

# Preparing for an Installation of a 33 to 256 Processor System

HR-04122-0B

Origin™ Systems

Last Modified: August 1999

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## Record of Revision

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### November 1997

Original printing.

### December 1997

In this online revision, Figure 1 was modified to reflect currently available floor layouts.

### Revision A: June 1998

Revision A updates Figure 1, Figure 2, Figure 3, Figure 4, Figure 6, Figure 12, Figure 13, Figure 14, Figure 15, Figure 16, Figure 17, and Figure 22. Table 2 and Table 3 include new information about the 20-inch workstation monitor. Table 3 includes new information about the 24-inch workstation monitor. The section titled “Securing the Cabinets” was added to this revision. The section titled “System Components and Configurations” includes new information. All references to “CRAY Router” were replaced with “MetaRouter.”

### Revision B: August 1999

Revision B includes extensive technical, configuration, and naming convention changes. These changes include new power figures for Origin 2000 racks and corrections to the 256-P dimensions shown in Figure 16. The document is retitled.

## Overview

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This document provides information that helps management and site preparation personnel prepare suitable environments for SGI Origin 2000 computer systems and SGI Onyx2 InfiniteReality2 computer systems that contain 33 to 256 processors. It includes site specifications and requirements that you may use as a guide during the site planning and preparation process.

For site planning information about systems with fewer than 33 processors, consult the document titled *Site Preparation for Origin Family, Onyx2, OCTANE, and O2*, SGI publication number 007-3452-003.

**NOTE:** Information and technical specifications for Onyx2 InfiniteReality2 racks and multirack systems are identical to those listed for Onyx2 InfiniteReality rack and multirack systems.

SGI site planning representatives are available for site planning consultation; contact a site planning representative by telephone in the USA at 1 800 284 2729, extension 62820; at +1 715 726 2820; by fax at +1 715 726 2969; by e-mail at *site@sgi.com*.

You will also want to discuss your site planning, preparation, and installation plans with your Silicon Graphics account manager. Contact your account manager to obtain configuration information for any system.

Use the following steps as a planning guide for your system installation:

1. Identify the space, power, and environmental requirements for the system.
2. Select a location for the system and identify any necessary modifications.
3. Prepare the site according to the guidelines in this publication. You may use the site planning checklist at the end of this document as a guide.

## System Components and Configurations

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SGI Origin 2000 computer systems and Onyx2 InfiniteReality2 computer systems consist of a variety of standard and optional equipment. The configuration of each computer system depends on customer requirements. Each system is air cooled and consists of three or more racks. In addition to the racks, your system may include SCSI RAID racks or Origin Fibre Channel racks. The SCSI RAID rack and the Origin Fibre Channel rack storage systems provide high-capacity, high-availability disk storage for the Origin 2000 computer system.

A typical Origin 2000 computer system contains the following components:

- Three to sixteen Origin 2000 racks (33 to 256 CPUs)
- MetaRouters (required for any system that consists of more than four Origin 2000 racks)
- SCSI RAID rack or Origin Fibre Channel rack
- Silicon Graphics O2 workstation with color monitor
- IRISconsole software option (required for systems with more than 64 CPUs)

A typical Onyx2 InfiniteReality2 computer system contains the following components:

- One to sixteen Onyx2 InfiniteReality2 racks (2 to 128 CPUs)
- One to sixteen graphics pipes
- One or more 24-inch color monitors

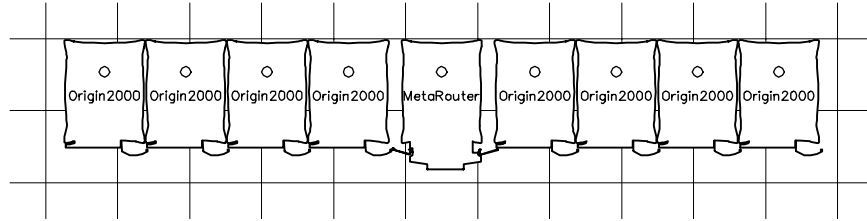
[Figure 1](#) shows the Origin 2000 128- and 256-processor multirack system (standard and optional floor layouts) placed on 24 in. x 24 in. floor panels. [Figure 2](#) shows the typical distance between racks (standard layout).

**E-mail [site@sgi.com](mailto:site@sgi.com) to request full scale floor cutout templates of the standard and optional floor layouts.**

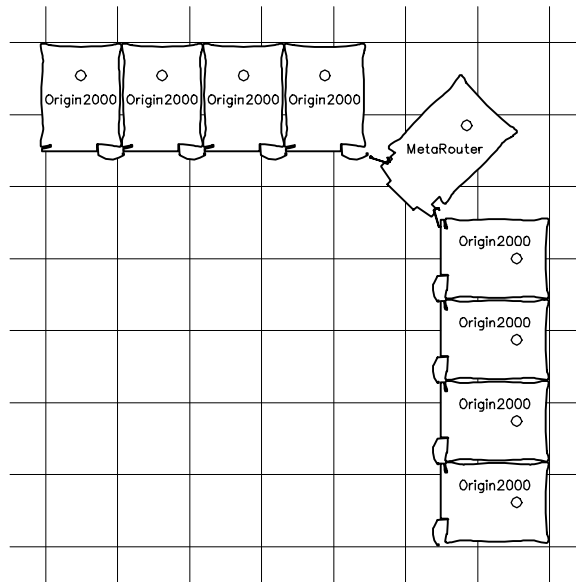
**NOTE:** The optional floor layout for the Origin 2000 128-processor multirack system requires an “L” configuration panel/ground strap kit (SGI part number 026-1318-001). Contact your SGI account manager for ordering information.

Figure 1. Origin 2000 128- and 256-Processor Multitrack Systems: Standard and Optional Floor Layouts Placed on 24 in. x 24 in. Floor Panels

Origin 2000 128-Processor Standard Floor Layout



Origin 2000 128-Processor Optional Floor Layout



Origin 2000 256-Processor Standard Floor Layout

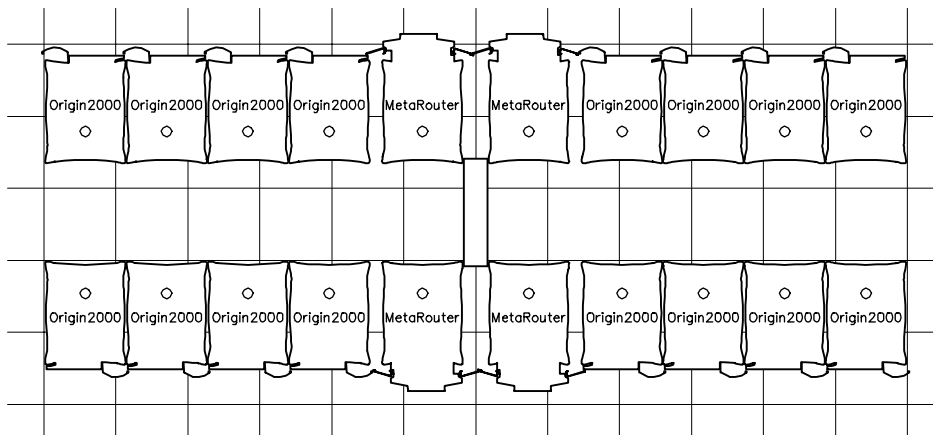
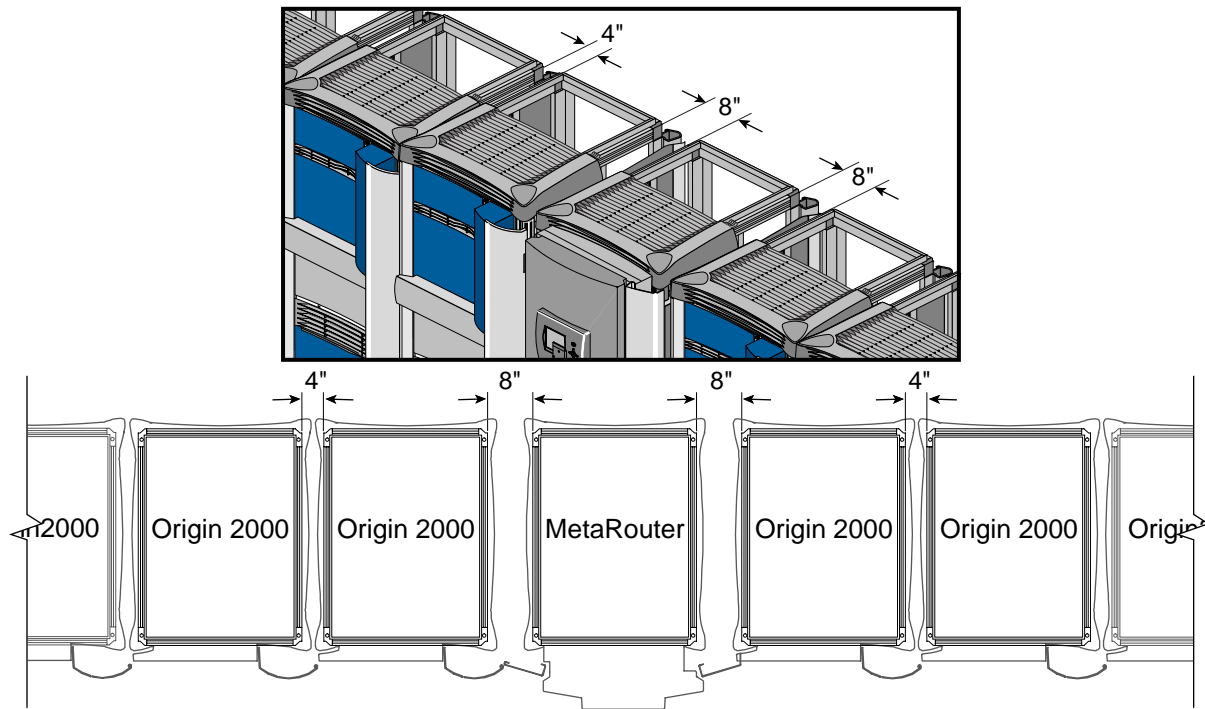


Figure 2. Distance between Racks (Standard Layout)



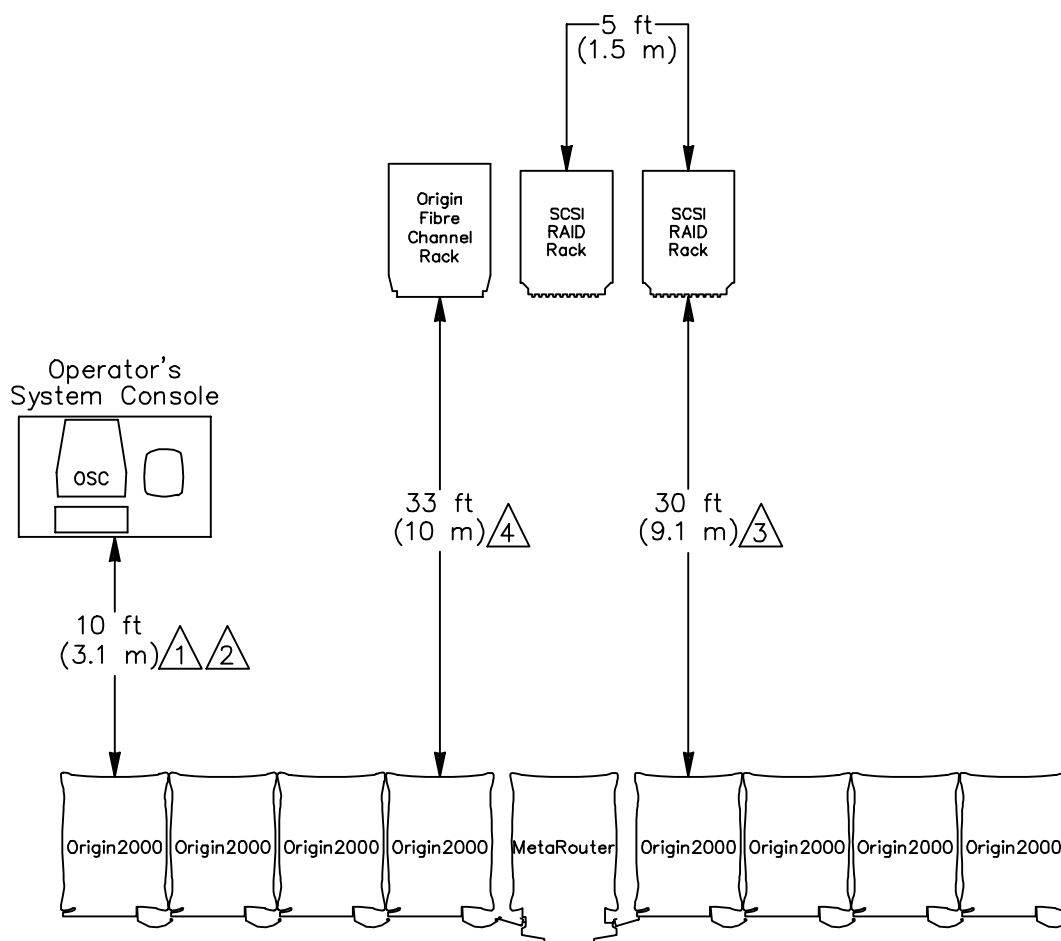
## Equipment Separation Limits

Prior to any site preparation, the arrangement of computer equipment within the facility must meet certain placement and separation requirements. You should prepare drawings that illustrate the arrangement and location of the computer equipment; you may ask SGI site planning personnel for assistance with the drawings.

Figure 3 illustrates the maximum recommended separation limits between the various components of a system.



Figure 3. Separation Limits



NOTES:

- 1 The standard serial cable provided with the Origin 2000 system is 15 ft (4.6 m). Contact your Silicon Graphics account manager to order longer cables, up to 40 ft (12.2 m).
- 2 The IRISconsole option allows for a 25 ft (7.6 m) serial cable. The cable is plugged into the multimodule system controller (MMSC) of the rack indicated. Contact your Silicon Graphics account manager for longer cables.
- 3 The SCSI RAID Rack may be connected to any Origin 2000 Rack that is configured with the system.
- 4 The Origin Fibre Channel Rack may be connected to any Origin 2000 Rack that is configured with the system. The Origin Fibre Channel Rack comes with a standard 33 ft (10 m) copper cable. Longer copper or fibre cables are available as an option. Contact your Silicon Graphics account manager for longer cables.

## Site Requirements

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Use the information and guidelines in this section to plan an access route and to meet the environmental and power requirements for your system.

### Planning Your Access Route

The standard dock height for freight trailers in the USA is 48.00 in. (1219 mm) from the ground. If your loading dock is 48.00 in. (1219 mm) from the ground, you may use a pallet jack to unload the system, in most cases. If not, you must provide a forklift or other means to unload the system. The maximum access incline should not exceed 10 degrees (height:length = 1:6). If you have concerns about your site access route, contact a site planning representative by telephone in the USA at 1 800 284 2729, extension 62820; at +1 715 726 2820; by fax at +1 715 726 2969; or by e-mail at [site@sgi.com](mailto:site@sgi.com).

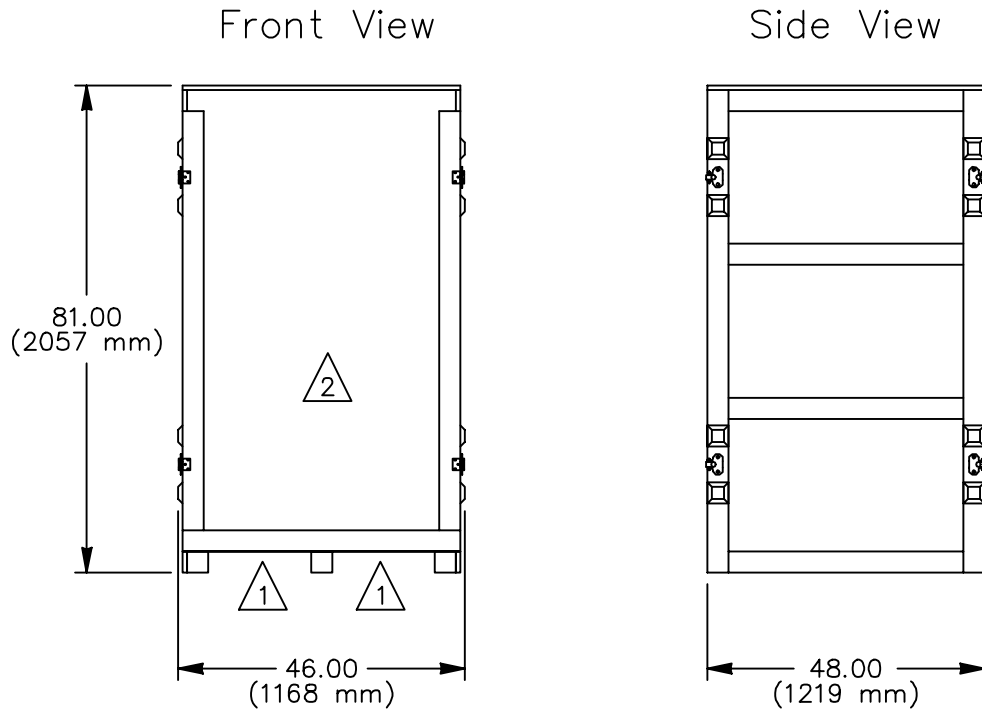
Each Origin 2000 rack, Onyx2 InfiniteReality2 rack, MetaRouter, SCSI RAID rack, and Origin Fibre Channel rack ships in its own palletized container that includes an attached ramp for system removal from the pallet. **You must provide a pallet jack to allow SGI personnel to move each container to the approximate system location.**

Only authorized SGI personnel may move containers to their approximate system locations, remove racks from their shipping containers, and move the racks to their final destinations in the computer room. If a shipping container is too large for the planned access route to the computer room, authorized SGI personnel will remove the shipping containers and wheel the racks on their casters through your facility to the computer room.

**NOTE:** After the shipping container is removed, do not remove the ESD bag from the rack until a ground connection is made.

[Figure 4](#) illustrates the shipping configuration of the Origin 2000 rack, Onyx2 InfiniteReality2 rack, and MetaRouter. [Figure 5](#) illustrates the SCSI RAID rack shipping configurations. [Figure 6](#) illustrates the Origin Fibre Channel rack shipping configuration.

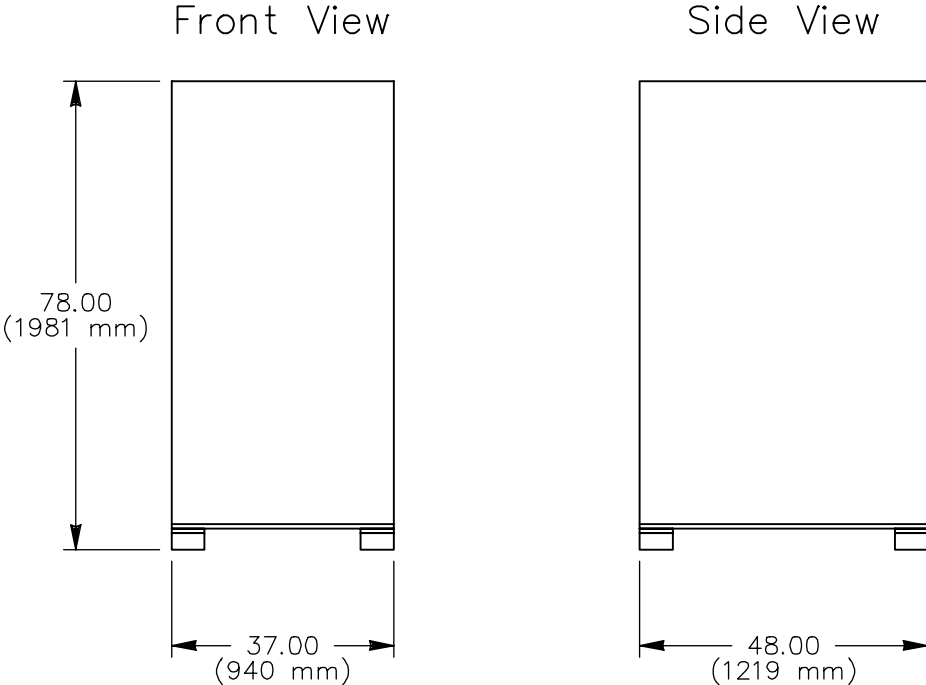
Figure 4. Origin 2000 Rack, Onyx2 InfiniteReality2 Rack, and MetaRouter Shipping Configuration



1 Lift opening 17.00 x 3.50 (432 mm) x (89 mm).

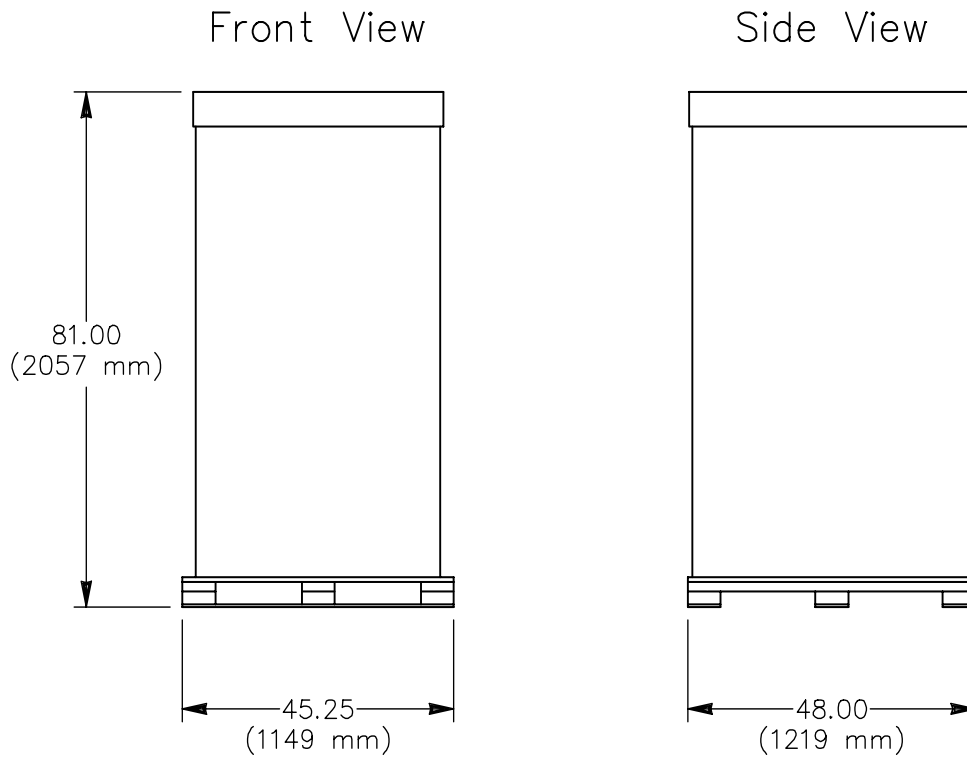
2 The end panel serves as a ramp for unloading the rack.

Figure 5. SCSI RAID Rack Shipping Configuration



NOTE: The shipping container consists of a wooden pallet and a corrugated paper cover. A ramp is enclosed in the shipping container to facilitate the removal of the SCSI RAID rack from the pallet.

Figure 6. Origin Fibre Channel Rack Shipping Configuration



NOTE: The shipping container consists of a wooden pallet and a corrugated paper cover. A ramp is enclosed in the shipping container to facilitate the removal of the Origin Fibre Channel Rack from the pallet.

## Environmental Requirements

The design of your environmental control system (such as computer room air-conditioning units) must ensure that the intake air to each Origin 2000 rack, each Onyx2 InfiniteReality2 rack, each SCSI RAID rack, and each Origin Fibre Channel rack meets the requirements that [Table 1](#) specifies. Each rack receives intake air through the front and top of the rack and exhausts heated air through the back of the rack. When you install the system, ensure that heated air from other equipment does not discharge toward the air intakes of any rack. The equipment can overheat if heated air enters the front or top intake of any rack.

When the racks arrive, if they are significantly colder (a difference of 40 °F [22 °C] or more) than the environment in which you will install them, leave the racks in their shipping containers (at the final destination) for 24 hours to prevent thermal shock and condensation.

Refer to [Table 1](#) for the environmental requirements for each system.

*Table 1. System Environmental Requirements*

Characteristic	Specification
<b>Temperatures:</b>	
Operating < 5,000 ft (1524 m) <sup>a</sup>	41 to 95 °F (5 to 35 °C)
Operating > 5,000 ft (1524 m) <sup>a</sup>	41 to 86 °F (5 to 30 °C)
Nonoperating	-4 to 140 °F (-20 to 60 °C)
Maximum thermal gradient	18 °F (10 °C) per hour
<b>Relative Humidity:</b>	
Operating <sup>a</sup>	10% to 90% noncondensing
Nonoperating	10% to 95% noncondensing
Maximum humidity gradient	10% relative humidity per hour
<b>Altitude:</b>	
Operating	0 to 10,000 ft (0 to 3048 m)
Nonoperating	0 to 40,000 ft (0 to 12192 m)

<sup>a</sup> SGI recommends an operating temperature of 72 °F (22 °C) and a relative humidity of 50% noncondensing.

## Facility Power Requirements

[Table 2](#) lists the electrical specifications for Origin 2000 racks, Onyx2 InfiniteReality2 racks, SGI O2 workstations, monitors, SCSI RAID racks, and the Origin Fibre Channel racks.

**NOTE:** [Table 2](#) lists the maximum requirements; other configurations might require significantly less power.

Calculated power consumption calculations for specific Origin 2000 systems and Onyx2 InfiniteReality2 systems are available from your local site planning representative. Refer to the “[Summary](#)” section on [page 48](#) for contact information.

**NOTE:** In order to maintain a ground potential of less than 500 millivolts between interconnected Origin 2000 racks, Silicon Graphics requires that all power circuits that supply power to a Origin 2000 rack or Onyx2 InfiniteReality2 rack originate from the same electrical distribution panel. Electrical work and installations must comply with all applicable local, state, and national electrical codes.

SGI makes every effort to minimize the effects of power failures and interruptions to the system hardware. Studies indicate that computer systems that are subjected to repeated power interruptions and fluctuations experience higher component failure rates than systems with stable power sources.

SGI encourages you to install a stable power source, such as an uninterruptible power system (UPS), to minimize component failures.

Each Origin 2000 rack, each SCSI RAID rack, and each piece of support equipment requires its own customer-supplied receptacle. Each Onyx2 InfiniteReality2 rack, Origin Fibre Channel rack, and O2 workstation requires two power receptacles. If you have difficulty obtaining the correct receptacles as listed in [Table 2](#), please contact your account manager.

**NOTE:** Power circuits for Origin 2000 racks, Onyx2 InfiniteReality2 racks, SCSI RAID racks, and Origin Fibre Channel racks must be dedicated circuits that feed only the receptacles for the racks.

In addition to the equipment that [Table 2](#) lists, your system configuration might also include optional equipment such as modems, printers, and additional displays. Please plan your facility electrical and air-conditioning requirements accordingly.

Table 2. System Power Requirements

Electrical Service	Specification
<b>Each Origin 2000 Rack Requires:</b>	
Voltage	180 to 254 Vac, single phase
Frequency	47 to 63 Hz
Circuit breaker	30 amp 32 amp
	North America and Japan International
Maximum power consumption	2.85 kVA (2.71 kW)
Hold-up time	16 milliseconds
Total harmonic distortion (THD)	Less than 12% at full load
Power cable	8-ft (2.4-m) pluggable drop cord
Receptacle (1 per rack):	NEMA L6-30R or equivalent IEC309, 32 amp, single phase
	North America and Japan International
<b>Each MetaRouter Requires:</b>	
Voltage	180 to 254 Vac, single phase
Frequency	47 to 63 Hz
Circuit breaker	30 amp 32 amp
	North America and Japan International
Maximum power consumption	0.85 kVA (0.63 kW)
Hold-up time	16 milliseconds
Total harmonic distortion (THD)	Less than 25% at full load
Power cable	8-ft (2.4-m) pluggable drop cord
Receptacle (1 per rack)	NEMA L6-30R or equivalent IEC309, 32 amp, single phase
	North America and Japan International



Table 2. System Power Requirements (continued)

Electrical Service	Specification
<b>Each Onyx2 InfiniteReality2 Rack Requires:</b>	
Voltage	180 to 254 Vac, single phase
Frequency	47 to 63 Hz
Circuit breaker (2 required)	30 amp 32 amp
	North America and Japan International
Maximum power consumption	2.88 kVA (2.73 kW)
Hold-up time	16 milliseconds
Total harmonic distortion (THD)	Less than 12% at full load
Power cable (2 supplied)	8-ft (2.4-m) pluggable drop cord
Receptacle (2 required):	NEMA L6-30R or equivalent IEC309, 32 amp, single phase
	North America and Japan International
<b>A Maximum Configuration Onyx2 InfiniteReality2 System with 128 Processors and 16 Pipes Requires:</b>	
Voltage	180 to 254 Vac, single phase
Frequency	47 to 63 Hz
Circuit breaker (25 total)	30 amp 32 amp
	North America and Japan International
Maximum power consumption	38.88 kVA (36.75 kW)
Hold-up time	16 milliseconds
Total harmonic distortion (THD)	Less than 12% at full load
Power cable (25 total)	8-ft (2.4-m) pluggable drop cord
Receptacle (25 total):	NEMA L6-30R or equivalent IEC309, 32 amp, single phase
	North America and Japan International

Table 2. System Power Requirements (continued)

Electrical Service	Specification
<b>Each SCSI RAID Rack Requires:</b>	
Voltage	180 to 254 Vac, single phase
Frequency	47 to 63 Hz
Circuit breaker	30 amp 32 amp
Maximum power consumption	4.00 kVA (3.92 kW)
Hold-up time	16 milliseconds
Total harmonic distortion (THD)	Configuration dependent
Power cable	8-ft (2.4-m) pluggable drop cord
Receptacle (1 per rack required):	NEMA L6-30R or equivalent IEC309, 32 amp, single phase
	North America and Japan International
<b>Each Origin Fibre Channel Rack Requires:</b>	
Voltage	180 to 254 Vac, single phase
Frequency	47 to 63 Hz
Circuit breaker (2 per rack required)	30 amp 32 amp
Maximum power consumption	3.86 kVA (3.63kW)
Hold-up time	16 milliseconds
Total harmonic distortion (THD)	Configuration dependent
Power cable (2 supplied per rack)	8-ft (2.4-m) pluggable drop cord
Receptacle (2 per rack required):	NEMA L6-30R or equivalent IEC309, 32 amp, single phase
	North America and Japan International

Table 2. System Power Requirements (continued)

Electrical Service	Specification
<b>The O2 Workstation with a Monitor Requires:</b>	
Voltage	90 to 127 Vac or 180 to 254 Vac, single phase
Frequency	47 to 63 Hz
Circuit Breaker	North America and Japan International 15 amp 16 amp
Maximum power consumption	420 watts
Power cables (2 supplied)	8-ft (2.4-m) pluggable drop cord
Receptacles (2 required):	North America and Japan International NEMA 5-15R or equivalent IEC309, 16 amp, single phase

## Remote Support

Each Origin 2000 system may use the Remote Access Tool (RAT), which resides on the O2 workstation if the customer chooses to install this tool.

The RAT software application enables site engineers and users who purchase IRISconsole products to remotely monitor, configure, and control the computer system. RAT interfaces the Multi-Module System Controller (MMSC) in each rackmount cabinet, which interfaces the Module System Controller (MSC) in each module through a series of connecting cables and a private 10BaseT network. Additionally, RAT may be connected using a serial connection. For more information about the connectivity and functionality of RAT, contact your system support engineer (SSE).

SGI support personnel use a modem as a data communication link for the remote support of SGI computer systems. If site security regulations permit the use of a modem, contact the local telephone company well in advance of system delivery to arrange for installation of the appropriate telephone line. In the United States of America and Canada, you should install a public-switched dedicated data telephone line, such as a telephone, an X.25 pad, or an ISDN terminal adapter. SGI recommends that you install another telephone near the system for general use. For system installations outside the USA and Canada, please contact your account manager for the modem type and telephone line requirements.

For detailed information about RAT, refer to the document titled *Remote Access Tool (RAT) Reference Guide*, SGI publication number 108-0168-002.

## Network Connections

If you plan any optional network interfaces to your Origin 2000 system, such as Ethernet, you must ensure that you provide the proper cables and transceivers to match your network protocol.

## Raised-floor Installations

Origin 2000 systems and Onyx2 InfiniteReality2 systems do not require a raised-floor system. However, SGI recommends a raised-floor system because it provides convenient routes for underfloor air circulation and for power and communication cabling. SGI recommends a minimum raised-floor height of 12.00 in. (305 mm). When you design your raised-floor system, place perforated floor panels or floor grilles near the base of the front of the cabinets, not directly under them. Also, be sure to provide sufficient space between rows of racks to allow proper cooling in bottom-cooled, raised-floor environments.

Each rack that you install on a raised floor requires a floor cutout. [Figure 7](#) illustrates the floor cutout for a single Origin 2000 rack and a single Onyx2 InfiniteReality2 rack. [Figure 8](#) illustrates the floor cutout for the MetaRouter. [Figure 9](#) illustrates the floor cutout for the SCSI RAID rack. [Figure 10](#) illustrates the floor cutout for the Origin Fibre Channel rack.

**NOTE:** SGI provides full-scale templates upon request for the location of system floor cutouts.

The computer room floor must support the weight of all the racks in your system configuration. Each component, with the exception of the SCSI RAID rack, rests on four leveling pads that concentrate the weight of the rack on a small surface area.

Additional floor support pedestals increase the floor-loading strength of the raised floor. If your computer site lies in an earthquake zone, you can secure the computer system components to the computer room subfloor for added stability. Refer to the section titled “[Securing the Cabinets](#)” for more information. You may remove the four leveling pads from the Origin 2000 rack, Onyx2 InfiniteReality2 rack, and MetaRouter and use the threaded holes as fastening points to stabilize the components. Contact your Site Planning representative for specific details.

If you have any questions about the structural capabilities of any floor, please contact a qualified structural engineer. If you do not install your system on a raised floor, SGI recommends that you install flat cable guides to protect cables from damage and computer room personnel from injury. Contact your Site Planning representative for ordering information.

Figure 7. Origin 2000 Rack and Onyx2 InfiniteReality2 Rack Floor Cutout

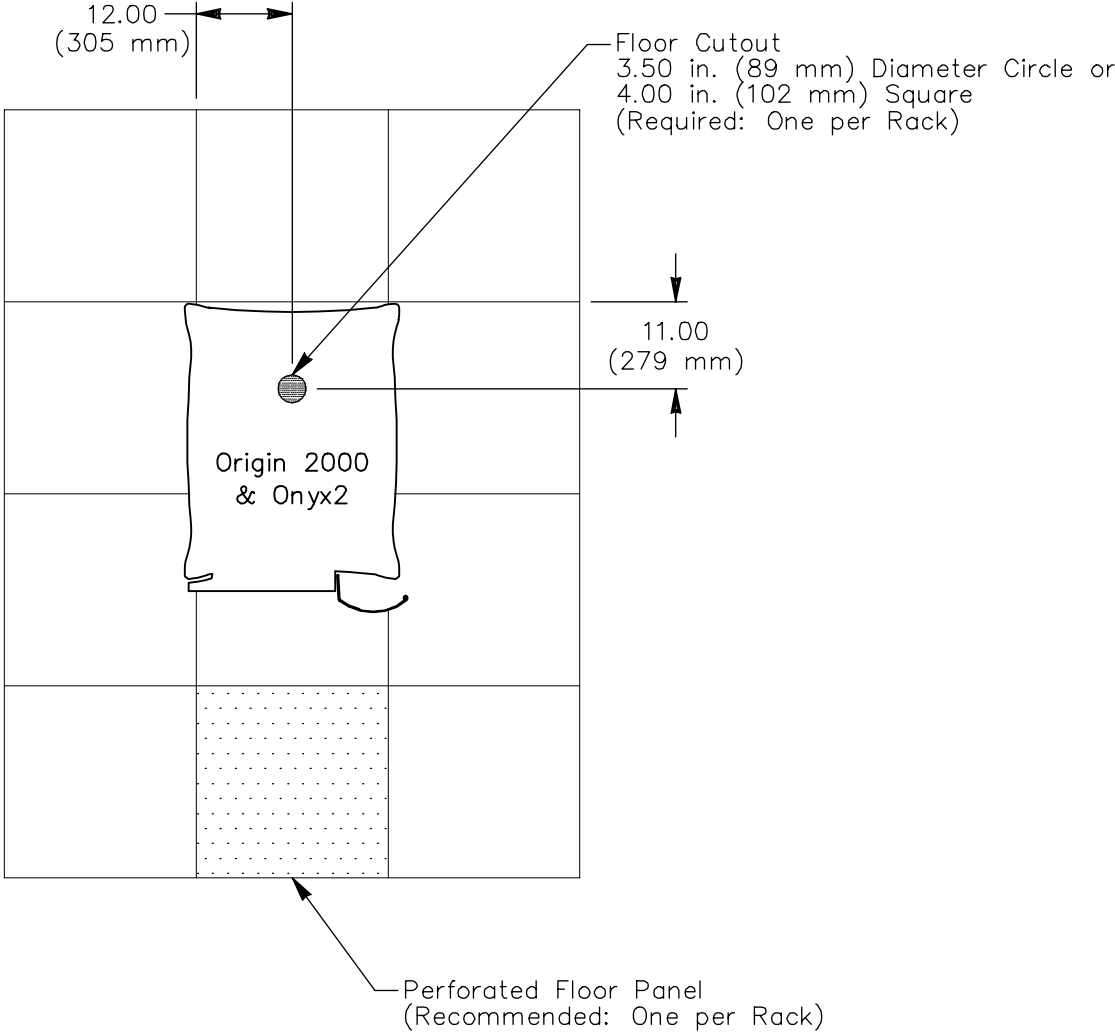


Figure 8. MetaRouter Floor Cutout

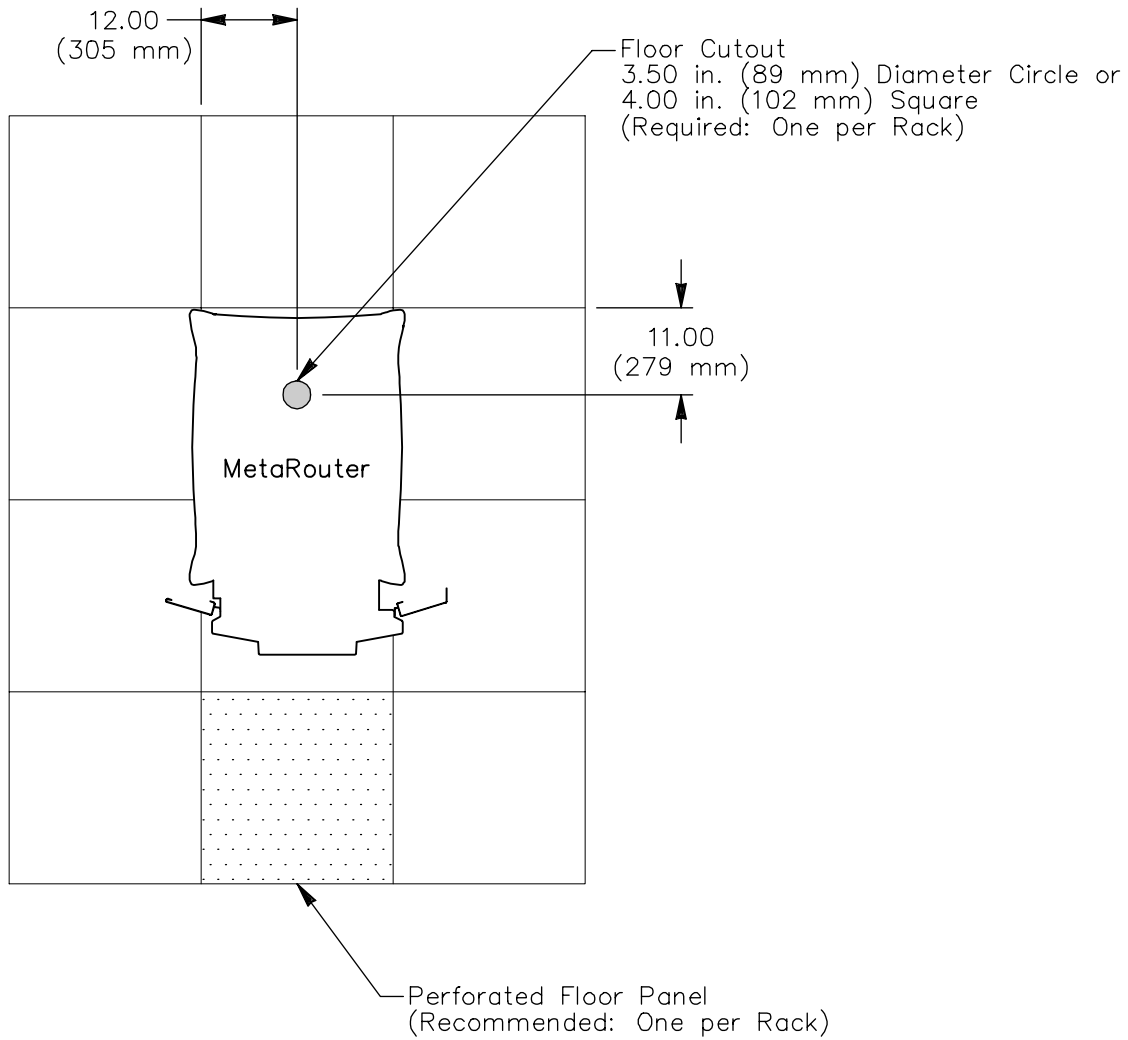


Figure 9. SCSI RAID Rack Floor Cutout

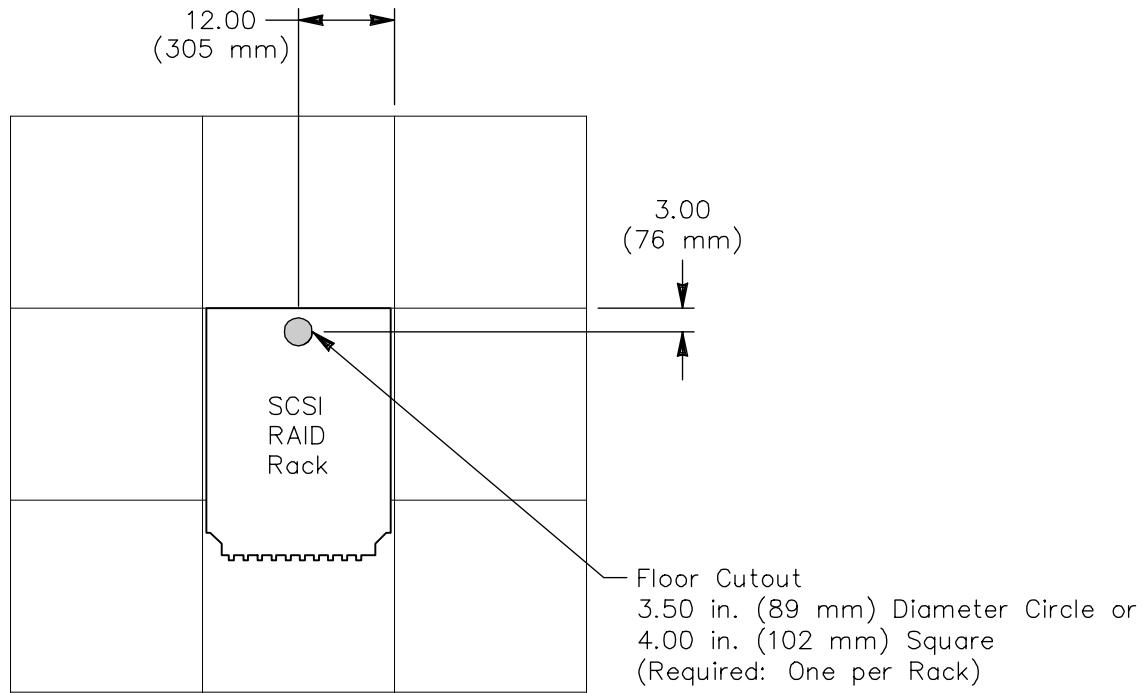
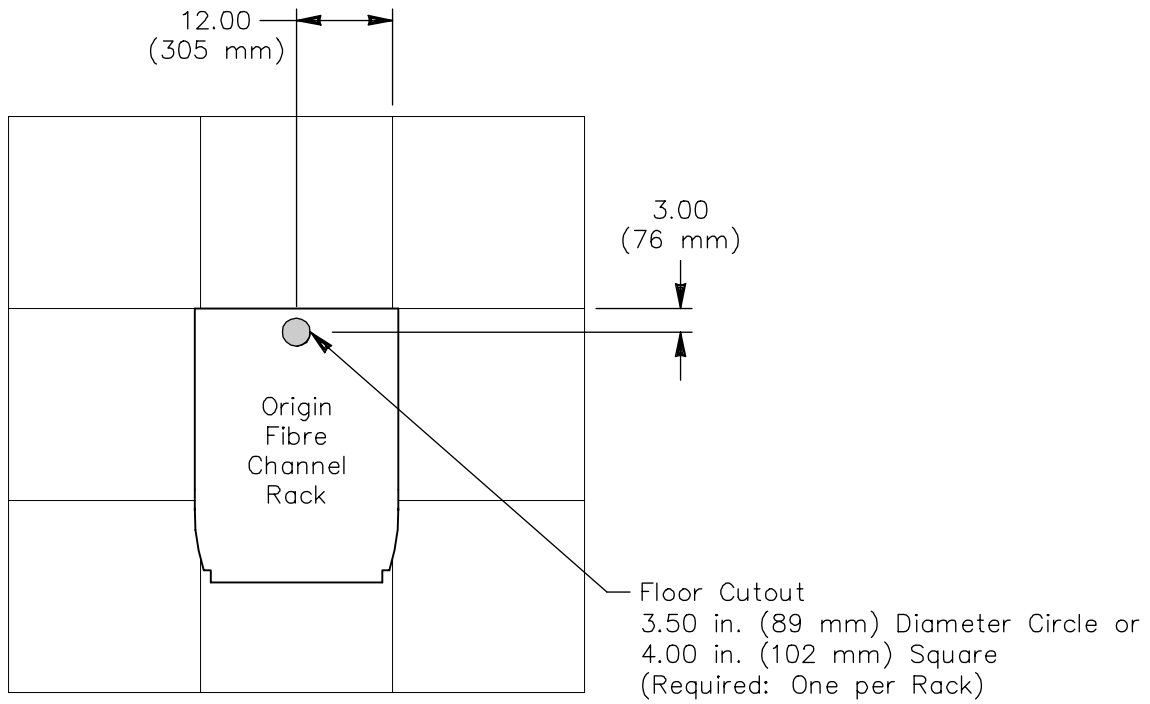


Figure 10. Origin Fibre Channel Rack Floor Cutout



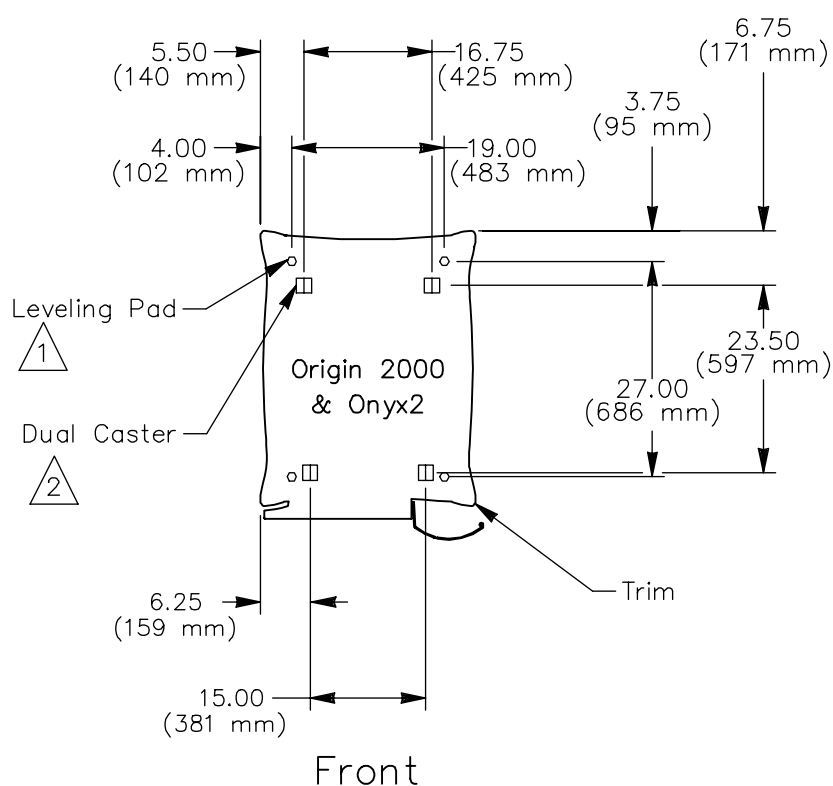


## Securing the Cabinets

In areas prone to earthquakes, you may secure each Origin 2000 rack, each Onyx2 InfiniteReality2 rack, each MetaRouter, and each Origin Fibre Channel rack to the computer room subfloor using the four M12 threaded weld nuts located on the underside of each cabinet. Refer to [Figure 11](#), [Figure 12](#), and [Figure 13](#).

**NOTE:** The SCSI RAID rack must be modified if you wish to secure it to the computer room subfloor. Contact your Site Planning representative for detailed information about securing the SCSI RAID rack.

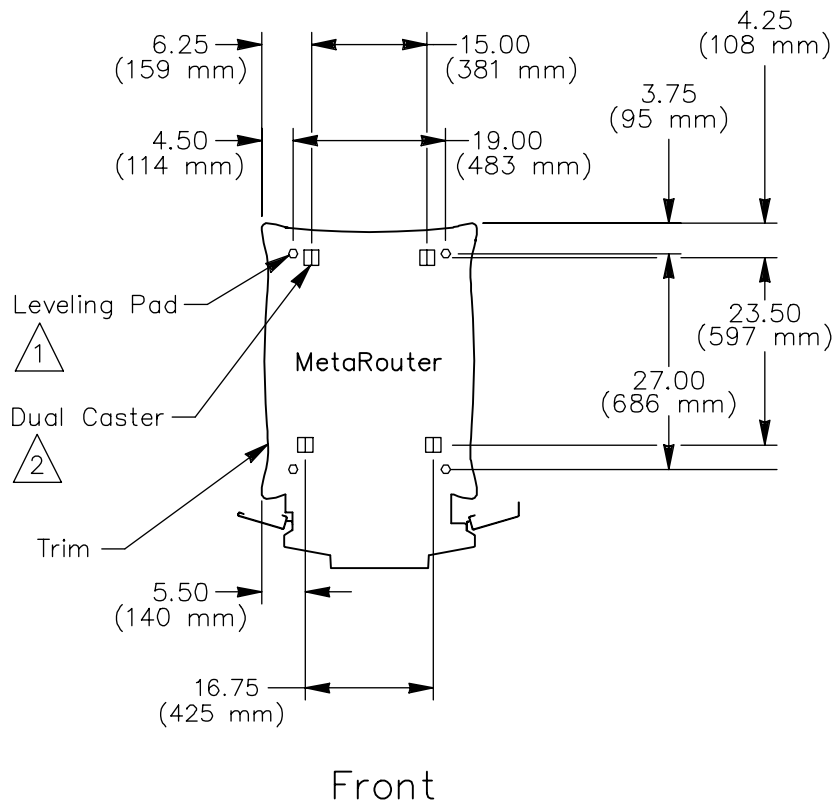
*Figure 11. Securing the Origin 2000 Rack and Onyx2 Rack*



1 The leveling pad diameter is 1.00 inch (25 mm). Seismic anchors can be used in earthquake prone areas. The M12 threaded weld nuts, which are located on the underside of each rack 2.00 inches (51 mm) up from floor level, can be used.

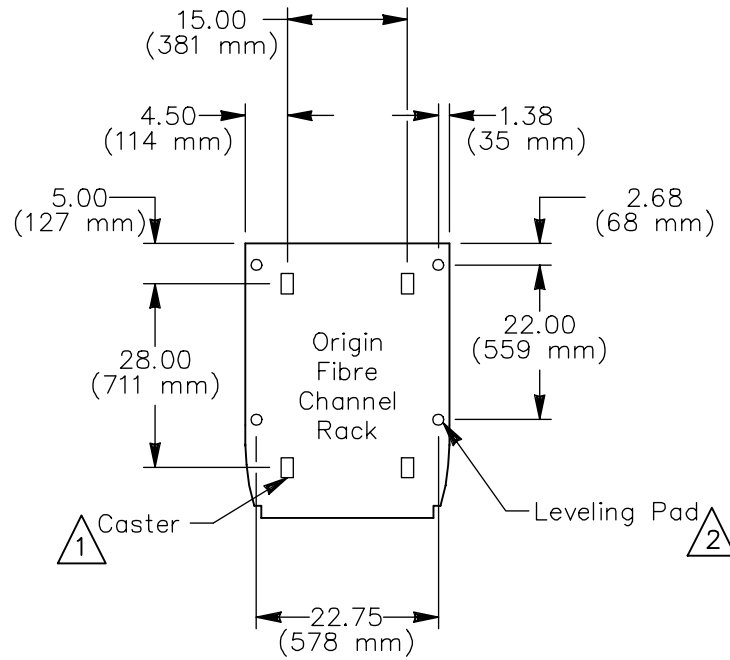
2 The dual-caster diameter is 1.88 inches (48 mm) and has a total width of 1.88 inches (48 mm). The casters that are located in the rear of the rack swivel; the front casters are stationary.

Figure 12. Securing the MetaRouter



- △<sub>1</sub> The leveling pad diameter is 1.00 inch (25 mm). Seismic anchors can be used in earthquake prone areas. The M12 threaded weld nuts, which are located on the underside of each rack 2.00 inches (51 mm) up from floor level, can be used.
- △<sub>2</sub> The dual-caster diameter is 1.88 inches (48 mm) and has a total width of 1.88 inches (48 mm). The casters that are located in the front of the rack swivel; the rear casters are stationary.

Figure 13. Securing the Origin Fibre Channel Rack



1 The caster diameter is 2.50 in. (64 mm), and the caster width is 1.50 in. (38 mm).

2 The leveling pad diameter is 1.38 in. (35 mm).

## Physical Specifications

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Origin 2000 systems and Onyx2 InfiniteReality2 systems consist of a variety of standard and optional equipment. Each rack or peripheral device and each system configuration has unique physical characteristics.

[Table 3](#) provides physical specifications for Origin 2000 racks, MetaRouters, Onyx2 InfiniteReality2 racks, Onyx2 InfiniteReality2 multirack systems, SCSI RAID cabinets, Origin Fibre Channel racks, O2 workstations, and workstation monitors. The following subsections describe the system components in detail. All specifications in [Table 3](#) are per rack unless otherwise noted.

**NOTE:** An above-the-floor cable trough connects the two rows of equipment in 256-processor Origin 2000 multirack systems. The two cable troughs restrict access to the area between the rows of equipment. Sites with 256-processor systems must maintain a 36-inch (892-mm) separation between the computer room walls and the end of each row of equipment to meet maintenance and safety requirements. The shaded area in [Figure 16](#) represents these above-the-floor cable troughs.

Table 3. Physical Specifications

Characteristic		Specification
<b>Origin 2000 Rack</b>		
Height		73.00 in. (1854 mm)
Width of one rack		28.00 in. (711 mm)
Depth		38.50 in. (978 mm)
Maximum weight (per rack)		750 lbs (340 kg)
Shipping characteristics (per rack):		
	Height	81.00 in. (2057 mm)
	Width	46.00 in. (1168 mm)
	Depth	48.00 in. (1219 mm)
	Weight	900 lbs (408 kg)
Access requirements:		
	Front	36.00 in. (914 mm)
	Rear	36.00 in. (914 mm)
Acoustical noise level		55 dBA at 3.3 ft (1 m)
Maximum heat dissipation to air (per rack)		9.24 kBtu/hr (2.71 kW)
Cooling requirement		Ambient air
Maximum airflow		800 CFM (0.38 m <sup>3</sup> /s)
Vibration		
	Maximum sustained, operational	5–10 Hz @ 0.01 in. total excursion, 10–500 Hz @ 0.1g
	Maximum peak, operational	5–10 Hz @ 0.02 in. total excursion, 10–500 Hz @ 0.1g
<b>MetaRouter</b>		
Height		73.00 in. (1854 mm)
Width of one rack		35.00 in. (889 mm)
Depth		43.25 in. (1099 mm)
Maximum weight (per rack)		750 lbs (340 kg)
Shipping characteristics (per rack):		
	Height	81.00 in. (2057 mm)
	Width	46.00 in. (1168 mm)
	Depth	48.00 in. (1219 mm)
	Weight	900 lbs (408 kg)
Access requirements:		
	Front	36.00 in. (914 mm)
	Rear	36.00 in. (914 mm)
Acoustical noise level		55 dBA at 3.3 ft (1 m)
Maximum heat dissipation to air (per rack)		2.15 kBtu/hr (0.63 kW)
Cooling requirement		Ambient air
Maximum airflow		700 CFM (0.33 m <sup>3</sup> /s)

Table 3. Physical Specifications (continued)

Characteristic		Specification
<b>Onyx2 InfiniteReality2 Rack</b>		
Height		73.00 in. (1854 mm)
Width of one rack		28.00 in. (711 mm)
Depth		38.50 in. (978 mm)
Maximum weight (per rack)		800 lbs (363 kg)
Shipping characteristics (per rack):		
	Height	81.00 in. (2057 mm)
	Width	46.00 in. (1168 mm)
	Depth	48.00 in. (1219 mm)
	Weight	950 lbs (431 kg)
Access requirements:		
	Front	36.00 in. (914 mm)
	Rear	36.00 in. (914 mm)
Acoustical noise level		65 dBA at 3.3 ft (1 m)
Maximum heat dissipation to air (per rack)		9.31 kBtu/hr (2.73 kW)
Cooling requirement		Ambient air
Maximum airflow (per rack)		850 CFM (0.40 m <sup>3</sup> /s)
Vibration		
	Maximum sustained, operational	5–10 Hz @ 0.01 in. total excursion, 10–500 Hz @ 0.1g
	Maximum peak, operational	5–10 Hz @ 0.02 in. total excursion, 10–500 Hz @ 0.1g
<b>A Maximum Configuration Onyx2 InfiniteReality2 System with 128 Processors and 16 Pipes Requires:</b>		
Height		73.00 in. (1854 mm)
Width		253.00 in. (6426 mm)
Depth		118.00 in. (2997 mm)
Maximum weight (per rack)		800 lbs (363 kg)
Shipping characteristics (per rack):		
	Height	81.00 in. (2057 mm)
	Width	48.00 in. (1219 mm)
	Depth	48.00 in. (1219 mm)
	Weight	950 lbs (431 kg)
Access requirements:		
	Front	36.00 in. (914 mm)
	Rear	36.00 in. (914 mm)

Table 3. Physical Specifications (continued)

Characteristic		Specification
Acoustical noise level		70 dBA at 3.3 ft (1 m)
Maximum heat dissipation to air		125.39 kBtu/hr (36.75 kW)
Cooling requirement		Ambient air
Maximum airflow (per rack)		850 CFM (0.40 m <sup>3</sup> /s)
Vibration	Maximum sustained, operational	5–10 Hz @ 0.01 in. total excursion, 10–500 Hz @ 0.1g 5–10 Hz @ 0.02 in. total excursion, 10–500 Hz @ 0.1g
	Maximum peak, operational	
<b>SCSI RAID Rack</b>		
Height		71.00 in. (1803 mm)
Width		23.00 in. (584 mm)
Depth		31.00 in. (787 mm)
Maximum weight		900 lbs (408 kg)
Shipping characteristics (per rack):		
	Height	78.00 in. (1981 mm)
	Width	37.00 in. (940 mm)
	Depth	48.00 in. (1219 mm)
	Weight	1050 lbs (473 kg)
Access requirements:		
	Side	1.00 in. (25 mm)
	Front	32.00 in. (813 mm)
	Top	30.00 in. (762 mm)
Cooling requirement		Ambient air
Maximum heat dissipation to air		13.38 kBtu/hr (3.92 kW)
Vibration		5–500 Hz @ 0.25g
<b>Origin Fibre Channel Rack</b>		
Height		75.25 in. (1911 mm)
Width of one cabinet		25.50 in. (648 mm)
Depth		34.25 in. (870 mm)
Maximum weight		1100 lbs (499 kg)
Shipping characteristics (per rack):		
	Height	81.00 in. (2057 mm)
	Width	45.25 in. (1149 mm)
	Depth	48.00 in. (1219 mm)
	Weight	1250 lbs (563 kg)





Table 3. Physical Specifications (continued)

Characteristic	Specification
<b>O2 Workstation</b>	
Height	12.75 in. (324 mm)
Width	9.75 in. (248 mm)
Depth	12.00 in. (305 mm)
Weight	22 lbs (10 kg)
Cooling requirement	Ambient air
Maximum heat dissipation to air	835 Btu/hr (245 W)
Maximum airflow	37 CFM (0.02 m <sup>3</sup> /s)
Vibration	
Operational	5-19 Hz @ 0.02 in. total excursion, 19-100 Hz @ 0.25g
In packaging	5-19 Hz @ 0.10 in. total excursion, 19-500 Hz @0.50g
<b>Workstation Monitor (20 in.)</b>	
Height	19.25 in. (489 mm)
Width	19.00 in. (483 mm)
Depth	20.00 in. (508 mm)
Weight	69 lbs (31 kg)
Cooling requirement	Ambient air
Maximum heat dissipation to air	409 Btu/hr (120 W)
<b>Workstation Monitor (24 in.)</b>	
Height	19.75 in. (502 mm)
Width	23.00 in. (584 mm)
Depth	21.50 in. (546 mm)
Weight	90 lbs (41 kg)
Cooling requirement	Ambient air
Maximum heat dissipation to air	597 Btu/hr (175 W)

## Origin 2000 Systems

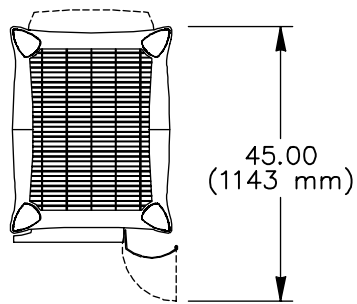
Each Origin 2000 rack can contain a maximum of two modules. Each module can contain from one to four node boards, with up to two superscalar processors (CPUs) on each board. This means that each Origin 2000 rack may contain between 2 and 16 CPUs. Origin 2000 multirack systems with more than 64 CPUs (4 full racks) require a MetaRouter, which is also modular and mounts in a rack. The maximum multirack system configuration is 256 CPUs. This configuration consists of 16 full racks with 32 modules and 128 node boards, and 4 MetaRouter racks that contain 2 modules each. Each module inside the MetaRouter houses eight router boards.

[Figure 14](#) illustrates a single Origin 2000 rack. [Figure 15](#) illustrates the MetaRouter. [Figure 16](#) illustrates the possible Origin 2000 multirack system configurations.

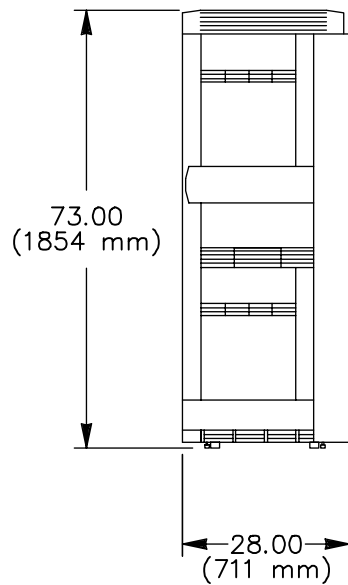
**NOTE:** CrayLink cables connect MetaRouters to Origin 2000 racks. Braided straps are also attached between MetaRouter racks to provide ground continuity.

Figure 14. Origin 2000 Rack

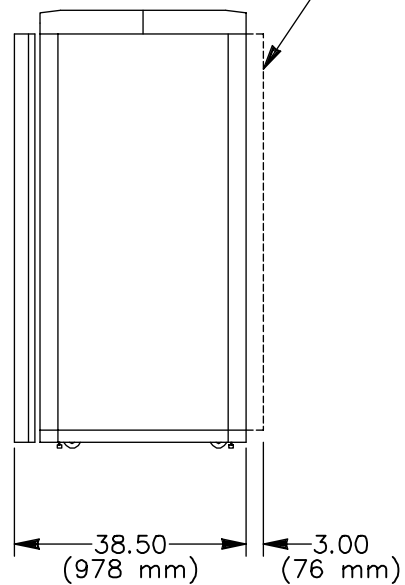
Plan View



Front View



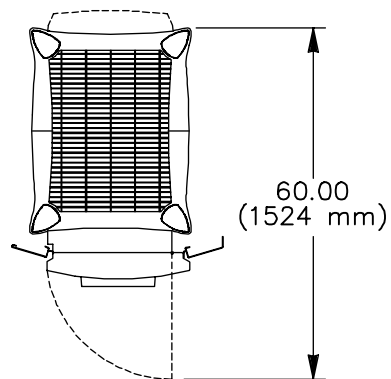
Side View



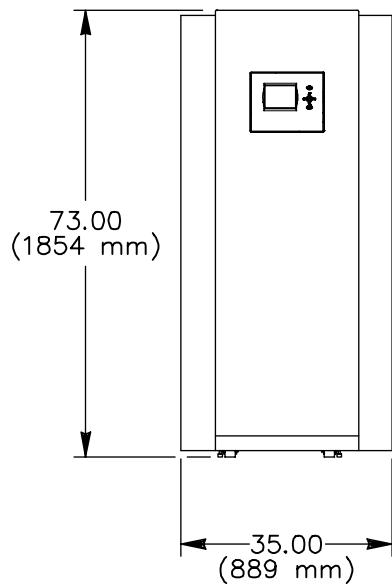
Optional Rear Panel

Figure 15. MetaRouter

Plan View



Front View



Side View

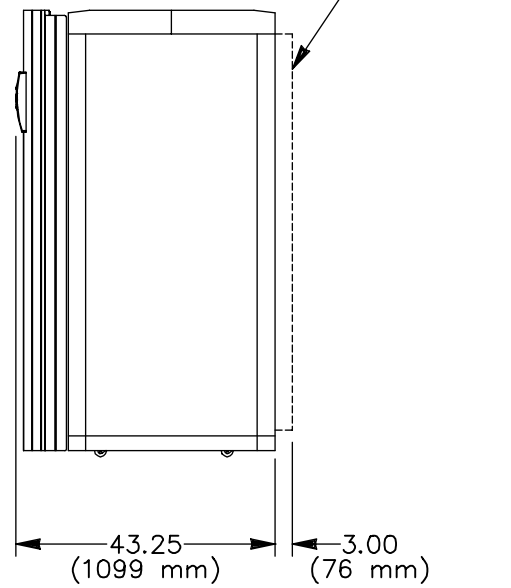
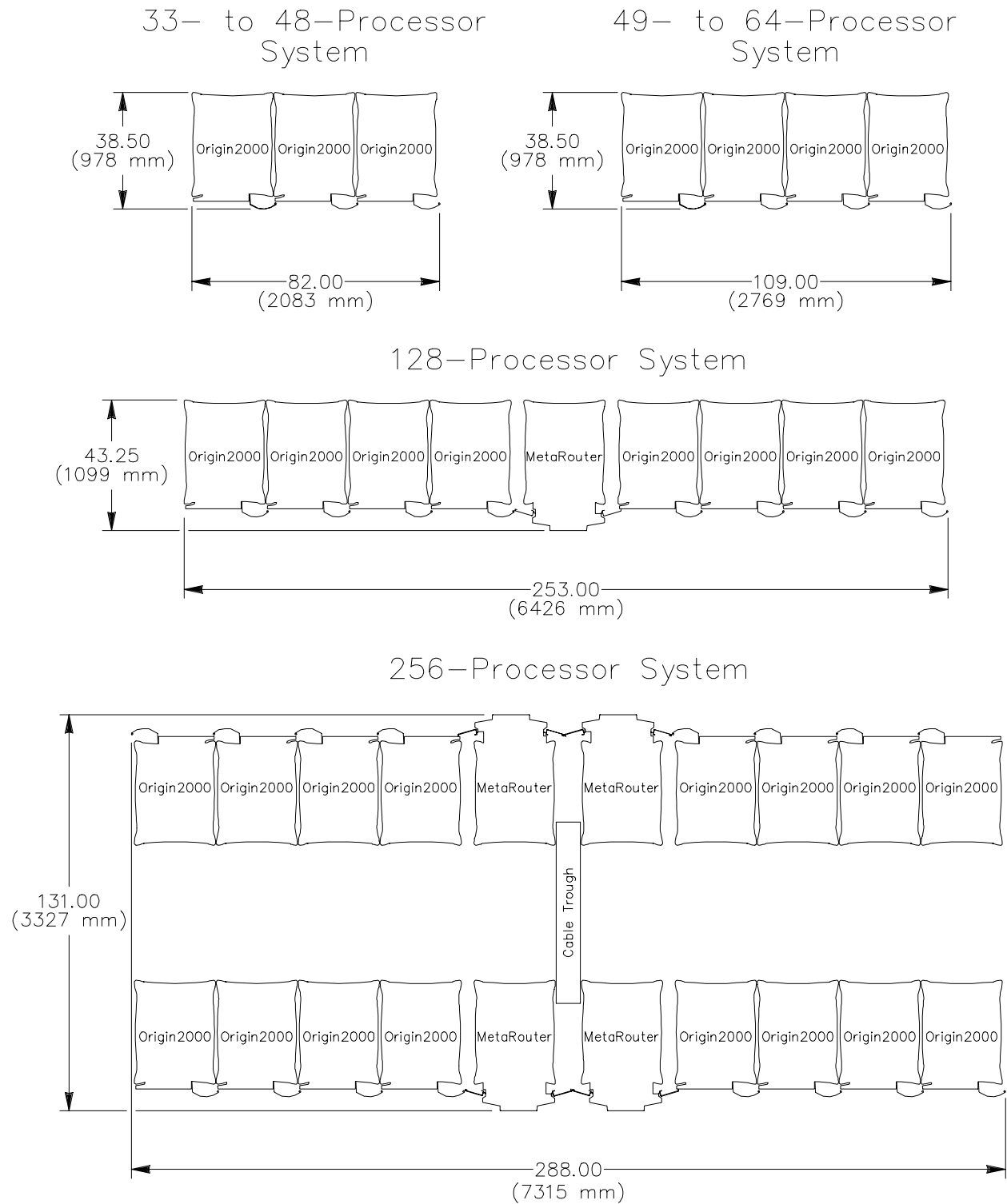


Figure 16. Origin 2000 Multitrack System Configurations



## Onyx2 InfiniteReality2 Systems

The following subsections provide configuration and rack placement information about available Onyx2 InfiniteReality2 systems. [Figure 17](#) illustrates the Onyx2 InfiniteReality2 rack. [Figure 18](#) illustrates the Onyx2 InfiniteReality2 rack and multirack system configurations.

### Onyx2 InfiniteReality2 Rack System

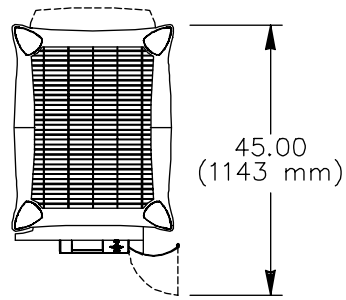
The Onyx2 InfiniteReality2 rack system is a single-rack computer system that contains one compute module and one graphics insert module. This compute module contains between two and eight CPUs. The graphics insert module, which is located above the compute module, contains up to two graphics pipelines and up to six raster manager boards with associated display boards. Refer to [Figure 17](#).

### Onyx2 InfiniteReality Multirack Systems

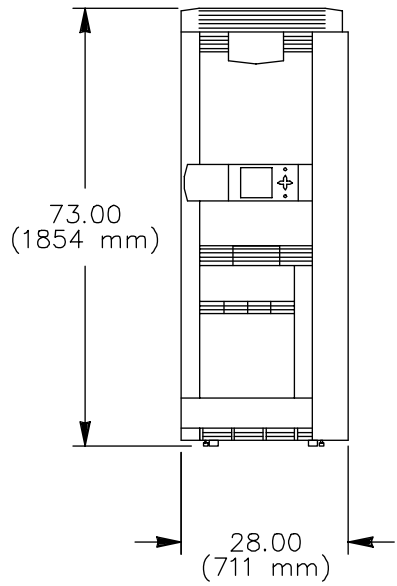
The Onyx2 InfiniteReality2 multirack systems range in configurations from 9 CPUs, 3 graphic pipelines, and 8 raster managers configured into two racks to a maximum configuration consisting of 128 CPUs, 16 graphic pipelines, and 64 raster managers configured into 17 racks (refer to [page 40](#) and [page 41](#)).

Figure 17. Onyx2 InfiniteReality2 Rack

Plan View



Front View



Side View

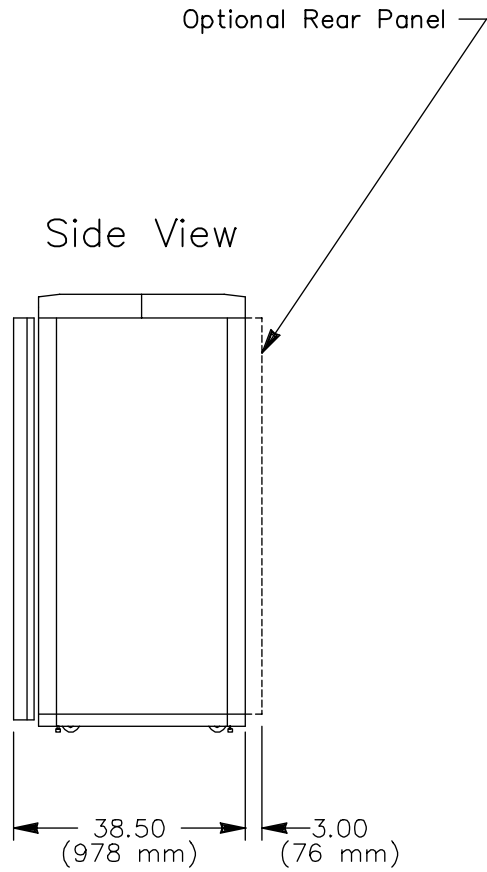
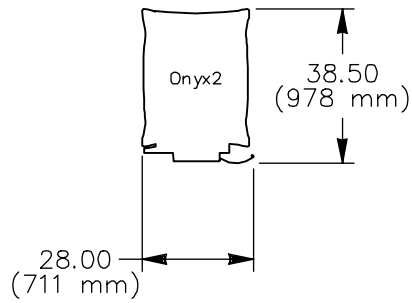
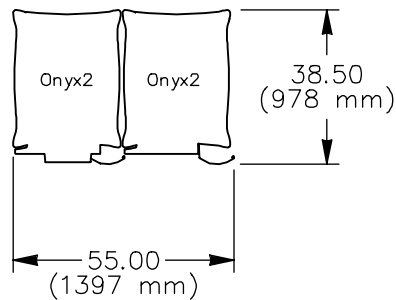


Figure 18. Onyx2 InfiniteReality2 System Configurations

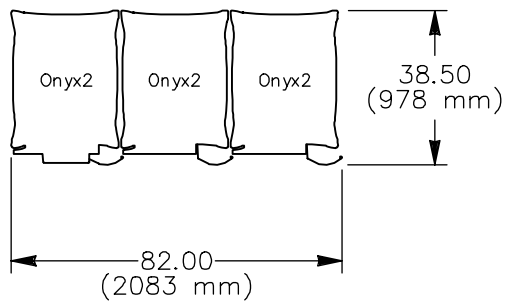
Onyx2 InfiniteReality2 Rack



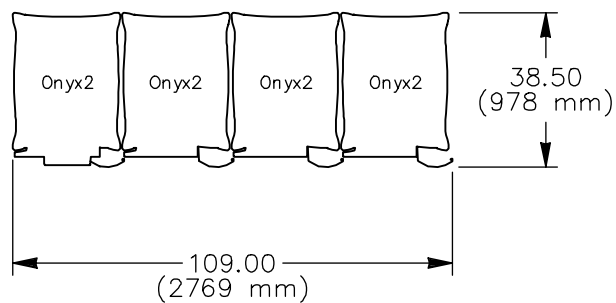
Onyx2 InfiniteReality2 Multirack System (2 Racks)



Onyx2 InfiniteReality2 Multirack System (3 Racks)



Onyx2 InfiniteReality2 Multirack System (4 Racks)



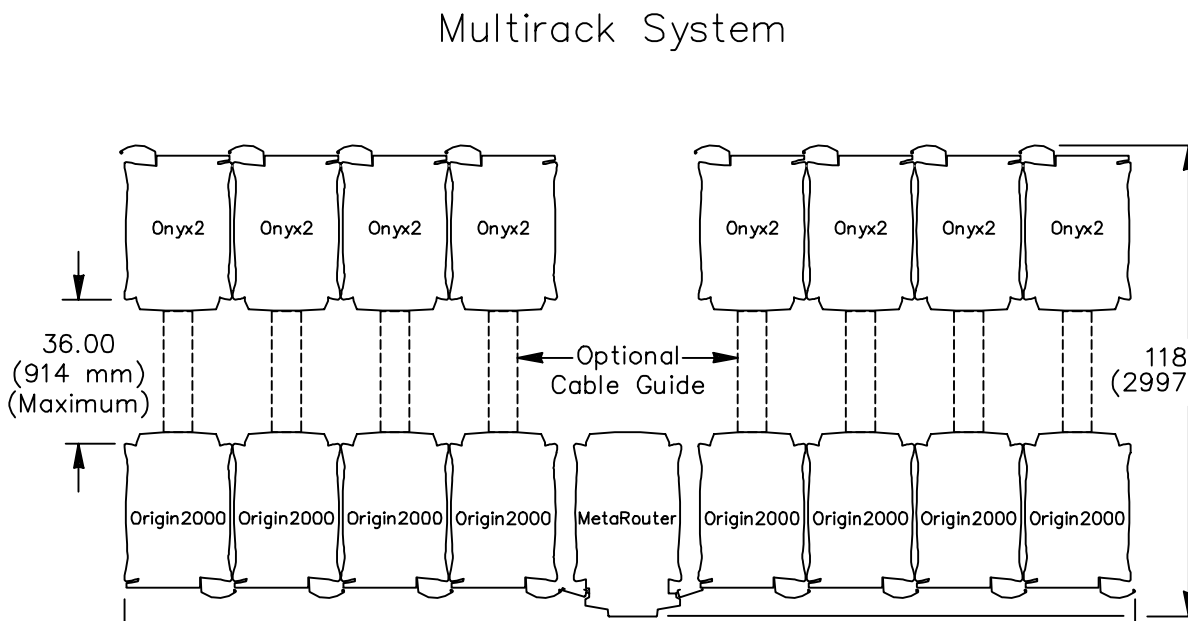


### Onyx2 InfiniteReality2 Multirack System Layout Options

The Onyx2 InfiniteReality2 system may be located on a raised or nonraised floor adjacent to an Origin 2000 system if adequate space is available. Cable length restrictions do not allow more than two Onyx2 racks to be located adjacent to the Origin 2000 racks. Sites with systems configured with more than four Onyx2 racks (two on each end of an Origin 2000 row of racks) must locate the racks behind the Origin 2000 racks as shown in Figure 19. Other floor layouts are possible; contact Site Planning for additional floor layouts and floor cutout templates.

**NOTE:** Cable guides are used to route cables between Onyx2 racks and Origin 2000 racks at sites with nonraised floors. Contact your SGI account representative for ordering information.

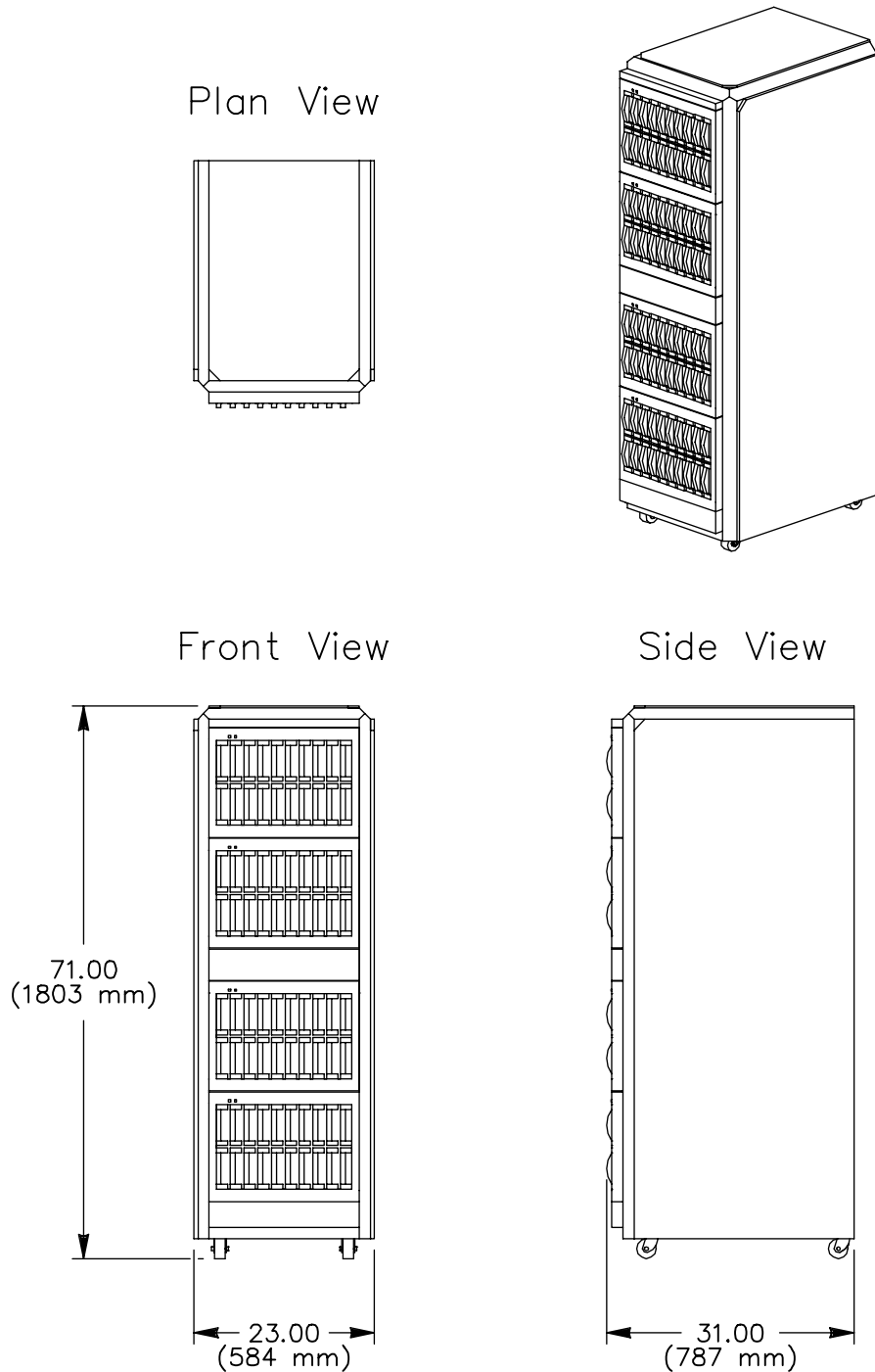
Figure 19. Onyx2 InfiniteReality2 Multirack System Layout Option:  
128-Processor Onyx2 InfiniteReality2 Multirack System with 16 Graphics Pipes



### SCSI RAID Rack

The SCSI RAID rack is an air-cooled disk storage chassis that is capable of housing up to four RAID chassis assemblies. Each RAID chassis assembly can house up to 20 disk drive modules. [Figure 20](#) illustrates the SCSI RAID rack.

Figure 20. SCSI RAID Rack

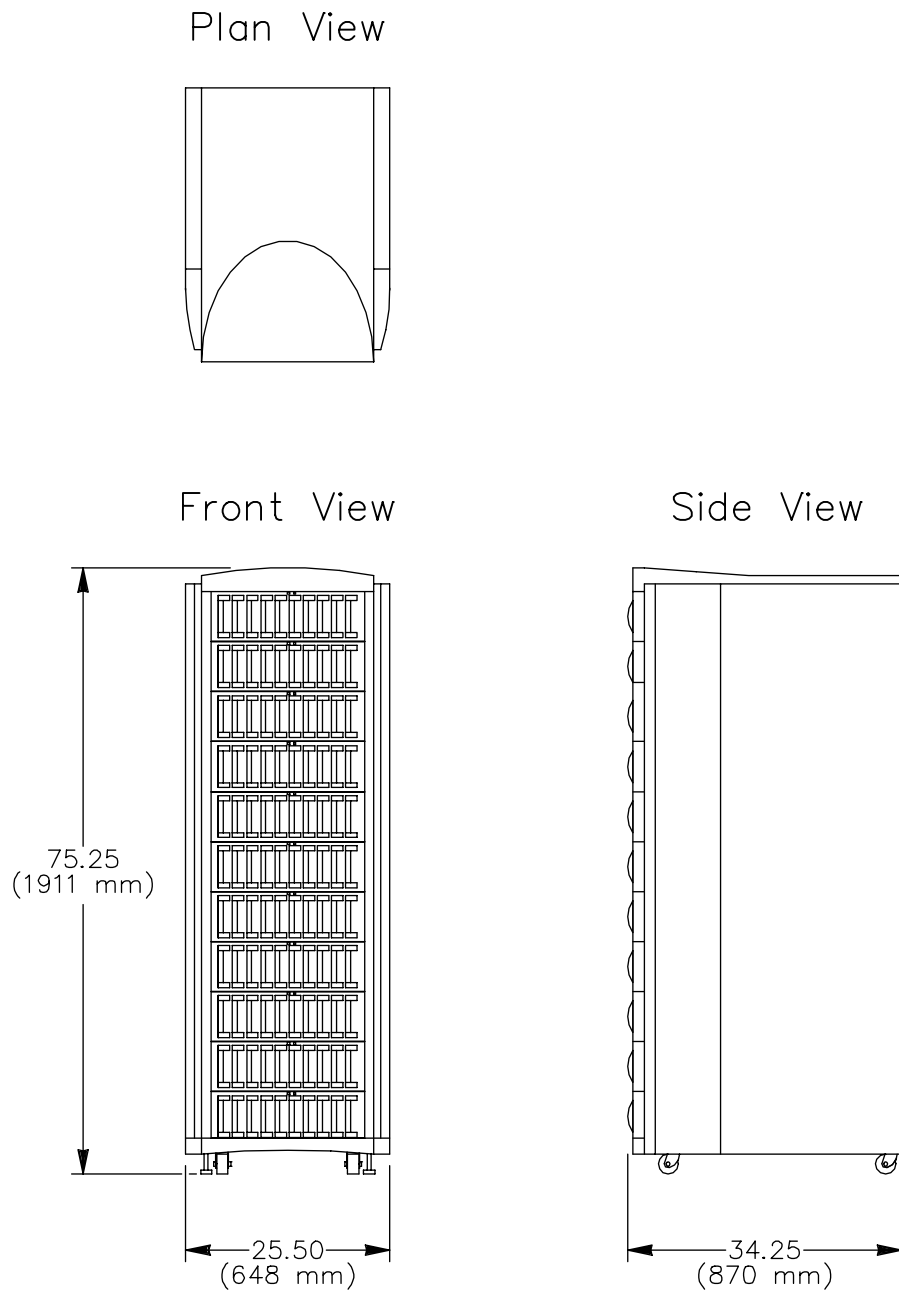


## Origin Fibre Channel Rack

The Origin Fibre Channel rack contains up to 11 FibreVault disk enclosures or up to 5 Fibre Channel RAID enclosures. Each FibreVault disk enclosure can contain up to 10 non-RAID disk modules. Each Fibre Channel RAID enclosure can contain up to 10 RAID disk modules.

Figure 21 illustrates the Origin Fibre Channel rack.

Figure 21. Origin Fibre Channel Rack



## O2 Workstation

The O2 workstation provides monitoring and control capabilities for the Origin 2000 system and the Onyx2 InfiniteReality2 system. The O2 workstation consists of the workstation chassis with internal CD-ROM drive, monitor, keyboard, mouse, cables, CD-ROM disks, and documentation. Contact your account representative to purchase the optional camera and optional 30 in. x 48 in. (762 mm x 1219 mm) table for the workstation. You may also purchase additional data equipment for your particular application. [Figure 22](#) illustrates the O2 workstation. [Figure 23](#) illustrates the 20-in. color O2 workstation monitor.

**NOTE:** If the workstation will be connected to a system with more than 64 CPUs, the IRISconsole option must be added to the workstation.

*Figure 22. O2 Workstation*

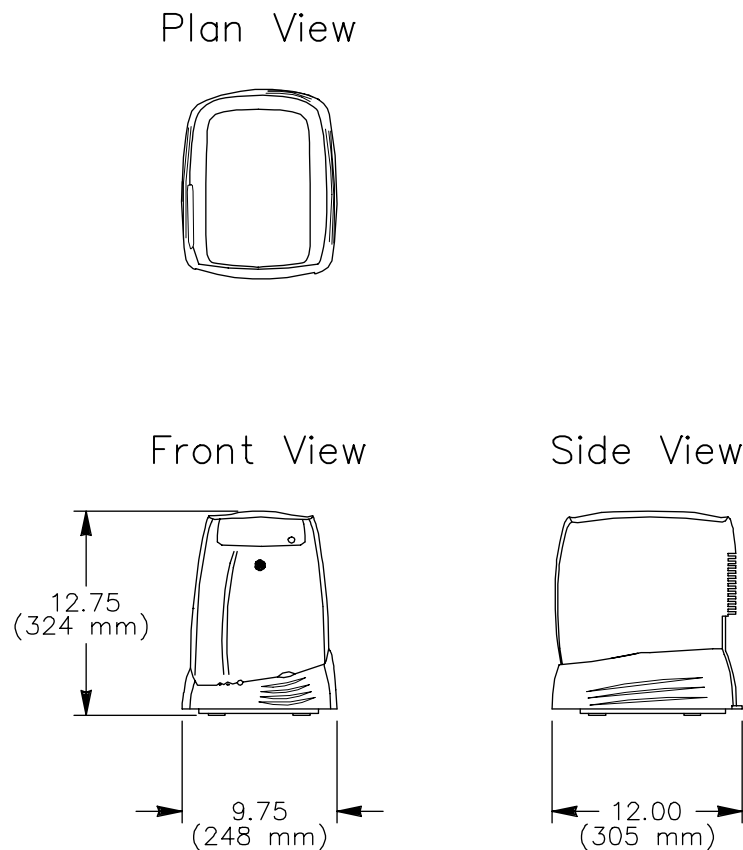
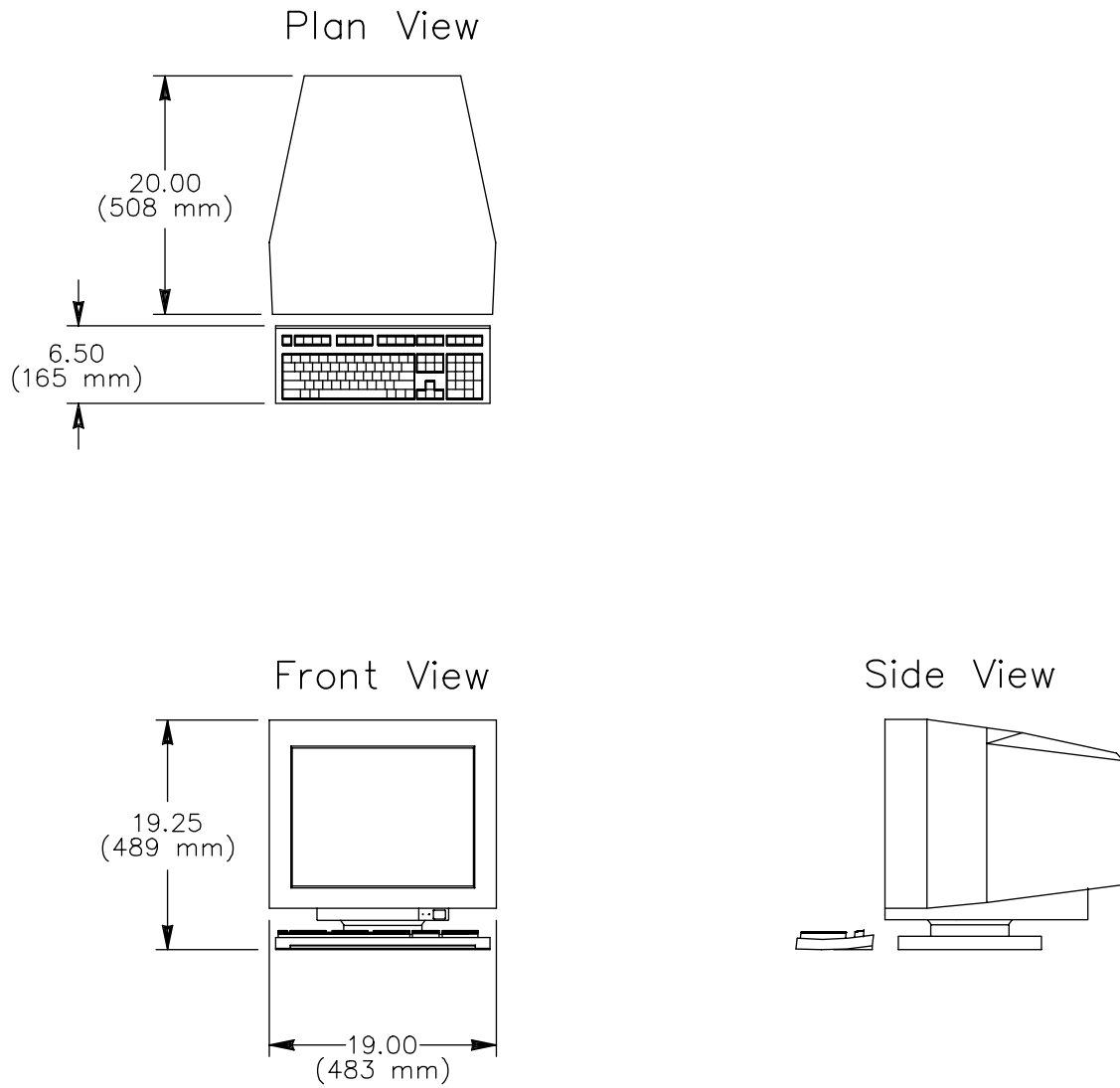


Figure 23. 20-in. Color O2 Workstation Monitor



## Site Planning Checklist

Table 4 provides a site planning checklist that you can use as an organizational tool during the site planning and preparation process. During the planning process, you might discover additional preparation issues at your site that this checklist does not address. To discuss your site plans and to resolve any issues, contact a SGI site planning representative by one of the methods listed in the summary of this document.

Table 4. Site Planning Checklist

Yes	No	Planning Issue	Comments
		Have you determined the system configuration? Configuration: _____	
		Have you determined the installation date? Date: _____	
		What is the total number of system racks, including Metarouters?	
		Have you established the system location?	
		Does the equipment floor layout meet the equipment maintenance access requirements?	
		Will the equipment be positioned so that the exhaust air of one heat-discharging device does not enter the air inlet of another?	
		Have you identified an access route to the final system location?	
		Does the access route meet the access requirements outlined in the section titled "Planning Your Access Route"?	
		Does the access route meet the floor-loading requirements for the system?	
		Have you made provisions to cover irregular or engraved floor patterns along the access route to reduce vibration of the system while moving it?	
		Will customer assistance be available to help unload, unpack, and move the system during delivery?	
		Does your loading dock meet standard freight-carrier truck requirements? If not, have you allocated a forklift for delivery? Contact your site planning representative if you have concerns about your loading dock.	
		Is a pallet jack available on-site to move the system in its shipping container to the final system location?	
		Do the pallet-jack fork dimensions meet the requirements for the shipping container?	

Table 4. Site Planning Checklist (continued)

Yes	No	Planning Issue	Comments
		Are the elevator and elevator door dimensions adequate?	
		Is the elevator weight capacity adequate?	
		Does each ramp in the access route have an incline that is less than 10 degrees?	
		Did you order the power receptacles for the mainframe cabinet(s) and for all other equipment in your system?	
		Are the circuit breakers for all cabinets properly installed and labeled?	
		Are all power receptacles properly installed and labeled?	
		Are the floor cutouts properly positioned and free of sharp edges?	
		Are the recommended perforated floor panels properly positioned?	
		Did you order a table and chair for the O2 workstation and monitor?	
		Are the power receptacles for the O2 workstation and monitor located nearby, so that you can use standard power cables?	
		Have the required network connections been installed for the O2 workstation?	
		Is the computer room floor rated for the system floor loading?	
		Can the computer room environment be properly maintained within the specifications listed in the section titled "Environmental Requirements"?	
		Is additional fire suppression equipment required?	
		Are dedicated telephone lines installed if you plan to implement remote support for your system?	
		Have all required network addresses been established?	
		Have you trained system administrators or enrolled operators in the necessary training courses?	

## Summary

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Now that you understand the basic configurations and requirements of the Origin 2000 system and the Onyx2 InfiniteReality2 system, you can make appropriate plans for your site. SGI site planning representatives are available for consultation regarding site planning and preparation. You may contact a SGI site planning representative by any of the following methods:

- Phone +1 715 726 2820, or in the USA: +1 800 284 2729, extension 62820
- Fax +1 715 726 2969
- E-mail *site@sgi.com*