

The image features a solid red background. On the right side, the word 'COMPAQ' is written in a large, white, italicized, sans-serif font. On the left side, there is a white vertical sidebar. At the top of this sidebar is a black rectangular header. Inside this header, the text 'Tripp Lite' is on the left and 'Best' is on the right, both in white. Below the header, the text 'artPro NET' is on the left and 'Fortress' is on the right, both in black. Below this header section, there are four horizontal white lines spanning the width of the sidebar.



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# Compaq Power Management Products

Compaq has developed a full range of power management products that protect and manage computer systems ranging from individual workstations to distributed enterprises.

## Rack-mountable Uninterruptible Power Supplies

Compaq Rack-mountable UPSs provide maximum uptime in the event of a power problem for a variety of rack-based computer systems, providing powerful performance while occupying minimal rack space. The R3000 UPS is 3U (5.25 inches). The R1500 UPS is 2U (3.5 inches).



UPS Model	Part Number
<b>R1500 Series</b>	
R1500	242704-001
R1500j	242704-291
R1500h	242704-002
<b>R3000 Series</b>	
R3000	242705-001
R3000j	242705-291
R3000h	242705-002
R3000h-NA	242705-003

## Tower Uninterruptible Power Supplies

Compaq Tower UPSs provide advanced power protection for the entire network including workstations, hubs, routers, and servers that require maximum uptime and fault tolerance in the event of a power problem.



UPS Model	Part Number
<b>T700 Series</b>	
T700	295372-B21
T700h	295372-B22
T700j	295372-291
<b>T1000 Series</b>	
T1000	242688-001
T1000h	242688-002
<b>T1500 Series</b>	
T1500	242688-003
T1500h	242688-004
T1500j	242688-293
<b>T2000 Series</b>	
T2000	242688-005
T2000j	242688-295
<b>T2400 Series</b>	
T2400h	242688-006
T2400h-NA	242688-007

j = Japanese model  
h = High voltage model  
h-NA = North American high voltage model.

# **Compaq Power Management Products** (continued)



## **Power Distribution Unit**

The Compaq Power Distribution Unit provides managed power distribution for rack cabinets without consuming valuable rack space. The unique sidewall mount design provides 12 AC receptacles that help distribute elevated power requirements within rack cabinets, as well as maximized cord management.

Model	Part Number
PDU	295363-001
PDUh	295363-B31
PDUh-NA	295363-002
PDUj	295363-291



## **Multi-Server Card**

The Multi-Server Card is a Compaq UPS option that facilitates direct communication with up to three critical servers (each of which can run a different operating system) via individual serial communication ports, eliminating the need to purchase additional UPSs to support each server.

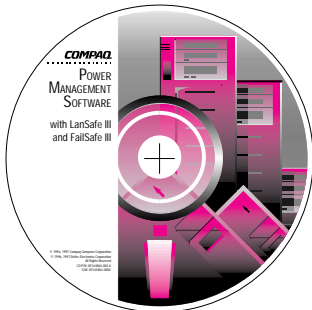
Model	Part Number
Worldwide	242755-001



## **Scalable Card**

The Scalable Card, another Compaq UPS option, enables multiple Compaq UPSs to work together as one virtual UPS, providing UPS scalability, field upgradeability, and expandable run time.

Model	Part Number
Worldwide	242756-001



## **Compaq Power Management Software**

Compaq Power Management Software is a tightly integrated, alert response application within Compaq Insight Manager which enables system administrators to monitor and control Compaq UPSs locally or remotely. This versatile application provides system administrators with an overview of network power conditions, as well as enables them to configure shutdown timing, customize alert messages, and perform UPS diagnostic checks.

Model	Part Number
Software provided with all Compaq UPS models.	

j = Japanese model  
h = High voltage model  
h-NA = North American high voltage model.

# Why Buy Compaq Power Management Products?

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Compaq's full range of power management products provide you with the power to protect, the power to manage, the power to communicate with your network, and the power to guarantee maximum data integrity.

## **Ultimate, Long-Term Battery Reliability with Compaq Enhanced Battery Management**

Batteries that are constantly trickle-charged reach the end of their useful life in less than half the time of those charged using advanced techniques such as Compaq's Enhanced Battery Management technology. Compaq understands that the battery reliability of your UPS is essential to ensuring network server protection. Compaq's Enhanced Battery Management, standard with all Compaq UPSs, is an advanced battery technology that uses a patented, three-stage charging technique that doubles battery service life, optimizes battery recharge time, and provides up to a 60-day advanced notification of pending battery failure.

## **Intelligent Manageability with Compaq Power Management Software**

Compaq Power Management Software allows for diagnostics, monitoring, user notification, and — when necessary during an extended blackout — unattended, prioritized shutdown of multiple servers and client workstations. For ultimate intelligent manageability, the Compaq UPS has been designed to schedule startups and shutdowns of connected equipment and control separate receptacle groups (load segments).

## **More Flexibility with Compaq UPS Option Cards**

All Compaq UPS option cards seamlessly integrate into the back of your Compaq UPS. The Compaq Multi-Server Card facilitates direct communication with up to three servers, thereby eliminating the need for multiple UPSs. The Compaq Scalable Card enables multiple UPSs to work together and be monitored as one logical UPS providing enhanced protection, scalability (runtime), and future expandability.

## **Preserve Valuable Rack Space with the Compaq Power Distribution Unit**

Designed to fit into a Compaq rack cabinet environment, the Compaq Power Distribution Unit provides managed power distribution and surge protection via 12 circuit-breaker and fuse-protected AC receptacles. The unique sidewall-mount design of the Compaq Power Distribution Unit preserves valuable rack space for more critical servers and systems.

## **Compaq Quality**

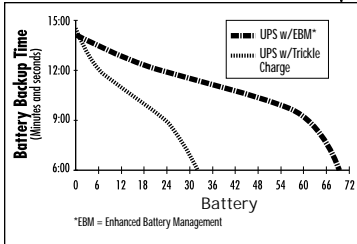
Having built its reputation on providing the highest quality products, Compaq's hardware qualification process is the toughest in the industry. Extensive evaluation, testing, and product improvement guarantee the highest level of system protection, electrical performance, product construction, and compatibility.

## **Superior UPS Warranty**

To back up the wide range of features offered with our UPSs, Compaq provides a three-year, on-site limited warranty, as well as an additional \$25,000 Computer Load Protection Guarantee (provided by Compaq's original equipment manufacturer), while competitive systems typically offer only a two-year warranty.

# Enhanced Battery Management Ensures Ultimate, Long-Term Battery Reliability

The heart of any UPS is the battery. The maintenance-free, sealed, lead-acid cells used in virtually all manufacturers' UPSs have a two- to four-year life expectancy. When the batteries die, the UPS is no longer uninterruptible, leaving its user unprotected in the event of a power failure. Compaq's Enhanced Battery Management is a proprietary technology that doubles battery service life, provides up to a 60-day advance warning of pending battery failure, and offers the fastest safe recharge time — increasing the return on your UPS investment. This innovative technology is comprised of three components:



## Double Battery Service Life with Intelligent Battery Charging

All UPS batteries need charging. Extended charging, however, significantly shortens battery life. The Compaq UPS utilizes a patented three-stage charging process that ultimately doubles battery service life. First, the Compaq UPS rapidly charges the battery to 90%. A constant voltage (float charge) continues until the battery reaches full capacity. The charger is then turned off and the Compaq UPS goes into a rest mode, enabling the battery to be preserved for future power failures. Most manufacturers use a trickle-charging method (a constant voltage feeding a low current to the battery) which dries the electrolyte and corrodes the plates, reducing potential battery life by up to 50%.

## Advance Notification of Battery Replacement with Sophisticated Monitoring Techniques

All batteries will eventually fail. Because UPS batteries are valve-regulated, sealed, lead-acid cells, there has not been a practical way to provide users with advance notification of battery failure. The only way to determine that batteries needed replacing was to wait until the power failed, taking the servers and computers down with it. Compaq's Enhanced Battery Management is the only technology available that reliably provides advance notification prior to battery failure. The Compaq UPS microprocessor periodically initiates a brief discharge cycle to check the internal impedance of the battery. This impedance is calculated and compared to an ideal battery state, indicating to the user, well in advance, when battery replacement is necessary.

## Minimize Battery Use with Superior Voltage Regulation

Most manufacturers' UPSs monitor input voltage variations as low as -25%, but transfer to battery when a surge or a sag needs to be filtered in the system. This type of voltage regulation shortens the UPS's battery service life. Compaq's innovative Buck/Double Boost voltage regulation ensures consistent input voltage to the load by automatically "bucking" it if it is too high, or "boosting" it if it is too low. Voltage variations as low as -35% or as high as +20% are corrected — without transferring to battery. This reduces the number of charge/recharge cycles, thereby prolonging the life of the Compaq UPS battery.

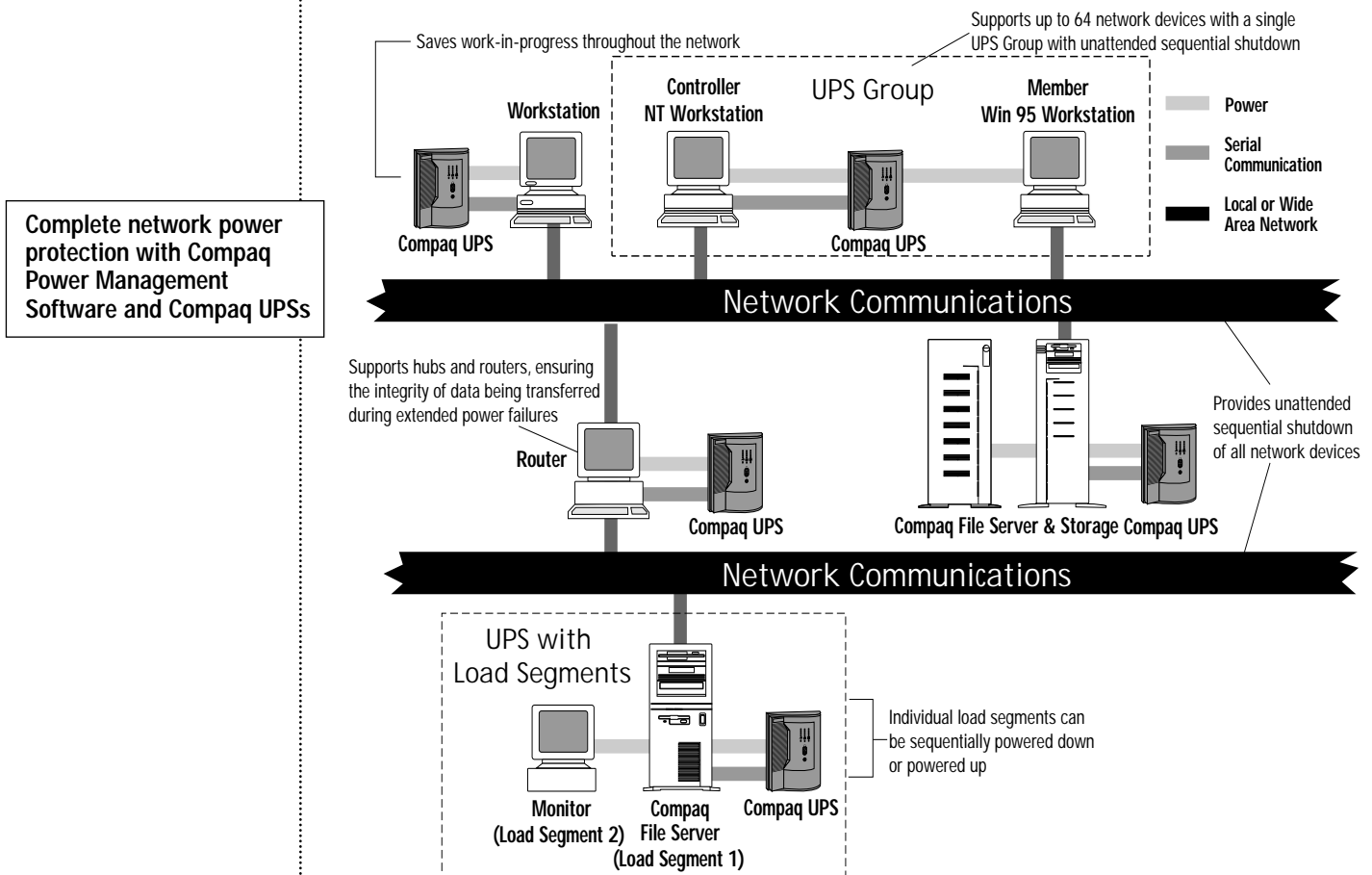
# Protecting Enterprise Environments with Compaq UPSs

## The Costly Effects of Power Problems in an Enterprise Environment

The effects of blackouts and other power problems in an enterprise environment can be devastating and costly. Using a Compaq UPS to protect servers and other critical equipment prevents unnecessary downtime, loss of data, and damage to your hardware. Maximum data integrity and system uptime require a prioritized shutdown plan which is managed by Compaq Power Management Software. Preserving data is an increasingly complex issue in today's enterprise environments. Communication systems are required to transfer and store information within internal computer networks and must also provide critical links to the enterprise-wide networks.

## Data Integrity of Your Entire Network with Compaq Power Management Software

A prioritized shutdown ensures that all network devices are shut down in a orderly, sequential manner, saving all work-in-progress throughout the network. Compaq Power Management Software empowers network administrators by allowing them to define their own shutdown process. Thus, a company's most critical equipment (such as a database or file server) can be shut down last, after work-in-progress has been saved from client workstations through hubs, switches, routers, and communication servers.



# Protecting Enterprise Environments with Compaq UPSs (continued)

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## **Extended Runtime for Critical Servers and More**

With Compaq Power Management Software, individual load segments on Compaq UPSs can be sequentially powered down, extending run time for more critical servers, or powered up, ensuring correct, orderly startup such as servers before workstations. In addition, to conserve energy, Compaq Power Management Software allows for scheduled on and off times which are programmable for each load segment or the entire UPS.

## **Complete Network Power Protection**

Compaq Power Management Software supports up to 64 network devices within a single UPS group and provides unattended, sequential shutdown of every device in that group, regardless of the operating system. Any device whose input power is supported by a single UPS is considered to be part of a UPS group. A UPS group might be several servers or workstations. If the network devices are connected by a network cable and can communicate with one another via this interface, only a UPS-to-computer serial interface connection is required. If different operating systems are in the UPS group, still only one copy of Power Management Software is needed, although a signal splitting device such as Compaq's Multi-Server Card might be necessary.

When power quality is compromised, so are a company's vital data files including data entry, orders, records, e-mail messages, and other critical business information. Compaq Power Management Software used in conjunction with Compaq UPSs plays a vital role in ensuring data integrity and protection of your business's critical network servers and other systems.



# Intelligent Manageability with Compaq Power Management Software

## Your UPS Just Got Smarter with Compaq Power Management Software

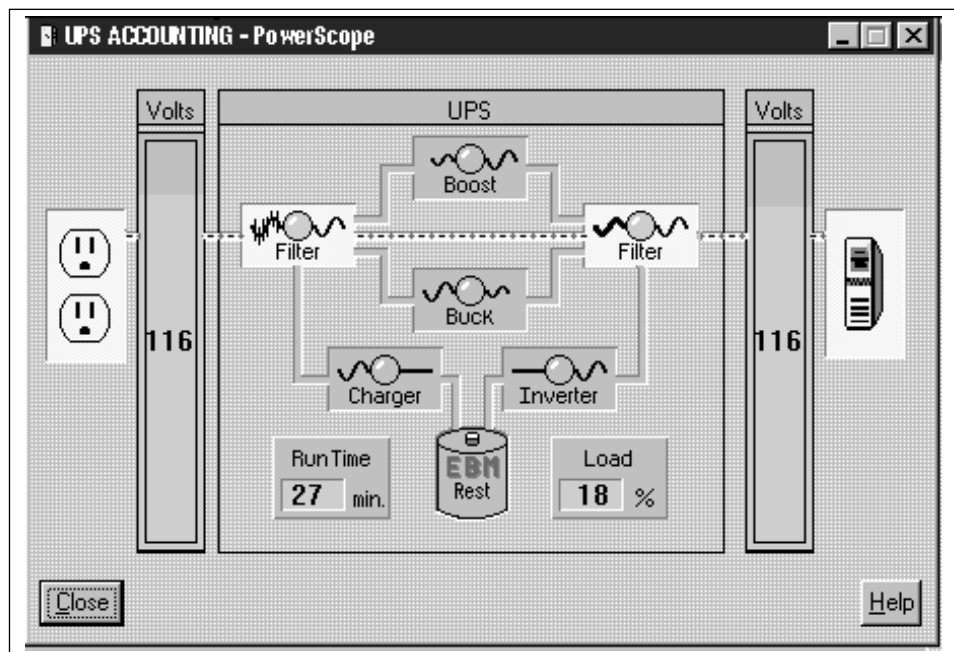
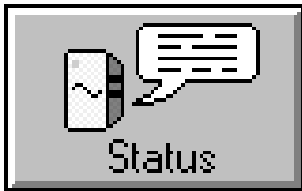
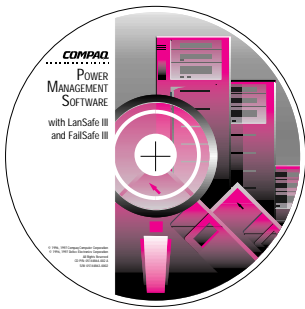
Compaq Power Management Software takes server data protection the extra mile, and then some. Management notification, diagnostics, monitoring, and — when necessary during an extended blackout — unattended, prioritized shutdown of multiple Compaq servers and client workstations are standard features of Compaq Power Management Software. Because the Compaq UPS supports separate load segments, users can program Compaq Power Management Software to schedule segment-by-segment shutdowns and startups of connected equipment.

## Status Information is Clear and Complete

For any Compaq server or system device in your network, you can access UPS status information quickly and easily. The **Status** function provides a color-coded system overview (normal, degraded, or failed) at the status button on the Compaq Power Management Window. The status window provides color-coded information on system elements, including UPS communications, UPS operational status, utility power, battery charge, utility ground fault detection, inverter power, and UPS overload detection.

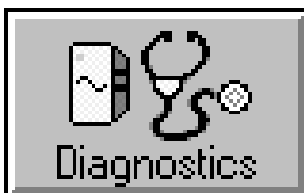
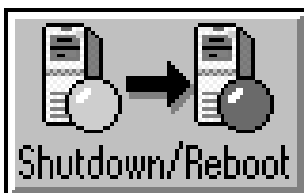
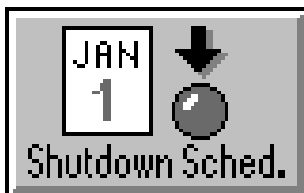
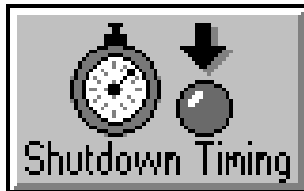
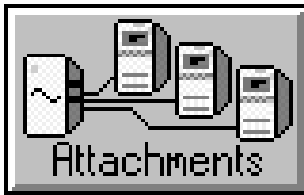
## The Power Situation is Easy to Understand

The Compaq Power Management PowerScope screen provides a graphical, real-time display of the inside of the UPS.



The **PowerScope** display is a dynamic, functional block diagram of power from the source, through the UPS, and out to the load. For any Compaq server on the network, the PowerScope shows the UPS input and output voltages (color-coded for easy interpretation), available battery run time in minutes, and the percentage load, a measure of the capacity of the UPS.

## Compaq Power Management Software (continued)



### **Load Segmenting for Extended Backup Time**

The Compaq UPS has individually controlled load segments. If power fails, users can extend backup time for their most critical servers or systems via Compaq Power Management Software.

The *Attachments* window enables configuration of the connected servers/systems to specified load segments. Once this is done, the shutdown window details your *Shutdown Timing* in terms of wink time, countdown time, and shutdown delay, assuring a prioritized system shutdown. Similarly, the *Startup Timing* feature ensures a prioritized return to service.

### **Automatic Alert Communication**

Compaq Power Management Software provides additional *Alert Handling* capabilities. These capabilities allow you to customize alert messages in another language, configure the system to execute commands in the occurrence of a particular alert, and to broadcast messages and off-site e-mails in any given alert situation. This ensures that the entire system administration staff is fully informed of any system emergency.

### **Scheduled Shutdowns**

Why spend money on power by running equipment you don't need? Compaq Power Management Software and Compaq UPSs supporting load segments give you the ability to run the equipment you want when you want to. *Shutdowns* and restarts can be scheduled on a regular basis for each day of the week. If a piece of equipment isn't needed (on weekends and holidays, for example), the system shuts it down and doesn't start it until you program it to do so.

### **Shutdown/Reboot Flexibility**

Use Compaq Power Management Software to *Shutdown* your UPS with three restart options. An immediate *Reboot* can be performed, the startup can be timed for any user-specified interval, or it may be permanent until the UPS is restarted manually.

### **Information Logs**

The power event and battery management *Logs* provide a history of significant system events that can be used for problem detection and resolution.

### **Diagnostics**

Compaq Power Management Software *Diagnostics* features a Power Monitor window reminder when it's time to run preventive maintenance. You can program the messages for whatever time intervals you need. When you start *Diagnostics*, you start a simple but vital test of every UPS on the network for approximately 40 seconds, wherein your system is put on battery power to test the circuitry. This way you know your UPS will be ready in the event of an emergency.

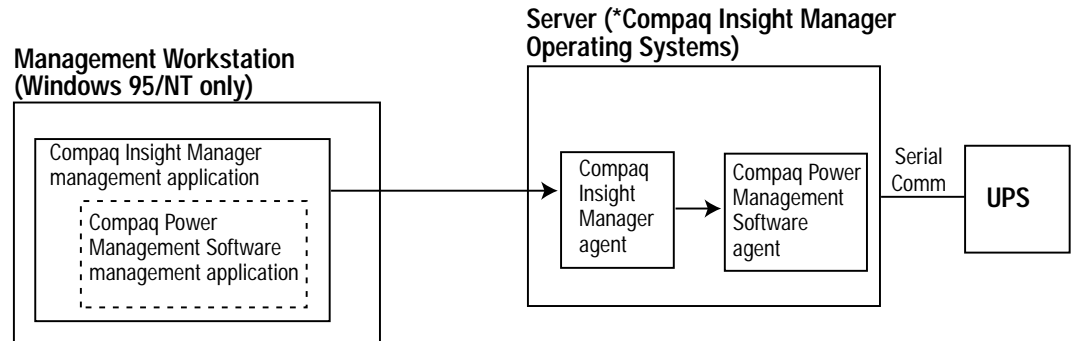
# Compaq Power Management Software (continued)

## How It Works

The Compaq Power Management Software Agent runs on each Compaq computer and Compaq server supported by a Compaq UPS. As long as the equipment is running, the agent observes the power environment of the UPS. Access to Compaq Power Management Software is through the UPS icon within the Compaq Insight Manager Console.

Should utility power fail or another significant power problem occur, the Compaq UPS places connected servers and systems on battery power and the Compaq Power Management Software issues an alert. The alert goes via an SNMP trap to the system administrator's workstation (Windows NT or Windows 95) running Compaq Insight Manager.

Compaq Power Management Software responds to the alert as programmed by the system administrator. As the power event continues, Compaq Power Management Software begins a prioritized system shutdown, saving all work-in-progress throughout the network.



\* Compaq Power Management Software supports the following Operating Systems through Compaq Insight Manager: Microsoft WindowsNT 3.51 and 4.0 (server and workstation), Microsoft Windows 95, IBM OS/2 1.21B, SCO Unix 5.0 and 5.02, Unixware, and Novell Netware Intranetwork 3.X and 4.X.

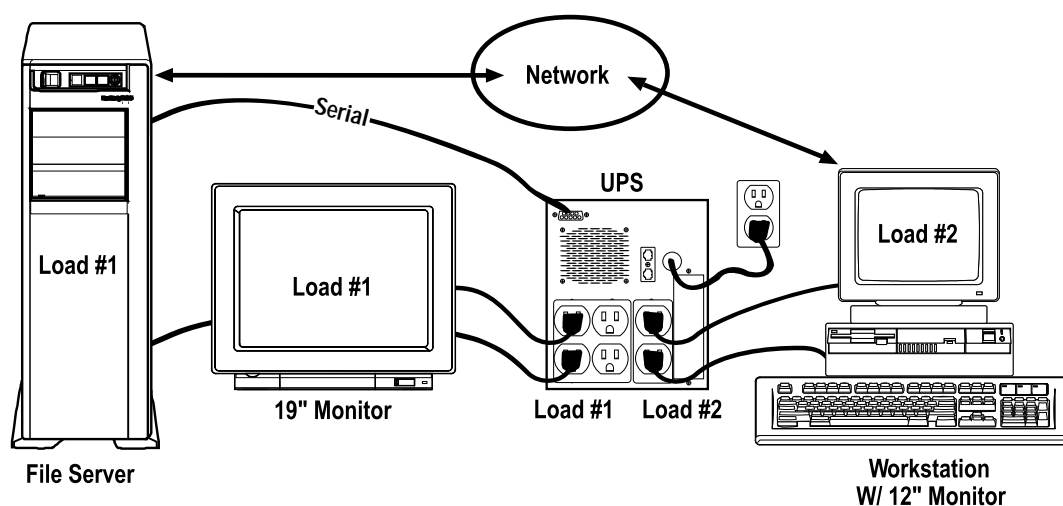
# Extended Backup with Load Segment Control

With Compaq UPS load segment control, users have the flexibility to configure scheduled startups and shutdowns of their equipment, as well as to independently control load segments.

Working in conjunction with Compaq Power Management Software, the Compaq UPS can be configured to extend run times for critical devices. Because the receptacles on the back of the Compaq UPS are divided into two or more groups — called load segments — each load can be controlled independently.\* By shutting down one load segment, the runtime for more critical servers and systems is extended on the other load segment, providing additional protection by shutting down less critical servers and systems first.

Compaq Power Management Software also facilitates a prioritized startup of connected equipment. Furthermore, the power scheduling feature allows for scheduled on-and-off times, promoting energy and power conservation.

\*700 UPS Series have only one load segment.



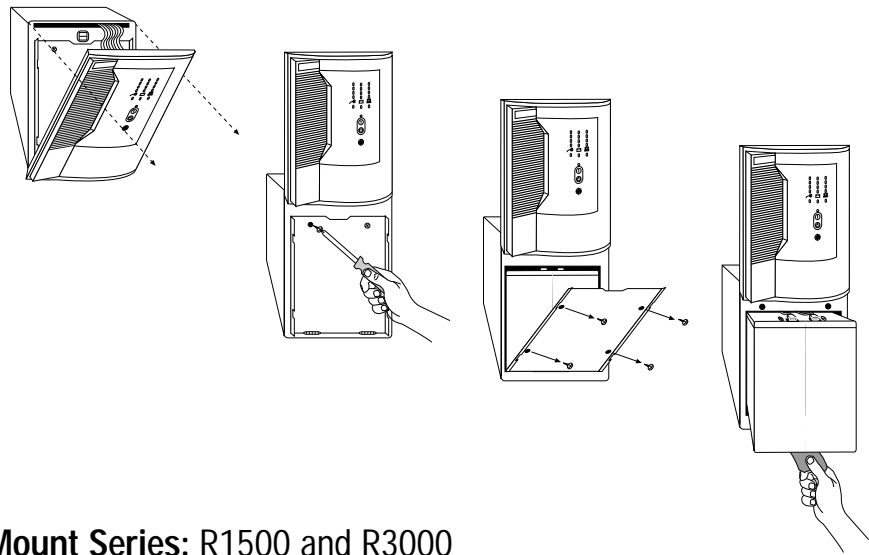
Independently controlled load segments with Compaq UPSs are managed by Compaq Power Management Software

# Ease of Serviceability with Hot-Swappable Batteries

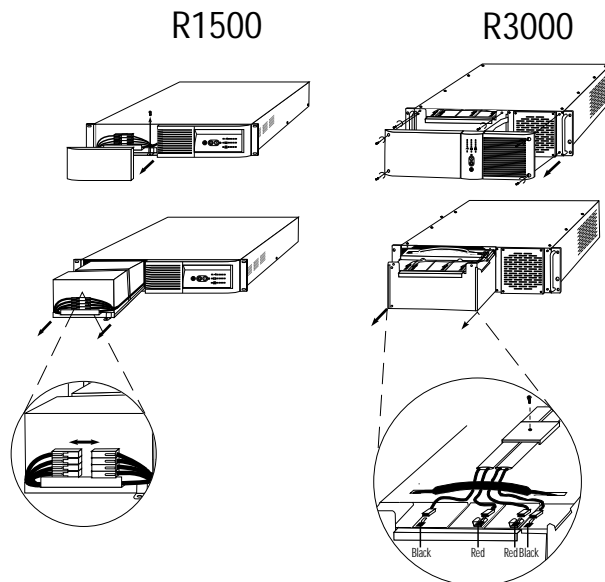
While Enhanced Battery Management has the ability to double battery service life, it cannot prevent inevitable battery failure. When your batteries reach the end of their useful life, replacement is easy with hot-swappable batteries. Simple access through the front panel allows users to safely install new batteries without ever powering down the connected equipment.

## **Tower Series: T700, T1000, T1500, T2000, and T2400h**

For models without internal batteries (Tower models 2000 and 2400h), the procedure is accomplished by replacing battery packs.



## **Rack-Mount Series: R1500 and R3000**



# Enhance System Flexibility and Manageability with Compaq UPS Option Cards

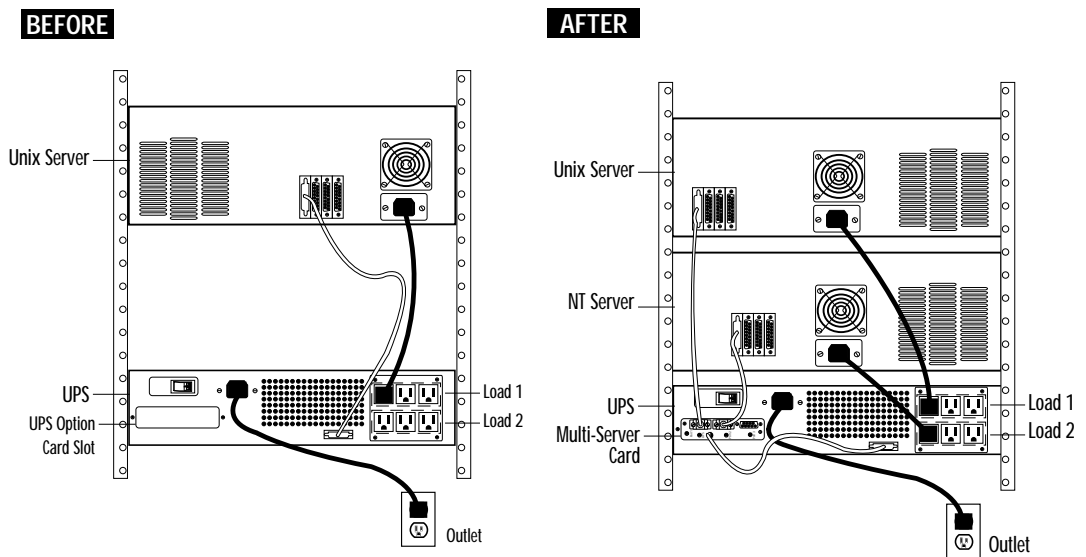
To further enhance your UPS communication capabilities, Compaq offers two UPS option cards that provide additional management and control capabilities during a power failure and are available at a minimum investment.

## Compaq Multi-Server Card

With Compaq's Multi-Server Card, users can serially connect up to three network devices to a single UPS. This allows communication for networks with multiple servers or disparate operating systems. So a business running Novell, Windows NT, and Unix servers does not have to acquire an individual UPS for each piece of equipment. The Multi-Server card permits out-of-band communication with up to three servers even when the network is down. It saves you money since it is not necessary to buy additional UPSs.

**Application:** Need to add an NT server and another UPS for serial communications?

**Solution:** Install the Compaq Multi-Server Card and manage multiple platforms with one UPS.



## Compaq UPS Option Cards (continued)

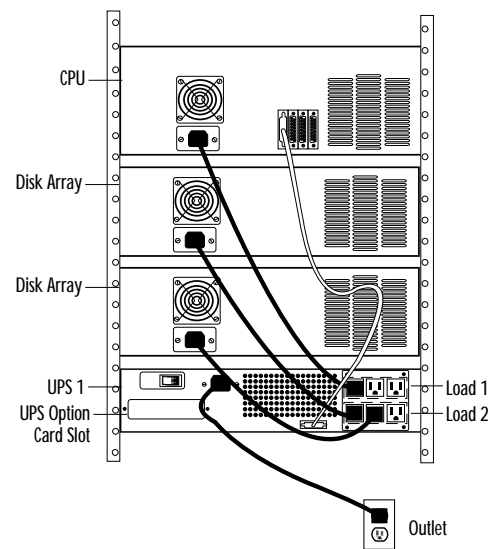
### Compaq Scalable Card

Because evolving system needs may require a higher power level to accommodate an increased load, users can add the Scalable Card to their Compaq UPS. Enabling up to three UPSs to be connected to one group of network devices, this option provides power scalability and field upgradeability. Rather than having to purchase a new, larger UPS to increase load capacity, users can choose to connect a second or third UPS to the original UPS to achieve the right power level for their system.

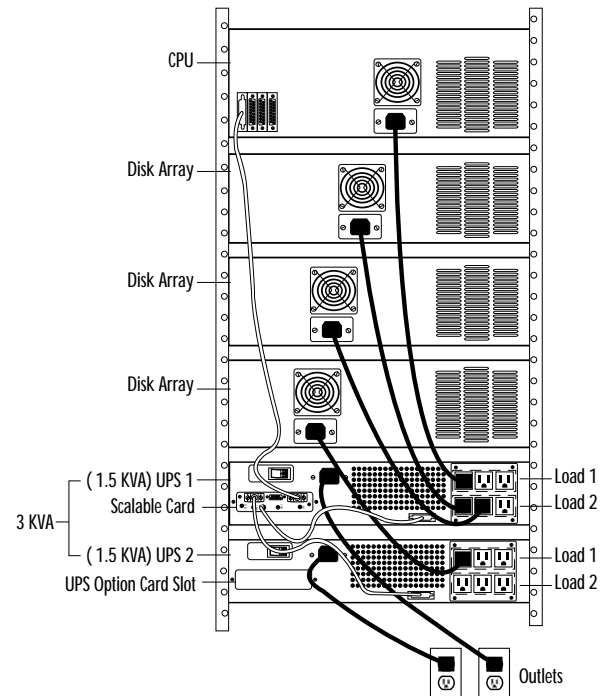
**Application:** Need increased server capacity; need a larger UPS?

**Solution:** Add another (smaller) UPS and install Compaq's Scalable Card. This provides flexibility and eliminates the need to buy a larger UPS. In the example below, Load 1 on UPS 2 becomes a virtual third load segment.

**BEFORE**



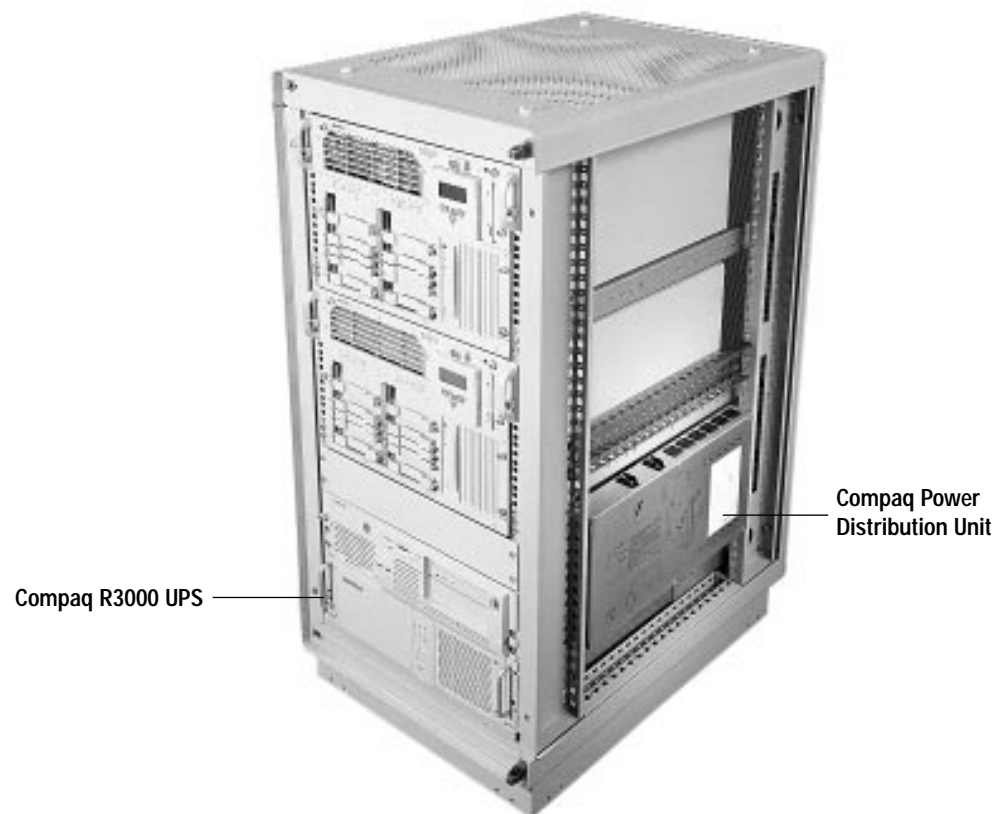
**AFTER**



# Preservation of Rack Real Estate with the Compaq Power Distribution Unit

The Compaq Power Distribution Unit offers managed power distribution without sacrificing valuable rack space. The Power Distribution Unit distributes power to a maximum of 12 additional circuit-breaker and fuse-protected AC receptacles. From a single point of connection, the Power Distribution Unit delivers exceptional surge and spike protection while conveniently consolidating multiple power cords.

The unique “Zero-U” design of the Compaq Power Distribution Unit enables it to be mounted into the side of an equipment rack, consuming no valuable front-panel rack space. Connected between the frame members of Compaq 42U, 36U, and 22U rack cabinets, the unit can be added to a fully configured rack while saving space for business critical servers and other equipment.



Typical rack-mount application with Compaq Power Distribution Unit.

The Compaq Power Distribution Unit is also designed to further complement the functionality of your Compaq R3000 UPS (high and low voltage models). On the R3000 UPS, Compaq provides a high current outlet that is part of load segment three of the UPS. By plugging a Compaq Power Distribution Unit in this high current outlet, you have added 12 receptacles to your UPS, which can be managed as part of load segment three of your Compaq R3000 UPS.

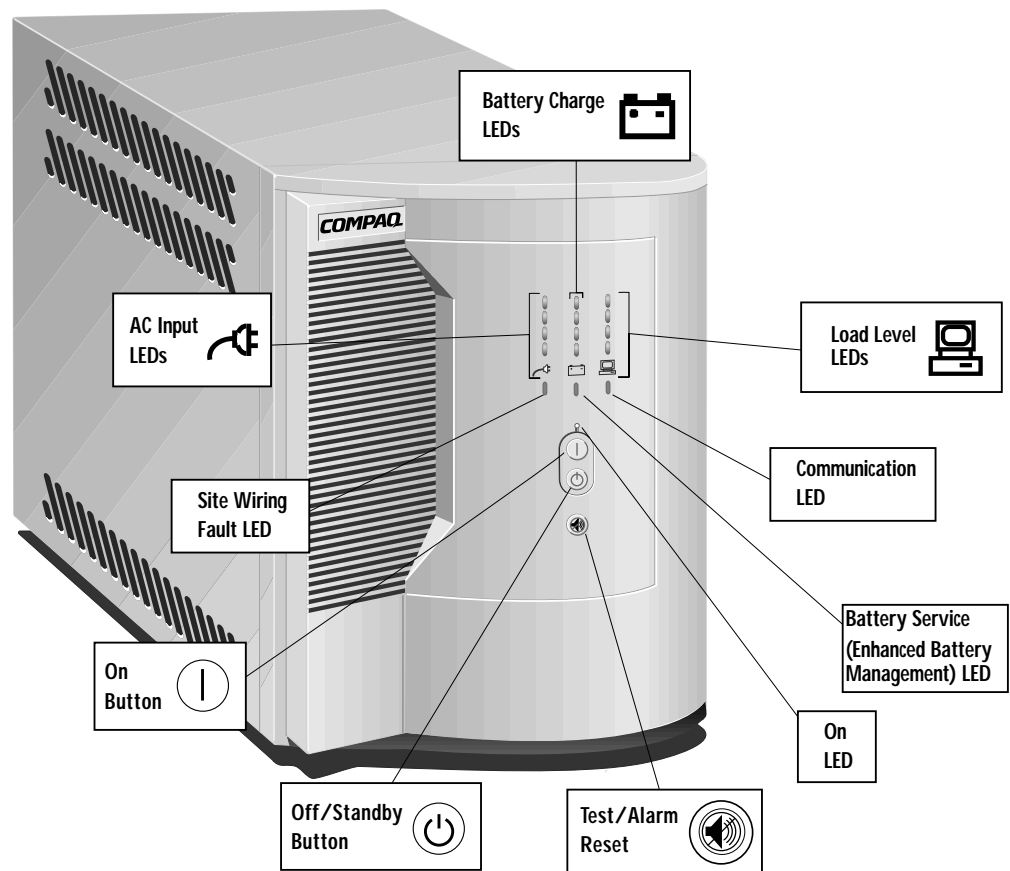


# Ease of Configuration Via Front Panel Display

## Operation

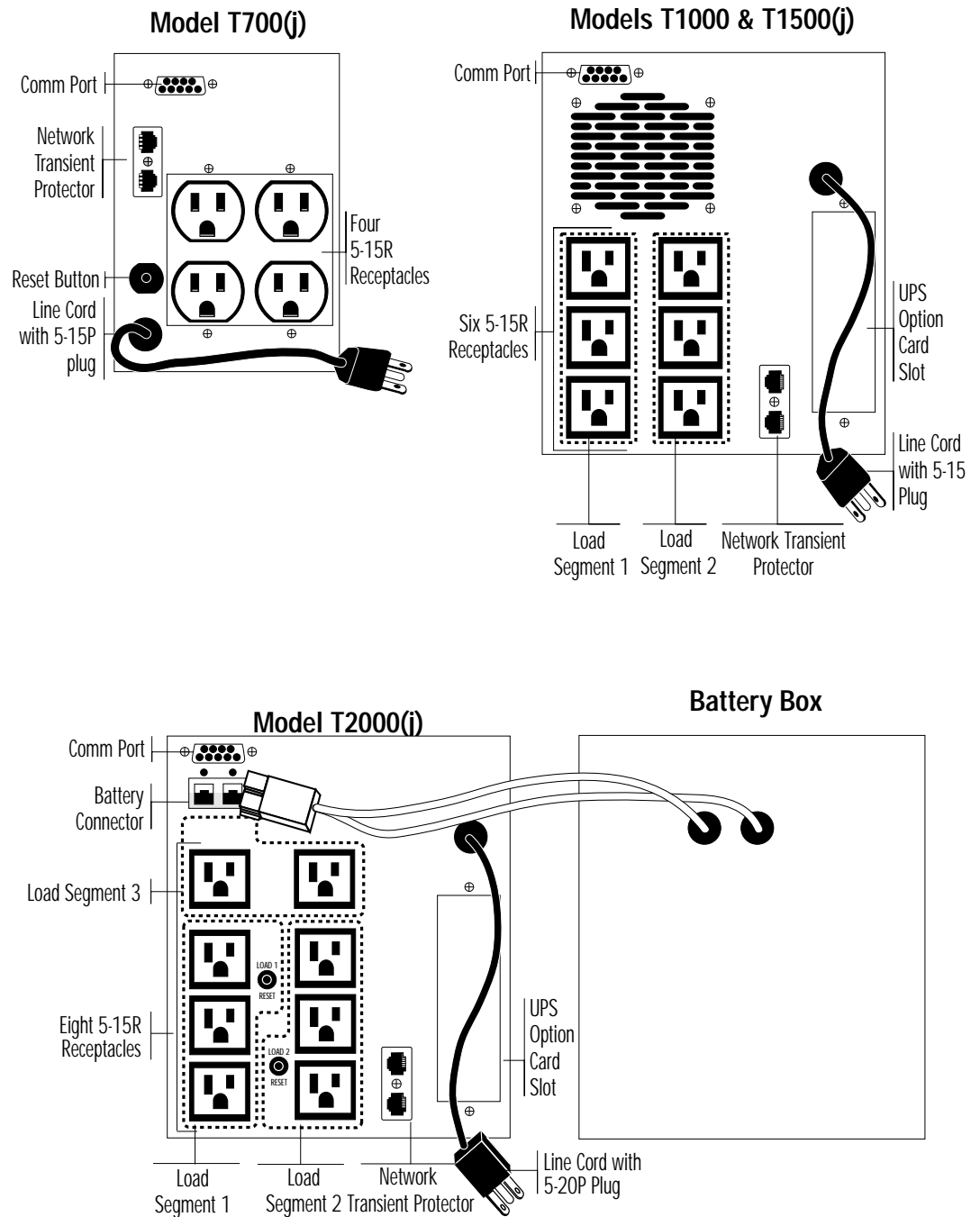
For easy monitoring, all Compaq UPSs feature simple icons. The provided LEDs tell users everything they need to know about site wiring, voltage, battery, load, and communications conditions. In addition, depressing the dual-purpose Test/Alarm Silence button initiates a self-diagnostic routine that verifies monitoring operations.

When the Compaq UPS is in its standard mode of operation, the front panel LEDs indicate how the UPS is functioning and also warn about possible problems, such as low battery, overvoltage, or overload conditions.



# Rear Panels (Tower Models)

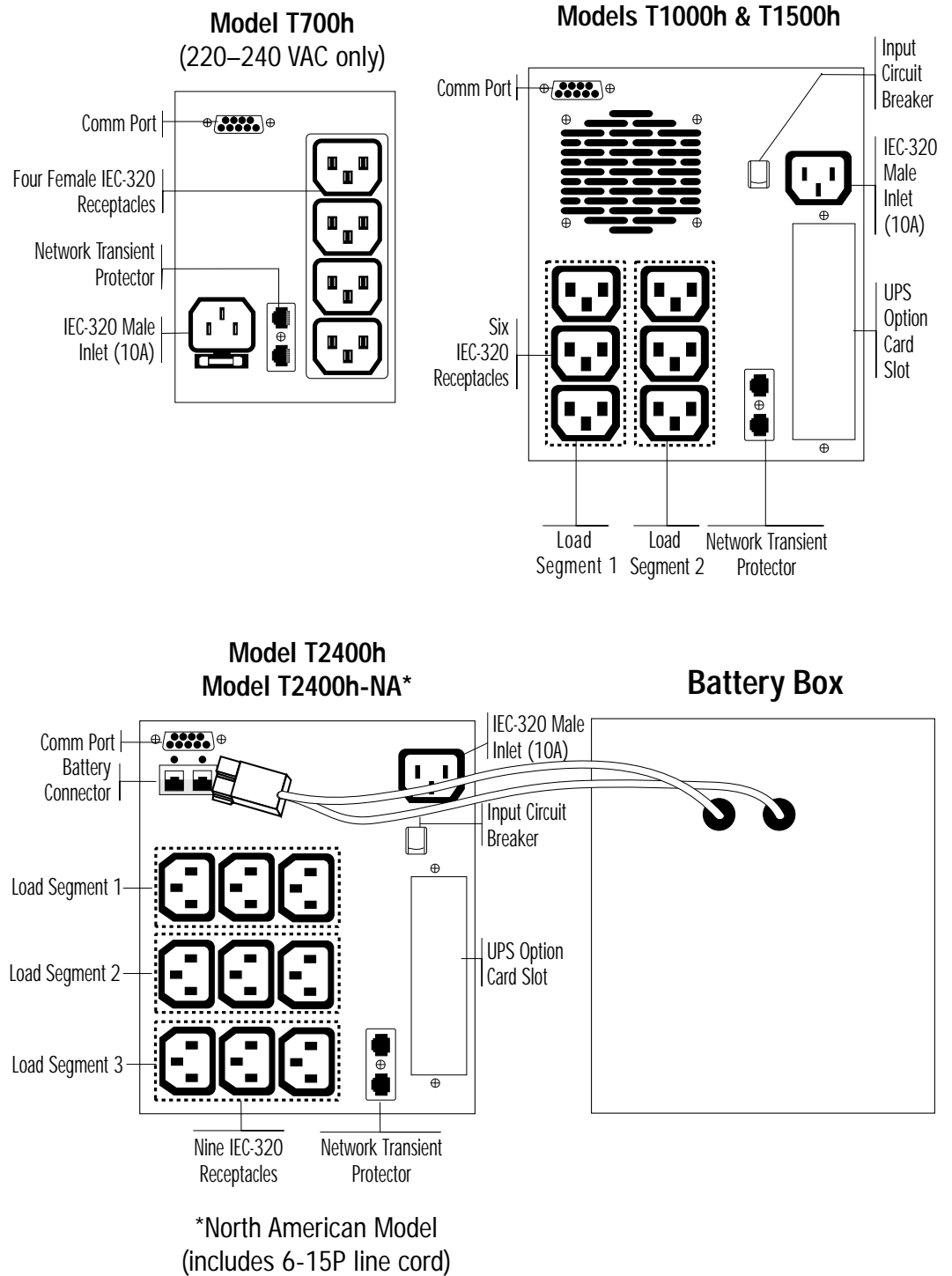
## Low Voltage (100–127 VAC)



(j) = models available for Japan.

# Rear Panels (Tower Models)

## High Voltage (208–240 VAC)

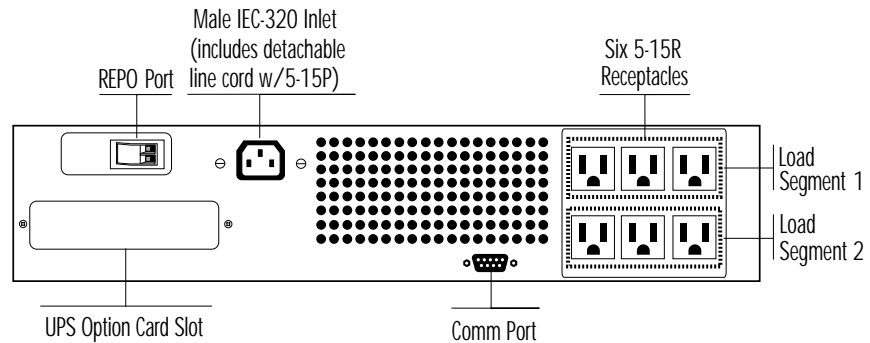


**Note:** h = high voltage  
h-NA = high voltage-North America

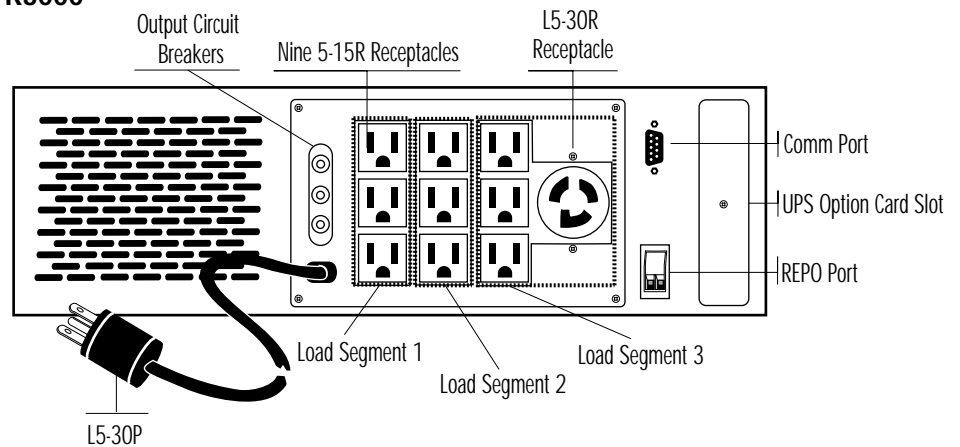
# Rear Panels (Rack Models)

## Low Voltage (100–127 VAC)

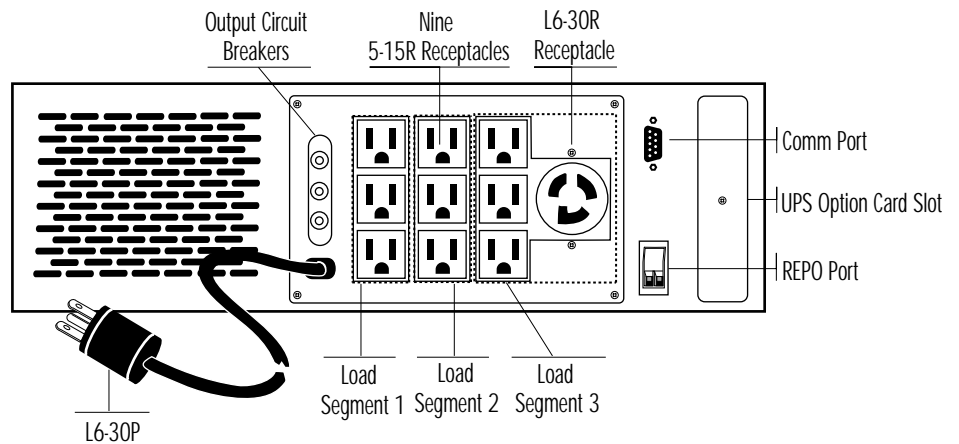
### Model R1500(j)



### Model R3000



### Model R3000j

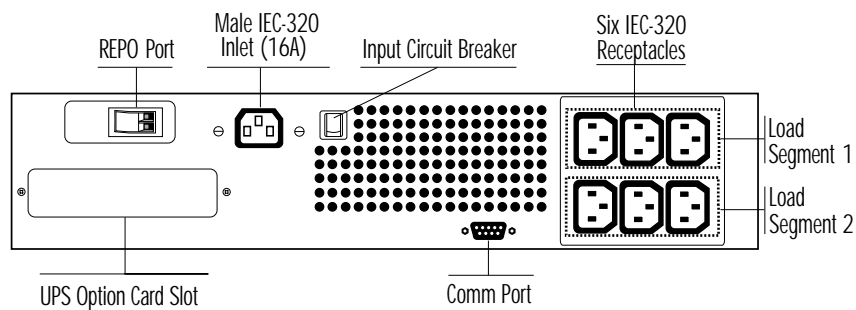


(j) = Models available for Japan.

# Rear Panels (Rack Models)

## High Voltage (200–240 VAC)

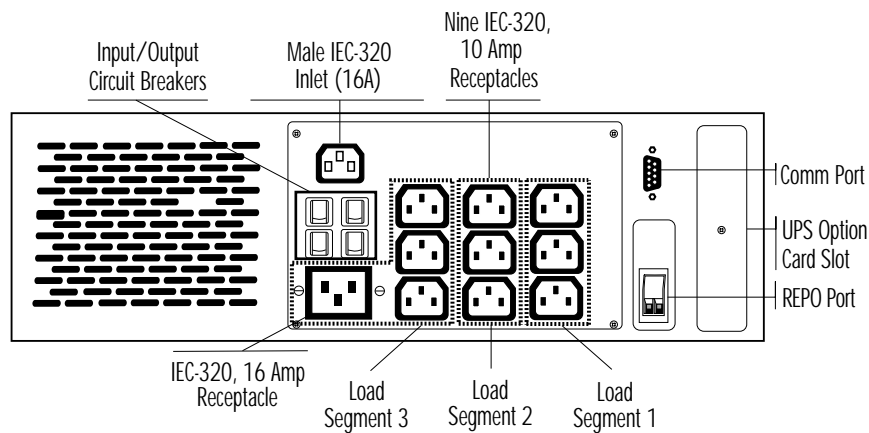
### Model R1500h



### Model R3000h

### Model R3000h-NA\*

\*North American model includes L6-20P line cord



**Note:** h = high voltage  
h-NA = high voltage-North America

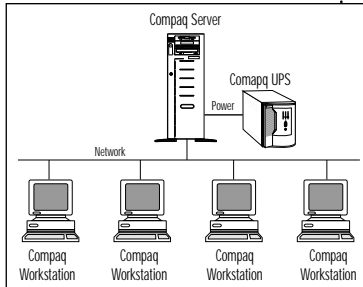
# Understanding UPS Configurations

## Network Configurations

There are several configuration options when using Compaq UPSs to protect a Local Area Network (LAN).

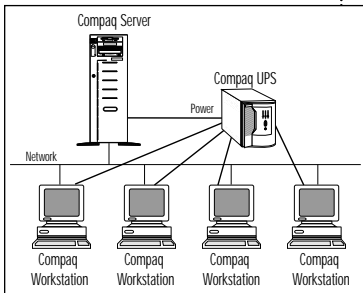
### Server or Single Workstation Only

For those seeking basic protection, using one UPS to protect a single server or single workstation is considered sufficient. In case of a power failure, data integrity is maintained. The data, however, is not accessible by unprotected servers or workstations until normal power is resumed.



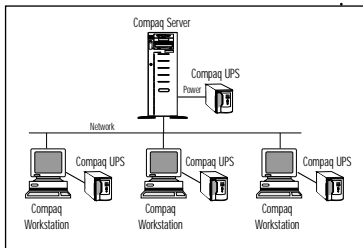
### Central UPS for Server and Nodes or Total Multi-User Environment

Use of one central UPS is recommended for more critical LAN environments when each workstation's processing transactions must be kept current and where workstation location does not require special wiring or use of extension cords to connect to the UPS. This single UPS must not only support all connected equipment, but also must be large enough to allow for future expansion.



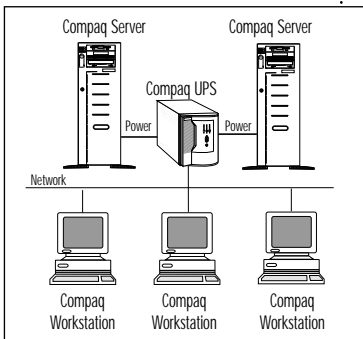
### Multiple UPSs for Server and Nodes or Individual Workstations

Using multiple UPSs is recommended in the most critical real-time processing environments. It is often the most practical option for both financial and safety reasons and requires no special wiring. In addition, as the LAN grows, additional UPSs are added to each workstation location, instead of replacing an outgrown unit.



### Multiple Servers with One UPS

Connecting one UPS to more than one server is practical in applications where there are multiple servers in close proximity to one another (especially common in rack cabinet configurations). In such cases, it may be more economical or a space-saving advantage to use one larger UPS instead of two smaller ones to back up multiple servers.



# Which Compaq UPS is Right for You?

## Determining the Required UPS Power Rating

The table below shows which UPS models can be used with the various Compaq server and storage system models. This will vary with actual configurations, type of peripherals also protected by the UPS, and amount of backup time required. The VA values shown on the adjacent chart are maximum values.

For configurations involving multiple servers and/or additional critical storage/option products, simply add up the total VA of the equipment that will be plugged into the UPS and select the UPS model with a VA rating higher than the equipment load. To allow for future system growth, a good rule of thumb is that the computer load should be about 60% - 80% of the UPS VA capacity.

Compaq Products	VA Rating	Redundant Power Supply
14- or 15- inch Compaq Monitor <sup>1</sup>	112	N/A
4/8 Port Rack Switch <sup>1</sup>	117	N/A
SCSI Storage Expander <sup>1</sup>	235	N/A
ProLiant 850, 850R <sup>1</sup>	270	N/A
ProSignia 200 <sup>1</sup>	280	N/A
ProSignia VS or ProSignia 300 <sup>1</sup>	285	N/A
ProLiant 800 <sup>1</sup>	324	N/A
CPW 5000 <sup>1</sup>	324	N/A
ProSignia 500 <sup>1</sup>	345	N/A
CPW 5100 <sup>1</sup>	378	N/A
ProLiant 1200 <sup>1</sup>	378	N/A
CPW 6000, 8000 <sup>1</sup>	439	N/A
ProLiant 1600, 1600R <sup>1</sup>	439	N/A
ProLiant Storage System <sup>1</sup>	465	N/A
ProLiant 2500, 2500R <sup>1</sup>	470	N/A
ProLiant 1500, 1500R <sup>1</sup>	500	N/A
ProLiant Storage System F1/F2 <sup>1</sup>	585	N/A
ProLiant 2000, 2000R <sup>2</sup>	659	N+1
ProLiant 4500, 5000, 4500R, 5000R <sup>2</sup>	729	N+1
DLT Array II <sup>1</sup>	745	N/A
ProLiant 3000, 5500, 6500 <sup>2</sup>	1013	N+1
ProLiant 6000, 7000 <sup>3</sup>	2025	2N+1

<sup>1</sup>VA Rating is calculated at maximum configuration of the system.  
<sup>2</sup>VA Rating is calculated based on N+1 maximum configuration.  
<sup>3</sup>VA Rating is calculated based on 2N+1 maximum configuration.

## Estimated Backup Time in Minutes

Load	T700 Series	T1000 Series	T1500 Series	T2000 Series**	T2400 Series**	R1500 Series	R3000 Series
300 VA	19	49	79	92	162	67	187
350 VA	16	30	67	79	139	57	160
400 VA	14	26	59	69	122	50	140
450 VA	12	23	43	58	108	36	124
500 VA	9	21	38	51	97	32	112
600 VA	7	16	32	36	81	27	93
700 VA	5	14	27	30	62	23	80
800 VA		12	24	26	54	20	56
900 VA		9	17	23	48	15	50
1000 VA		8	16	20	43	13	45
1200 VA			13	14	36	11	38
1400 VA			10	12	24	8	32
1500 VA			9	10	23	7	30
1800 VA				8	19		21
2000 VA				7	16		19
2200 VA					14		17
2400 VA					13		14
3000 VA							11

\*VA loads are estimates; size UPS according to total actual equipment configurations VA load.

\*\*Includes external battery cabinet.

Volts x Amps = VA per device

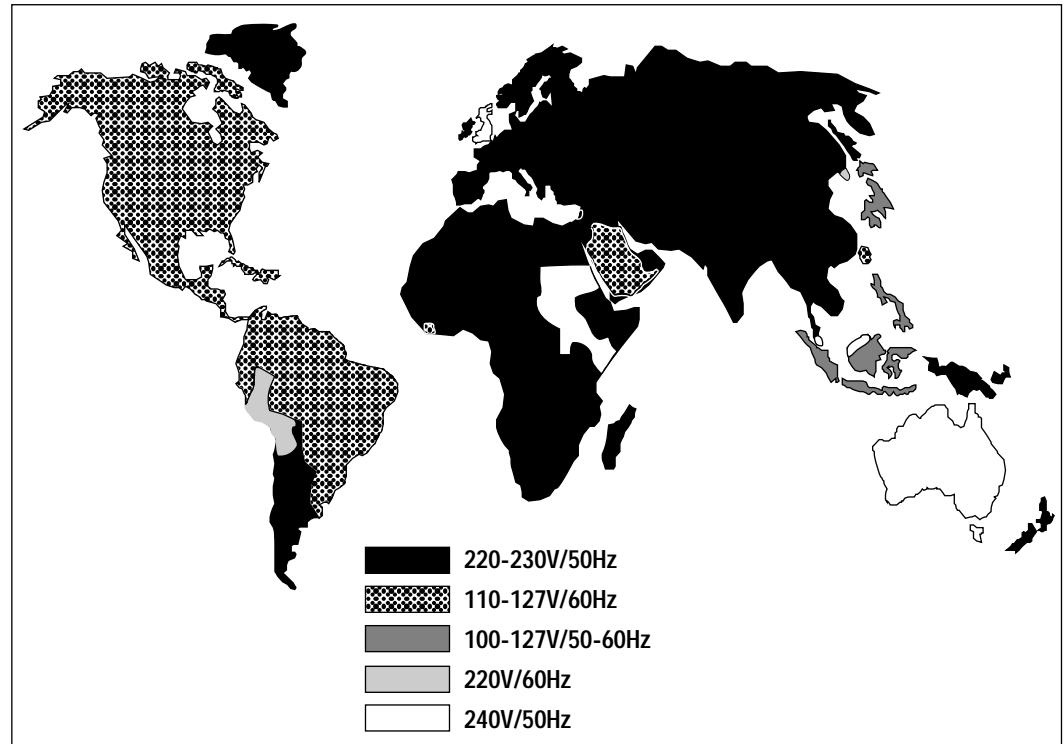
If only Watts are given:

Watts x 1.35 = VA

VA/1000 = KVA

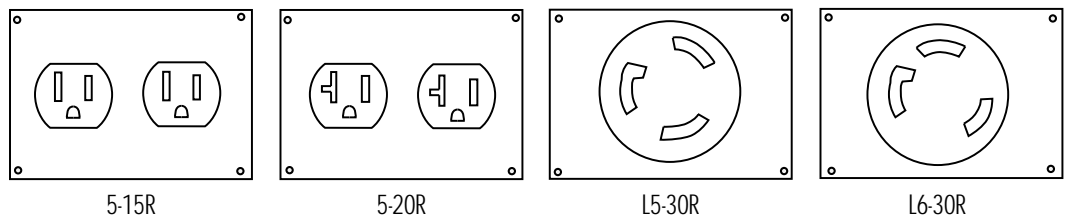
# Worldwide Power Requirements

## Worldwide Voltage

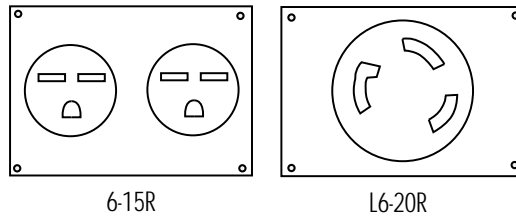


## Electrical Receptacles (North American, Latin America, and Japanese Models)

(100–127 VAC)



(200–240 VAC)





# Compaq UPS Model Guide

## Compaq Tower UPS Models

Model Number	Part Number	Power Out (VA/Watt)	Input Connection	Output Connections	Dimensions WxHxD	Weight
<b>Low Voltage Models (100–127 VAC; 60 Hz)<sup>1</sup></b>						
T700 <sup>2</sup>	295372-B21	700/420	5-15P	(4) 5-15R	4.6 x 6.4 x 14.8 in 11.68 x 16.26 x 37.6 cm	22 lb/10 kg
T700j <sup>3</sup>	295372-291	700/420	5-15P	(4) 5-15R	4.6 x 6.4 x 14.8 in 11.68 x 16.26 x 37.6 cm	22 lb/10 kg
T1000	242688-001	1000/670	5-15P	(6) 5-15R	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	43 lb/19.5 kg
T1500	242688-003	1440/960	5-15P	(6) 5-15R	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	57 lb/25.85 kg
T1500j <sup>3</sup>	242688-293	1440/960	5-15P	(6) 5-15R	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	57 lb/25.85 kg
T2000	242688-005	1920/1400	5-20P	(8) 5-15R	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	32 lb/14.5 kg
T2000j <sup>3</sup>	242688-295	1920/1400	5-20P	(8) 5-15R	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	32 lb/14.5 kg
<b>High Voltage Models (208–240 VAC; 50/60 Hz)<sup>4</sup></b>						
T700h	295372-B22	700/420	IEC-320 (10 A)	(4) IEC-320 (10 A)	4.6 x 6.4 x 14.8 in 11.68 x 16.26 x 37.6 cm	22 lb/10 kg
T1000h	242688-002	1000/670	IEC-320 (10 A)	(6) IEC-320 (10 A)	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	43 lb/19.5 kg
T1500h	242688-004	1500/960	IEC-320 (10 A)	(6) IEC-320 (10 A)	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	57 lb/25.85 kg
T2400h	242688-006	2300/1600	IEC-320 (10 A)	(9) IEC-320 (10 A)	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	34 lb/15.42 kg
T2400h-NA <sup>5</sup>	242688-007	2300/1600	IEC-320 (10 A)	(9) IEC-320 (10 A)	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	34 lb/15.42 kg
<b>Battery Boxes</b>						
(for T2000)	—	48 VDC, 10 Ahr	cord w/connector	—	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	47 lb/21.32 kg
(for T2400h)	—	48 VDC, 17 Ahr	cord w/connector	—	7.0 x 8.8 x 17.1 in 17.78 x 22.35 x 44.43 cm	63 lb/28.58 kg

1. User selectable for 100, 110, 120, or 127 VAC. With 100 or 110 VAC selected, unit can operate at 50 Hz.

2. T700 not configurable for 100 VAC.

3. Japanese, 100 volt model.

4. User selectable for 208, 220, 230, or 240 VAC. T700h not configurable for 208 VAC.

5. NA indicates North American high voltage model.

## Compaq Rack-Mount UPS Models

Model Number	Part Number	Power Out (VA/Watt)	Input Connection	Output Connections	Dimensions WxHxD	Weight
<b>Low Voltage Models (100–127 VAC; 60 Hz)<sup>1</sup></b>						
R1500	242704-001	1440/960	5-15P	(6) 5-15R	19.0 x 3.5 x 16.0 in 48.26 x 8.89 x 40.64 cm	58 lb/26.31 kg
R1500j <sup>2</sup>	242704-291	1440/960	5-15P	(6) 5-15R	19.0 x 3.5 x 16.0 in 48.26 x 8.89 x 40.64 cm	58 lb/26.31 kg
R3000	242705-001	2880/2250	L5-30P	(9) 5-15R & (1) L5-30R	19.0 x 5.25 x 22.3 in 48.26 x 13.34 x 56.64 cm	132 lb/59.87 kg
R3000j <sup>2</sup>	242705-291	2880/2250	L6-30P	(9) 5-15R & (1) L6-30R	19.0 x 5.25 x 22.3 in 48.26 x 13.34 x 56.64 cm	132 lb/59.87 kg
<b>High Voltage Models (208–240 VAC; 50/60 Hz)<sup>3</sup></b>						
R1500h	242704-002	1500/960	IEC-320 (10 A)	(6) IEC-320 (10 A)	19.0 x 3.5 x 16.0 in 48.26 x 8.89 x 40.64 cm	58 lb/26.31 kg
R3000h	242705-002	3000/2250	IEC-320 (16 A)	(9) IEC-320 (10 A) & (1) IEC-320 (16 A)	19.0 x 5.25 x 22.3 in 48.26 x 13.34 x 56.64 cm	132 lb/59.87 kg
R3000h-NA <sup>4</sup>	242705-003	3000/2250	IEC-320 (16 A)	(9) IEC-320 (10 A) & (1) IEC-320 (16 A)	19.0 x 5.25 x 22.3 in 48.26 x 13.34 x 56.64 cm	132 lb/59.87 kg

1. User selectable 100, 110, 120, or 127 VAC. With 100 or 110 VAC selected, unit can operate at 50 Hz.

2. Japanese, 100 volt model.

3. User selectable for 208, 220, 230, or 240 VAC.

4. h-NA indicates North American high voltage model.

# Compaq UPS Technical Specifications

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## Electrical Input

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### Voltage

120 and 230 VAC nominal; see Model Selection Guide for user selectable voltages

### On Line Voltage Range

-30%, +20% for nominal; user selectable extended range of -35%, +20%

### Nominal Input Frequency

50/60 Hz auto-selection  
(60 Hz only for 120 and 127 VAC)

### Frequency Tolerance

Nominal  $\pm 3$  Hz

## Electrical Output

---

### Power Levels

700 to 3000 VA

### On Line Regulation

-10%, +6%; within Computer Business Equipment Manufacturers Association's Guidelines (+10%; -15% using extended range)

### On Battery Regulation

$< \pm 5\%$  RMS

### Voltage Wave Shape

Sine wave, 3% THD (T700 and T700h models: quasi-sine wave)

### No Load Sleep Mode (Battery Mode)

Outputs are turned off if  $< 5\%$  load is detected (selectable), except T700

### Interconnecting Cords (high voltage models)

Rack models: 6 ea. IEC-320 (10 A)  
Tower models: 2 ea. IEC-320 (10 A)

### Backup Time

15 minutes @ typical load

### Battery Charging

$< 3$  hrs. to 90% usable capacity

### Battery Type

Sealed, maintenance-free lead-acid; starved electrolyte

### Start-On-Battery

Startup with UPS batteries in absence of utility power

## Indicators and Controls

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### Serial Communication

Intelligent serial communication to provide alarms with history, measured parameters, self-test, and many other features

### REPO Port

Remote Emergency Power Off; allows for shutdown of UPS (rack models only)

## Environmental and Safety

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### Dimensions and Weight

See Model Selection Guide

### Operating Temp

0°C - 40°C (32°F - 104°F) UL tested at 25°C (77°F)

### Storage Temp

-20°C - 60°C (-4°F - 140°F)

### Relative Humidity

5 to 95% non-condensing

### Operating Altitude

Up to 3,000 meters above sea level

### EMC Markings

FCC; low voltage models also VCCI; high voltage models also CE

### Emissions

FCC Class B 700, 1000, 1500VA models;  
FCC Class A 2000, 2400, 3000VA models;  
high voltage models also CISPR Class A,  
EN50091-2, EN55022, and IEC6100-3-2

### Surge Suppression

Manufactured with surge suppressors that meet UL 1449

### Safety Certifications

UL 1778, CSA 22.2, No. 107.1; high voltage models also EN50091-1 and IEC60950

### Safety Markings

UL and CSA; 120 volt models also NOM\*; high voltage models also CE, VDE, S\*, FI\*, N\*, and D\* (except models T700 and T700h)

### Immunity

EN50091-2, IEC6100-4-2, 3, 4, 5 and ANSI C62.41 Cat B (formerly IEEE 587)

### REPO Port

Meets NEC code 645-11 intent and UL requirements

# Questions & Answers

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## Understanding Power Quality

### What is Power Quality?

Industry relies on power quality, yet lack of reliable power can lead to substantial problems. Power quality is, in essence, powering and grounding sensitive electronic equipment in the manner that is suitable for its operation. Power quality problems arise when there is a difference between the quality of power supplied and the quality of power required for reliable load equipment operation. The electronics age has unveiled two apparent truths about power:

- Utilities cannot provide the clean and consistent power that sensitive electronic equipment demands.
- Computer or communications customers are ultimately responsible for the safe operation of their equipment.

You may be surprised to learn that while the power supplied by local utility companies is sufficient to run components such as lights and television sets, it is not suitable for sensitive electronic equipment such as computers and servers.

### What is the Real Impact of Power Quality Problems?

The financial impact of power quality problems can be astronomical. It is estimated that “dirty power” and associated momentary disturbances in transmission can cost industry in lost production and equipment damage between \$3 billion and \$5 billion per year.<sup>1</sup> The real effects of system downtime, including lost data and business opportunities, can be immeasurable.

According to a survey by the Business Communications Co., downtime costs are estimated between \$1,000 per hour and more than \$78,000 per hour. Some studies raise this estimate to \$500,000 per hour.

On an even more serious note, research has shown that only 43% of businesses suffering a substantial power disaster ever recover sufficiently to resume business, according to the National Archives and Records Administration in Washington, DC.

Every data processing professional knows the risk of hardware damage resulting from a major disaster. But the truth is that everyday dirty power poses a far greater risk to processing systems because there’s no way to get rid of dirty power without power protection equipment. Power problems alone account for 45% of computer data loss, according to Contingency Research Inc. Equipment that utilizes adequate power protection will experience less downtime. Although this information emphasizes power quality in the United States, foreign power is generally more erratic and therefore more damaging than that in the U.S.

### What are the Causes of Power Problems?

Only 35% of power problems are generated outside the home or office by events such as lightning, utility grid switching, mis-wiring, etc. Almost all electrical surges or transient voltage activity are generated within the home or business.

Sags are the most common disturbance at a typical computer site (72.1%), followed by surges (15.8%) and spikes (8.1%). Four out of five computer crashes and communications problems are caused by deep sags and not power outages and blackouts.<sup>2</sup>

<sup>1</sup> Information Week, January 8, 1998.

<sup>2</sup> Business Communications Co., 1998.

# Questions & Answers

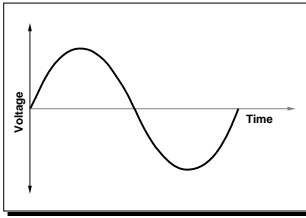
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## What Are the Causes and Effects of Power Problems?

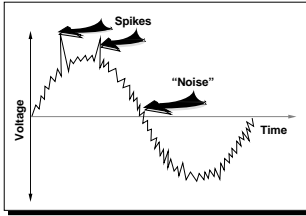
### Healthy Electricity

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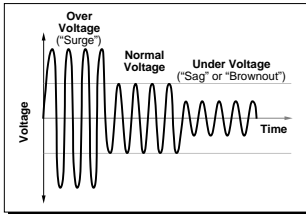
A typical sine wave form



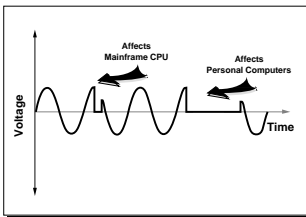
Healthy Electricity (sine wave)



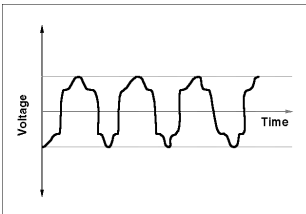
Noise, Transients, and Spikes



Fluctuation: Sags and Surges



Brownouts, Extended Sags



Harmonic Distortion

### Noise and Transients

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High frequency impulses on sine wave

- Cause — radio frequency on utility line
- Effects — damage to logic circuitry and data files

### Spikes

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Extremely high voltage strikes to utility line

- Cause — lightning, utility load switching
- Effects — actual hardware damage, file corruption

### Fluctuation: Sags and Surges (Spikes lasting longer than one cycle)

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Over and under voltage conditions

- Cause — sudden startups of large loads, large load switching
- Effects — slows disk drives intolerably, causing data errors; actual hardware damage

### Brownouts, Extended Sags

---

Periods of low voltage on utility lines

- Cause — voltage reduction by overburdened utilities, damage to electrical lines and other factors
- Effects — causes intolerable voltage levels for circuitry and drive performance, damaging hardware or causing data errors

### Harmonic Distortion

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Distortions in the current and voltage sine wave sent back by variable speed motor equipment

- Cause — computers, fax equipment, copiers
- Effects — actual hardware damage, interrupted communications

### Blackouts Total Power Failures

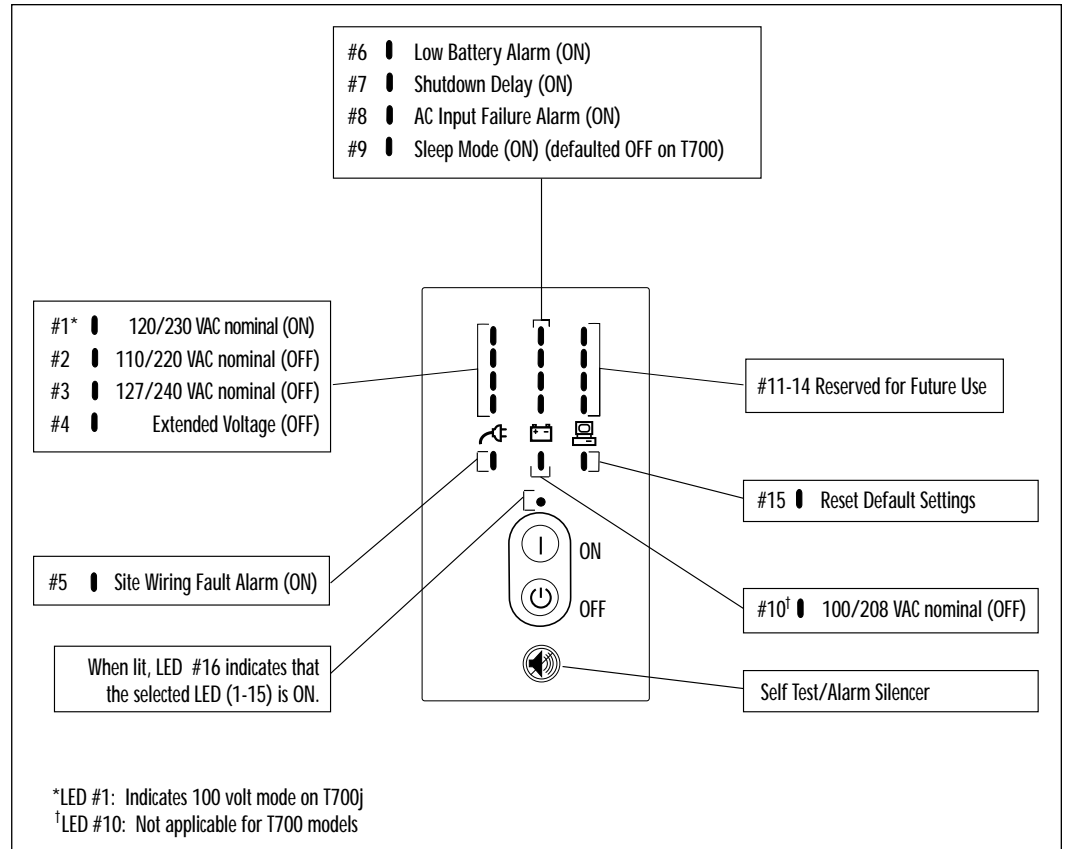
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- Cause — violent weather, overburdened power grids, car accidents that bring down power lines, earthquakes, etc.
- Effects — hardware damage and data loss

# Questions & Answers

## Understanding UPS Configuration

In the Configure Mode, the LEDs allow factory-set defaults to be changed. A user may wish to alter these functions if the AC input consistently fluctuates higher or lower than the factory-set nominal input voltage. Other changeable functions include LEDs for extended voltage, shutdown delay, sleep mode, low battery, and AC input failure. In the Configure Mode, each LED represents a changeable function, with the control buttons responsible for enabling or disabling them (see illustration below).



### Where can I find definitions of the setting and instructions on how to change the UPS configurations?

In the Compaq UPS user manual.

### How do I get into configure mode?

Press the ON and SelfTest/Alarm Silencer button at the same time to switch to configure mode. Once in configure mode, use the ON button to scroll through the LEDs (LED will flash).

Then, to turn on or off a particular LED, simply press the SelfTest/Alarm Silencer button (while in configure mode). The light over the ON button will be green if the LED is on and no light will appear if the LED is off.

### Can I configure voltage settings via the front panel?

Yes, the front panel is the only place you can configure voltages other than the default setting already programmed on the UPS. Refer to the above question on how to change these defaults.

# Questions & Answers

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## UPS Technology

### **What UPS technology is available with the Compaq UPS?**

The Compaq UPS utilizes a line-interactive plus topology which features sine wave output and superior input/output voltage regulation. This technology is inherently reliable and highly efficient. The Compaq UPS can correct input voltage variations as low as -35% of nominal voltage without transferring to the battery. This will ensure the battery is preserved and ready for the next power anomaly.

### **Does the UPS have a transformer?**

Yes. Its function is to provide buck and boost regulation as well as provide isolation between the battery and the output.

### **Can I change the line cord that is provided with the UPS?**

We strongly recommend, due to worldwide safety standards, that you do not remove or change the line cords provided with the UPS.

### **Can I change the plug provided with the UPS?**

Yes, as long as the new plug is rated the same voltage and amperage as the provided plug.

### **What does the ground fault indicator (LED # 5, front panel) tell me?**

This would indicate a possible wiring error in the outlet to the UPS, which should be checked by an electrician. In high voltage applications (240 V), however, this alarm is always on, even in a correctly wired installation. If this is the case, it should be disabled.

### **When should I disable the SLEEP feature (LED # 9, front panel) ?**

In lightly loaded applications that you wish to keep running (less than 5% load) the sleep feature should be disabled.

# Troubleshooting

The Troubleshooting Guide tells you how to solve problems you may encounter with your Compaq UPS.

Symptom	Possible Cause	What To Do
UPS will not start	Line cord is not connected	Connect line cord
	Circuit breaker on rear panel is open	Push circuit breaker button
	Wall socket is dead	Test wall socket
	Battery fuse or circuit open	Contact service center
LED 5 is RED (Site Wiring Fault)	Ground wire or connection does not exist in wall outlet	Have a qualified electrician establish grounding connection
	Line & neutral wires are reversed in wall outlet	Have a qualified electrician correct the wiring
Flashing Battery Service LED (LED 10) and alarm won't clear	DC overvoltage condition	Call Customer Service
LED 10 is RED (Battery Service)	Potential battery failure	Let UPS go through a full charge cycle by keeping it plugged in for 24 hrs; push Test/Alarm Reset button
	New battery improperly connected	Check connections or call Customer Service
UPS switches frequently between battery and AC input	Input voltage in your area differs from the UPS nominal	Change UPS nominal input to match local nominal
LED 10 (Battery Service) is red during initial start up	UPS out of service for a long period	Keep UPS connected to line for at least 24 hrs. and then conduct self test
LED 11 is SOLID RED	Overload condition because load is drawing too much power	Determine if load(s) is defective or if too many loads are connected to UPS; if so, disconnect a load
LED 1 is SOLID RED*	Line is high; UPS in battery operation	Correct input voltage problem if possible or be prepared to lose battery power to your load(s) in approx. 3 to 5 minutes (depending on configuration) after Impending Low Battery LED turns on
LED 4 is SOLID RED	Line is low (power failure); UPS in battery operation	Correct AC input problem if possible or be prepared to lose battery power to your load(s) in approx. 3 to 5 minutes (depending on configuration) after Impending Low Battery LED turns on
LED 4 is FLASHING RED	Line has returned but reset was not pushed	Push Test/Alarm Reset

\*If the UPS continuously displays a solid red LED 1 or 4 above the AC Input symbol, input voltage range can be extended.

# Compaq Power Management Products Glossary

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## **Agent**

A power management software program that acts as a focal point for data collection and configuration of a specific network entity (hardware or software). Agents send data to the power management software console. They are installed and run on each network system.

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## **Battery Management Log**

A record of battery history maintained by the Compaq Power Management Software.

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## **Circuit Breaker (CB)**

A device for manually opening (breaking) or closing a circuit to interrupt or apply electric power to an electrical apparatus. A circuit breaker can also open a circuit automatically when it senses an overload.

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## **Console**

The software program that displays information and controls the system by communicating with agents. The console is used to configure communications port setup, alert handling, shutdown timing, restart delays, and regularly scheduled shutdowns. The console runs on the management station for the network.

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## **Countdown Time**

The time in minutes after the end of wink time that the system waits before starting a shutdown sequence. This interval provides time to finish work and save files. Each minute, the user is informed of the time remaining until shutdown.

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## **LEDs**

Light Emitting Diodes located on the front of the UPS that inform users of various UPS operations.

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## **Line-interactive**

A UPS containing an off-line inverter that transfers on during a blackout, but providing faster transfer times than a standby UPS. Power conditioning and surge suppression are provided to protect the load.

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## **Load**

Equipment that receives power from a UPS.

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## **Load Segments**

Groups of receptacles on the rear panel of a UPS which can be independently controlled via power management software.

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## **Load Shedding**

The ability to divide the total load into segments and to start and stop each load segment individually.

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## **Shutdown Delay**

The time in seconds from when the software begins to shut down your system until the power from the UPS shuts off. This interval allows the system to log off servers and users, terminate any applications that may be running, and close all files in the file system. The default value is 90 seconds.

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## **Transformer**

A device that raises or lowers the voltage of an alternating current of an electrical source.

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## **UPS Group**

Multiple nodes supported by a single UPS. The UPS with the serial communications cable is the UPS Group Controller; all others are UPS Group Members. With regard to Compaq Power Management Software, this feature maximizes network control and saves money.

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## **Wink Time**

The interval between an alert situation and the transmission of an alert message from the system to the user. The interval can be extended to reduce nuisance messages or shortened to reduce reliance on the battery. The default is 5 seconds.



## Notes

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# Notice

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