Origin™ 2000 Redundant Power Supply Option Owner's Guide

Document Number 007-3654-001

CONTRIBUTORS

Written by Carolyn Curtis
Illustrated by Dan Young
Production by Carlos Miqueo
Engineering contributions by Greg Schaem, Tony Roaque, Chris Rowe, Sally Abolitz, Judy Bergwerk, Matt Robinson, Wendy Ju, and David Sakamoto
St. Peter's Basilica image courtesy of ENEL SpA and InfoByte SpA. Disk Thrower image courtesy of Xavier Berenguer, Animatica.

FCC Warning
This equipment has been tested and found compliant with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Attention
This product requires the use of external shielded cables in order to maintain compliance pursuant to Part 15 of the FCC Rules.

VDE 0871/6.78

This equipment has been tested to and is in compliance with the Level A limits per VDE 0871.

European Union Statement

This device complies with the European Directives listed on the "Declaration of Conformity" which is included with each product. The CE mark insignia displayed on the device is an indication of conformity to the aforementioned European requirements.

CE

NRTL/C

International Special Committee on Radio Interference (CISPR)

This equipment has been tested to and is in compliance with the Class A limits per CISPR publication 22.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Attention

Cet appareil numérique n'émet pas de perturbations radioélectriques dépassant les normes applicables aux appareils numériques de Classe A préscrites dans le Règlement sur les interferences radioélectriques etabli par le Ministère des Communications du Canada.

Japanese Compliance Statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Compliance Statement in Chinese

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策．

Origin™ 2000 Redundant Power Supply Option Owner's Guide
Document Number 007-3654-001

Contents

List of Figures

List of Tables

About This Guide

The Silicon Graphics redundant power supply is a power supply option for the Silicon Graphics Origin 2000 deskside or rackmount system. This option enables a system to continue operation after a power supply failure; a Silicon Graphics System Support Engineer can easily replace a failed module while the system operates normally.

The firmware for the redundant power supply requires IRIX version 6.5.4 with patch 3658, or an appropriate version of IRIX later than 6.5.4. The Origin 2000 system shipping with the redundant power supply has the appropriate IRIX version.

The redundant power supply requires a 220-volt outlet.

Warning: The Origin 2000 system uses electrical power internally that is hazardous if the equipment is improperly handled. Only Silicon Graphics System Support Engineers or other personnel trained by Silicon Graphics are qualified to replace a failed power supply, power supply module, or fan tray.

Audience

This guide is written for owners and users of an Origin 2000 deskside or rackmount system. It presumes general knowledge of the system and familiarity with the Origin 2000 owner documentation.

Structure of This Document

This guide consists of the following chapter and appendix:

- Chapter 1, “Redundant Power Supply Features and Operation,” describes power supply function and indicators. It also describes accompanying changes in the Origin 2000 chassis design and provides technical specifications for the redundant power supply.
- Appendix A, “MSC Messages,” summarizes all MSC messages for reference.

Other Documentation

Besides this manual, have handy the owner's guide for the Origin 2000 system:

- *Origin2000 Deskside Owner's Guide*
- *Origin2000 Rackmount Owner's Guide*

If you do not have these guides handy, the information is also online in the following locations:

- IRIS InSight Library: from the Toolchest, choose Help > Online Books > SGI EndUser or SGI Admin, and select the applicable owner's or hardware guide.
- Technical Publications Library: if you have access to the Internet, enter the following URL in your Web browser location window: http://techpubs.sgi.com/library/

  Once you are in the library, choose Catalogs > Hardware Catalog > and look under the Owner's Guides for the applicable owner's guide.

Conventions

Messages and prompts that appear on-screen are shown in `fixed-width font`. Manual titles are in *italics*.

Product Support

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

Chapter 1

Redundant Power Supply Features and Operation

This chapter explains

Redundant Power Supply Operation

The redundant power supply consists of an enclosure containing four power supply modules. Figure 1-1 shows the redundant power supply in an Origin 2000 deskside system.

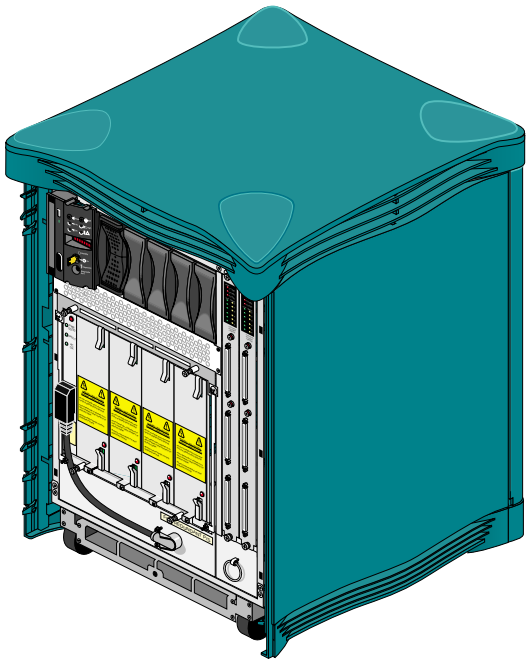

Figure 1-1 Redundant Power Supply in Origin 2000 Deskside, Facade Removed

Each power supply module fulfills 25% of the power needs of the Origin 2000 system. If one module fails, the remaining modules run at a higher rate, each supplying 33.3% of the system's power. This option enables a Silicon Graphics Origin 2000 deskside or rackmount system to continue operation after a power supply failure; a Silicon Graphics System Support Engineer can easily replace a failed module while the system remains in normal operation.

Note: The redundant power supply requires a 220-volt outlet.

If the redundant power supply senses overtemperature conditions on any output, or detects insufficient airflow, it shuts down; AC input power must be manually power-cycled.

Redundant Power Supply LEDs

The LEDs on the redundant power supply function the same way as those on the original power supply; see your system's owner's guide for a description. In addition, each module in the redundant power supply has a red fault LED.

Note the following:

- The LEDs provide information for service personnel; none are visible unless the system facade is removed.
- Removing the system facade is necessary only when a fan tray or power supply is being replaced; these are not customer-replaceable units.
- The facade must remain in place for normal operation.

The module system controller (MSC) provides complete information on system status and any power supply fault conditions, as explained in "MSC Failure Messages" on page 5.

Origin 2000 Changes for the Redundant Power Supply

The rackmount Origin 2000 facade and the deskside Origin 2000 facade and chassis have been slightly redesigned to accommodate the redundant power supply. The revised MSC accommodates signals from the redundant power supply that were not produced by the original power supply, resulting in new messages. Appendix A, "MSC Messages," explains these and, for reference, all other MSC messages. The MSC firmware revision level for the redundant power supply is 4.0 or greater.

The redundant power supply option uses a redesigned fan tray. The three front fans in the tray, which are directly below the power supply, are more powerful to handle the increased airflow requirements of the redundant power supply. These three fans run only at high speed.

The other six fans in the fan tray have two speeds, regulated by the system with respect to ambient temperature. If one fan of these six fans fails, the others compensate to enable continuous operation. If two of these six fail, or if one of the first three fans fails, the system shuts down. See "Getting the Failed Component Replaced" on page 6 for information on replacing the failed component.

Power Supply Failure Messages

If a redundant power supply module fails, the MSC displays a failure message. You can use *hinv -v* or *hwgraph* to determine if redundancy is operational. This section describes using *hinv -v* and *hwgraph* output to determine redundancy, as well as MSC messages relating to system failure.

hwgraph Output

You can use *hwgraph* to determine if a redundant power supply is present in the system. For example:

```
ls /hw/module/1/slot/n1/node/rps
```

If a message like the following appears, the *rps* directory is not present, and a redundant power supply is not present in the system.

```
Cannot access rps: No such file or directory
```

hinv Output

You can use *hinv -v* to determine if redundancy is operational. For each Origin 2000 module, example output is as follows:

```
Redundant Power Supply in Module 1 (Enabled)
```

If redundancy is lost, the output is as follows:

```
Redundant Power Supply in Module 1 (Lost Redundancy)
```

The *syslog* file displays a message when redundancy is lost; for example:

```
ALERT: (MAINT-NEEDED):module 1 MSC: Power Supply Redundancy is Lost
```

When redundancy is restored, *syslog* shows a message such as the following:

```
WARNING: module 1 MSC: Power Supply Redundancy is Restored
```

MSC Failure Messages

If a module fails, the MSC displays this message:

```
RPWR FL
```

Note: When the system boots, the PROM gets information from the system controller about redundant power supply status. However, if a module fails while the system is still in PROM mode, the system does not recognize the loss of redundancy.

In the unlikely event that more than one module in the redundant power supply fails, or if the redundant power supply enclosure fails, or for certain fan tray failures, the system shuts down. Table 1-1 lists the MSC error messages informing you of these conditions.

Table 1-1 MSC Failure Messages

Message	Condition
`RPWR FL`	Power supply has entered a nonredundant mode because a power supply module has failed.
`PFW FAIL`	Power supplied to the system has failed or dropped below acceptable parameters. The system has shut down.
`PS FAIL`	The internal power supply has failed and the system has shut down.
`OVR TEMP`	The system's temperature has exceeded acceptable limits and the system has shut down.
I2C FAIL	The system controller and the node board(s) cannot communicate. This message can appear during power-on of a multirack configuration. See "Power-Cycling a Multirack Configuration" on page 6.
`M FAN FL`	More than one system fan has failed and the system has shut down.
`FAN FAIL`	A system fan has failed. The system shuts down if - fan 1, 2, or 3 (front fans, under the power supply) fails - one of fans 4 through 9 fails and the system temperature is high

For a full listing of MSC messages, see Appendix A, "MSC Messages." Information here and in Appendix A supersedes MSC message information in the *Origin2000 Deskside Owner's Guide* and *Origin2000 Rackmount Owner's Guide*.

Getting the Failed Component Replaced

If an MSC failure message or a lost redundancy message described in "Power Supply Failure Messages" on page 4 appears, immediately call your service provider. The power supply cannot be turned on again until the faulty modules, redundant power supply enclosure, or fan tray is replaced. Table 1-2 gives part numbers for failed components.

Table 1-2 Redundant Power Supply Replacement Part Numbers

Failed Component	Order Number
Redundant power supply module	060-0055-00x
Redundant power supply enclosure, including four modules	013-2469-00x
Fan tray for redundant power supply	013-2329-00x

Warning: The Origin 2000 system uses electrical power internally that is hazardous if the equipment is improperly handled. Only Silicon Graphics System Support Engineers (SSEs) or other personnel trained by Silicon Graphics are qualified to replace a failed power supply, power supply module, or fan tray.

The SSE removes the faulty power supply or module, or failed fan tray, only if the replacement component is available. Leaving a component bay empty causes airflow problems and exposes potentially dangerous sources of electrical power.

Power-Cycling a Multirack Configuration

A module displaying the `I2C FAIL` message automatically shuts down; other modules in the multirack configuration continue to boot. Depending on circumstances, you might want to bring down the other modules in the configuration. To do so, follow these steps:

1. If the configuration has booted to the IRIX level, verify that filesystems are backed up and make sure all users are off the systems in the configuration.
2. On each module in the configuration, become superuser and shut down the system software by entering **`shutdown -y g0`**.
3. Power off the configuration with the MMSC command Power Down. See Chapter 7 of the *Origin2000 Rackmount Owner's Guide* for more information if necessary. (Alternatively, you can power off each module individually by putting the key switch on the front of each module into the standby position.)

4. Power off the module that displayed the `I2C FAIL` message by pushing down the main power switch on the rear of the module; see Figure 1-2.

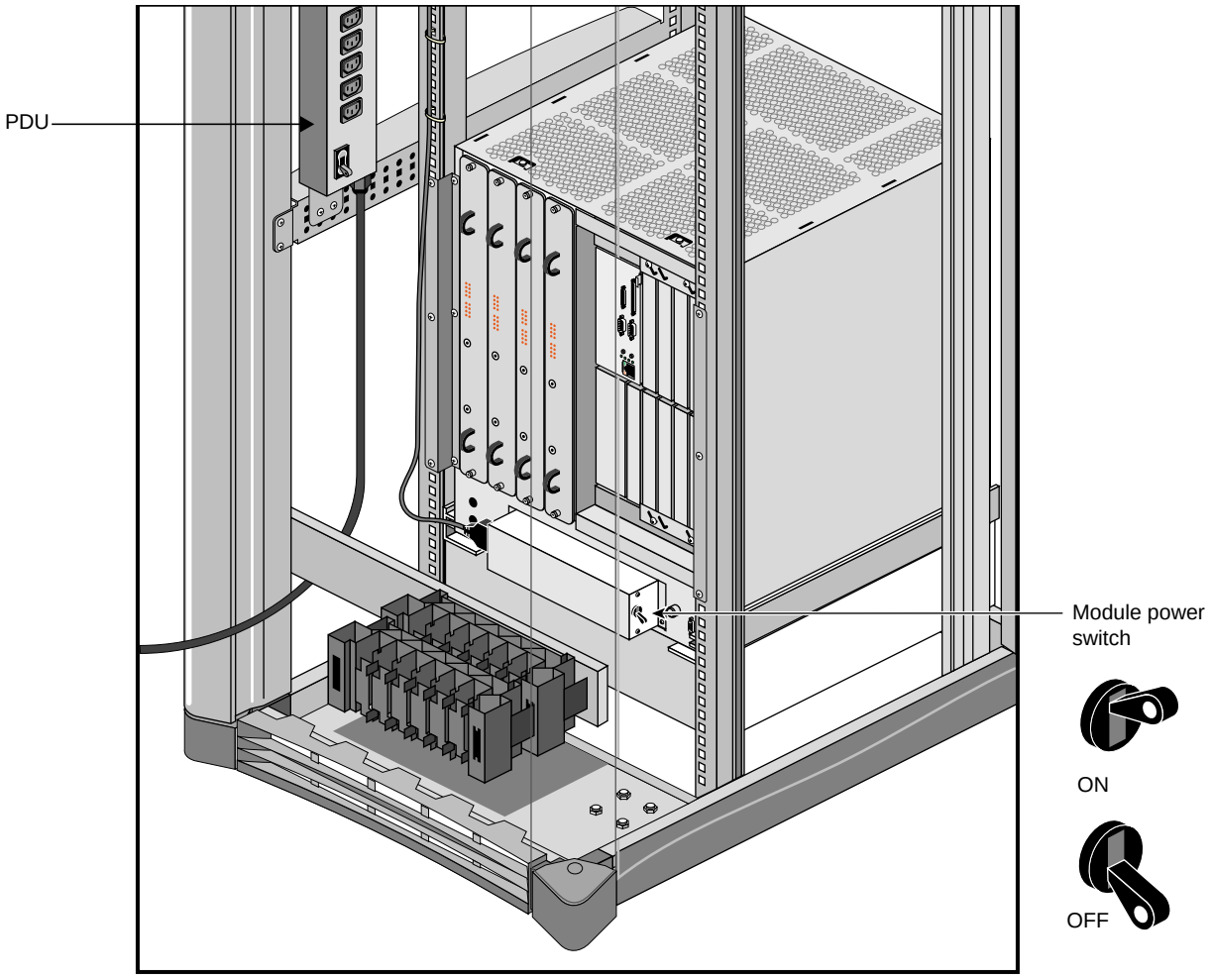

Figure 1-2 Module Main Power Switch

Note: The module that displayed the `I2C FAIL` message is the only one you need to power off with the power switch. Leave the switch on the Origin Rack's power distribution unit (PDU) and the key switch on the front of the disabled module in the ON position.

5. Wait 30 seconds. Check that all LEDs have gone dark.
6. Push up the module power switch on the module that displayed the `I2C FAIL` message.
7. Power on the configuration with the MMSC Power Up command.

Technical Specifications

Table 1-3 lists technical data for the redundant power supply.

Table 1-3 Redundant Power Supply Specifications

Parameter	Specification
Voltage	187-264 Volts, 1-phase
Maximum watts (from the wall)	2,300 watts
Minimum power factor	0.98
Maximum inrush current	140 amps
Frequency	47-63 Hertz
Maximum heat output	7.850 Btu/hr (1.63 ton AC load)
Weight	16 kg (35 lb) complete (enclosure with four modules) 2.8 kg (6.25 lb) per module
Ambient temperature	Minimum 0˚ C (32˚ F) Maximum 50˚ C (122˚ F)

Appendix A

MSC Messages

The MSC front panel has an eight-character LED readout that supplies information about system status. Table A-1 lists and explains all MSC messages. The last two messages are specific to the redundant power supply.

This information supersedes MSC message information in the *Origin2000 Deskside Owner's Guide* and *Origin2000 Rackmount Owner's Guide.*

Table A-1 System Controller Messages

Message	Condition
`SYS OK`	The system is operating normally.
`POWER UP`	The system is being powered on from the front panel switch.
`R PWR UP`	The system is being powered on remotely via the MSC serial connection.
`R PWR DN`	The system has been powered off from a remote location.
`PWR CYCL`	The system has received the command to power cycle from the console or a remote user.
`HBT TO`	The system has registered a heartbeat timeout. A nonmaskable interrupt is generated, followed by a system reset.
`PFW FAIL`	Power supplied to the system has failed or dropped below acceptable parameters. The system has shut down. Call your service provider.
`PS FAIL`	The power supply has failed and the system has shut down. Call your service provider.
`POK FAIL`	A power OK failure occurred on an unidentified board.
`I2C FAIL`	The system controller and the node board(s) cannot communicate. This message can appear during power-on of a multirack configuration. See "Power-Cycling a Multirack Configuration" on page 6.
`OVR TEMP`	The system's temperature has exceeded acceptable limits and the system has shut down. Call your service provider.

Table A-1 (continued) System Controller Messages

Message	Condition
KEY OFF	The MSC's switch has been turned to standby.
RESET	The MSC's switch has been turned to the diagnostic position, and the reset button has been pushed.
NMI	The MSC's switch has been turned to the diagnostic position, and the nonmaskable interrupt button pushed.
M FAN FL	More than one fan (fans 4 through 9) has failed and the system has shut down. Call your service provider.
FAN FAIL	A system fan has failed; call your service provider. The system shuts down if - fan 1, 2, or 3 (front fans, under the power supply) fails - one of fans 4 through 9 fails and the system temperature is high
RPWR FL	The redundant power supply has entered nonredundant mode because a power supply module has failed. Call your service provider.
RPWR OK	Redundant power has been restored from nonredundant mode.

Tell Us About This Manual

As a user of Silicon Graphics products, you can help us to better understand your needs and to improve the quality of our documentation.

Any information that you provide will be useful. Here is a list of suggested topics:

- General impression of the document
- Omission of material that you expected to find
- Technical errors
- Relevance of the material to the job you had to do
- Quality of the printing and binding

Please send the title and part number of the document with your comments. The part number for this document is 007-3654-001.

Thank you!

Three Ways to Reach Us

- To send your comments by **electronic mail**, use either of these addresses:
  - On the Internet: techpubs@sgi.com
  - For UUCP mail (through any backbone site): *[your_site]*!sgi!techpubs
- To **fax** your comments (or annotated copies of manual pages), use this fax number: 650-932-0801
- To send your comments by **traditional mail**, use this address:

  Technical Publications
  Silicon Graphics, Inc.
  2011 North Shoreline Boulevard, M/S 535
  Mountain View, California 94043-1389