2U PCI-X Expansion Module Addendum

This addendum provides information about the physical and architectural aspects of the 2U PCI-X expansion module (see Figure 1). It also describes how to cable the 2U PCI-X expansion module to a compute module and a power source, and describes where to locate the installation and maintenance procedures. This addendum includes the following sections:

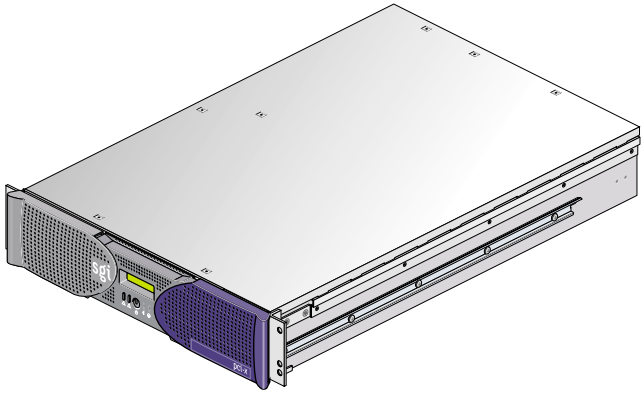

Figure 1 Front View of 2U PCI-X Expansion Module

Your SGI system support engineer (SSE) should perform the addition or replacement of parts and service of your 2U PCI-X expansion module, with the exception of the following procedures that you may perform yourself:

- Installing the PCI-X expansion module
- Cabling the PCI-X expansion module
- Installing and removing PCI cards
- Replacing a power supply

All of these instructions for the 2U PCI-X expansion module, with the exception of cabling, are the same as the instructions for the compute module; therefore, you can use the instructions that are included in your system's user guide. Instructions on how to cable the 2U PCI-X expansion module are described in this addendum.

Cabling

You need the following two cables to connect the 2U PCI-X expansion module to a compute module and to a power source:

- A 1-meter (39.37-in.) NUMAlink cable
- A 1-meter power cable

To connect the 2U PCI-X expansion module to a compute module, connect the 1-meter NUMAlink cable between the XIO connector of the 2U PCI-X expansion module and the XIO connector of the compute module, as shown in Figure 2.

To connect the 2U PCI-X expansion module to an AC power source, connect the power cable between the power connector on the 2U PCI-X expansion module and the power source. Figure 2 shows a power distribution unit (PDU) as the power source for the 2U PCI-X expansion module.

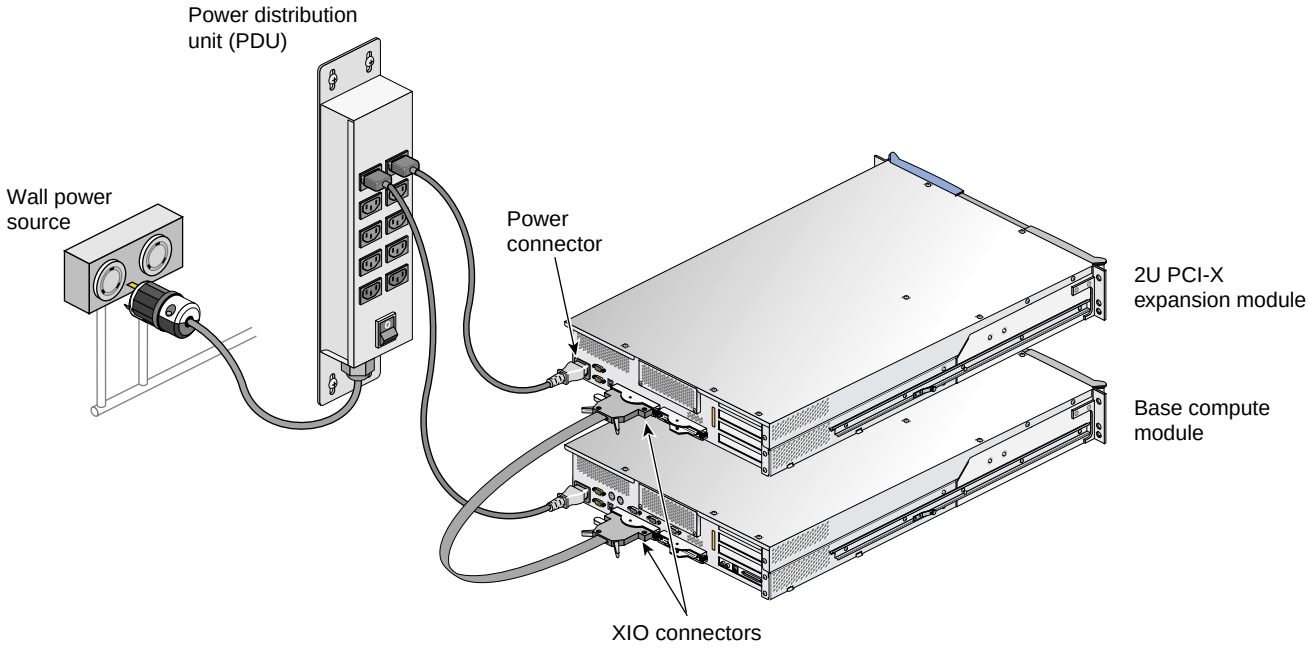

Figure 2 Cabling Example for the 2U PCI-X Expansion Module

Functional Architecture

The 2U PCI-X expansion module is an I/O device that can seat as many as four 3.3-V or universal PCI and/or PCI-X cards. The PCI cards reside on two buses; each bus has two slots that are labeled 1 and 2. For information on how to install or replace a PCI card, see your system's user guide.

This module is based on the architecture of the SGI Origin 350 and SGI Onyx 350 compute modules; however, it does not contain an IP53 node board. Because the 2U PCI-X expansion module does not have a Bedrock ASIC (a component of the IP53 node board), it must connect to a compute module via the XIO port. This port operates at 1200 MB/s in each direction.

The main components that make up the 2U PCI-X expansion module are as follows (see Figure 3):

- The PCI riser card contains the four PCI-X slots and a PCI interface chip (PIC) ASIC. The PIC ASIC is the interface between the PCI cards and the compute module that connects to the XIO port.
- The interface board receives voltage from the internal power supply and converts it to the voltage levels that the components within the module require; the interface board also contains L1 controller logic and an XIO connector.
- The L1 controller monitors and controls the 2U PCI-X expansion module. In normal operation, the L1 controller communicates with the L2 controller via the XIO connection to the compute module. It can also connect to the L2 controller via the L1 port.

The 2U PCI-X expansion module is an AC-powered device that can contain one or two 500-W power supplies; the second supply is optional and is required only when you want redundant power. The power supply inputs 100/240 VAC from a power source (for example, a PDU) and outputs 500 W (12 VDC, 5 VDC, and 3.3 VDC). This DC voltage is distributed to the components within the module via a cable harness.

Note: When the module contains two power supplies, the power supplies are hot swappable.

The procedure for replacing a power supply of a 2U PCI-X expansion module is the same as replacing a power supply of a compute module. These instructions are described in your system's user guide.

The 2U PCI-X expansion module is an air-cooled device; it contains a single 80-mm dual-axial redundant fan that cools the PCI riser board and the PCI cards, and two 100-mm impellers that cool the interface board and the power supplies. The power supplies are also cooled by a 60-mm fan.

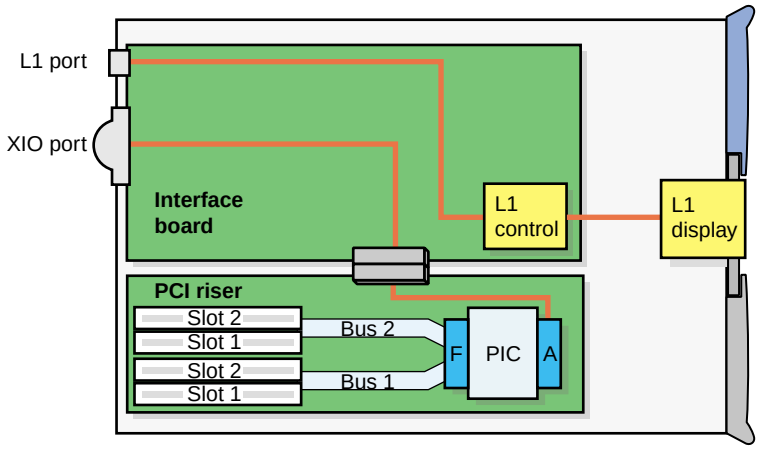

Figure 3 2U PCI-X Expansion Module Block Diagram

Components

This section describes the external components of the 2U PCI-X expansion module in the following subsections:

Front Panel Components

The 2U PCI-X expansion module contains the following front-panel items (see Figure 4):

- **L1 controller display.** This liquid crystal display (LCD) displays status and error messages that the L1 controller generates.
- **Power button with LED**. This button powers on the internal components. Alternatively, the system console can be used to power on the internal components. The LED illuminates green when the internal components are on.
- **Reset switch**. This switch resets the internal ASICs.
- **Non-maskable interrupt (NMI) switch**. This switch is not used by the 2U PCI-X expansion module.
- **Service-required LED**. This LED illuminates yellow to indicate that a component of the PCI-X expansion module has failed or is not operating properly, but the module is still functioning properly.
- **Failure LED**. This LED illuminates red to indicate that a failure has occurred and the module is not operating.

In addition, the 2U PCI-X expansion module has one or two power supplies that can be accessed from the front of the module. These power supplies are located behind the door that has the **pci-x** label. The left supply is required and the right supply is optional.

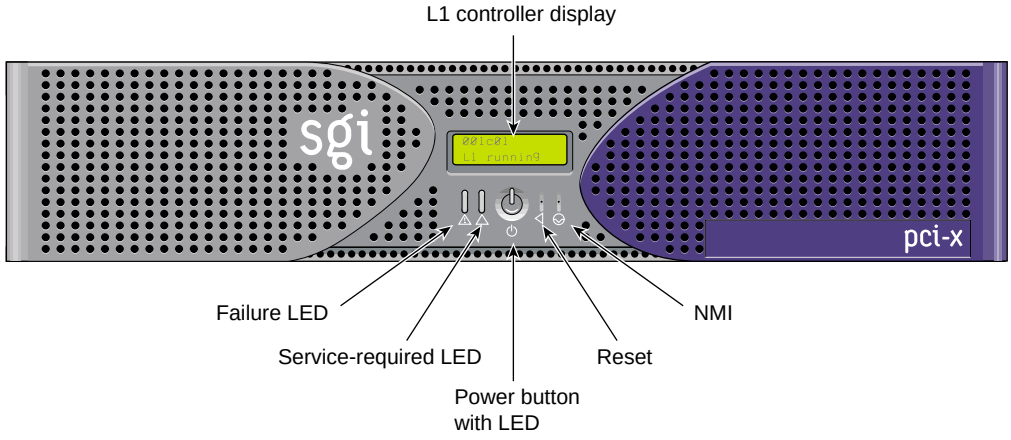

Figure 4 Front View of 2U PCI-X Expansion Module

Rear Panel Components

The 2U PCI-X expansion module contains the following rear-panel items (see Figure 5):

- **Power connector.** This connector connects the module to an AC power outlet or PDU.
- **XIO connector**. This connector connects the 2U PCI-X expansion module to a compute module.
- **L1 port.** This port can connect the 2U PCI-X expansion module's L1 controller to an L2 controller. Normally, the L1 controller of the 2U PCI-X expansion module connects to the L2 controller via the compute module to which it is attached.
- **PCI slots.** These four slots house PCI and/or PCI-X cards.

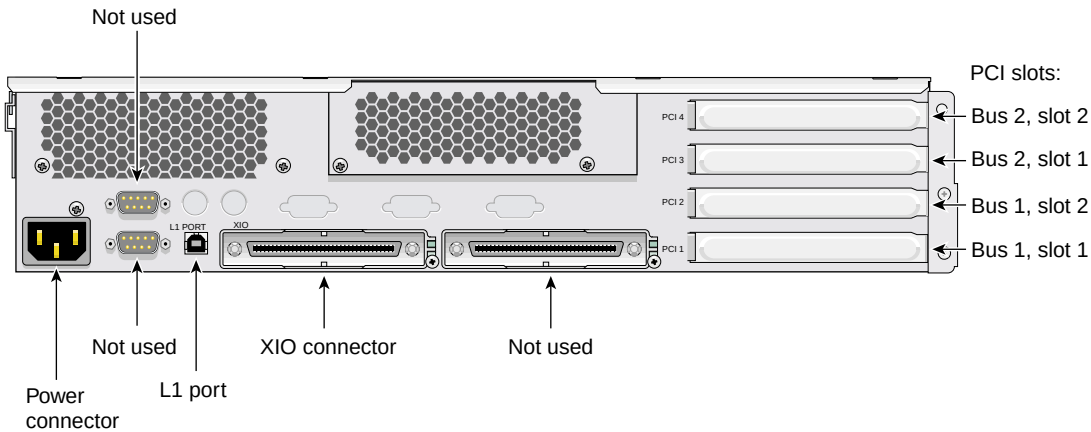

Figure 5 Rear View of 2U PCI-X Expansion Module

Technical Specifications

Table 1 lists the technical specifications for the 2U PCI-X expansion module.

Table 1 2U PCI-X Expansion Module Specifications

Characteristic	Specification
Height	3.44 in. (8.80 cm)
Width	17.06 in. (43.36 cm)
Depth	27.0 in. (68.58 cm) (with bezel)
Weight	~30 lb. (13.6 kg)
Input power	100/240 VAC autosensing (100 W, 341 BTU/Hr)