

March 1999  
ECG011/0499

Prepared by ECG Technology  
Communications Group

Compaq Computer Corporation

**Contents**

<b>Compaq Multi-Server UPS Card.....</b>	<b>3</b>
<b>Software to Support the Compaq Multi-Server UPS Card.....</b>	<b>6</b>
<b>Compaq Scalable UPS Card.....</b>	<b>8</b>
<b>Software to Support the Compaq Scalable UPS Card.....</b>	<b>10</b>
<b>Combining Compaq UPS Option Cards .....</b>	<b>10</b>
<b>Compaq R6000 ERM Battery System.....</b>	<b>13</b>
<b>Compaq High to Low Voltage Transformer (250VA)Kit .....</b>	<b>15</b>
<b>Questions and Answers.....</b>	<b>16</b>

## UPS Options Available and Supported with the Compaq R6000



The Compaq R6000 Uninterruptible Power System is one of the most powerful and versatile disaster protection systems available today. The R6000 UPS can be easily upgraded to suit changing system requirements by adding an Extended Run Module (ERM) or one of two Compaq UPS Hardware Option Cards: the Multi-Server UPS Card or the Scalable UPS Card.

The Compaq R6000 offers extended back-up protection of up to three hours when Extended Run Modules are added. The Compaq R6000 can also be integrated with Compaq UPS Hardware Option Cards to further extend and customize current load management and configuration capabilities, while still minimizing the cost of additional power protection.

Compaq UPS Hardware Option Cards work in conjunction with Compaq Power Management Software to facilitate an economical and sensible method to custom-tailor your Compaq R6000 peripheral capabilities.

Help us improve our technical communication. Let us know what you think about the technical information in this document. Your feedback is valuable and will help us structure future communications. Please send your comments to: [glenn.clowney@compaq.com](mailto:glenn.clowney@compaq.com)

## Notice

The information in this publication is subject to change without notice and is provided "AS IS" WITHOUT WARRANTY OF ANY KIND. THE ENTIRE RISK ARISING OUT OF THE USE OF THIS INFORMATION REMAINS WITH RECIPIENT. IN NO EVENT SHALL Compaq BE LIABLE FOR ANY DIRECT, CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER DAMAGES WHATSOEVER (INCLUDING WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION OR LOSS OF BUSINESS INFORMATION), EVEN IF Compaq HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

The limited warranties for Compaq products are exclusively set forth in the documentation accompanying such products. Nothing herein should be construed as constituting a further or additional warranty.

This publication does not constitute an endorsement of the product or products that were tested. The configuration or configurations tested or described may or may not be the only available solution. This test is not a determination of product quality or correctness, nor does it ensure compliance with any federal state or local requirements.

Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.

Compaq, Contura, Deskpro, Fastart, Compaq Insight Manager, LTE, PageMarq, Systempro, Systempro/LT, ProLiant, TwinTray, ROMPaq, LicensePaq, QVision, SLT, ProLinea, SmartStart, NetFlex, DirectPlus, QuickFind, RemotePaq, BackPaq, TechPaq, SpeedPaq, QuickBack, PaqFax, Presario, SilentCool, CompaqCare (design), Aero, SmartStation, MiniStation, and PaqRap, registered United States Patent and Trademark Office.

Netelligent, Armada, Cruiser, Concerto, QuickChoice, ProSignia, Systempro/XL, Net1, LTE Elite, Vocalyst, PageMate, SoftPaq, FirstPaq, SolutionPaq, EasyPoint, EZ Help, MaxLight, MultiLock, QuickBlank, QuickLock, UltraView, Innovate logo, Wonder Tools logo in black/white and color, and Compaq PC Card Solution logo are trademarks and/or service marks of Compaq Computer Corporation.

Microsoft, Windows, Windows NT, Windows NT Server and Workstation, Microsoft SQL Server for Windows NT are trademarks and/or registered trademarks of Microsoft Corporation.

NetWare and Novell are registered trademarks and intraNetWare, NDS, and Novell Directory Services are trademarks of Novell, Inc.

Pentium is a registered trademark of Intel Corporation.

Copyright ©1999 Compaq Computer Corporation. All rights reserved. Printed in the U.S.A.

UPS Options Available and Supported with the Compaq R6000  
White Paper prepared by ECG Technology Communications Group

First Edition (March 1999)  
Document Number ECG011/0499

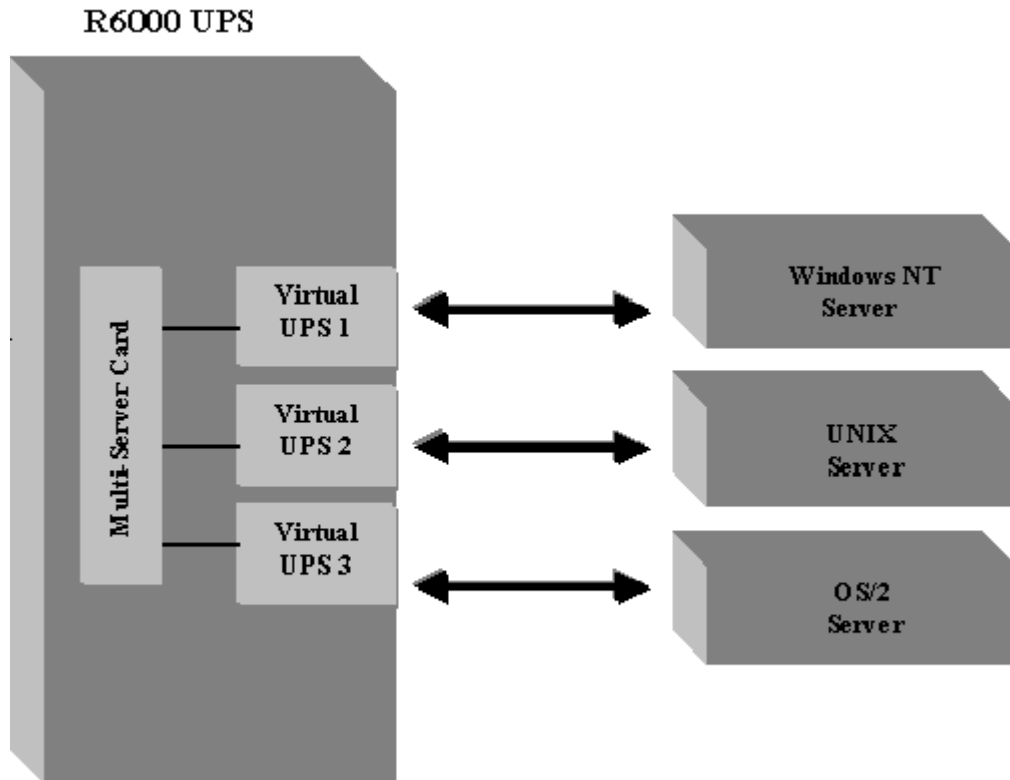
## Compaq Multi-Server UPS Card



**Figure 1. The Multi-Server UPS Card**

The Compaq R6000 Uninterruptible Power System combined with the Compaq Multi-Server UPS Card manage independent workloads and optimize power management performance. The Multi-Server UPS Card allows a single uninterruptible power system, the R6000 UPS, to serially connect with up to three computers or servers. Each port on the Multi-Server Card creates a virtual UPS that can each be configured to control more than one load segment, resulting in one virtual UPS with multiple load segments per port. Each connected computer controls a virtual UPS.

The Compaq R6000 UPS will appear as up to three virtual Uninterruptible Power Systems, instead of one, reducing the need to purchase an additional UPS for individual network management purposes. With the available ability to split work loads on the R6000, each virtual UPS, created through the Multi-Server UPS Option Card, can easily be treated separately and each can communicate with network servers independently. Each virtual UPS that connects to the Compaq R6000 can be run off of separate networks supported by different operating systems. For example, virtual UPS 1 can communicate with a Windows NT server on one network while virtual UPS 2 communicates with UNIX on a second network, while virtual UPS 3 communicates with OS/2 on a third network. Even if networks go down, this option allows direct communication from the R6000 to each server to conduct a graceful shutdown of each operating system. Refer to the following diagram for an example of multi-network communication.

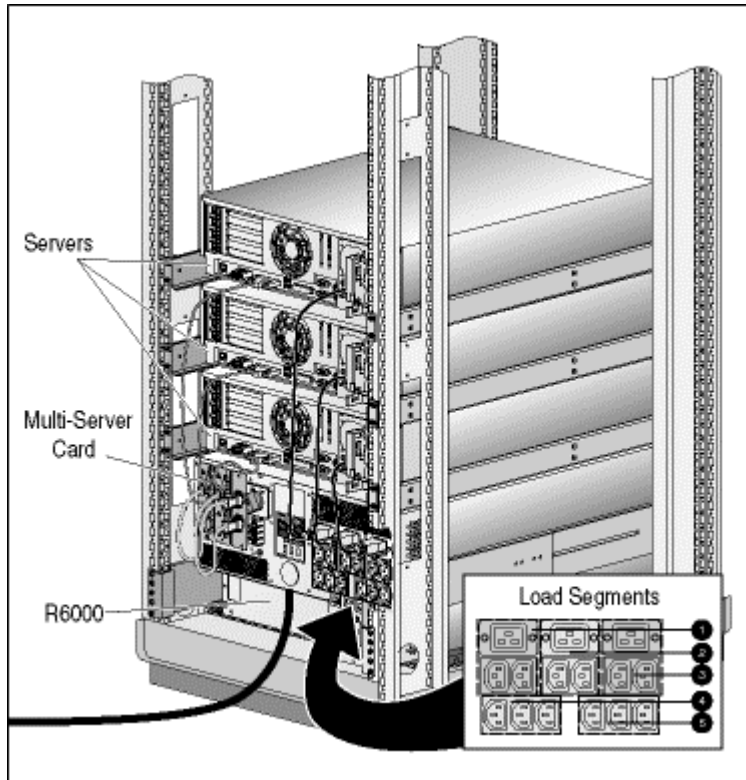


**Figure 2.** Diagram depicting the Compaq R6000 UPS communicating with three separate networks via the Multi-Server UPS Card.

---

**Note:** Each Virtual UPS stems from load segmentation attached to the Multi-Server Card to allow communication to each operating system from only one UPS, the Compaq R6000.

---



**Figure 3.** Three network devices connected serially to one Compaq R6000 UPS via the Multi-Server UPS Card

The Compaq UPS R6000 receptacles labeled Load Segment 1 act as the receptacles for one virtual UPS communicating through port 1 on the Multi-Server UPS Card. Similarly, port 2 is mapped to Load Segment 2, and port 3 is mapped to Load Segment 3.

---

**Note:** The Compaq R6000 can support up to five load segments. Refer to the "Combining Compaq UPS Options Cards" section for further information.

---

## Software to Support the Compaq Multi-Server UPS Card

The Compaq UPS Load Segment Configurator is a software utility that sets the mapping of up to five load segments while using a Multi-Server UPS Card with the UPS R6000. Compaq UPS Load Segment Configurator runs on any Windows 95, Windows 98, or Windows NT computer and is located on the *UPS Management and CPM FailSafe CD for Standalone Units* that accompanied the R6000. For more detailed configuration instruction, refer to the configuration instruction documentation.

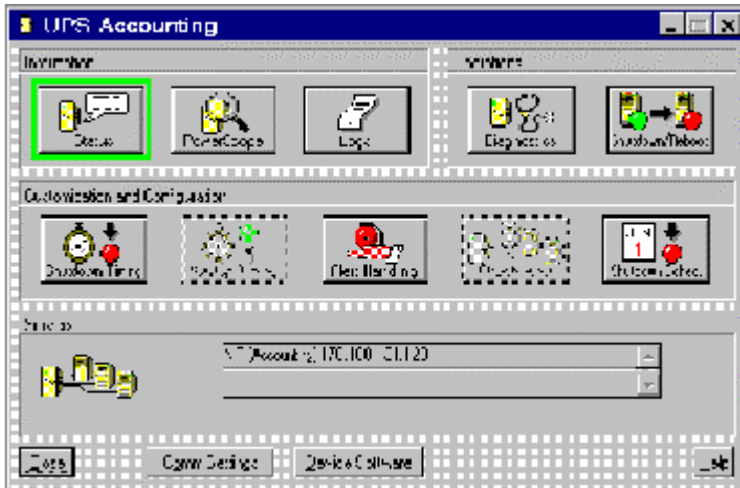
---

**Note:** Configure the load segments for the R6000 prior to installing Compaq Power Management Software for any of the servers attached to the Multi-Server UPS Card that require changes in their default mapping.

---

After Compaq UPS Load Segment Configurator has been successfully installed and configured, proceed with the installation of Compaq Power Management Software (CPM). CPM software is an intelligent management utility that works integrally with Compaq Insight Manager allowing complete configuration of alert responses to advance the operating and control capacity of any Compaq R6000 in a network environment. CPM Software, in conjunction with the Multi-Server UPS Card, permits individual shutdown configuration, resulting in customized prioritization of workloads. Extended Run and separate shutdown or reboot times of loads you select is also available to independently manage workloads.

Compaq Power Management Software will automatically recognize the Multi-Server UPS Card once installation is complete. Compaq Power Management software can be installed from the *Compaq Power Management CD* or the *Compaq Management CD* included with SmartStart. For complete instructions on the operation of the software, reference the *Compaq Power Management Software User Guide*. The guide is downloadable from the [www.Compaq.com](http://www.Compaq.com) web site. Refer to Figure 4 to view the Compaq Power Management window.



**Figure 4. Compaq Power Management window with the Startup Timing and Attachments buttons grayed out, indicating a Multi-Server configuration**

The Startup Timing and Attachments buttons were disabled if the Virtual UPS had only one load segment. In Compaq Power Management 1.5, only the Attachments button is disabled if there is only one load segment. Both buttons are enabled if there are two or more load segments in the Virtual UPS.

## Compaq Scalable UPS Card



**Figure 5. The Compaq Scalable UPS Card**

Because evolving system needs may require higher power availability to accommodate an increased workload, users can equip their Compaq R6000 UPS with the Compaq Scalable UPS Card. The Scalable UPS Card boosts the power capacity of the R6000 by combining independent workloads to optimize power management performance. The Compaq Scalable UPS Card gives you three serial ports in place of your existing UPS serial port. One port is for communication with your existing CPU, and the other two ports are to provide communication with other Uninterruptible Power Systems.

With the use of a Scalable UPS Card, one server can control up to three Compaq Uninterruptible Power Systems with independent load segment combinations totaling up to an 18,000VA/18,000W configuration. This allows the user to add UPS power ratings, watts, or kVA quantities, incrementally as power requirements grow with added storage and server capacity or other loads. Additional Uninterruptible Power Systems added via the Compaq Scalable UPS Card appear as one virtual UPS by Compaq Power Management Software.

The maximum number of load segments that can be supported with the Compaq Scalable UPS Card is limited to the number of load segments your system can control. See Figure 6 for Scaled UPS configuration.



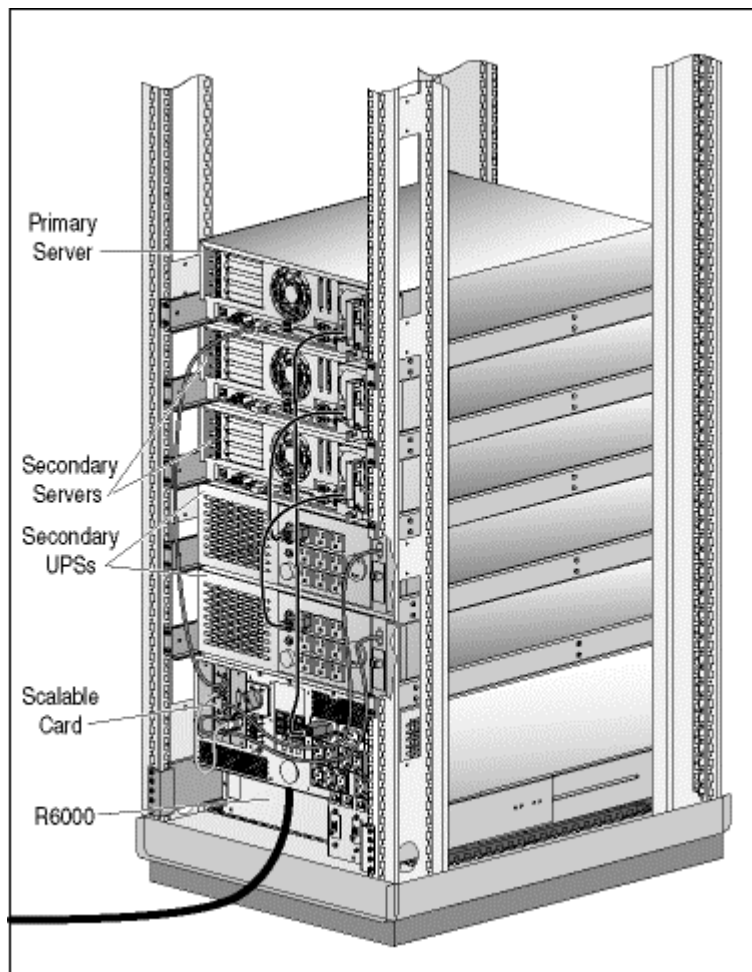


Figure 6. Sample Scalable UPS Card configuration in the Compaq R6000

## Software to Support the Compaq Scalable UPS Card

Compaq Power Management Software is an intelligent management utility that is tightly integrated with Compaq Insight Manager, allowing complete configurable alert responses to advance the operating capacity of your Compaq UPS R6000. Compaq Management Software, along with the Scalable UPS Card, allows the configuration of combined workloads to deliver the maximum capacity of your Uninterruptible Power Systems. Additional Uninterruptible Power Systems added to the Compaq R6000 via the Scalable UPS Card appear as one virtual UPS by Compaq Power Management Software.

Compaq Power Management Software will automatically recognize the Scalable UPS Card once installation into the R6000 is complete. Compaq Power Management software can be installed from the *Compaq Power Management CD* or the *Compaq Management CD* included with SmartStart. For complete instructions on the operation of the software, reference the *Compaq Power Management Software User Guide*. The guide is downloadable from the [www.Compaq.com](http://www.Compaq.com) web site.

---

**Note:** Although the Compaq R6000 UPS incorporates two option card slots, only one Compaq Scalable Option Card is supported. Please refer to Table 1 for multiple option card supported configurations.

---

## Combining Compaq UPS Option Cards

With the release of the Compaq UPS R6000, two UPS Hardware Option Cards can now be used simultaneously for even greater power management control and flexibility. Please refer to the following table to determine which simultaneous combinations are supported. In Multi-Server UPS Option Card combinations, the UPS Load Segment Configurator Utility will be needed.

**Table 1. Compaq Option Cards Matrix**

Case	Slot	Multi-Server	Scalable	Direct Connect Result (no PDU)
1	1	X		3 servers managing a total of 5 load segments
	2			
2	1	X		5 servers managing a total of 5 load segments
	2	X		
3	1		X	1 server managing a total of 8 load segments
	2			

---

**Note:** Board combinations can be used in the primary UPS only. When UPS units are chained, no additional boards can be used in the other units.

---

Refer to **Figure 7** to view the R6000 UPS working in conjunction with two Multi-Server UPS Option Cards.

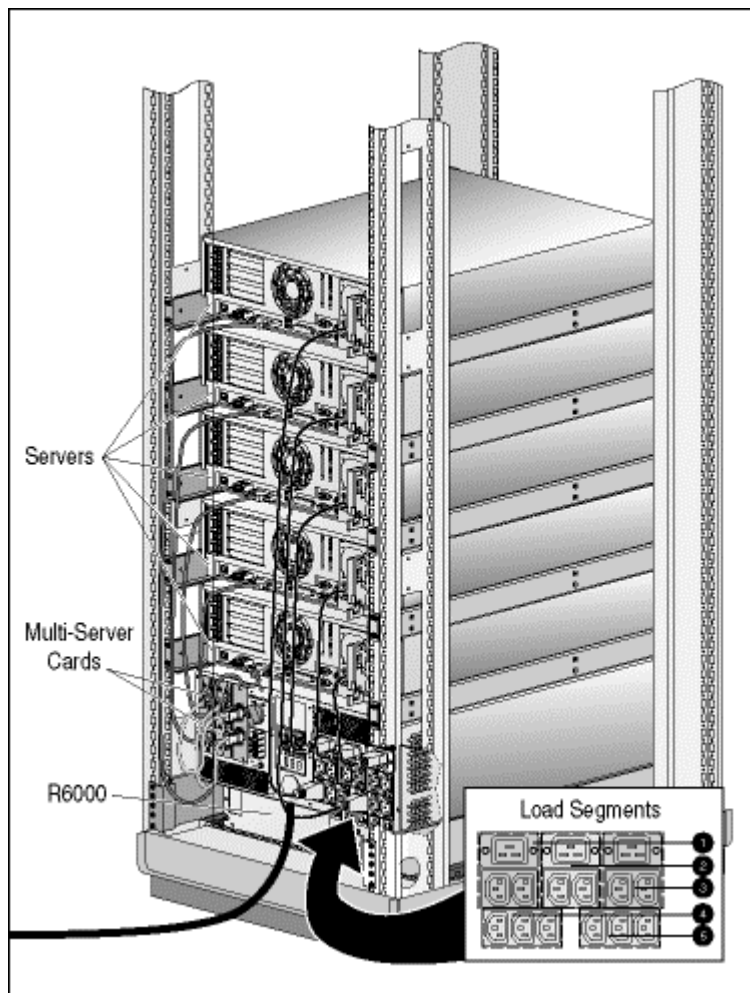


Figure 7. The Compaq R6000 connected to five servers via two Multi-Server UPS Option Cards

## Compaq R6000 ERM Battery System



**Figure 8. Compaq Extended Run Module Battery System**

The Compaq R6000 UPS has optional Compaq Extended Run Modules (ERMs) that are rack mounted battery modules that extend the overall back-up time for full load (6000 watts of power) to 28 minutes. Each optional Compaq Extended Run Module fits into 3 “U” of rack space and includes a single battery connector for easy interconnection to the R6000 UPS. The ERM consists of two pullout “hot-swap” battery trays that are compatible with the standard integrated battery trays and each incorporates a circuit breaker to isolate the ERM battery module during installation, maintenance and removal.

The Compaq R6000 offers a wide-range of battery back-up times over a variety of loads. Starting with the standard integral batteries and moving to either one or two add-on Extended Run Modules, the Compaq R6000 can provide battery back-up protection for critical loads ranging from minutes to hours. Table 2 shows a matrix of load and battery back-up times that can be achieved with the Compaq R6000 and optional ERMs.

**Table 2. Compaq R6000 UPS Battery Back-up Time**

Load in Watts	Standard Batteries	One Additional ERM	Two Additional ERMS
1000	1 hour 2 minutes	2 hours 24 minutes	3 hours
2000	28 minutes	1 hour 6 minutes	1 hour 47 minutes
3000	18 minutes	40 minutes	1 hour 6 minutes
4000	12 minutes	28 minutes	47 minutes
5000	8 minutes	21 minutes	36 minutes
6000	6 minutes	18 minutes	28 minutes

The batteries used in the Compaq R6000 are maintenance-free, sealed, lead-acid cells with an immobilized electrolyte. Each slide out battery tray in the standard unit and the Extended Run Modules consists of fourteen individual 12 volt batteries rated at five amps each. These individual batteries are connected in series within each tray to provide two 168 VDC strings that are connected in series and add up to a DC bus voltage of 336 VDC. This high voltage DC bus

enables an efficient conversion of DC to AC voltage within the power inverter stage without the need of DC boost circuitry. The DC bus is well protected with an internal circuit breaker for DC bus isolation, a special one-way connector and additional reverse polarity protection built into the Compaq R6000 ensuring safety to both personnel and equipment.

For information on changing the configuration of the Compaq UPS R6000 to recognize the Extended Run Module, refer to Chapter 4, "Configuration" of The 6000 Series UPS Operation and Reference Guide.

## Compaq High to Low Voltage Transformer (250VA)Kit



**Figure 9. Compaq High to Low Voltage Transformer**

The Compaq High to Low Voltage Transformer (250VA) is a low voltage 100–127 VAC Power Distribution Unit (PDU). The PDU will distribute energy to the external devices in amounts customized to each device's needs, allowing peripherals with extensive power requirements to operate simultaneously with other peripherals possessing minimal voltage needs distributed from one UPS, the R6000.

The Power Distribution Unit is equipped with a Circuit Breaker function to protect any devices connected to the Compaq R6000 from damage in the event of an incoming electrical surge or external equipment malfunction.

The Power Distribution Unit provides two receptacles for rack-mounted devices and attaches between the frame members of a rack to preserve interior and front panel rack space.

---

**Note:** Refer to the installation documentation that accompanied the High to Low Voltage Transformer for installation and Circuit Breaker information.

---

## Questions and Answers

*Question:*

Currently I have a Compaq R6000 protecting one of the servers (running Windows NT) on my network.. How can I protect the other two servers on my network, one of which is running Novell, the other Unix?

*Answer:*

Install a Compaq Multi-Server Card in your existing R6000 UPS. Use the card to establish direct communications with each server; connect the power cord from each server to a different UPS load segment.

*Question:*

How can I shut down an individual server in my network for maintenance purposes? All my servers are protected by the same Compaq R6000 UPS, but I only have direct communications with one server.

*Answer:*

Install a Compaq Multi-Server Card in your existing R6000 UPS. Use the card to establish direct communications with each server; connect the power cord from each server to a different UPS load segment, then, through Compaq Power Management software, configure the individual load segment for scheduled shutdown.

*Question:*

Currently I have an R6000 UPS protecting one of the servers on my network. I need to maximize my server capacity to achieve a more powerful system. What can I do without replacing my existing UPS?

*Answer:*

Install a Compaq Scalable UPS Card in your R6000 UPS. Use the card to establish direct communications with the server and then through Compaq Power Management software, configure the UPS to maximize system capacity.

*Question:*

What is the maximum capacity that my existing system can be expanded with the installation of a Compaq Scalable UPS Card?

*Answer:*

Up to three UPSs can be supported by one Scalable UPS Card to operate as one powerful virtual unit.

*Question:*

Is it possible to install two Compaq Scalable UPS Cards to support my R6000 UPS?

*Answer:*

No. One Scalable UPS Card alone supports up to three Uninterruptible Power Systems; therefore eliminating the need to install two.



*Question:*

Is it possible to install two Multi-Server UPS Cards to support my R6000 UPS?

*Answer:*

Yes. Two Multi-Server UPS Cards can be simultaneously supported by installing one card in Slot 1 and another in Slot 2.

*Question:*

I'd like to install a Compaq Scalable UPS in one of the Uninterruptible Power Systems in my network configuration and a Compaq Multi-Server Card in another UPS. Is this possible?

*Answer:*

No. Compaq Power Management Software will recognize either a Compaq Scalable UPS Card or a Compaq Multi-Server Card, but not both.

*Question:*

What is the next step after installing the Multi-Server Card?

*Answer:*

Run the Compaq Load Segment Configurator Utility, and upon its installation, install Compaq Power Management Software.

*Question:*

How can I protect my mission critical Compaq servers?

*Answer:*

If you have one or more mission critical servers in your network, your best solution would be a virtual UPS created by the addition of a Scalable UPS Card installed in the primary UPS. Make sure there is adequate battery back-up for your mission critical server(s).

*Question:*

What is the process for installing an Option Card?

*Answer:*

Reference the installation documentation that is provided with the Option Card.

*Question:*

Why are two of the buttons grayed out in the Compaq Power Management screen after installing a Multi-Server UPS Card?

*Answer:*

Each load segment is pre-assigned to a specific port; load segments cannot be subdivided into smaller load segments.

*Question:*

How are ports assigned in relationship to the load segments when using a Multi-Server UPS Card?

*Answer:*

Port 1 is assigned to Load Segment 1 and so on, depending on how many load segments are supported on the R6000 UPS.

*Question:*

Does it matter which port to use with a scalable configuration?

*Answer:*

Yes. One port is for communication with your existing CPU, and the other two ports are to provide communication with the other UPSs.

*Question:*

What are the issues with three servers attached to the Multi-Server board, but only two load segments available on the R6000 UPS?

*Answer:*

The server attached to Port 3 will have no control over the segment that it is attached to. You should ensure that the configurations for the segment that it is powered by are adequate for shutdown of the application running on that server.

*Question:*

When using the Scalable UPS Card, am I able to add UPS kVA power rating quantities as my individual needs increase?

*Answer:*

Yes. UPS kVA power ratings can be added incrementally due to the fact that one server can control up to three Compaq Uninterruptible Power Systems totaling 18,000VA/18,000W.

*Question:*

How can low voltage peripherals run concurrently with high power devices on the R6000?

*Answer:*

Add the Compaq High to Low Voltage Transformer to simultaneously support peripherals that use low voltage.

*Question:*

In the event of power emergency, how does the Compaq High to Low Voltage Transformer prevent damage from incoming electrical surges to my externally attached equipment?

*Answer:*

The Compaq High to Low Voltage Transformer comes equipped with a Circuit Breaker feature that prevents damage to attached external equipment in the case of incoming electrical surges.

*Question:*

What is a Power Distribution Unit?

*Answer:*

A Power Distribution Unit, or PDU, is a device that distributes energy to external devices in increments to suit individual power requirements.

*Question:*

How do I install a Power Distribution Unit?

*Answer:*

Refer to the installation documentation that accompanied the PDU.

*Question:*

How can I extend the backup time for the Compaq R6000?

*Answer:*

Install a Compaq Extended Run Module (ERM) to the R6000.

*Question:*

I would like to install several Compaq Extended Run Modules. How many can be simultaneously supported?

*Answer:*

Up to two Compaq Extended Run Modules may be used to prolong the runtime of each R6000 UPS.

*Question:*

How long can the Extended Run Module provide back-up support for my Compaq R6000 UPS?

*Answer:*

An Extended Run Module can extend battery back-up time on the R6000 up to three hours. For more detailed information, please refer to the "Compaq R6000 Battery Back-up Time" matrix on page 13.

*Question:*

Do the batteries for the Compaq R6000 require service?

*Answer:*

No. The batteries used in the Compaq R6000 are composed of sealed, lead-acid cells with an immobilized electrolyte that require no maintenance.

*Question:*

Is it safe to have an additional battery back-up supply, such as an Extended Run Module when using a Compaq R6000 UPS?

*Answer:*

Yes. The DC bus is well protected with an internal circuit breaker, a one-way connector, and reverse polarity protection to ensure safe operation.