2 Keyboard and Mouse Cabling

The POWER Challenge Extreme Graphics option ships with a standard 101-key international keyboard. The keyboard has two identical plug receptacles, located in the upper right and left corners. These receptacles accept the 6-pin connectors from either the keyboard cable or the mouse. Attach the keyboard as shown in Figure 2-5.

Note: After you install the keyboard and mouse, go to the "Power On and Testing" section for detailed bring-up instructions.

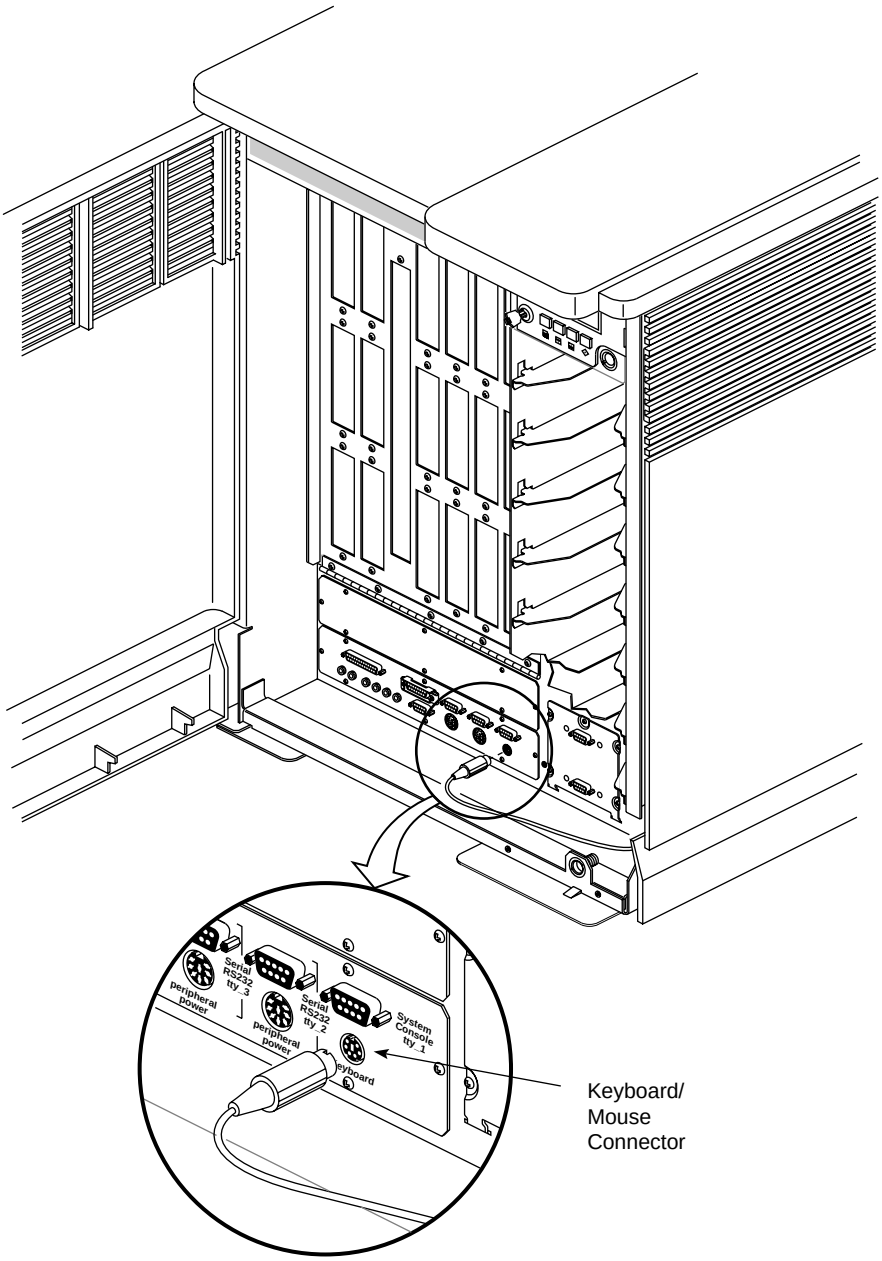

Figure 2-5 Keyboard Cabling

2.5 Power On and Testing

At this stage of the installation, you should have only the keyboard, mouse, and monitor connected. Leave any console terminal connected to the system. *Do not* connect additional internal or external devices to the chassis at this time.

If something is wrong with the system, it will be easier to spot problems if additional devices are not connected. Follow these procedures to power on the system:

1. Turn on the main power switch on the back of the unit.
2. Turn on the graphics monitor (and console terminal if installed).
3. Turn the System Controller key switch to the On position.
4. If desired, use the System Controller menu and display to watch the boot process status messages.
5. When the power-on diagnostics have been completed, you see this message on the monitor or console terminal:

   ```
   Starting up the system ...
   To perform System Maintenance instead, press <Esc>
   ```

   Press **<Esc>** within five seconds after the completion of the power-on diagnostic. You should see a menu similar to the following:

   ```
   System Maintenance Menu

   1) Start System
   2) Install System Software
   3) Run Diagnostics
   4) Recover System
   5) Enter Command Monitor

   Option ?
   ```

6. Select **5**, enter the "Command Monitor," and see the >> prompt.
7. Reload the system software.
8. Type **hinv** to check and verify the basic hardware configuration of the system. You should get a display similar to the following:

   ```
   System: IP21
   Processor: 75 Mhz R8000, 4M secondary cache
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 1)
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 2)
   Memory size: 64 Mbytes
   SCSI Disk: scsi(0)disk(1)
   SCSI Disk: scsi(0)disk(2)
   Graphics: GU1-Extreme
   ```

   Note: Some hardware options (such as a network board) may not be recognized by the PROM monitor. These options will not be listed by the *hinv* command. However, after you load and boot the operating system, the *hinv* command (executed at the IRIX prompt) should list *most* of the system hardware options. You can also type the following command at the IRIX prompt to obtain graphics hardware information (see the next section for details):

   ```
   /usr/gfx/gfxinfo
   ```

The *hinv* command typed in at the IRIX prompt displays more detailed information:

```
2 75 MHZ IP21 Processors
CPU: MIPS R8000 Processor Chip Revision: 2.1
FPU: MIPS R8010 Floating Point Chip Revision: 0.1
Data cache size: 16 Kbytes
Instruction cache size: 16 Kbytes
Secondary unified instruction/data cache size: 4 Mbytes
Main memory size: 64 Mbytes, 2-way interleaved
I/O board, Ebus slot 5: IO4 revision 1
Integral EPC serial ports: 4
Integral Ethernet controller: et0, Ebus slot 5
Integral SCSI controller 1: Version WD33C95A
Integral SCSI controller 0: Version WD33C95A
Disk drive: unit 1 on SCSI controller 0
Graphics board: GU1-Extreme
CC synchronization join counter
VME bus: adapter 0 mapped to adapter 45
VME bus: adapter 45
Integral IO4 parallel port: Ebus slot 5
```

If you need additional information on installing software on the system, see the *IRIS Software Installation Guide* and the software release notes.

2.5.1 Checking the Monitor Resolution

Use the following command to determine the screen resolution:

/usr/gfx/gfxinfo

You should get a message similar to the following:

```
Graphics board 0 is “GR2TP” graphics.
Managed (“:0.0”) 1280x1024
8 GEs, 2 REs, 24 bitplanes, 4 auxplanes, 4 cidplanes, Z-buffer
GR2 revision 6, VB2.0
HQ2.1 rev A, GE7 rev B, RE3.1 rev A, VC1 rev B,
assuming 20” monitor
```

2.5.2 Changing the Monitor Resolution

After you load IRIX, you can use the *setmon* command to change the resolution or video output format (VOF). This example shows you how to change the VOF to 1024 x 768:

```
su
setenv DISPLAY :0
/usr/gfx/setmon -x 1024x768_66
killall Xsgi
/usr/gfx/gfxinit -v
Xsgi &
```

Note: The *setmon* command loads the VOF value into EEPROM so that the system boots up in the specified display mode.

For additional information on monitor and graphics settings, see the following reference (man) pages:

- *setmonitor(3g)*
- *vout(1V)*
- *setmon(1g)*
- *gfxinfo(1g)*
- *gfxinit(1g)*
- *stopgfx(1g)*
- *startgfx(1g)*

Chapter 3

POWER Challenge XL Extreme Graphics Installation

This chapter describes how to unpack, cable, and configure the Extreme Graphics option for POWER Challenge XL rackmount systems.

3.1 Extreme Graphics System Installation Summary

Use the following steps as a quick installation checklist for the Extreme Graphics option:

- Read the safety precautions
- Shut down the system
- Open the back door
- Undo the I/O panel to access the board slots in Cardcage 2
- Remove the VCAM-equipped IO4 board
- Remove any mezzanine boards from the VCAM-equipped IO4
- Unpack the Extreme option boards and cables
- Reinstall the mezzanine boards on the GCAM-equipped IO4 and/or on another IO4 board
- Install the new GCAM-equipped IO4 in slot 15
- Install the Extreme board set in VME slot 21
- Connect internal cables to the graphics board and I/O panel
- Close up and secure the I/O panel
- Connect the monitor cables
- Connect the keyboard and mouse
- Power up the system and verify normal operation
- Return the IO4 board and VCAM to Silicon Graphics

3.2 Safety

Warning: **Installation of this option requires specific training and technical knowledge. These instructions have been provided for use by Silicon Graphics system support engineers (SSEs) or Silicon Graphics trained or certified personnel only. This equipment uses internal voltages that are hazardous if the equipment is improperly assembled or disassembled.**

Caution: This equipment is sensitive to damage from electrostatic discharge (ESD) caused by the buildup of electrical potential on clothing and other materials.

Follow these ESD preventive measures:

- Attach a ground strap to your wrist when connecting or disconnecting boards.
- Ensure that you and all electrical equipment that you handle during this installation are at ground potential to avoid damage from ESD.
- Keep the boards in their antistatic bags until they are needed, and remove them only when you are properly grounded to the chassis ground.
- Place the boards only on an antistatic mat. Do not place boards on top of an antistatic bag unless the outside of the bag also has antistatic protection.
- If you are servicing a system or installing a hardware upgrade, do not disconnect the power cord from the wall socket *or* the chassis. You will lose the system ground and could damage the equipment as a result.
- Do not use an ohmmeter on the boards.

3.3 Extreme Option Installation in POWER Challenge XL

Note: All three of the access covers to the chassis are held shut with magnetic strips; there are no latches.

Gain access to Cardcage 2 and install the Extreme option by performing the following steps:

1. Open the rear door of the system cabinet.
2. Determine if any of the cables attached to the I/O panel obstruct the panel's movement when opened. Remove cables as required.
3. Release the two quarter-turn fasteners securing the I/O panel (see Figure 3-1) and lower the panel until it is horizontal.

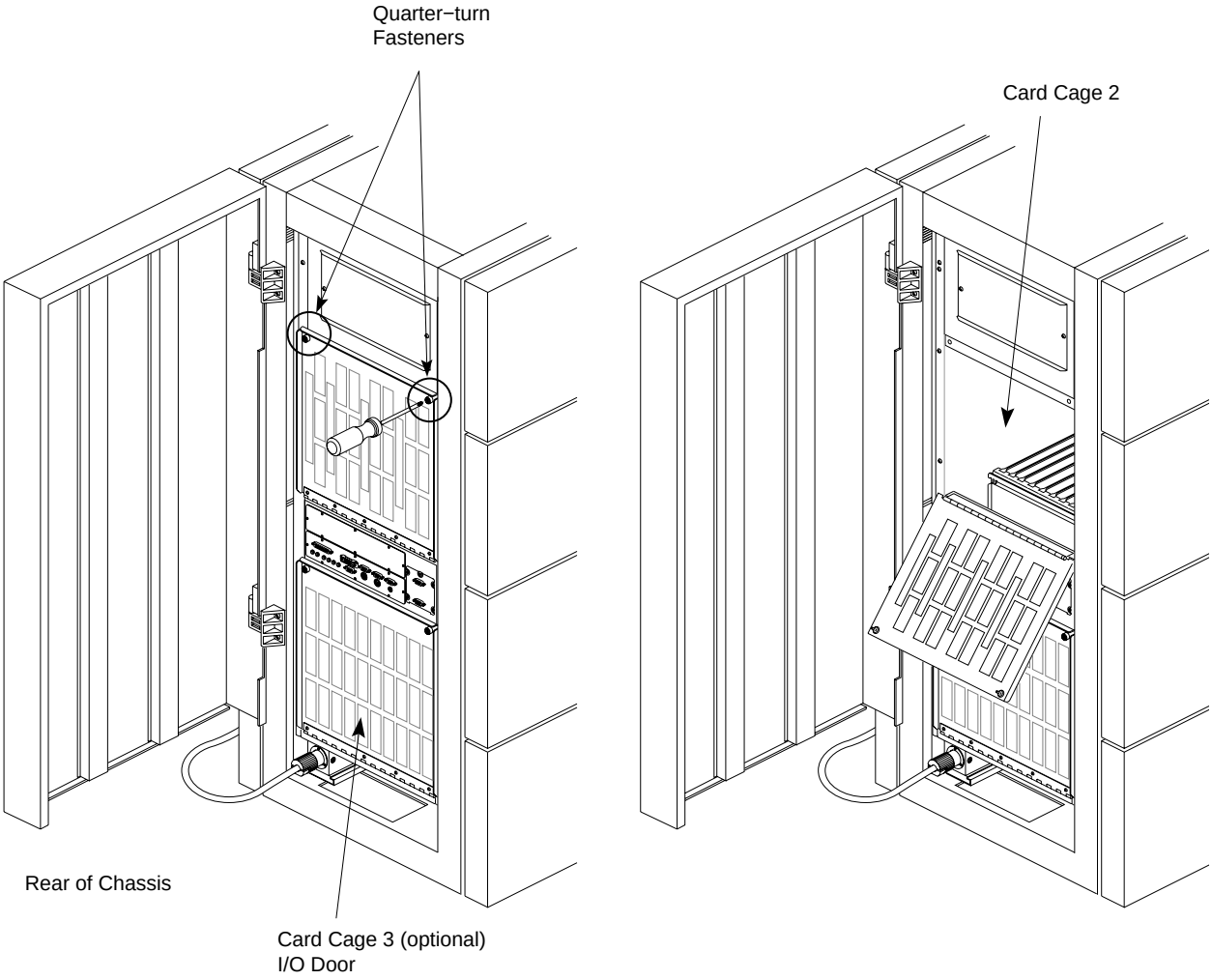

Figure 3-1 Gaining Access to Cardcage 2

4. Remove any internal I/O cables that will prevent the panel from pivoting down past horizontal.
5. Unlatch the cable supporting the I/O panel and gently allow the panel to pivot down toward the floor.
6. Undo the cables and remove the primary IO4 board and VCAM assembly from slots 15 and 16.

   Note: If there is a short mezzanine board on the primary IO4, it will have to be moved to the new GCAM-equipped IO4 (see Figure 3-2). If there are two short mezzanine boards installed on the original IO4, you will have to move one of the mezzanine cards to another IO4. If there is no other IO4 in the system, it may be possible to move the mezzanine card to another system or move an IO4 from another system to yours.

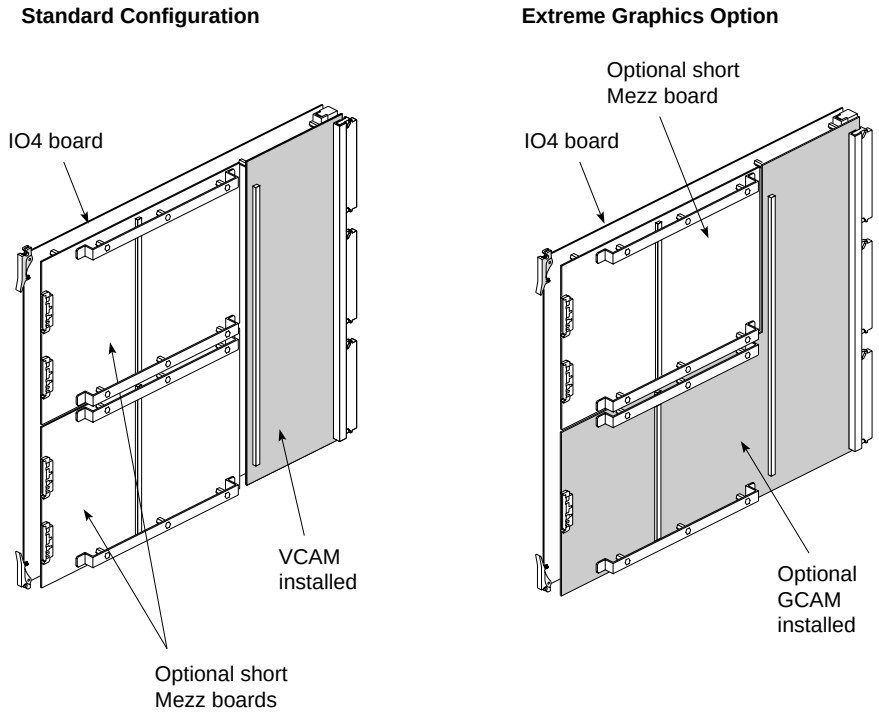

Figure 3-2 VCAM- and GCAM-Equipped IO4 Boards

7. Install the new GCAM-equipped IO4 in place of the old VCAM-equipped IO4 in slot 15 (see Figure 3-4). Make sure that the new IO4 is properly seated into the backplane connectors and that the ejector tabs have engaged the top and bottom card guides.

Note: In Cardcage 2, the only Ebus board having a dedicated slot is the primary IO4 board. The first (or only) IO4 board must be installed in slot 15, with its mounted GCAM attached to the slot 16 backplane connectors. Additional IO4s (with no VCAM or GCAM) must be installed sequentially in slots 13 (second IO4), 11 (third IO4), and 9 (fourth IO4).

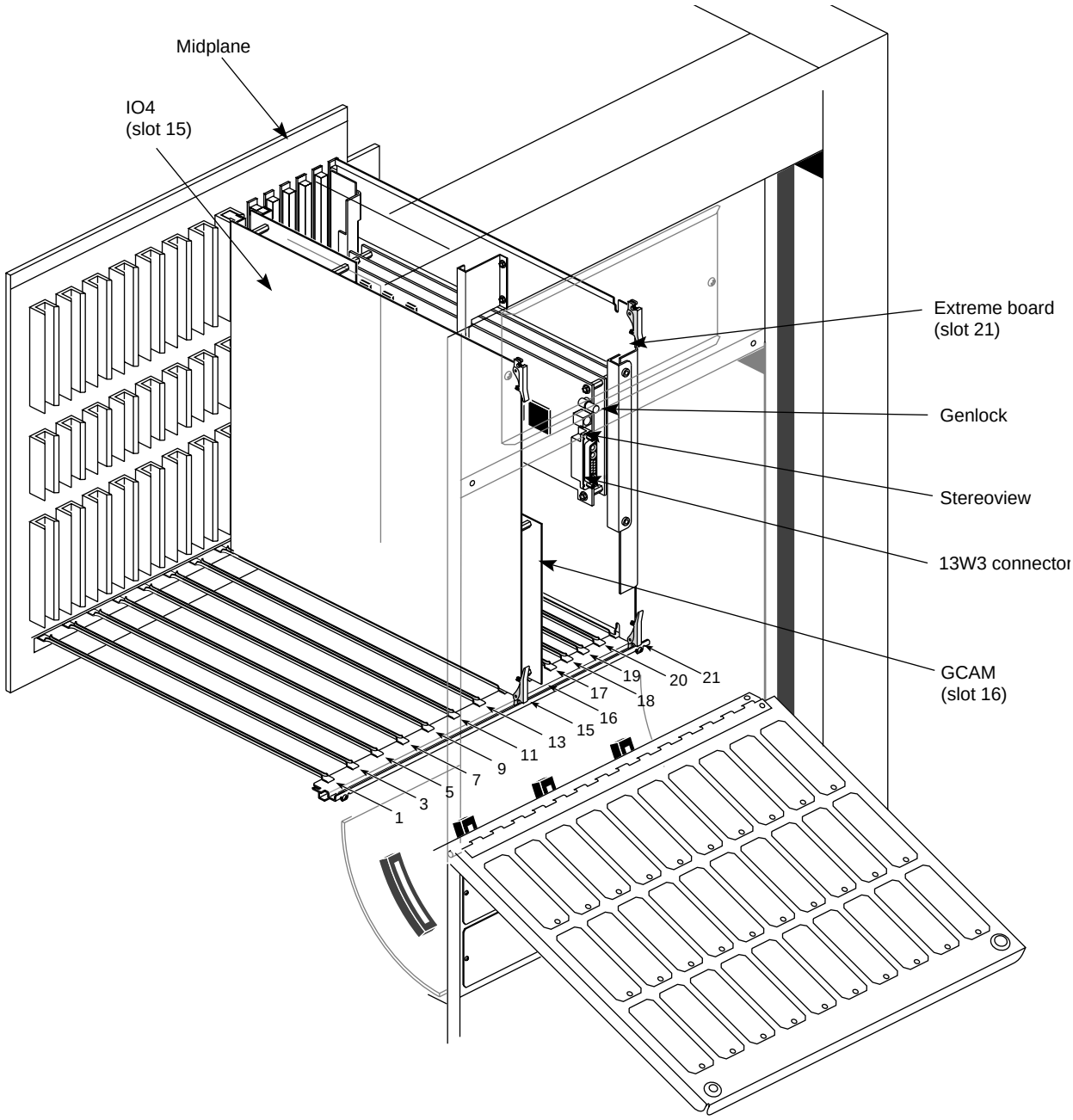

Figure 3-3 Installing the Extreme Option

8. Ensure that the GCAM is properly seated in the slot-16 backplane connectors.
9. Remove any VME boards from slots 19, 20, and 21.
10. Install the Extreme Graphics board set in the last VME cardcage slot (21). Ensure that the board is correctly seated in the midplane connectors and that the ejector tabs have engaged the top and bottom card guides.

Note: The board set will protrude inward, making it impossible to use slots 19 and 20.

11. Reinstall the VME boards, removed in Step 9, in vacant slots in either Cardcage 2 or 3, or in another system if necessary. Ensure that the boards are correctly seated in their midplane connectors and that their ejector tabs have engaged the top and bottom card guides.
12. Connect the 13W3, Genlock, and Stereoview connectors to the Extreme board (see Figure 3-4).
13. Remove three short I/O plates and connect the 13W3, Genlock, and Stereoview I/O plate connectors to the I/O panel.
14. Connect the monitor, keyboard, and mouse using the information in the next sections.

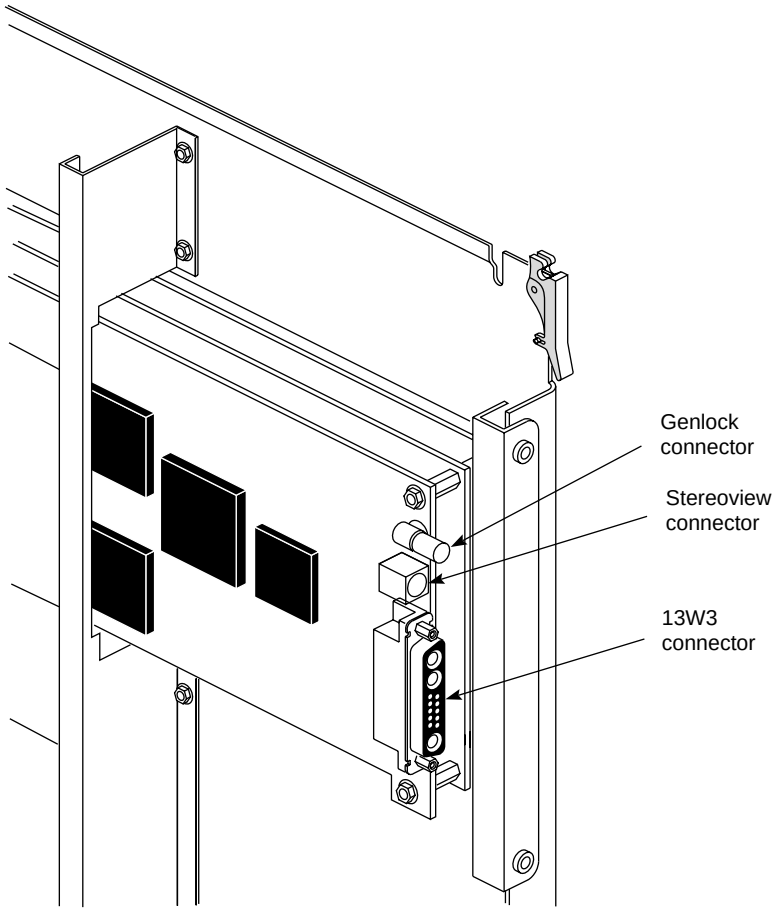

Figure 3-4 Extreme Board Set I/O Connectors

3.4 Monitor Cabling

Note that the Extreme Graphics option configuration does not automatically ship with a color monitor (the monitor is listed as a separate line item from the Extreme Graphics option). Regardless of the monitor's origin, it must use a 13W3 connector. See Figure 3-5 for the Silicon Graphics 20-inch monitor connectors and controls.

Note: For additional information regarding monitor operation, see the user's guide for the monitor.

Connect the color monitor to the Extreme Graphics 13W3 connector using the following steps:

1. Find the monitor video cable. It has large 13W3 connectors on each end.
2. Attach one end of the monitor video cable to the 13W3 connector on the back of the monitor. Secure the screws on either side of the connector.
3. Attach the other end of the monitor video cable to the 13W3 connector on the deskside system's I/O panel. Secure the screws on either side of the connector.

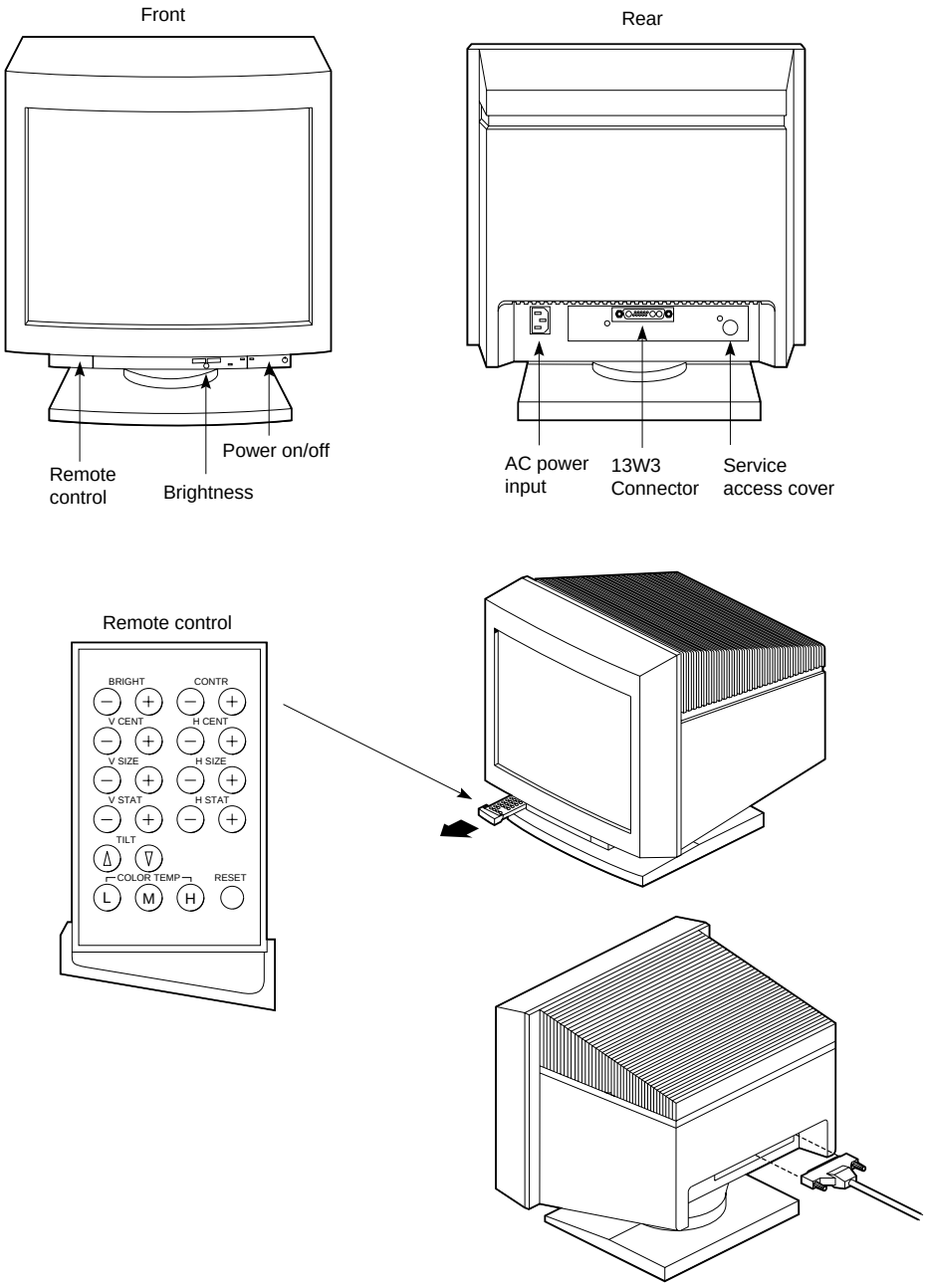

Figure 3-5 20-Inch Monitor Connectors and Controls

3.5 Keyboard and Mouse Cabling

The POWER Challenge Extreme Graphics option ships with a standard 101-key international keyboard. The keyboard has two identical plug receptacles, located in the upper right and left corners. These receptacles accept the 6-pin connectors from either the keyboard cable or the mouse. Attach the keyboard as shown in Figure 3-6.

Note: After you install the keyboard and mouse, go to the "Power On and Testing" section for detailed startup instructions.

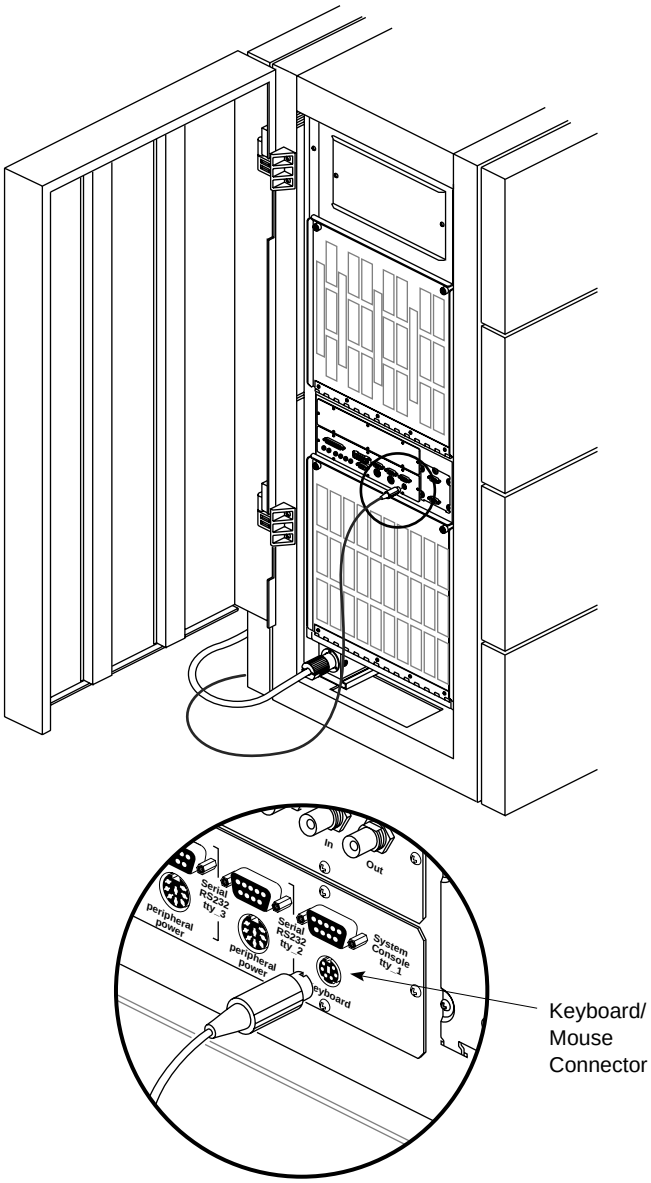

Figure 3-6 Connecting the Keyboard

If you need additional information on installing software on the system, see the *IRIS Software Installation Guide* and the software release notes.

3.6 Power On and Testing

At this stage of the installation, you should have only the keyboard, mouse, and monitor connected. Leave any console terminal connected to the system.

Do not connect additional internal or external devices to the chassis at this time. If something is wrong with the system, it is easier to spot the problem if additional devices are not connected. Follow these procedures to power up the system.

1. Turn on the main power switch on the back of the unit.
2. Turn on the graphics monitor (and console terminal if installed).
3. Turn the System Controller key switch to the On position.
4. If desired, use the System Controller menu and display to watch the boot process status messages.
5. When the power-on diagnostics have been completed, you will see this message on the monitor or console terminal:

   ```
   Starting up the system ...
   To perform System Maintenance instead, press <Esc>
   ```

   Press ***<Esc>*** within five seconds after the completion of the power-on diagnostic. You should see a menu similar to the following:

   ```
   System Maintenance Menu

   1) Start System
   2) Install System Software
   3) Run Diagnostics
   4) Recover System
   5) Enter Command Monitor

   Option ?
   ```

6. Select ***5***, enter the "Command Monitor," and see the >> prompt.
7. Reload the system software.
8. Type ***hinv*** to check and verify the hardware configuration of the system. You should get a display similar to the following:

   ```
   System: IP21
   Processor: 75 Mhz R8000, 4M secondary cache
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 1)
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 2)
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 3)
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 4)
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 5)
   Processor: 75 Mhz R8000, 4M secondary cache, (cpu 6)
   Memory size: 64 Mbytes
   SCSI Disk: scsi(0)disk(1)
   SCSI Disk: scsi(0)disk(2)
   Graphics: GU1-Extreme
   ```

Note: Some hardware options (such as a network board) may not be recognized by the PROM monitor. These options will not be listed by the *hinv* command. However, after you load and boot the operating system, the *hinv* command (executed at the IRIX prompt) should list *most* of the system hardware options. You can also type the following command at the IRIX prompt to obtain graphics hardware information (see the following section for more details):

/usr/gfx/gfxinfo

The *hinv* command typed in at the IRIX prompt displays more detailed information:

```
6 75 MHZ IP21 Processors
CPU: MIPS R8000 Processor Chip Revision: 2.1
FPU: MIPS R8010 Floating Point Chip Revision: 0.1
Data cache size: 16 Kbytes
Instruction cache size: 16 Kbytes
Secondary unified instruction/data cache size: 4 Mbytes
Main memory size: 64 Mbytes, 2-way interleaved
I/O board, Ebus slot 15: IO4 revision 1
Integral EPC serial ports: 4
Integral Ethernet controller: et0, Ebus slot 15
Integral SCSI controller 1: Version WD33C95A
Integral SCSI controller 0: Version WD33C95A
Disk drive: unit 1 on SCSI controller 0
Graphics board: GU1-Extreme
CC synchronization join counter
VME bus: adapter 0 mapped to adapter 45
VME bus: adapter 45
Integral EPC parallel port: Ebus slot 15
```

3.6.1 Checking the Monitor Resolution

Use the following command to determine the screen resolution:

/usr/gfx/gfxinfo

You should get a message similar to the following:

```
Graphics board 0 is “GR2TP” graphics.
Managed (“:0.0”) 1280x1024
8 GEs, 2 REs, 24 bitplanes, 4 auxplanes, 4 cidplanes, Z-buffer
GR2 revision 6, VB2.0
HQ2.1 rev A, GE7 rev B, RE3.1 rev A, VC1 rev B,
assuming 20” monitor
```

3.6.2 Changing the Monitor Resolution

After you load IRIX, you can use the *setmon* command to change the resolution or video output format (VOF). This example shows you how to change the VOF to 1024 x 768.

```
su
setenv DISPLAY :0
/usr/gfx/setmon -x 1024x768_66
killall Xsgi
/usr/gfx/gfxinit -v
Xsgi &
```

Note: The *setmon* command loads the VOF value into EEPROM so that the system boots up in the specified display mode.

For additional information on monitor and graphics settings, see the following reference (man) pages:

- *setmonitor(3g)*
- *vout(1V)*
- *setmon(1g)*
- *gfxinfo(1g)*
- *gfxinit(1g)*
- *stopgfx(1g)*
- *startgfx(1g)*

Chapter 4

Onyx Deskside Extreme Graphics Removal and Upgrade to RealityEngine^2

This chapter describes how to remove the Extreme Graphics option and upgrade an Onyx deskside system with a RealityEngine^2 (RE^2) graphics board set.

4.1 Extreme-to-RE^2 Graphics System Upgrade Summary

Use the following steps as a quick checklist for the Extreme Graphics-to-RE^2 upgrade:

- Read the safety precautions
- Shut down the system
- Open the I/O panel to access the board slots
- Remove the Extreme graphics board set, cables, and I/O plates
- Replace the three Extreme I/O plates with blank I/O plates
- Remove the GCAM-equipped IO4 board
- Install a VCAM-equipped IO4
- Unpack the RE^2 boards and cables
- Install the RE^2 graphics board set
- Connect the RE^2 internal cable to the graphics board and I/O plate
- Close up and secure the I/O panel
- Connect the monitor
- Power up the system and verify normal operation
- Return the Extreme board set and IO4/GCAM board to Silicon Graphics

4.2 Safety

Read these safety statements carefully before you remove or install any components.

Warning: **Installation of this upgrade requires specific training and technical knowledge. These instructions have been provided for use by Silicon Graphics system support engineers (SSEs) and Silicon Graphics trained or approved personnel only. This equipment uses electrical power internally that is hazardous if the equipment is improperly assembled or disassembled.**

Caution: This equipment is sensitive to damage from electrostatic discharge (ESD) caused by the buildup of electrical potential on clothing and other materials.

Follow these ESD preventive measures:

- Attach a ground strap to your wrist when connecting / disconnecting boards.
- Ensure that you and all electrical equipment that you handle during this installation are at ground potential to avoid damage from ESD.
- Keep the boards in their antistatic bags until they are needed, and remove them only when you are properly grounded to the chassis ground.
- Place the boards only on an antistatic mat. Do not place boards on top of an antistatic bag unless the outside of the bag also has antistatic protection.
- If you are servicing a system or installing a hardware upgrade, do not disconnect the power cord from the wall socket *and* the chassis. You will lose the system ground and could damage the equipment as a result.
- Do not use an ohmmeter on the boards as it can damage sensitive ICs or other components.

4.3 Unpacking and Checking the Parts

Before beginning the installation procedure, verify that all of the necessary parts are present. See Figure 4-1 and the following parts list. The Extreme Graphics-to-RealityEngine^2 upgrade kit should include at least the following items. Note that the RE^2 graphics system can contain up to four RM4 boards.

The hardware upgrade kit contents should include:

- Video filter bracket assembly (P / N 013-0831-001)
- 3PH analog video cable assembly (P / N 018-0428-001)
- DI PCB assembly (P / N 030-0233-001)
- RE^2 Video I / O assembly (P / N 013-0511-003)
- Three blank I / O panel plates (P / N 040-0514-002)
- IO4 board assembly with VCAM (P / N 013-0646-001)
- DG2 board assembly (P / N 030-0513-004)

- GE10 graphics board (P / N 030-0325-005)
- RM4 board assembly (P / N 030-0359-001)
- Everest analog video cable assembly (P / N 018-0291-002)
- Manual Kit (P / N 013-0888-001)

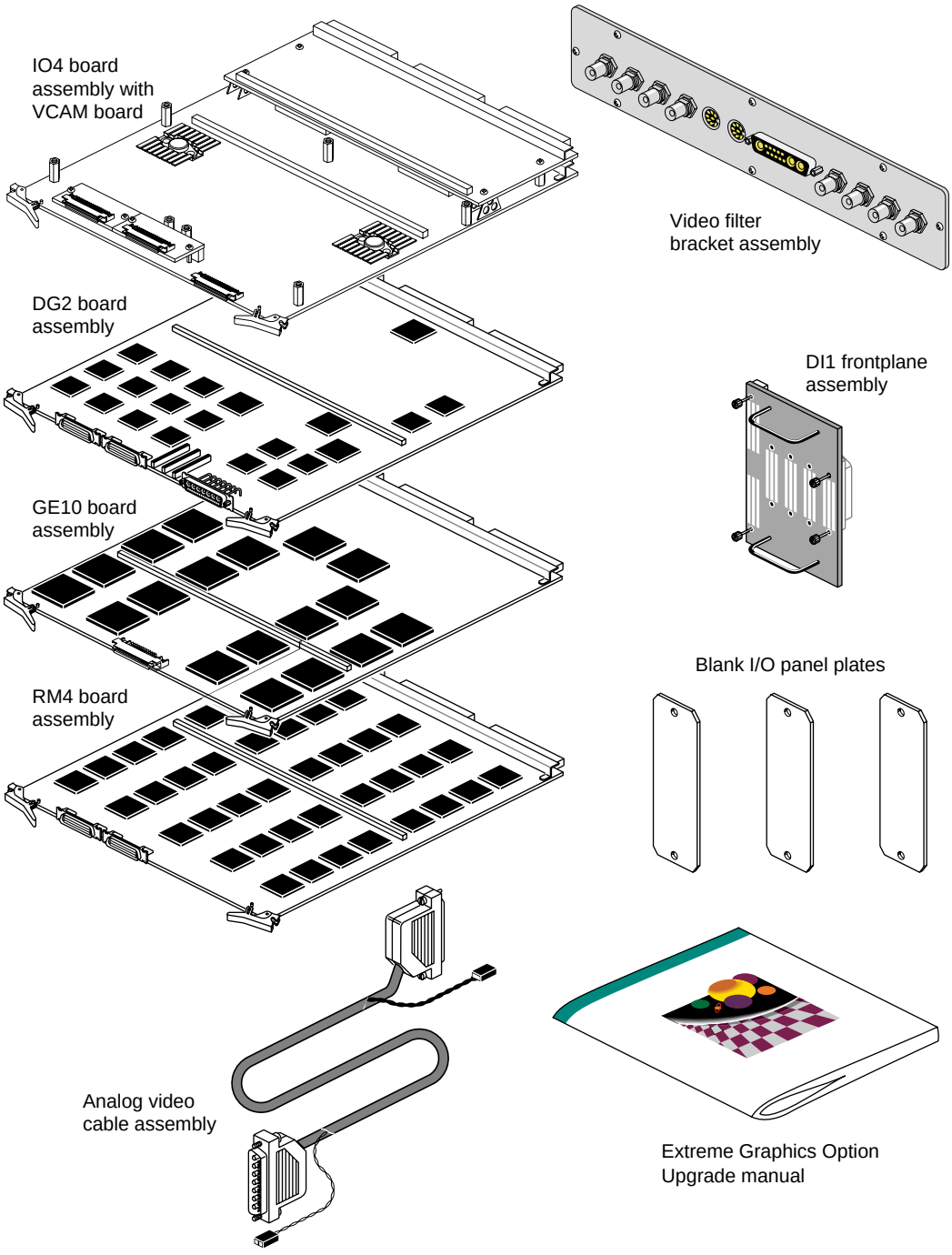

Figure 4-1 Parts for RealityEngine^2 Upgrade

The Onyx deskside system supports one RE^2 board set in the following configurations:

- 5 span
- 10 span
- 20 span

Caution: The optional 20-span configuration requires 220 VAC power. The 5- and optional 10-span systems can use 110 VAC in the United States and Canada.

The RE^2 board set can have up to four RM boards per pipeline. As more RM boards are added, the spans are interleaved, providing higher resolution and display quality.

Note: The maximum configuration for a RE^2 board set in a 110V system is two RM4 boards. A 10-span system has 10 pixel generators, 160 image engines and increased memory. A 20-span system has 20 pixel generators, 320 image engines, and even greater memory.

If it is necessary to differentiate the boards, the RM boards receive a 2-bit identity field from the video bus front plane, the DI1. This field identifies which of four potential addresses a board occupies.

4.4 Extreme Graphics-to-RE^2 Upgrade in the Deskside Onyx

Use the following steps to perform the upgrade:

1. As the superuser, enter ***/etc/shutdown*** in a functional UNIX window. Turn the System Controller key switch to the Off position, and switch the system circuit breaker to Off.
2. Open the front door and release the quarter-turn fastener securing the I/O panel. Gently lower the panel.
3. Remove the GCAM-equipped IO4 board from slot 3 of the cardcage (see Figure 4-2). Transfer any installed mezzanine daughter board to the new VCAM-equipped IO4 at this time.
4. Unfasten the attached cables and remove the AB4 Extreme Graphics board set from slot 8 in the cardcage.
5. Install a VCAM-equipped IO4 in slot 3. Ensure that the backplane connectors are correctly seated and that the ejector tabs have engaged the top and bottom card guides.
6. Remove the three Extreme connector I/O panels and replace them with blank I/O panels.
7. Remove any boards occupying the required slots (see Figure 4-4) and install the GE10, DG2 and RM4 boards as shown. Ensure that each board's backplane connectors are correctly seated and that its ejector tabs have engaged the top and bottom card guides.
8. Install the DI1 board as shown in Figure 4-4.

9. Reinstall any boards removed in step 7, either in this or in another system, as required. Ensure that each board's backplane connectors are correctly seated and that its ejector tabs have engaged the top and bottom card guides.
10. Remove the long, horizontal blank I/O panel from above the standard I/O panel and replace it with the RE^2 video I/O panel (see Figure 4-5).
11. Connect the two internal cables (video and Stereosync) between the RE^2 board set and the video I/O panel (see Figure 4-6). External connections to the video I/O panel are illustrated in Figure 4-7.
12. Close the system, reboot, and test the graphics functions.

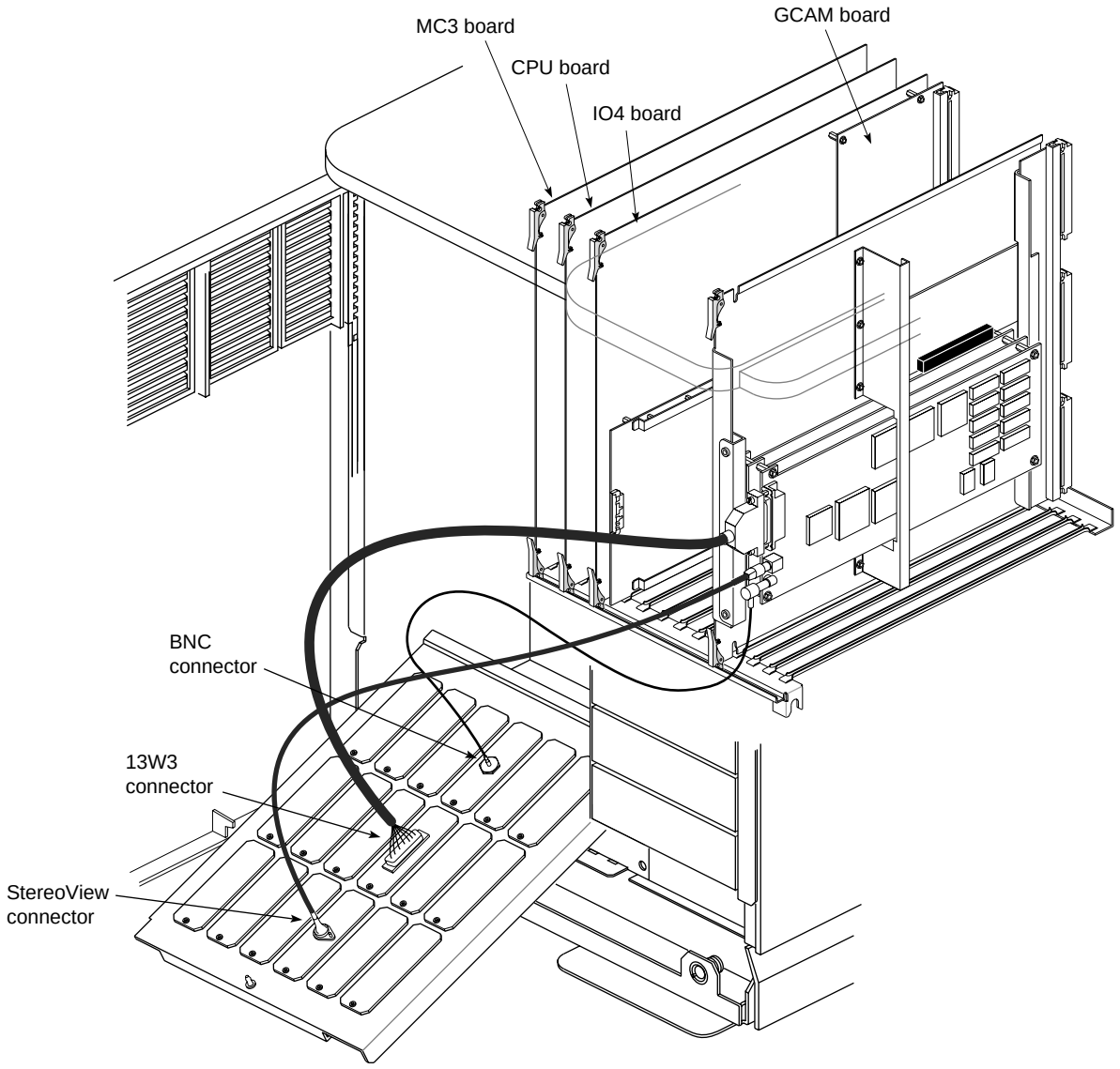

Figure 4-2 Extreme Graphics Option Installed in Onyx Deskside

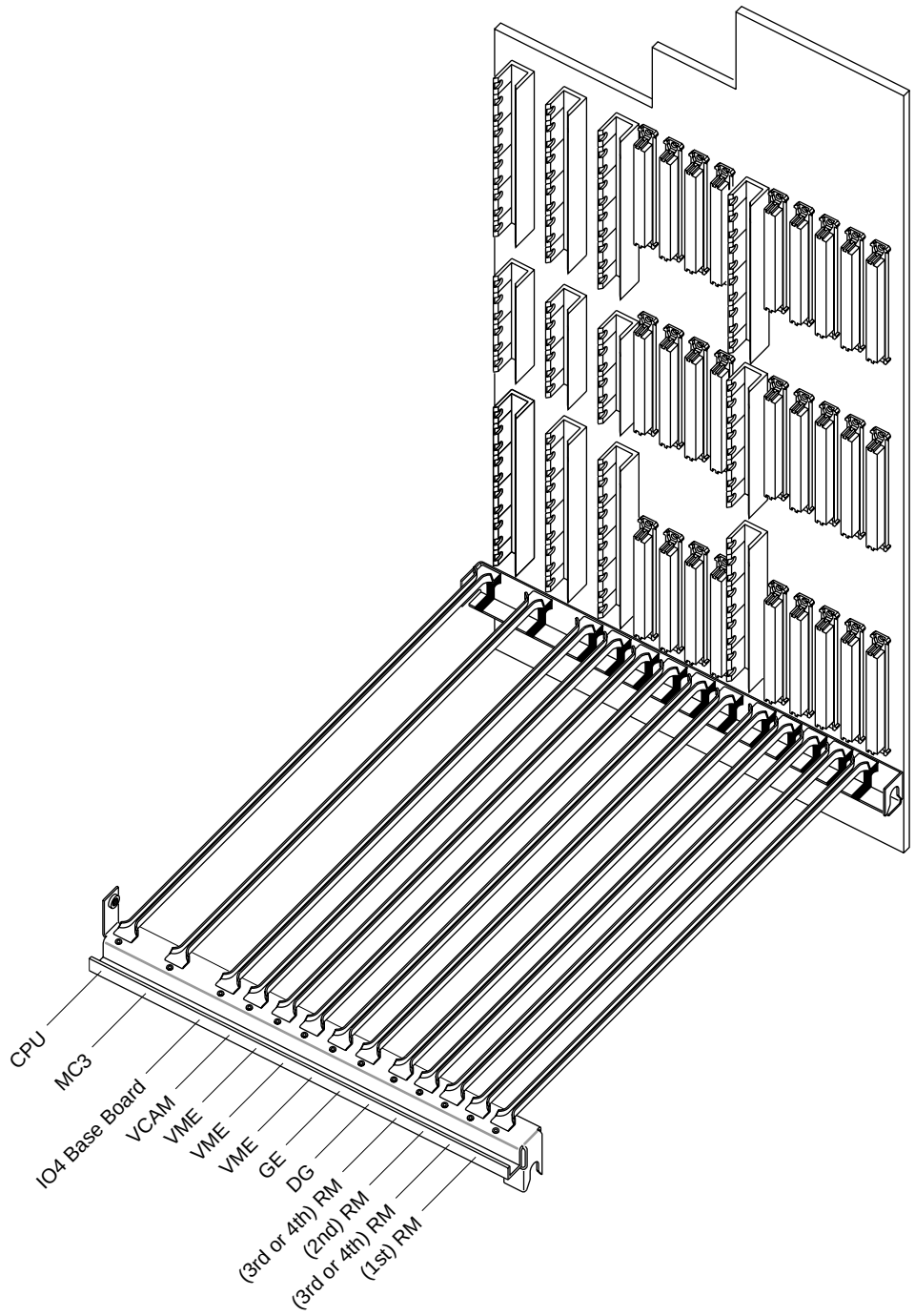

Figure 4-3 Cardcage Slot Assignments for RealityEngine^2 Boards in a Deskside Onyx

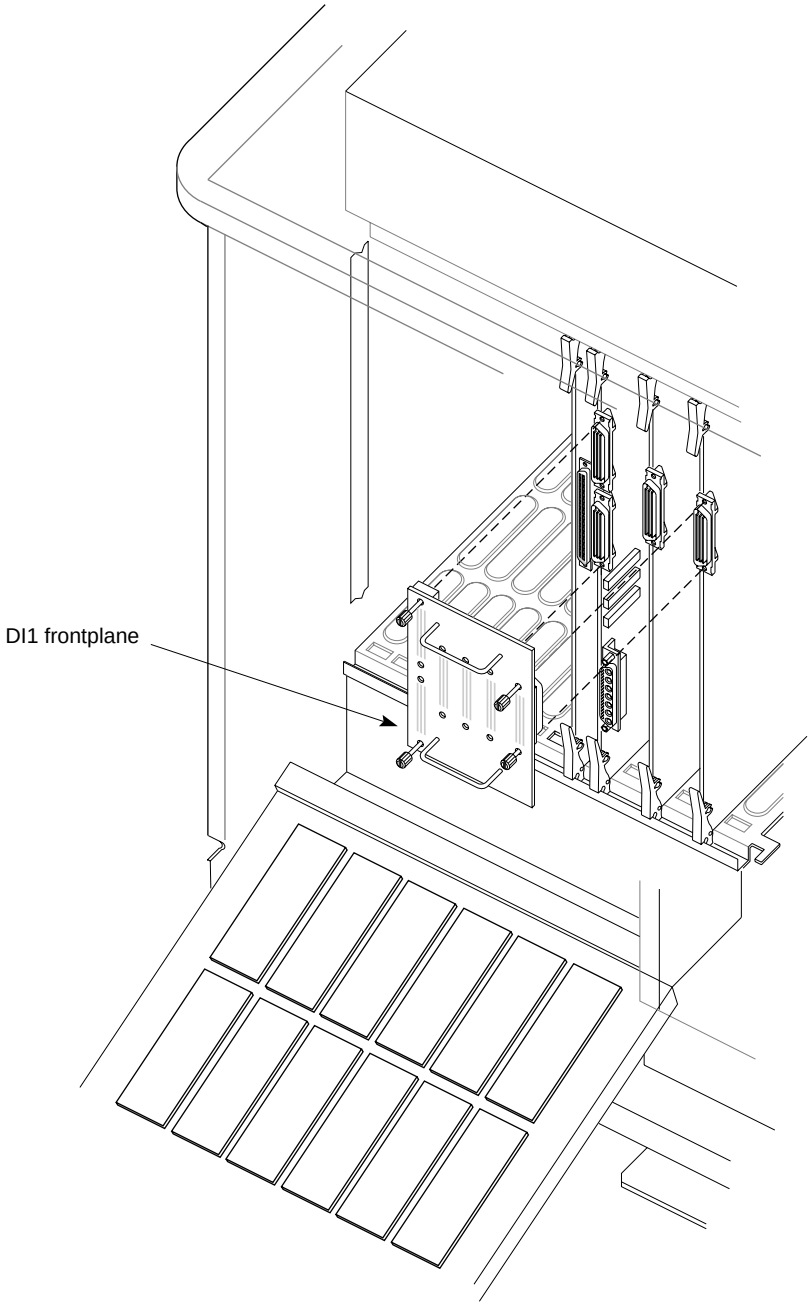

Figure 4-4 Installing the DI1 Board

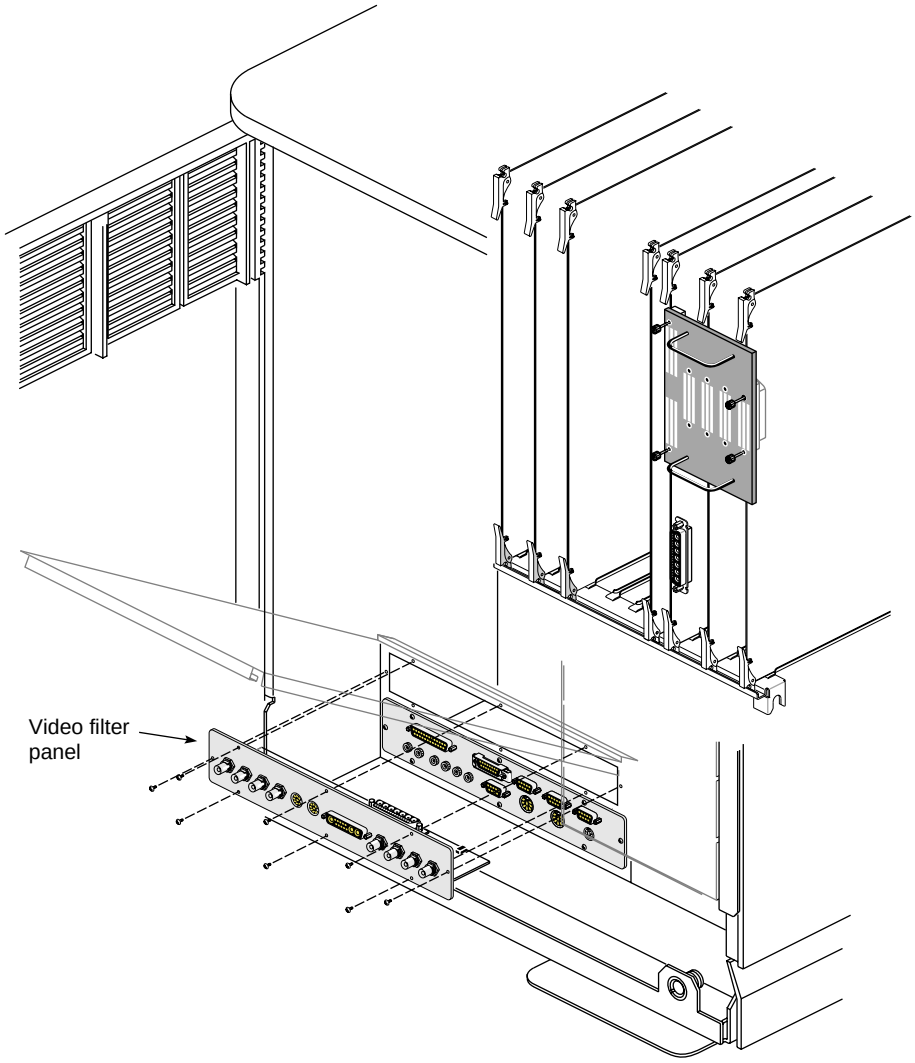

Figure 4-5 Installing the RealityEngine^2 Video I/O Panel

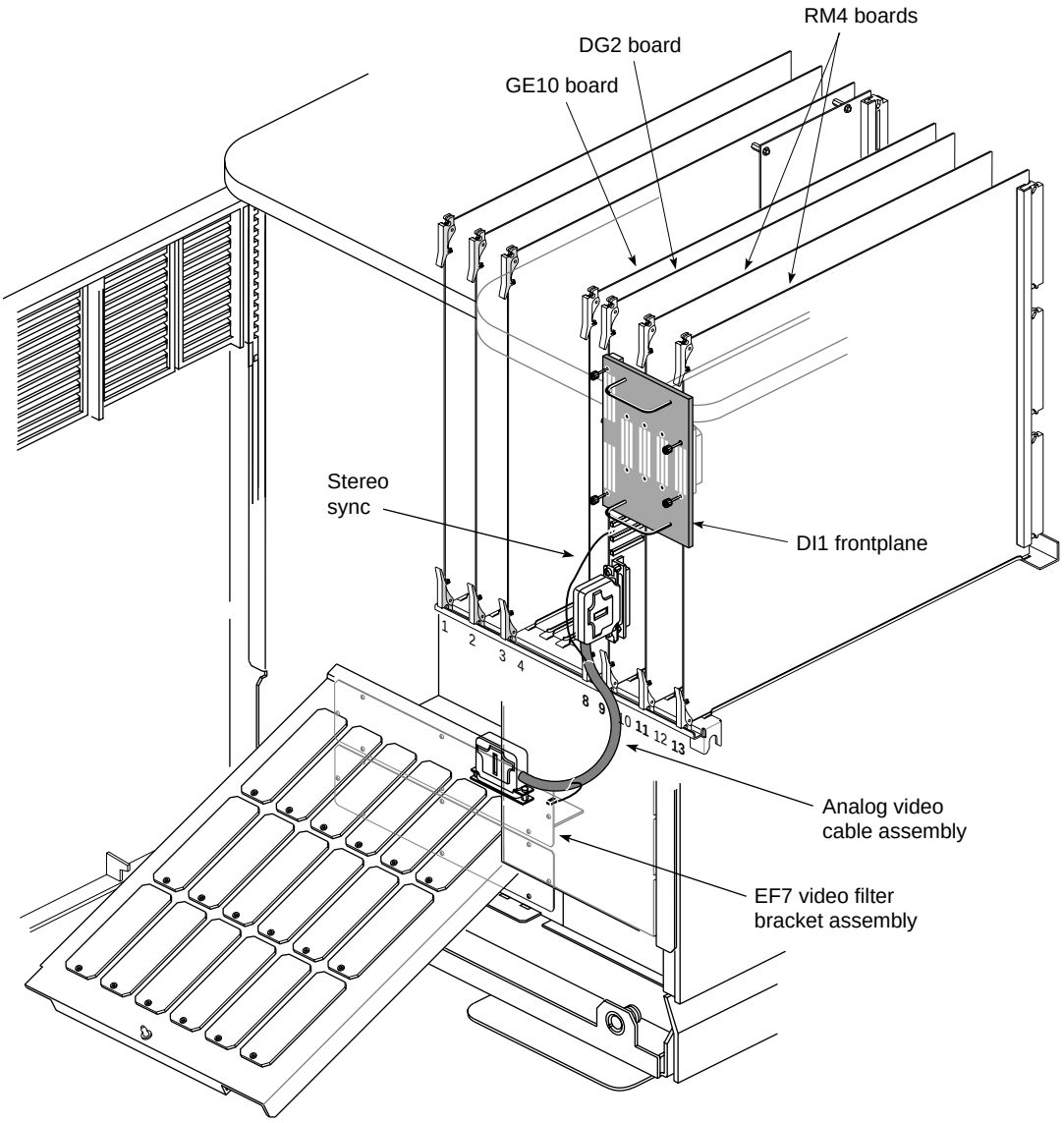

Figure 4-6 RealityEngine^2 Video I/O Panel Internal Connections

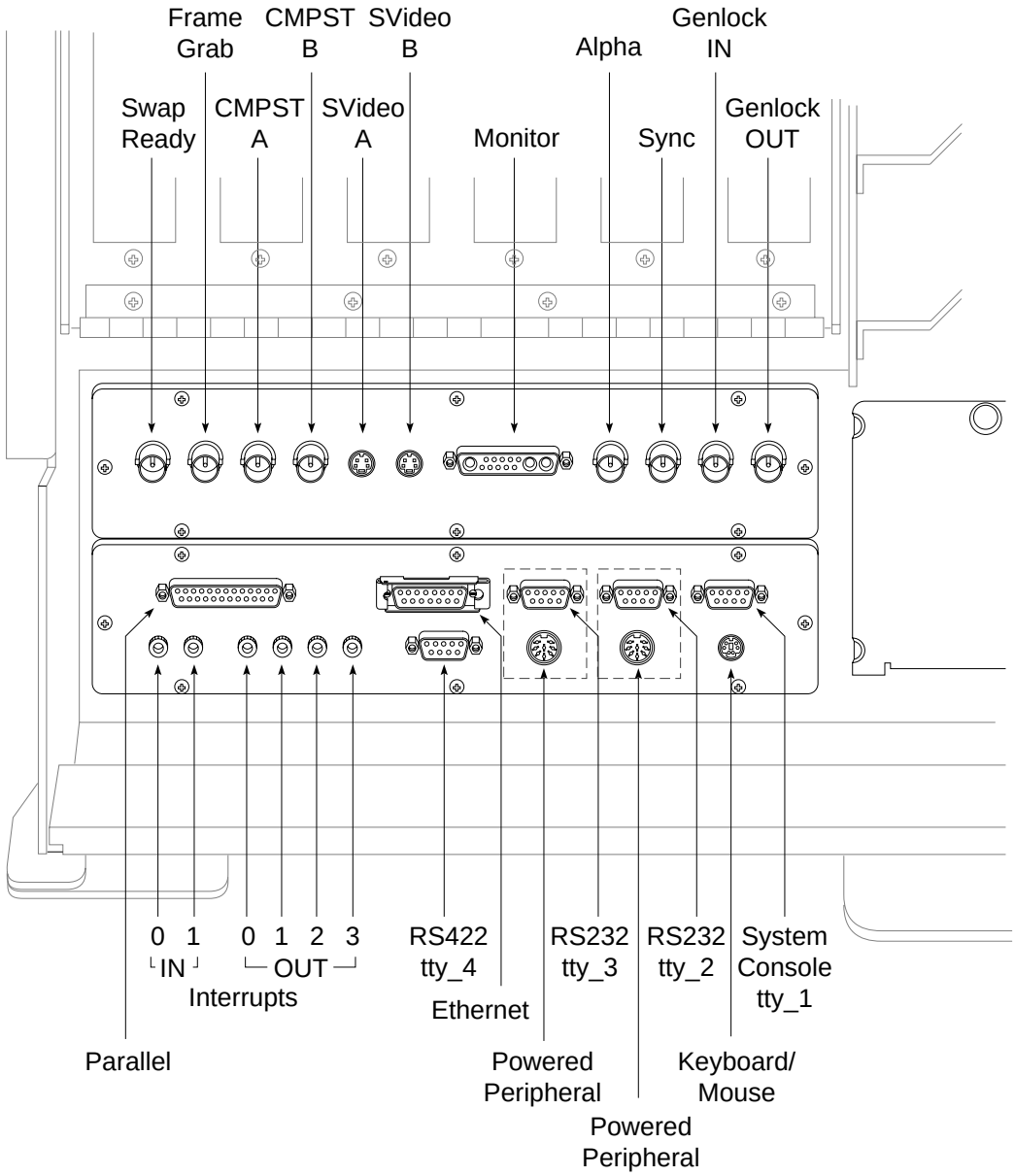

Figure 4-7 RealityEngine^2 Video I/O Panel External Connections

4.5 Power On and Testing

At this stage of the installation, you should have only the keyboard, mouse, and monitor connected. Leave any console terminal connected to the system.

Do not connect additional internal or external devices to the chassis at this time. If something is wrong with the system, it is easier to spot problems if additional devices are not connected.

Follow these procedures to power up the system:

1. Turn on the main power switch on the back of the unit.
2. Turn on the graphics monitor (and console terminal if installed).
3. Turn the System Controller key switch to the On position.
4. If desired, use the System Controller menu and display to watch the boot process status messages.
5. When the power-on diagnostics have been completed, you see this message on the monitor or console terminal:

   ```
   Starting up the system ...
   To perform System Maintenance instead, press <Esc>
   ```

   Press **<Esc>** within five seconds after the completion of the power-on diagnostic. You should see a menu similar to the following:

   ```
   System Maintenance Menu

   1) Start System
   2) Install System Software
   3) Run Diagnostics
   4) Recover System
   5) Enter Command Monitor

   Option ?
   ```

6. Select **5**, enter the "Command Monitor," and see the >> prompt.
7. Reload the system software.
8. Type **hinv** to check and verify the hardware configuration of the system. You should get a display similar to the following:

   ```
   2 75 MHZ IP21 Processors
   CPU: MIPS R8000 Processor Chip Revision: 2.1
   FPU: MIPS R8010 Floating Point Chip Revision: 0.1
   Data cache size: 16 Kbytes
   Instruction cache size: 16 Kbytes
   Secondary unified instruction/data cache size:4 Mbytes
   Main memory size: 256 Mbytes, 2-way interleaved
   I/O board, Ebus slot 3: IO4 revision 1
   Integral EPC serial ports: 4
   Integral Ethernet controller: et0, Ebus slot 3
   Integral SCSI controller 1: Version WD33C95A
   Integral SCSI controller 0: Version WD33C95A
   Disk drive: unit 1 on SCSI controller 0
   RealityEngine2 Graphics Installed
   CC synchronization join counter
   VME bus: adapter 0 mapped to adapter 45
   VME bus: adapter 45
   Integral IO4 parallel port: Ebus slot 3
   ```

Note: Some hardware options (such as a network board) may not be recognized by the PROM monitor. These options will not be listed by the *hinv* command. However, after you load and boot the operating system, the *hinv* command (executed at the IRIX prompt) should list *most* of the system hardware options. You can also type

the following command at the IRIX prompt to obtain graphics hardware information:
/usr/gfx/gfxinfo

If you need additional information on installing software on the system, see the *IRIS Software Installation Guide* and / or the software release notes.

4.5.1 Checking the Monitor Resolution

The RE^2 option configurations support a number of screen resolutions or video output formats (VOFs). See the release notes or reference (man) pages for the possible settings.

Note: Only the RE^2 graphics (two and four RM board versions) support 1600 x 1200 resolution. This resolution is displayed only on the 21-inch monitor. For additional information regarding monitor operation, see the monitor's user's guide.

Use the following command to determine the screen resolution:

/usr/gfx/gfxinfo

You should get a message similar to the following:

```
Graphics board 0 is "REV" graphics.
Unmanaged 0x0 1024x768
RealityEngine2 Graphics Subsystem
12 GE (GE10 rev. 0x4)
2 RM boards
Small pixel depth
10-bit RGB pixels
Not using VS2
```

Note: The second line indicates the screen resolution setting. The fifth line down also tells you how many RM boards are present (two in this example).

4.5.2 Changing the Monitor Resolution

After you load IRIX, you can use the *setmon* command to change the resolution or video output format (VOF). This example shows you how to change the VOF to 1600 x 1200.

```
su
setenv DISPLAY :0
/usr/gfx/setmon -x 1600x1200_60
killall Xsgi
/usr/gfx/gfxinit -v
Xsgi &
```

Note: The *setmon* command loads the VOF value into EEPROM so that the system boots up in the specified display mode. Also note that you can only use the 1600x1200 pixel resolution with the 21" monitor and two or four RM configurations.

A description of the formats shipped with a particular IRIX release may be found in the file */usr/gfx/ucode/RE/dg2/vof/README*.

For additional information on monitor and graphics settings, see the following reference (man) pages:

- *setmonitor(3g)*
- *vout(1V)*
- *setmon(1g)*
- *gfxinfo(1g)*
- *gfxinit(1g)*
- *stopgfx(1g)*
- *startgfx(1g)*